TOWN OF LITTLE ELM
PLANNING & ZONING COMMISSION

December 21, 2023

Persons may address the Planning and Zoning Commission on any issue. This is the appropriate time for citizens to address the Commission on any concern whether on this agenda or not. Each member of the public who desires to address the P&Z Commission regarding an item on an agenda for an open meeting of the P&Z Commission shall have the right to address the Commission on the item before the Commission's consideration of the item. All speakers not requiring a translator are given 3 minutes to speak and may address the Commission only once on each agenda item. Non-English Speakers who require a translator are given 6 minutes to speak and may address the Commission only once on each agenda item. In accordance with the State of Texas Open Meeting Act, the board may not comment or deliberate such statements during this period, except as authorized by Section 551.042, Texas Government Code. To address the Commission for any public hearing item please sign a speaker's sheet located on the tables by the front entry and submit to a Staff member.

1. ## 5:50 PM Work Session

2. ## 6:00 PM Regular Meeting

3. ## Roll Call

4. ## Consent Agenda

1. Discuss and take action regarding the approval of the December 7, 2023, Regular Planning and Zoning Commission Meeting Minutes.

2. **Providence Commons Ph 3 (FP-23-004658)**. Presentation, discussion, and consideration on a request for approval of a Final Plat consisting of 9.813, situated in A0662A M.Jones, TR 37A within Little Elm's Town Limits, in order to establish one lot, along with easements necessary for development.
   - Presentation
   - Discussion
   - Consideration

3. **Little Elm Court Addition (FP-23-004646).** Presentation, discussion, and consideration on a request for approval of a Final Plat consisting of 7.224, generally located south of the intersection of Woodlake Pkwy and Farm to Market Road, within Little Elm's Town Limits, in order to establish one lot, along with easements necessary for development.
   - Presentation
   - Discussion
   - Consideration

5. ## Regular Agenda

1. **PUBLIC HEARING/ Ordinance Text Amendment.** Public hearing, discussion, and take action on a recommendation regarding proposed text amendments to Chapter 106, Zoning Ordinance, by amending said chapters and associated appendices in order to establish compliance with new State Statues as a result of the recent legislative session and enable minor corrections or clarification throughout the text.
    - Staff Report
    - Open Public Hearing
    - Receive Public Comment
    - Close Public Hearing
    - Discussion and Recommendation

2. **PUBLIC HEARING/ Ordinance Text Amendment.** A recommendation regarding proposed text amendments to Chapter 107, Subdivision Ordinance, by amending said chapters and associated appendices in order to establish compliance with new State Statutes as a result of the recent legislative sessions and enable minor corrections or clarification throughout the text.
    - Staff Report
    - Open Public Hearing
    - Receive Public Comment
    - Close Public Hearing
    - Discussion and Recommendation

6. ## Discussion of future agenda items, update on Council action, and requests for new business considerations

7. ## Adjourn

Certificate

I certify that the above notice of the Planning & Zoning Commission meeting was posted on the bulletin board of the Town of Little Elm, Texas on December 18, 2023, prior to 5:00 p.m. The Little Elm Town Hall is wheelchair accessible and accessible parking spaces are available. Requests for accommodations or interpretive service must be made 48 hours prior to this meeting. Please contact the Town Secretary's office at 214-975-0404 or 972-377-5540 (fax) for arrangements.

_____

Olga Chernomorets - Managing Director of Planning Services

TOWN OF LITTLE ELM
PLANNING & ZONING COMMISSION

12/21/2023

OVERVIEW

Project	Adoption of the December 7, 2023 Planning & Zoning Commission Meeting Minutes
P&Z Hearing	12/21/2023
Council Hearing	N/A
Size	N/A
Current Zoning	N/A
Proposed Use	N/A
Existing Use	N/A
Future Land Use Plan Designation	N/A
Applicant	N/A
Owner	N/A
Strategic Goal	

Agenda Item

Discuss and take action regarding the approval of the December 7, 2023, Regular Planning and Zoning Commission Meeting Minutes.

Location

N/A

Planning Analysis

N/A

Recommended Action

N/A

Attachments

December 7, 2023 Minutes

D R A F T

Minutes
Town of Little Elm
PLANNING & ZONING COMMISSION
Regular Meeting
Thursday, DECEMBER 7, 2023 - 6:00 pm

Present:	Tom Ocelli, Commissioner; Brent Thibeaux, Commissioner; Michael Bell, Commissioner; Ron Trees, Chairman; Robert Martin, Vice Chairman; Deb Cadet , Alternate Commissioner
Absent:	Jack Skinner, Commissioner; Stephen Horn, Commissioner; Chip Norman, Alternate Commissioner
Staff Present:	Olga Chernomorets, Managing Director of Planning Services Brian Salvesen, Senior Planner Citlali Castro, Planner

1. ## 5:30 PM Work Session

2. ## 6:00 PM Regular Meeting

3. ## Roll Call

4. ## Consent Agenda

Motion: Approve consent agenda as presented.

Motion by Commissioner Michael Bell, seconded by Commissioner Brent Thibeaux

AYE: Commissioner Tom Ocelli, Commissioner Brent Thibeaux, Commissioner Michael Bell, Chairman Ron Trees, Vice Chairman Robert Martin, Alternate Commissioner Deb Cadet

6 - 0 Passed - Unanimously

1. Discuss and take action regarding the approval of the November 2, 2023, Regular Planning and Zoning Commission Meeting Minutes.

Agenda item approved in consent agenda motion.

2. **Providence Commons Ph 3 (FP-23-004658).** Presentation, discussion, and consideration on a request for approval of a Final Plat consisting of 9.813, situated in A0662A M.Jones, TR 37A within Little Elm's Town Limits, in order to establish one lot, along with easements necessary for development.
    - Presentation
    - Discussion
    - Consideration

Extension request approved in consent agenda motion.

3. **Little Elm Court Addition (FP-23-004646).** Presentation, discussion, and consideration on a request for approval of a Final Plat consisting of 7.224, generally located south of the intersection of Woodlake Pkwy and Farm to Market Road, within Little Elm's Town Limits, in order to establish one lot, along with easements necessary for development.
    - Presentation
    - Discussion
    - Consideration

Extension request approved in consent agenda motion.

5. Regular Agenda

1. **PUBLIC HEARING/Frisco Park Annex Planned Development (PD-23-004986)**. Public hearing, discussion, and take action on a recommendation regarding a request to rezone approximately 4.9 acres of land, currently zoned Lakefront District, generally located north of the intersection of Main Street and East Park Drive, within Little Elm's town limits, in order to establish a new Planned Development district, based on Lakefront District standards, creating a regulating plan providing a conceptual framework for redevelopment of this area.
    - Staff Report
    - Open Public Hearing
    - Receive Public Hearing
    - Close Public Hearing
    - Discussion and Recommendation

Staff presented agenda item.

Chairman Trees asked if the Town would try to find a builder to develop the site and for clarification on what the process would look like.

- The intent is to establish a plan of action so that when the developer is ready they can come forward and to encourage them to meet the vision and purchase additional land. It does not need to be only one developer to develop the entire site.

Commissioner Bell asked if residents live there today and if it impacts their ability to sell, rent, purchase, or add on to their homes? He also wanted to know if the residents were involved in the design of the vision at any point up to the night of the public hearing? He also wanted to know if the residents were notified about this agenda item?

- This will not impact the ability to sell, rent, purchase or add on to their homes. Staff took the Lakefront's text and vision and tried to implement it. The residents were notified of the public hearing 10 days prior.

Vice-Chair Martin asked how many of the lots are occupied and how many were rented.

- Staff did not have an exact number but did state that they vary, but some are short-term rentals.

Commissioner Cadet wanted to know if the existing homes were townhomes?

- The existing homes were the typical single-family homes along with some manufactured housing. Some of the lots are vacant.

Chairman Trees opened the public hearing at 6:17pm. There were two speakers present:

- Jeffery Peters, 401 E Park Drive
- Ryan O'Neil, 316 E Park Drive

Jefferey Peters owns and rents his property as an Airbnb. He stated that the proposed vision would take up to 40% of his yard. He inquired about the maintenance and payment of the roads. He wanted to know if anyone had requested the rezoning or if it was coming from Staff.

Commissioner Bell asked for clarification regarding future plans for 401 E Park Drive.

- Jefferey Peters has designed a lighthouse that will be used as a rental unit for Airbnb. He negotiated a contract with a developer to buy his property.

Ryan O'Neil was in attendance to express his vision for the neighborhood. He mentioned how the area is unique and expressed that he did not want to see more people on the nearby trail. He would like to work with staff and the community to create a vision.

Chairman Trees closed the public hearing at 6:27pm.

Staff clarified that townhomes are allowed by right. Staff's goal was not to move people out but to ensure that, when lots are being bought by developers, they would be able to follow a cohesive vision.

- Town Staff also clarified that the intent for the infrastructure improvements will be taken care of by the developer.

Commissioner Bell inquired about the proposed lighthouse project.

- Staff clarified that without looking at the proposed plans, it is hard to tell whether it will be allowed.

Commissioner Bell stated that he understands the intent of the project but was concerned that the public was not involved in the process. He believed that there needs to be some education regarding the concept plan and what it means for the residents and their home.

Chairman Trees would be more comfortable if Staff engaged the community and worked together.

Commissioner Thibeaux applauded Staff for moving forward with the vision of the District. He believed that it is good to move forward with the zoning area, but there are other concepts that can be implemented.

Vice-Chair Martin believes that there is a meeting point for Staff and the residents regarding the vision of the area.

Commissioner Ocelli agreed that it is best to table the item until there is further communication regarding the project.

Motion: Table agenda item until the January 18, 2024, Regular Planning and Zoning Meeting.

Motion by Commissioner Tom Ocelli, seconded by Commissioner Brent Thibeaux

AYE: Commissioner Tom Ocelli, Commissioner Brent Thibeaux, Commissioner Michael Bell, Chairman Ron Trees, Vice Chairman Robert Martin, Alternate Commissioner Deb Cadet

6 - 0 Passed - Unanimously

2. **PUBLIC HEARING/ The Dog Stop Planned Development (PD-23-03342)**. Public hearing, discussion, and take action on a request to rezone approximately 2.476 acres of land, currently zoned as Light Commercial, generally located south of the intersection of Lake Trail Drive and East Eldorado Parkway, within Little Elm's town Limit's, in order to establish a new Planned Development District based on Light Commercial Standards, with modified development standards for a commercial dog grooming and boarding service with outdoor play areas, and publicly accessible dog park.
   - Staff Report
   - Open Public Hearing
   - Receive Public Comment
   - Close Public Hearing
   - Discussion and Recommendation

Staff presented agenda item.

Commissioner Martin had a question regarding parking for the dog park visitors as part of the proposed project.

- The store component of the project would be at a 1:200 ratio for parking and the kennel part was 1:1000 ratio. The workers and retail visitors are accommodated for parking and there is sufficient parking for the dog park visitors.

Commissioner Bell had a couple questions regarding the hours of operation, access to the pump station, dumpster location and odor.

- Staff clarified that hours of operations would have to be agreed on in the development agreement. Access will be determined during the civil phase, which includes curb cuts. The staff talked to the applicant about the odor that could become a problem with the dumpster. The applicant will work with CWD to get on a schedule that works best to reduce any potential nuisances at the proposed location.

Commissioner Cadet inquired about other buildings in the town that have excessive signage like what is being proposed.

- Staff cannot recall other businesses that are allowed more signage than what the town's code of ordinance allows.

Commissioner Bell asked if they were to change businesses, they would not have the same amount of signage allowance.

- Staff ensured the Commission that what is being proposed is only for the Dog Stop.

The applicant, Dennis Hill and the General Contractor, Jared Sulak were present to answer questions and expand on their proposal and their vision.

The applicant elaborated on the concern about dog waste and odor. They stated that they utilize dog bags to pick up the waste, and then they throw it in another bag that is sealed up that will then be thrown out to the dumpster.

The applicant also clarified that they would like to use the black chain link fence because dogs try to jump over it and, since it is in the floodplain, water needs to be able to flow through the fence. The white vinyl fencing is also better for dog safety since they will not be able to see through it or jump over it, and it will hold up better if dogs scratch at it.

Commissioner Bell stated that while he is in support of the project, he would like to see the

dumpster placed somewhere else due to the proximity to the church that is next door. He also believes that the applicant needs to establish what they will do with the transparent wall.

Commissioner Ocelli inquired about who will be able to access the splash pad, and why they are not doing the white vinyl fencing around the splash pad.

- Only customers are allowed on the splash pad. Regarding the white vinyl fencing, the applicant wants to do something new, they would like to pursue an innovative and stylish component for the splash pad.

Commissioner Cadet asked if they would be recycling.

- The site design only allows for a single dumpster. Staff feels comfortable with the sigle dumbperst due to a small retail portion of the business. They will not have as many boxes that need to be recycled.

Commissioner Ocelli stated that the signage looked reasonable to him.

Commissioner Thibeaux acknowledged that the signage is part of their brand and design.

Commissioner Thibeaux asked if it was possible to have a smaller recycling bin somewhere, since they would still need one.

- Staff will look into this possibility.

Commissioner Ocelli suggested taking away some parking spots near the pump station to allow the dumpster to be moved.

- If the engineering team can make it work, it could be a possibility.

Commissioner Cadet asked if there is anything that could help the smell of the dumpster.

- The applicant will double bag their waste along with code enforcement, making sure that they are keeping everything clean.

Motion: Approve with the conditions that:

- Standard details of the fencing types will be provided and approved by staff.
- Maintenance and signage for the park will be provided.
- The applicant and Staff explore the possibility of moving the dumpster to the corner near the pump station.

Motion by Vice Chairman Robert Martin, seconded by Commissioner Michael Bell

AYE: Commissioner Tom Ocelli, Commissioner Brent Thibeaux, Commissioner Michael Bell, Chairman Ron Trees, Vice Chairman Robert Martin, Alternate Commissioner Deb Cadet

6 - 0 Passed - Unanimously

3. **PUBLIC HEARING/Twin Lakes Planned Development (PD-22-06012)**. Public hearing, discussion and take action on a request to rezone approximately 4.4780 acres of land, currently zoned a Light Commercial, generally located on the southeast corner of South Elm Ridge Road and East University District, within Little Elm's Town Limits, in order to establish a new Planned Development District with a Light Commercial base, within modified development standards, for a veterinary clinic with outdoor kennel and retail buildings.
    - Staff Report
    - Open Public Hearing
    - Receive Public Hearing
    - Close Public Hearing
    - Discussion and Recommendation

Staff presented item.

Commissioner Ocelli asked if they needed a masonry fence on the south of the property. He then asked if there was anything that could help with the dog sound, since there won't be a masonry wall.

- Since it is backing an apartment complex, the Town does not require a masonry fence. The pool in the apartment is approximately 100 ft from the detention pond.

Chairman Trees opened the public hearing at 7:39pm. There was one speaker:

- Kamran Ghatrehee, 6911 Maple St. Frisco,Texas 75033

Kamran Ghatrehee wanted to know if the applicant will pave Elm Ridge Road.

- The property line is east of Elm Ridge Road. The applicant does not plan to redevelop South Elm Ridge Road. There will be a connection to South Elm Ridge Road. The existing road will remain how it is, there will just be a connection.

Chairman Trees closed the public hearing at 7:42pm.

Commissioner Martin asked the applicant about the plan regarding starting phase 2 after the completion of phase 1.

- The applicant clarified that they will need to get the veterinary clinic running before the start of phase 2.

Commissioner Bell asked if Elm Ridge Road is owned by the Town. He was also happy to see the applicant reinvesting in the Town.

- Elm Ridge Road is town owned.

Motion: Approve with the condition that the Site Plan to match the Landscape Plan, providing the appropriate setback and fence along the southern portion of the property.

Motion by Commissioner Brent Thibeaux, seconded by Vice Chairman Robert Martin

AYE: Commissioner Tom Ocelli, Commissioner Brent Thibeaux, Commissioner Michael Bell, Chairman Ron Trees, Vice Chairman Robert Martin, Alternate Commissioner Deb Cadet

6 - 0 Passed - Unanimously

4. **PUBLIC HEARING/ Ordinance Text Amendment.** Public hearing, discussion, and take action on a recommendation regarding proposed text amendments to Chapter 106, Zoning Ordinance, by amending said chapters and associated appendices in order to establish compliance with new State Statues as a result of the recent legislative session and enable minor corrections or clarification throughout the text.
    - Staff Report
    - Open Public Hearing
    - Receive Public Comment
    - Close Public Hearing
    - Discussion and Recommendation

Motion: Approval to extend the item to the December 21, 2023 Regular Planning and Zoning Meeting.

Motion by Vice Chairman Robert Martin, seconded by Commissioner Brent Thibeaux

AYE: Commissioner Tom Ocelli, Commissioner Brent Thibeaux, Commissioner Michael Bell, Chairman Ron Trees, Vice Chairman Robert Martin, Alternate Commissioner Deb Cadet

6 - 0 Passed - Unanimously

5. **PUBLIC HEARING/ Ordinance Text Amendment.** A recommendation regarding proposed text amendments to the Chapter 107, Subdivision Ordinance, by amending said chapters and associated appendices in order to establish compliance with new State Statutes as a result of the recent legislative sessions and enable minor corrections or clarification throughout the text.
   - Staff Report
   - Open Public Hearing
   - Receive Public Comment
   - Close Public Hearing
   - Discussion and Recommendation

Motion by Alternate Commissioner Deb Cadet, seconded by Commissioner Michael Bell Motion: Approval to extend the item to the December 21, 2023, Regular Planning and Zoning Meeting.

AYE: Commissioner Tom Ocelli, Commissioner Brent Thibeaux, Commissioner Michael Bell, Chairman Ron Trees, Vice Chairman Robert Martin, Alternate Commissioner Deb Cadet

6 - 0 Passed - Unanimously

6. Discussion of future agenda items, update on Council action, and requests for new business considerations

A potential workshop with Council regarding the retaining and masonry wall was brought up during the Oak Grove Planned Development process.

7. Adjourn

Chairman Trees adjourned at 7:50pm.

TOWN OF LITTLE ELM
PLANNING & ZONING COMMISSION

12/21/2023

OVERVIEW

Project	FINAL PLAT/ Providence Commons Ph 3 (FP-23-004658)
P&Z Hearing	12/21/2023
Council Hearing	N/A
Size	Approximately 9.813 acres
Current Zoning	Planned Development
Proposed Use	Residential
Existing Use	Vacant
Future Land Use Plan Designation	Low Density Residential
Applicant	Don Warnke, Cole & Associates
Owner	Barry Rich, R&M Materials
Strategic Goal	

Agenda Item

Providence Commons Ph 3 (FP-23-004658). Presentation, discussion, and consideration on a request for approval of a Final Plat consisting of 9.813, situated in A0662A M.Jones, TR 37A within Little Elm's Town Limits, in order to establish one lot, along with easements necessary for development.

- Presentation
- Discussion
- Consideration

Location

Located North of Obsidian Rd, within Little Elm's Town Limits.

Planning Analysis

The purpose of a final plat is to ensure that the proposed subdivision and development of the land is consistent with all standards of the Town's Subdivision Ordinance pertaining to the adequacy of public facilities, that public improvements to serve the subdivision or development have been installed and accepted by the Town or that provision for such installation has been made, that all other requirements and conditions have been satisfied or provided to allow the final plat to be recorded.

Recommended Action

Staff requests the commission approve the plat with the following conditions:

1. Show acreage value to 3 decimal places.
2. Fix bearing and length measurements.
3. Include zoning information (PD number and Densities).
4. Properly label "X" lots.
5. Update Town signature block.

Attachments

Location Map

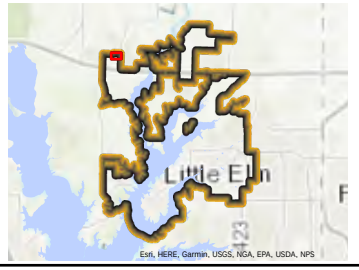
Providence Commons Plat

Providence commons Ph. 3 FP (FP-23-004658)
Aubrey, TX 76227

Town of Little Elm
Denton County, Tx

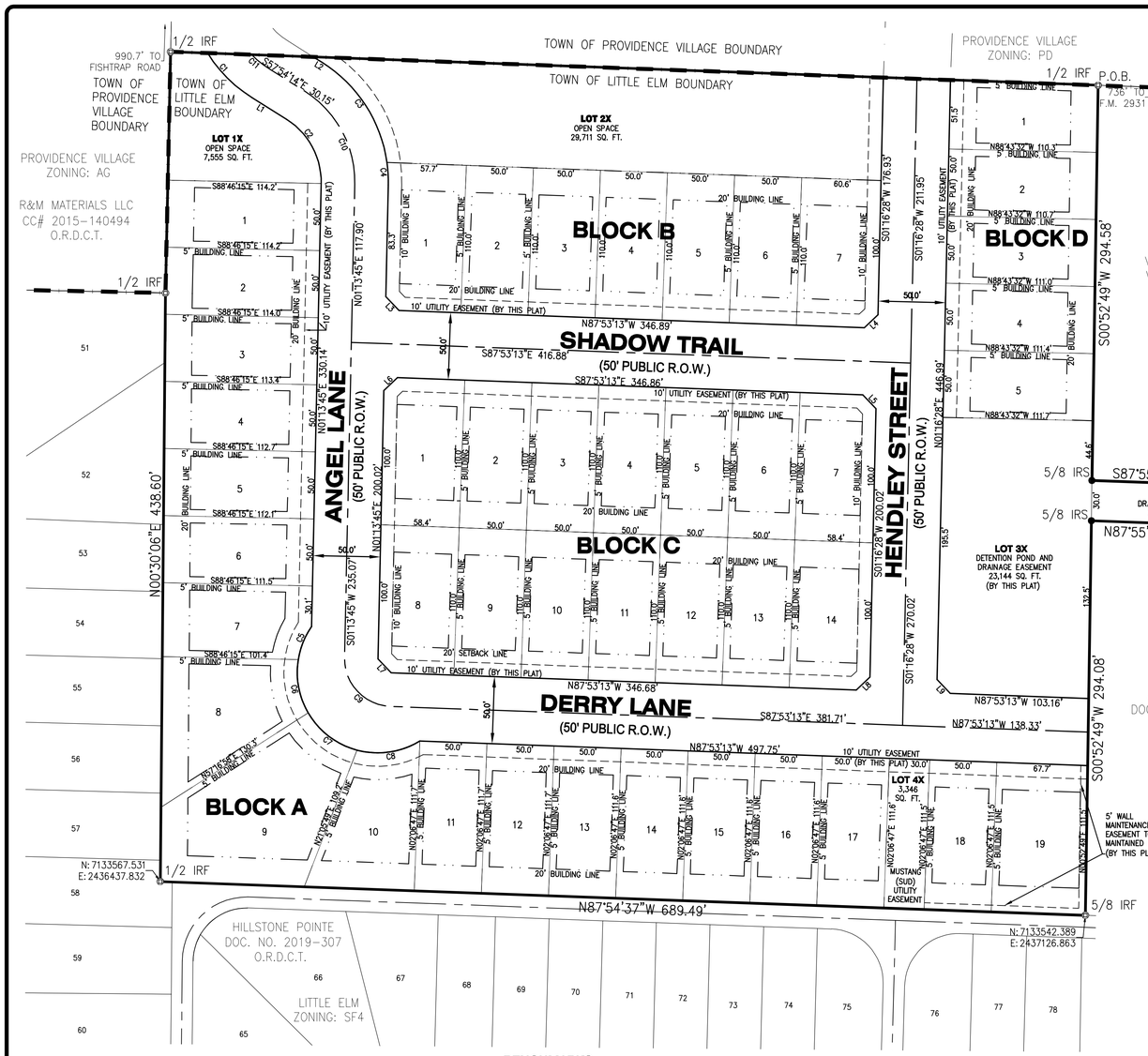
Date: 12/7/2023

0 90 180
US Feet



This product is to be used for graphical representation only. The accuracy is not to be taken/ used
as data produced for engineering purposes or by a Registered Professional Land Surveyor
for the State of Texas. For this level of detail, supervision and certification of the produced data by a Registered Professional Land Surveyor for the State of Texas would have to be performed.
Town of Little Elm and its members assume no responsibility for the accuracy of said data.

Project Location: G:\GIS\For Town Employees\ID\ArcServices\Jpeg\LocationMap1



BLOCK LOTS AREA TABLES

BLOCK A:

LOTS AREA TABLE		
Lot #	SQ. FT.	ACRES
1	5,698 SQ. FT.	0.131
2	5,672 SQ. FT.	0.130
3	5,645 SQ. FT.	0.130
4	5,618 SQ. FT.	0.129
5	5,592 SQ. FT.	0.128
6	5,565 SQ. FT.	0.128
7	5,947 SQ. FT.	0.137
8	8,006 SQ. FT.	0.184
9	12,231 SQ. FT.	0.281
10	6,682 SQ. FT.	0.153
11	5,584 SQ. FT.	0.128
12	5,583 SQ. FT.	0.128
13	5,582 SQ. FT.	0.128
14	5,581 SQ. FT.	0.128
15	5,580 SQ. FT.	0.128
16	5,579 SQ. FT.	0.128
17	5,578 SQ. FT.	0.128
18	5,577 SQ. FT.	0.128
19	7,688 SQ. FT.	0.176

BLOCK B:

LOTS AREA TABLE		
Lot #	SQ. FT.	ACRES
1	6,224 SQ. FT.	0.143
2	5,500 SQ. FT.	0.126
3	5,500 SQ. FT.	0.126
4	5,500 SQ. FT.	0.126
5	5,500 SQ. FT.	0.126
6	5,500 SQ. FT.	0.126
7	6,547 SQ. FT.	0.150

BLOCK C:

LOTS AREA TABLE		
Lot #	SQ. FT.	ACRES
1	6,465 SQ. FT.	0.148
2	5,500 SQ. FT.	0.126
3	5,500 SQ. FT.	0.126
4	5,500 SQ. FT.	0.126
5	5,500 SQ. FT.	0.126
6	5,500 SQ. FT.	0.126
7	6,283 SQ. FT.	0.144
8	6,279 SQ. FT.	0.144
9	5,500 SQ. FT.	0.126
10	5,500 SQ. FT.	0.126
11	5,500 SQ. FT.	0.126
12	5,500 SQ. FT.	0.126
13	5,500 SQ. FT.	0.126
14	6,461 SQ. FT.	0.148

BLOCK D:

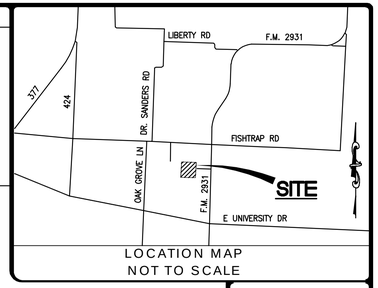
LOTS AREA TABLE		
Lot #	SQ. FT.	ACRES
1	5,592 SQ. FT.	0.128
2	5,526 SQ. FT.	0.127
3	5,543 SQ. FT.	0.127
4	5,560 SQ. FT.	0.128
5	5,577 SQ. FT.	0.128

X-LOTS:

LOTS AREA TABLE		
Lot #	SQ. FT.	ACRES
1	7,555 SQ. FT.	0.173
2	29,711 SQ. FT.	0.682
3	23,144 SQ. FT.	0.531
4	3,346 SQ. FT.	0.077

LEGEND

VOL.	VOLUME
PG.	PAGE
R.O.W.	RIGHT-OF-WAY
⊙	FOUND IRON ROD
●	IRON ROD SET
℄	CENTERLINE
C.M.	CONTROLLING MONUMENT
P.O.B.	POINT OF BEGINNING
INST. NO.	INSTRUMENT NUMBER
O.R.D.C.T.	OFFICIAL RECORDS DENTON COUNTY TEXAS



LOCATION MAP
NOT TO SCALE

50' 0' 50' 100'
SCALE: 1" = 50'

OWNER'S ACKNOWLEDGEMENT AND DEDICATION

STATE OF TEXAS §
COUNTY OF DENTON §

I (WE), THE UNDERSIGNED, OWNER(S) OF THE LAND SHOWN ON THIS PLAT WITHIN THE AREA DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

ALL THAT CERTAIN TRACT OF LAND SITUATED IN THE MARCELLA JONES SURVEY, ABSTRACT NUMBER 662, DENTON COUNTY, TEXAS, BEING PART OF THAT SAME CALLED 10.517 ACRES TRACT OF LAND DESCRIBED IN DEED TO R & M MATERIALS RECORDED IN COUNTY CLERK'S FILE NUMBER 2016-16715, OFFICIAL RECORDS, DENTON COUNTY, TEXAS (O.R.D.C.T.), AND BEING MORE PARTICULARLY DESCRIBED HEREIN AS FOLLOWS:

BEGINNING AT A 1/2 INCH IRON ROD FOUND FOR THE NORTHEAST CORNER OF SAID 10.517 ACRES TRACT BEING IN THE SOUTH LINE OF A CALLED 29.989 ACRES TRACT OF LAND DESCRIBED IN DEED TO R & M MATERIALS, LLC RECORDED IN COUNTY CLERK'S FILE NUMBER 2010-103658, O.R.D.C.T. AND FROM WHICH POINT A 1/2 INCH IRON ROD FOUND IN THE WESTERLY RIGHT-OF-WAY (R.O.W.) OF F.M. ROAD 2931 BEARS SOUTH 87 DEGREES 54 MINUTES 14 SECONDS EAST, A DISTANCE OF 739.98 FEET;

THENCE SOUTH 00 DEGREES 52 MINUTES 49 SECONDS WEST, ALONG THE EASTERLY LINE OF SAID 10.517 ACRES TRACT, A DISTANCE OF 294.58 FEET TO A 5/8 INCH IRON ROD SET FOR THE EASTERLY CORNER OF SAID 10.517 ACRES TRACT AND BEING IN THE SOUTH LINE OF A TRACT OF LAND DESCRIBED IN DEED TO VALORIE L. FREEMAN IN VOLUME 4215, PAGE 1058 O.R.D.C.T.;

THENCE SOUTH 87 DEGREES 55 MINUTES 23 SECONDS EAST, ALONG THE SOUTH LINE OF SAID FREEMAN TRACT, A DISTANCE OF 739.87 FEET TO A 5/8 INCH IRON ROD SET FOR THE EASTERNMOST CORNER OF SAID 10.517 ACRES TRACT AND BEING IN THE WESTERLY RIGHT-OF-WAY (R.O.W.) OF F.M. ROAD 2931;

THENCE SOUTH 00 DEGREES 52 MINUTES 04 SECONDS WEST, ALONG THE WESTERLY RIGHT-OF-WAY (R.O.W.) OF F.M. ROAD 2931, A DISTANCE OF 30.00 FEET TO A 5/8 INCH IRON ROD SET FOR THE EASTERNMOST CORNER OF SAID 10.517 ACRES TRACT AND BEING IN THE WESTERLY RIGHT-OF-WAY (R.O.W.) OF F.M. ROAD 2931;

THENCE NORTH 87 DEGREES 55 MINUTES 23 SECONDS WEST, ALONG THE NORTH LINE OF A TRACT OF LAND DESCRIBED IN DEED TO JACK J. GOODE & FAYE M. GOODE IN DOCUMENT NUMBER 1993-32587, O.R.D.C.T., A DISTANCE OF 739.87 FEET TO A 5/8 IRON ROD SET FOR THE EASTERLY CORNER OF SAID 10.517 ACRES TRACT;

THENCE SOUTH 00 DEGREES 52 MINUTES 49 SECONDS, ALONG THE EASTERLY LINE OF SAID 10.517 ACRES TRACT, A DISTANCE OF 294.08 FEET TO A 5/8 INCH IRON ROD SET IN THE NORTH LINE OF BLOCK A HILLSTONE POINT PHASES 1A, 2 & 3 ADDITION RECORDED IN DOCUMENT NO. 2019-307, O.R.D.C.T.;

THENCE NORTH 87 DEGREES 54 MINUTES 37 SECONDS WEST, ALONG THE SOUTH LINE OF SAID 10.517 ACRES TRACT AND NORTH LINE OF SAID BLOCK A, A DISTANCE OF 689.49 FEET TO A 1/2 INCH IRON ROD FOUND FOR THE SOUTHWEST CORNER OF SAID 10.517 ACRES TRACT AND ELL CORNER OF SAID BLOCK A HILLSTONE POINT PHASES 1A, 2 & 3 ADDITION;

THENCE NORTH 00 DEGREES 30 MINUTES 06 SECONDS EAST, ALONG THE WEST LINE OF SAID 10.517 ACRES TRACT AND EAST LINE OF SAID BLOCK A, A DISTANCE OF 438.60 FEET TO A 1/2 INCH IRON ROD FOUND FOR CORNER IN THE WEST LINE OF SAID 10.517 ACRES TRACT AND BEING THE SOUTHEAST CORNER OF A CALLED 6.059 ACRES TRACT DESCRIBED IN DEED TO R & M MATERIALS, LLC RECORDED IN DOCUMENT NO. 2015-140494, O.R.D.C.T.;

THENCE NORTH 01 DEGREE 13 MINUTES 00 SECONDS EAST, CONTINUING ALONG THE WEST LINE OF SAID 10.517 ACRES TRACT AND EAST LINE OF SAID 6.059 ACRES TRACT, A DISTANCE OF 179.86 FEET TO A 1/2 INCH IRON ROD FOUND FOR THE NORTHWEST CORNER OF SAID 10.517 ACRES TRACT AND SOUTHWEST CORNER OF SAID 29.989 ACRES TRACT;

THENCE SOUTH 87 DEGREES 55 MINUTES 54 SECONDS EAST, DEPARTING THE EAST LINE OF SAID 6.059 ACRES TRACT AND ALONG THE NORTH LINE OF SAID 10.517 ACRES TRACT AND SOUTH LINE OF SAID 29.989 ACRES TRACT, A DISTANCE OF 691.33 FEET TO THE POINT OF BEGINNING AND CONTAINING, WITHIN THE METES AND BOUNDS HEREIN RECITED 10.32 ACRES (449,638 SQ. FT.) OF LAND, MORE OR LESS.

AND DESIGNATED HEREIN AS THE PROVIDENCE COMMONS SUBDIVISION TO THE TOWN OF LITTLE ELM, TEXAS, AND WHOSE NAME IS SUBSCRIBED HERETO, HEREBY DEDICATE TO THE PUBLIC USE FOREVER BY FEE SIMPLE TITLE, FREE AND CLEAR OF ALL LIENS AND ENCUMBRANCES, ALL STREETS, THOROUGHFARES, ALLEYS, PARKS, AND TRAILS, AND TO THE PUBLIC USE FOREVER EASEMENTS FOR SIDEWALKS,STORM DRAINAGE FACILITIES, FLOODWAYS, WATERMAINS, WASTEWATER MAINS AND OTHER UTILITIES, AND ANY OTHER PROPERTY NECESSARY TO SERVE THE PLAT AND TO IMPLEMENT THE REQUIREMENTS OF THE PLATTING ORDINANCES, RULES, AND REGULATIONS THEREON SHOWN FOR THE PURPOSE AND CONSIDERATION THEREIN EXPRESSED.

OWNER: _____

DATE: _____

STATE OF TEXAS §
COUNTY OF DENTON §

BEFORE ME, THE UNDERSIGNED AUTHORITY IN AND FOR _____ COUNTY, TEXAS, ON THIS DAY PERSONALLY APPEARED _____ KNOWN TO ME TO BE THE PERSON AND OFFICER WHOSE NAME IS SUBSCRIBED TO THE FOREGOING INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE IS _____, AND THAT HE/SHE IS AUTHORIZED TO EXECUTE THE FOREGOING INSTRUMENT FOR THE PURPOSES AND CONSIDERATION THEREIN EXPRESSED, AND IN THE CAPACITY THEREIN STATED.

GIVEN UNDER HAND AND SEAL OF OFFICE THIS_____ DAY OF _____, 20_____.

_____
NOTARY PUBLIC IN AND FOR THE STATE OF TEXAS

_____
(PRINT NOTARY'S NAME)

MY COMMISSION EXPIRES: _____

FOR REFERENCE

RIGHT-OF-WAY LINE AND CURVE TABLES

Parcel Line Table		
Line #	Direction	Length
L1	N57° 54' 14"W	30.15
L2	S57° 54' 14"E	7.96
L3	N43° 19' 44"W	14.25
L4	S46° 41' 38"W	14.04
L5	S43° 18' 22"E	14.25
L6	S46° 40' 16"W	14.03
L7	N43° 19' 44"W	14.25
L8	S46° 41' 38"W	14.04
L9	S43° 18' 22"E	14.25

Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C1	47.76	105.00	26.06	N44° 52' 19"W	47.35
C2	56.76	55.00	59.13	N28° 20' 14"W	54.28
C3	91.54	105.00	49.95	S32° 55' 42"E	88.67
C4	16.83	105.00	9.18	N3° 21' 43"W	16.81
C5	26.80	60.00	25.60	S21° 59' 20"W	26.58
C6	41.17	60.00	39.31	S10° 27' 55"E	40.37
C7	46.98	60.00	44.87	S52° 33' 17"E	45.79
C8	48.66	60.00	46.46	N81° 46' 49"E	47.33
C9	55.22	35.50	89.12	S43° 19' 44"E	49.82
C10	82.57	80.00	59.13	S28° 20' 14"E	78.95
C11	18.17	80.00	13.01	S51° 23' 52"E	18.13

GENERAL NOTES:

1. BASIS OF BEARING: TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE 4202.
2. TOTAL AREA OF BOUNDARY = 427,442 SQUARE FEET OR 9.813 ACRES
3. THE SUBJECT PROPERTY DOES NOT LIE WITHIN A 100 YEAR FLOOD PLAIN ACCORDING TO COMMUNITY PANEL NO. 48121C0405G, DATED APRIL 18, 2011, OF THE NATIONAL FLOOD INSURANCE RATE MAPS FOR DENTON COUNTY, TEXAS.
4. MINIMUM FINISHED FLOOR ELEVATIONS ARE AT LEAST 2 FEET ABOVE THE 100 YEAR FLOOD PLAIN.
5. THIS PROPERTY MAY BE SUBJECT TO CHARGES RELATED TO IMPACT FEES AND THE APPLICANT SHOULD CONTACT THE TOWN REGARDING ANY APPLICABLE FEES DUE.
6. ALL LOTS COMPLY WITH THE MINIMUM SIZE REQUIREMENTS OF THE ZONING DISTRICT.
7. ALL COMMON AREAS WILL BE OWNED AND MAINTAINED BY THE HOA.
8. THIS PLAT DOES NOT ALTER OR REMOVE EXISTING DEED RESTRICTIONS, IF ANY, ON THIS PROPERTY.
9. NOTICE – SELLING A PORTION OF THIS ADDITION BY METES AND BOUNDS IS A VIOLATION OF TOWN ORDINANCE AND STATE LAW AND IS SUBJECT TO FINES AND WITHHOLDING OF UTILITIES AND BUILDING PERMITS.
10. WATER SERVICE TO BE PROVIDED BY MUSTANG SPECIAL UTILITY DISTRICT.
11. SANITARY SEWER TO BE HANDLED BY FACILITIES APPROVED BY MUSTANG SPECIAL UTILITY DISTRICT.
12. TOTAL RIGHT-OF-WAY DEDICATED BY THIS PLAT = 2.20 ACRES
13. ALL BUILDING LINES SHOWN HEREON ARE DEDICATED BY THIS PLAT.
14. ALL LOT MONUMENTS SET HEREON SHALL BE 5/8 INCH IRON RODS WITH CAP STAMPED "COLE DESIGN GROUP #10193871".
15. THE INTENT OF THIS PLAT IS TO SUBDIVIDE PARENT TRACT INTO PLATTED LOTS

BENCHMARKS:

TOWN OF LITTLE ELM GEODETIC CONTROL MONUMENT #6 – THIS STATION IS A "B"-ORDER VERTICAL STABILITY BERNTSEN TOP-SECURITY SLEEVE-ROD SURVEY MONUMENT WITH ACCESS COVER SET FLUSH TO GRADE, AND A 3/4 INCH THREADED ALUMINUM ROD, CAPPED WITH A CENTER PUNCHED 3.25 INCH DIAMETER ALUMINUM DISC STAMPED "TOWN OF LITTLE ELM, DENTON COUNTY, TEXAS, INCORPORATED JULY 11, 1966, GEODETIC SURVEY MONUMENT NO 6."
THE GPS STATION IS LOCATED IN THE GRASS AREA AT THE NORTHWEST CORNER OF THE INTERSECTION OF U.S. HIGHWAY 380 AND ELM STREET (PRIVATE DRIVE). THE STATION IS BETWEEN THE BACK OF CURB OF THE EAST END OF THE PARKING LOT OF FIRST TEXOMA NATIONIAL BANK AND THE WEST EDGE OF ASPHALT OF ELM STREET. IT IS 36.9 FEET NORTHEAST OF THE NORTHEAST CORNER OF AN ELECTRONIC SIGN WITH A BRICK FACADE FOR THE BANK AND 29.4 FEET SOUTHWEST OF A STREET SIGN AND 24.0 FEET WEST OF THE EDGE OF PAVEMENT OF ELM STREET.

ELEV. = 577.10' (PUBLISHED)

NGS MONUMENT DN1314 – DESCRIBED BY COAST AND GEODETIC SURVEY 1935 (CAS) THIS STATION IS ABOUT 2-1/2 MILES S OF AUBREY. 9 MILES NE OF DENTON, ON LAND OWNED BY ANDY CAIN. THE MARK IS ON A SMALL HUMMOCK ABOUT 10 FEET W OF THE CENTER OF A SMALL TRIANGULAR FENCED-IN LOT, WHICH IS JUST S OF A GARDEN LOT AND 100 YARDS S OF THE SMALL LOG BARN ON MR. CAINS FARM. 46 FEET NW OF AN OPEN WELL. 64 FEET W OF THE CENTER LINE OF A N-S ROAD AND PROJECTS 2 INCHES.

ELEV. = 673.00' (PUBLISHED)

CP111 – LOCATED IN THE SOUTHWESTERN PORTION OF THE RIGHT-OF-WAY INTERSECTION FOR F.M. 2931 AND FISHTRAP ROAD, FOUND APPROXIMATELY 7.76 FEET WEST FROM A STOP SIGN ALONG THE RIGHT-OF-WAY INTERSECTION.

NORTHINGS = 7135111.24670'
EASTINGS = 2437900.60790'
ELEVATION = 583.20'

CP113 – LOCATED ALONG THE RIGHT-OF-WAY OF F.M. 2931 AND FOUND APPROXIMATELY 37.10 FEET NORTHWEST FROM A CABLE MARKER THAT IS PLACED ALONG THE RIGHT-OF-WAY OF F.M. 2931.

NORTHINGS = 7134162.89580'
EASTINGS = 2437908.63500'
ELEVATION = 581.35'

UTILITY PROVIDER APPROVAL:

GAS COMPANY:

_____
ATMOS ENERGY DATE

ELECTRIC COMPANY:

_____
ONCOR ELECTRIC DATE

WATER SERVICE:

_____
MUSTANG SPECIAL UTILITY DISTRICT DATE

SEWER SERVICE:

_____
MUSTANG SPECIAL UTILITY DISTRICT DATE

CERTIFICATE OF FINAL PLAT APPROVAL

APPROVED

_____ _____
TOWN OFFICIAL DATE
TOWN OF LITTLE ELM, TEXAS

THE UNDERSIGNED, THE TOWN SECRETARY OF THE TOWN OF LITTLE ELM, TEXAS, HEREBY CERTIFIES THAT THE FOREGOING FINAL PLAT OF THE PROVIDENCE COMMONS SUBDIVISION OR ADDITION TO THE TOWN OF LITTLE ELM WAS SUBMITTED TO THE PLANNING AND ZONING COMMISSION ON THE _____ DAY OF _____, 20__, AND THE COMMISSION, BY FORMAL ACTION, THEN AND THERE ACCEPTED THE FINAL PLAT AND PUBLIC WORKS IMPROVEMENTS AND INFRASTRUCTURE, AND SAID COMMISSION FURTHER AUTHORIZES TOWN OFFICIALS TO NOTE THE ACCEPTANCE THEREOF BY SIGNING HIS/HER NAME AS HEREINABOVE SUBSCRIBED.

WITNESS BY HAND THIS _____ DAY OF _____, 20__.

_____
TOWN SECRETARY
TOWN OF LITTLE ELM, TEXAS

CERTIFICATE OF SURVEYOR

STATE OF TEXAS §
COUNTY OF DENTON §

I, DANIEL L. JACKSON, REGISTERED PROFESSIONAL LAND SURVEYOR NO. 5577, IN THE STATE OF TEXAS, HEREBY CERTIFY THAT THIS PLAT IS TRUE AND CORRECT AND WAS PREPARED FROM AN ACTUAL SURVEY OF THE PROPERTY MADE UNDER MY SUPERVISION ON THE GROUND.

REGISTERED PROFESSIONAL LAND SURVEYOR
STATE OF TEXAS NO. 5577

_____
DATE

STATE OF TEXAS §
COUNTY OF DENTON §

BEFORE ME, THE UNDERSIGNED AUTHORITY, ON THIS DAY PERSONALLY APPEARED, KNOWN TO ME TO BE THE PERSON WHOSE NAME IS SUBSCRIBED TO THE FOREGOING INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE EXECUTED THE SAME FOR THE PURPOSE AND CONSIDERATION THEREIN STATED.

GIVEN UNDER HAND AND SEAL OF OFFICE THIS_____ DAY OF _____, 20_____.

NOTARY PUBLIC_____

_____COUNTY, TEXAS

SURVEYOR:
DANIEL L. "LUKE" JACKSON
LJACKSON@COLETX.COM
COLE DESIGN GROUP, INC.
7501 LONESTAR DRIVE, SUITE 250B
PLANO, TX 75034
972-624-6000

OWNER:
R&M MATERIALS, LLC
SCOTT@NTNSMLLC.COR
5208 TENNYSON PKWY, STE 130
PLANO, TX 75024
214-239-4722

DEVELOPER/ OWNER:
R&M MATERIALS, LLC
5208 TENNYSON PKWY, STE 130
PLANO, TX 75024
PHONE 214-239-4722

+ DALLAS
7501 Lone Star Drive
Suite 250B
Plano, TX 75024
972.624.6000 tel
www.coletx.com

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/ GIS / ADA TRANSITION PLANNING
Texas Board of Professional Engineers and Land Surveyors
Registered Engineering Firm, F-10233 Land Survey Corporate Registration #10193871

DRAWN BY: MDH
CHECKED BY: DLJ
DRAWING SCALE: 1" = 50'
DATE: 11/28/2023
Job Number 16-0170
Sheet Number C1.1

FINAL PLAT
PROVIDENCE COMMONS
PHASE THREE
LOTS 1-19, BLOCK A
LOTS 1-7, BLOCK B
LOTS 1-14, BLOCK C
LOTS 1-5, BLOCK D
XLOT 1 & 4, BLOCK A; XLOT 2, BLOCK B; XLOT 3, BLOCK C
BEING 10.32 ACRES
SITUATED IN THE MARCELLA JONES SURVEY,
ABSTRACT NO. 662
TOWN OF LITTLE ELM
DENTON COUNTY, TEXAS

USER: William Bunt TAB: 24X36 FINAL PLAT
DATE: November 28, 2023 - 12:40:25 PM
DRAWING: S:\JOBS\Jobs2016\16-0170-SUA\CADD_V-Work\V_PHASE3_PLAT_16-0170.dwg

TOWN OF LITTLE ELM
PLANNING & ZONING COMMISSION

12/21/2023

OVERVIEW

Project	FINAL PLAT/ Little Elm Court Addition (FP-23-004646)
P&Z Hearing	12/21/2023
Council Hearing	N/A
Size	Approximately 7.224 Acres.
Current Zoning	Planned Development (Light Commercial Base)
Proposed Use	Light Commercial (LC)
Existing Use	Partially Developed
Future Land Use Plan Designation	Retail/Commercial
Applicant	Andrew Yeoh, Triangle Engineering
Owner	KM 423 Partners, LP
Strategic Goal	

Agenda Item

Little Elm Court Addition (FP-23-004646). Presentation, discussion, and consideration on a request for approval of a Final Plat consisting of 7.224, generally located south of the intersection of Woodlake Pkwy and Farm to Market Road, within Little Elm's Town Limits, in order to establish one lot, along with easements necessary for development.

- Presentation
- Discussion
- Consideration

Location

Generally located south of the intersection of Woodlake Pkwy and Farm to Market Road, within Little Elm's Town Limits,

Planning Analysis

The purpose of a final plat is to ensure that the proposed subdivision and development of the land is consistent with all standards of the Town's Subdivision Ordinance pertaining to the adequacy of public facilities, that public improvements to serve the subdivision or development have been installed and accepted by the Town or that provision for such installation has been made, that all other requirements and conditions have been satisfied or provided to allow the final plat to be recorded.

The applicant requests an extension to allow for more time to bring the plat into compliance with the Town's

Recommended Action

Staff recommends approval of the applicant's extension request to the January 4, 2024 Regular Planning and Zoning Commission Meeting.

Attachments

Location Map

Little Elm Court Addition (FP-23-004646)
Little Elm, TX 75068

Town of Little Elm
Denton County, Tx
Date: 12/7/2023

0 90 180
US Feet

This product is to be used for graphical representation only. The accuracy is not to be taken/ used
as data produced for engineering purposes or by a Registered Professional Land Surveyor
for the State of Texas. For this level of detail, supervision and certification of the produced data by a Registered Professional Land Surveyor for the State of Texas would have to be performed.
Town of Little Elm and its members assume no responsibility for the accuracy of said data.

Project Location: G:\GIS\For Town\Employee\GIS\eServices\Ideal\LocationMap\

TOWN OF LITTLE ELM
PLANNING & ZONING COMMISSION

12/21/2023

OVERVIEW

Project	PUBLIC HEARING/ Chapter 106 Ordinance Text Amendment
P&Z Hearing	12/21/2023
Council Hearing	January 16, 2023
Size	N/A
Current Zoning	N/A
Proposed Use	N/A
Existing Use	N/A
Future Land Use Plan Designation	N/A
Applicant	N/A
Owner	N/A
Strategic Goal	

Agenda Item

PUBLIC HEARING/ Ordinance Text Amendment. Public hearing, discussion, and take action on a recommendation regarding proposed text amendments to Chapter 106, Zoning Ordinance, by amending said chapters and associated appendices in order to establish compliance with new State Statues as a result of the recent legislative session and enable minor corrections or clarification throughout the text.

- Staff Report
- Open Public Hearing
- Receive Public Comment
- Close Public Hearing
- Discussion and Recommendation

Location

N/A

Planning Analysis

Background.

In 1972 the Town of Little Elm first adopted a Zoning Ordinance through Ordinance No. 42. The Zoning Ordinance has been replaced or amended several times since then either comprehensively or in part. The most recent comprehensive Zoning Ordinance amendment occurred in 2019 through Ordinance No. 1527. Since 2019, there have been several small amendments to the Zoning Ordinance, such as adding certain zoning definitions, amending district height requirements, and clarifying the intent and installation of public

art in the Lakefront District. However, since 2019, there has not been a chapter wide update of the Zoning Ordinance.

Proposal.
As a result of the 2023 legislative sessions, the legal counsel for the Town has proposed several text amendments to keep the Town compliant with new State Statutes. Over the recent years, Staff have also been keeping track of minor errors and potential changes necessary to clarify or resolve conflicting items through the code, as well as changing land use practices. Considering the state's required changes to the Zoning Ordinance, Staff believe this is an appropriate time to make the necessary minor revisions. Changes other than those recommended by counsel are largely clerical in nature seeking to clarify, standardize, or keep up with land use practices today.

Changes suggested by legal counsel have been noted in the red-lined version and the change log to easily differentiate what is a legal requirement versus other proposed changes.

The changes proposed by legal counsel are as follows:

- 106.02.02 “Board of Adjustment”
  - These changes reflect new legislation related to the compensation and amortization options for property owners and lessees for damages associated with termination of a nonconforming use.

- 106.02.11 “Map amendments to the zoning ordinance”
  - These changes include language specifically provided by new State Statute related to notices sent out when a zoning change would turn a conforming into a nonconforming use.

- 106.05.05 “Nonconforming uses and structures”
  - Changes the minimum timeframe for abandonment from 30 days to six months. Also adds notification and remedy requirements.

The changes proposed by Town Staff are as follows:

- 106.01.14 “Land use definitions”
  - Staff added a definition for “Banquet Hall” and also added it to the Schedule of Uses. Staff has received numerous requests for banquet halls but due to not being specifically defined as a use or in the use chart staff have been interpreting the ordinance to be an accessory use. Being limited to this interpretation has given staff limited ability to work with applicants wishing to open up a Banquet Hall and in some cases such as Knotting Hill, create a PD where the use is added in order to allow for the use. Staff believes this use definition allows for clear understanding of what a Banquet Hall is, how it is used, and what a banquet hall isn’t. This amendment gives the Town Staff and potential applicants a clearer understanding of what is allowed under this use, how to administer this use, and makes the process of allowing this use more efficient.
  - Staff also amended the definitions for “Manufacturing and industrial, heavy” and “Manufacturing and industrial, light”. The changes made removed lines about worker’s skill, which staff felt were not relevant to the land use definition.

- Sections 106.03.02 “Zoning districts – Residential” and 106.06.17 “Multifamily landscape requirements”
  - These changes move the approving authority for open space credit from the Planning and Zoning Commission or Town Council to the Director of Development Services. This amendment also quantifies the max slope of open area, which is not to exceed two percent across the whole area. Previously there was not an amount specified for the max slope, which is why no approval was ever sought out. The change also moves the approving authority due to the Director of

Development Services, since it is likely that there will not be a substantial waiver and if the development is requesting waivers, it would then go before the Planning and Zoning Commission and Town Council under a Planned Development request, at which point, it would allow review and consideration of the open space slope.

- Sections 106.04.01 “US 380 Overlay District” and 106.06.46 “Stacking Standards”
  - These changes changed the use of “car” to “automobile” for the continuity of using the same word across the entire chapter.

- Section 106.05.01 “Schedule of Uses”
  - Staff corrected Communications Tower to Specific Use Permit from Conditional Use Permit to match section 106.05.02 which states Communications Towers require a Specific Use Permit.
  - Staff also added the Banquet Hall Use to the chart, requiring an SUP in LF, LC, HC, LI, and HI districts. This is in response to staff receiving many requests for banquet hall type uses, but not having a clear path to the administrative approval of such a use.

- Section 106.06.05 “Architectural Standards for Commercial Structures”
  - Staff changed the minimum and maximum building materials for buildings over 15,000 square feet to match those of buildings under 15,000 square feet.

- Section 106.06.15 “Plant List”
  - Staff added Latin plant species names in order to clarify recurring questions from Landscape Architects. Staff also removed several invasive species and corrected spelling mistakes.

- Section 106.06.18 “Commercial Landscape Requirements”
  - Staff removed the enhanced entranceway paving option and combined it with the enhanced hardscape option. These were two common points options commonly selected together, negating the positive impact of the points system. Staff also removed the amenity detention pond and combined it under the retention pond option and reduced the points from 10 to 5 since rainwater storage is a requirement of site development. Lastly, staff also added points for outdoor lighting being “Darksky Approved” in accordance to the Town’s Comprehensive Plan environmental goals and objectives.

- Section 106.03.32 “Residential Fences”
  - Staff have requested that the provision that residential fences cannot be put around a vacant lot in order to match the International Property Maintenance Code which was adopted by the Town.

- Section 106.06.45 “Parking Requirements Per Land Use”
  - Staff also changed “Car” to “Automobile” in this section for continuity throughout the chapter. Staff also removed the provision that allows restaurant parking ratios to decrease to 1:200 from 1:100 when the total building square footage of development is over 15,000 square feet. Staff requests that it remain 1:100 regardless of development size. Staff added a new parking category of restaurant in include restaurants that don’t have any indoor seating and only offer pick-up or delivery, which have become increasingly popular lately and don’t require as much parking as traditional sit-down restaurants.

Comprehensive Plan.
Staff believe these proposed minor changes are still in line with the intent of the current Zoning Ordinance, overall vision for the Town, and work towards the goals and objectives set forth in the Comprehensive Plan.

Recommended Action

Staff recommends approval of the suggested changes by legal counsel.

Staff requests the Commission review the staff proposed changes and evaluate the proposals based on the goal of the Town's Comprehensive Plan, current land use trends, and staff experience with the Zoning Ordinance. Staff requests direction and welcomes any feedback that might enhance the intended effect of these text changes.

Attachments

Chapter 106 Change Log
Sec._106.01.14 Red lined
Sec._106.01.14
Sec._106.02.02 Red lined
Sec._106.02.02
Sec._106.02.11 Red lined
Sec._106.02.11
Sec._106.03.02 Red lined
Sec._106.03.02
Sec._106.04.01 Red lined
Sec._106.04.01
Sec._106.05.01 Red lined
Sec._106.05.01
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Sec._106.06.17 Red lined
Sec._106.06.17
Sec._106.06.18 Red lined
Sec._106.06.18
Sec._106.06.32 Red lined
Sec._106.06.32
Sec._106.06.45 Red lined
Sec._106.06.45
Sec._106.06.46 Red lined
Sec._106.06.46

Section	Description	Old	New
106.01.14	Created Definition for Banquet Hall	**NA**	Banquet Hall. An establishment which is rented by individuals or groups to accommodate private functions including, but not limited to, banquets, weddings, anniversaries, and other similar celebrations. Such use, may or may not include: 1) kitchen facilities for the preparation or catering of food; 20 the sale of alcoholic beverages for on-premise consumption, only during the schedules events, and not open to the general public; 3) outdoor gardens or reception facilities.
106.01.14	Enhanced defition of Heavy Manufacturing, removed portion about worker's skill	*Manufacturing and industrial, heavy.* A facility that involves assembly and fabrication activities and the use of machines, tools and labor to make items for use or sale and typically requires access to major thoroughfares, major highways, and/or other means of transportation such as the railroad for transfer of parts and final products. May also include warehousing, research and development, wholesaling operations with infrequent customer or client visits, and may include related office and shipping areas. Heavy industry involves one or more of the following characteristics such as large and heavy products; large and heavy equipment and facilities (such as heavy equipment, large machine tools, and spacious buildings); or complex and numerous processes. The labor for heavy industry often must be highly skilled. Examples of heavy industry include, but are not limited to, steel manufacturing, automotive assembly, machine tool design and construction, boat or aircraft manufacturing, and power plants.	*Manufacturing and industrial, heavy.* A facility that involves assembly and fabrication activities and the use of machines, tools and labor to make items for use or sale and typically requires access to major thoroughfares, major highways, and/or other means of transportation such as the railroad for transfer of parts and final products. May also include warehousing, research and development, wholesaling operations with infrequent customer or client visits, and may include related office and shipping areas. Heavy industry involves one or more of the following characteristics such as large and heavy products; large and heavy equipment and facilities (such as heavy equipment, large machine tools, and spacious buildings); or complex and numerous processes. Examples of heavy industry include, but are not limited to, steel manufacturing, automotive assembly, machine tool design and construction, boat or aircraft manufacturing, and power plants.
106.01.14	Enhanced defition of Light Manufacturing, removed portion about "low skilled workers"	*Manufacturing and industrial, light.* A facility that involves assembly and fabrication activities and the use of machines, tools and labor to make items for use or sale. May also include warehousing, research and development, wholesaling operations with infrequent customer or client visits, and may include related office and shipping areas. Light industry is often assembly-based and is typically consumer-oriented (i.e., most light industrial products are sold to retail stores or end users rather than as intermediate parts for use by other industries). Light industry generally has less environmental impact than those associated with heavy industry. Light industry may employ lower skilled workers with only moderate training and often employ large numbers of people. Light industries require a relatively small amount of raw materials, area and power. Examples of light industry include, but are not limited to, plastic items, clothing, shoes, foods, beverages, personal care and home care products, cosmetics, drugs, furniture, consumer electronics, and home appliances.	*Manufacturing and industrial, light.* A facility that involves assembly and fabrication activities and the use of machines, tools and labor to make items for use or sale. May also include warehousing, research and development, wholesaling operations with infrequent customer or client visits, and may include related office and shipping areas. Light industry is often assembly-based and is typically consumer-oriented (i.e., most light industrial products are sold to retail stores or end users rather than as intermediate parts for use by other industries). Light industry generally has less environmental impact than those associated with heavy industry. Light industries require a relatively small amount of raw materials, area and power. Examples of light industry include, but are not limited to, plastic items, clothing, shoes, foods, beverages, personal care and home care products, cosmetics, drugs, furniture, consumer electronics, and home appliances.
106.02.02	Added new state statute reference, per Town Attorney.	To hear and decide upon the existence of any nonconforming use and to enforce the amortization provisions as set forth in this chapter	To hear and decide upon the existence of any nonconforming use and to enforce the amortization provisions as set forth in this chapter and authorized by Texas Local Government Code Section 211.019.
106.02.11	Added new notice requirement for non conforming uses, per Town Attorney.		In addition to the foregoing notice, the Town shall provide written notice of each public hearing regarding any proposed adoption of or change to a zoning regulation or boundary under which a current conforming use of a property is a nonconforming use if the regulation or boundary is adopted or changed. The notice shall: (i) be mailed by United States mail to each owner of real or business personal property where the proposed nonconforming use is located as indicated by the most recently approved municipal tax roll and each occupant of the property not later than the 10th day before the hearing date; (ii) contain the time and place of the hearing; and (iii) include the following text in bold 14-point type or larger: "THE TOWN OF LITTLE ELM IS HOLDING A HEARING THAT WILL DETERMINE WHETHER YOU MAY LOSE THE RIGHT TO CONTINUE USING YOUR PROPERTY FOR ITS CURRENT USE. PLEASE READ THIS NOTICE CAREFULLY."
106.03.02	Clarification on maximum allowed slope in open space areas and changed approving authority for exceeding the allowed slope.	At the time of site plan approval, the planning and zoning commission and town council may allow a credit not to exceed ten percent of the total required usable open space for adjacent and immediately accessible public parks. The combined credit for areas calculated at a three-to-one basis and for public parks shall not exceed 50 percent of the total usable open space for an individual lot or parcel of land.	At the time of site plan approval, the Director of Development Services may give full or partial credit for open areas that exceed the maximum slope of 2 percent, if it is determined that such areas are environmentally significant and that their preservation would enhance the development.
106.04.01.d	Changed "Car" to "Automobile" for continuity		
106.05.01	Changed Communication Tower to SUP from CUP to match section 106.05.2.		
106.05.01	Add Banquet Hall as new use, allowed only through SUP in LC, HC, LI, HI, and LF		
106.05.05.c.3	Changed time period for abandonedment triggering loss of nonconforming rights, per Town Attorney.	If any such nonconforming use of land ceases for any reason for a period of more than 30 days any subsequent use of such land shall conform to the regulations specified by this chapter for the district in which such land is located.	If any such nonconforming use of land is intentionally abandoned for at least six months, , all nonconforming rights are terminated and any subsequent use of such land shall conform to the regulations specified by this chapter for the district in which such land is located.
106.05.05.k	Added compensation requirements requirements for termination of nonconforming uses for termination per Town Attorney.		k) Termination of Nonconforming Uses and Compensation for such Termination. 1. A person using a property in a manner considered to be a nonconforming use as a result of the adoption of or change to a zoning regulation or boundary may continue to use the property in the same manner unless required by the Town to stop the nonconforming use of the property. 2. If the Town requires a property owner or lessee to stop the nonconforming use of a property as described by Subsection (k)(1), the owner or lessee of the property is entitled to compensation as set forth In Texas Local Government Code Section 211.019(d). 3. Not later than the 10th day after the date the Town imposes a requirement to stop a nonconforming use of a property under this section, the Town shall give written notice to each owner or lessee of the property, as indicated by the most recently approved municipal tax roll, who is required to stop a nonconforming use of the property of the requirement and of the remedies which an owner or lessee of the property is entitled to under Texas Local Government Code Section 211.019(d). 4. A person entitled to a remedy under Texas Local Government Code Section 211.019 may appeal a compensation determination to the board of adjustment not later than the 20th day after the date the determination is made.
106.06.05	Corrected building façade standards typo		
106.06.15	Added Latin Names to Approved Plant List, minor spelling corrections, removed duplicate or invasive plants.		
106.06.17.a	Clarification on maximum allowed slope in open space areas and changed approving authority for exceeding the allowed slope.	(5) *Credit for sloped areas* . At the time of site plan approval, the Planning and Zoning Commission and Town Council may give full or partial credit for open areas that exceed the maximum slope, if it is determined that such areas are environmentally significant and that their preservation would enhance the development.	*Credit for sloped areas* . At the time of site plan approval, the Director of Development Services may give full or partial credit for open areas that exceed the maximum slope of 2 percent, if it is determined that such areas are environmentally significant and that their preservation would enhance the development.
106.06.18	Amended Lakdscape Points chart. Combined Enhanced entraceway paving and enhanced hardscape, Removed providing dry amentiy detention pond, decreased points for enhanced amenity dentiontion retention pond from 10 to 5, and created "Darksky approved" outdoor lighting for 5 points.		
106.03.32	Added that fences cannot be built around vacant lots.		*Vacant Lots.* Fences cannot be located on vacant or undeveloped lots.
106.06.45	Changed "Car" to "Automobile" for continuity		
106.06.45	Added clarification on 1:200 ratio exemption for restuarants, also added new category of "restaurant, pick-up or delivery only".	1 space per 100 square feet of floor area. Outdoor seating areas (covered or not) under 500 square feet are exempt. When part of a multitenant development 15,000 square feet or greater, 1 space for every 200 square feet.	1 space per 100 square feet of floor area. Outdoor seating areas (covered or not) under 500 square feet are exempt.
106.06.46	Changed "Car" to "Automobile" for continuity		

Sec. 106.01.14 Land use definitions.

Accessory structure. Any structure, either attached or detached from the main building, located on the same lot, the use of which is incidental to that of the main structure. Accessory structures include, but are not limited to, patio covers, arbors, gazebos, cabanas, outdoor kitchens, recreational fire enclosures, trellis, and structures/sheds or the like. A permit is required for many accessory structures (see sections 106.05.02.1(a) and (b), "accessory uses - residential" and "accessory uses - nonresidential," respectively, for regulations).

Adult Day Service. A daytime care establishment that supports the health, nutritional, social, and daily living needs of adults in a professionally staffed, group setting.

Airport or landing field. A landing facility for fixed or rotary wing aircraft containing a minimum of 60 acres (see section 106.05.02.2(a), "airport/helipad/heliport" for regulations).

Airport/heliport. A place where aircraft and/or helicopters can land and take off, usually equipped with hangars, facilities for refueling and repair, and various accommodations for pilots and passengers (see section 106.05.02.2(a), "airport/helipad/heliport" for regulations).

Alternative energy systems.

(1) *Solar devices.* A solar panel or device is a structure that is intended to capture the light from the sun and transfer that energy to electricity for general use (see section 106.05.02.2(b), "alternative energy sources - solar" for regulations.)

(2) *Wind energy conversion system (WECS).* Any mechanical device, such as a wind charger, windmill, or wind turbine, which is designed to extract kinetic energy from the wind and converts or stores it for practical use or a form of usable energy. (see section 106.05.02.2(c), "alternative energy sources - wind energy" for regulations)

Alternative financial services. A check cashing business, payday advance or loan business, money transfer business, car title loan business or pawn shop (see section 106.05.02.2(d), "alternative financial services" for regulations).

(1) *Bank, savings and loan or credit union.* An establishment, open to the public, for the deposit, custody, loan, exchange or issue of money, the extension of credit, and/or facilitating the transmission of funds and that is typically licensed by the appropriate state or federal agency as a bank, savings and loan association, or credit union. This includes businesses' activities listed under SIC Codes 60 and 61, but excludes pawnshops, check cashing businesses, payday advance/loan businesses and car title loan businesses.

(2) *Car title and loan services.* An establishment that makes small consumer loans that leverage the equity value of a car or other vehicle as collateral where the title to such vehicle is owned free and clear by the loan applicant and any existing liens on the car or vehicle cancel the application. The loan terms are often for 30 days and failure to repay the loan or make interest payments to extend the loan allows the lender to take possession of the car or vehicle. This excludes state or federally chartered banks, savings and loan associations or credit unions engaged primarily in the business of making longer term loans and which make loans that leverage the total equity value of a car or vehicle as collateral.

(3) *Check cashing business.* An establishment that provides to the customer an amount of money that is equal to the face of the check or the amount specified in the written authorization for an electronic transfer of money, less any fee charged for the transaction, and where there is an agreement not to cash the check or execute an electronic transfer of money for a specified period of time, the business of cashing checks, warrants, drafts, money orders, or other commercial paper serving the same purpose for compensation by any person or entity other than a retail seller engaged primarily in the business of selling consumer goods, including consumables to retail buyers, that cashes checks or money orders or issues money orders or money transfers for a minimum flat fee as a service that is

incidental to its main purpose or business. This definition excludes a state or federally chartered bank, savings and loan association or credit union, pawnshop, grocery store or gas station, so long as the gas station does not handle more than 100 such transactions within any calendar month.

(4) *Pawn shop.* A shop that lends money in exchange for valuable personal property as security deposited with it or pledged to it. This definition includes the sale of such securities after repossession and the sale of merchandise generally found in retail stores.

(5) *Payday advance or loan business.* An establishment that makes small consumer loans, usually backed by postdated check or authorization to make an electronic debit against an existing financial account, where the check or debit is held for an agreed-upon term, or until an applicant's next payday, and then cashed unless the customer repays the loan to reclaim such applicant's check. ?

Amenity center. A recreational facility, including, but not limited to, clubhouse, swimming pool, or play area, operated for the exclusive use of private residents or neighborhood groups and their guests, and not open to the general public.

Antenna. An instrument or device consisting of wires, poles, rods, or reflecting discs, designed for transmitting or receiving any portion of the radio, microwave, or electromagnetic spectrum (see section 106.05.02.2(h), "communications antennas" for regulations)

Antenna support structure. Any tower, mast, pole, tripod, box frame, or other structure utilized for the purpose of transmission, retransmission, and/or reception of electromagnetic, radio, television, or microwave signals and used for commercial broadcasting or telecommunication purposes. This definition shall also include a satellite dish exceeding 12 feet in diameter and a microwave-transmitting tower. All radiating equipment must comply with Federal Communications Commission (FCC), Environmental Protection Agency (EPA), Occupational Health and Safety Administration (OSHA), and all other applicable state and federal regulatory agency requirements and guidelines for human safety, as they exist or may be amended. Definition includes ancillary ground equipment. (See section 106.05.02.2(i), "communications support structures/towers" for regulations)

Antenna, stealth. A stealth antenna is a commercial antenna that is designed to be non-obtrusive, or virtually transparent or invisible to the surrounding neighborhood. Stealth antennas include, but are not limited to:

(1) Antennas within a building's attic space,

(2) Antennas on the roof of a minimum three-story building and not visible from the property line of the lot on which the antenna is located,

(3) Antennas on a public utility structure, such as a water tower or high transmission line support tower, and painted to match the structure,

(4) Antennas located within a structure such as a flagpole, church steeple, lamppost, subdivision monument, clock tower, or similar architectural feature, and antennas located on an athletic field light pole.

Antique shop and used furniture. A retail establishment engaged in the selling of works of art, furniture, or other artifacts of an earlier period, with all sales and storage occurring inside a building.

Arcade. An establishment in which there are located six or more skill or pleasure machines used for compensation found in the schedule of uses as "Commercial Amusement, Indoor."

Assembly uses. A building or structure for the gathering together of persons for purposes of civic, social or religious functions.

Athletic stadium or field, private. A private field and/or structure used for sporting events with associated spectator seating, either permanent or temporary.

Athletic stadium or field, public. A field and/or structure owned and operated by the town and/or a local independent school district used for sporting events with associated spectator seating, either permanent or temporary. The stadium may include other accessory buildings such as a food service or catering facility and/or dressing rooms/showers.

Automated dispenser machine. An unmanned, freestanding structure that dispenses goods that may include, but are not limited to, water, ice, entertainment videos or CDs, newspapers, and soft drinks, that may be located outside of or separate from the primary structure.

Automated intake machine. An unmanned, freestanding structure that is designed to receive certain goods that include, but are not limited to, recycling items, library books and donations, that may be located outside of or separate from the primary structure.

Automated teller machine (ATM). An unmanned, freestanding structure that performs banking financial functions at a location that may be separate from the controlling financial institution.

Automobile. A self-propelled mechanical vehicle designed for use on streets and highways for the conveyance of goods and people, including, but not limited to, passenger cars, trucks, buses, motor scooters, and motorcycles.

Automobile and boat repair, major. A building or portion thereof whose principal use is for the repair, servicing, equipping, or maintenance of motor vehicles or motor vehicle components, including engines, radiators, starters, transmissions, brakes, tires and wheels, seats and similar components that may require overnight outdoor storage of vehicles awaiting or under repair, if screened in compliance with all applicable regulations. General repair or reconditioning of engines, air-conditioning systems, and transmissions for automobiles; wrecker or towing service with on-site storage of vehicles; collision services including body, frame, or fender straightening or repair; customizing; painting; vehicle steam cleaning; tire retreading; insurance estimations with on-site storage; undercoating and rust proofing, and other similar uses.

Automobile and boat repair, minor. A daytime retail operation wherein the sale, installation, and/or inspection of tires, batteries, brakes and other related minor parts or accessories is carried on; specifically intended to exclude major automotive repair and overnight outdoor storage of vehicles awaiting or under repair.

Automobile and boat sales, accessories. A retail shop that sells parts or accessories for vehicles that does not include any installation of same.

Automobile and boat sales, new. Retail sales or leasing of new automobiles, light load vehicles or boats. Sales, rental, and/or leasing of new automobiles or light load vehicles, including, as accessory uses: sales, repair, and automobile storage.

Automobile and boat sales, outside display. The use of any land area for the display and sale of new or used vehicles and accessory parts, including tires, for automobiles, trucks, vans, trailers, or recreation vehicles.

Automobile and boat sales, used. Retail sales or offering for sale of used automobiles, light load vehicles or boats.

Automobile and boat/rv storage. The storage on a lot or tract of operable motor vehicles for the purpose of holding such vehicles for sale, distribution or storage.

Automobile parking garage. A structure for the parking of automobiles.

Automobile parking lot. An area where a fee is charged for parking automobiles.

Automobile wash, automated secondary use. A facility for the washing of motor vehicles, including a self-service operation, operated in conjunction with another primary use, such as fueling stations or convenience stores.

Automobile wash, full service. A facility where a customer may have an automobile, motorcycle, or other vehicles washed in exchange for financial remuneration. This definition generally includes detailing of the vehicle and may include other services, such as leather or upholstery cleaning.

Automobile wash, self service. A facility, typically coin or token operated, used by the customer to wash their own automobiles, motorcycles, and other vehicles.

Bakery, candy or ice-cream shop. A relatively small retail establishment that primarily sells baked goods, candy and other confections, and/or ice-cream/yogurt for on-premises consumption or take-out.

Banquet Hall. An establishment which is rented by individuals or groups to accommodate private functions including, but not limited to, banquets, weddings, anniversaries, and other similar celebrations. Such use, may or may not include: 1) kitchen facilities for the preparation or catering of food; 20 the sale of alcoholic beverages for on-premise consumption, only during the schedules events, and not open to the general public; 3) outdoor gardens or reception facilities.

Bar. An establishment principally for the sale and consumption of alcoholic beverages on the premises that derives 75 percent or more of its gross revenue on a quarterly (three-month) basis from the sale or service of alcoholic beverages, as defined in the Texas Alcoholic Beverage Code, for on-premises consumption. If an establishment is located in a hotel or motel, the gross revenues of the particular establishment, rather than the gross revenues of the entire hotel or motel, will be used in calculating the percentage of revenues derived from the sale or service of alcoholic beverages. (See section 106.05.02.2(e), "bar or brewpub" for regulations)

Bed and breakfast inn. An owner-occupied private home which offers lodging for paying guests not to exceed one week in duration, and which serves breakfast to these guests and which contains one or more guest bedrooms. (See section 106.05.02.2(f), "bed and breakfast" for regulations)

Body art studio. An establishment whose services include tattooing and/or body piercing. Tattooing shall mean the placing of designs, letters, figures, symbols or other marks upon or under the skin of any person, using ink or other substances that result in the permanent coloration of the skin by means of the use of needles or other instruments designed to contact or puncture the skin. Body piercing shall mean the creation of an opening in an individual's body, other than ear piercing, to insert jewelry or other decoration.

Brewpub. An establishment where the on-site brewing of beer occurs as well as tasting and/or retail sales. (See section 106.05.02.2(e), "bar or brewpub" for regulations)

Building material and hardware sales, major. An establishment for the sale of materials customarily used in the construction of buildings and other structures, including outside storage or display of materials or merchandise and may include the rental of construction tools and/or vehicles.

Building material and hardware sales, minor. An establishment for the sale of materials customarily used in the construction of buildings and other structures, without any outside storage or display of materials or merchandise.

Business Service. This group includes establishments primarily engaged in providing off-site services not elsewhere classified to business enterprises on a fee contract basis . Examples include, but are not limited to, plumbing services, cleaning services, computer/equipment repair services with certain on-site storage needs such as fleet vehicles used to provide off-site services to customers.

Campground or *RV park.* Any area that is designed for occupancy by transients using tents, mobile trailers, or recreational vehicles for temporary sleeping purposes. Also, a tract of land on which two or more campsites are located, established, or maintained as temporary living quarters for recreation, education or vacation purposes.

Caretaker's/guard's residence. A residence located on a premises with a main nonresidential use and occupied only by a caretaker or guard, and his/her family, employed on the premises. (see section 106.05.02.2(g), "caretaker or guard residence" for regulations)

Catering service. A business which offers prepared food and drink for consumption elsewhere.

Child care center, incidental. A place designed solely for the care of children belonging to employees and/or patrons of the primary use. The center shall be completely contained within the primary use and shall not constitute more than 15 percent of the main use. The operating hours of the center shall be the same as the primary use and shall not include overnight lodging, medical treatment, counseling, or rehabilitation services. This use may be subject to regulation by the Texas Department of Family and Protective Services.

Child care center. A facility that is licensed to care for any number of children for less than 24 hours per day, at a location other than the permit holder's primary residence. Included in this definition are daycare services, Montessori schools.

Child care, group home. An adult and/or child caring facility licensed by the state, designed to provide resident services to individuals who are physically handicapped, mentally ill, mentally retarded, or developmentally disabled, in which no more than eight such individuals reside with one or more resident counselors or other staff persons. For the purposes of this section, mental illness and developmental disability shall not include illegal use of or addiction to a controlled substance or any criminal behavior.

Child care, foster family home (independent). Per the definition of the department of family and protective services (DFPS) or as amended by the DFPS, a single independent home that is the primary residence of the foster parents and licensed to provide care for up to six children up to the age of 18 years.

Child care, foster group home (independent). Per the definition of the department of family and protective services (DFPS) or as amended by the DFPS, a single independent home that is the primary residence of the foster parents licensed to provide care for seven to 12 children up to the age of 18 years.

Child care, licensed child care center. Per the definition of the department of family and protective services (DFPS) or as amended by the DFPS, an operation providing care for seven or more children younger than 14 years old for less than 24 hours per day at a location other than the permit holder's home.

Child care, licensed child care home. Per the definition of the department of family and protective services (DFPS) or as amended by the DFPS, the primary caregiver provides care in the caregiver's own residence for children from birth through 13 years. The total number of children in care varies with the ages of the children, but the total number of children in care at any given time, including the children related to the caregiver, must not exceed 12.

Child care, listed family home. Per the definition of the department of family and protective services (DFPS) or as amended by the DFPS, a caregiver at least 18 years old who provides care in her own home for compensation, for three or fewer children unrelated to the caregiver, ages birth through 13 years. Regular care is provided, which is care provided for at least four hours a day, three or more days a week, and more than nine consecutive weeks. The total number of children in care, including children related to the caregiver, may not exceed 12.

Child care, registered child care home. Per the definition of the department of family and protective services (DFPS) or as amended by the DFPS, a caregiver who provides regular care in her own home for not more than six children from birth through 13 years. Child day care can be provided for six additional school-aged children before and after the customary school day. The total number of children in care at any given time, including the children related to the caregiver, must not exceed 12.

Clinic, animal (no outside runs). An animal medical facility designed for immediate and short term care (i.e. not requiring the animal to be boarded or kept within the facility overnight), for diagnosis, treatment of household pets including but not limited to dogs, cats, and birds.

Clinic, animal (with outside runs). A facility for diagnosis, treatment or hospitalization of household pets including but not limited to dogs, cats, birds, and horses.

Clinic/medical lab. Offices for one or more physicians, surgeons or dentists engaged in treating sick or injured persons, but not including rooms for the lodging of patients. The facility may also conduct the testing of blood and other tissue samples for the purpose of diagnosis of diseases.

College, university, or *trade school.* An institution established for educational purposes offering courses for study beyond the secondary education level, including trade schools and commercial schools offering training or instruction in a trade, art, or occupation.

Commercial amusement, indoor. An enterprise providing for indoor recreational activities, services, amusements, and instruction, usually for an admission fee. Uses may include, but are not limited to, bowling alleys, ice or roller skating rinks, bingo parlors, amusement arcades, and/or sports practice areas. Such business shall be constructed to limit noise by installing adequate acoustic barriers.

Commercial amusement, outdoor. An enterprise providing for outdoor recreational activities, services, amusements, and instruction, usually for an admission fee, including, but not limited to, batting cages, miniature golf, go-kart tracks, and carnivals.

Commissary. A facility that is the home base for a restaurant-equipped vehicle that serves as a mobile food vendor. The commissary also is used for the storage and partial production of food items that are delivered to customers by the mobile food vendor located away from the commissary location.

Communication tower/antenna. Any tower, mast, pole, tripod, box frame, or other structure utilized for the purpose of transmission, retransmission, and/or reception of electromagnetic, radio, television, or microwave signals. See also "antenna support structure." (See section 106.05.02.2(h), "communication antennas" for regulations)

Concrete batch plant, permanent. A permanent manufacturing facility for the production of concrete or asphalt.

Concrete batch plant, temporary. A temporary manufacturing facility for the on-site production of concrete or asphalt during construction of a project, and to be removed when the project is completed. Following removal, the tract shall be returned to its previous condition. (See section 106.05.03(a), "batch plants, temporary" for regulations)

Construction yard, field office, temporary. A building, structure, or storage/assembly yard used in conjunction with a development project for housing temporary supervisory or administrative functions related to development, construction, or the sale of real estate properties within the development and subject to removal at completion of construction. A facility used for the temporary office and material storage in connection with a project under construction or remodel. (See section 106.05.03(d), "construction yard, temporary" for regulations)

Contractor's shop. A facility for the contractor's office and the storage and maintenance of contractor's supplies and operational equipment.

Dwelling, assisted living facility. A private facility that provides care for chronically ill, aged, or disabled persons who need some health supervision and related care but not including hospital care. Such facilities do not contain facilities for surgical care or the treatment of alcoholism, drug addiction, communicable disease or injury. A facility designed for adults or children with special needs and/or who need assistance with daily living, including but not limited to the production of meals, assistance with shopping, management of medications and personal grooming. Typically, the resident occupies a room or suite of rooms and eats the majority of meals communally.

Dwelling, assisted living home. A facility located in a private residential home designed for adults who need or desire assistance with daily living, including but not limited to the production of meals, assistance with shopping, management of medications and personal grooming. (See section 106.05.02.2(j), "home child care" for regulations)

Dwelling, boardinghouse or rooming house. A building other than a hotel where lodging and/or meals for three or more persons are provided for compensation.

Dwelling, duplex. A building containing two single-family dwelling units totally separated from each other by an unpierced fire wall from basement to roof, intended or designed for occupancy by two families.

Dwelling, factory-built home. Any manufactured single-family mobile home constructed prior to June 15, 1976. (See also dwelling, HUD-Code manufactured home)

Dwelling, group home. An adult and/or child care facility, licensed by the state, designed to provide resident services to individuals who are physically handicapped, mentally impaired, or developmentally disabled, but does not provide services to individuals with psychiatric, addiction, substance abuse or who exhibit criminal behavior. (See section 106.05.02.2(j), "home child care" for regulations)

Dwelling, HUD-Code manufactured home. A HUD-Code compliant single-family structure constructed after June 15, 1976, designed for long-term residential use that is constructed elsewhere and is moved from the factory or sales location to its permanent site (see also dwelling, factory-built home)

Dwelling, listed family home. A home that provides child care for compensation for three or fewer children, excluding children who are related to the caretaker, for at least four hours a day, three or more days a week, for more than nine consecutive weeks in the caretaker's own residence and that is required to [be] listed with the state. (See section 106.05.02.2(j), "home child care" for regulations)

Dwelling, live-work. A dwelling unit that contains, to a limited extent, a separate commercial component on the ground floor and is typically in the form similar to a townhouse or store with residential quarters above or behind the commercial use.

Dwelling, mobile home. Any manufactured single-family mobile home constructed prior to June 15, 1976.

Dwelling, multifamily. Any building or portion thereof, which is designed, built, rented, leased, or let to be occupied as three or more dwelling units or apartments or which is occupied as a home or place of residence by three or more families living in independent dwelling units. Though residential in use, it is considered a commercial development in regard to and application of development standards and regulations. A building containing three or more dwelling units on a single lot or tract designed to be occupied by three or more families living independent of one another.

Dwelling, patio home. A dwelling on a separate lot with open space setbacks on at least three sides.

Dwelling, single-family, detached. A platted lot containing one dwelling unit, not attached to any other dwelling by any means and is surrounded by open space or yards, designed and constructed for occupancy by one family and has no physical connection to a building located on any other separate lot or tract.

Dwelling, townhome. A structure containing three or more dwelling units with each unit designed for occupancy by one household and each unit attached by a common fire wall.

Electrical power generating plant. All equipment, fixtures, and property operated or maintained in connection with the production of electricity and transmission of electricity produced.

Electrical substation. A location for transforming electricity prior to the distribution of electricity to individual customers.

Fairgrounds/exhibition area. An area that may include structures or outside areas for the exhibition of rodeos, conventions and similar special events.

Family. (1) one or more persons related by blood, marriage, adoption or guardianship occupying a dwelling unit and living as a single housekeeping unit; or (2) a group of persons not all related by blood, marriage, adoption or guardianship occupying a dwelling unit and living as a single housekeeping unit, but not to exceed two persons per bedroom with a maximum total of five such persons occupying a dwelling unit.

Farm accessory building. A structure located on an active farm, ranch, or orchard in which livestock, feed, equipment, vehicles, or accessories necessary for the running of the business are kept, including but not limited to, barns, silos, sheds and exercise pavilions.

Farm, ranch, stable, garden or *orchard.* An area of five acres or more which is used for growing of usual farm products, vegetables, fruits, trees and grain and for the raising thereon of the usual farm poultry and farm animals such as horses, cattle, and sheep and including the necessary accessory uses for raising, treating, and storing products raised on the premises, but not including the commercial feeding of offal or garbage to swine or other animals and not including any type of agriculture or husbandry specifically prohibited by ordinance or law.

Farmers market. An area containing individual vendors who offer fruits, vegetables, herbs, spices, edible seeds, nuts, live plants, flowers, and honey for sale. This definition does include the sale of meat, fish, poultry, eggs, refrigerated dairy products, or home canned or packaged items when the proper health rules and regulations are followed and/or health permit obtained. (See section 106.05.03(c), "farmers market, temporary" for regulations)

Florist. A facility for the retail sale of flowers, ornamental plants, and accessory items. This definition does not include a nursery with outside display. (See also Greenhouse and Nursery)

Fraternal organization, lodge, civic club, fraternity or *sorority.* A group of people whose membership is restricted by a set of bylaws or regulations.

Funeral home/crematorium. A place for the storage of human bodies prior to their burial or cremation, or a building used for the preparation of the deceased for burial or cremation, where cremation occurs within the building, with or without place where ceremonies or gatherings connected to the deceased may occur.

Funeral home/mortuary. A place for the storage of human bodies prior to their burial, or a building used for the preparation of the deceased for burial and the display of the deceased, a place where ceremonies or gatherings connected to the deceased may occur, but does not allow the cremation of human remains.

Gas pumps/fuel sales. A retail fuel sales facility selling fuel for motor vehicles including, but not limited to, automobiles, motorcycles, buses, or recreational vehicles with no ancillary services such as vehicle service, vehicle repair, or sale of items other than fuel. The fueling or gasoline station may be attended or automated.

Golf course, tennis club, polo club, or *country club (private).* An area of 20 acres or more containing a golf course, polo facilities, tennis facilities and/or a clubhouse and available only to private specific membership; such a club may contain adjunct facilities such as private club, dining room, swimming pool, retail sales, and similar recreational or service facilities. A tract of land with at least nine holes for playing the game of golf that may include a clubhouse, dining and snack bar, pro shop, practice facility and other accessory uses.

Greenhouse or *nursery for retail plant sales.* A facility that may include the outside display of plants offered for sale when such display is located behind the front yard line established in the district in which the nursery or greenhouse is located.

Gun or archery range, indoor. Any indoor facility open to the public and occupying all or a portion of a building where firearms are discharged or arrows are shot for either testing or recreation purposes. Such business shall be constructed to limit noise by installing adequate acoustic barriers.

Gunsmith. A retail establishment for the sale and service of guns and related items.

Gymnastics/dance studio/martial arts. A building or portion of a building used by a gymnast, dancer, or martial artist for practice or for instructional classes in gymnastics, dance, or martial arts and similar activities.

Health/fitness center. A facility which promotes physical fitness, weight control, exercise, and personal improvement that may also include massage or bathing.

Heavy machinery sales, service, and storage. A retail or wholesale facility that sells, services and stores heavy machinery such as farm equipment, dredging equipment, paving equipment, etc.

Helipad. A place, typically on the roof of a building or a small ground area where helicopters may land and take off, but without any service or fueling capabilities. (See section 106.05.02.2(a), "airport/helipad/heliport" for regulations)

Home occupation. An occupation, which is secondary to the primary use of a dwelling as a residence, conducted on residential premises by the occupant of the residence. Home occupations shall be subject to the conditions set forth in section 106.05.02.2(k), "home occupations." Any activity carried out for personal gain in a dwelling unit by a resident of the premises, which occupation is secondary to the residential purpose of the premises.

Hospital. An institution or place where sick or injured patients are given medical or surgical care either at public (charity) or private expense.

Hotel. A building or group of buildings designed for and occupied as a temporary abiding place of individuals with access to the rooms from an indoor corridor and providing six or more room units where customary services such as linen, maid service, telephone, and upkeep of furniture are provided for a daily fee.

Hotel, extended stay (also called "residence hotel"). A building or group of buildings used as a temporary dwelling place for individuals in exchange for financial consideration where customary hotel services such as linen, housekeeping service, and telephone are provided. Residence hotel room units are designed to be suitable for long term occupancy with financial consideration typically being calculated on a weekly and/or monthly basis. Typical residence hotel attributes include, but are not limited to, kitchen facilities, and external doorways into room units. (See section 106.05.02.2(l), hotel, extended stay" for regulations)

Hotel, full-service. A full service hotel is considered a top tier hotel in terms of amenities and service provided to the clientele. (See section 106.05.02.2(m), "hotel, full-service" for regulations)

Hotel, limited service. A limited service hotel provides travelers an economical choice with fewer amenities than a full service hotel. (See section 106.05.02.2(n), "hotel, limited-service" for regulations)

Household appliance service and repair. A retail establishment where household appliances are serviced and repaired on site. May also include sales of new or used household appliances.

Incidental retail and service uses. Defined as operating within another establishment, such as a bank branch, nail salon, eyewear service, tax service, etc. within a "big box" store. May also be located within an office complex or hotel, or institution, such as a deli, convenience store, or restaurant for the use of the employees, guests, and students.

Kennel, indoor. An establishment where domesticated animals(four or more dogs, cats or other domestic animals at least four months of age) are housed, groomed, bred, boarded, trained, or sold for commercial purposes that does not include outside pens or runs.

Kennel, outdoor. An establishment where domesticated animals (four or more dogs, cats or other domestic animals at least four months of age) are housed, groomed, bred, boarded, trained, or sold for commercial purposes that includes outdoor pens or runs.

Laundry and/or dry cleaning, commercial. A plant for cleaning garments, fabrics, rugs, uniforms, draperies, or other similar items on a commercial or bulk basis.

Laundry and/or dry cleaning, pickup and receiving station. A facility that only receives and dispenses laundry and dry cleaning that is processed in bulk by a commercial laundry or dry cleaning facility located elsewhere.

Laundry and/or dry cleaning, self-service. A facility for washing and/or dry cleaning garments and similar items where typically the customer supervises and handles the cleaning of his/her garments and items, such as a laundromat. Machines for use are typically of a similar size as found in the home and not a commercial laundry or cleaning plant.

Laundry and/or dry cleaning, small custom shop. A retail establishment for the cleaning of individual garments, fabrics, rugs, draperies or other similar items on the premises, which may include minor garment repair. A custom cleaning shop not exceeding 5,000 square feet of floor area or a pickup station.

Liquor store. A facility for the sale of beer, wine, and/or liquor not for on-premises consumption that derives 75 percent or more of its gross revenue from the on-premises sale of beer, wine, and/or liquor. (See section 106.05.02.2(o), "liquor stores" for regulations).

Machine/welding shop. A facility in which materials are processed by machining, cutting, grinding, welding, etc.

Manufactured home. Any manufactured single-family mobile home constructed prior to June 15, 1976. (See also Dwelling, factory-built home. (See section 106.05.02.2(p), "manufactured home replacement" for replacement regulations)

Manufactured/mobile home display and sales. The offering for sale, storage, or display of trailers, HUD-Code manufactured homes or mobile homes on a parcel of land but excluding the use of such facilities as dwellings either on a temporary or permanent basis. Such use may be permitted with the approval of the town council in the MH Mobile Home District to permit sale of mobile homes or HUD-Code manufactured homes owned by the mobile home park owner or operator for placement in the mobile home park.

Manufacturing and industrial, heavy. A facility that involves assembly and fabrication activities and the use of machines, tools and labor to make items for use or sale and typically requires access to major thoroughfares, major highways, and/or other means of transportation such as the railroad for transfer of parts and final products. May also include warehousing, research and development, wholesaling operations with infrequent customer or client visits, and may include related office and shipping areas. Heavy industry involves one or more of the following characteristics such as large and heavy products; large and heavy equipment and facilities (such as heavy equipment, large machine tools, and spacious buildings); or complex and numerous processes. ~~The labor for heavy industry often must be highly skilled.~~ Examples of heavy industry include, but are not limited to, steel manufacturing, automotive assembly, machine tool design and construction, boat or aircraft manufacturing, and power plants.

Manufacturing and industrial, light. A facility that involves assembly and fabrication activities and the use of machines, tools and labor to make items for use or sale. May also include warehousing, research and development, wholesaling operations with infrequent customer or client visits, and may include related office and shipping areas. Light industry is often assembly-based and is typically consumer-oriented (i.e., most light industrial products are sold to retail stores or end users rather than as intermediate parts for use by other industries). Light industry generally has less environmental impact than those associated with heavy industry. ~~Light industry may employ lower skilled workers with only moderate training and often employ large numbers of people.~~ Light industries require a relatively small amount of raw materials, area and power. Examples of light industry include, but are not limited to, plastic items, clothing, shoes, foods, beverages, personal care and home care products, cosmetics, drugs, furniture, consumer electronics, and home appliances.

Media studio. A facility where the production, editing, storage, and/or transmittal of audio/visual media occurs. Includes, but is not limited to, a TV studio, a radio studio, a production or editing facility. (See section 106.05.02.2(q), media studio" for regulations)

Mini-warehouse/self storage. A building containing separate, individual self-storage units for rent or lease. The conduct of sales, business, or any activity other than storage is prohibited within any individual storage unit.

Mixed-use building. A vertical mixed use building that includes a variety of retail, office, and/or residential uses such as lofts, live-work units, apartments and condominiums, but contains nonresidential use in a majority of the ground floor.

Mobile food vendor, food truck. Any person who operates and sells food from a motorized vehicle capable of moving from place to place during the course of the day and may include some preparation of food or drink for sale.

Mobile food vendor, stationary. Any person or persons who operates and sells food from a stationary cart or trailer mounted on a chassis, for a period of 15 calendar days or more per year. Stationary mobile food vendors include, but are not limited to, snow-cone stands, hot-dog carts, and ice-cream carts. Any similar facility that operates for 14 calendar days or less shall be considered a "temporary food establishment" as defined by the town health ordinance, as it exists or may be amended.

Model home. A single-family dwelling in a developing subdivision located on a legally platted lot of record that is limited to temporary use as a sales office for the subdivision and to provide an example of the dwellings which have been built or which are proposed to be built in the same subdivision. (See section 106.05.03(e), "model home, temporary" for regulations)

Motel. A facility offering short-term overnight lodging accommodations on a daily rate to the general public and having direct access to individual guest rooms from the parking area or outside balconies.

Motorcycle sales/service. A facility that sells, leases, and services motorcycles, usually defined as two-wheeled, self-propelled vehicle having one or two saddles or seats, and may have a sidecar attached. For purposes of this chapter, motorbikes, motor-scooters, mopeds and similar vehicles are classified as motorcycles.

Municipal uses operated by the Town of Little Elm. Any structure, park, open space, or roadway owned and/or operated by the Town of Little Elm, including but not limited to town hall, libraries, recreation centers, parks, and roadways.

Museum/art gallery. A building serving as a repository for a collection of natural, scientific, artistic, or literary objects of interest, and designed to be used for viewing, with or without an admission charge, and which may include as an accessory use the sale of goods related to the collection.

Office, administrative, medical, or professional. A building used for the provision of executive, management, or administrative services. Typical uses include, but are not limited to, administrative offices and services including real estate, property management, investment, medical, architect, engineer, travel, secretarial services, accounting organizations and associations, and vehicle rental office without on-site storage of fleet vehicles.

Office, showroom. A building that primarily consists of sales offices and sample display areas for products and/or services delivered or performed off-premises. Catalog and telephone sales facilities are examples. Incidental retail sales of products associated with the primary products and/or services are also permitted. Warehousing facilities shall not exceed 50 percent of the total floor area. This designation does not include contractor's shop and storage yard.

Office, warehouse, distribution center. A building primarily devoted to storage, warehousing, and distribution of goods, merchandise, supplies, and equipment. Accessory uses may include retail and wholesale sales areas, sales offices, and display areas for products sold and distributed from the storage and warehousing areas. Also referred to as "flex space."

Open storage and display, permanent. A secondary land use providing outdoor storage or display of commodities, materials, goods, equipment, vehicles, or merchandise in its normal day-to-day business activities. This definition excludes new and used sale or lease of automobiles, motorcycles recreational vehicles, boats, or watercrafts. This definition does not include temporary outside merchandise display, such as a sidewalk sale. (See section 106.05.02.2(s), "open storage, permanent or ongoing" for regulations)

Open storage and display, temporary. The temporary display of merchandise for sale outside of a building. (See section 106.05.03(f), "open storage, temporary" for regulations)

Open storage and display, under eave display, temporary. The temporary display of merchandise for sale located immediately outside the main entrance to the building and generally in the area that is adjacent to the

building and between the building and the walkway/entrance. Items include, but are not limited to, firewood, plants, pumpkins, shopping carts, and other similar items. (See section 106.05.03(g), "open storage, temporary, under eave display" for regulations)

Park or playground. An open recreation facility or park owned and operated by a public agency such as the municipal park department or school board and available to the general public.

Personal service (other than listed). Establishments primarily engaged in providing on-site services to consumers based on intellectual or manual efforts. Examples include, but are not limited to, a licensed massage business, tutoring service, tailor, shoe repair service, barbershop, beauty shop, health studio, spa/salon, or travel consultant.

Portable building sales. A retail establishment that sells portable buildings meant to be used as accessory uses only and not for habitation.

Print shop, major industrial plant. An establishment specializing in long-run printing operations including, but not limited to, book, magazine, and newspaper publishing using engraving, die cutting, lithography, and thermography processes.

Print shop, minor retail shop. An establishment specializing in short-run operations to produce newsletters, flyers, resumes, maps, construction documents and plans, and similar materials using photocopying, duplicating, and blue printing processes. This definition shall include mailing and shipping services, but excludes the on-site storage of heavy load fleet vehicles, such as a Kinko's.

Printing plant, reprographic shop. A facility for the reproduction of materials or drawings on a job order or bulk basis utilizing lithography, off-set printing, or other printing techniques.

Private club. A facility that caters to a limited clientele that requires membership standing in order to participate. May include, but is not limited to, cigar clubs, gaming clubs, pool rooms, or other similar type uses. May require additional licenses from TABC or the state for operation. Does not include not-for-profit gaming operations, such as Bingo, offered by charitable organizations.

Religious facility. A building used primarily for religious assembly and worship and those accessory activities which are customarily associated therewith, and the place of residence for ministers, priests, nuns, rabbis, or other religious personnel on the premises (tax exempt as defined by state law). For the purposes of this chapter, Bible study and other similar activities that occur in a person's primary residence do not constitute a "religious facility."

Research and development center. Facilities for research including laboratories, experimental equipment and operations involving compounding or testing of materials or equipment. Any facility that is determined by health, fire, or building official to be a hazard or nuisance to adjacent property or the community at large, due to the possible emission of excessive smoke, noise, gas, fumes, dust, odor, or vibration, or the danger of fire, explosion, or radiation is not to be included in this category.

Restaurant. A building or portion of a building where food and drink is served for consumption in the building, and where provisions may be made for serving food on the premises outside the building.

Restaurant, dine-in only. An establishment where food and drink are prepared, served and consumed by the general public within an indoor dining area and may include an outdoor seating area.

Restaurant, dine-in only with alcoholic beverages. An establishment where food and drink, including alcoholic beverages, are prepared, served and consumed by the general public within an indoor dining area and may include an outdoor seating area.

Restaurant, drive-in. An eating establishment where food or drink is served to customers in motor vehicles or where facilities are provided on the premises which encourage the serving and consumption of food in automobiles on or near the restaurant premises. An establishment where food and drink are prepared and

ordered via service screens and served to customers either in an outdoor seating area or in their motor vehicles that are temporarily parked and which the food will generally be consumed in their vehicles or off-premises.

Restaurant, drive-through service. An establishment where food and drink are prepared, served and consumed by customers who are given the option of dining within the indoor dining area, the outdoor seating area or via a service window and drive-through lane to customers in motor vehicles who will be consuming the food off-premises.

Restaurant, pick-up or delivery only. An establishment preparing food to the general public in which the food, once prepared, is either picked up for consumption off-premises, or is delivered to the end user by the restaurant staff.

Restaurant, temporary. A retail food establishment that operates at a fixed location for a limited period of time.

Restaurant, with micro-brewery. An establishment that serves food and alcoholic beverages that prepares handcrafted natural beer or ale intended for consumption on the premises as an accessory use.

Salvage yard, wrecking yard. Any lot upon which four or more motor vehicles of any kind which are incapable of being operated due to condition or a lack of license or have been placed for the purpose of obtaining parts for recycling or resale.

School, charter. An alternative institution to the public school system licensed and funded by the state which provides a basic academic education comparable to that provided in the public schools and receives funding from the state and charges no admission fees to its attendees.

School, private or parochial. A school under the sponsorship of a private or religious agency having a curriculum generally equivalent to public elementary or secondary schools, but not including private or trade or commercial schools, and receives no funding from any governmental agency. Establishments that provide cooperative education (co-op) are included in this definition.

School, public. An educational institution regulated by the state which is operated by the public or an independent school district, having a curriculum that includes kindergarten, elementary or secondary education, but not including private, business, commercial, trade, or craft schools.

Seasonal sales. Temporary display and sale of items customarily associated with a particular season, such as Christmas trees, holiday decorations, firewood; pumpkins, or any other similar product for sale during a recognized holiday.

Senior living facility. A multiple family dwelling means any building or portion thereof which is designed, built, rented, leased or let to contain three or more age-restricted (55 or older) dwelling units or apartments on a single lot, or which is occupied as a home or place of residence by three or more age-restricted (55 or older) families living in independent dwelling units.

Sewage pump station. A facility for transporting sewer including pumps, piping, valves and controls.

Sewage treatment plant. A facility that treats sewage so that it may be returned to the natural water supply without negative effects. Water from a sewage treatment plant is considered "gray water" and is suitable for irrigation but no consumption.

Sexually oriented businesses. Sexually oriented establishments and businesses as defined in town Ordinance No. 628 as it exists or may be amended. Sexually oriented uses include, but are not limited to, adult bookstore, adult video store, adult theater, adult cabaret, sexual encounter center, and nude modeling center. (See section 106.05.02.2(v), "sexually oriented businesses" and the aforementioned town ordinances for regulations)

Smoking establishment. An establishment that sells products and devices primarily for the purpose of smoking or vaping in various forms. These establishments sometime provide a contained area with a separate ventilation system for the purpose of smoking within the associated structure.

Store, big box. A retail establishment with a single-tenant that comprises more than 50,000 square feet, such as Target or Walmart.

Store, convenience. A retail establishment providing for the sale of food items, nonprescription drugs, small household items and gifts. Gasoline and diesel fuel may also be offered for sale. Maximum size of the establishment shall be no more than 6,000 square feet, not including storage areas and administrative offices.

Store, discount, variety or department. A retail establishment offering a wide variety of merchandise in departments and exceeding 6,000 square feet in floor area.

Store, drugstore or pharmacy. A retail establishment for preparing, preserving, compounding and dispensing of drugs and medicines; and may include the display and sale of other merchandise such as cosmetics, notions, fountain service and similar items.

Store, feed. A retail establishment for the sale of grain, prepared feed, and forage for pets, livestock and fowl, but not involving the grinding, mixing, or commercial compounding of such items. An establishment for the selling of corn, grain, and other foodstuffs for animals and livestock and including other implements and goods related to agricultural processes, but not including farm machinery.

Store, furniture, home furnishings and appliance store. A retail facility that sells primarily goods for the home, such as furniture, carpet, appliances, and accessories.

Store, grocery. A retail establishment that displays and sells consumable goods and sundries and may include secondary uses such as a pharmacy, photo shop, banking service, delicatessen, bakery and/or prepared foods.

Store, hardware and home improvement. A retail establishment that sells building materials, paint, cutlery, tools, utensils, screws, nails, etc. This definition does not include "big box" hardware/lumber/home improvement type stores with outdoor display.

Store, incidental retail or service uses. Located within an office or other employment center, such uses include barbershop or beauty shop, smoke shop, candy counter, restaurant, pharmacy, or other incidental activity secondary to the primary office or employment occupancy.

Store, pet shop. A retail establishment offering small animals, fish, or birds for sale as pets and where all such creatures are housed within the building.

Store, shopping center. A group of retail, service, commercial, and restaurant establishments planned, constructed and managed as a single entity with customer and employee parking provided on-site, provision for goods delivery separated from customer access, provision of aesthetically appropriate design and protection from the elements.

Street, private. A thoroughfare which affords access to property abutting thereon for residents of that property and service vehicles only via controlled gate access. The land on which the street is constructed is owned by a homeowners association and the street is maintained by that entity. (See sections 106.05.02.2(t), "private street development/gated communities - existing subdivisions" and (u), "private street development/gated communities - new subdivisions", for regulations)

Street, public. A thoroughfare which affords principal means of access to property abutting thereon. The land on which the street is constructed is owned by a governmental entity and the pavement is maintained by that entity.

Telephone exchange. A telecommunications facility to which subscribers' telephones connect that switches calls among subscribers or to other exchanges for further routing.

Theater, drive-in. An outdoor facility arranged so that patrons can view the screen and receive the sound in the privacy of their cars, or while seated outside.

Theater, indoor. A facility for showing motion pictures to an audience inside an enclosed structure.

Transit center/bus terminal. Passenger terminal or loading facilities for franchised private or publicly-owned transit system.

Truck terminal. An area where trucks used to transport goods are stored or parked between trips.

Truck/trailer/heavy equipment/RV/bus repair. An establishment providing major and minor automobile repair services to heavy load vehicles defined as self-propelled vehicles having a manufacturer's recommended gross vehicle weight (GVW) of greater than 11,000 pounds, such as large recreational vehicles, tractor trailers, buses and other similar vehicles. Such vehicle repair may occur within a structure or outside the structure due to the size of the vehicles.

Truck/trailer/heavy equipment/RV/bus sales. A facility which sells or leases vehicles having a manufacturer's recommended gross vehicle weight (GVW) of greater than 11,000 pounds, such as large recreational vehicles, tractor trailers, buses and other similar vehicles. The term "truck" shall be construed to mean "heavy load vehicle" unless specifically stated otherwise. The sales and leasing facility includes outdoor storage and display of the vehicles listed.

Utility distribution/transmission line. Facilities, including subsidiary stations, that serve to distribute, transmit, transform, or reduce the pressure of gas, water, or electric current, including, but not limited to, electrical transmission lines, gas transmission lines, and metering stations.

Vending kiosk, commercial. An unmanned structure that provides a product for remuneration. Examples are ice machines, video vending machines (see section 106.05.02.2(w), "vending kiosk, commercial" for regulations).

Vending kiosk, not-for-profit. An unmanned structure that provides a product. The fee for such product may be reduced or waived. (See section 106.05.02.2(x), "vending kiosk, not-for-profit" for regulations)

Warehouse. A large facility used primarily for the storage of goods and may include an office incidental to the primary use.

Water pumping station. A facility for transporting water including pumps, piping, valves and controls.

Water reservoir or *well.* An artesian well or manmade underground reservoir where water is collected and kept in quantity for use by a water system.

Water treatment plant. A facility for the purifying, storage, and distribution of town water including a system of reservoirs, channels, and mains.

Wholesale and distribution center. An establishment engaged in the receipt, storage, and distribution of goods, products, cargo, and materials to retailers, wholesalers, agents, brokers, and/or to industrial, commercial, institutional, or professional business users and may include an office incidental to the primary use.

Winery/brewery retail sales. An establishment operated by the holder of a winery or brewery permit which has been lawfully issued to the permittee for the premises by the Texas Alcoholic Beverage Commission (or any successor entity thereto) in accordance with V.T.C.A., Alcoholic Beverage Code ch. 16 for the on-premises consumption of wine and or beer.

Winery/brewery/distillery. A manufacturing plant designed to distill alcoholic spirits such as wine, beer, ale or liquor. No on-premises individual sales of alcoholic drinks are allowed.

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1527 , § 2, 10-15-2019; Ord. No. 1582 , § 2, 12-1-2020; Ord. No. 1614 , § 2, 3-2-2021; Ord. No. 1646 , § 2, 11-16-2021; Ord. No. 1692 , § 2, 12-20-2022)

Sec. 106.01.14 Land use definitions.

Accessory structure. Any structure, either attached or detached from the main building, located on the same lot, the use of which is incidental to that of the main structure. Accessory structures include, but are not limited to, patio covers, arbors, gazebos, cabanas, outdoor kitchens, recreational fire enclosures, trellis, and structures/sheds or the like. A permit is required for many accessory structures (see sections 106.05.02.1(a) and (b), "accessory uses - residential" and "accessory uses - nonresidential," respectively, for regulations).

Adult Day Service. A daytime care establishment that supports the health, nutritional, social, and daily living needs of adults in a professionally staffed, group setting.

Airport or landing field. A landing facility for fixed or rotary wing aircraft containing a minimum of 60 acres (see section 106.05.02.2(a), "airport/helipad/heliport" for regulations).

Airport/heliport. A place where aircraft and/or helicopters can land and take off, usually equipped with hangars, facilities for refueling and repair, and various accommodations for pilots and passengers (see section 106.05.02.2(a), "airport/helipad/heliport" for regulations).

Alternative energy systems.

(1) *Solar devices.* A solar panel or device is a structure that is intended to capture the light from the sun and transfer that energy to electricity for general use (see section 106.05.02.2(b), "alternative energy sources - solar" for regulations.)

(2) *Wind energy conversion system (WECS).* Any mechanical device, such as a wind charger, windmill, or wind turbine, which is designed to extract kinetic energy from the wind and converts or stores it for practical use or a form of usable energy. (see section 106.05.02.2(c), "alternative energy sources - wind energy" for regulations)

Alternative financial services. A check cashing business, payday advance or loan business, money transfer business, car title loan business or pawn shop (see section 106.05.02.2(d), "alternative financial services" for regulations).

(1) *Bank, savings and loan or credit union.* An establishment, open to the public, for the deposit, custody, loan, exchange or issue of money, the extension of credit, and/or facilitating the transmission of funds and that is typically licensed by the appropriate state or federal agency as a bank, savings and loan association, or credit union. This includes businesses' activities listed under SIC Codes 60 and 61, but excludes pawnshops, check cashing businesses, payday advance/loan businesses and car title loan businesses.

(2) *Car title and loan services.* An establishment that makes small consumer loans that leverage the equity value of a car or other vehicle as collateral where the title to such vehicle is owned free and clear by the loan applicant and any existing liens on the car or vehicle cancel the application. The loan terms are often for 30 days and failure to repay the loan or make interest payments to extend the loan allows the lender to take possession of the car or vehicle. This excludes state or federally chartered banks, savings and loan associations or credit unions engaged primarily in the business of making longer term loans and which make loans that leverage the total equity value of a car or vehicle as collateral.

(3) *Check cashing business.* An establishment that provides to the customer an amount of money that is equal to the face of the check or the amount specified in the written authorization for an electronic transfer of money, less any fee charged for the transaction, and where there is an agreement not to cash the check or execute an electronic transfer of money for a specified period of time, the business of cashing checks, warrants, drafts, money orders, or other commercial paper serving the same purpose for compensation by any person or entity other than a retail seller engaged primarily in the business of selling consumer goods, including consumables to retail buyers, that cashes checks or money orders or issues money orders or money transfers for a minimum flat fee as a service that is

incidental to its main purpose or business. This definition excludes a state or federally chartered bank, savings and loan association or credit union, pawnshop, grocery store or gas station, so long as the gas station does not handle more than 100 such transactions within any calendar month.

(4) *Pawn shop.* A shop that lends money in exchange for valuable personal property as security deposited with it or pledged to it. This definition includes the sale of such securities after repossession and the sale of merchandise generally found in retail stores.

(5) *Payday advance or loan business.* An establishment that makes small consumer loans, usually backed by postdated check or authorization to make an electronic debit against an existing financial account, where the check or debit is held for an agreed-upon term, or until an applicant's next payday, and then cashed unless the customer repays the loan to reclaim such applicant's check. ?

Amenity center. A recreational facility, including, but not limited to, clubhouse, swimming pool, or play area, operated for the exclusive use of private residents or neighborhood groups and their guests, and not open to the general public.

Antenna. An instrument or device consisting of wires, poles, rods, or reflecting discs, designed for transmitting or receiving any portion of the radio, microwave, or electromagnetic spectrum (see section 106.05.02.2(h), "communications antennas" for regulations)

Antenna support structure. Any tower, mast, pole, tripod, box frame, or other structure utilized for the purpose of transmission, retransmission, and/or reception of electromagnetic, radio, television, or microwave signals and used for commercial broadcasting or telecommunication purposes. This definition shall also include a satellite dish exceeding 12 feet in diameter and a microwave-transmitting tower. All radiating equipment must comply with Federal Communications Commission (FCC), Environmental Protection Agency (EPA), Occupational Health and Safety Administration (OSHA), and all other applicable state and federal regulatory agency requirements and guidelines for human safety, as they exist or may be amended. Definition includes ancillary ground equipment. (See section 106.05.02.2(i), "communications support structures/towers" for regulations)

Antenna, stealth. A stealth antenna is a commercial antenna that is designed to be non-obtrusive, or virtually transparent or invisible to the surrounding neighborhood. Stealth antennas include, but are not limited to:

(1) Antennas within a building's attic space,

(2) Antennas on the roof of a minimum three-story building and not visible from the property line of the lot on which the antenna is located,

(3) Antennas on a public utility structure, such as a water tower or high transmission line support tower, and painted to match the structure,

(4) Antennas located within a structure such as a flagpole, church steeple, lamppost, subdivision monument, clock tower, or similar architectural feature, and antennas located on an athletic field light pole.

Antique shop and used furniture. A retail establishment engaged in the selling of works of art, furniture, or other artifacts of an earlier period, with all sales and storage occurring inside a building.

Arcade. An establishment in which there are located six or more skill or pleasure machines used for compensation found in the schedule of uses as "Commercial Amusement, Indoor."

Assembly uses. A building or structure for the gathering together of persons for purposes of civic, social or religious functions.

Athletic stadium or field, private. A private field and/or structure used for sporting events with associated spectator seating, either permanent or temporary.

Athletic stadium or field, public. A field and/or structure owned and operated by the town and/or a local independent school district used for sporting events with associated spectator seating, either permanent or temporary. The stadium may include other accessory buildings such as a food service or catering facility and/or dressing rooms/showers.

Automated dispenser machine. An unmanned, freestanding structure that dispenses goods that may include, but are not limited to, water, ice, entertainment videos or CDs, newspapers, and soft drinks, that may be located outside of or separate from the primary structure.

Automated intake machine. An unmanned, freestanding structure that is designed to receive certain goods that include, but are not limited to, recycling items, library books and donations, that may be located outside of or separate from the primary structure.

Automated teller machine (ATM). An unmanned, freestanding structure that performs banking financial functions at a location that may be separate from the controlling financial institution.

Automobile. A self-propelled mechanical vehicle designed for use on streets and highways for the conveyance of goods and people, including, but not limited to, passenger cars, trucks, buses, motor scooters, and motorcycles.

Automobile and boat repair, major. A building or portion thereof whose principal use is for the repair, servicing, equipping, or maintenance of motor vehicles or motor vehicle components, including engines, radiators, starters, transmissions, brakes, tires and wheels, seats and similar components that may require overnight outdoor storage of vehicles awaiting or under repair, if screened in compliance with all applicable regulations. General repair or reconditioning of engines, air-conditioning systems, and transmissions for automobiles; wrecker or towing service with on-site storage of vehicles; collision services including body, frame, or fender straightening or repair; customizing; painting; vehicle steam cleaning; tire retreading; insurance estimations with on-site storage; undercoating and rust proofing, and other similar uses.

Automobile and boat repair, minor. A daytime retail operation wherein the sale, installation, and/or inspection of tires, batteries, brakes and other related minor parts or accessories is carried on; specifically intended to exclude major automotive repair and overnight outdoor storage of vehicles awaiting or under repair.

Automobile and boat sales, accessories. A retail shop that sells parts or accessories for vehicles that does not include any installation of same.

Automobile and boat sales, new. Retail sales or leasing of new automobiles, light load vehicles or boats. Sales, rental, and/or leasing of new automobiles or light load vehicles, including, as accessory uses: sales, repair, and automobile storage.

Automobile and boat sales, outside display. The use of any land area for the display and sale of new or used vehicles and accessory parts, including tires, for automobiles, trucks, vans, trailers, or recreation vehicles.

Automobile and boat sales, used. Retail sales or offering for sale of used automobiles, light load vehicles or boats.

Automobile and boat/rv storage. The storage on a lot or tract of operable motor vehicles for the purpose of holding such vehicles for sale, distribution or storage.

Automobile parking garage. A structure for the parking of automobiles.

Automobile parking lot. An area where a fee is charged for parking automobiles.

Automobile wash, automated secondary use. A facility for the washing of motor vehicles, including a self-service operation, operated in conjunction with another primary use, such as fueling stations or convenience stores.

Automobile wash, full service. A facility where a customer may have an automobile, motorcycle, or other vehicles washed in exchange for financial remuneration. This definition generally includes detailing of the vehicle and may include other services, such as leather or upholstery cleaning.

Automobile wash, self service. A facility, typically coin or token operated, used by the customer to wash their own automobiles, motorcycles, and other vehicles.

Bakery, candy or ice-cream shop. A relatively small retail establishment that primarily sells baked goods, candy and other confections, and/or ice-cream/yogurt for on-premises consumption or take-out.

Banquet Hall. An establishment which is rented by individuals or groups to accommodate private functions including, but not limited to, banquets, weddings, anniversaries, and other similar celebrations. Such use, may or may not include: 1) kitchen facilities for the preparation or catering of food; 20 the sale of alcoholic beverages for on-premise consumption, only during the schedules events, and not open to the general public; 3) outdoor gardens or reception facilities.

Bar. An establishment principally for the sale and consumption of alcoholic beverages on the premises that derives 75 percent or more of its gross revenue on a quarterly (three-month) basis from the sale or service of alcoholic beverages, as defined in the Texas Alcoholic Beverage Code, for on-premises consumption. If an establishment is located in a hotel or motel, the gross revenues of the particular establishment, rather than the gross revenues of the entire hotel or motel, will be used in calculating the percentage of revenues derived from the sale or service of alcoholic beverages. (See section 106.05.02.2(e), "bar or brewpub" for regulations)

Bed and breakfast inn. An owner-occupied private home which offers lodging for paying guests not to exceed one week in duration, and which serves breakfast to these guests and which contains one or more guest bedrooms. (See section 106.05.02.2(f), "bed and breakfast" for regulations)

Body art studio. An establishment whose services include tattooing and/or body piercing. Tattooing shall mean the placing of designs, letters, figures, symbols or other marks upon or under the skin of any person, using ink or other substances that result in the permanent coloration of the skin by means of the use of needles or other instruments designed to contact or puncture the skin. Body piercing shall mean the creation of an opening in an individual's body, other than ear piercing, to insert jewelry or other decoration.

Brewpub. An establishment where the on-site brewing of beer occurs as well as tasting and/or retail sales. (See section 106.05.02.2(e), "bar or brewpub" for regulations)

Building material and hardware sales, major. An establishment for the sale of materials customarily used in the construction of buildings and other structures, including outside storage or display of materials or merchandise and may include the rental of construction tools and/or vehicles.

Building material and hardware sales, minor. An establishment for the sale of materials customarily used in the construction of buildings and other structures, without any outside storage or display of materials or merchandise.

Business Service. This group includes establishments primarily engaged in providing off-site services not elsewhere classified to business enterprises on a fee contract basis . Examples include, but are not limited to, plumbing services, cleaning services, computer/equipment repair services with certain on-site storage needs such as fleet vehicles used to provide off-site services to customers.

Campground or *RV park.* Any area that is designed for occupancy by transients using tents, mobile trailers, or recreational vehicles for temporary sleeping purposes. Also, a tract of land on which two or more campsites are located, established, or maintained as temporary living quarters for recreation, education or vacation purposes.

Caretaker's/guard's residence. A residence located on a premises with a main nonresidential use and occupied only by a caretaker or guard, and his/her family, employed on the premises. (see section 106.05.02.2(g), "caretaker or guard residence" for regulations)

Catering service. A business which offers prepared food and drink for consumption elsewhere.

Child care center, incidental. A place designed solely for the care of children belonging to employees and/or patrons of the primary use. The center shall be completely contained within the primary use and shall not constitute more than 15 percent of the main use. The operating hours of the center shall be the same as the primary use and shall not include overnight lodging, medical treatment, counseling, or rehabilitation services. This use may be subject to regulation by the Texas Department of Family and Protective Services.

Child care center. A facility that is licensed to care for any number of children for less than 24 hours per day, at a location other than the permit holder's primary residence. Included in this definition are daycare services, Montessori schools.

Child care, group home. An adult and/or child caring facility licensed by the state, designed to provide resident services to individuals who are physically handicapped, mentally ill, mentally retarded, or developmentally disabled, in which no more than eight such individuals reside with one or more resident counselors or other staff persons. For the purposes of this section, mental illness and developmental disability shall not include illegal use of or addiction to a controlled substance or any criminal behavior.

Child care, foster family home (independent). Per the definition of the department of family and protective services (DFPS) or as amended by the DFPS, a single independent home that is the primary residence of the foster parents and licensed to provide care for up to six children up to the age of 18 years.

Child care, foster group home (independent). Per the definition of the department of family and protective services (DFPS) or as amended by the DFPS, a single independent home that is the primary residence of the foster parents licensed to provide care for seven to 12 children up to the age of 18 years.

Child care, licensed child care center. Per the definition of the department of family and protective services (DFPS) or as amended by the DFPS, an operation providing care for seven or more children younger than 14 years old for less than 24 hours per day at a location other than the permit holder's home.

Child care, licensed child care home. Per the definition of the department of family and protective services (DFPS) or as amended by the DFPS, the primary caregiver provides care in the caregiver's own residence for children from birth through 13 years. The total number of children in care varies with the ages of the children, but the total number of children in care at any given time, including the children related to the caregiver, must not exceed 12.

Child care, listed family home. Per the definition of the department of family and protective services (DFPS) or as amended by the DFPS, a caregiver at least 18 years old who provides care in her own home for compensation, for three or fewer children unrelated to the caregiver, ages birth through 13 years. Regular care is provided, which is care provided for at least four hours a day, three or more days a week, and more than nine consecutive weeks. The total number of children in care, including children related to the caregiver, may not exceed 12.

Child care, registered child care home. Per the definition of the department of family and protective services (DFPS) or as amended by the DFPS, a caregiver who provides regular care in her own home for not more than six children from birth through 13 years. Child day care can be provided for six additional school-aged children before and after the customary school day. The total number of children in care at any given time, including the children related to the caregiver, must not exceed 12.

Clinic, animal (no outside runs). An animal medical facility designed for immediate and short term care (i.e. not requiring the animal to be boarded or kept within the facility overnight), for diagnosis, treatment of household pets including but not limited to dogs, cats, and birds.

Clinic, animal (with outside runs). A facility for diagnosis, treatment or hospitalization of household pets including but not limited to dogs, cats, birds, and horses.

Clinic/medical lab. Offices for one or more physicians, surgeons or dentists engaged in treating sick or injured persons, but not including rooms for the lodging of patients. The facility may also conduct the testing of blood and other tissue samples for the purpose of diagnosis of diseases.

College, university, or *trade school.* An institution established for educational purposes offering courses for study beyond the secondary education level, including trade schools and commercial schools offering training or instruction in a trade, art, or occupation.

Commercial amusement, indoor. An enterprise providing for indoor recreational activities, services, amusements, and instruction, usually for an admission fee. Uses may include, but are not limited to, bowling alleys, ice or roller skating rinks, bingo parlors, amusement arcades, and/or sports practice areas. Such business shall be constructed to limit noise by installing adequate acoustic barriers.

Commercial amusement, outdoor. An enterprise providing for outdoor recreational activities, services, amusements, and instruction, usually for an admission fee, including, but not limited to, batting cages, miniature golf, go-kart tracks, and carnivals.

Commissary. A facility that is the home base for a restaurant-equipped vehicle that serves as a mobile food vendor. The commissary also is used for the storage and partial production of food items that are delivered to customers by the mobile food vendor located away from the commissary location.

Communication tower/antenna. Any tower, mast, pole, tripod, box frame, or other structure utilized for the purpose of transmission, retransmission, and/or reception of electromagnetic, radio, television, or microwave signals. See also "antenna support structure." (See section 106.05.02.2(h), "communication antennas" for regulations)

Concrete batch plant, permanent. A permanent manufacturing facility for the production of concrete or asphalt.

Concrete batch plant, temporary. A temporary manufacturing facility for the on-site production of concrete or asphalt during construction of a project, and to be removed when the project is completed. Following removal, the tract shall be returned to its previous condition. (See section 106.05.03(a), "batch plants, temporary" for regulations)

Construction yard, field office, temporary. A building, structure, or storage/assembly yard used in conjunction with a development project for housing temporary supervisory or administrative functions related to development, construction, or the sale of real estate properties within the development and subject to removal at completion of construction. A facility used for the temporary office and material storage in connection with a project under construction or remodel. (See section 106.05.03(d), "construction yard, temporary" for regulations)

Contractor's shop. A facility for the contractor's office and the storage and maintenance of contractor's supplies and operational equipment.

Dwelling, assisted living facility. A private facility that provides care for chronically ill, aged, or disabled persons who need some health supervision and related care but not including hospital care. Such facilities do not contain facilities for surgical care or the treatment of alcoholism, drug addiction, communicable disease or injury. A facility designed for adults or children with special needs and/or who need assistance with daily living, including but not limited to the production of meals, assistance with shopping, management of medications and personal grooming. Typically, the resident occupies a room or suite of rooms and eats the majority of meals communally.

Dwelling, assisted living home. A facility located in a private residential home designed for adults who need or desire assistance with daily living, including but not limited to the production of meals, assistance with shopping, management of medications and personal grooming. (See section 106.05.02.2(j), "home child care" for regulations)

Dwelling, boardinghouse or rooming house. A building other than a hotel where lodging and/or meals for three or more persons are provided for compensation.

Dwelling, duplex. A building containing two single-family dwelling units totally separated from each other by an unpierced fire wall from basement to roof, intended or designed for occupancy by two families.

Dwelling, factory-built home. Any manufactured single-family mobile home constructed prior to June 15, 1976. (See also dwelling, HUD-Code manufactured home)

Dwelling, group home. An adult and/or child care facility, licensed by the state, designed to provide resident services to individuals who are physically handicapped, mentally impaired, or developmentally disabled, but does not provide services to individuals with psychiatric, addiction, substance abuse or who exhibit criminal behavior. (See section 106.05.02.2(j), "home child care" for regulations)

Dwelling, HUD-Code manufactured home. A HUD-Code compliant single-family structure constructed after June 15, 1976, designed for long-term residential use that is constructed elsewhere and is moved from the factory or sales location to its permanent site (see also dwelling, factory-built home)

Dwelling, listed family home. A home that provides child care for compensation for three or fewer children, excluding children who are related to the caretaker, for at least four hours a day, three or more days a week, for more than nine consecutive weeks in the caretaker's own residence and that is required to [be] listed with the state. (See section 106.05.02.2(j), "home child care" for regulations)

Dwelling, live-work. A dwelling unit that contains, to a limited extent, a separate commercial component on the ground floor and is typically in the form similar to a townhouse or store with residential quarters above or behind the commercial use.

Dwelling, mobile home. Any manufactured single-family mobile home constructed prior to June 15, 1976.

Dwelling, multifamily. Any building or portion thereof, which is designed, built, rented, leased, or let to be occupied as three or more dwelling units or apartments or which is occupied as a home or place of residence by three or more families living in independent dwelling units. Though residential in use, it is considered a commercial development in regard to and application of development standards and regulations. A building containing three or more dwelling units on a single lot or tract designed to be occupied by three or more families living independent of one another.

Dwelling, patio home. A dwelling on a separate lot with open space setbacks on at least three sides.

Dwelling, single-family, detached. A platted lot containing one dwelling unit, not attached to any other dwelling by any means and is surrounded by open space or yards, designed and constructed for occupancy by one family and has no physical connection to a building located on any other separate lot or tract.

Dwelling, townhome. A structure containing three or more dwelling units with each unit designed for occupancy by one household and each unit attached by a common fire wall.

Electrical power generating plant. All equipment, fixtures, and property operated or maintained in connection with the production of electricity and transmission of electricity produced.

Electrical substation. A location for transforming electricity prior to the distribution of electricity to individual customers.

Fairgrounds/exhibition area. An area that may include structures or outside areas for the exhibition of rodeos, conventions and similar special events.

Family. (1) one or more persons related by blood, marriage, adoption or guardianship occupying a dwelling unit and living as a single housekeeping unit; or (2) a group of persons not all related by blood, marriage, adoption or guardianship occupying a dwelling unit and living as a single housekeeping unit, but not to exceed two persons per bedroom with a maximum total of five such persons occupying a dwelling unit.

Farm accessory building. A structure located on an active farm, ranch, or orchard in which livestock, feed, equipment, vehicles, or accessories necessary for the running of the business are kept, including but not limited to, barns, silos, sheds and exercise pavilions.

Farm, ranch, stable, garden or *orchard.* An area of five acres or more which is used for growing of usual farm products, vegetables, fruits, trees and grain and for the raising thereon of the usual farm poultry and farm animals such as horses, cattle, and sheep and including the necessary accessory uses for raising, treating, and storing products raised on the premises, but not including the commercial feeding of offal or garbage to swine or other animals and not including any type of agriculture or husbandry specifically prohibited by ordinance or law.

Farmers market. An area containing individual vendors who offer fruits, vegetables, herbs, spices, edible seeds, nuts, live plants, flowers, and honey for sale. This definition does include the sale of meat, fish, poultry, eggs, refrigerated dairy products, or home canned or packaged items when the proper health rules and regulations are followed and/or health permit obtained. (See section 106.05.03(c), "farmers market, temporary" for regulations)

Florist. A facility for the retail sale of flowers, ornamental plants, and accessory items. This definition does not include a nursery with outside display. (See also Greenhouse and Nursery)

Fraternal organization, lodge, civic club, fraternity or *sorority.* A group of people whose membership is restricted by a set of bylaws or regulations.

Funeral home/crematorium. A place for the storage of human bodies prior to their burial or cremation, or a building used for the preparation of the deceased for burial or cremation, where cremation occurs within the building, with or without place where ceremonies or gatherings connected to the deceased may occur.

Funeral home/mortuary. A place for the storage of human bodies prior to their burial, or a building used for the preparation of the deceased for burial and the display of the deceased, a place where ceremonies or gatherings connected to the deceased may occur, but does not allow the cremation of human remains.

Gas pumps/fuel sales. A retail fuel sales facility selling fuel for motor vehicles including, but not limited to, automobiles, motorcycles, buses, or recreational vehicles with no ancillary services such as vehicle service, vehicle repair, or sale of items other than fuel. The fueling or gasoline station may be attended or automated.

Golf course, tennis club, polo club, or *country club (private).* An area of 20 acres or more containing a golf course, polo facilities, tennis facilities and/or a clubhouse and available only to private specific membership; such a club may contain adjunct facilities such as private club, dining room, swimming pool, retail sales, and similar recreational or service facilities. A tract of land with at least nine holes for playing the game of golf that may include a clubhouse, dining and snack bar, pro shop, practice facility and other accessory uses.

Greenhouse or *nursery for retail plant sales.* A facility that may include the outside display of plants offered for sale when such display is located behind the front yard line established in the district in which the nursery or greenhouse is located.

Gun or archery range, indoor. Any indoor facility open to the public and occupying all or a portion of a building where firearms are discharged or arrows are shot for either testing or recreation purposes. Such business shall be constructed to limit noise by installing adequate acoustic barriers.

Gunsmith. A retail establishment for the sale and service of guns and related items.

Gymnastics/dance studio/martial arts. A building or portion of a building used by a gymnast, dancer, or martial artist for practice or for instructional classes in gymnastics, dance, or martial arts and similar activities.

Health/fitness center. A facility which promotes physical fitness, weight control, exercise, and personal improvement that may also include massage or bathing.

Heavy machinery sales, service, and storage. A retail or wholesale facility that sells, services and stores heavy machinery such as farm equipment, dredging equipment, paving equipment, etc.

Helipad. A place, typically on the roof of a building or a small ground area where helicopters may land and take off, but without any service or fueling capabilities. (See section 106.05.02.2(a), "airport/helipad/heliport" for regulations)

Home occupation. An occupation, which is secondary to the primary use of a dwelling as a residence, conducted on residential premises by the occupant of the residence. Home occupations shall be subject to the conditions set forth in section 106.05.02.2(k), "home occupations." Any activity carried out for personal gain in a dwelling unit by a resident of the premises, which occupation is secondary to the residential purpose of the premises.

Hospital. An institution or place where sick or injured patients are given medical or surgical care either at public (charity) or private expense.

Hotel. A building or group of buildings designed for and occupied as a temporary abiding place of individuals with access to the rooms from an indoor corridor and providing six or more room units where customary services such as linen, maid service, telephone, and upkeep of furniture are provided for a daily fee.

Hotel, extended stay (also called "residence hotel"). A building or group of buildings used as a temporary dwelling place for individuals in exchange for financial consideration where customary hotel services such as linen, housekeeping service, and telephone are provided. Residence hotel room units are designed to be suitable for long term occupancy with financial consideration typically being calculated on a weekly and/or monthly basis. Typical residence hotel attributes include, but are not limited to, kitchen facilities, and external doorways into room units. (See section 106.05.02.2(l), hotel, extended stay" for regulations)

Hotel, full-service. A full service hotel is considered a top tier hotel in terms of amenities and service provided to the clientele. (See section 106.05.02.2(m), "hotel, full-service" for regulations)

Hotel, limited service. A limited service hotel provides travelers an economical choice with fewer amenities than a full service hotel. (See section 106.05.02.2(n), "hotel, limited-service" for regulations)

Household appliance service and repair. A retail establishment where household appliances are serviced and repaired on site. May also include sales of new or used household appliances.

Incidental retail and service uses. Defined as operating within another establishment, such as a bank branch, nail salon, eyewear service, tax service, etc. within a "big box" store. May also be located within an office complex or hotel, or institution, such as a deli, convenience store, or restaurant for the use of the employees, guests, and students.

Kennel, indoor. An establishment where domesticated animals(four or more dogs, cats or other domestic animals at least four months of age) are housed, groomed, bred, boarded, trained, or sold for commercial purposes that does not include outside pens or runs.

Kennel, outdoor. An establishment where domesticated animals (four or more dogs, cats or other domestic animals at least four months of age) are housed, groomed, bred, boarded, trained, or sold for commercial purposes that includes outdoor pens or runs.

Laundry and/or dry cleaning, commercial. A plant for cleaning garments, fabrics, rugs, uniforms, draperies, or other similar items on a commercial or bulk basis.

Laundry and/or dry cleaning, pickup and receiving station. A facility that only receives and dispenses laundry and dry cleaning that is processed in bulk by a commercial laundry or dry cleaning facility located elsewhere.

Laundry and/or dry cleaning, self-service. A facility for washing and/or dry cleaning garments and similar items where typically the customer supervises and handles the cleaning of his/her garments and items, such as a laundromat. Machines for use are typically of a similar size as found in the home and not a commercial laundry or cleaning plant.

Laundry and/or dry cleaning, small custom shop. A retail establishment for the cleaning of individual garments, fabrics, rugs, draperies or other similar items on the premises, which may include minor garment repair. A custom cleaning shop not exceeding 5,000 square feet of floor area or a pickup station.

Liquor store. A facility for the sale of beer, wine, and/or liquor not for on-premises consumption that derives 75 percent or more of its gross revenue from the on-premises sale of beer, wine, and/or liquor. (See section 106.05.02.2(o), "liquor stores" for regulations).

Machine/welding shop. A facility in which materials are processed by machining, cutting, grinding, welding, etc.

Manufactured home. Any manufactured single-family mobile home constructed prior to June 15, 1976. (See also Dwelling, factory-built home. (See section 106.05.02.2(p), "manufactured home replacement" for replacement regulations)

Manufactured/mobile home display and sales. The offering for sale, storage, or display of trailers, HUD-Code manufactured homes or mobile homes on a parcel of land but excluding the use of such facilities as dwellings either on a temporary or permanent basis. Such use may be permitted with the approval of the town council in the MH Mobile Home District to permit sale of mobile homes or HUD-Code manufactured homes owned by the mobile home park owner or operator for placement in the mobile home park.

Manufacturing and industrial, heavy. A facility that involves assembly and fabrication activities and the use of machines, tools and labor to make items for use or sale and typically requires access to major thoroughfares, major highways, and/or other means of transportation such as the railroad for transfer of parts and final products. May also include warehousing, research and development, wholesaling operations with infrequent customer or client visits, and may include related office and shipping areas. Heavy industry involves one or more of the following characteristics such as large and heavy products; large and heavy equipment and facilities (such as heavy equipment, large machine tools, and spacious buildings); or complex and numerous processes. Examples of heavy industry include, but are not limited to, steel manufacturing, automotive assembly, machine tool design and construction, boat or aircraft manufacturing, and power plants.

Manufacturing and industrial, light. A facility that involves assembly and fabrication activities and the use of machines, tools and labor to make items for use or sale. May also include warehousing, research and development, wholesaling operations with infrequent customer or client visits, and may include related office and shipping areas. Light industry is often assembly-based and is typically consumer-oriented (i.e., most light industrial products are sold to retail stores or end users rather than as intermediate parts for use by other industries). Light industry generally has less environmental impact than those associated with heavy industry. Light industries require a relatively small amount of raw materials, area and power. Examples of light industry include, but are not limited to, plastic items, clothing, shoes, foods, beverages, personal care and home care products, cosmetics, drugs, furniture, consumer electronics, and home appliances.

Media studio. A facility where the production, editing, storage, and/or transmittal of audio/visual media occurs. Includes, but is not limited to, a TV studio, a radio studio, a production or editing facility. (See section 106.05.02.2(q), media studio" for regulations)

Mini-warehouse/self storage. A building containing separate, individual self-storage units for rent or lease. The conduct of sales, business, or any activity other than storage is prohibited within any individual storage unit.

Mixed-use building. A vertical mixed use building that includes a variety of retail, office, and/or residential uses such as lofts, live-work units, apartments and condominiums, but contains nonresidential use in a majority of the ground floor.

Mobile food vendor, food truck. Any person who operates and sells food from a motorized vehicle capable of moving from place to place during the course of the day and may include some preparation of food or drink for sale.

Mobile food vendor, stationary. Any person or persons who operates and sells food from a stationary cart or trailer mounted on a chassis, for a period of 15 calendar days or more per year. Stationary mobile food vendors include, but are not limited to, snow-cone stands, hot-dog carts, and ice-cream carts. Any similar facility that operates for 14 calendar days or less shall be considered a "temporary food establishment" as defined by the town health ordinance, as it exists or may be amended.

Model home. A single-family dwelling in a developing subdivision located on a legally platted lot of record that is limited to temporary use as a sales office for the subdivision and to provide an example of the dwellings which have been built or which are proposed to be built in the same subdivision. (See section 106.05.03(e), "model home, temporary" for regulations)

Motel. A facility offering short-term overnight lodging accommodations on a daily rate to the general public and having direct access to individual guest rooms from the parking area or outside balconies.

Motorcycle sales/service. A facility that sells, leases, and services motorcycles, usually defined as two-wheeled, self-propelled vehicle having one or two saddles or seats, and may have a sidecar attached. For purposes of this chapter, motorbikes, motor-scooters, mopeds and similar vehicles are classified as motorcycles.

Municipal uses operated by the Town of Little Elm. Any structure, park, open space, or roadway owned and/or operated by the Town of Little Elm, including but not limited to town hall, libraries, recreation centers, parks, and roadways.

Museum/art gallery. A building serving as a repository for a collection of natural, scientific, artistic, or literary objects of interest, and designed to be used for viewing, with or without an admission charge, and which may include as an accessory use the sale of goods related to the collection.

Office, administrative, medical, or professional. A building used for the provision of executive, management, or administrative services. Typical uses include, but are not limited to, administrative offices and services including real estate, property management, investment, medical, architect, engineer, travel, secretarial services, accounting organizations and associations, and vehicle rental office without on-site storage of fleet vehicles.

Office, showroom. A building that primarily consists of sales offices and sample display areas for products and/or services delivered or performed off-premises. Catalog and telephone sales facilities are examples. Incidental retail sales of products associated with the primary products and/or services are also permitted. Warehousing facilities shall not exceed 50 percent of the total floor area. This designation does not include contractor's shop and storage yard.

Office, warehouse, distribution center. A building primarily devoted to storage, warehousing, and distribution of goods, merchandise, supplies, and equipment. Accessory uses may include retail and wholesale sales areas, sales offices, and display areas for products sold and distributed from the storage and warehousing areas. Also referred to as "flex space."

Open storage and display, permanent. A secondary land use providing outdoor storage or display of commodities, materials, goods, equipment, vehicles, or merchandise in its normal day-to-day business activities. This definition excludes new and used sale or lease of automobiles, motorcycles recreational vehicles, boats, or watercrafts. This definition does not include temporary outside merchandise display, such as a sidewalk sale. (See section 106.05.02.2(s), "open storage, permanent or ongoing" for regulations)

Open storage and display, temporary. The temporary display of merchandise for sale outside of a building. (See section 106.05.03(f), "open storage, temporary" for regulations)

Open storage and display, under eave display, temporary. The temporary display of merchandise for sale located immediately outside the main entrance to the building and generally in the area that is adjacent to the building and between the building and the walkway/entrance. Items include, but are not limited to, firewood, plants, pumpkins, shopping carts, and other similar items. (See section 106.05.03(g), "open storage, temporary, under eave display" for regulations)

Park or playground. An open recreation facility or park owned and operated by a public agency such as the municipal park department or school board and available to the general public.

Personal service (other than listed). Establishments primarily engaged in providing on-site services to consumers based on intellectual or manual efforts. Examples include, but are not limited to, a licensed massage business, tutoring service, tailor, shoe repair service, barbershop, beauty shop, health studio, spa/salon, or travel consultant.

Portable building sales. A retail establishment that sells portable buildings meant to be used as accessory uses only and not for habitation.

Print shop, major industrial plant. An establishment specializing in long-run printing operations including, but not limited to, book, magazine, and newspaper publishing using engraving, die cutting, lithography, and thermography processes.

Print shop, minor retail shop. An establishment specializing in short-run operations to produce newsletters, flyers, resumes, maps, construction documents and plans, and similar materials using photocopying, duplicating, and blue printing processes. This definition shall include mailing and shipping services, but excludes the on-site storage of heavy load fleet vehicles, such as a Kinko's.

Printing plant, reprographic shop. A facility for the reproduction of materials or drawings on a job order or bulk basis utilizing lithography, off-set printing, or other printing techniques.

Private club. A facility that caters to a limited clientele that requires membership standing in order to participate. May include, but is not limited to, cigar clubs, gaming clubs, pool rooms, or other similar type uses. May require additional licenses from TABC or the state for operation. Does not include not-for-profit gaming operations, such as Bingo, offered by charitable organizations.

Religious facility. A building used primarily for religious assembly and worship and those accessory activities which are customarily associated therewith, and the place of residence for ministers, priests, nuns, rabbis, or other religious personnel on the premises (tax exempt as defined by state law). For the purposes of this chapter, Bible study and other similar activities that occur in a person's primary residence do not constitute a "religious facility."

Research and development center. Facilities for research including laboratories, experimental equipment and operations involving compounding or testing of materials or equipment. Any facility that is determined by health, fire, or building official to be a hazard or nuisance to adjacent property or the community at large, due to the possible emission of excessive smoke, noise, gas, fumes, dust, odor, or vibration, or the danger of fire, explosion, or radiation is not to be included in this category.

Restaurant. A building or portion of a building where food and drink is served for consumption in the building, and where provisions may be made for serving food on the premises outside the building.

Restaurant, dine-in only. An establishment where food and drink are prepared, served and consumed by the general public within an indoor dining area and may include an outdoor seating area.

Restaurant, dine-in only with alcoholic beverages. An establishment where food and drink, including alcoholic beverages, are prepared, served and consumed by the general public within an indoor dining area and may include an outdoor seating area.

Restaurant, drive-in. An eating establishment where food or drink is served to customers in motor vehicles or where facilities are provided on the premises which encourage the serving and consumption of food in automobiles on or near the restaurant premises. An establishment where food and drink are prepared and ordered via service screens and served to customers either in an outdoor seating area or in their motor vehicles that are temporarily parked and which the food will generally be consumed in their vehicles or off-premises.

Restaurant, drive-through service. An establishment where food and drink are prepared, served and consumed by customers who are given the option of dining within the indoor dining area, the outdoor seating area

or via a service window and drive-through lane to customers in motor vehicles who will be consuming the food off-premises.

Restaurant, pick-up or delivery only. An establishment preparing food to the general public in which the food, once prepared, is either picked up for consumption off-premises, or is delivered to the end user by the restaurant staff.

Restaurant, temporary. A retail food establishment that operates at a fixed location for a limited period of time.

Restaurant, with micro-brewery. An establishment that serves food and alcoholic beverages that prepares handcrafted natural beer or ale intended for consumption on the premises as an accessory use.

Salvage yard, wrecking yard. Any lot upon which four or more motor vehicles of any kind which are incapable of being operated due to condition or a lack of license or have been placed for the purpose of obtaining parts for recycling or resale.

School, charter. An alternative institution to the public school system licensed and funded by the state which provides a basic academic education comparable to that provided in the public schools and receives funding from the state and charges no admission fees to its attendees.

School, private or parochial. A school under the sponsorship of a private or religious agency having a curriculum generally equivalent to public elementary or secondary schools, but not including private or trade or commercial schools, and receives no funding from any governmental agency. Establishments that provide cooperative education (co-op) are included in this definition.

School, public. An educational institution regulated by the state which is operated by the public or an independent school district, having a curriculum that includes kindergarten, elementary or secondary education, but not including private, business, commercial, trade, or craft schools.

Seasonal sales. Temporary display and sale of items customarily associated with a particular season, such as Christmas trees, holiday decorations, firewood; pumpkins, or any other similar product for sale during a recognized holiday.

Senior living facility. A multiple family dwelling means any building or portion thereof which is designed, built, rented, leased or let to contain three or more age-restricted (55 or older) dwelling units or apartments on a single lot, or which is occupied as a home or place of residence by three or more age-restricted (55 or older) families living in independent dwelling units.

Sewage pump station. A facility for transporting sewer including pumps, piping, valves and controls.

Sewage treatment plant. A facility that treats sewage so that it may be returned to the natural water supply without negative effects. Water from a sewage treatment plant is considered "gray water" and is suitable for irrigation but no consumption.

Sexually oriented businesses. Sexually oriented establishments and businesses as defined in town Ordinance No. 628 as it exists or may be amended. Sexually oriented uses include, but are not limited to, adult bookstore, adult video store, adult theater, adult cabaret, sexual encounter center, and nude modeling center. (See section 106.05.02.2(v), "sexually oriented businesses" and the aforementioned town ordinances for regulations)

Smoking establishment. An establishment that sells products and devices primarily for the purpose of smoking or vaping in various forms. These establishments sometime provide a contained area with a separate ventilation system for the purpose of smoking within the associated structure.

Store, big box. A retail establishment with a single-tenant that comprises more than 50,000 square feet, such as Target or Walmart.

Store, convenience. A retail establishment providing for the sale of food items, nonprescription drugs, small household items and gifts. Gasoline and diesel fuel may also be offered for sale. Maximum size of the establishment shall be no more than 6,000 square feet, not including storage areas and administrative offices.

Store, discount, variety or department. A retail establishment offering a wide variety of merchandise in departments and exceeding 6,000 square feet in floor area.

Store, drugstore or pharmacy. A retail establishment for preparing, preserving, compounding and dispensing of drugs and medicines; and may include the display and sale of other merchandise such as cosmetics, notions, fountain service and similar items.

Store, feed. A retail establishment for the sale of grain, prepared feed, and forage for pets, livestock and fowl, but not involving the grinding, mixing, or commercial compounding of such items. An establishment for the selling of corn, grain, and other foodstuffs for animals and livestock and including other implements and goods related to agricultural processes, but not including farm machinery.

Store, furniture, home furnishings and appliance store. A retail facility that sells primarily goods for the home, such as furniture, carpet, appliances, and accessories.

Store, grocery. A retail establishment that displays and sells consumable goods and sundries and may include secondary uses such as a pharmacy, photo shop, banking service, delicatessen, bakery and/or prepared foods.

Store, hardware and home improvement. A retail establishment that sells building materials, paint, cutlery, tools, utensils, screws, nails, etc. This definition does not include "big box" hardware/lumber/home improvement type stores with outdoor display.

Store, incidental retail or service uses. Located within an office or other employment center, such uses include barbershop or beauty shop, smoke shop, candy counter, restaurant, pharmacy, or other incidental activity secondary to the primary office or employment occupancy.

Store, pet shop. A retail establishment offering small animals, fish, or birds for sale as pets and where all such creatures are housed within the building.

Store, shopping center. A group of retail, service, commercial, and restaurant establishments planned, constructed and managed as a single entity with customer and employee parking provided on-site, provision for goods delivery separated from customer access, provision of aesthetically appropriate design and protection from the elements.

Street, private. A thoroughfare which affords access to property abutting thereon for residents of that property and service vehicles only via controlled gate access. The land on which the street is constructed is owned by a homeowners association and the street is maintained by that entity. (See sections 106.05.02.2(t), "private street development/gated communities - existing subdivisions" and (u), "private street development/gated communities - new subdivisions", for regulations)

Street, public. A thoroughfare which affords principal means of access to property abutting thereon. The land on which the street is constructed is owned by a governmental entity and the pavement is maintained by that entity.

Telephone exchange. A telecommunications facility to which subscribers' telephones connect that switches calls among subscribers or to other exchanges for further routing.

Theater, drive-in. An outdoor facility arranged so that patrons can view the screen and receive the sound in the privacy of their cars, or while seated outside.

Theater, indoor. A facility for showing motion pictures to an audience inside an enclosed structure.

Transit center/bus terminal. Passenger terminal or loading facilities for franchised private or publicly-owned transit system.

Truck terminal. An area where trucks used to transport goods are stored or parked between trips.

Truck/trailer/heavy equipment/RV/bus repair. An establishment providing major and minor automobile repair services to heavy load vehicles defined as self-propelled vehicles having a manufacturer's recommended gross vehicle weight (GVW) of greater than 11,000 pounds, such as large recreational vehicles, tractor trailers, buses and other similar vehicles. Such vehicle repair may occur within a structure or outside the structure due to the size of the vehicles.

Truck/trailer/heavy equipment/RV/bus sales. A facility which sells or leases vehicles having a manufacturer's recommended gross vehicle weight (GVW) of greater than 11,000 pounds, such as large recreational vehicles, tractor trailers, buses and other similar vehicles. The term "truck" shall be construed to mean "heavy load vehicle" unless specifically stated otherwise. The sales and leasing facility includes outdoor storage and display of the vehicles listed.

Utility distribution/transmission line. Facilities, including subsidiary stations, that serve to distribute, transmit, transform, or reduce the pressure of gas, water, or electric current, including, but not limited to, electrical transmission lines, gas transmission lines, and metering stations.

Vending kiosk, commercial. An unmanned structure that provides a product for remuneration. Examples are ice machines, video vending machines (see section 106.05.02.2(w), "vending kiosk, commercial" for regulations).

Vending kiosk, not-for-profit. An unmanned structure that provides a product. The fee for such product may be reduced or waived. (See section 106.05.02.2(x), "vending kiosk, not-for-profit" for regulations)

Warehouse. A large facility used primarily for the storage of goods and may include an office incidental to the primary use.

Water pumping station. A facility for transporting water including pumps, piping, valves and controls.

Water reservoir or *well.* An artesian well or manmade underground reservoir where water is collected and kept in quantity for use by a water system.

Water treatment plant. A facility for the purifying, storage, and distribution of town water including a system of reservoirs, channels, and mains.

Wholesale and distribution center. An establishment engaged in the receipt, storage, and distribution of goods, products, cargo, and materials to retailers, wholesalers, agents, brokers, and/or to industrial, commercial, institutional, or professional business users and may include an office incidental to the primary use.

Winery/brewery retail sales. An establishment operated by the holder of a winery or brewery permit which has been lawfully issued to the permittee for the premises by the Texas Alcoholic Beverage Commission (or any successor entity thereto) in accordance with V.T.C.A., Alcoholic Beverage Code ch. 16 for the on-premises consumption of wine and or beer.

Winery/brewery/distillery. A manufacturing plant designed to distill alcoholic spirits such as wine, beer, ale or liquor. No on-premises individual sales of alcoholic drinks are allowed.

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1527 , § 2, 10-15-2019; Ord. No. 1582 , § 2, 12-1-2020; Ord. No. 1614 , § 2, 3-2-2021; Ord. No. 1646 , § 2, 11-16-2021; Ord. No. 1692 , § 2, 12-20-2022)

Sec. 106.02.02 Board of adjustment.

(a) *Authority, duties and responsibilities.*

(1) To hear and decide appeals where it is alleged there is error in any order, requirement, decision or determination made by the development services director in the enforcement of this chapter, including any appeal from a vested rights determination by the town manager pursuant to the town's vested rights policy, originally adopted by Resolution No. 11210602, and as amended by Resolution No. 03050801, and detailed in section 106.02.07, "vested rights," and any other applicable amendments.

(2) To hear and decide only such special exceptions as the board of adjustment is specifically authorized to pass on by the terms of this chapter; to decide such questions as are granted; and to grant special exceptions with such conditions and safeguards as are appropriate under this chapter, or to deny special exceptions when not in harmony with the purpose and intent of this chapter.

(3) To hear and decide upon only such variances or modifications of the height, yard, area, coverage and parking regulations as the board is specifically authorized to pass on pursuant to the terms of this chapter.

(4) To hear and decide upon the existence of any nonconforming use and to enforce the amortization provisions as set forth in this chapter and authorized by Texas Local Government Code Section 211.019.

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(5) To provide a reasonable interpretation of the provisions of chapter 22, article III, of the Code of Ordinances relating to substandard structures, to mitigate specific provisions of the substandard structure ordinances which create practical difficulties in their enforcement and to hear cases and make determinations relating to substandard structures.

(b) *Composition of the board and terms of service.*

(1) The board shall consist of five regular members who shall be appointed by the town council. Two of the regular members shall be appointed in one year and the remaining three members shall be appointed in the following year, with terms expiring on February 28 of the year the term ends.

(2) In addition to the five regular members of the board of adjustment, two alternate members of the board, who shall serve in the absence of one or more regular members, shall be appointed by a majority vote of the town council so that all cases heard by the board will always be heard by a minimum of four members. The initial term of office of two of the alternate members shall be one year while the initial term of the other two alternates shall be two years. Thereafter, all of the alternates shall be appointed for two-year terms. In determining which of the two alternate members shall serve in the absence of a member, the alternate members shall be contacted to serve on a rotating basis starting first with the alternate member having the longest tenure. If for any reason more than one member must be absent, more than one (alternate may serve consistent with the provisions of this section.

(3) Each member or alternate member of the board shall be a resident citizen and qualified voter of the town, at the time of his appointment. A member or alternate member who ceases to reside in the town during his term of office must immediately forfeit his office.

(4) The term of office for all members shall be two years. All vacancies on the board shall be filled by the town council.

(5) A regular member may not serve more than two consecutive full terms. This term limitation shall not apply to alternates.

Commented [BS1]: Suggested by Robert

(6) Members of the board may be removed by the town council in accordance with V.T.C.A., Local Government Code ch. 211.

(7) Members and alternates shall serve without compensation.

(c) *Meetings and procedures.* The board shall adopt procedures and rules necessary to the conduct of its affairs and in keeping with the provisions of this chapter and in accordance with state law.

(1) *Meetings.* Meetings shall be held at the call of the chairman and at such other times as the board may determine. The chairman, or in his absence the acting chairman, may administer oaths and compel the attendance of witnesses. All meetings shall be conducted in accordance with the Texas Open Meetings Act.

(2) *Quorum.* Each case before the board must be heard by at least four members. The concurring vote of at least four members of the board shall be necessary to reverse any order, requirement, decision or determination of the director, or to decide in favor of the applicant on any matter upon which the board is required to act under this Code or to grant any variance authorized by this chapter.

(3) *Election of officers.* At the first scheduled board meeting in March of each year, or as soon thereafter as practicable, the first item of business shall be the selection of the board of adjustment's chairman and vice-chairman by the regular members of the board. The alternate members of the board are not eligible to serve as the board chairman or vice-chairman or to participate in the selection of such chairman or vice-chairman.

(4) *Chairman's duties.* The chairman shall preside over meetings. If a question regarding procedures arises, Robert's Rules of Order, Newly Revised, shall apply.

(5) *Vice-chairman's duties.* The vice-chairman shall assist the chairman in directing the affairs of the board of adjustment. In the absence of the chairman, the vice-chairman shall assume the duties of the chairman.

(6) *Minutes.* The board shall keep minutes of its proceedings, showing the vote of each member upon each question, or if absent or failing to vote indicating such fact, and shall keep records of its examinations and other official actions, all of which are public records and shall be immediately filed in the office of the board.

(7) *Voluntary disqualification for cause.* A member shall disqualify himself from voting whenever he finds that he has a personal or monetary interest in the property or case under review, or that he will be directly affected by the decision of the board.

(d) *Appeal of director's decision.* In exercising its powers, the board may, in conformity with the provisions of the state statutes, as existing or hereafter amended, reverse or affirm, wholly or partly, or may modify the order, requirements, decision or determination appealed from and make such order, requirement, decision or determination, in the board's opinion, as ought to be made and shall have all the powers of the officer from whom the appeal is taken.

(1) Appeals to the board concerning interpretation or administration of this chapter that is not related to a specific application, address, or project may be taken by any person aggrieved or by any officer, department, or board of the town affected by any decision of the director. Appeals to the board concerning interpretation or administration of this chapter that is related to a specific application, address, or project may be taken by a person who (i) filed the application that is the subject of the director's decision, (ii) is the owner or representative of the owner of the property that is the subject of the director's decision, or (iii) is aggrieved by the director's decision and is the owner of real property within 200 feet of the property that is the subject of the director's decision. Additionally, any officer, department, board, or bureau of the town may appeal any director's decision concerning interpretation or administration of this chapter. Such appeals shall be taken within a reasonable time,

not to exceed 20 days, after the decision has been rendered by the director by filing with the official and the board a notice of appeal specifying the grounds thereof. The director shall forthwith transmit to the board all papers constituting the record upon which the action appealed from was taken.

(2) The board shall fix a reasonable time for the hearing of the appeal, give public notice thereof as well as due notice to the parties in interest, and decide the same within a reasonable time. At the hearing, any party may appear in person or by agent or attorney. The board shall decide the appeal at the next meeting for which notice can be provided following the hearing and not later than the 60th day after the date the appeal is filed.

(3) An appeal stays all proceedings in furtherance of the action appealed from, unless the director from whom the appeal is taken certifies to the board after the notice of appeal is filed with him, that, by reason of facts stated in the certificate, a stay would, in his opinion, cause imminent peril to life and property. In such case, proceedings shall not be stayed other than by a restraining order which may be granted by the board or by a court of record on application, on notice to the director from whom the appeal is taken and on due cause shown.

(e) *Appeals resulting from board action.*

(1) Any persons, jointly or severally, aggrieved by a decision of the board under this section, or any taxpayer or any officer, department, or board of the municipality may present to a court of competent jurisdiction a petition, duly verified, setting forth that such decision is illegal, in whole or in part, specifying the grounds of the illegality. Such petition shall be presented to the court within ten days after the filing of the decision in the office of the board and not thereafter.

(2) Any owner, lienholder, or mortgagee of record of property, jointly or severally, aggrieved by the final decision of the board issued under this section, may file in district court a petition, duly verified, setting forth that such decision is illegal, in whole or in part, specifying the grounds of the illegality. Such petition shall be presented to the court within 30 days after the date a copy of the final decision is personally delivered or mailed via first class mail, certified mail return receipt requested, to the owner, lienholder, or mortgagee and not thereafter.

(3) Any person aggrieved by a decision of the board issued under this section, may file in district court a petition, duly verified, setting forth that such decision is illegal, in whole or in part, specifying the grounds of the illegality. Such petition shall be presented to the court within 20 days after the date the decision is rendered by the board and not thereafter.

(f) *Special exceptions.*

(1) A special exception shall not be granted by the board unless and until:

a. Written application for a special exception is submitted indicating the section of this chapter under which the special exception is sought and stating the grounds on which it is requested;

b. Notice must be given at least 15 days in advance of the public hearing. The owner of the property for which special exception is sought or his agent shall be notified by mail. Notice of such hearings must be posted on the property for which the special exception is sought, at the town hall, and notice must be provided in one other public place, such as a newspaper, at least 15 days prior to the public hearing;

c. A public hearing must be held. Any party may appear in person or by agent or attorney;

d. The board shall make a finding that it is empowered under the section of this chapter described in the application to grant the special exception, and that the granting of the special exception will not adversely affect the public interest.

(2) In granting any special exception, the board may prescribe appropriate conditions and safeguards in conformity with this chapter. Violation of such conditions and safeguards, when made a part of the terms under which the special exception is granted, shall be deemed a violation of this chapter and the penalties set forth in section 106.01.11, "penalties and enforcement," shall apply. The board shall prescribe a time limit within which the action for which the special exception is required shall begin or be completed, or both. Failure to begin or complete, or both, such action within the time limit set shall void the special exception, without necessity of further action by the board.

(g) *Variances.*

(1) To authorize upon appeal in specific cases such variance from the terms of this chapter as will not be contrary to the public interest where, owing to special conditions, a literal enforcement of the provisions of this chapter would result in unnecessary hardship and so that the spirit of this chapter is observed and substantial justice is achieved. A variance from the terms of this chapter shall not be granted by the board unless and until a written application for a variance is submitted demonstrating the following:

a. That special conditions and circumstances exist which are peculiar to the land, structure, or building involved and which are not applicable to other lands, structures, or buildings in the same district or area;

b. That a literal interpretation of the provisions of this chapter would deprive the applicant of rights commonly enjoyed by other properties in the same district or area under the terms of this chapter;

c. That the special conditions and circumstances do not result from the actions of the applicant; and

d. That granting the variance requested will not confer on the applicant any special privilege that is denied by this chapter to other lands, structures, or buildings in the same district or area.

(2) Nonconforming use of neighboring lands, structures, or buildings in the same district, and permitted use of lands, structures, or buildings in other districts shall not be considered grounds for the issuance of a variance.

(3) Notice of public hearing must be given as set forth in this section;

(4) A public hearing must be held. Any party may appear in person, or by agent or attorney;

(5) The board shall make findings that the requirements of this section have been met by the applicant for a variance;

(6) The board shall further make a finding that the reasons set forth in the application justify the granting of the variance and that the variance is the minimum variance that will make possible the reasonable use of the land, building, or structure;

(7) The board shall further make a finding that the granting of the variance will be in harmony with the general purpose and intent of this chapter and will not be injurious to the neighborhood or otherwise detrimental to the public welfare.

(8) In granting any variance, the board may prescribe appropriate conditions and safeguards in conformity with this chapter. Violation of such conditions and safeguards, when made a part of the terms under which the variance is granted, shall be deemed a violation of this chapter and the penalties set forth in section 106.01.11, "penalties and enforcement," shall apply.

(9) Under no circumstances shall the board grant a variance to allow a use not permissible under the terms of this chapter in the district involved or any use expressly or by implication prohibited by the terms of this chapter in said district.

(h) *Nonconforming uses.*

(1) The board, on its own motion or at the direction of the town council or an interested property owner, may inquire into the existence of any nonconforming use in the Town of Little Elm, and after public hearing and investigation into the conditions created by the use, fire or health hazards created by the use, and any other danger or nuisance to the public due to or created by any condition or use existing on the property, require the discontinuance or termination of such use. The owner of the use under investigation by the board shall have not less than ten days written notice prior to the day of the public hearing. The board, after having heard from any affected parties and the public, shall prescribe a reasonable time period for compliance, discontinuance and termination of the nonconforming use. The board shall, in accordance with Section 211.019 of the Texas Local Government Code, utilize the procedures and owner or lessee compensation criteria contained in said Section in the event the Town determines that a nonconforming use of property shall: ~~that allows for amortization of the owner's actual investment in the use that occurred before the time that the use became nonconforming.~~

a. In prescribing said time period, the board shall consider the following factors:

1. The capital investment in structures, fixed equipment, and other assets (excluding inventory and other assets that may be feasibly transferred to another site) on the property at the time the use became nonconforming;

2. Any costs that are directly attributable to the establishment of compliance date, including demolition expenses, relocation expenses, termination of leases, and discharge of mortgages;

3. Any return on investment since inception of the use, including net income and depreciation; ~~and~~

4. The anticipated annual recovery of investment, including net income and depreciation; and~~.~~

5. In accordance with Section 211.019 of the Texas Local Government Code, utilize the procedures and owner or lessee compensation criteria contained in said Section in the event the Town determines that a nonconforming use of property shall cease.

Commented [BS2]: Suggested by Robert

b. If the board establishes an amortization (or compliance) date for a nonconforming use, the use must cease operation on that date and it may not operate thereafter unless it becomes a conforming use. The board shall, pursuant to the requirements of Section 211.019 of the Texas Local Government Code, determine the payment that is due to the owner or the lessee of the property for damages associated with terminating the nonconforming use.

Commented [BS3]: Suggested by Robert

c. For purposes of this section, "owner" means the owner of the nonconforming use at the time of the board's determination of an amortization (or compliance) date for the nonconforming use, and "lessee" means an individual or entity that has a valid lease for the nonconforming use at the time of the board's determination of an amortization (or compliance) date for the nonconforming use. ~~.~~

Commented [BS4]: Suggested by Robert

d. The board shall have the power to subpoena witnesses, documents and things; administer oaths; punish for contempt; and may require the production of documents and other things, under such regulations as it may establish or deem appropriate.

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1527 , § 2, 10-15-2019; Ord. No. 1665 , § 2, 5-17-2022)

Sec. 106.02.02 Board of adjustment.

(a) *Authority, duties and responsibilities.*

(1) To hear and decide appeals where it is alleged there is error in any order, requirement, decision or determination made by the development services director in the enforcement of this chapter, including any appeal from a vested rights determination by the town manager pursuant to the town's vested rights policy, originally adopted by Resolution No. 11210602, and as amended by Resolution No. 03050801, and detailed in section 106.02.07, "vested rights," and any other applicable amendments.

(2) To hear and decide only such special exceptions as the board of adjustment is specifically authorized to pass on by the terms of this chapter; to decide such questions as are granted; and to grant special exceptions with such conditions and safeguards as are appropriate under this chapter, or to deny special exceptions when not in harmony with the purpose and intent of this chapter.

(3) To hear and decide upon only such variances or modifications of the height, yard, area, coverage and parking regulations as the board is specifically authorized to pass on pursuant to the terms of this chapter.

(4) To hear and decide upon the existence of any nonconforming use and to enforce the amortization provisions as set forth in this chapter and authorized by Texas Local Government Code Section 211.019.

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(5) To provide a reasonable interpretation of the provisions of chapter 22, article III, of the Code of Ordinances relating to substandard structures, to mitigate specific provisions of the substandard structure ordinances which create practical difficulties in their enforcement and to hear cases and make determinations relating to substandard structures.

(b) *Composition of the board and terms of service.*

(1) The board shall consist of five regular members who shall be appointed by the town council. Two of the regular members shall be appointed in one year and the remaining three members shall be appointed in the following year, with terms expiring on February 28 of the year the term ends.

(2) In addition to the five regular members of the board of adjustment, two alternate members of the board, who shall serve in the absence of one or more regular members, shall be appointed by a majority vote of the town council so that all cases heard by the board will always be heard by a minimum of four members. The initial term of office of two of the alternate members shall be one year while the initial term of the other two alternates shall be two years. Thereafter, all of the alternates shall be appointed for two-year terms. In determining which of the two alternate members shall serve in the absence of a member, the alternate members shall be contacted to serve on a rotating basis starting first with the alternate member having the longest tenure. If for any reason more than one member must be absent, more than one (alternate may serve consistent with the provisions of this section.

(3) Each member or alternate member of the board shall be a resident citizen and qualified voter of the town, at the time of his appointment. A member or alternate member who ceases to reside in the town during his term of office must immediately forfeit his office.

(4) The term of office for all members shall be two years. All vacancies on the board shall be filled by the town council.

(5) A regular member may not serve more than two consecutive full terms. This term limitation shall not apply to alternates.

(6) Members of the board may be removed by the town council in accordance with V.T.C.A., Local Government Code ch. 211.

(7) Members and alternates shall serve without compensation.

(c) *Meetings and procedures.* The board shall adopt procedures and rules necessary to the conduct of its affairs and in keeping with the provisions of this chapter and in accordance with state law.

(1) *Meetings.* Meetings shall be held at the call of the chairman and at such other times as the board may determine. The chairman, or in his absence the acting chairman, may administer oaths and compel the attendance of witnesses. All meetings shall be conducted in accordance with the Texas Open Meetings Act.

(2) *Quorum.* Each case before the board must be heard by at least four members. The concurring vote of at least four members of the board shall be necessary to reverse any order, requirement, decision or determination of the director, or to decide in favor of the applicant on any matter upon which the board is required to act under this Code or to grant any variance authorized by this chapter.

(3) *Election of officers.* At the first scheduled board meeting in March of each year, or as soon thereafter as practicable, the first item of business shall be the selection of the board of adjustment's chairman and vice-chairman by the regular members of the board. The alternate members of the board are not eligible to serve as the board chairman or vice-chairman or to participate in the selection of such chairman or vice-chairman.

(4) *Chairman's duties.* The chairman shall preside over meetings. If a question regarding procedures arises, Robert's Rules of Order, Newly Revised, shall apply.

(5) *Vice-chairman's duties.* The vice-chairman shall assist the chairman in directing the affairs of the board of adjustment. In the absence of the chairman, the vice-chairman shall assume the duties of the chairman.

(6) *Minutes.* The board shall keep minutes of its proceedings, showing the vote of each member upon each question, or if absent or failing to vote indicating such fact, and shall keep records of its examinations and other official actions, all of which are public records and shall be immediately filed in the office of the board.

(7) *Voluntary disqualification for cause.* A member shall disqualify himself from voting whenever he finds that he has a personal or monetary interest in the property or case under review, or that he will be directly affected by the decision of the board.

(d) *Appeal of director's decision.* In exercising its powers, the board may, in conformity with the provisions of the state statutes, as existing or hereafter amended, reverse or affirm, wholly or partly, or may modify the order, requirements, decision or determination appealed from and make such order, requirement, decision or determination, in the board's opinion, as ought to be made and shall have all the powers of the officer from whom the appeal is taken.

(1) Appeals to the board concerning interpretation or administration of this chapter that is not related to a specific application, address, or project may be taken by any person aggrieved or by any officer, department, or board of the town affected by any decision of the director. Appeals to the board concerning interpretation or administration of this chapter that is related to a specific application, address, or project may be taken by a person who (i) filed the application that is the subject of the director's decision, (ii) is the owner or representative of the owner of the property that is the subject of the director's decision, or (iii) is aggrieved by the director's decision and is the owner of real property within 200 feet of the property that is the subject of the director's decision. Additionally, any officer, department, board, or bureau of the town may appeal any director's decision concerning interpretation or administration of this chapter. Such appeals shall be taken within a reasonable time,

not to exceed 20 days, after the decision has been rendered by the director by filing with the official and the board a notice of appeal specifying the grounds thereof. The director shall forthwith transmit to the board all papers constituting the record upon which the action appealed from was taken.

(2) The board shall fix a reasonable time for the hearing of the appeal, give public notice thereof as well as due notice to the parties in interest, and decide the same within a reasonable time. At the hearing, any party may appear in person or by agent or attorney. The board shall decide the appeal at the next meeting for which notice can be provided following the hearing and not later than the 60th day after the date the appeal is filed.

(3) An appeal stays all proceedings in furtherance of the action appealed from, unless the director from whom the appeal is taken certifies to the board after the notice of appeal is filed with him, that, by reason of facts stated in the certificate, a stay would, in his opinion, cause imminent peril to life and property. In such case, proceedings shall not be stayed other than by a restraining order which may be granted by the board or by a court of record on application, on notice to the director from whom the appeal is taken and on due cause shown.

(e) *Appeals resulting from board action.*

(1) Any persons, jointly or severally, aggrieved by a decision of the board under this section, or any taxpayer or any officer, department, or board of the municipality may present to a court of competent jurisdiction a petition, duly verified, setting forth that such decision is illegal, in whole or in part, specifying the grounds of the illegality. Such petition shall be presented to the court within ten days after the filing of the decision in the office of the board and not thereafter.

(2) Any owner, lienholder, or mortgagee of record of property, jointly or severally, aggrieved by the final decision of the board issued under this section, may file in district court a petition, duly verified, setting forth that such decision is illegal, in whole or in part, specifying the grounds of the illegality. Such petition shall be presented to the court within 30 days after the date a copy of the final decision is personally delivered or mailed via first class mail, certified mail return receipt requested, to the owner, lienholder, or mortgagee and not thereafter.

(3) Any person aggrieved by a decision of the board issued under this section, may file in district court a petition, duly verified, setting forth that such decision is illegal, in whole or in part, specifying the grounds of the illegality. Such petition shall be presented to the court within 20 days after the date the decision is rendered by the board and not thereafter.

(f) *Special exceptions.*

(1) A special exception shall not be granted by the board unless and until:

a. Written application for a special exception is submitted indicating the section of this chapter under which the special exception is sought and stating the grounds on which it is requested;

b. Notice must be given at least 15 days in advance of the public hearing. The owner of the property for which special exception is sought or his agent shall be notified by mail. Notice of such hearings must be posted on the property for which the special exception is sought, at the town hall, and notice must be provided in one other public place, such as a newspaper, at least 15 days prior to the public hearing;

c. A public hearing must be held. Any party may appear in person or by agent or attorney;

d. The board shall make a finding that it is empowered under the section of this chapter described in the application to grant the special exception, and that the granting of the special exception will not adversely affect the public interest.

(2) In granting any special exception, the board may prescribe appropriate conditions and safeguards in conformity with this chapter. Violation of such conditions and safeguards, when made a part of the terms under which the special exception is granted, shall be deemed a violation of this chapter and the penalties set forth in section 106.01.11, "penalties and enforcement," shall apply. The board shall prescribe a time limit within which the action for which the special exception is required shall begin or be completed, or both. Failure to begin or complete, or both, such action within the time limit set shall void the special exception, without necessity of further action by the board.

(g) *Variances.*

(1) To authorize upon appeal in specific cases such variance from the terms of this chapter as will not be contrary to the public interest where, owing to special conditions, a literal enforcement of the provisions of this chapter would result in unnecessary hardship and so that the spirit of this chapter is observed and substantial justice is achieved. A variance from the terms of this chapter shall not be granted by the board unless and until a written application for a variance is submitted demonstrating the following:

a. That special conditions and circumstances exist which are peculiar to the land, structure, or building involved and which are not applicable to other lands, structures, or buildings in the same district or area;

b. That a literal interpretation of the provisions of this chapter would deprive the applicant of rights commonly enjoyed by other properties in the same district or area under the terms of this chapter;

c. That the special conditions and circumstances do not result from the actions of the applicant; and

d. That granting the variance requested will not confer on the applicant any special privilege that is denied by this chapter to other lands, structures, or buildings in the same district or area.

(2) Nonconforming use of neighboring lands, structures, or buildings in the same district, and permitted use of lands, structures, or buildings in other districts shall not be considered grounds for the issuance of a variance.

(3) Notice of public hearing must be given as set forth in this section;

(4) A public hearing must be held. Any party may appear in person, or by agent or attorney;

(5) The board shall make findings that the requirements of this section have been met by the applicant for a variance;

(6) The board shall further make a finding that the reasons set forth in the application justify the granting of the variance and that the variance is the minimum variance that will make possible the reasonable use of the land, building, or structure;

(7) The board shall further make a finding that the granting of the variance will be in harmony with the general purpose and intent of this chapter and will not be injurious to the neighborhood or otherwise detrimental to the public welfare.

(8) In granting any variance, the board may prescribe appropriate conditions and safeguards in conformity with this chapter. Violation of such conditions and safeguards, when made a part of the terms under which the variance is granted, shall be deemed a violation of this chapter and the penalties set forth in section 106.01.11, "penalties and enforcement," shall apply.

(9) Under no circumstances shall the board grant a variance to allow a use not permissible under the terms of this chapter in the district involved or any use expressly or by implication prohibited by the terms of this chapter in said district.

(h) *Nonconforming uses.*

(1) The board, on its own motion or at the direction of the town council or an interested property owner, may inquire into the existence of any nonconforming use in the Town of Little Elm, and after public hearing and investigation into the conditions created by the use, fire or health hazards created by the use, and any other danger or nuisance to the public due to or created by any condition or use existing on the property, require the discontinuance or termination of such use. The owner of the use under investigation by the board shall have not less than ten days written notice prior to the day of the public hearing. The board, after having heard from any affected parties and the public, shall prescribe a reasonable time period for compliance, discontinuance and termination of the nonconforming use. The board shall, in accordance with Section 211.019 of the Texas Local Government Code, utilize the procedures and owner or lessee compensation criteria contained in said Section in the event the Town determines that a nonconforming use of property shall:

a. In prescribing said time period, the board shall consider the following factors:

1. The capital investment in structures, fixed equipment, and other assets (excluding inventory and other assets that may be feasibly transferred to another site) on the property at the time the use became nonconforming;

2. Any costs that are directly attributable to the establishment of compliance date, including demolition expenses, relocation expenses, termination of leases, and discharge of mortgages;

3. Any return on investment since inception of the use, including net income and depreciation; 4. The anticipated annual recovery of investment, including net income and depreciation; and

5. In accordance with Section 211.019 of the Texas Local Government Code, utilize the procedures and owner or lessee compensation criteria contained in said Section in the event the Town determines that a nonconforming use of property shall cease.

b. If the board establishes an amortization (or compliance) date for a nonconforming use, the use must cease operation on that date and it may not operate thereafter unless it becomes a conforming use. The board shall, pursuant to the requirements of Section 211.019 of the Texas Local Government Code, determine the payment that is due to the owner or the lessee of the property for damages associated with terminating the nonconforming use.

c. For purposes of this section, "owner" means the owner of the nonconforming use at the time of the board's determination of an amortization (or compliance) date for the nonconforming use, and “lessee” means an individual or entity that has a valid lease for the nonconforming use at the time of the board's determination of an amortization (or compliance) date for the nonconforming use.

d. The board shall have the power to subpoena witnesses, documents and things; administer oaths; punish for contempt; and may require the production of documents and other things, under such regulations as it may establish or deem appropriate.

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1527 , § 2, 10-15-2019; Ord. No. 1665 , § 2, 5-17-2022)

Sec. 106.02.11. Map amendments to the zoning ordinance.

(a) *Purpose.* The zoning ordinance official zoning map may be changed from time-to-time due to changes in market forces, development opportunities, or individual requests for development other than what is designated on the official zoning map. This section describes the process by which the official zoning map may be changed.

(b) *Authority.* Any person or corporation having a legal or equitable ownership interest in any real property may petition the town council for a change or amendment to the official zoning map or the regulations relating to a specific tract of land located within the town. In addition, the planning and zoning commission may on its own motion or on request from the town council institute a study and proposal for such changes and amendments in the public interest.

(c) *City initiation.* The town council may, from time to time, amend or change by ordinance the boundaries of the various zoning districts or the use and development regulations relating to a specific property in accordance with the manner provided by state law.

(d) *Procedure and approval.*

(1) *Compliance with comprehensive future land use map (FLUP).* Before taking action on any proposed amendment or change, staff shall determine that the proposed amendment is consistent with the goals and vision of the comprehensive plan. If it is not, the staff recommendation shall be for denial unless or until a comprehensive plan change has been effected that would bring the request into compliance with the comprehensive plan.

ARTICLE II, TABLE A	
Future Land Use Plan/Zoning District Conversion Table	
Future Land Use Plan Designation	Supported Zoning Districts*
Estate Residential	AG, SF-RE, CF
Low Density Residential	A-1, A-2, SF-1, SF-2, SF-3, SF-4, SF-X
Medium Density Residential	TH, D, PH, SF-X
High Density Residential	MF, TH, PH
Manufactured Home Area	MH-1, D
Public/Semi-Public	CF
Parks and Open Space	AG, CF
Private Recreation	CF
Town Center	LF, CF
Retail/Office	O, NS, LC, CF
Business Commercial	LC, HC, LI, HI, CF
Lakefront District	N/A
Eldorado Corridor District	N/A

*PD zoning may be supported in any of the FLUP designations

(2) *Comprehensive plan and zoning amendment considered concurrently.* A future land use plan amendment and a zoning change may be requested together, noticed together, and be considered at the same planning and zoning commission and town council meetings. If processed together there will not be an additional application fee. However, if a future land use plan amendment is requested

separate from a zoning request, an application fee is required to be paid. The amount shall be equal to the zoning application fee.

(3) *Notification prior to the planning and zoning commission public hearing.* The commission must hold a public hearing on any application for a zoning map amendment or change prior to making its recommendations and report to the town council. The following state mandated regulations must be met before the public hearing may be convened:

a. Written notice of all public hearings before the commission on a proposed amendment or change to the official zoning map, including an amendment or change to the use and development regulations governing a specific tract of land, must be sent to all owners of real property located within 200 feet of the property on which the change is requested. Notice must be given a minimum of ten days prior to the date set for the public hearing by mailing such notice properly addressed and postage-paid to each taxpayer as the ownership appears on the last approved town tax roll. A certificate of mailing shall be obtained from the postal service and copy of same shall be retained in the case records.

b. In addition to the foregoing notice, the Town shall provide written notice of each public hearing regarding any proposed adoption of or change to a zoning regulation or boundary under which a current conforming use of a property is a nonconforming use if the regulation or boundary is adopted or changed. The notice shall:

(i) be mailed by United States mail to each owner of real or business personal property where the proposed nonconforming use is located as indicated by the most recently approved municipal tax roll and each occupant of the property not later than the 10th day before the hearing date;

(ii) contain the time and place of the hearing; and

(iii) include the following text in bold 14-point type or larger: "THE TOWN OF LITTLE ELM IS HOLDING A HEARING THAT WILL DETERMINE WHETHER YOU MAY LOSE THE RIGHT TO CONTINUE USING YOUR PROPERTY FOR ITS CURRENT USE. PLEASE READ THIS NOTICE CAREFULLY."

Commented [BS1]: Suggested by Robert

c. Notice of such hearing by the planning and zoning commission must be given by publication in the official newspaper of the Town of Little Elm stating the time and place of such public hearing a minimum of ten days prior to the hearing.

d~~c~~. Public notification signs must be posted, per subsection (e), below, a minimum of ten days prior to the hearing and remain in place until the public hearing by the commission and must remain in place until the hearing before the town council.

e~~d~~. Notice of the public hearing must be posted at town hall a minimum of 72 hours prior to the commission hearing.

(4) *Commission recommendation.* The town council shall not take action on a proposed zoning amendment without a recommendation from the planning and zoning commission.

(5) *Town council notification and approval.* A public hearing must be held by the town council before adopting any proposed zoning map amendment or development regulation change relating to a specific tract of land. The following state mandated regulations must be met before the public hearing may be convened:

a. Notice of the town council public hearing must be given by publication in the official newspaper of the Town of Little Elm stating the time and place of such public hearing a minimum of 15 days prior to the hearing.

b. Public notification signs posted, per subsection (e), below, must remain in place until the public hearing by town council.

c. Notice of the town council public hearing must be posted at town hall a minimum of 72 hours prior to the hearing.

(6) If a written protest against such change is submitted in accordance with section 106.02.13, "zoning amendment protest procedure," by the owners of 20 percent or more of either (i) the area of the lots or land covered by the proposed change or (ii) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area, such map amendment shall not become effective except by the favorable vote of three-fourths of all the members of the town council.

(7) In computing the percentage of land area under subsection (6), above, the area of streets and alleys shall be included.

(e) *Public notification signage.*

(1) Any person, firm or corporation requesting a change in zoning from one zoning classification to another zoning classification on a specific site or other amendments to the use and development regulations governing such property shall erect and maintain a notification sign, provided by the town upon said property. Such sign shall be:

a. Sized a standard four-foot by four-foot;

b. Located within 15 feet of the closest, adjacent, most heavily traveled thoroughfare;

c. Located perpendicular to the street so as to be clearly visible and both sides of the sign are clearly readable from the thoroughfare and not obstructed in any manner;

d. Located so as not to create a hazard to traffic on, entering or leaving public rights-of-way abutting the property; and

e. Erected on the subject property at least ten days prior to the public hearing of such request by the planning and zoning commission, and to remain continuously on said property until final action by the town council or withdrawal of the request by the applicant. Removal of the required public notification sign by the applicant prior to final action of the town council shall constitute a withdrawal of the request. Photographic proof (with time stamp) must be provided to staff to ensure that the notification signs have been placed on the property within the required timeframe.

(2) It shall be unlawful for anyone to remove, destroy, deface or obstruct the view of a required sign which gives notice that a zoning hearing has been requested, however, it shall be an affirmative defense to prosecution of the underlying zoning request has been finally approved or denied by the town council or if such request has been withdrawn by the applicant.

(3) In the event the applicant should fail to erect or maintain any required signs in accordance with any appropriate standard in this section, then the public hearing before the planning and zoning commission and/or town council must be postponed to a date in the future that allows adequate time for compliance.

(4) The sign shall be two-sided and state that a zoning change is requested and shall list a phone number of an appropriate town department that may be contacted for information regarding this request.

(5) There shall be a cost attributed to the receiving of each sign by the applicant and such cost shall be listed in the schedule of fees.

(6) Failure to comply with the posting of the signs required by this section 106.02.11(e), "map amendments to the zoning ordinance, public notification signage" or to otherwise strictly comply with the manner in which such signs are posted, shall not invalidate any public hearing or action taken by either the commission or the town council relating to a request to amend the zoning regulations relating to the property.

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1587 , § 2, 1-5-2021)

Sec. 106.02.11. Map amendments to the zoning ordinance.

(a) *Purpose.* The zoning ordinance official zoning map may be changed from time-to-time due to changes in market forces, development opportunities, or individual requests for development other than what is designated on the official zoning map. This section describes the process by which the official zoning map may be changed.

(b) *Authority.* Any person or corporation having a legal or equitable ownership interest in any real property may petition the town council for a change or amendment to the official zoning map or the regulations relating to a specific tract of land located within the town. In addition, the planning and zoning commission may on its own motion or on request from the town council institute a study and proposal for such changes and amendments in the public interest.

(c) *City initiation.* The town council may, from time to time, amend or change by ordinance the boundaries of the various zoning districts or the use and development regulations relating to a specific property in accordance with the manner provided by state law.

(d) *Procedure and approval.*

(1) *Compliance with comprehensive future land use map (FLUP).* Before taking action on any proposed amendment or change, staff shall determine that the proposed amendment is consistent with the goals and vision of the comprehensive plan. If it is not, the staff recommendation shall be for denial unless or until a comprehensive plan change has been effected that would bring the request into compliance with the comprehensive plan.

ARTICLE II, TABLE A	
Future Land Use Plan/Zoning District Conversion Table	
Future Land Use Plan Designation	Supported Zoning Districts*
Estate Residential	AG, SF-RE, CF
Low Density Residential	A-1, A-2, SF-1, SF-2, SF-3, SF-4, SF-X
Medium Density Residential	TH, D, PH, SF-X
High Density Residential	MF, TH, PH
Manufactured Home Area	MH-1, D
Public/Semi-Public	CF
Parks and Open Space	AG, CF
Private Recreation	CF
Town Center	LF, CF
Retail/Office	O, NS, LC, CF
Business Commercial	LC, HC, LI, HI, CF
Lakefront District	N/A
Eldorado Corridor District	N/A

*PD zoning may be supported in any of the FLUP designations

(2) *Comprehensive plan and zoning amendment considered concurrently.* A future land use plan amendment and a zoning change may be requested together, noticed together, and be considered at the same planning and zoning commission and town council meetings. If processed together there will not be an additional application fee. However, if a future land use plan amendment is requested

separate from a zoning request, an application fee is required to be paid. The amount shall be equal to the zoning application fee.

(3) *Notification prior to the planning and zoning commission public hearing.* The commission must hold a public hearing on any application for a zoning map amendment or change prior to making its recommendations and report to the town council. The following state mandated regulations must be met before the public hearing may be convened:

a. Written notice of all public hearings before the commission on a proposed amendment or change to the official zoning map, including an amendment or change to the use and development regulations governing a specific tract of land, must be sent to all owners of real property located within 200 feet of the property on which the change is requested. Notice must be given a minimum of ten days prior to the date set for the public hearing by mailing such notice properly addressed and postage-paid to each taxpayer as the ownership appears on the last approved town tax roll. A certificate of mailing shall be obtained from the postal service and copy of same shall be retained in the case records.

b. In addition to the foregoing notice, the Town shall provide written notice of each public hearing regarding any proposed adoption of or change to a zoning regulation or boundary under which a current conforming use of a property is a nonconforming use if the regulation or boundary is adopted or changed. The notice shall:

(i) be mailed by United States mail to each owner of real or business personal property where the proposed nonconforming use is located as indicated by the most recently approved municipal tax roll and each occupant of the property not later than the 10th day before the hearing date;

(ii) contain the time and place of the hearing; and

(iii) include the following text in bold 14-point type or larger: "THE TOWN OF LITTLE ELM IS HOLDING A HEARING THAT WILL DETERMINE WHETHER YOU MAY LOSE THE RIGHT TO CONTINUE USING YOUR PROPERTY FOR ITS CURRENT USE. PLEASE READ THIS NOTICE CAREFULLY."

c. Notice of such hearing by the planning and zoning commission must be given by publication in the official newspaper of the Town of Little Elm stating the time and place of such public hearing a minimum of ten days prior to the hearing.

d. Public notification signs must be posted, per subsection (e), below, a minimum of ten days prior to the hearing and remain in place until the public hearing by the commission and must remain in place until the hearing before the town council.

e. Notice of the public hearing must be posted at town hall a minimum of 72 hours prior to the commission hearing.

(4) *Commission recommendation.* The town council shall not take action on a proposed zoning amendment without a recommendation from the planning and zoning commission.

(5) *Town council notification and approval.* A public hearing must be held by the town council before adopting any proposed zoning map amendment or development regulation change relating to a specific tract of land. The following state mandated regulations must be met before the public hearing may be convened:

a. Notice of the town council public hearing must be given by publication in the official newspaper of the Town of Little Elm stating the time and place of such public hearing a minimum of 15 days prior to the hearing.

b. Public notification signs posted, per subsection (e), below, must remain in place until the public hearing by town council.

c. Notice of the town council public hearing must be posted at town hall a minimum of 72 hours prior to the hearing.

(6) If a written protest against such change is submitted in accordance with section 106.02.13, "zoning amendment protest procedure," by the owners of 20 percent or more of either (i) the area of the lots or land covered by the proposed change or (ii) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area, such map amendment shall not become effective except by the favorable vote of three-fourths of all the members of the town council.

(7) In computing the percentage of land area under subsection (6), above, the area of streets and alleys shall be included.

(e) *Public notification signage.*

(1) Any person, firm or corporation requesting a change in zoning from one zoning classification to another zoning classification on a specific site or other amendments to the use and development regulations governing such property shall erect and maintain a notification sign, provided by the town upon said property. Such sign shall be:

a. Sized a standard four-foot by four-foot;

b. Located within 15 feet of the closest, adjacent, most heavily traveled thoroughfare;

c. Located perpendicular to the street so as to be clearly visible and both sides of the sign are clearly readable from the thoroughfare and not obstructed in any manner;

d. Located so as not to create a hazard to traffic on, entering or leaving public rights-of-way abutting the property; and

e. Erected on the subject property at least ten days prior to the public hearing of such request by the planning and zoning commission, and to remain continuously on said property until final action by the town council or withdrawal of the request by the applicant. Removal of the required public notification sign by the applicant prior to final action of the town council shall constitute a withdrawal of the request. Photographic proof (with time stamp) must be provided to staff to ensure that the notification signs have been placed on the property within the required timeframe.

(2) It shall be unlawful for anyone to remove, destroy, deface or obstruct the view of a required sign which gives notice that a zoning hearing has been requested, however, it shall be an affirmative defense to prosecution of the underlying zoning request has been finally approved or denied by the town council or if such request has been withdrawn by the applicant.

(3) In the event the applicant should fail to erect or maintain any required signs in accordance with any appropriate standard in this section, then the public hearing before the planning and zoning commission and/or town council must be postponed to a date in the future that allows adequate time for compliance.

(4) The sign shall be two-sided and state that a zoning change is requested and shall list a phone number of an appropriate town department that may be contacted for information regarding this request.

(5) There shall be a cost attributed to the receiving of each sign by the applicant and such cost shall be listed in the schedule of fees.

(6) Failure to comply with the posting of the signs required by this section 106.02.11(e), "map amendments to the zoning ordinance, public notification signage" or to otherwise strictly comply with the manner in which such signs are posted, shall not invalidate any public hearing or action taken by either the commission or the town council relating to a request to amend the zoning regulations relating to the property.

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1587 , § 2, 1-5-2021)

Sec. 106.03.02 Zoning districts—Residential.

(a) *A-1 Single-Family District.*

(1) *Purpose.* The purpose of the A-1 Single-Family District is to allow single family detached dwellings on lots of not less than 10,000 square feet, together with allowed incidental uses.

(2) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE D	
A-1 SINGLE-FAMILY RESIDENTIAL DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	10'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	80'
Minimum lot area	10,000 sq. ft.
Minimum floor area[3]	1,500 sq. ft.

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a one-family dwelling. Lots bordering streets on curves or contours shall be 80 feet in width at the building line.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said A-1 Single-Family District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 1,500 square feet.

(b) *A-2 Single-Family District.*

(1) *Purpose.* The purpose of the A-2 Single-Family District is to allow single family detached dwellings on lots of not less than 10,000 square feet, together with allowed incidental uses.

(2) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE E	
A-2 SINGLE-FAMILY RESIDENTIAL DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	10'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'
Minimum lot area	6,000 sq. ft.
Minimum lot area (no public sewer)	1 acre
Minimum floor area[3]	1,000 sq. ft.

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a one-family dwelling. Lots bordering streets on curves or contours shall be 60 feet in width at the building line.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said A-2 Single-Family District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 1,000 square feet.

(c) *SF-RE Single-Family Ranchette Estate District.*

(1) *Purpose.* The purpose of the SF-RE Single-Family Ranchette Estates District is to allow single-family detached dwellings on lots of not less than one acre per family, together with allowed incidental and accessory uses.

(2) *Application.* Lots in a subdivision or plat legally approved and properly recorded in Denton County prior to the effective date of Ordinance No. 427 which do not meet the minimum lot sizes and area requirements set forth in this section shall not be considered to be in violation of said requirements and, for purposes of this section, shall be deemed to conform to the requirements set forth in this section.

(3) *Use regulations.* No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, installed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(4) *Accessory buildings.* The following accessory buildings or shall be permitted as accessory to the principal structure or use within the SF-RE Single-Family Ranchette Estates District in accordance with the following:

a. If the SF-RE parcel is three acres or greater, accessory uses may also include all agricultural/farm buildings including, but not limited to, a stable, barn, pen, corral, kennel, greenhouse, or coop.

b. When allowed, agriculture-related accessory structures shall be made of masonry materials, wood, or cementitious fiber board and are not required to meet the maximum square footage requirements as referenced in section 106.05.01(a), "schedule of uses - residential."

c. The minimum setback from any property line for any accessory agricultural/farm structure shall be 25 feet.

(5) *Height and area regulations.* Height and area regulations. The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE F	
SF-RE SINGLE-FAMILY RANCHETTE ESTATE DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	40'
Minimum side yard setback	20'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	30'
Minimum lot width (at building line)[2]	120'
Minimum lot area	1 acre
Minimum floor area[3]	2,400 sq. ft.
Minimum number of garage spaces[4]	2
Minimum number of drive spaces	2

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling. Lots bordering streets on curves or contours shall be 120 feet in width at the building line.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said SF-RE Single-Family Ranchette Estate District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 2,400 square feet.

Note 4. Garages may not be used for living quarters unless 2 other enclosed parking spaces are provided on the lot.

(d) *SF-1 Single-Family District.*

(1) *Purpose.* The purpose of the SF-1 Single-Family District is to allow single family detached dwellings on lots of not less than 10,000 square feet, together with allowed incidental uses.

(2) *Uses regulations.* No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, installed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE G	
SF-1 SINGLE-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	10'
Minimum side yard setback on corner[1]	25'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'
Minimum lot area	10,000 sq. ft.
Minimum floor area[3]	2,000 sq. ft.
Minimum number of garage spaces[4]	2
Minimum number of drive spaces	2

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 25 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling. Lots bordering streets on curves or contours shall be 60 feet in width at the building line.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said SF-1 Single-Family District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 2,000 square feet.

Note 4. Garages may not be used for living quarters unless two other enclosed parking spaces are provided on the lot.

(e) *SF-2 Single-Family District.*

(1) *Purpose.* The purpose of the SF-2 Single-Family District is to allow single-family detached dwellings on lots of not less than 8,000 square feet, together with allowed incidental and accessory uses.

(2) *Use regulations.* No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, installed, or altered, except for one or more of the uses specified in section 106.05.01(a), "Schedule of uses - residential."

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE H	
SF-2 SINGLE-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	10'

Minimum side yard setback on corner[1]	25'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'
Minimum lot area	8,000 sq. ft.
Minimum floor area[3]	1,600 sq. ft.
Minimum number of garage spaces[4]	2
Minimum number of drive spaces	2

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 25 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling. Lots bordering streets on curves or contours shall be 60 feet in width at the building line.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said SF-2 Single-Family District shall have a floor area, excluding basements, open and screened porches, and garages, of not less than 1,600 square feet.

Note 4. Garages may not be used for living quarters unless 2 other enclosed parking spaces are provided on the lot.

(f) *SF-3 Single-Family District.*

(1) *Purpose.* The purpose of the SF-3 Single-Family District is to allow single-family detached dwellings on lots of not less than 7,000 square feet, together with allowed incidental and accessory uses.

(2) *Use regulations.* No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, installed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE I	
SF-3 SINGLE-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	6'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'
Minimum lot area	7,000 sq. ft.
Minimum floor area[3]	1,400 sq. ft.
Minimum number of garage spaces[4]	2
Minimum number of drive spaces	2

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said SF-3 Single-Family District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 1,400 square feet.

Note 4. Garages may not be used for living quarters unless two other enclosed parking spaces are provided on the lot.

(g) *SF-4 Single-Family District.*

(1) *Purpose.* The purpose of the SF-4 Single-Family District is to allow single-family detached dwellings on lots of not less than 6,000 square feet, together with allowed incidental and accessory uses.

(2) *Use regulations.* No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, installed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE J	
SF-4 SINGLE-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	6'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'
Minimum lot area	6,000 sq. ft.
Minimum floor area[3]	1,200 sq. ft.
Minimum number of garage spaces[4]	2
Minimum number of drive spaces	2

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said SF-4 Single-Family District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 1,200 square feet.

Note 4. Garages may not be used for living quarters unless two other enclosed parking spaces are provided on the lot.

(h) *SF-X Single-Family Mixed Size District.*

(1) *Purpose.* The purpose of the SF-X Single-Family District is to allow a mix of relatively large single-family detached dwellings on lots that range from a minimum of 10,000 square feet to one acre or more, together with allowed incidental and accessory uses.

(2) *Mix of lot sizes.* A minimum of three lots sizes, defined by lot width and overall lot area, shall be provided within the subdivision.

(3) *Minimum and maximum percentages.* A minimum of 20 of the largest lot sizes shall be provided and a maximum of 50 of the smallest lot size may be provided.

(4) *Use regulations.* No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, installed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(5) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE K	
SF-X SINGLE-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	20'
Minimum side yard setback	6'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (measured at building line)[2]	
Smallest lot width (maximum of 50% of total number of lots)	60'
Medium lot width	75'
Largest lot width (minimum of 20% of the total number of lots)	90'
Minimum lot area	
Smallest lot area (maximum of 50% of total number of lots)	10,000 sq. ft.
Medium lot area	14,520 sq. ft. or ⅓ acre
Largest lot area (minimum of 20% of the total number of lots)	21,780 sq. ft. or ½ acre
Minimum floor area[2]	
Smallest lot area (maximum of 50% of total number of lots)	1,800 sq. ft.
Medium lot area	2,000 sq. ft.
Largest lot area (minimum of 20% of the total number of lots)	2,400 sq. ft.
Minimum number of garage spaces[3]	2

Minimum number of drive spaces	2

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling.

Note 3. Garages may not be used for living quarters unless two other enclosed parking spaces are provided on the lot.

(i) *D Duplex Two-Family District.*

(1) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(2) *Separate utilities.* All utilities shall be provided separately to each duplex such that each unit is individually metered.

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot shall be as follows:

ARTICLE III, TABLE L	
D DUPLEX TWO-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	6'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'/30'[5]
Minimum lot area per family	2,500 sq. ft.
Minimum lot area per family with no sewer	10,000 sq. ft.
Minimum floor area per family[3]	700 sq. ft.
Minimum number of garage spaces[4]	2
Minimum number of drive spaces	2

Note 1. Lot area per family. Every two-family dwelling unit hereafter erected, reconstructed, altered or enlarged shall provide a lot area of not less than 2,500 square feet per family; provided, however, that where a lot has less area than herein required and was of record and in separate ownership at the time of the passage of this chapter, said lot may be occupied by not more than one family. In areas not served by sanitary sewer the minimum lot area per family shall be 10,000 square feet.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling.

Note 3. Floor area. Every two-family unit hereafter erected, constructed, reconstructed or altered shall have a floor area, excluding basements, open and screened porches and garages of not less than 700 square feet per each single-family dwelling unit.

Note 4. Garages may not be used for living quarters unless two other enclosed parking spaces are provided on the lot.

Note 5. Lots may be subdivided into two 30-foot (minimum) wide lots provided that the associated duplex structure be constructed with a fire wall along the shared, common boundary.

(j) *TH Townhome District.*

(1) *Site plan review required.* All townhome developments are subject to site plan review and approval by director. The site plan shall show the typical layout of the townhome lot and an overall layout of the development.

(2) *Site plan approval.* Deviations from the townhome standards in this chapter can be accomplished through the site plan process, subject to review and approval by the planning and zoning commission and town council during public hearings.

(3) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(4) *Minimum parking and garage access.* All townhome developments shall provide rear entry off-street parking with a minimum two car garage. Alleys servicing these developments shall be a minimum 12 feet in width.

(5) *On-street parking.* Parallel parking shall be provided along the curb in the right-of-way, but shall not count toward the minimum number of parking spaces required per unit.

(6) *Open space.* Ten percent of the total townhome development shall be dedicated as usable open space. This area shall be platted as common area (i.e. owned and maintained by the homeowners' association - HOA); open space must be usable but may include up to 50 percent floodplain. Open space should be located to preserve existing trees. If not practical due to the natural restrictions of the tract of land, then one large canopy tree and one small ornamental tree for every 5,000 square feet of required open space shall be provided.

(7) *Minimum street widths and orientation* . Streets adjacent to townhomes shall have a minimum 62-foot right-of-way. All townhomes shall be platted on individual lots and require public street or public easement frontage, but shall not have both front and rear street frontage.

(8) *Front access from sidewalks.* All buildings which have residential unit floor plates within six feet of grade shall include a primary front door entrance into the unit which may be accessed from the sidewalk.

(9) *Front door entry.* The front door entry shall be located a minimum of two feet above the sidewalk elevation and include a minimum 24 square foot stoop. If pre-empted by topographic conditions, the entry may be lowered in elevation, subject to approval of the director. However, up to 50 percent of units may be ADA accessible from the sidewalk provided there is a metal fence separating the private area from the public sidewalk area.

(10) *Landscape buffer and screening.* A ten-foot-wide rear landscape buffer shall be provided and shall contain one tree for every 30 linear feet. When located in commercial zoning districts, masonry screen wall requirements and the ten landscape buffer do not apply, unless backing against single-family residential, which requires eight-foot-high masonry screen wall.

(11) *Window views.* Units must also include windows which provide residents a view of the street or public access easement and sidewalk area.

(12) *Commercial design standards included.* Any and all graphics from the 2009 Commercial Design Standards report not supported by textual technological limitations are hereby codified as supporting material by reference.

(13) *Front yard landscape zones.* Three zones are required between back of curb and the building line, as described below:

a. Streetscape zone (1). A minimum five-foot-wide area adjacent to the back-of-curb for trees and street furniture, including a one-foot dismount strip. An urban tree in a tree well shall be provided for every 25 linear feet in the streetscape zone. For every three urban trees, a bike rack, trash receptacle, bench, lighted bollard, or other approved street furniture is required.

b. Sidewalk zone (2). A minimum six-foot-wide clear sidewalk.

c. Landscape zone (3). A minimum six-foot landscape/patio area adjacent to the building). In order to differentiate the different zones (public v. private) of the sidewalk, townhome may construct a three-foot-high wrought iron, masonry, or cast stone fence. Balcony and patio railings and fences shall be largely transparent and constructed of tempered glass, wrought iron or metal. Masonry columns may be used on patios provided that they are used as accents. Wood fences and railings and chain-link fencing are prohibited.

(14) *Rear yard setback landscaping.* Within the rear building setback, one urban tree is required.

(15) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot shall be as follows:

ARTICLE III, TABLE M	
TH TOWNHOME DISTRICT DEVELOPMENT STANDARDS	
Maximum height	45'
Minimum front yard setback	6'
Maximum front yard setback	12'
Minimum side yard setback[1]	5'
Minimum side yard setback on corner	15'
Minimum rear yard setback	20'
Minimum rear fence setback	5'
Minimum lot width (at building line)	25'
Minimum lot depth	100'
Maximum block length	600'
Minimum number of garage spaces per unit[2]	2
Number of other parking spaces per unit[3]	0.3

Note 1. The minimum side yard is five feet between groups of three to six townhomes; side yard at corner is 15 feet, and requires all three zones referenced in subsection (13) above.

Note 2. Garages may not be used for living quarters.

Note 3. Other parking spaces (for guests or employees) may be located tandem to the garage parking spaces, in a separate parking lot, or on-street.

(k) *PH Patio Home District.*

(1) *Site plan review required.* All patio home developments are subject to site plan review and approval by director. The site plan shall show the layout of the typical patio home lot and an overall layout of the development.

(2) *Site plan approval.* Deviations from the patio home standards in this chapter can be accomplished through the site plan process, subject to review and approval by the planning and zoning commission and town council during public hearings.

(3) *Definition.* Patio homes are single-family dwellings that are smaller in scale than typical residential homes, are located on a unique platted lot, and may have a zero lot line on one side of the building. If the zero lot line is chosen, or any side yard setback smaller than five feet, no windows shall be placed on that side of the patio home. Windows, doors, patios and other features should be placed along the wider side yard setback to create a greater sense of open space.

(4) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(5) *Minimum parking and garage access.* All patio home developments shall provide rear entry off-street parking with a minimum two car garage. Alleys servicing these developments shall be a minimum 12 feet in width.

(6) *On-street parking.* Parallel parking shall be provided along the curb in the right-of-way, but shall not count toward the minimum number of parking spaces required per unit.

(7) *Open space.* Ten percent of the total patio home development shall be dedicated as usable open space. This area shall be platted as common area (i.e. owned and maintained by the homeowners' association); open space must be usable but may include up to 50 percent floodplain. Open space should be located to preserve existing trees. If not practical due to the natural restrictions of the tract of land, then one large canopy tree and one small ornamental tree for every 5,000 square feet of required open space shall be provided.

(8) *Minimum street widths and orientation.* Streets adjacent to townhomes shall have a minimum 62-foot right-of-way. All patio home shall be individually platted and require public street or public easement frontage, but shall not have both front and rear street frontage.

(9) *Front access from sidewalks.* All buildings which have residential unit floor plates within six feet of grade shall include a primary front door entrance into the unit which may be accessed from the sidewalk.

(10) *Front door entry.* The front door entry shall be located a minimum of two feet above the sidewalk elevation and include a minimum 24 square foot stoop. If pre-empted by topographic conditions, the entry may be lowered in elevation, subject to approval of the director. However, up to 50 percent of units may be ADA accessible from the sidewalk provided there is a metal fence separating the private area from the public sidewalk area.

(11) *Landscape buffer and screening.* A ten-foot-wide rear landscape buffer shall be provided and shall contain one tree for every 30 linear feet. When located in commercial zoning districts, masonry screen wall requirements and the ten landscape buffer do not apply, unless backing against single-family residential, which requires eight-foot-high masonry screen wall.

(12) *Window views.* Units must also include windows which provide residents a view of the street or public access easement and sidewalk area.

(13) *Residential architectural standards apply.* Minimum masonry requirements, roof pitch, and design elements listed in section 106.06.03 "architectural standards for residential structures."

(14) *Front yard landscape zones.* Three zones are required between back of curb and the building line, as described below:

a. Streetscape zone (1). A minimum five-foot-wide area adjacent to the back-of-curb for trees and street furniture, including a one-foot dismount strip. An urban tree in a tree well shall be provided for every 25 linear feet in the streetscape zone. For every three urban trees, a bike rack, trash receptacle, bench, lighted bollard, or other approved street furniture is required.

b. Sidewalk zone (2). A minimum six-foot-wide clear sidewalk.

c. Landscape zone (3). A minimum six-foot landscape/patio area adjacent to the building). In order to differentiate the different zones (public v. private) of the sidewalk, townhome may construct a three-foot-high wrought iron, masonry, or cast stone fence. Balcony and patio railings and fences shall be largely transparent and constructed of tempered glass, wrought iron or metal. Masonry columns may be used on patios provided that they are used as accents. Wood fences and railings and chain-link fencing are prohibited.

(15) *Rear yard landscaping.* Within the rear building setback, one urban tree is required.

(16) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot shall be as follows:

ARTICLE III, TABLE N	
PH PATIO HOME DISTRICT DEVELOPMENT STANDARDS	
Maximum height	45'
Minimum front yard setback	6'
Maximum front yard setback	12'
Minimum total side yard setback[1]	10'
Minimum side yard setback on corner	15'
Minimum rear yard setback	20'
Minimum rear fence setback	5'
Minimum lot width (at building line)	35'
Minimum lot depth	100'
Maximum block length	600'
Minimum number of garage spaces per unit[2]	2
Minimum number of other spaces per unit[3]	0.5

Note 1. The minimum total side yard is ten feet between each patio home. This may be split evenly (5/5), with a zero lot line (0/10) or any combination that adds to ten feet; side yard at corner is 15 feet, and requires all three zones referenced in subsection (14) above.

Note 2. Garages may not be used for living quarters.

Note 3. Other parking spaces (for guests or employees) may be located tandem to the garage parking spaces, in a separate parking lot, or on-street.

(l) *MF Multifamily District.*

(1) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(2) *Accessory buildings and use.* Accessory buildings and uses customarily incident to any of the above uses are permitted when not involving the conduct of business other than incidental to the residential use of such lot, including private and storage garages; provided, however, that such accessory buildings comply with section 106.05.021, "accessory uses" and said accessory building shall not be used for commercial purposes. (The term "commercial purposes" shall include part-time businesses.)

(3) *Height and area regulations.* The density, lot coverage, height of buildings, the minimum and maximum dimensions of lots and yards, and other development standards permitted shall be as follows:

ARTICLE III, TABLE O	
MF MULTIFAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum density per acre	16 dwelling units
Maximum lot coverage	40%
Maximum height[1]	45'
Minimum front yard setback	25'
Minimum side yard between buildings	15'
Minimum side yard adjacent to street	20'
Minimum rear yard setback	30'
Minimum lot width (at property line)	70'

Minimum lot width (on curve at building line)	70'
Minimum number of bedrooms per unit	1
Minimum floor area per bedroom:[2]	
One bedroom unit	650 sq. ft.
Two bedroom unit	800 sq. ft.
Three bedroom unit	1,000 sq. ft.
Each additional bedroom over three	200 sq. ft.

Note 1. The height of any apartment building erected on a lot adjacent to single-family residential uses or zoning shall be limited to one story for a distance of 150 feet from the single-family district boundary, inclusive of streets and/or highways.

Note 2. Floor area. Every multifamily unit hereafter erected, constructed, reconstructed or altered shall have a floor area, excluding basements, open and screened porches, patios, and balconies of not less than specified above.

(4) *Courts.* Where an apartment building is erected so as to create inner courts, the faces of all opposite walls in such courts shall be a minimum distance of 30 feet apart and no balcony or canopy shall extend into such court area for a distance greater than five feet.

(5) *Lighting.* Lighting shall be designed and used to discourage crime and undesirable activity and to provide adequate vision, comfort and safety. It should use the lowest possible illumination to effectively allow surveillance. Open-air parking lot lighting shall be designed to provide for uniform lighting throughout the facility with no dark patches or pockets. The use of sensor technologies, timers or other means to activate lighting during the night may be used to conserve energy, provide safety, and promote compatibility between different land uses. In order to direct light downward and minimize the amount of light spill into the dark night sky, lighting fixtures shall be full cut-off fixtures. Open-air parking lot lighting shall not cause direct illumination on adjacent and nearby properties or streets. Fixtures should be of a type or adequately shielded so as to prevent glare from normal viewing angles. All lighting shall conform to this chapter.

(6) *Screening, fences, gates and stacking.* The entire site shall be screened from view on three sides from persons standing at ground level on the site or immediately adjoining property, by a masonry wall (minimum eight feet in height). A wall not more than eight feet in height shall be erected in the front yard that is of at least 50 percent black tubular steel or decorative metal. It is also mandatory for all apartments to be gated communities. Each gate shall be in proper working order at all times. In addition, there shall be a minimum stacking area for four vehicles at each gate.

(7) *Balconies/patios.* When an apartment building is erected so as to create balconies or patios facing a public street such balconies shall not extend beyond the building line.

(8) *Refuse facilities.* Complexes shall provide sufficient refuse facilities, subject to discretionary review and approval by the director and screened in compliance with the zoning ordinance.

(9) *Mechanical equipment.* Mechanical equipment shall be constructed, located and screened so as not to interfere with the peace and comfort of the occupant(s) of any building or residence.

(10) *Mail kiosks.* Mail kiosk shall have a minimum of three required parking spaces for the development within 50 feet, unless a drive-through facility is provided. The mail kiosk must be constructed of 100 percent masonry and constructed of the same materials as the main structure with a metal roof.

(11) *Building design.* Each building must follow the following conditions in addition to the town's architectural and design standards. (See Section 106.06.04 for more detail on architectural design and materials)

a. Except for windows, doors and garage doors, the exterior of all building elevations shall be 100 percent masonry. Cementitious fiberboard may be used for areas not considered conducive for masonry, as determined by the building official, and architectural features, including but not limited to bay windows, dormers, chimneys not part of an exterior wall, and gables.

b. Flat primary roofs are prohibited.

c. The residential building angle to public streets and single-family zoning districts will be between a minimum of 20 to a maximum of 70 degrees, unless parking is provided between the building and the street.

d. As an alternative to angling the buildings along the public street, adjacent buildings may be offset a distance equal to one-half the width of the building closest to the street, not to be less than 30 feet.

(12) *Parking regulations.* The minimum off-street parking and loading regulations shall be poured concrete surfaces, and comply with the following:

a. For buildings other than residential dwellings, one off-street parking space for each 200 square feet of floor area shall be provided.

b. All buildings hereafter erected, reconstructed, altered, enlarged or converted for one or more uses permitted in the Multifamily District shall provide adequate permanent off-street facilities for the loading and unloading of merchandise and good within or adjacent to the building in such a manner as not to obstruct the freedom of traffic movement on the public streets or alleys.

c. Two off-street parking spaces for each apartment dwelling unit plus one space for each additional bedroom unit (more than one) shall be provided. Covered parking spaces for at least 25 percent of the total required parking spaces (not including required guest parking) shall be provided.

d. No dead-end parking will be allowed.

e. Garages, when provided, shall be 100 percent masonry and be constructed of the same materials as the main structure. The garage may be part of the dwelling structure. The garage shall not be used for storage, thereby prohibiting the parking of an operable vehicle. Enclosed garage parking spaces shall be a minimum of ten by 20 feet. Stacking spaces shall not be counted towards required parking spaces.

(13) *Open space.* Each lot or parcel of land must comply with the following conditions in addition to the town's landscaping ordinance.

a. Each lot or parcel of land, which is used for multiple-family residences, shall provide on the same lot or parcel of land, usable open space, in accordance with [table H in section 106.06.18]. The open space shall have a minimum dimension of not less than 30 feet.

b. Of the required open space, 15 percent shall be arranged or located in a contiguous mass. This contiguous mass must be located within the required open space.

c. In meeting this requirements, a credit of three square feet may be applied for each square foot utilized for swimming pools and adjacent decks, patios, or lounge areas within ten feet of a pool; developed and equipped children's play areas; usable portions of recreational buildings; and private balconies and enclosed patios with a minimum dimension of five feet. Tennis courts are specifically excluded from this increased credit allowance. At the time of site plan approval, the planning and zoning commission and town council may allow a credit not to exceed ten percent of the total required usable open space for adjacent and immediately accessible public parks. The

combined credit for areas calculated at a three-to-one basis and for public parks shall not exceed 50 percent of the total usable open space for an individual lot or parcel of land.

d. One large canopy tree shall be provided per 3,500 square feet of required open space.

e. At the time of site plan approval, the Director of Development Services ~~planning and zoning commission and/or town council~~ may give full or partial credit for open areas that exceed the maximum slope of 2 percent, if it is determined that such areas are environmentally significant and that their preservation would enhance the development.

(14) *Required amenities.* A minimum of four of the following must be incorporated into each multifamily development. A minimum of two major and two minor amenities must be provided in significant proportion to the development. The scale of the amenities as well as other comparable amenities can be approved through the site plan approval process.

a. Major amenities:

1. Dog park.
2. Indoor exercise facility.
3. Jogging trail.
4. Sport courts and fields (volleyball, baseball, tennis etc.).
5. Swimming pool.

b. Minor amenities:

1. Gazebo.
2. Improved picnic areas (with tables, grills, shading).
3. Playground or tot lot.
4. Putting green.

(15) *Miscellaneous requirements.* The following additional regulations are required for all Multifamily District apartment houses:

a. Separate sewer drain plumbing for all kitchen sinks that route through a grease trap;

b. Washer and dryer connections in each unit;

c. Lint traps on all laundry room washers; and

d. Storm drain debris collectors.

(m) *MH-1 Manufactured Home Single-Family District.*

(1) *Purpose.* Providing for certain manufactured and modular dwellings with specific reference to the seal of approval granted by appropriate state agencies and meeting federal standards and providing for single-family and two-family dwelling units.

(2) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(3) *Building materials.* Duplex and single-family residences located within this district may use cementitious fiberboard to fulfill the masonry building requirements.

(4) *Base district note.* The MH-1 District standards remain only for the purpose of establishing a base zoning district to support existing planned developments in Town with a base MH-1 district that were approved before January 5, 2021.

(5) *Height and area regulations.* In said MH-1 Manufactured Home Single-Family District the height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE P	
MANUFACTURED HOME SINGLE-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	6'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'
Minimum lot area	6,000 sq. ft.
Minimum floor area[3]	1,000 sq. ft.

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling. Lots bordering streets on curves or contours shall be 80 feet in width at the building line.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said Manufactured Home Single-Family District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 1,000 square feet.

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1501, § 2, 6-18-2019; Ord. No. 1527 , § 2, 10-15-2019; Ord. No. 1587 , § 2, 1-5-2021)

Sec. 106.03.02 Zoning districts—Residential.

(a) *A-1 Single-Family District.*

(1) *Purpose.* The purpose of the A-1 Single-Family District is to allow single family detached dwellings on lots of not less than 10,000 square feet, together with allowed incidental uses.

(2) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE D	
A-1 SINGLE-FAMILY RESIDENTIAL DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	10'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	80'
Minimum lot area	10,000 sq. ft.
Minimum floor area[3]	1,500 sq. ft.

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a one-family dwelling. Lots bordering streets on curves or contours shall be 80 feet in width at the building line.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said A-1 Single-Family District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 1,500 square feet.

(b) *A-2 Single-Family District.*

(1) *Purpose.* The purpose of the A-2 Single-Family District is to allow single family detached dwellings on lots of not less than 10,000 square feet, together with allowed incidental uses.

(2) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE E	
A-2 SINGLE-FAMILY RESIDENTIAL DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	10'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'
Minimum lot area	6,000 sq. ft.
Minimum lot area (no public sewer)	1 acre
Minimum floor area[3]	1,000 sq. ft.

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a one-family dwelling. Lots bordering streets on curves or contours shall be 60 feet in width at the building line.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said A-2 Single-Family District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 1,000 square feet.

(c) *SF-RE Single-Family Ranchette Estate District.*

(1) *Purpose.* The purpose of the SF-RE Single-Family Ranchette Estates District is to allow single-family detached dwellings on lots of not less than one acre per family, together with allowed incidental and accessory uses.

(2) *Application.* Lots in a subdivision or plat legally approved and properly recorded in Denton County prior to the effective date of Ordinance No. 427 which do not meet the minimum lot sizes and area requirements set forth in this section shall not be considered to be in violation of said requirements and, for purposes of this section, shall be deemed to conform to the requirements set forth in this section.

(3) *Use regulations.* No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, installed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(4) *Accessory buildings.* The following accessory buildings or shall be permitted as accessory to the principal structure or use within the SF-RE Single-Family Ranchette Estates District in accordance with the following:

a. If the SF-RE parcel is three acres or greater, accessory uses may also include all agricultural/farm buildings including, but not limited to, a stable, barn, pen, corral, kennel, greenhouse, or coop.

b. When allowed, agriculture-related accessory structures shall be made of masonry materials, wood, or cementitious fiber board and are not required to meet the maximum square footage requirements as referenced in section 106.05.01(a), "schedule of uses - residential."

c. The minimum setback from any property line for any accessory agricultural/farm structure shall be 25 feet.

(5) *Height and area regulations.* Height and area regulations. The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE F	
SF-RE SINGLE-FAMILY RANCHETTE ESTATE DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	40'
Minimum side yard setback	20'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	30'
Minimum lot width (at building line)[2]	120'
Minimum lot area	1 acre
Minimum floor area[3]	2,400 sq. ft.
Minimum number of garage spaces[4]	2
Minimum number of drive spaces	2

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling. Lots bordering streets on curves or contours shall be 120 feet in width at the building line.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said SF-RE Single-Family Ranchette Estate District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 2,400 square feet.

Note 4. Garages may not be used for living quarters unless 2 other enclosed parking spaces are provided on the lot.

(d) *SF-1 Single-Family District.*

(1) *Purpose.* The purpose of the SF-1 Single-Family District is to allow single family detached dwellings on lots of not less than 10,000 square feet, together with allowed incidental uses.

(2) *Uses regulations.* No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, installed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE G	
SF-1 SINGLE-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	10'
Minimum side yard setback on corner[1]	25'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'
Minimum lot area	10,000 sq. ft.
Minimum floor area[3]	2,000 sq. ft.
Minimum number of garage spaces[4]	2
Minimum number of drive spaces	2

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 25 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling. Lots bordering streets on curves or contours shall be 60 feet in width at the building line.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said SF-1 Single-Family District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 2,000 square feet.

Note 4. Garages may not be used for living quarters unless two other enclosed parking spaces are provided on the lot.

(e) *SF-2 Single-Family District.*

(1) *Purpose.* The purpose of the SF-2 Single-Family District is to allow single-family detached dwellings on lots of not less than 8,000 square feet, together with allowed incidental and accessory uses.

(2) *Use regulations.* No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, installed, or altered, except for one or more of the uses specified in section 106.05.01(a), "Schedule of uses - residential."

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE H	
SF-2 SINGLE-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	10'

Minimum side yard setback on corner[1]	25'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'
Minimum lot area	8,000 sq. ft.
Minimum floor area[3]	1,600 sq. ft.
Minimum number of garage spaces[4]	2
Minimum number of drive spaces	2

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 25 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling. Lots bordering streets on curves or contours shall be 60 feet in width at the building line.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said SF-2 Single-Family District shall have a floor area, excluding basements, open and screened porches, and garages, of not less than 1,600 square feet.

Note 4. Garages may not be used for living quarters unless 2 other enclosed parking spaces are provided on the lot.

(f) *SF-3 Single-Family District.*

(1) *Purpose.* The purpose of the SF-3 Single-Family District is to allow single-family detached dwellings on lots of not less than 7,000 square feet, together with allowed incidental and accessory uses.

(2) *Use regulations.* No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, installed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE I	
SF-3 SINGLE-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	6'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'
Minimum lot area	7,000 sq. ft.
Minimum floor area[3]	1,400 sq. ft.
Minimum number of garage spaces[4]	2
Minimum number of drive spaces	2

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said SF-3 Single-Family District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 1,400 square feet.

Note 4. Garages may not be used for living quarters unless two other enclosed parking spaces are provided on the lot.

(g) *SF-4 Single-Family District.*

(1) *Purpose.* The purpose of the SF-4 Single-Family District is to allow single-family detached dwellings on lots of not less than 6,000 square feet, together with allowed incidental and accessory uses.

(2) *Use regulations.* No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, installed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE J	
SF-4 SINGLE-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	6'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'
Minimum lot area	6,000 sq. ft.
Minimum floor area[3]	1,200 sq. ft.
Minimum number of garage spaces[4]	2
Minimum number of drive spaces	2

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said SF-4 Single-Family District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 1,200 square feet.

Note 4. Garages may not be used for living quarters unless two other enclosed parking spaces are provided on the lot.

(h) *SF-X Single-Family Mixed Size District.*

(1) *Purpose.* The purpose of the SF-X Single-Family District is to allow a mix of relatively large single-family detached dwellings on lots that range from a minimum of 10,000 square feet to one acre or more, together with allowed incidental and accessory uses.

(2) *Mix of lot sizes.* A minimum of three lots sizes, defined by lot width and overall lot area, shall be provided within the subdivision.

(3) *Minimum and maximum percentages.* A minimum of 20 of the largest lot sizes shall be provided and a maximum of 50 of the smallest lot size may be provided.

(4) *Use regulations.* No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, installed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(5) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE K	
SF-X SINGLE-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	20'
Minimum side yard setback	6'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (measured at building line)[2]	
Smallest lot width (maximum of 50% of total number of lots)	60'
Medium lot width	75'
Largest lot width (minimum of 20% of the total number of lots)	90'
Minimum lot area	
Smallest lot area (maximum of 50% of total number of lots)	10,000 sq. ft.
Medium lot area	14,520 sq. ft. or ⅓ acre
Largest lot area (minimum of 20% of the total number of lots)	21,780 sq. ft. or ½ acre
Minimum floor area[2]	
Smallest lot area (maximum of 50% of total number of lots)	1,800 sq. ft.
Medium lot area	2,000 sq. ft.
Largest lot area (minimum of 20% of the total number of lots)	2,400 sq. ft.
Minimum number of garage spaces[3]	2

Minimum number of drive spaces	2

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling.

Note 3. Garages may not be used for living quarters unless two other enclosed parking spaces are provided on the lot.

(i) *D Duplex Two-Family District.*

(1) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(2) *Separate utilities.* All utilities shall be provided separately to each duplex such that each unit is individually metered.

(3) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot shall be as follows:

ARTICLE III, TABLE L	
D DUPLEX TWO-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	6'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'/30'[5]
Minimum lot area per family	2,500 sq. ft.
Minimum lot area per family with no sewer	10,000 sq. ft.
Minimum floor area per family[3]	700 sq. ft.
Minimum number of garage spaces[4]	2
Minimum number of drive spaces	2

Note 1. Lot area per family. Every two-family dwelling unit hereafter erected, reconstructed, altered or enlarged shall provide a lot area of not less than 2,500 square feet per family; provided, however, that where a lot has less area than herein required and was of record and in separate ownership at the time of the passage of this chapter, said lot may be occupied by not more than one family. In areas not served by sanitary sewer the minimum lot area per family shall be 10,000 square feet.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling.

Note 3. Floor area. Every two-family unit hereafter erected, constructed, reconstructed or altered shall have a floor area, excluding basements, open and screened porches and garages of not less than 700 square feet per each single-family dwelling unit.

Note 4. Garages may not be used for living quarters unless two other enclosed parking spaces are provided on the lot.

Note 5. Lots may be subdivided into two 30-foot (minimum) wide lots provided that the associated duplex structure be constructed with a fire wall along the shared, common boundary.

(j) *TH Townhome District.*

(1) *Site plan review required.* All townhome developments are subject to site plan review and approval by director. The site plan shall show the typical layout of the townhome lot and an overall layout of the development.

(2) *Site plan approval.* Deviations from the townhome standards in this chapter can be accomplished through the site plan process, subject to review and approval by the planning and zoning commission and town council during public hearings.

(3) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(4) *Minimum parking and garage access.* All townhome developments shall provide rear entry off-street parking with a minimum two car garage. Alleys servicing these developments shall be a minimum 12 feet in width.

(5) *On-street parking.* Parallel parking shall be provided along the curb in the right-of-way, but shall not count toward the minimum number of parking spaces required per unit.

(6) *Open space.* Ten percent of the total townhome development shall be dedicated as usable open space. This area shall be platted as common area (i.e. owned and maintained by the homeowners' association - HOA); open space must be usable but may include up to 50 percent floodplain. Open space should be located to preserve existing trees. If not practical due to the natural restrictions of the tract of land, then one large canopy tree and one small ornamental tree for every 5,000 square feet of required open space shall be provided.

(7) *Minimum street widths and orientation* . Streets adjacent to townhomes shall have a minimum 62-foot right-of-way. All townhomes shall be platted on individual lots and require public street or public easement frontage, but shall not have both front and rear street frontage.

(8) *Front access from sidewalks.* All buildings which have residential unit floor plates within six feet of grade shall include a primary front door entrance into the unit which may be accessed from the sidewalk.

(9) *Front door entry.* The front door entry shall be located a minimum of two feet above the sidewalk elevation and include a minimum 24 square foot stoop. If pre-empted by topographic conditions, the entry may be lowered in elevation, subject to approval of the director. However, up to 50 percent of units may be ADA accessible from the sidewalk provided there is a metal fence separating the private area from the public sidewalk area.

(10) *Landscape buffer and screening.* A ten-foot-wide rear landscape buffer shall be provided and shall contain one tree for every 30 linear feet. When located in commercial zoning districts, masonry screen wall requirements and the ten landscape buffer do not apply, unless backing against single-family residential, which requires eight-foot-high masonry screen wall.

(11) *Window views.* Units must also include windows which provide residents a view of the street or public access easement and sidewalk area.

(12) *Commercial design standards included.* Any and all graphics from the 2009 Commercial Design Standards report not supported by textual technological limitations are hereby codified as supporting material by reference.

(13) *Front yard landscape zones.* Three zones are required between back of curb and the building line, as described below:

a. Streetscape zone (1). A minimum five-foot-wide area adjacent to the back-of-curb for trees and street furniture, including a one-foot dismount strip. An urban tree in a tree well shall be provided for every 25 linear feet in the streetscape zone. For every three urban trees, a bike rack, trash receptacle, bench, lighted bollard, or other approved street furniture is required.

b. Sidewalk zone (2). A minimum six-foot-wide clear sidewalk.

c. Landscape zone (3). A minimum six-foot landscape/patio area adjacent to the building). In order to differentiate the different zones (public v. private) of the sidewalk, townhome may construct a three-foot-high wrought iron, masonry, or cast stone fence. Balcony and patio railings and fences shall be largely transparent and constructed of tempered glass, wrought iron or metal. Masonry columns may be used on patios provided that they are used as accents. Wood fences and railings and chain-link fencing are prohibited.

(14) *Rear yard setback landscaping.* Within the rear building setback, one urban tree is required.

(15) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot shall be as follows:

ARTICLE III, TABLE M	
TH TOWNHOME DISTRICT DEVELOPMENT STANDARDS	
Maximum height	45'
Minimum front yard setback	6'
Maximum front yard setback	12'
Minimum side yard setback[1]	5'
Minimum side yard setback on corner	15'
Minimum rear yard setback	20'
Minimum rear fence setback	5'
Minimum lot width (at building line)	25'
Minimum lot depth	100'
Maximum block length	600'
Minimum number of garage spaces per unit[2]	2
Number of other parking spaces per unit[3]	0.3

Note 1. The minimum side yard is five feet between groups of three to six townhomes; side yard at corner is 15 feet, and requires all three zones referenced in subsection (13) above.

Note 2. Garages may not be used for living quarters.

Note 3. Other parking spaces (for guests or employees) may be located tandem to the garage parking spaces, in a separate parking lot, or on-street.

(k) *PH Patio Home District.*

(1) *Site plan review required.* All patio home developments are subject to site plan review and approval by director. The site plan shall show the layout of the typical patio home lot and an overall layout of the development.

(2) *Site plan approval.* Deviations from the patio home standards in this chapter can be accomplished through the site plan process, subject to review and approval by the planning and zoning commission and town council during public hearings.

(3) *Definition.* Patio homes are single-family dwellings that are smaller in scale than typical residential homes, are located on a unique platted lot, and may have a zero lot line on one side of the building. If the zero lot line is chosen, or any side yard setback smaller than five feet, no windows shall be placed on that side of the patio home. Windows, doors, patios and other features should be placed along the wider side yard setback to create a greater sense of open space.

(4) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(5) *Minimum parking and garage access.* All patio home developments shall provide rear entry off-street parking with a minimum two car garage. Alleys servicing these developments shall be a minimum 12 feet in width.

(6) *On-street parking.* Parallel parking shall be provided along the curb in the right-of-way, but shall not count toward the minimum number of parking spaces required per unit.

(7) *Open space.* Ten percent of the total patio home development shall be dedicated as usable open space. This area shall be platted as common area (i.e. owned and maintained by the homeowners' association); open space must be usable but may include up to 50 percent floodplain. Open space should be located to preserve existing trees. If not practical due to the natural restrictions of the tract of land, then one large canopy tree and one small ornamental tree for every 5,000 square feet of required open space shall be provided.

(8) *Minimum street widths and orientation.* Streets adjacent to townhomes shall have a minimum 62-foot right-of-way. All patio home shall be individually platted and require public street or public easement frontage, but shall not have both front and rear street frontage.

(9) *Front access from sidewalks.* All buildings which have residential unit floor plates within six feet of grade shall include a primary front door entrance into the unit which may be accessed from the sidewalk.

(10) *Front door entry.* The front door entry shall be located a minimum of two feet above the sidewalk elevation and include a minimum 24 square foot stoop. If pre-empted by topographic conditions, the entry may be lowered in elevation, subject to approval of the director. However, up to 50 percent of units may be ADA accessible from the sidewalk provided there is a metal fence separating the private area from the public sidewalk area.

(11) *Landscape buffer and screening.* A ten-foot-wide rear landscape buffer shall be provided and shall contain one tree for every 30 linear feet. When located in commercial zoning districts, masonry screen wall requirements and the ten landscape buffer do not apply, unless backing against single-family residential, which requires eight-foot-high masonry screen wall.

(12) *Window views.* Units must also include windows which provide residents a view of the street or public access easement and sidewalk area.

(13) *Residential architectural standards apply.* Minimum masonry requirements, roof pitch, and design elements listed in section 106.06.03 "architectural standards for residential structures."

(14) *Front yard landscape zones.* Three zones are required between back of curb and the building line, as described below:

a. Streetscape zone (1). A minimum five-foot-wide area adjacent to the back-of-curb for trees and street furniture, including a one-foot dismount strip. An urban tree in a tree well shall be provided for every 25 linear feet in the streetscape zone. For every three urban trees, a bike rack, trash receptacle, bench, lighted bollard, or other approved street furniture is required.

b. Sidewalk zone (2). A minimum six-foot-wide clear sidewalk.

c. Landscape zone (3). A minimum six-foot landscape/patio area adjacent to the building). In order to differentiate the different zones (public v. private) of the sidewalk, townhome may construct a three-foot-high wrought iron, masonry, or cast stone fence. Balcony and patio railings and fences shall be largely transparent and constructed of tempered glass, wrought iron or metal. Masonry columns may be used on patios provided that they are used as accents. Wood fences and railings and chain-link fencing are prohibited.

(15) *Rear yard landscaping.* Within the rear building setback, one urban tree is required.

(16) *Height and area regulations.* The height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot shall be as follows:

ARTICLE III, TABLE N	
PH PATIO HOME DISTRICT DEVELOPMENT STANDARDS	
Maximum height	45'
Minimum front yard setback	6'
Maximum front yard setback	12'
Minimum total side yard setback[1]	10'
Minimum side yard setback on corner	15'
Minimum rear yard setback	20'
Minimum rear fence setback	5'
Minimum lot width (at building line)	35'
Minimum lot depth	100'
Maximum block length	600'
Minimum number of garage spaces per unit[2]	2
Minimum number of other spaces per unit[3]	0.5

Note 1. The minimum total side yard is ten feet between each patio home. This may be split evenly (5/5), with a zero lot line (0/10) or any combination that adds to ten feet; side yard at corner is 15 feet, and requires all three zones referenced in subsection (14) above.

Note 2. Garages may not be used for living quarters.

Note 3. Other parking spaces (for guests or employees) may be located tandem to the garage parking spaces, in a separate parking lot, or on-street.

(l) *MF Multifamily District.*

(1) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(2) *Accessory buildings and use.* Accessory buildings and uses customarily incident to any of the above uses are permitted when not involving the conduct of business other than incidental to the residential use of such lot, including private and storage garages; provided, however, that such accessory buildings comply with section 106.05.021, "accessory uses" and said accessory building shall not be used for commercial purposes. (The term "commercial purposes" shall include part-time businesses.)

(3) *Height and area regulations.* The density, lot coverage, height of buildings, the minimum and maximum dimensions of lots and yards, and other development standards permitted shall be as follows:

ARTICLE III, TABLE O	
MF MULTIFAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum density per acre	16 dwelling units
Maximum lot coverage	40%
Maximum height[1]	45'
Minimum front yard setback	25'
Minimum side yard between buildings	15'
Minimum side yard adjacent to street	20'
Minimum rear yard setback	30'
Minimum lot width (at property line)	70'

Minimum lot width (on curve at building line)	70'
Minimum number of bedrooms per unit	1
Minimum floor area per bedroom:[2]	
One bedroom unit	650 sq. ft.
Two bedroom unit	800 sq. ft.
Three bedroom unit	1,000 sq. ft.
Each additional bedroom over three	200 sq. ft.

Note 1. The height of any apartment building erected on a lot adjacent to single-family residential uses or zoning shall be limited to one story for a distance of 150 feet from the single-family district boundary, inclusive of streets and/or highways.

Note 2. Floor area. Every multifamily unit hereafter erected, constructed, reconstructed or altered shall have a floor area, excluding basements, open and screened porches, patios, and balconies of not less than specified above.

(4) *Courts.* Where an apartment building is erected so as to create inner courts, the faces of all opposite walls in such courts shall be a minimum distance of 30 feet apart and no balcony or canopy shall extend into such court area for a distance greater than five feet.

(5) *Lighting.* Lighting shall be designed and used to discourage crime and undesirable activity and to provide adequate vision, comfort and safety. It should use the lowest possible illumination to effectively allow surveillance. Open-air parking lot lighting shall be designed to provide for uniform lighting throughout the facility with no dark patches or pockets. The use of sensor technologies, timers or other means to activate lighting during the night may be used to conserve energy, provide safety, and promote compatibility between different land uses. In order to direct light downward and minimize the amount of light spill into the dark night sky, lighting fixtures shall be full cut-off fixtures. Open-air parking lot lighting shall not cause direct illumination on adjacent and nearby properties or streets. Fixtures should be of a type or adequately shielded so as to prevent glare from normal viewing angles. All lighting shall conform to this chapter.

(6) *Screening, fences, gates and stacking.* The entire site shall be screened from view on three sides from persons standing at ground level on the site or immediately adjoining property, by a masonry wall (minimum eight feet in height). A wall not more than eight feet in height shall be erected in the front yard that is of at least 50 percent black tubular steel or decorative metal. It is also mandatory for all apartments to be gated communities. Each gate shall be in proper working order at all times. In addition, there shall be a minimum stacking area for four vehicles at each gate.

(7) *Balconies/patios.* When an apartment building is erected so as to create balconies or patios facing a public street such balconies shall not extend beyond the building line.

(8) *Refuse facilities.* Complexes shall provide sufficient refuse facilities, subject to discretionary review and approval by the director and screened in compliance with the zoning ordinance.

(9) *Mechanical equipment.* Mechanical equipment shall be constructed, located and screened so as not to interfere with the peace and comfort of the occupant(s) of any building or residence.

(10) *Mail kiosks.* Mail kiosk shall have a minimum of three required parking spaces for the development within 50 feet, unless a drive-through facility is provided. The mail kiosk must be constructed of 100 percent masonry and constructed of the same materials as the main structure with a metal roof.

(11) *Building design.* Each building must follow the following conditions in addition to the town's architectural and design standards. (See Section 106.06.04 for more detail on architectural design and materials)

a. Except for windows, doors and garage doors, the exterior of all building elevations shall be 100 percent masonry. Cementitious fiberboard may be used for areas not considered conducive for masonry, as determined by the building official, and architectural features, including but not limited to bay windows, dormers, chimneys not part of an exterior wall, and gables.

b. Flat primary roofs are prohibited.

c. The residential building angle to public streets and single-family zoning districts will be between a minimum of 20 to a maximum of 70 degrees, unless parking is provided between the building and the street.

d. As an alternative to angling the buildings along the public street, adjacent buildings may be offset a distance equal to one-half the width of the building closest to the street, not to be less than 30 feet.

(12) *Parking regulations.* The minimum off-street parking and loading regulations shall be poured concrete surfaces, and comply with the following:

a. For buildings other than residential dwellings, one off-street parking space for each 200 square feet of floor area shall be provided.

b. All buildings hereafter erected, reconstructed, altered, enlarged or converted for one or more uses permitted in the Multifamily District shall provide adequate permanent off-street facilities for the loading and unloading of merchandise and good within or adjacent to the building in such a manner as not to obstruct the freedom of traffic movement on the public streets or alleys.

c. Two off-street parking spaces for each apartment dwelling unit plus one space for each additional bedroom unit (more than one) shall be provided. Covered parking spaces for at least 25 percent of the total required parking spaces (not including required guest parking) shall be provided.

d. No dead-end parking will be allowed.

e. Garages, when provided, shall be 100 percent masonry and be constructed of the same materials as the main structure. The garage may be part of the dwelling structure. The garage shall not be used for storage, thereby prohibiting the parking of an operable vehicle. Enclosed garage parking spaces shall be a minimum of ten by 20 feet. Stacking spaces shall not be counted towards required parking spaces.

(13) *Open space.* Each lot or parcel of land must comply with the following conditions in addition to the town's landscaping ordinance.

a. Each lot or parcel of land, which is used for multiple-family residences, shall provide on the same lot or parcel of land, usable open space, in accordance with [table H in section 106.06.18]. The open space shall have a minimum dimension of not less than 30 feet.

b. Of the required open space, 15 percent shall be arranged or located in a contiguous mass. This contiguous mass must be located within the required open space.

c. In meeting this requirements, a credit of three square feet may be applied for each square foot utilized for swimming pools and adjacent decks, patios, or lounge areas within ten feet of a pool; developed and equipped children's play areas; usable portions of recreational buildings; and private balconies and enclosed patios with a minimum dimension of five feet. Tennis courts are specifically excluded from this increased credit allowance. At the time of site plan approval, the planning and zoning commission and town council may allow a credit not to exceed ten percent of the total required usable open space for adjacent and immediately accessible public parks. The

combined credit for areas calculated at a three-to-one basis and for public parks shall not exceed 50 percent of the total usable open space for an individual lot or parcel of land.

d. One large canopy tree shall be provided per 3,500 square feet of required open space.

e. At the time of site plan approval, the Director of Development Services may give full or partial credit for open areas that exceed the maximum slope of 2 percent, if it is determined that such areas are environmentally significant and that their preservation would enhance the development.

(14) *Required amenities.* A minimum of four of the following must be incorporated into each multifamily development. A minimum of two major and two minor amenities must be provided in significant proportion to the development. The scale of the amenities as well as other comparable amenities can be approved through the site plan approval process.

a. Major amenities:

1. Dog park.

2. Indoor exercise facility.

3. Jogging trail.

4. Sport courts and fields (volleyball, baseball, tennis etc.).

5. Swimming pool.

b. Minor amenities:

1. Gazebo.

2. Improved picnic areas (with tables, grills, shading).

3. Playground or tot lot.

4. Putting green.

(15) *Miscellaneous requirements.* The following additional regulations are required for all Multifamily District apartment houses:

a. Separate sewer drain plumbing for all kitchen sinks that route through a grease trap;

b. Washer and dryer connections in each unit;

c. Lint traps on all laundry room washers; and

d. Storm drain debris collectors.

(m) *MH-1 Manufactured Home Single-Family District.*

(1) *Purpose.* Providing for certain manufactured and modular dwellings with specific reference to the seal of approval granted by appropriate state agencies and meeting federal standards and providing for single-family and two-family dwelling units.

(2) *Use regulations.* No building, structure, land or premises will be used, and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the uses specified in section 106.05.01(a), "schedule of uses - residential."

(3) *Building materials.* Duplex and single-family residences located within this district may use cementitious fiberboard to fulfill the masonry building requirements.

(4) *Base district note.* The MH-1 District standards remain only for the purpose of establishing a base zoning district to support existing planned developments in Town with a base MH-1 district that were approved before January 5, 2021.

(5) *Height and area regulations.* In said MH-1 Manufactured Home Single-Family District the height of buildings, the minimum dimensions of lots and yards, and the minimum lot area per family permitted on any lot, shall be as follows:

ARTICLE III, TABLE P	
MANUFACTURED HOME SINGLE-FAMILY DISTRICT DEVELOPMENT STANDARDS	
Maximum height	35'
Minimum front yard setback	25'
Minimum side yard setback	6'
Minimum side yard setback on corner[1]	28'
Minimum rear yard setback	20'
Minimum lot width (at building line)[2]	60'
Minimum lot area	6,000 sq. ft.
Minimum floor area[3]	1,000 sq. ft.

Note 1. Where interior lots have been planned or sold fronting on the side street, may project not more than ten feet in front of the line established for buildings by the front yard requirements for the interior lots on the side street, provided this regulation shall not be interpreted to reduce the buildable width of a corner lot in separate ownership at the time of the passage of this chapter, to less than 28 feet, and provided that the side yard regulations above shall be observed.

Note 2. The minimum width of a lot shall be measured at the front building line provided that where a lot has less width than herein required, in separate ownership at the time of the passage of this chapter, this regulation will not prohibit the erection of a single-family dwelling. Lots bordering streets on curves or contours shall be 80 feet in width at the building line.

Note 3. Each dwelling unit hereafter erected, constructed, reconstructed or altered in said Manufactured Home Single-Family District shall have a floor area, excluding basements, open and screened porches and garages, of not less than 1,000 square feet.

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1501, § 2, 6-18-2019; Ord. No. 1527 , § 2, 10-15-2019; Ord. No. 1587 , § 2, 1-5-2021)

Sec. 106.04.01 US 380 Overlay District.

(a) *Purpose.* The U.S. 380 Overlay District (380-OD) is identified in the 2017 Comprehensive Plan as the town's major commercial hub for employment. To this end, enhanced regulations are adopted to stimulate high-quality employment opportunities in this area. The 380 Overlay District is intended to substantially advance a legitimate governmental interest that includes promoting the economic development of the overlay district area, promoting a job base for the residents of Little Elm, and to regulate the character of growth along the 380 Corridor.

(b) *Description.* The Town of Little Elm hereby adopts the U.S. Highway 380 Overlay District establishing development standards for properties within the 380 Corridor in the Town of Little Elm jurisdictional limits, regarding use regulations, height regulations, signage, landscaping, and lighting requirements.

(c) *Boundary.* The physical boundaries of the US 380 Overlay District are identified in exhibit A of Ordinance No. 835, as it exists or is amended by town council.

(d) *Use regulations.*

(1) *Permitted uses.* The base zoning district of the subject property determines the permitted land uses in the US 380 Overlay District. Furthermore, the only permitted zoning districts in the overlay district are as follows: LC Light Commercial, HC Heavy Commercial, LI Light Industrial, HI Heavy Industrial, and related PD Planned Development Districts. Permitted land uses are outlined in section 106.05.01(b), "schedule of uses - nonresidential." All applicable regulations for use, yard, area, lot dimensions, utility placement, and landscaping shall be those specified for each district, including planned development stipulations except as otherwise stated in this chapter.

(2) *Prohibited uses.* The following uses are prohibited in the US 380 Overlay District, unless approved through the specific use permit process:

a. Automobile or truck leasing or renting.

b. Automobile sales, new or used.

c. Batching plant (concrete or asphalt, permanent).

d. Boat repair.

e. Boat sales, new or used.

f. Brick company with outside storage.

g. Building materials and hardware (outside display).

h. Church or rectory.

i. Commercial amusement (outdoor).

j. Dance hall.

k. Firing range, indoor/outdoor.

l. Flea market.

m. Heavy vehicle sales or storage.

n. Landfill (commercial).

o. Motorcycle sales with outside display.

p. Open or outside storage of products or materials that are not screened.

q. Pawn shop.

r. Portable building sales.

s. Recreational vehicle sales, new or used.

t. Residence home for the aged.

u. Rock quarries, sand, gravel, or earth excavation.

v. Salvage or reclamation of products that are not screened.

w. School, public primary or secondary.

x. Self-storage or mini warehouse.

y. Sexually oriented businesses.

z. Storage or repair of furniture and appliances, outside building.

aa. Tire retreading and recapping.

bb. Tire sales with outside storage.

cc. Trailer or manufactured home display or sales or rental.

dd. Truck and bus rental or repair.

ee. Truck sales, new or used.

ff. Vehicle or automobile ~~car~~ wash, self-serve.

gg. Veterinarian clinic or kennel with outside pens.

hh. Wrecking yard, auto salvage, junkyard, or outside reclamation.

(e) *Buffer zones required between industrial uses or zoning districts and single-family uses or zoning districts.* A buffer zone shall be required between industrial and single-family residential zoning districts or uses to provide separation between the two areas. These special buffering requirements are necessary in order to mitigate the impact associated with adjacent non-compatible uses. A 40-foot transitional buffer is required for industrial uses or zoning districts adjacent to single-family residential uses or zoning districts within the 380 Overlay District. Any transitional buffer area that is provided shall be landscaped and irrigated. Trees shall be provided at a rate of one tree per 30 linear feet. Fifty percent of the trees shall be evergreen and shall be evenly dispersed.

(f) *Height and setback regulations.* In the US 380 Overlay District the height of buildings and the setback regulations shall be as follows:

ARTICLE IV, TABLE A			
US 380 OVERLAY DISTRICT HEIGHT AND SLOPE DEVELOPMENT STANDARDS			
Distance from property line of the closest residential zoning or use	Less than 500'	500' to 750'	Over 750'
Nonresidential uses with residential proximity	3:1 slope	2:1 slope	1:1 slope
Nonresidential uses without residential proximity	1:1 slope		

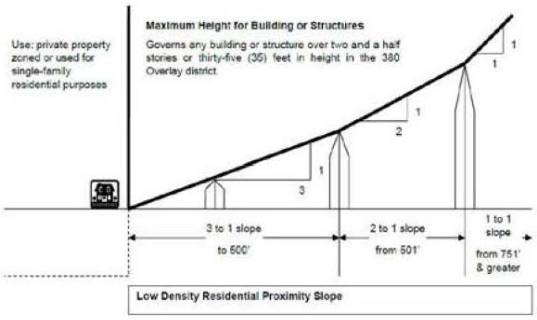
Note 1. Height. There will be no building height limitation as long as the setback regulations set forth below are met. Setbacks (shown above) shall be applied to all buildings over two and one-half stories or 35 feet in height. Buildings that are less than 35 feet in height shall use the setbacks identified in each zoning district. See the figure below for additional information regarding the required setbacks.

Note 2. This includes land zoned or used for single-family residential purposes regardless of jurisdiction.

Note 3. A height setback envelope is a plane projected upward and outward from a site of origination, which is defined as any private property that is zoned or used for single-family residential purposes.

Note 4. When referring to height setback envelopes, all slopes in this chapter are stated as to horizontal run to vertical rise.

Note 5. Surface parking facilities may be located within the height setback envelope, as required for nonresidential uses, so long as the parking does not encroach into the required landscape setbacks.



(g) *Signage.* In the US 380 Overlay District, signs shall be subject to the following regulations:

(1) *Internal illumination.* Outdoor, internally illuminated advertising signs may have a background, letters, and/or symbols of any color combination.

(2) *Monument sign.*

a. *Area*: The maximum area for a monument sign shall be 100 square feet.

b. *Height:* The maximum height for a monument sign shall be ten feet.

(3) *Multi-tenant monument sign:*

a. Area: The maximum area shall be based upon the size of the development.

b. Five acres or less is 150 square feet.

c. For every acre over five acres, the sign size may be increased by ten square feet with the maximum allowed area 240 square feet is permitted.

d. Height: The maximum height shall be 24 feet.

(4) *Wall sign area:*

a. For each one linear foot of primary building face, three square feet of wall sign is allowed. A maximum of 200 square feet of wall signage is allowed per building or tenant.

b. Big box primary tenants may use a total of 400 square feet.

(5) *Electronic message signs:*

a. The portion of the sign that may be electronic message is limited to 60 percent of the total sign.

b. Any change of pictures or information on said sign may not include animation but may include transitions which change at a rate no faster than every six seconds.

(h) *Landscaping.* Landscaping shall conform to the requirements found in the landscaping ordinance. In addition to these requirements, the following are required:

(1) *Perimeter landscaping:*

(2) A thirty-foot front landscape setback adjacent to US 380 shall be maintained. The landscape setback shall generally consist of trees, shrubs, groundcover, berms, and/or related elements.

(3) For the perimeter landscaped area adjacent to US 380, one large canopy tree and one small ornamental tree shall be required every 25 linear feet of street frontage. Trees may be grouped or clustered to facilitate site design.

(i) *Lighting.* The installation of lighting shall limit off-site spill (off the parcel containing the development) to a maximum of 0.5 footcandles at any location on any residential property, and no limit at any location on any nonresidential property, as measurable from any orientation of the measuring device.

(Ord. No. 1407, § 2, 8-15-2017)

Sec. 106.04.01 US 380 Overlay District.

(a) *Purpose.* The U.S. 380 Overlay District (380-OD) is identified in the 2017 Comprehensive Plan as the town's major commercial hub for employment. To this end, enhanced regulations are adopted to stimulate high-quality employment opportunities in this area. The 380 Overlay District is intended to substantially advance a legitimate governmental interest that includes promoting the economic development of the overlay district area, promoting a job base for the residents of Little Elm, and to regulate the character of growth along the 380 Corridor.

(b) *Description.* The Town of Little Elm hereby adopts the U.S. Highway 380 Overlay District establishing development standards for properties within the 380 Corridor in the Town of Little Elm jurisdictional limits, regarding use regulations, height regulations, signage, landscaping, and lighting requirements.

(c) *Boundary.* The physical boundaries of the US 380 Overlay District are identified in exhibit A of Ordinance No. 835, as it exists or is amended by town council.

(d) *Use regulations.*

(1) *Permitted uses.* The base zoning district of the subject property determines the permitted land uses in the US 380 Overlay District. Furthermore, the only permitted zoning districts in the overlay district are as follows: LC Light Commercial, HC Heavy Commercial, LI Light Industrial, HI Heavy Industrial, and related PD Planned Development Districts. Permitted land uses are outlined in section 106.05.01(b), "schedule of uses - nonresidential." All applicable regulations for use, yard, area, lot dimensions, utility placement, and landscaping shall be those specified for each district, including planned development stipulations except as otherwise stated in this chapter.

(2) *Prohibited uses.* The following uses are prohibited in the US 380 Overlay District, unless approved through the specific use permit process:

a. Automobile or truck leasing or renting.

b. Automobile sales, new or used.

c. Batching plant (concrete or asphalt, permanent).

d. Boat repair.

e. Boat sales, new or used.

f. Brick company with outside storage.

g. Building materials and hardware (outside display).

h. Church or rectory.

i. Commercial amusement (outdoor).

j. Dance hall.

k. Firing range, indoor/outdoor.

l. Flea market.

m. Heavy vehicle sales or storage.

n. Landfill (commercial).

o. Motorcycle sales with outside display.

p. Open or outside storage of products or materials that are not screened.

q. Pawn shop.

r. Portable building sales.

s. Recreational vehicle sales, new or used.

t. Residence home for the aged.

u. Rock quarries, sand, gravel, or earth excavation.

v. Salvage or reclamation of products that are not screened.

w. School, public primary or secondary.

x. Self-storage or mini warehouse.

y. Sexually oriented businesses.

z. Storage or repair of furniture and appliances, outside building.

aa. Tire retreading and recapping.

bb. Tire sales with outside storage.

cc. Trailer or manufactured home display or sales or rental.

dd. Truck and bus rental or repair.

ee. Truck sales, new or used.

ff. Vehicle or automobile wash, self-serve.

gg. Veterinarian clinic or kennel with outside pens.

hh. Wrecking yard, auto salvage, junkyard, or outside reclamation.

(e) *Buffer zones required between industrial uses or zoning districts and single-family uses or zoning districts.* A buffer zone shall be required between industrial and single-family residential zoning districts or uses to provide separation between the two areas. These special buffering requirements are necessary in order to mitigate the impact associated with adjacent non-compatible uses. A 40-foot transitional buffer is required for industrial uses or zoning districts adjacent to single-family residential uses or zoning districts within the 380 Overlay District. Any transitional buffer area that is provided shall be landscaped and irrigated. Trees shall be provided at a rate of one tree per 30 linear feet. Fifty percent of the trees shall be evergreen and shall be evenly dispersed.

(f) *Height and setback regulations.* In the US 380 Overlay District the height of buildings and the setback regulations shall be as follows:

ARTICLE IV, TABLE A			
US 380 OVERLAY DISTRICT HEIGHT AND SLOPE DEVELOPMENT STANDARDS			
Distance from property line of the closest residential zoning or use	Less than 500'	500' to 750'	Over 750'
Nonresidential uses with residential proximity	3:1 slope	2:1 slope	1:1 slope
Nonresidential uses without residential proximity	1:1 slope		

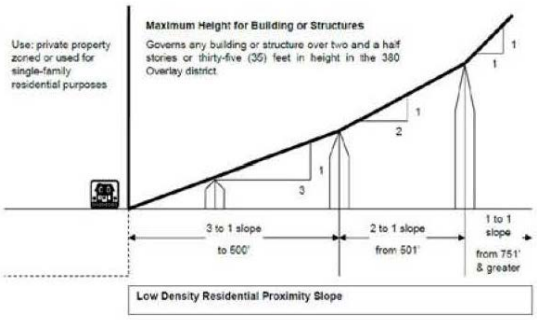
Note 1. Height. There will be no building height limitation as long as the setback regulations set forth below are met. Setbacks (shown above) shall be applied to all buildings over two and one-half stories or 35 feet in height. Buildings that are less than 35 feet in height shall use the setbacks identified in each zoning district. See the figure below for additional information regarding the required setbacks.

Note 2. This includes land zoned or used for single-family residential purposes regardless of jurisdiction.

Note 3. A height setback envelope is a plane projected upward and outward from a site of origination, which is defined as any private property that is zoned or used for single-family residential purposes.

Note 4. When referring to height setback envelopes, all slopes in this chapter are stated as to horizontal run to vertical rise.

Note 5. Surface parking facilities may be located within the height setback envelope, as required for nonresidential uses, so long as the parking does not encroach into the required landscape setbacks.



(g) *Signage.* In the US 380 Overlay District, signs shall be subject to the following regulations:

(1) *Internal illumination.* Outdoor, internally illuminated advertising signs may have a background, letters, and/or symbols of any color combination.

(2) *Monument sign.*

a. *Area*: The maximum area for a monument sign shall be 100 square feet.

b. *Height:* The maximum height for a monument sign shall be ten feet.

(3) *Multi-tenant monument sign:*

a. Area: The maximum area shall be based upon the size of the development.

b. Five acres or less is 150 square feet.

c. For every acre over five acres, the sign size may be increased by ten square feet with the maximum allowed area 240 square feet is permitted.

d. Height: The maximum height shall be 24 feet.

(4) *Wall sign area:*

a. For each one linear foot of primary building face, three square feet of wall sign is allowed. A maximum of 200 square feet of wall signage is allowed per building or tenant.

b. Big box primary tenants may use a total of 400 square feet.

(5) *Electronic message signs:*

a. The portion of the sign that may be electronic message is limited to 60 percent of the total sign.

b. Any change of pictures or information on said sign may not include animation but may include transitions which change at a rate no faster than every six seconds.

(h) *Landscaping.* Landscaping shall conform to the requirements found in the landscaping ordinance. In addition to these requirements, the following are required:

(1) *Perimeter landscaping:*

(2) A thirty-foot front landscape setback adjacent to US 380 shall be maintained. The landscape setback shall generally consist of trees, shrubs, groundcover, berms, and/or related elements.

(3) For the perimeter landscaped area adjacent to US 380, one large canopy tree and one small ornamental tree shall be required every 25 linear feet of street frontage. Trees may be grouped or clustered to facilitate site design.

(i) *Lighting.* The installation of lighting shall limit off-site spill (off the parcel containing the development) to a maximum of 0.5 footcandles at any location on any residential property, and no limit at any location on any nonresidential property, as measurable from any orientation of the measuring device.

(Ord. No. 1407, § 2, 8-15-2017)

Sec. 106.05.01 Schedule of uses.

Land and buildings in each of the following classified districts may be used for any of the following listed uses but no land shall hereafter be used, and no building or structure shall hereafter be erected, altered or converted which is arranged or designed or used for other than uses specified for the district in which it is located as set forth by the use schedule located in section 106.05.01(a) and (b), "Schedule of uses - residential" and "schedule of uses - nonresidential," respectively.

(a) *Residential zoning districts uses.* P=permitted by right; C=conditional use; S=specific use permit required. A blank space indicates the use is prohibited in that district.

ARTICLE V, TABLE A Residential Zoning Districts	SF-RE	SF-1	SF-2	SF-3	SF-4	A-1	A-2	SF-X	TH	MH-1	D	MF
Primary Residential Uses												
Amenity center	P	P	P	P	P	P	P	> P	P	P	P	P
Dwelling, accessory	P											
Dwelling, assisted living facility												S
Dwelling, assisted living home												S
Dwelling, boarding house or rooming house												P
Dwelling, duplex										P	P	P
Dwelling, group home	P	P	P	P	P	P	P	P	P	P	P	P
Dwelling, HUD Code man. home										P		
Dwelling, listed family home	P	P	P	P	P	P	P	P	P	P	P	P
Dwelling, live-work unit	See nonresidential uses											
Dwelling, mobile home											P C	C
Dwelling, model home	C	C	C	C	C	C	C	C	C		C	
Dwelling, multifamily												P
Dwelling, single-family detached	P	P	P	P	P	P	P	P	P	P	P	P
Dwelling, townhome									P	P	P	P
Senior living facility												S
Mixed use building									C	C	C	C
Accessory and Incidental Uses												
Accessory structure	C	C	C	C	C	C	C	C	C	C	C	C
Automated dispenser machine												

Automated intake machine												
Automated teller machine (ATM), off-site												
Caretaker/guard's Residence												
Construction yard, field office temporary	C	C	C	C	C	C	C	C	C	C	C	C
Farm accessory building	C											
Home occupation	C	C	C	C	C	C	C	C	C	C	C	C
Open storage, permanent												
Open storage, temporary												
Seasonal sales												
Solar panels or devices	C	C	C	C	C	C	C	C	C	C	C	C
Vending kiosk, commercial												
Vending kiosk, not-for-profit	C	C	C	C	C	C	C	C	C	C	C	C
Wind energy conversion system (WECS)	C	C	C	C	C	C	C	C	C	C	C	C
Institutional and Special Uses												
Assembly uses	S	S	S	S	S	S	S	S	S	S	S	S
Athletic stadium or field	S	S	S	S	S	S	S	S	S		S	S
Cemetery or mausoleum	S	S	S	S	S	S	S	S	S		S	S
College, university, or trade school	S	S	S	S	S	S	S	S	S		S	S
Farm, ranch, stable, garden, or orchard												
Fraternal organization, lodge, civic club, fraternity, or sorority												
Golf course, tennis club, polo club, or country club (private)	S	S	S	S	S	S	S	S	S		S	S
Gun or archery range, indoor												
Hospital												S
Municipal uses	P	P	P	P	P	P	P	P	P		P	P
Museum/art gallery												
Park or playground	P	P	P	P	P	P	P	P	P	P	P	P

Recreation center	S	S	S	S	S	S	S	S	S		S	S
Religious facility	P	P	P	P	P	P	P	P	P	P	P	P
School, private, charter or parochial	S	S	S	S	S	S	S	S	S		S	S
School, public	P	P	P	P	P	P	P	P	P		P	P
Infrastructure Type Uses												
Airport/landing field/heliport												
Communication tower	S	S	S	S	S	S	S	S	S	S	S	S
Electric power generating plant												
Electric substation	S	S	S	S	S	S	S	S	S	S	S	S
Private utility, other than listed	P	P	P	P	P	P	P	P	P	P	P	P
Sewage pumping station	P	P	P	P	P	P	P	P	P	P	P	P
Sewage treatment plant	S	S	S	S	S	S	S	S	S	S	S	S
Telephone exchange	S	S	S	S	S	S	S	S	S	S	S	S
Transit center/bus terminal												
Utility line	S	S	S	S	S	S	S	S	S	S	S	S
Water reservoir, water pumping station, water well	P	P	P	P	P	P	P	P	P	P	P	P
Water treatment plant	S	S	S	S	S	S	S	S	S	S	S	S
Retail Uses												
Antique shop and used furniture (inside)												
Arcade												
Bakery, candy or ice cream shop												
Bar/brewpub												
Building material and hardware sales, major												
Building material and hardware sales, minor												
Commercial amusement, indoor												
Commercial amusement, outdoor												

Farmers market												
Greenhouse or nursery for retail plant sales												
Heavy machinery sales and storage												
Portable building sales												
Private club												
Restaurant, dine-in												
Restaurant, drive-in												
Restaurant, drive-thru												
Restaurant, with brewpub												
Restaurant, pick-up only												
Smoking Establishment												
Store, big box												
Store, convenience												
Store, discount, variety, or department store												
Store, drugstore or pharmacy												
Store, feed												
Store, florist												
Store, grocery												
Store, hardware & home imp.												
Store, incidental												
Store, liquor												
Store, pet shop												
Store, shopping center												
Store, other than listed above												
Theatre, indoor												
Theatre, drive-in												
Winery/brewery retail sales												
Service Uses												
Alternative financial services												

Bank, savings and loan, or credit union												
Bed and breakfast inn	S	S	S	S	S	S	S	S	S	S	S	S
Body art studio												
Business Service												
Campground or RV park												S
Catering service/commissary												
Child care center								S				S
Child care center, in-home	C	C	C	C	C	C	C	C	C	C	C	C
Clinic/medical lab												
Clinic, animal, with no outside runs												
Clinic, animal, with outside runs												
Contractor's shop with outside storage												
Contractor's shop inside only												
Custom personal service												
Day Service, Adult												
Fairgrounds/exhibition area												
Funeral home/crematorium												
Funeral home/mortuary												
Gunsmith												
Gymnastics/dance studio/ martial arts												
Health/fitness center												
Hotel, extended stay												
Hotel, full service												
Hotel, limited service												
Household appliance service												
Incidental retail and service uses												
Kennel, no outside runs												
Kennel, with outside runs												
Laundry/dry cleaning, commercial												
Laundry/dry cleaning, pickup station												

Laundry/dry cleaning, self-service												
Laundry/dry cleaning, small shop												
Motel												
Office, professional and general administrative												
Personal service (other than listed)												
Print shop, minor retail shop												
Sexually oriented businesses												
Studio, photography, music, artistic, etc.												
Studio, media												
Automobile and Related Uses												
Auto/boat repair, major												
Auto/boat repair, minor												
Auto/boat sales, accessories only												
Auto/boat sales/leasing, new, outside display												
Auto/boat sales, used, outside display												
Auto/boat/RV storage												
Auto parking, lot or garage												P
Auto wash, automated												
Auto wash, full-service												
Auto wash, self-serve												
Gas pumps/fuel sales												
Manufactured/mobile home display and sales										S		
Motorcycle sales/service												
Truck, trailer, heavy equipment, RV and bus, repair												
Truck, trailer, heavy equipment, RV and bus, sales and leasing												
Truck terminal												

Industrial and Manufacturing Uses												
Concrete batch plant, permanent												
Concrete batch plant, temporary	C	C	C	C	C	C	C	C				C
Machine/welding shop												
Manufacturing or industrial uses, heavy												
Manufacturing or industrial uses, light												
Mini-warehouse/self-storage												
Office/showroom												
Print shop, industrial plant												
Research and development center												
Salvage yard, wrecking yard												
Warehouse/distribution center												
Winery/brewery/distillery manufacturing												

(b) *Nonresidential zoning districts uses.* P=permitted by right; C=Conditional Use; S=Specific Use Permit required.

ARTICLE V, TABLE B Nonresidential Zoning Districts	AG	O	NS	CF	LC	HC	LF	LI	HI
	Agricultural	Office	Neighborhood	Community	Light Commercial	Heavy	Lake front	Light Industrial	Heavy
Primary Residential Uses									
Amenity center							P		
Dwelling, accessory	P								
Dwelling, assisted living facility		S			S	S			
Dwelling, assisted living home									
Dwelling, boarding house or rooming house									
Dwelling, duplex									
Dwelling, group home									

Dwelling, HUD Code man. home									
Dwelling, listed family home									
Dwelling, live-work unit							P		
Dwelling, mobile home									
Dwelling, model home									
Dwelling, multifamily									
Dwelling, single-family detached	P								
Dwelling, townhome							P	S	S
Senior living facility		S			S		S		
Mixed use building					S	C	P	C	C
Accessory and Incidental Uses									
Accessory structure	C	C	C	C	C	C	C	C	C
Automated dispenser machine			P		P	P		P	P
Automated intake machine			S		S	S		S	S
Automated teller machine, off-site			S		S	S		S	S
Caretaker's/guard's residence						C		C	C
Construction yard, field office, temporary	C	C	C		C	C	C	C	C
Farm accessory building	C								
Home occupation	C				C	C	C		
Open storage, permanent/ongoing	S				S	S		S	S
Open storage, temporary					C	C		C	C
Seasonal sales	C				C	C		C	C
Solar panels, devices, commercial		C			S	C	C	C	C
Vending kiosk, commercial		C			C	C	C	C	C
Vending kiosk, not-for-profit	C	C	C	C	C	C	C	C	C
Wind energy conversion system (WECS)	C	C	C	C	S	C	C	C	C
Assembly uses	S	P	P	P	P	P	P	P	P
Athletic stadium or field	S	S	S	P	S	S		S	S
Cemetery or mausoleum	S	S	S		S	S		S	S
Institutional and Special Uses									
College, university, or trade school	S	P	S	P	P	P	S	P	P

Farm, ranch, stable, garden, or orchard	P								
Fraternal organization, lodge, civic club, fraternity, or sorority		P	P		P	P	P	P	P
Golf course, tennis club, polo club, or country club (private)	S	S	S	P	P	P		P	P
Gun or archery range, indoor				S	S	S		S	S
Hospital		S	S	P	P	P		P	P
Municipal uses operated by the Town of Little Elm	P	P	P	P	P	P	P	P	P
Museum/art gallery		S	S	P	P	P	P	P	P
Park or playground	P	P	P	P	P	P	P	P	P
Recreation center	S	P	P	P	P	P	P	P	P
Religious facility	P	P	P	P	P	P	P	P	P
School, private, charter or parochial	S	S	S	S	S	S	S	S	S
School, public	P	P	P	P	P	P	P	P	P
Infrastructure Type Uses									
Airport/landing field/heliport		C		C	C	C	C	C	C
Alternate energy system	C	C	C	C	S	C	C	C	C
Communication tower	~~C~~ S	~~C~~ S	~~C~~ S	~~C~~ S	S	~~C~~ S	S	~~C~~ S	~~C~~ S
Electric power generating plant	S			S	S	S		S	P
Electric substation	S	S	S	S	S	S	S	S	S
Helipad									
Private utility, other than listed	P	P	P	P	P	P	P	P	P
Sewage pumping station	P	P	P	P	P	P	P	P	P
Sewage treatment plant	S	S	S	S	S	S		S	S
Telephone exchange	S	S	P		P	P	P	P	P
Transit center/bus terminal		P	P		P	P	P	P	P
Utility distribution/transmission line	S	S	S		S	S	S	S	S
Water Reservoir, water pumping station, water well	P	P	P		P	P	P	P	P
Water treatment plant	S	S	S		S	S		S	S
Retail Uses									
Antique shop and used furniture, inside only					P	P	P	P	P

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Arcade					S	S	S	S	S
Bakery, candy or ice-cream shop			P		P	P	P	P	P
Bar/brewpub					S	S	P	S	S
Building material and hardware sales, major					P	P	P	P	P
Building material and hardware sales, minor					P	P	P	P	P
Commercial amusement, indoor					P	P	P	P	P
Commercial amusement, outdoor					S	S	S	P	P
Farmers market					S	S	S	S	
Florist			P		P	P	P	P	P
Greenhouse/nursery for plant sales		S			P	P	P	P	P
Heavy machinery sales and storage						P		P	P
Portable building sales					S	P		P	P
Private club					S	S			
Restaurant, dine-in		S	P		P	P	P	P	P
Restaurant, drive-in			S		S	P	P	P	P
Restaurant, drive-thru			S		S	P	P	P	P
Restaurant, with brewpub					P	P	P	P	P
Restaurant, pick-up only					P	P	P	P	P
Smoking Establishment		S	S		S	S	S	S	S
Store, big box					P	P	P	P	P
Store, convenience			P		P	P	P	P	P
Store, discount, variety, or department store					P	P	P	P	P
Store, drugstore or pharmacy					P	P	P	P	P
Store, feed					P	P		P	P
Store, florist			P		P	P	P	P	P
Store, grocery					P	P	P	P	P
Store, hardware and home imp.					P	P	P	P	P
Store, incidental (within another use)					P	P	P	P	P
Store, liquor					S	S	S	S	S
Store, pet shop					S	S	S	S	S
Store, shopping center					P	P	P	P	P
Store, other than listed above					P	P	P	P	P
Theatre, indoor		S			P	P	P	P	P

Theatre, drive-in					S	P		P	P
Winery/brewery retail sales					P	P	P	P	P
Service Uses									
Alternative financial services					S	C		C	C
Bank, savings and loan, or credit union		P			S	P	P	P	P
Banquet Hall					S	S	S	S	S
Bed and breakfast inn	S	P	P		P		P		
Body art studio						S	S	S	S
Business Service	S	S	S		S	S	S	S	S
Campground or RV park	S								
Catering service					P	P	P	P	P
Child care center		S	S		S	S	S	S	S
Child care center, in-home	C								
Cleaning and pressing (small shop/pickup)			P		P	P	P	P	P
Clinic/medical lab		P	P		P	P	P	P	P
Clinic, animal (no outside runs)	S		P		P	P	P	P	P
Clinic, animal (with outside runs)	S				S	P		P	P
Commissary					S	S		S	S
Contractor's shop with outside storage						P		P	P
Contractor's shop inside only					P	P		P	P
Custom personal service		P	P		P	P	P	P	P
Day Service, Adult		S	S		S	S	S	S	S
Fairgrounds/exhibition area		S			S	P		P	P
Fortune teller/psychic						S		S	S
Funeral home/crematorium		S			S	S		S	S
Funeral home/mortuary		S			P	P	P	P	P
Gunsmith					P	P	P	P	P
Gymnastics/dance studio/martial arts		P	P		P	P	P	P	P
Health/fitness center		P			P	P	P	P	P
Hotel, extended stay					S	S	S	S	S
Hotel, full service					P	P	P	P	P
Hotel, limited service					S	S	S	S	S

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Household appliance service and repair		S	P		P	P	P	P	P
Incidental retail and service uses			P	P	P	P	P	P	P
Kennel, no outside runs					P	P	P	P	P
Kennel, with outside runs					S	S	S	S	S
Laundry/dry cleaning, commercial						P		P	P
Laundry/dry cleaning, pickup station			P		P	P	P	P	P
Laundry/dry cleaning, self-service					P	P		P	P
Motel									
Office, professional and general administrative		P	P		P	P	P	P	P
Personal service (other than listed)					P	P	P	P	P
Print shop, minor retail shop					P	P	P	P	P
Sexually oriented businesses								C	C
Studio, photography, music, artistry		P	P		P	P	P	P	P
Studio, media		P			P	P	P	P	P
Automobile and Vehicular Uses									
Auto/boat repair, major					S	S		S	S
Auto/boat repair, minor					S	S		S	S
Auto/boat sales, accessories only					P	P	P	P	P
Auto/boat sales/leasing, new, outdoor display					S	S		P	P
Auto/boat sales, used, outdoor display						S		P	P
Auto/boat/RV storage						S		P	P
Auto parking, lot or garage		P			S	P	P	P	P
Auto wash, automated					S	S		S	S
Auto wash, full-service					S	S		S	S
Auto wash, self-serve						S		S	S
Gas pumps/fuel sales					S	S		S	S
Manufactured/mobile home display and sales								S	P
Motorcycle sales/service					S	P		P	P
Truck, trailer, heavy equipment, RV, bus repair								P	P
Truck, trailer, heavy equipment, RV and bus sales and leasing						P		P	P
Truck terminal						P		P	P

Industrial and Manufacturing Uses									
Concrete batch plant, permanent									S
Concrete batch plant, temporary	C	C	C		C	C		C	C
Machine/welding shop								P	P
Manufacturing or industrial uses, heavy									C
Manufacturing or industrial uses, light								C	C
Mini-warehouse/self-storage						S		S	S
Office/showroom						P		P	P
Print shop, industrial						P		P	P
Research and dev't center						P		P	P
Salvage yard, wrecking yard									S
Warehouse/distribution center								P	P
Winery/brewery/distillery manufacturing					S	S	P	P	P

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1582 , § 2, 12-1-2020; Ord. No. 1587 , § 2, 1-5-2021; Ord. No. 1646 , § 2, 11-16-2021; Ord. No. 1682 , § 2, 8-16-2022)

Sec. 106.05.01 Schedule of uses.

Land and buildings in each of the following classified districts may be used for any of the following listed uses but no land shall hereafter be used, and no building or structure shall hereafter be erected, altered or converted which is arranged or designed or used for other than uses specified for the district in which it is located as set forth by the use schedule located in section 106.05.01(a) and (b), "Schedule of uses - residential" and "schedule of uses - nonresidential," respectively.

(a) *Residential zoning districts uses.* P=permitted by right; C=conditional use; S=specific use permit required. A blank space indicates the use is prohibited in that district.

ARTICLE V, TABLE A Residential Zoning Districts	SF-RE	SF-1	SF-2	SF-3	SF-4	A-1	A-2	SF-X	TH	MH-1	D	MF
	Ranch Estate	Single-family	Single-family	Single-family	Single-family	Single-family	Single-family	Single-family	Single-family	Townhome	Manufactured	Duplex Multi
Primary Residential Uses												
Amenity center	P	P	P	P	P	P	P	> P	P	P	P	P
Dwelling, accessory	P											
Dwelling, assisted living facility												S
Dwelling, assisted living home												S
Dwelling, boarding house or rooming house												P
Dwelling, duplex										P	P	P
Dwelling, group home	P	P	P	P	P	P	P	P	P	P	P	P
Dwelling, HUD Code man. home										P		
Dwelling, listed family home	P	P	P	P	P	P	P	P	P	P	P	P
Dwelling, live-work unit	See nonresidential uses											
Dwelling, mobile home											P C	C
Dwelling, model home	C	C	C	C	C	C	C	C	C		C	
Dwelling, multifamily												P
Dwelling, single-family detached	P	P	P	P	P	P	P	P	P	P	P	P
Dwelling, townhome									P	P	P	P
Senior living facility												S
Mixed use building									C	C	C	C
Accessory and Incidental Uses												
Accessory structure	C	C	C	C	C	C	C	C	C	C	C	C
Automated dispenser machine												

Automated intake machine												
Automated teller machine (ATM), off-site												
Caretaker/guard's Residence												
Construction yard, field office temporary	C	C	C	C	C	C	C	C	C	C	C	C
Farm accessory building	C											
Home occupation	C	C	C	C	C	C	C	C	C	C	C	C
Open storage, permanent												
Open storage, temporary												
Seasonal sales												
Solar panels or devices	C	C	C	C	C	C	C	C	C	C	C	C
Vending kiosk, commercial												
Vending kiosk, not-for-profit	C	C	C	C	C	C	C	C	C	C	C	C
Wind energy conversion system (WECS)	C	C	C	C	C	C	C	C	C	C	C	C
Institutional and Special Uses												
Assembly uses	S	S	S	S	S	S	S	S	S	S	S	S
Athletic stadium or field	S	S	S	S	S	S	S	S	S		S	S
Cemetery or mausoleum	S	S	S	S	S	S	S	S	S		S	S
College, university, or trade school	S	S	S	S	S	S	S	S	S		S	S
Farm, ranch, stable, garden, or orchard												
Fraternal organization, lodge, civic club, fraternity, or sorority												
Golf course, tennis club, polo club, or country club (private)	S	S	S	S	S	S	S	S	S		S	S
Gun or archery range, indoor												
Hospital												S
Municipal uses	P	P	P	P	P	P	P	P	P		P	P
Museum/art gallery												
Park or playground	P	P	P	P	P	P	P	P	P	P	P	P

Recreation center	S	S	S	S	S	S	S	S	S		S	S
Religious facility	P	P	P	P	P	P	P	P	P	P	P	P
School, private, charter or parochial	S	S	S	S	S	S	S	S	S		S	S
School, public	P	P	P	P	P	P	P	P	P		P	P
Infrastructure Type Uses												
Airport/landing field/heliport												
Communication tower	S	S	S	S	S	S	S	S	S	S	S	S
Electric power generating plant												
Electric substation	S	S	S	S	S	S	S	S	S	S	S	S
Private utility, other than listed	P	P	P	P	P	P	P	P	P	P	P	P
Sewage pumping station	P	P	P	P	P	P	P	P	P	P	P	P
Sewage treatment plant	S	S	S	S	S	S	S	S	S	S	S	S
Telephone exchange	S	S	S	S	S	S	S	S	S	S	S	S
Transit center/bus terminal												
Utility line	S	S	S	S	S	S	S	S	S	S	S	S
Water reservoir, water pumping station, water well	P	P	P	P	P	P	P	P	P	P	P	P
Water treatment plant	S	S	S	S	S	S	S	S	S	S	S	S
Retail Uses												
Antique shop and used furniture (inside)												
Arcade												
Bakery, candy or ice cream shop												
Bar/brewpub												
Building material and hardware sales, major												
Building material and hardware sales, minor												
Commercial amusement, indoor												
Commercial amusement, outdoor												

Farmers market												
Greenhouse or nursery for retail plant sales												
Heavy machinery sales and storage												
Portable building sales												
Private club												
Restaurant, dine-in												
Restaurant, drive-in												
Restaurant, drive-thru												
Restaurant, with brewpub												
Restaurant, pick-up only												
Smoking Establishment												
Store, big box												
Store, convenience												
Store, discount, variety, or department store												
Store, drugstore or pharmacy												
Store, feed												
Store, florist												
Store, grocery												
Store, hardware & home imp.												
Store, incidental												
Store, liquor												
Store, pet shop												
Store, shopping center												
Store, other than listed above												
Theatre, indoor												
Theatre, drive-in												
Winery/brewery retail sales												
Service Uses												
Alternative financial services												

Bank, savings and loan, or credit union												
Bed and breakfast inn	S	S	S	S	S	S	S	S	S	S	S	S
Body art studio												
Business Service												
Campground or RV park												S
Catering service/commissary												
Child care center								S				S
Child care center, in-home	C	C	C	C	C	C	C	C	C	C	C	C
Clinic/medical lab												
Clinic, animal, with no outside runs												
Clinic, animal, with outside runs												
Contractor's shop with outside storage												
Contractor's shop inside only												
Custom personal service												
Day Service, Adult												
Fairgrounds/exhibition area												
Funeral home/crematorium												
Funeral home/mortuary												
Gunsmith												
Gymnastics/dance studio/ martial arts												
Health/fitness center												
Hotel, extended stay												
Hotel, full service												
Hotel, limited service												
Household appliance service												
Incidental retail and service uses												
Kennel, no outside runs												
Kennel, with outside runs												
Laundry/dry cleaning, commercial												
Laundry/dry cleaning, pickup station												

Laundry/dry cleaning, self-service												
Laundry/dry cleaning, small shop												
Motel												
Office, professional and general administrative												
Personal service (other than listed)												
Print shop, minor retail shop												
Sexually oriented businesses												
Studio, photography, music, artistic, etc.												
Studio, media												
Automobile and Related Uses												
Auto/boat repair, major												
Auto/boat repair, minor												
Auto/boat sales, accessories only												
Auto/boat sales/leasing, new, outside display												
Auto/boat sales, used, outside display												
Auto/boat/RV storage												
Auto parking, lot or garage												P
Auto wash, automated												
Auto wash, full-service												
Auto wash, self-serve												
Gas pumps/fuel sales												
Manufactured/mobile home display and sales										S		
Motorcycle sales/service												
Truck, trailer, heavy equipment, RV and bus, repair												
Truck, trailer, heavy equipment, RV and bus, sales and leasing												
Truck terminal												

Industrial and Manufacturing Uses												
Concrete batch plant, permanent												
Concrete batch plant, temporary	C	C	C	C	C	C	C	C				C
Machine/welding shop												
Manufacturing or industrial uses, heavy												
Manufacturing or industrial uses, light												
Mini-warehouse/self-storage												
Office/showroom												
Print shop, industrial plant												
Research and development center												
Salvage yard, wrecking yard												
Warehouse/distribution center												
Winery/brewery/distillery manufacturing												

(b) *Nonresidential zoning districts uses.* P=permitted by right; C=Conditional Use; S=Specific Use Permit required.

ARTICLE V, TABLE B Nonresidential Zoning Districts	AG	O	NS	CF	LC	HC	LF	LI	HI	
	Agricultur	Office	Neighb	Comm	Light Co	Heavy	Lakefro	Light In	Heav	
Primary Residential Uses										
Amenity center							P			
Dwelling, accessory	P									
Dwelling, assisted living facility		S			S	S				
Dwelling, assisted living home										
Dwelling, boarding house or rooming house										
Dwelling, duplex										
Dwelling, group home										

Dwelling, HUD Code man. home									
Dwelling, listed family home									
Dwelling, live-work unit							P		
Dwelling, mobile home									
Dwelling, model home									
Dwelling, multifamily									
Dwelling, single-family detached	P								
Dwelling, townhome							P	S	S
Senior living facility		S			S		S		
Mixed use building					S	C	P	C	C
Accessory and Incidental Uses									
Accessory structure	C	C	C	C	C	C	C	C	C
Automated dispenser machine			P		P	P		P	P
Automated intake machine			S		S	S		S	S
Automated teller machine, off-site			S		S	S		S	S
Caretaker's/guard's residence						C		C	C
Construction yard, field office, temporary	C	C	C		C	C	C	C	C
Farm accessory building	C								
Home occupation	C				C	C	C		
Open storage, permanent/ongoing	S				S	S		S	S
Open storage, temporary					C	C		C	C
Seasonal sales	C				C	C		C	C
Solar panels, devices, commercial		C			S	C	C	C	C
Vending kiosk, commercial		C			C	C	C	C	C
Vending kiosk, not-for-profit	C	C	C	C	C	C	C	C	C
Wind energy conversion system (WECS)	C	C	C	C	S	C	C	C	C
Assembly uses	S	P	P	P	P	P	P	P	P
Athletic stadium or field	S	S	S	P	S	S		S	S
Cemetery or mausoleum	S	S	S		S	S		S	S
Institutional and Special Uses									
College, university, or trade school	S	P	S	P	P	P	S	P	P

Farm, ranch, stable, garden, or orchard	P								
Fraternal organization, lodge, civic club, fraternity, or sorority		P	P		P	P	P	P	P
Golf course, tennis club, polo club, or country club (private)	S	S	S	P	P	P		P	P
Gun or archery range, indoor				S	S	S		S	S
Hospital		S	S	P	P	P		P	P
Municipal uses operated by the Town of Little Elm	P	P	P	P	P	P	P	P	P
Museum/art gallery		S	S	P	P	P	P	P	P
Park or playground	P	P	P	P	P	P	P	P	P
Recreation center	S	P	P	P	P	P	P	P	P
Religious facility	P	P	P	P	P	P	P	P	P
School, private, charter or parochial	S	S	S	S	S	S	S	S	S
School, public	P	P	P	P	P	P	P	P	P
Infrastructure Type Uses									
Airport/landing field/heliport		C		C	C	C	C	C	C
Alternate energy system	C	C	C	C	S	C	C	C	C
Communication tower	S	S	S	S	S	S	S	S	S
Electric power generating plant	S			S	S	S		S	P
Electric substation	S	S	S	S	S	S	S	S	S
Helipad									
Private utility, other than listed	P	P	P	P	P	P	P	P	P
Sewage pumping station	P	P	P	P	P	P	P	P	P
Sewage treatment plant	S	S	S	S	S	S		S	S
Telephone exchange	S	S	P		P	P	P	P	P
Transit center/bus terminal		P	P		P	P	P	P	P
Utility distribution/transmission line	S	S	S		S	S	S	S	S
Water Reservoir, water pumping station, water well	P	P	P		P	P	P	P	P
Water treatment plant	S	S	S		S	S		S	S
Retail Uses									
Antique shop and used furniture, inside only					P	P	P	P	P

Arcade					S	S	S	S	S
Bakery, candy or ice-cream shop			P		P	P	P	P	P
Bar/brewpub					S	S	P	S	S
Building material and hardware sales, major					P	P	P	P	P
Building material and hardware sales, minor					P	P	P	P	P
Commercial amusement, indoor					P	P	P	P	P
Commercial amusement, outdoor					S	S	S	P	P
Farmers market					S	S	S	S	
Florist			P		P	P	P	P	P
Greenhouse/nursery for plant sales		S			P	P	P	P	P
Heavy machinery sales and storage						P		P	P
Portable building sales					S	P		P	P
Private club					S	S			
Restaurant, dine-in		S	P		P	P	P	P	P
Restaurant, drive-in			S		S	P	P	P	P
Restaurant, drive-thru			S		S	P	P	P	P
Restaurant, with brewpub					P	P	P	P	P
Restaurant, pick-up only					P	P	P	P	P
Smoking Establishment		S	S		S	S	S	S	S
Store, big box					P	P	P	P	P
Store, convenience			P		P	P	P	P	P
Store, discount, variety, or department store					P	P	P	P	P
Store, drugstore or pharmacy					P	P	P	P	P
Store, feed					P	P		P	P
Store, florist			P		P	P	P	P	P
Store, grocery					P	P	P	P	P
Store, hardware and home imp.					P	P	P	P	P
Store, incidental (within another use)					P	P	P	P	P
Store, liquor					S	S	S	S	S
Store, pet shop					S	S	S	S	S
Store, shopping center					P	P	P	P	P
Store, other than listed above					P	P	P	P	P
Theatre, indoor		S			P	P	P	P	P

Theatre, drive-in					S	P		P	P
Winery/brewery retail sales					P	P	P	P	P
Service Uses									
Alternative financial services					S	C		C	C
Bank, savings and loan, or credit union		P			S	P	P	P	P
Banquet Hall					S	S	S	S	S
Bed and breakfast inn	S	P	P		P		P		
Body art studio						S	S	S	S
Business Service	S	S	S		S	S	S	S	S
Campground or RV park	S								
Catering service					P	P	P	P	P
Child care center		S	S		S	S	S	S	S
Child care center, in-home	C								
Cleaning and pressing (small shop/pickup)			P		P	P	P	P	P
Clinic/medical lab		P	P		P	P	P	P	P
Clinic, animal (no outside runs)	S		P		P	P	P	P	P
Clinic, animal (with outside runs)	S				S	P		P	P
Commissary					S	S		S	S
Contractor's shop with outside storage						P		P	P
Contractor's shop inside only					P	P		P	P
Custom personal service		P	P		P	P	P	P	P
Day Service, Adult		S	S		S	S	S	S	S
Fairgrounds/exhibition area		S			S	P		P	P
Fortune teller/psychic						S		S	S
Funeral home/crematorium		S			S	S		S	S
Funeral home/mortuary		S			P	P	P	P	P
Gunsmith					P	P	P	P	P
Gymnastics/dance studio/martial arts		P	P		P	P	P	P	P
Health/fitness center		P			P	P	P	P	P
Hotel, extended stay					S	S	S	S	S
Hotel, full service					P	P	P	P	P
Hotel, limited service					S	S	S	S	S

Household appliance service and repair		S	P		P	P	P	P	P
Incidental retail and service uses			P	P	P	P	P	P	P
Kennel, no outside runs					P	P	P	P	P
Kennel, with outside runs					S	S	S	S	S
Laundry/dry cleaning, commercial						P		P	P
Laundry/dry cleaning, pickup station			P		P	P	P	P	P
Laundry/dry cleaning, self-service					P	P		P	P
Motel									
Office, professional and general administrative		P	P		P	P	P	P	P
Personal service (other than listed)					P	P	P	P	P
Print shop, minor retail shop					P	P	P	P	P
Sexually oriented businesses								C	C
Studio, photography, music, artistry		P	P		P	P	P	P	P
Studio, media		P			P	P	P	P	P
Automobile and Vehicular Uses									
Auto/boat repair, major					S	S		S	S
Auto/boat repair, minor					S	S		S	S
Auto/boat sales, accessories only					P	P	P	P	P
Auto/boat sales/leasing, new, outdoor display					S	S		P	P
Auto/boat sales, used, outdoor display						S		P	P
Auto/boat/RV storage						S		P	P
Auto parking, lot or garage		P			S	P	P	P	P
Auto wash, automated					S	S		S	S
Auto wash, full-service					S	S		S	S
Auto wash, self-serve						S		S	S
Gas pumps/fuel sales					S	S		S	S
Manufactured/mobile home display and sales								S	P
Motorcycle sales/service					S	P		P	P
Truck, trailer, heavy equipment, RV, bus repair								P	P
Truck, trailer, heavy equipment, RV and bus sales and leasing						P		P	P
Truck terminal						P		P	P

Industrial and Manufacturing Uses									
Concrete batch plant, permanent									S
Concrete batch plant, temporary	C	C	C		C	C		C	C
Machine/welding shop								P	P
Manufacturing or industrial uses, heavy									C
Manufacturing or industrial uses, light								C	C
Mini-warehouse/self-storage						S		S	S
Office/showroom						P		P	P
Print shop, industrial						P		P	P
Research and dev't center						P		P	P
Salvage yard, wrecking yard									S
Warehouse/distribution center								P	P
Winery/brewery/distillery manufacturing					S	S	P	P	P

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1582 , § 2, 12-1-2020; Ord. No. 1587 , § 2, 1-5-2021; Ord. No. 1646 , § 2, 11-16-2021; Ord. No. 1682 , § 2, 8-16-2022)

Sec. 106.05.05 Nonconforming uses and structures.

(a) *Intent.* Within the districts established by this chapter or amendments that may later be adopted, there exist lots, structures, and uses of land and structures which were lawful before this chapter was passed or amended, but which would be prohibited, regulated or restricted under the terms of this chapter or future amendments.

(1) It is the intent of this chapter to permit these nonconformities to continue until they are removed, but not to encourage their survival. Such uses are declared by this chapter to be incompatible with permitted uses in the districts involved. It is further the intent of this chapter that nonconformities shall not be enlarged upon, expanded, or extended, nor be used as grounds for adding other structures or uses prohibited elsewhere in the same district.

(2) A nonconforming use of a structure, a nonconforming use of land, or a nonconforming use of a structure and land shall not be extended or enlarged after passage of this chapter by attachment on a building or premises of additional signs intended to be seen from the street or off the premises, or by the addition of other uses of a nature which would be prohibited generally in the district involved.

(3) To avoid undue hardship, nothing in this chapter shall be deemed to require a change in the plans, construction or designated use of any building on which actual construction was lawfully begun prior to the effective date of adoption or amendment of this chapter and upon which actual building construction has been diligently carried on. Actual construction is hereby defined to include the placing of construction materials in permanent position and fastened in a permanent manner; except that where demolition or removal of an existing building has been substantially begun in preparation for rebuilding, such demolition or removal shall be deemed to be actual construction, provided that work shall be diligently carried on until completion of the building involved.

(b) *Nonconforming lots of record.*

(1) In any district in which single-family dwellings are permitted, notwithstanding limitations imposed by other provisions of this chapter, a single-family dwelling and customary accessory buildings may be erected on any single lot of record at the effective date of adoption or amendment of this chapter. Such lot must be in separate ownership and not of continuous frontage with other lots in the same ownership. This provision shall apply even though such lot fails to meet the requirements for area or width standards, or both, that are generally applicable in the district, provided that yard dimensions and other requirements not involving area or width, or both, of the lot must conform to the regulations for the district in which such lot is located. Variance of area, width, and yard requirements may be obtained only through action of the board of adjustment (see section 106.02.02(a)(3) for more information).

(2) If two or more lots or combinations of lots and portions of lots with continuous frontage in single ownership are of record at the time of passage or amendment of this chapter, and if all or part of the lots do not meet the requirements for lot width and area as established by this chapter, the lands involved shall be considered to be an undivided parcel for the purposes of this chapter, and no portion of said parcel shall be used which does not meet lot width and are requirements established by this chapter, nor shall any division of the parcel be made which leaves remaining any with width or area below the requirements stated in this chapter.

(c) *Nonconforming uses of land.* Where, at the effective date of adoption or amendment of this chapter, lawful use of land exists that is made no longer permissible under the terms of this chapter as enacted or amended, such use may be continued, so long as it remains otherwise lawful, subject to the following provisions:

(1) No such nonconforming use shall be enlarged or increased, nor extended to occupy a greater area of land than was occupied at the effective date of adoption or amendment of this chapter;

(2) No such nonconforming use shall be moved in whole or in part to any other portion of the lot or parcel occupied by such use at the effective date of adoption or amendment of this chapter;

(3) If any such nonconforming use of land ~~,~~ is intentionally abandoned for at least six months ~~ceases for any reason for a period of more than 30 days~~, all nonconforming rights are terminated and any subsequent use of such land shall conform to the regulations specified by this chapter for the district in which such land is located.

(d) *Nonconforming uses of structures.* If a lawful use of a structure, or of structure and premises in combination, exists at the effective date of adoption or amendment of this chapter that would not be allowed in the district under the terms of this chapter, the lawful use may be continued so long as it remains otherwise lawful, subject to the following provisions:

(1) No existing structure devoted to a use not permitted by this chapter in the district in which it is located shall be enlarged, extended, constructed, reconstructed, moved, or structurally altered except in changing the use of the structure to a use permitted in the district in which it located.

(2) Any nonconforming use may be extended throughout any parts of a building which were manifestly arranged or designed for such use at the time of adoption or amendment for this chapter, but no such use shall be extended to occupy any land outside such building.

(3) Any structure, or structure and land in combination, in or on which a nonconforming use is superseded by a permitted use, shall thereafter conform to the regulations for the district in which such structure is located, and the nonconforming use may not thereafter be resumed.

(4) When a nonconforming use of a structure, or structure and premises in combination, is discontinued or abandoned for six consecutive months or for 18 months during any three-year period, the structure thereafter shall not be used except in conformance with the regulations of the district in which it is located.

(5) Where nonconforming use status applies to a structure and premises in combination, removal or destruction of the structure shall eliminate the nonconforming status of the land.

(6) Where nonconforming use status applies to a conforming structure, such use shall be immediately terminated upon transfer to another ownership or lease.

(e) *Changing uses and nonconforming rights.*

(1) Nonconforming use to conforming use. Any nonconforming use may be changed to a conforming use, and once such change is made, the use shall not be changed back to any nonconforming use.

(2) Nonconforming use to another nonconforming use. A nonconforming use may not be changed to another nonconforming use.

(3) Conforming use in a nonconforming structure. Where a conforming use is located in a nonconforming structure, the use may be changed to another conforming use by the process outlined in section 106.05.05(f), expansion of nonconforming uses and structures.

(f) *Expansion of nonconforming uses and structures.* An expansion of a nonconforming use or structure is allowed in accordance with the following.

(1) *Nonconforming use expansion in existing building.* A nonconforming use located within a building may be extended throughout the existing building, provided.

a. No structural alteration, except as provided in section 106.05.05(f)(5) below, may be made on or in the building except those required by law to preserve such building in a structurally sound condition.

b. The number of dwelling units or rooms in a nonconforming residential use must not be increased so as to exceed the number of dwelling units or rooms existing at the time said use became a nonconforming use.

(2) *Nonconforming use prohibited from expansion beyond existing building.* Nonconforming use within a building shall not be extended to occupy any land outside the building.

(3) *Off-street loading and parking.* Nonconforming use of land or building shall not be enlarged, increased, or extended to occupy a greater area of land than was occupied at the time the land became a nonconforming use, except to provide off-street loading or off-street parking space.

(4) *Residential lot exemption.* The minimum residential lot areas for the various zoning districts shall be in accordance with their respective districts except that a lot having less area than herein required which was an official "lot of record" prior to [date of adoption of ordinance], may be used for a single-family dwelling.

(5) *Expansion of nonconforming buildings with conforming uses.* Buildings or structures which do not conform to the area regulations or development standards in this chapter but where the uses are deemed conforming shall not increase the gross floor area greater than ten percent from the date when the building became nonconforming.

(6) Reuse of abandoned or vacant buildings by conforming uses allowed. Buildings or structures which have been vacant or abandoned for less than six months and do not meet the current area regulations or development standards shall be allowed to be reoccupied by a conforming use.

(g) *Restoration of nonconforming structures.*

(1) *Total destruction.* If a nonconforming structure is destroyed by fire, the elements, or other cause, it may not be rebuilt except to conform to the provisions of this chapter.

(2) *Partial destruction.* In the case of partial destruction of a nonconforming structure not exceeding 51 percent of its total appraised value as determined by the Appraisal District, reconstruction will be permitted, but the existing square footage or function of the nonconforming structure cannot be expanded.

(h) *Movement of nonconforming structures.*

(1) *Relocation of a nonconforming structure within a platted lot.* Nonconforming structures may be relocated within the same platted lot.

(2) *Compliance.* Nonconforming structures shall comply with all setback and screening requirements.

(i) *Repairs and maintenance.* On any building devoted in whole or in part to an nonconforming use, work may be done in any period of 12 consecutive months on ordinary repairs, or on repair or replacement of nonbearing walls, fixture, wiring or plumbing, to an extent not exceeding ten percent of the current replacement value of the building, provided that the cubic content of the building as it existed at the time of passage or amendment of this chapter shall be not increased. Nothing in this chapter shall be deemed to prevent the strengthening or restoring to a safe condition of any building or part thereof declared to be unsafe by any official charged with protecting the public safety, upon order of such official.

(j) *Uses under exception provisions not nonconforming uses.* Any use for which a special exception is permitted as provided in this chapter shall not be deemed a nonconforming use, but shall without further action be deemed a conforming use in such district only for the single property granted such exception.

(k) *Termination of Nonconforming Uses and Compensation for such Termination.*

(1) A person using a property in a manner considered to be a nonconforming use as a result of the adoption of or change to a zoning regulation or boundary may continue to use the property in the same manner unless required by the Town to stop the nonconforming use of the property.

(2) If the Town requires a property owner or lessee to stop the nonconforming use of a property as described by Subsection (k)(1), the owner or lessee of the property is entitled to compensation as set forth In Texas Local Government Code Section 211.019(d).

(3) Not later than the 10th day after the date the Town imposes a requirement to stop a nonconforming use of a property under this section, the Town shall give written notice to each owner or lessee of the property, as indicated by the most recently approved municipal tax roll, who is required to stop a nonconforming use of the property of the requirement and of the remedies which an owner or lessee of the property is entitled to under Texas Local Government Code Section 211.019(d).

(4) A person entitled to a remedy under Texas Local Government Code Section 211.019 may appeal a compensation determination to the board of adjustment not later than the 20th day after the date the determination is made.

Commented [BS1]: Suggested by Robert

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1635 , § 2, 9-7-2021)

Sec. 106.05.05 Nonconforming uses and structures.

(a) *Intent.* Within the districts established by this chapter or amendments that may later be adopted, there exist lots, structures, and uses of land and structures which were lawful before this chapter was passed or amended, but which would be prohibited, regulated or restricted under the terms of this chapter or future amendments.

(1) It is the intent of this chapter to permit these nonconformities to continue until they are removed, but not to encourage their survival. Such uses are declared by this chapter to be incompatible with permitted uses in the districts involved. It is further the intent of this chapter that nonconformities shall not be enlarged upon, expanded, or extended, nor be used as grounds for adding other structures or uses prohibited elsewhere in the same district.

(2) A nonconforming use of a structure, a nonconforming use of land, or a nonconforming use of a structure and land shall not be extended or enlarged after passage of this chapter by attachment on a building or premises of additional signs intended to be seen from the street or off the premises, or by the addition of other uses of a nature which would be prohibited generally in the district involved.

(3) To avoid undue hardship, nothing in this chapter shall be deemed to require a change in the plans, construction or designated use of any building on which actual construction was lawfully begun prior to the effective date of adoption or amendment of this chapter and upon which actual building construction has been diligently carried on. Actual construction is hereby defined to include the placing of construction materials in permanent position and fastened in a permanent manner; except that where demolition or removal of an existing building has been substantially begun in preparation for rebuilding, such demolition or removal shall be deemed to be actual construction, provided that work shall be diligently carried on until completion of the building involved.

(b) *Nonconforming lots of record.*

(1) In any district in which single-family dwellings are permitted, notwithstanding limitations imposed by other provisions of this chapter, a single-family dwelling and customary accessory buildings may be erected on any single lot of record at the effective date of adoption or amendment of this chapter. Such lot must be in separate ownership and not of continuous frontage with other lots in the same ownership. This provision shall apply even though such lot fails to meet the requirements for area or width standards, or both, that are generally applicable in the district, provided that yard dimensions and other requirements not involving area or width, or both, of the lot must conform to the regulations for the district in which such lot is located. Variance of area, width, and yard requirements may be obtained only through action of the board of adjustment (see section 106.02.02(a)(3) for more information).

(2) If two or more lots or combinations of lots and portions of lots with continuous frontage in single ownership are of record at the time of passage or amendment of this chapter, and if all or part of the lots do not meet the requirements for lot width and area as established by this chapter, the lands involved shall be considered to be an undivided parcel for the purposes of this chapter, and no portion of said parcel shall be used which does not meet lot width and are requirements established by this chapter, nor shall any division of the parcel be made which leaves remaining any with width or area below the requirements stated in this chapter.

(c) *Nonconforming uses of land.* Where, at the effective date of adoption or amendment of this chapter, lawful use of land exists that is made no longer permissible under the terms of this chapter as enacted or amended, such use may be continued, so long as it remains otherwise lawful, subject to the following provisions:

(1) No such nonconforming use shall be enlarged or increased, nor extended to occupy a greater area of land than was occupied at the effective date of adoption or amendment of this chapter;

(2) No such nonconforming use shall be moved in whole or in part to any other portion of the lot or parcel occupied by such use at the effective date of adoption or amendment of this chapter;

(3) If any such nonconforming use of land is intentionally abandoned for at least six months , all nonconforming rights are terminated and any subsequent use of such land shall conform to the regulations specified by this chapter for the district in which such land is located.

(d) *Nonconforming uses of structures.* If a lawful use of a structure, or of structure and premises in combination, exists at the effective date of adoption or amendment of this chapter that would not be allowed in the district under the terms of this chapter, the lawful use may be continued so long as it remains otherwise lawful, subject to the following provisions:

(1) No existing structure devoted to a use not permitted by this chapter in the district in which it is located shall be enlarged, extended, constructed, reconstructed, moved, or structurally altered except in changing the use of the structure to a use permitted in the district in which it located.

(2) Any nonconforming use may be extended throughout any parts of a building which were manifestly arranged or designed for such use at the time of adoption or amendment for this chapter, but no such use shall be extended to occupy any land outside such building.

(3) Any structure, or structure and land in combination, in or on which a nonconforming use is superseded by a permitted use, shall thereafter conform to the regulations for the district in which such structure is located, and the nonconforming use may not thereafter be resumed.

(4) When a nonconforming use of a structure, or structure and premises in combination, is discontinued or abandoned for six consecutive months or for 18 months during any three-year period, the structure thereafter shall not be used except in conformance with the regulations of the district in which it is located.

(5) Where nonconforming use status applies to a structure and premises in combination, removal or destruction of the structure shall eliminate the nonconforming status of the land.

(6) Where nonconforming use status applies to a conforming structure, such use shall be immediately terminated upon transfer to another ownership or lease.

(e) *Changing uses and nonconforming rights.*

(1) Nonconforming use to conforming use. Any nonconforming use may be changed to a conforming use, and once such change is made, the use shall not be changed back to any nonconforming use.

(2) Nonconforming use to another nonconforming use. A nonconforming use may not be changed to another nonconforming use.

(3) Conforming use in a nonconforming structure. Where a conforming use is located in a nonconforming structure, the use may be changed to another conforming use by the process outlined in section 106.05.05(f), expansion of nonconforming uses and structures.

(f) *Expansion of nonconforming uses and structures.* An expansion of a nonconforming use or structure is allowed in accordance with the following.

(1) *Nonconforming use expansion in existing building.* A nonconforming use located within a building may be extended throughout the existing building, provided.

a. No structural alteration, except as provided in section 106.05.05(f)(5) below, may be made on or in the building except those required by law to preserve such building in a structurally sound condition.

b. The number of dwelling units or rooms in a nonconforming residential use must not be increased so as to exceed the number of dwelling units or rooms existing at the time said use became a nonconforming use.

(2) *Nonconforming use prohibited from expansion beyond existing building.* Nonconforming use within a building shall not be extended to occupy any land outside the building.

(3) *Off-street loading and parking.* Nonconforming use of land or building shall not be enlarged, increased, or extended to occupy a greater area of land than was occupied at the time the land became a nonconforming use, except to provide off-street loading or off-street parking space.

(4) *Residential lot exemption.* The minimum residential lot areas for the various zoning districts shall be in accordance with their respective districts except that a lot having less area than herein required which was an official "lot of record" prior to [date of adoption of ordinance], may be used for a single-family dwelling.

(5) *Expansion of nonconforming buildings with conforming uses.* Buildings or structures which do not conform to the area regulations or development standards in this chapter but where the uses are deemed conforming shall not increase the gross floor area greater than ten percent from the date when the building became nonconforming.

(6) Reuse of abandoned or vacant buildings by conforming uses allowed. Buildings or structures which have been vacant or abandoned for less than six months and do not meet the current area regulations or development standards shall be allowed to be reoccupied by a conforming use.

(g) *Restoration of nonconforming structures.*

(1) *Total destruction.* If a nonconforming structure is destroyed by fire, the elements, or other cause, it may not be rebuilt except to conform to the provisions of this chapter.

(2) *Partial destruction.* In the case of partial destruction of a nonconforming structure not exceeding 51 percent of its total appraised value as determined by the Appraisal District, reconstruction will be permitted, but the existing square footage or function of the nonconforming structure cannot be expanded.

(h) *Movement of nonconforming structures.*

(1) *Relocation of a nonconforming structure within a platted lot.* Nonconforming structures may be relocated within the same platted lot.

(2) *Compliance.* Nonconforming structures shall comply with all setback and screening requirements.

(i) *Repairs and maintenance.* On any building devoted in whole or in part to an nonconforming use, work may be done in any period of 12 consecutive months on ordinary repairs, or on repair or replacement of nonbearing walls, fixture, wiring or plumbing, to an extent not exceeding ten percent of the current replacement value of the building, provided that the cubic content of the building as it existed at the time of passage or amendment of this chapter shall be not increased. Nothing in this chapter shall be deemed to prevent the strengthening or restoring to a safe condition of any building or part thereof declared to be unsafe by any official charged with protecting the public safety, upon order of such official.

(j) *Uses under exception provisions not nonconforming uses.* Any use for which a special exception is permitted as provided in this chapter shall not be deemed a nonconforming use, but shall without further action be deemed a conforming use in such district only for the single property granted such exception.

(k) *Termination of Nonconforming Uses and Compensation for such Termination*.

(1) A person using a property in a manner considered to be a nonconforming use as a result of the adoption of or change to a zoning regulation or boundary may continue to use the property in the same manner unless required by the Town to stop the nonconforming use of the property.

(2) If the Town requires a property owner or lessee to stop the nonconforming use of a property as described by Subsection (k)(1), the owner or lessee of the property is entitled to compensation as set forth In Texas Local Government Code Section 211.019(d).

(3) Not later than the 10th day after the date the Town imposes a requirement to stop a nonconforming use of a property under this section, the Town shall give written notice to each owner or lessee of the property, as indicated by the most recently approved municipal tax roll, who is required to stop a nonconforming use of the property of the requirement and of the remedies which an owner or lessee of the property is entitled to under Texas Local Government Code Section 211.019(d).

(4) A person entitled to a remedy under Texas Local Government Code Section 211.019 may appeal a compensation determination to the board of adjustment not later than the 20th day after the date the determination is made.

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1635 , § 2, 9-7-2021)

Sec. 106.06.05 Architectural standards for commercial structures (includes office, retail, commercial, mixed use, etc.).

(a) *Intent.* The following apply to nonresidential developments, including institutional buildings:

(1) The intent of this subsection is to create buildings which reflect the lakefront character of Little Elm. The size, disposition and design of buildings play an important role in achieving that goal.

(2) Buildings should be constructed in a manner that allows flexibility to accommodate a range of uses over time in order to avoid the need to demolish and rebuild for successive uses.

(3) Buildings should directly contribute to the attractiveness, safety and function of the street and public areas.

(4) Buildings should be constructed in a manner, and with materials, that are highly durable and will continue to endure and be attractive over a long time, especially adjacent to public and pedestrian areas.

(5) It is not the intent of this section to discourage innovation. The use of exceptional design features, such as tower elements, exposed beams, or other unique and outstanding architectural ornamentation worthy of merit that make a positive contribution to the surrounding visual environment is encouraged.

(b) *Design standards.*

(1) All buildings within a common development, as shown on a development plan, concept plan, or preliminary site plan, shall have similar architectural styles, materials, colors and detailing.

(2) All structures shall be architecturally finished on all sides that can be seen from a public right-of-way with similar styles, materials, colors and detailing.

(3) Facades shall generally be built parallel to the street frontage, except at street intersections, where a facade containing a primary building entrance should be curved or angled toward an intersection.

(4) All buildings shall be designed and constructed in tri-partite architecture so that they have a distinct base, middle and top, separated by horizontal elements (see examples next page).

(5) All buildings shall be constructed of 100 percent masonry finishing material, as outlined in table B and in the proportions illustrated in table C.

(6) All streetscape elements and site amenities, such as bike racks, trash receptacles, lampposts, and tree grates shall be metal, rust and flake/chip resistant, and generally be black "storm cloud" in color. Bollards can be concrete or cast metal and shall be of decorative design.

Examples of Tri-partite Construction

(c) *Exterior materials for all commercial development.*

(1) *Categories of exterior materials.* The Town of Little Elm has categorized exterior building materials for commercial buildings into three categories, as follows:

(2) *Category A* materials are defined as the superior masonry products from which the town prefers buildings to be predominantly constructed. Unless otherwise provided for in this chapter, acceptable Category A masonry finishing materials are brick, natural stone, and manufactured stone.

(3) *Category B* materials are the secondary products that the town recognizes as masonry materials acceptable for use, but also as products that are less desirable and therefore should not be the predominant material. Unless otherwise provided for in this chapter, acceptable Category B masonry finishing materials include three-step stucco, architectural concrete block with integrated color (i.e. split-face CMU), concrete tilt wall (colored or stamped), engineered wood, and cementitious fiberboard with integrated color (in the form of lap siding or board and batten).

(4) *Category C* materials are accent products acceptable in limited application for architectural accents and features and for walls on upper stories of multiple story buildings. Unless otherwise provided for in this chapter, acceptable Category C materials include metal, tile, glass block, exterior insulation and finish systems (EIFS), and wood.

ARTICLE VI, TABLE B	
EXTERIOR CATEGORIES & MATERIALS FOR COMMERCIAL	
Categories	Materials
A	Brick, stone, or manufactured stone
B	Split-face CMU, stucco, cementitious fiber board, engineered wood, tilt-wall construction
C	Metal, wood, tile, glass, EIFS
Prohibited	Plain concrete block, aggregate, vinyl, plastic

(5) *Windows.* Windows and glazing shall be limited to a minimum of 30 percent and maximum of 70 percent of each building elevation facing a street, major access lane, or side yard greater than ten feet. This does not apply to big box buildings (greater than 50,000 square feet in size). Faux (i.e. false) windows are allowed for side yards.

(6) *Roof designs and materials.* For buildings with a visible hip, gable or mansard roof, allowed materials include metal (standing seam), slate or tile (clay or cement, barrel or Roman-shaped).

(7) *Prohibited materials.* Prohibited exterior surface materials include cinder block, vinyl, plastic, and aggregate pea-gravel finished surfaces.

(d) *Facade design standards for buildings 15,000 square feet or smaller.* The following shall apply to all exterior walls of buildings that are 15,000 square feet or smaller and which are clearly visible from a public right-of-way or along an active storefront (see table C):

(1) Walls, excluding windows, doors and other openings, shall be constructed of a minimum 80 percent Group A materials and a maximum of 20 percent Group B materials. However, accent materials from Group C may be allowed in limited application for architectural accents or features.

(2) A big box may use split-face CMU (architectural block) for up to 20 percent of the primary facade, in addition to the 20 percent of other Group B materials.

(3) All exterior walls of buildings less than 15,000 square feet are considered primary facades, regardless of orientation.

(e) *Facade design standards for buildings larger than 15,000 square feet.* The following shall apply to all exterior walls of buildings 15,000 square feet or larger and which are not clearly visible from a public street or along an active storefront, or are constructed on a property line as one of a series of in-line buildings where the wall will become part of a common wall (see table C):

(1) *Primary facades.* Allowed materials. Walls, excluding windows, doors, and other openings, shall be constructed of a minimum 20 percent Group A materials and a maximum of 80 percent Group B materials. In any case, the color of the walls shall match the primary facades.

(2) *Secondary facades.* Secondary facades which are adjacent to the primary facade shall continue the primary facade treatment by wrapping the corner. This may be achieved with elements such as cornices, bases and vertical elements. In all cases, however, wall surface materials shall wrap the corner.

ARTICLE VI, TABLE C

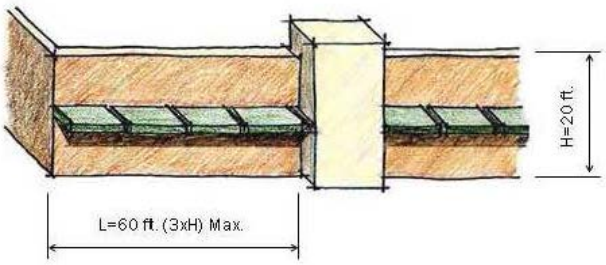
Required Percentages of Exterior Materials For Commercial

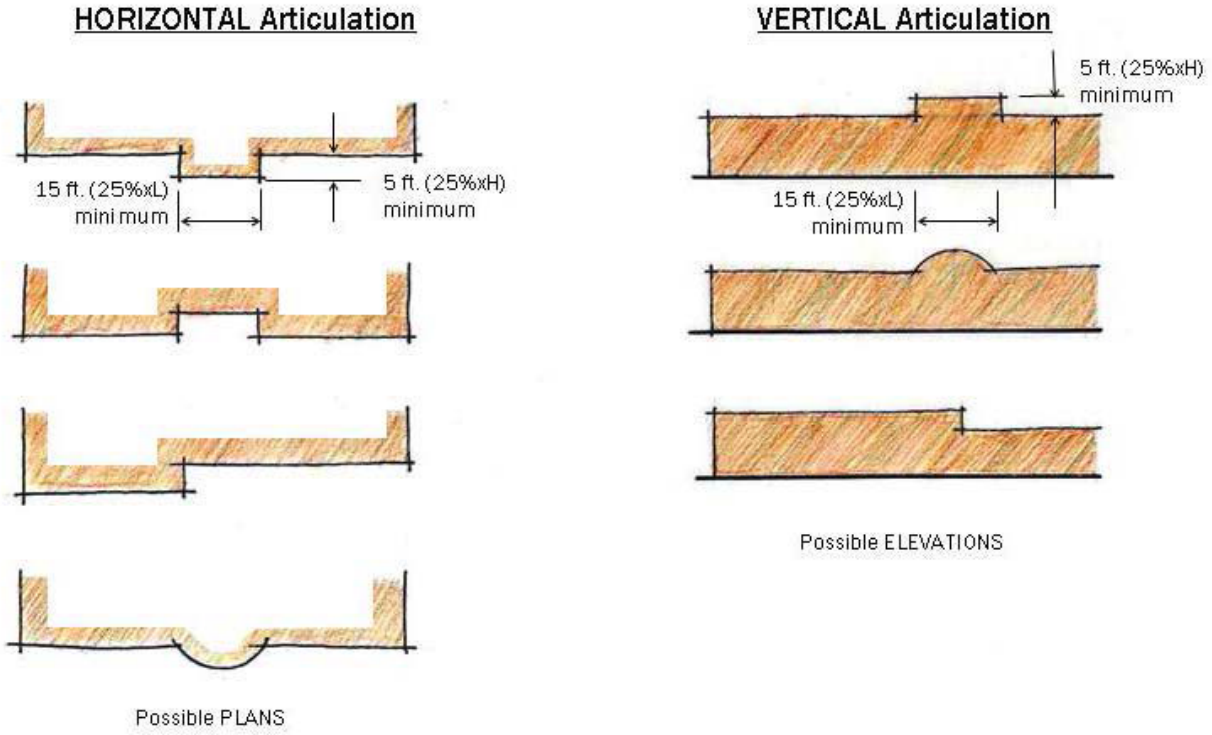
	Facades	Percentage Breakdown	Definition
Buildings 15,000 square feet or less	Primary	Min. 80% Group A Max. 20% Group B	Exterior walls on public street or along an active storefront
	Secondary	Min. 20% Group A Max. 80% Group B	Exterior walls NOT clearly visible from a public street or along an active storefront
Buildings greater than 15,000 square feet	Primary	Min. ~~20~~80% Group A Max. ~~80~~20% Group B	Exterior walls on public street or along an active storefront
	Secondary	Min. ~~80~~20% Group A Max. ~~20~~80% Group B	Exterior walls NOT clearly visible from a public street or along an active storefront

(f) *Building articulation design standards.* Primary facades clearly visible from a public street or along an active storefront shall meet the following minimum standards for articulation:

(1) *Horizontal articulation.* No building wall shall extend for a distance equal to three times the wall's height without having an offset equal to 25 percent of the wall's height, and that new plane shall extend for a distance equal to at least 25 percent of the maximum length of the first plane.

(2) *Vertical articulation.* No wall length shall extend for a distance greater than three times the height of the wall without changing height by a minimum of 25 percent of the wall's height, and that new plane shall extend for a distance equal to at least 25 percent of the maximum length of the first plane. Pitched roofs shall count toward achieving vertical articulation, provided they are 65 degrees or less from horizontal.





(g) *Design standards.*

(1) *Two masonry materials required.* At least two masonry materials shall be used on all exterior facades.

(2) *Roof design.* Roofs shall be peaked with either hip, gable or mansard design with a minimum one-to-four (1:4) pitch, or a parapet wall or false mansard design with a minimum one-to-two (1:2) pitch is

acceptable only if constructed around the entire perimeter of a building so that no flat roof shall be visible from a public street or along an active storefront.

(3) *Landmark buildings.*

a. Buildings which are located on an axis with a terminating street or major access lane or at the intersection of streets and/or major access lane shall be considered a landmark building.

b. Such buildings shall be designed with landmark features which take advantage of that location, such as an accentuated entry and a unique building articulation which is offset from the front wall planes and goes above the main building eave or parapet line.

c. Landmark features shall be in proportion to the building and are subject to review and approval by the director.

(4) *Building color.*

a. The dominant color of all buildings shall be muted, natural or earth-tone shades of color. Black and stark white shall not be used except as an accent color.

b. There are no restrictions on accent colors which comprise less than one percent of the building face including wall signs, except that no high intensity colors, neon colors or fluorescent colors shall be used on exterior surfaces of the building.

c. Bright, reflective, pure tone primary or secondary colors are permissible only in limited application as accent colors on door and window frames, moldings, cornices, canopies, awnings, signs, etc. This provision shall not be construed as a license to employ corporate imaging on the primary building facade.

d. No more than one color shall be used for visible roof surfaces; however, if more than one type of roofing material is used, the materials shall be varying hues of the same color.

(5) *Auxiliary design standards.* All structures shall be designed to incorporate no less than four of the architectural elements from the list below. Buildings over 50,000 square feet must include a minimum of five of the referenced architectural elements:

a. Canopies, awnings, porticos with colonnade or arcades;

b. Raised pilaster cornices (end columns at corner), or quoined corners;

c. Vertical elements (tower, cupola, lighthouse, turret, arches, etc.);

d. Accented windows and doors framed with smooth cobble, cast stone, limestone or other decorative masonry headers and sills; or dormer windows;

e. Outdoor patios and/or courtyards (landscaped and furnished);

f. Decorative ornamentation integrated into the building facade, such as corbels, medallions (non-signage), functioning clocks, niches, wrought iron, balconettes, gargoyles, or horizontal and rhythm patterned brickwork;

g. Other architectural features approved by the director.

(Ord. No. 1407, § 2, 8-15-2017)

Sec. 106.06.05 Architectural standards for commercial structures (includes office, retail, commercial, mixed use, etc.).

(a) *Intent.* The following apply to nonresidential developments, including institutional buildings:

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(5) It is not the intent of this section to discourage innovation. The use of exceptional design features, such as tower elements, exposed beams, or other unique and outstanding architectural ornamentation worthy of merit that make a positive contribution to the surrounding visual environment is encouraged.

(b) *Design standards.*

(1) All buildings within a common development, as shown on a development plan, concept plan, or preliminary site plan, shall have similar architectural styles, materials, colors and detailing.

(2) All structures shall be architecturally finished on all sides that can be seen from a public right-of-way with similar styles, materials, colors and detailing.

(3) Facades shall generally be built parallel to the street frontage, except at street intersections, where a facade containing a primary building entrance should be curved or angled toward an intersection.

(4) All buildings shall be designed and constructed in tri-partite architecture so that they have a distinct base, middle and top, separated by horizontal elements (see examples next page).

(5) All buildings shall be constructed of 100 percent masonry finishing material, as outlined in table B and in the proportions illustrated in table C.

(6) All streetscape elements and site amenities, such as bike racks, trash receptacles, lampposts, and tree grates shall be metal, rust and flake/chip resistant, and generally be black "storm cloud" in color. Bollards can be concrete or cast metal and shall be of decorative design.

Examples of Tri-partite Construction

(c) *Exterior materials for all commercial development.*

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(2) *Category A* materials are defined as the superior masonry products from which the town prefers buildings to be predominantly constructed. Unless otherwise provided for in this chapter, acceptable Category A masonry finishing materials are brick, natural stone, and manufactured stone.

(3) *Category B* materials are the secondary products that the town recognizes as masonry materials acceptable for use, but also as products that are less desirable and therefore should not be the predominant material. Unless otherwise provided for in this chapter, acceptable Category B masonry finishing materials include three-step stucco, architectural concrete block with integrated color (i.e. split-face CMU), concrete tilt wall (colored or stamped), engineered wood, and cementitious fiberboard with integrated color (in the form of lap siding or board and batten).

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(6) *Roof designs and materials.* For buildings with a visible hip, gable or mansard roof, allowed materials include metal (standing seam), slate or tile (clay or cement, barrel or Roman-shaped).

(7) *Prohibited materials.* Prohibited exterior surface materials include cinder block, vinyl, plastic, and aggregate pea-gravel finished surfaces.

(d) *Facade design standards for buildings 15,000 square feet or smaller.* The following shall apply to all exterior walls of buildings that are 15,000 square feet or smaller and which are clearly visible from a public right-of-way or along an active storefront (see table C):

(1) Walls, excluding windows, doors and other openings, shall be constructed of a minimum 80 percent Group A materials and a maximum of 20 percent Group B materials. However, accent materials from Group C may be allowed in limited application for architectural accents or features.

(2) A big box may use split-face CMU (architectural block) for up to 20 percent of the primary facade, in addition to the 20 percent of other Group B materials.

(3) All exterior walls of buildings less than 15,000 square feet are considered primary facades, regardless of orientation.

(e) *Facade design standards for buildings larger than 15,000 square feet.* The following shall apply to all exterior walls of buildings 15,000 square feet or larger and which are not clearly visible from a public street or along an active storefront, or are constructed on a property line as one of a series of in-line buildings where the wall will become part of a common wall (see table C):

(1) *Primary facades.* Allowed materials. Walls, excluding windows, doors, and other openings, shall be constructed of a minimum 20 percent Group A materials and a maximum of 80 percent Group B materials. In any case, the color of the walls shall match the primary facades.

(2) *Secondary facades.* Secondary facades which are adjacent to the primary facade shall continue the primary facade treatment by wrapping the corner. This may be achieved with elements such as cornices, bases and vertical elements. In all cases, however, wall surface materials shall wrap the corner.

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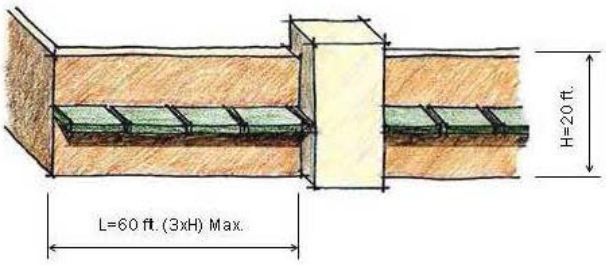
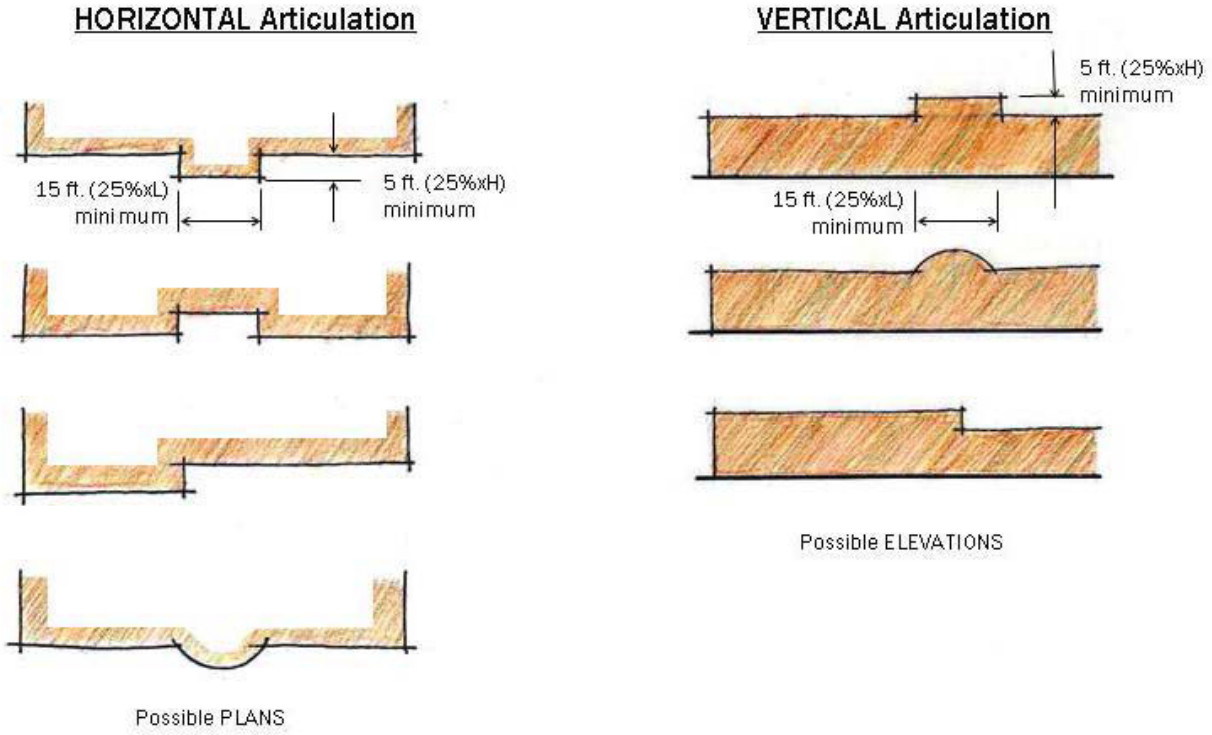
(f) *Building articulation design standards.* Primary facades clearly visible from a public street or along an active storefront shall meet the following minimum standards for articulation:

(1) *Horizontal articulation.* No building wall shall extend for a distance equal to three times the wall's height without having an offset equal to 25 percent of the wall's height, and that new plane shall extend for a distance equal to at least 25 percent of the maximum length of the first plane.

(2) *Vertical articulation.* No wall length shall extend for a distance greater than three times the height of the wall without changing height by a minimum of 25 percent of the wall's height, and that new plane shall extend for a distance equal to at least 25 percent of the maximum length of the first plane. Pitched roofs shall count toward achieving vertical articulation, provided they are 65 degrees or less from horizontal.





(g) *Design standards.*

(1) *Two masonry materials required.* At least two masonry materials shall be used on all exterior facades.

(2) *Roof design.* Roofs shall be peaked with either hip, gable or mansard design with a minimum one-to-four (1:4) pitch, or a parapet wall or false mansard design with a minimum one-to-two (1:2) pitch is

acceptable only if constructed around the entire perimeter of a building so that no flat roof shall be visible from a public street or along an active storefront.

(3) *Landmark buildings.*

a. Buildings which are located on an axis with a terminating street or major access lane or at the intersection of streets and/or major access lane shall be considered a landmark building.

b. Such buildings shall be designed with landmark features which take advantage of that location, such as an accentuated entry and a unique building articulation which is offset from the front wall planes and goes above the main building eave or parapet line.

c. Landmark features shall be in proportion to the building and are subject to review and approval by the director.

(4) *Building color.*

a. The dominant color of all buildings shall be muted, natural or earth-tone shades of color. Black and stark white shall not be used except as an accent color.

b. There are no restrictions on accent colors which comprise less than one percent of the building face including wall signs, except that no high intensity colors, neon colors or fluorescent colors shall be used on exterior surfaces of the building.

c. Bright, reflective, pure tone primary or secondary colors are permissible only in limited application as accent colors on door and window frames, moldings, cornices, canopies, awnings, signs, etc. This provision shall not be construed as a license to employ corporate imaging on the primary building facade.

d. No more than one color shall be used for visible roof surfaces; however, if more than one type of roofing material is used, the materials shall be varying hues of the same color.

(5) *Auxiliary design standards.* All structures shall be designed to incorporate no less than four of the architectural elements from the list below. Buildings over 50,000 square feet must include a minimum of five of the referenced architectural elements:

a. Canopies, awnings, porticos with colonnade or arcades;

b. Raised pilaster cornices (end columns at corner), or quoined corners;

c. Vertical elements (tower, cupola, lighthouse, turret, arches, etc.);

d. Accented windows and doors framed with smooth cobble, cast stone, limestone or other decorative masonry headers and sills; or dormer windows;

e. Outdoor patios and/or courtyards (landscaped and furnished);

f. Decorative ornamentation integrated into the building facade, such as corbels, medallions (non-signage), functioning clocks, niches, wrought iron, balconettes, gargoyles, or horizontal and rhythm patterned brickwork;

g. Other architectural features approved by the director.

(Ord. No. 1407, § 2, 8-15-2017)

Sec. 106.06.15 Plant list.

(a) *Approved list of plant materials.* All required plant material, including required residential trees, shall be from the following list unless alternate plant materials are approved through the landscape plan:

ARTICLE VI, TABLE D - PLANT LIST, APPROVED		
LARGE CANOPY TREES		
Bald Cypress *Taxodium distichum*	Bigtooth Maple *Acer grandidentatum*	Burr Oak *Quercus macrocarpa*
Caddo Maple *Acer floridanum*	Cedar Elm *Ulmus crassifolia*	Chinquapin Oak *Quercus muehlenbergii*
Chinese Pistache *Pistacia chinensis*	Dawn Redwood *Metasequoia glyptostroboides*	Ginkgo *Ginkgo biloba*
Homestead Elm *Ulmus 'Homestead'*	Italian Stone Pine *Pinus pinea*	Lacebark Elm *Ulmus parvifolia*
Southern Live Oak *Quercus virginiana*	Montezuma Cypress *Taxodium mucronatum*	Pecan *Carya illinoinensis*
Pond Cypress *Taxodium ascendens*	Red Oak *Quercus coccinea*	Shantung Maple *Acer truncatum*
Southern Magnolia *Magnolia grandiflora*	Texas Ash *Fraxinus albicans*	Trident Red Maple *Acer rubrum*
Urbanite Ash *Fraxinus pennsylvanica*	Shagbark Hickory *Carya ovata*	Deodar Cedar *Cedrus deodara*
Shumard Red Oak *Quercus shumardii*	Western Soapberry *Sapindus saponaria var. drummondii*	Winged Elm Ulmus alata
American Elm *Ulmus americana*	Chinese Elm *Ulmus parvifolia*	Texas Persimmon *Diospyros texana Scheele*
Autumn Blaze Maple *Acer x freemanii*	Russian Olive *Elaeagnus angustifolia*	Honey Locust Gleditsia triacanthos
Black Walnut *Juglans nigra*	~~Eastern Black Walnut~~ Texas Pistache *Pistacia mexicana*	Eastern Red Cedar Juniperus virginiana var. virginiana
Red Cedar Juniperus virginiana	Sweetgum *Liquidambar styraciflua L.*	~~Texas Pistache~~
SMALL ORNAMENTAL TREES		
American Smoketree *Cotinus obovatus*	Carolina Buckthorn *Frangula caroliniana*	Crepe Myrtle (tree form) *Lagerstroemia indica*
Desert Willow *Chilopsis linearis*	Dogwood *Cornus florida*	Eve's Necklace *Styphnolobium affine*
Flameleaf Sumac *Rhus copallinum*	Golden Raintree *Koelreuteria paniculata*	Italian Cypress *Cupressus sempervirens*
Japanese Maple *Acer palmatum*	Lacey Oak *Quercus laceyi* *Quercus glaucoides*	Mexican Buckeye *Ungnadia speciosa*
Possumhaw Holly	Redbud	Savannah Holly

Ilex decidua *Ilex curtissii*	*Cercis canadensis*	*Ilex x attenuata 'Savannah'*
Teddy Bear Magnolia *Magnolia grandiflora 'Southern Charm'*	~~Viburnum~~ Mexican Plum *Prunus mexicana*	Vitex *Vitex agnus-castus*
Wax Myrtle *Morella cerifera* *Cerothamnus ceriferus* *Cerothamnus pumilus*	Yaupon Holly *Ilex vomitoria Aiton*	River Birch *Betula nigra*
Eastern Redbud *Cercis canadensis*	Eastern Palatka Holly *Ilex x attenuata*	Foster Holly *Ilex x attenuate 'Fosteri'*
Flowering Crabapple *Malus 'Prairifire'*	Afghan (Eldarica) Pine *Pinus eldarica*	Ornamental Plum Prunus cerasifera
Cherry Laurel	Purple Plum Prunus cerasifera 'Atropurpurea'	~~Mexican Plum~~
~~Callery Pear~~	~~Flowering Pear~~	~~Texas Sophora~~
~~Chaste Tree~~		
URBAN TREES		
Allee (Lacebark) Elm *Ulmus parvifolia ALLÉE®*	Chinese Pistache *Pistacia chinensis*	Ginkgo *Ginkgo biloba*
Homestead Elm *Ulmus 'Homestead'*	Lacey Oak *Quercus laceyi* *Quercus glaucoide*	Pond Cypress *Taxodium distichum var. imbricarium*
Shantung Maple *Acer truncatum*	Teddy Bear Magnolia *Magnolia grandiflora 'Southern Charm'*	Urbanite Ash *Fraxinus pennsylvanica*
PALM~~DESERT~~ TREES		
Chinese Windmill *Trachycarpus fortunei*	Dwarf Palmetto *Sabal minor*	Mexican Blue Palm *Brahea armata*
Mexican Sabal Palm *Sabal mexicana*	Pindo Palm *Butia capitata*	Washington Fan Palm *Washingtonia robusta*
EVERGREEN SCREENING SHRUBS (low - less than 5 ft.)		
Agarito *Mahonia trifoliolata*	Boxwood Buxus	Dwarf Abelia *Caprifoliaceae Abelia Grandiflora*
Dwarf Burford Holly *Ilex cornuta 'Dwarf Burford'*	Elaeagnus (Silverberry) *Elaeagnus × ebbingei*	Euonymus *Euonymus*
Grayleaf Cotoneaster *Cotoneaster glaucophyllus*	Indian Hawthorn *Rhaphiolepis indica*	Juniper (several varieties)
~~Nandina~~	Texas Sage *Leucophyllum frutescens*	
EVERGREEN SCREENING SHRUBS (high - 5' or greater)		
Austrian Black Pine *Pinus Nigra*	Cleyera *Cleyera*	*Eastern Red Cedar* *Juniperus Virginiana*

Foster Holly *Ilex x attenuata 'Fosteri'*	Leyland Cypress *Cupressus × leylandii*	Little Gem Magnolia *Magnolia grandiflora*
Nelliey R. Steven's Holly *Ilex 'Nellie R. Stevens'*	Sweet Viburnum *Viburnum odoratissimum*	Waxleaf Ligustrum *Ligustrum japonicum*
OTHER APPROVED SHRUBS		
American Beautyberry *Callicarpa americana L.*	Apache Plume *Fallugia paradoxa (D. Don) Endl. ex Torr.*	Aralia *Aralia*
Aucuba *Aucuba japonica*	Autumn Sage *Salvia greggii A. Gray*	Azalea *Rhododendron subgenus Azaleastrum*
Barberry	Black Dalea *Dalea frutescens A. Gray*	Burning Bush
Chinese Fringe Flower *Loropetalum chinense*	Desert Spoon *Dasylirion wheeleri*	Dwarf Crepe Myrtle
Flowering Quince *Chaenomeles speciosa*	Holly (multiple varieties) *Ilex*	Horizontal Cotoneaster Cotoneaster horizontalis
Leatherleaf Mahonia	Pampas Grass *Cortaderia selloana*	Red Yucca *Hesperaloe parviflora*
Rose (shrub form) *Rosaceae*	Spirea *Spiraea*	Turk's Cap *Malvaviscus arboreus var. drummondii*
VINES		
Boston Ivy *Parthenocissus tricuspidata*	Carolina Jasmine *Gelsemium sempervirens*	Confederate Star Jasmine *Trachelospermum jasminoides*
Coral Honeysuckle *Lonicera sempervirens L.*	Crossvine *Bignonia capreolata*	English Ivy *Hedera helix*
Japanese Honeysuckle *Lonicera japonica*	Rose (climbing variety)	Trumpet Vine *Campsis radicans*
Virginia Creeper *Parthenocissus quinquefolia*		
GROUNDCOVER		
Ajuga *Ajuga*	Asian Jasmine *Trachelospermum asiaticum*	Bermuda Grass *Cynodon dactylon*
Buffalo Grass *Bouteloua dactyloides*	Creeping Juniper *Juniperus horizontalis*	Fountain Grass *Cenchrus setaceus*
Liriope (Monkey Grass) *Liriope*	Mondo Grass *Ophiopogon japonicus*	Purple Wintercreeper *Euonymus fortunei*
St. Augustine Stenotaphrum secundatum	Tall Fescue *Festuca arundinacea*	Zoysia *Zoysia*
Article VI, Table D - Plant List, Prohibited		
Bois D'Arc *Maclura pomifera*	Bradford Pear *Pyrus calleryana*	Catalpa *Catalpa speciosa*
Cottonwood	Hackberry	Lombardy Poplar

Populus fremontii	*C. occidentalis*	*Populus nigra*
Mesquite *Prosopis*	Mimosa *Albizia julibrissin*	Mulberry *Morus nigra*
Red Tip Photinia *Photinia × fraseri*	Siberian Elm *Ulmus pumila*	Silver Maple *Acer saccharinum*

(Ord. No. 1407, § 2, 10-20-2009; Ord. No. 1527 , § 2, 10-15-19)

Sec. 106.06.15 Plant list.

(a) *Approved list of plant materials.* All required plant material, including required residential trees, shall be from the following list unless alternate plant materials are approved through the landscape plan:

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Homestead Elm *Ulmus 'Homestead'*	Italian Stone Pine *Pinus pinea*	Lacebark Elm *Ulmus parvifolia*
Southern Live Oak *Quercus virginiana*	Montezuma Cypress *Taxodium mucronatum*	Pecan *Carya illinoinensis*
Pond Cypress *Taxodium ascendens*	Red Oak *Quercus coccinea*	Shantung Maple *Acer truncatum*
Southern Magnolia *Magnolia grandiflora*	Texas Ash *Fraxinus albicans*	Trident Red Maple *Acer rubrum*
Urbanite Ash *Fraxinus pennsylvanica*	Shagbark Hickory *Carya ovata*	Deodar Cedar *Cedrus deodara*
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(Ord. No. 1407, § 2, 10-20-2009; Ord. No. 1527 , § 2, 10-15-19)

Sec. 106.06.17 Multifamily landscape requirements.

(a) *Minimum open space.* New multi-family developments shall use the following regulations:

(1) *Open space per bedroom*. Each lot or parcel of land used for multiple-family residences shall provide on the same lot or parcel of land usable open space, in accordance with the table below:

ARTICLE VI, TABLE F MULTIFAMILY OPEN SPACE REQUIRED PER BEDROOM	
Number of Bedrooms	Open Space Required
1	400 square feet
Each additional bedroom over 1	Additional 300 square feet

(2) *Minimum dimensions*. Each open space area shall have a minimum dimension of not less than 30 feet.

(3) *Minimum overall percentage of open space*. No less than 15 percent of the required open space shall be arranged or located as a contiguous mass. This contiguous mass must be located within the required open space.

(4) *Credits for amenities*. In meeting the~~i~~s requirements, a credit of three (3) square feet may be applied for each square foot utilized for:

a. Swimming pools and adjacent decks, patios or lounge areas within ten feet of a pool;

b. Developed and equipped children's play areas;

c. Usable portions of recreational buildings; and

d. Private balconies and enclosed patios with a minimum dimension of five square feet.

Tennis courts are specifically excluded from this credit allowance.

(5) *Credit for sloped areas*. At the time of site plan approval, the Director of Development Services ~~Planning and Zoning Commission and Town Council~~ may give full or partial credit for open areas that exceed the maximum slope of 2 percent, if it is determined that such areas are environmentally significant and that their preservation would enhance the development.

(6) *Access to public parks*. At the time of site plan approval, the planning and zoning commission and town council may allow a credit not to exceed ten percent of the total required usable open space for adjacent and immediately accessible public parks. The combined credit for areas calculated at a three to one (3:1) basis and for public parks shall not exceed 50 percent of the total usable open space for an individual lot or parcel of land.

(7) *Minimum number of trees in open space*. One large canopy tree shall be provided per 1,000 square feet of required open space.

(8) *Hardscape*. All multi-family developments submitted after the adoption of this ordinance shall be required to include stained and stamped crosswalks from parking lots or structures to the main entrances of the buildings and other areas, as determined to be appropriate by the director.

(9) *Stone, gravel and rock*. If stone, gravel, decorative rock, crushed granite or other non-plant derived materials are used in a residential front yard, no more than 20 percent of the yard area may be made up of these materials. Non-plant derived materials should be used as an accent to the areas of the lawn made up of sod, living ground cover, low bushes or plants, or mulch and shall include vegetative

plantings within the stone/rock beds. In no case shall stone, gravel, rock or other non-plant derived materials be installed so that an impermeable surface area is created.

(10) *Mailboxes*. When mailboxes are grouped or clustered, they may be located in the right-of-way. The exterior of the mailbox structure shall be masonry to match the main buildings and the roof made of metal materials or materials that match the main buildings.

(11) *Artificial or synthetic turf*. Artificial or synthetic turf is prohibited.

(12) *Entrances to multi-family developments*. The landscape island at the main or secondary entrances to the multi-family development shall be within a platted lot to be owned and maintained by the management company. Landscaped entries shall be a minimum size of six feet by 30 feet and may include a monument entrance sign. Entry designs shall be subject to the approval of the director.

(13) *Landscaping for corner lots and residential/mulitfamily driveways.*

a. A minimum landscaped area of 900 square feet shall be located at the intersection corner of the lot, and commercial main entrance as shown on the landscape/site plan.

b. The landscaped area shall be provided within an area measured a minimum distance of 40 feet from the projected corner of the intersection on both sides of the lot or main entrance area.

(Ord. No. 1407, § 2, 10-20-2009; Ord. No. 1527 , § 2, 10-15-2019; Ord. No. 1587 , § 2, 1-5-2021)

Sec. 106.06.17 Multifamily landscape requirements.

(a) *Minimum open space.* New multi-family developments shall use the following regulations:

(1) *Open space per bedroom*. Each lot or parcel of land used for multiple-family residences shall provide on the same lot or parcel of land usable open space, in accordance with the table below:

ARTICLE VI, TABLE F MULTIFAMILY OPEN SPACE REQUIRED PER BEDROOM	
Number of Bedrooms	Open Space Required
1	400 square feet
Each additional bedroom over 1	Additional 300 square feet

(2) *Minimum dimensions*. Each open space area shall have a minimum dimension of not less than 30 feet.

(3) *Minimum overall percentage of open space*. No less than 15 percent of the required open space shall be arranged or located as a contiguous mass. This contiguous mass must be located within the required open space.

(4) *Credits for amenities*. In meeting thes requirements, a credit of three (3) square feet may be applied for each square foot utilized for:

a. Swimming pools and adjacent decks, patios or lounge areas within ten feet of a pool;

b. Developed and equipped children's play areas;

c. Usable portions of recreational buildings; and

d. Private balconies and enclosed patios with a minimum dimension of five square feet.

Tennis courts are specifically excluded from this credit allowance.

(5) *Credit for sloped areas*. At the time of site plan approval, the Director of Development Services may give full or partial credit for open areas that exceed the maximum slope of 2 percent, if it is determined that such areas are environmentally significant and that their preservation would enhance the development.

(6) *Access to public parks*. At the time of site plan approval, the planning and zoning commission and town council may allow a credit not to exceed ten percent of the total required usable open space for adjacent and immediately accessible public parks. The combined credit for areas calculated at a three to one (3:1) basis and for public parks shall not exceed 50 percent of the total usable open space for an individual lot or parcel of land.

(7) *Minimum number of trees in open space*. One large canopy tree shall be provided per 1,000 square feet of required open space.

(8) *Hardscape*. All multi-family developments submitted after the adoption of this ordinance shall be required to include stained and stamped crosswalks from parking lots or structures to the main entrances of the buildings and other areas, as determined to be appropriate by the director.

(9) *Stone, gravel and rock*. If stone, gravel, decorative rock, crushed granite or other non-plant derived materials are used in a residential front yard, no more than 20 percent of the yard area may be made up of these materials. Non-plant derived materials should be used as an accent to the areas of the lawn made up of sod, living ground cover, low bushes or plants, or mulch and shall include vegetative

plantings within the stone/rock beds. In no case shall stone, gravel, rock or other non-plant derived materials be installed so that an impermeable surface area is created.

(10) *Mailboxes*. When mailboxes are grouped or clustered, they may be located in the right-of-way. The exterior of the mailbox structure shall be masonry to match the main buildings and the roof made of metal materials or materials that match the main buildings.

(11) *Artificial or synthetic turf*. Artificial or synthetic turf is prohibited.

(12) *Entrances to multi-family developments*. The landscape island at the main or secondary entrances to the multi-family development shall be within a platted lot to be owned and maintained by the management company. Landscaped entries shall be a minimum size of six feet by 30 feet and may include a monument entrance sign. Entry designs shall be subject to the approval of the director.

(13) *Landscaping for corner lots and residential/mulitfamily driveways.*

a. A minimum landscaped area of 900 square feet shall be located at the intersection corner of the lot, and commercial main entrance as shown on the landscape/site plan.

b. The landscaped area shall be provided within an area measured a minimum distance of 40 feet from the projected corner of the intersection on both sides of the lot or main entrance area.

(Ord. No. 1407, § 2, 10-20-2009; Ord. No. 1527 , § 2, 10-15-2019; Ord. No. 1587 , § 2, 1-5-2021)

Sec. 106.06.18 Commercial landscape requirements.

(a) *Interior landscape requirements.*

(1) *Minimum landscaped area*. A minimum of ten percent of the gross vehicular use area shall be devoted to living landscape which includes grass, groundcover, plants, shrubs and trees. This is to be measured from the edge of the parking and/or driveway paving and sidewalks. Where practical, the majority of this landscaped area should be visible from the roadway.

(2) *Minimum trees provided overall*. There shall be a minimum of one large canopy tree planted for each 400 square feet or fraction thereof of required interior landscape area. Three small ornamental trees, a minimum of six feet in height and three inches in diameter, may be substituted for one required large canopy tree not to exceed 25 percent of the required large canopy trees if approved by the town.

(3) *Parking lot islands and terminus row islands*. Interior areas of parking lots shall contain planting islands located so as to best relieve the expanse of paving. Such islands shall contain at least one large canopy tree, and shall be located at the terminus of all parking rows. The remainder of the island space shall be landscaped with shrubs, lawn and living groundcover not to exceed three feet in height. Any trees located within a planting island may be counted towards the required number of interior trees. The minimum total area of such islands shall be ten feet by 18 feet, but may design the radii to facilitate traffic maneuverability.

(4) *Parking lot island spacing*. Planting islands shall not be spaced greater than every ten spaces unless approved on the landscape plan in order to preserve existing trees and natural features or due to unique site features. Islands shall provide one large canopy tree. In all cases, the total area requirements for landscaped islands for the respective parking areas shall be satisfied.

(5) *Parking lot swales*. In some cases, the use of landscaped swales in lieu of curbs and/or curb stops may be allowed. Appropriate drainage plans and plants must be submitted if this option is proposed.

(6) *Parking Lot medians*: There shall be a landscaped median between two rows of head-in parking, at every 20 spaces.

(7) *Big Box parking lot walkway*. "Big Box" stores shall provide a minimum ten (10) foot wide continuous landscape island every eight single rows of parking, with a large canopy tree every 30 linear feet, subject to review and approval by the town. This does not waive the requirement for terminus islands and trees on parking rows.

(8) *Entrances to Big Box stores*. In "big box" developments of 50,000 square feet or more, an urban tree shall be placed in a tree grate or tree well every 30 feet on center within a minimum 12 foot wide sidewalk along active storefronts and mixed-use building fronts. Trees may be clustered so not to block the main entrance. Facade trees are not required in areas with an architectural arcade.

(9) *Vehicular access drives*. A small ornamental tree is required along major access lanes every 25 linear feet within a development where reasonable, subject to review and approval by the director.

(10) *Pedestrian connections*. One urban tree is required along internal pedestrian connections every 30 linear feet.

(11) *Curbs and wheel stops*. All landscaped areas will be protected by a raised four inch concrete curb and/or wheel stop. Wheel stops are required for all perimeter parking spaces. Pavement will not be placed closer than four feet from the trunk of a tree unless approved by the director.

(12) *Hardscape*. All nonresidential developments submitted after the adoption of this ordinance shall be required to include stained and stamped crosswalks from parking lots or structures to the main entrances of the buildings and other areas, as determined to be appropriate by the director.

(13) *Variety*. The applicant is also encouraged to plant a variety of ornamental trees, shrubs and flowers in addition to the required plantings. Any permeable surface not occupied by trees, shrubs, planting beds, signs or other permitted fixtures shall be planted with turf or other living groundcover.

(14) *Stone, gravel and rock*. If stone, gravel, decorative rock, crushed granite or other non-plant derived materials are used in an interior landscape area, no more than 20 percent of the area may be made up of these materials. Non-plant derived materials should be used as an accent to the landscaped areas made up of sod, living ground cover, low bushes, plants, or mulch and may include vegetative plantings within the stone/rock beds. In no case shall stone, gravel, rock or other non-plant derived materials be installed so that an impermeable surface area is created.

(15) *Artificial or synthetic turf prohibited* (e.g. AstroTurf™). Artificial turf is prohibited in interior landscape areas.

(16) *Exception to interior landscape requirements*. Industrial uses shall be exempt from the interior landscape requirements, subject to review and approval by the director.

(b) *Foundation planting and other landscaping.*

a. Foundation plantings or sidewalk tree gates are required for buildings or groups of contiguous buildings that are 5,000 square feet or larger. One large canopy tree four inch minimum caliper, shall be required for every one thousand square feet of gross building area. These trees shall be located within 20 feet of the face of the building. These plantings are intended to provide pedestrian areas while breaking up the large areas of impervious surface. Trees required by other sections of this ordinance will not meet this requirement. Trees can be grouped or planted in singular form. These tree plantings should be placed so as not to impede sign visibility or pedestrian safety.

b. Trees planted less than four feet from the back of curb shall be located in a tree gate with a minimum dimension of four feet.

c. Ornamental trees may be substituted for half of the required large canopy trees at a building's foundation at the rate of five ornamentals for each required large tree with Town approval.

d. The above requirements may be reduced if approved by the Town and additional pedestrian features; such as plazas, seating areas, fountains, and outdoor recreation facilities are provided. These facilities must occupy an area equal to or greater than ten percent of the total building area.

(c) *Landscaping for corner lots and commercial driveways.*

a. A minimum landscaped area of 900 square feet shall be located at the intersection corner of the lot, and commercial main entrance as shown on the landscape/site plan.

b. The landscaped area shall be provided within an area measured a minimum distance of 40 feet from the projected corner of the intersection on both sides of the lot or main entrance area.

(d) *Perimeter landscape requirements.*

(1) *Vehicular screening from right-of-way*. All vehicular use areas shall be screened from all abutting properties and the public right-of-way with a wall, fence, evergreen hedge, berm or other durable landscape barrier. Plants and shrubs used in living barriers shall be at least 36 inches high at time of planting and shall be a type and species from the recommended plant list that will form a continuous hedge. Sporadic breaks in the hedge row may be approved to achieve unique designs. Any landscape barrier not containing live plants or trees shall be a minimum of three feet high at time of installation. One large tree four inch caliper minimum shall be planted per 20 linear feet of landscape edge.

(2) *Additional Screening.* Where any portion of parking lots, drives, access easements or other rights-of-way abut the landscape edge, shrubs 36 inches minimum shall be planted to form a contiguous buffer along the common boundary line.

i. The number of required shrubs shall be calculated solely on the area of the required landscaped edge.

ii. All landscaped areas including shrubs shall be planted in a defined planting bed or Town approved area.

iii. A berm will be required in addition to shrubs if the pad site elevation at the property line is within two feet above or below the ROW elevation.

iv. The berm must be 24 to 40 inches above the average grade of the street and parking lot curbs.

v. The slope of the berm shall not exceed a 33 percent grade.

(3) *Minimum landscape buffer along rights-of-ways*. Except in the Lakefront District, for all residential, nonresidential and multiple-family parcels, a minimum 25 foot landscape buffer adjacent to the right-of-way is required.

(4) *Landscape ROW buffer corner clip*. For all nonresidential and multifamily parcels located at the intersection of two dedicated public rights-of-way (ROW), a minimum 25 foot landscape buffer shall be provided parallel to the corner clip right-of-way dedication.

(5) *Minimum number of trees within ROW landscape buffers*. Landscape buffers adjacent to the public right-of-way shall contain at least one large canopy tree each 20 linear feet or fraction thereof of street frontage, inclusive of driveways. Trees may be grouped or clustered to facilitate site design if approved by the Town.

(6) *Landscape buffers between properties*. A perimeter landscape buffer of at least ten feet in width shall be maintained between adjacent properties. This landscaping can be reduced to five feet when abutting property of the same zoning. This buffer does not apply to various lots within a unified development. Access ways between lots may be permitted through all perimeter landscape areas.

(7) *Minimum number of large trees within perimeter landscape buffers*. Perimeter landscape buffers not adjacent to the public right-of-way shall contain at least one large canopy tree every 25 linear feet or fraction thereof when adjacent to another commercial use, and at least one large canopy tree every 20 linear feet when adjacent to residential uses or zoning. Trees may be grouped or clustered to facilitate site design and shall be appropriately staggered when adjacent to property of the same zoning.

(8) *Minimum number of small trees within perimeter landscape buffers*. For every five large canopy trees or fraction thereof required along the street frontage and perimeter, three ornamental trees shall also be provided.

(9) *Stone, gravel and rock*. If stone, gravel, decorative rock, crushed granite or other non-plant derived materials are used in a perimeter landscape area, no more than ten percent of the area may be made up of these materials. Non-plant derived materials should be used as an accent to the landscaped areas made up of sod, living ground cover, low bushes, plants, or mulch. In no case shall stone, gravel, rock or other non-plant derived materials be installed so that an impermeable surface area is created.

(10) *Artificial or synthetic turf*. Artificial or synthetic turf is prohibited in perimeter landscape areas.

(e) *Residential adjacency landscaping standards.* In order to preserve and protect the integrity, protect the quiet enjoyment and maintain property values of single family and other residential neighborhoods, the Town has determined that it is necessary and appropriate to adopt specialized regulations for non-single family residential uses and buildings that are constructed within 100 feet of properties used for single family residences.

a. A minimum of 20 feet wide landscaped buffer shall be provided adjacent to existing residential or vacant land zoned for residential uses.

b. A double row of trees four inch caliper minimum on offset 15 foot centers is planted within the required rear landscape edge, where 50 percent of the trees are large trees.

(f) *Landscape point system.*

(1) *Purpose*. The purpose of the landscape point system is to afford developers the freedom to design interesting and unique landscaping to augment the architecture of the development. Developers are encouraged to be creative in selecting the amenity type to create unique and memorable features.

(2) *Points shown on plan*. Landscape plans must show a minimum number of points in order to obtain approval. Landscape points are determined by the size of the lot being developed. These requirements are in addition to the interior and perimeter landscaping requirements.

ARTICLE VI, TABLE G	
NUMBER OF LANDSCAPE POINTS PER ACRE	
Site Size	Minimum Number of Points Required
<3 acres	25 points
Between 3 and 15 acres	30 points
>15 acres	35 points

(3) *List of amenities and points earned.* The following is a list of landscape elements and their associated point value, subject to review and approval by the director:

ARTICLE VI, TABLE H	
LANDSCAPE POINTS EARNED PER AMENITY	
Amenity Type/Size	Number of Points
Hardscaping, signage, or architectural features that include reference to Little Elm's lakefront character, such as use of sailboats or lighthouses in amenities	10
~~Enhanced entranceway paving (using pavers, cobble or different colored stamped concrete)~~	~~5~~
Enhanced hardscape (Stamped entryway (per design guide)~~stamped crosswalks~~, decorative cobble walkways, meandering sidewalks, etc.)	5
Enhanced landscaping (within development and at the entranceways of the development)	5
Enhanced site canopy (planting perimeter trees one per 30 feet AND locating a parking island every ten spaces)	5
Enhanced streetscape elements (e.g. decorative lampposts, receptacles, decorative bollards, etc.)	5
Use of street furniture (benches, tables and chairs)	5
Enhanced buffers: (providing a landscape buffer five feet more than what is required adjacent to street frontage and perimeter)	5
Open space provision greater than what is required (20 to 30 percent over minimum)	5
Buffer berms (providing 3-foot-high berms along the street frontage)	5
Use of shaded and decorative outdoor seating areas (benches, outdoor dining, etc.)	5
Use of masonry planters with irrigation (minimum 4)	5
Foundation plantings along 75 percent of the building's primary facade	5

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Decorative entrance including a landscaped median entry which is a minimum eight feet in width and 60 feet long	5
Public art, small (obelisks, sculptures, statues, clock towers, water fountains, etc.)	5
Public art, large (obelisks, sculptures, statues, clock towers, water fountains, etc.)	10
~~Amenity detention pond (dry)~~	~~5~~
Enhanced Amenity detention/retention pond (wet with fountain feature)	5~~10~~
All outdoor lighting is "Darksky Approved" and meets Town's Lighting requirements	5
Other (a developer may propose a unlisted landscape element if it meets the spirit and intent of the ordinance, subject to review and approval by the director)	5

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(4) *Developer discretion*. The developer may use any combination of the aforementioned landscape elements to obtain the necessary number of points required for the development. Different lots and landscapes will lend themselves to different types of designs. These regulations attempt to encourage creativity, diversity and water conservation in landscaping.

(5) *Scale, size, type*. Elements, both in terms of quantity and quality, should be in scale with the development, as determined by the Director. Multiple repetitions of an element can be awarded extra points, as determined by the director.

(g) *Approval of landscape site plan alternative waivers.*

a. The town council through a landscape site plan waiver may approve waiver alternatives to the landscape provisions.

b. All waivers must be processed through a developers agreement that is approved by the town council.

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1527 , § 2, 10-15-2019)

Sec. 106.06.18 Commercial landscape requirements.

(a) *Interior landscape requirements.*

(1) *Minimum landscaped area*. A minimum of ten percent of the gross vehicular use area shall be devoted to living landscape which includes grass, groundcover, plants, shrubs and trees. This is to be measured from the edge of the parking and/or driveway paving and sidewalks. Where practical, the majority of this landscaped area should be visible from the roadway.

(2) *Minimum trees provided overall*. There shall be a minimum of one large canopy tree planted for each 400 square feet or fraction thereof of required interior landscape area. Three small ornamental trees, a minimum of six feet in height and three inches in diameter, may be substituted for one required large canopy tree not to exceed 25 percent of the required large canopy trees if approved by the town.

(3) *Parking lot islands and terminus row islands*. Interior areas of parking lots shall contain planting islands located so as to best relieve the expanse of paving. Such islands shall contain at least one large canopy tree, and shall be located at the terminus of all parking rows. The remainder of the island space shall be landscaped with shrubs, lawn and living groundcover not to exceed three feet in height. Any trees located within a planting island may be counted towards the required number of interior trees. The minimum total area of such islands shall be ten feet by 18 feet, but may design the radii to facilitate traffic maneuverability.

(4) *Parking lot island spacing*. Planting islands shall not be spaced greater than every ten spaces unless approved on the landscape plan in order to preserve existing trees and natural features or due to unique site features. Islands shall provide one large canopy tree. In all cases, the total area requirements for landscaped islands for the respective parking areas shall be satisfied.

(5) *Parking lot swales*. In some cases, the use of landscaped swales in lieu of curbs and/or curb stops may be allowed. Appropriate drainage plans and plants must be submitted if this option is proposed.

(6) *Parking Lot medians*: There shall be a landscaped median between two rows of head-in parking, at every 20 spaces.

(7) *Big Box parking lot walkway*. "Big Box" stores shall provide a minimum ten (10) foot wide continuous landscape island every eight single rows of parking, with a large canopy tree every 30 linear feet, subject to review and approval by the town. This does not waive the requirement for terminus islands and trees on parking rows.

(8) *Entrances to Big Box stores*. In "big box" developments of 50,000 square feet or more, an urban tree shall be placed in a tree grate or tree well every 30 feet on center within a minimum 12 foot wide sidewalk along active storefronts and mixed-use building fronts. Trees may be clustered so not to block the main entrance. Facade trees are not required in areas with an architectural arcade.

(9) *Vehicular access drives*. A small ornamental tree is required along major access lanes every 25 linear feet within a development where reasonable, subject to review and approval by the director.

(10) *Pedestrian connections*. One urban tree is required along internal pedestrian connections every 30 linear feet.

(11) *Curbs and wheel stops*. All landscaped areas will be protected by a raised four inch concrete curb and/or wheel stop. Wheel stops are required for all perimeter parking spaces. Pavement will not be placed closer than four feet from the trunk of a tree unless approved by the director.

(12) *Hardscape*. All nonresidential developments submitted after the adoption of this ordinance shall be required to include stained and stamped crosswalks from parking lots or structures to the main entrances of the buildings and other areas, as determined to be appropriate by the director.

(13) *Variety*. The applicant is also encouraged to plant a variety of ornamental trees, shrubs and flowers in addition to the required plantings. Any permeable surface not occupied by trees, shrubs, planting beds, signs or other permitted fixtures shall be planted with turf or other living groundcover.

(14) *Stone, gravel and rock*. If stone, gravel, decorative rock, crushed granite or other non-plant derived materials are used in an interior landscape area, no more than 20 percent of the area may be made up of these materials. Non-plant derived materials should be used as an accent to the landscaped areas made up of sod, living ground cover, low bushes, plants, or mulch and may include vegetative plantings within the stone/rock beds. In no case shall stone, gravel, rock or other non-plant derived materials be installed so that an impermeable surface area is created.

(15) *Artificial or synthetic turf prohibited* (e.g. AstroTurf™). Artificial turf is prohibited in interior landscape areas.

(16) *Exception to interior landscape requirements*. Industrial uses shall be exempt from the interior landscape requirements, subject to review and approval by the director.

(b) *Foundation planting and other landscaping.*

a. Foundation plantings or sidewalk tree gates are required for buildings or groups of contiguous buildings that are 5,000 square feet or larger. One large canopy tree four inch minimum caliper, shall be required for every one thousand square feet of gross building area. These trees shall be located within 20 feet of the face of the building. These plantings are intended to provide pedestrian areas while breaking up the large areas of impervious surface. Trees required by other sections of this ordinance will not meet this requirement. Trees can be grouped or planted in singular form. These tree plantings should be placed so as not to impede sign visibility or pedestrian safety.

b. Trees planted less than four feet from the back of curb shall be located in a tree gate with a minimum dimension of four feet.

c. Ornamental trees may be substituted for half of the required large canopy trees at a building's foundation at the rate of five ornamentals for each required large tree with Town approval.

d. The above requirements may be reduced if approved by the Town and additional pedestrian features; such as plazas, seating areas, fountains, and outdoor recreation facilities are provided. These facilities must occupy an area equal to or greater than ten percent of the total building area.

(c) *Landscaping for corner lots and commercial driveways.*

a. A minimum landscaped area of 900 square feet shall be located at the intersection corner of the lot, and commercial main entrance as shown on the landscape/site plan.

b. The landscaped area shall be provided within an area measured a minimum distance of 40 feet from the projected corner of the intersection on both sides of the lot or main entrance area.

(d) *Perimeter landscape requirements.*

(1) *Vehicular screening from right-of-way*. All vehicular use areas shall be screened from all abutting properties and the public right-of-way with a wall, fence, evergreen hedge, berm or other durable landscape barrier. Plants and shrubs used in living barriers shall be at least 36 inches high at time of planting and shall be a type and species from the recommended plant list that will form a continuous hedge. Sporadic breaks in the hedge row may be approved to achieve unique designs. Any landscape barrier not containing live plants or trees shall be a minimum of three feet high at time of installation. One large tree four inch caliper minimum shall be planted per 20 linear feet of landscape edge.

(2) *Additional Screening.* Where any portion of parking lots, drives, access easements or other rights-of-way abut the landscape edge, shrubs 36 inches minimum shall be planted to form a contiguous buffer along the common boundary line.

i. The number of required shrubs shall be calculated solely on the area of the required landscaped edge.

ii. All landscaped areas including shrubs shall be planted in a defined planting bed or Town approved area.

iii. A berm will be required in addition to shrubs if the pad site elevation at the property line is within two feet above or below the ROW elevation.

iv. The berm must be 24 to 40 inches above the average grade of the street and parking lot curbs.

v. The slope of the berm shall not exceed a 33 percent grade.

(3) *Minimum landscape buffer along rights-of-ways*. Except in the Lakefront District, for all residential, nonresidential and multiple-family parcels, a minimum 25 foot landscape buffer adjacent to the right-of-way is required.

(4) *Landscape ROW buffer corner clip*. For all nonresidential and multifamily parcels located at the intersection of two dedicated public rights-of-way (ROW), a minimum 25 foot landscape buffer shall be provided parallel to the corner clip right-of-way dedication.

(5) *Minimum number of trees within ROW landscape buffers*. Landscape buffers adjacent to the public right-of-way shall contain at least one large canopy tree each 20 linear feet or fraction thereof of street frontage, inclusive of driveways. Trees may be grouped or clustered to facilitate site design if approved by the Town.

(6) *Landscape buffers between properties*. A perimeter landscape buffer of at least ten feet in width shall be maintained between adjacent properties. This landscaping can be reduced to five feet when abutting property of the same zoning. This buffer does not apply to various lots within a unified development. Access ways between lots may be permitted through all perimeter landscape areas.

(7) *Minimum number of large trees within perimeter landscape buffers*. Perimeter landscape buffers not adjacent to the public right-of-way shall contain at least one large canopy tree every 25 linear feet or fraction thereof when adjacent to another commercial use, and at least one large canopy tree every 20 linear feet when adjacent to residential uses or zoning. Trees may be grouped or clustered to facilitate site design and shall be appropriately staggered when adjacent to property of the same zoning.

(8) *Minimum number of small trees within perimeter landscape buffers*. For every five large canopy trees or fraction thereof required along the street frontage and perimeter, three ornamental trees shall also be provided.

(9) *Stone, gravel and rock*. If stone, gravel, decorative rock, crushed granite or other non-plant derived materials are used in a perimeter landscape area, no more than ten percent of the area may be made up of these materials. Non-plant derived materials should be used as an accent to the landscaped areas made up of sod, living ground cover, low bushes, plants, or mulch. In no case shall stone, gravel, rock or other non-plant derived materials be installed so that an impermeable surface area is created.

(10) *Artificial or synthetic turf*. Artificial or synthetic turf is prohibited in perimeter landscape areas.

(e) *Residential adjacency landscaping standards.* In order to preserve and protect the integrity, protect the quiet enjoyment and maintain property values of single family and other residential neighborhoods, the Town has determined that it is necessary and appropriate to adopt specialized regulations for non-single family residential uses and buildings that are constructed within 100 feet of properties used for single family residences.

a. A minimum of 20 feet wide landscaped buffer shall be provided adjacent to existing residential or vacant land zoned for residential uses.

b. A double row of trees four inch caliper minimum on offset 15 foot centers is planted within the required rear landscape edge, where 50 percent of the trees are large trees.

(f) *Landscape point system.*

(1) *Purpose*. The purpose of the landscape point system is to afford developers the freedom to design interesting and unique landscaping to augment the architecture of the development. Developers are encouraged to be creative in selecting the amenity type to create unique and memorable features.

(2) *Points shown on plan*. Landscape plans must show a minimum number of points in order to obtain approval. Landscape points are determined by the size of the lot being developed. These requirements are in addition to the interior and perimeter landscaping requirements.

ARTICLE VI, TABLE G

NUMBER OF LANDSCAPE POINTS PER ACRE

Site Size	Minimum Number of Points Required
<3 acres	25 points
Between 3 and 15 acres	30 points
>15 acres	35 points

(3) *List of amenities and points earned.* The following is a list of landscape elements and their associated point value, subject to review and approval by the director:

ARTICLE VI, TABLE H

LANDSCAPE POINTS EARNED PER AMENITY

Amenity Type/Size	Number of Points
Hardscaping, signage, or architectural features that include reference to Little Elm's lakefront character, such as use of sailboats or lighthouses in amenities	10
Enhanced hardscape (Stamped entryway (per design guide), decorative cobble walkways, meandering sidewalks, etc.)	5
Enhanced landscaping (within development and at the entranceways of the development) Enhanced hardscape (Stamped entryway (per design guide), decorative cobble walkways, meandering sidewalks, etc.)	5
Enhanced site canopy (planting perimeter trees one per 30 feet AND locating a parking island every ten spaces)	5
Enhanced streetscape elements (e.g. decorative lampposts, receptacles, decorative bollards, etc.)	5
Use of street furniture (benches, tables and chairs)	5
Enhanced buffers: (providing a landscape buffer five feet more than what is required adjacent to street frontage and perimeter)	5
Open space provision greater than what is required (20 to 30 percent over minimum)	5
Buffer berms (providing 3-foot-high berms along the street frontage)	5
Use of shaded and decorative outdoor seating areas (benches, outdoor dining, etc.)	5
Use of masonry planters with irrigation (minimum 4)	5
Foundation plantings along 75 percent of the building's primary facade	5

Decorative entrance including a landscaped median entry which is a minimum eight feet in width and 60 feet long	5
Public art, small (obelisks, sculptures, statues, clock towers, water fountains, etc.)	5
Public art, large (obelisks, sculptures, statues, clock towers, water fountains, etc.)	10
Enhanced Amenity detention/retention pond (wet with fountain feature)	5
All outdoor lighting is "Darksky Approved" and meets Town's Lighting requirements	5
Other (a developer may propose a unlisted landscape element if it meets the spirit and intent of the ordinance, subject to review and approval by the director)	5

(4) *Developer discretion*. The developer may use any combination of the aforementioned landscape elements to obtain the necessary number of points required for the development. Different lots and landscapes will lend themselves to different types of designs. These regulations attempt to encourage creativity, diversity and water conservation in landscaping.

(5) *Scale, size, type*. Elements, both in terms of quantity and quality, should be in scale with the development, as determined by the Director. Multiple repetitions of an element can be awarded extra points, as determined by the director.

(g) *Approval of landscape site plan alternative waivers.*

a. The town council through a landscape site plan waiver may approve waiver alternatives to the landscape provisions.

b. All waivers must be processed through a developers agreement that is approved by the town council.

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1527 , § 2, 10-15-2019)

Sec. 106.06.32 Residential fences.

(a) *General requirements.*

(1) *Permit required.*

a. Fence construction or repair of greater than 50 percent of the length of the fence requires a permit. Repairs with a total length of less than one full length of the fence (side or back yard) may be completed without a permit with materials matching the existing fence.

b. A plan showing exact materials, location, height, dimensions from property lines, sidewalks, curbs, and location of gates must accompany the completed application form and fee. The design of the fence must accommodate vision sight lines at the intersections of two roadways and the intersection of a drive with an alley or a roadway with a five-foot by five-foot triangle in these locations, measured from the edge of pavement.

(2) *Regulations.*

a. *Maximum height of residential fences.* Fences shall not be greater than eight feet in height, excluding a maximum six inches allowance for ground clearance and a decorative cap.

b. *Materials allowed.* No fence material shall be used to construct a fence except for those listed and regulated in this chapter. Generally, residential fences should only be wooden or black tubular steel (powder coated ornamental iron).

c. *Materials prohibited.* Barbed wire, electric, and other injurious fence material is prohibited in the town, unless the property is an agricultural district over five acres in size with a current AG Agricultural exemption tax status, legitimately needed for industrial purposes, or otherwise approved by the director.

d. *Fences that back or side to other residences.* Fences that back or side to another residence may have either side of the fence face the interior of the lot.

e. *Fences located on corner lots.* On all corner lots, fences shall not be closer than 15 feet from the face of any curb, unless otherwise approved by the director.

f. *Fences facing rights-of-way (on back, side or corners).* All fences erected on side yards of corner lots and reverse corner lots or backing to a right-of-way of shall be cedar, board-on-board, with a decorative cap so that a finished fence side faces the street.

g. *Fences located between houses that face the street.* The portion of fence that is parallel to the street and perpendicular to the fence along the side yard must be constructed of cedar, board-on-board, with a decorative cap so that a finished fence side faces the street.

h. *Fences in front yards.* Fences and walls are only allowed in front yards up to 30 inches in height and must be either: split-rail, wrought iron, picket fence, or decorative masonry wall. Lots over one acre in size are exempt from this regulation, subject to review and approval by the director. All front yard fences should generally be 50 percent open, except for walls when allowed.

i. *Public rights-of-way, easements.* No fence shall be erected on public right-of-way or within any drainage easement, unless otherwise authorized by the director.

j. *Within property lines.* Fences shall not encroach upon any property line (front, side, or rear).

k. *Fences adjacent to scenic views.* All fences installed adjacent to a floodplain, creek, or dedicated open space shall be black tubular steel.

l. *Neighborhood integrity grant program.* Properties that have exterior fences improved by the town through the Neighborhood Integrity Grant program shall maintain, repair, and replace the fence to the same standard as it was installed by the town.

m. *Vacant Lots.* Fences cannot be located on vacant or undeveloped lots.

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(3) *Required inspections.*

a. A footing inspection is required. The footing inspection must be completed prior to pouring concrete.

b. A final inspection is required and must be scheduled within one week (five business days) of completion.

c. All fence installers are required to be registered with the Town of Little Elm.

d. Fences that fail inspection through the rental registration program shall be repaired or replaced accordingly.

(b) *Wooden fence standards.*

(1) *Vertical posts.* All vertical posts shall be galvanized steel with a minimum two and three-eighths-inch diameter, a minimum CS 20 (.095) thickness, and set in a concrete footing.

(2) *Concrete footings.* Concrete footings shall be a minimum of eight inches in diameter and must be at least six inches deeper than the post depth.

(3) *Spacing of footings.* For fences less than seven feet in height, posts shall be spaced at a maximum of eight feet on center, set in a concrete footing of no less than 24 inches deep. For fences that are seven feet or greater in height, posts shall be spaced at a maximum of six feet on center, set in a concrete footing of no less than 36 inches deep.

(4) *Allowed materials.* Residential wood material shall be stained Western Red Cedar. White wood, if pre-stained or stained a natural brown or earth tone color, is also allowed.

(5) *Construction.* All materials shall be securely fastened, vertical boards to horizontal stringers, stringers to vertical posts, top rail, to ensure an ongoing attractive appearance and safe condition, free from rot, rust, vandalism, and other sources of decay.

(6) *Kick board.* The bottom of the fence shall be designed to prevent ground-to-wood contact and allow drainage beneath it. This can be achieved through the use of a concrete mow strip poured between the fence supports or by installing a two- by six-inch pressure treated kick board to cover the gap between the bottom of pickets and the ground. The kick board may have ground contact so long as it does not inhibit drainage.

(7) *Private residential fence adjacent to a subdivision perimeter wall.* A fence that is parallel to or perpendicular to such wall shall not exceed the height of the adjacent subdivision wall. A fence that is separated from the subdivision screening wall by a public alley or right-of-way is deemed to not be adjacent to the subdivision screening wall. If abutting, the height of the residential fence is allowed to transition or increase in height from the height of the subdivision screening wall to the maximum allowable height of the residential fence, provided that the transition is an even or smooth rate of increase and does not exceed a span of 16 feet in length.

(8) *Fences facing streets.* When a residential fence is visible to the right-of-way, the construction must be board-on-board with a decorative cap and with support posts placed on the inside of the fence (i.e. facing the enclosed area). This applies to both new fences and existing fences being replaced.

(c) *Exceptions.*

(1) *Materials.* The use of chain link, vinyl, split-rail, and composite materials may be allowed, if constructed to manufacturer's specifications, subject to discretionary review and approval by the director. Otherwise, these materials are generally prohibited. Existing non-conforming chain link fences may be replaced with similar material.

(2) *Interior fences.* Defined as fences within the property fence for specific uses, such as dog runs, swimming pool fences, and other similar situations within the interior of a back yard. These interior fences may be constructed of alternate materials, as long as all exterior and shared fence lines are built to compliance with section 106.06.32(a) and (b) and the alternate interior materials are shorter than the exterior fence and not visible to the public, subject to discretionary review and approval by the director.

(3) *Gate embellishments.* Decorative gate embellishments are allowed; however, they shall not exceed the height of the fence by more than two feet.

(4) *Submittal for review and approval.* Alternate materials and methods that deviate from the fence standards listed above may be submitted, subject to discretionary review and approval by the director.

(Ord. No. 1407, § 2, 8-15-2017)

Sec. 106.06.32 Residential fences.

(a) *General requirements.*

(1) *Permit required.*

a. Fence construction or repair of greater than 50 percent of the length of the fence requires a permit. Repairs with a total length of less than one full length of the fence (side or back yard) may be completed without a permit with materials matching the existing fence.

b. A plan showing exact materials, location, height, dimensions from property lines, sidewalks, curbs, and location of gates must accompany the completed application form and fee. The design of the fence must accommodate vision sight lines at the intersections of two roadways and the intersection of a drive with an alley or a roadway with a five-foot by five-foot triangle in these locations, measured from the edge of pavement.

(2) *Regulations.*

a. *Maximum height of residential fences.* Fences shall not be greater than eight feet in height, excluding a maximum six inches allowance for ground clearance and a decorative cap.

b. *Materials allowed.* No fence material shall be used to construct a fence except for those listed and regulated in this chapter. Generally, residential fences should only be wooden or black tubular steel (powder coated ornamental iron).

c. *Materials prohibited.* Barbed wire, electric, and other injurious fence material is prohibited in the town, unless the property is an agricultural district over five acres in size with a current AG Agricultural exemption tax status, legitimately needed for industrial purposes, or otherwise approved by the director.

d. *Fences that back or side to other residences.* Fences that back or side to another residence may have either side of the fence face the interior of the lot.

e. *Fences located on corner lots.* On all corner lots, fences shall not be closer than 15 feet from the face of any curb, unless otherwise approved by the director.

f. *Fences facing rights-of-way (on back, side or corners).* All fences erected on side yards of corner lots and reverse corner lots or backing to a right-of-way of shall be cedar, board-on-board, with a decorative cap so that a finished fence side faces the street.

g. *Fences located between houses that face the street.* The portion of fence that is parallel to the street and perpendicular to the fence along the side yard must be constructed of cedar, board-on-board, with a decorative cap so that a finished fence side faces the street.

h. *Fences in front yards.* Fences and walls are only allowed in front yards up to 30 inches in height and must be either: split-rail, wrought iron, picket fence, or decorative masonry wall. Lots over one acre in size are exempt from this regulation, subject to review and approval by the director. All front yard fences should generally be 50 percent open, except for walls when allowed.

i. *Public rights-of-way, easements.* No fence shall be erected on public right-of-way or within any drainage easement, unless otherwise authorized by the director.

j. *Within property lines.* Fences shall not encroach upon any property line (front, side, or rear).

k. *Fences adjacent to scenic views.* All fences installed adjacent to a floodplain, creek, or dedicated open space shall be black tubular steel.

l. *Neighborhood integrity grant program.* Properties that have exterior fences improved by the town through the Neighborhood Integrity Grant program shall maintain, repair, and replace the fence to the same standard as it was installed by the town.

m. *Vacant Lots.* Fences cannot be located on vacant or undeveloped lots.

(3) *Required inspections.*

a. A footing inspection is required. The footing inspection must be completed prior to pouring concrete.

b. A final inspection is required and must be scheduled within one week (five business days) of completion.

c. All fence installers are required to be registered with the Town of Little Elm.

d. Fences that fail inspection through the rental registration program shall be repaired or replaced accordingly.

(b) *Wooden fence standards.*

(1) *Vertical posts.* All vertical posts shall be galvanized steel with a minimum two and three-eighths-inch diameter, a minimum CS 20 (.095) thickness, and set in a concrete footing.

(2) *Concrete footings.* Concrete footings shall be a minimum of eight inches in diameter and must be at least six inches deeper than the post depth.

(3) *Spacing of footings.* For fences less than seven feet in height, posts shall be spaced at a maximum of eight feet on center, set in a concrete footing of no less than 24 inches deep. For fences that are seven feet or greater in height, posts shall be spaced at a maximum of six feet on center, set in a concrete footing of no less than 36 inches deep.

(4) *Allowed materials.* Residential wood material shall be stained Western Red Cedar. White wood, if pre-stained or stained a natural brown or earth tone color, is also allowed.

(5) *Construction.* All materials shall be securely fastened, vertical boards to horizontal stringers, stringers to vertical posts, top rail, to ensure an ongoing attractive appearance and safe condition, free from rot, rust, vandalism, and other sources of decay.

(6) *Kick board.* The bottom of the fence shall be designed to prevent ground-to-wood contact and allow drainage beneath it. This can be achieved through the use of a concrete mow strip poured between the fence supports or by installing a two- by six-inch pressure treated kick board to cover the gap between the bottom of pickets and the ground. The kick board may have ground contact so long as it does not inhibit drainage.

(7) *Private residential fence adjacent to a subdivision perimeter wall.* A fence that is parallel to or perpendicular to such wall shall not exceed the height of the adjacent subdivision wall. A fence that is separated from the subdivision screening wall by a public alley or right-of-way is deemed to not be adjacent to the subdivision screening wall. If abutting, the height of the residential fence is allowed to transition or increase in height from the height of the subdivision screening wall to the maximum allowable height of the residential fence, provided that the transition is an even or smooth rate of increase and does not exceed a span of 16 feet in length.

(8) *Fences facing streets.* When a residential fence is visible to the right-of-way, the construction must be board-on-board with a decorative cap and with support posts placed on the inside of the fence (i.e. facing the enclosed area). This applies to both new fences and existing fences being replaced.

(c) *Exceptions.*

(1) *Materials.* The use of chain link, vinyl, split-rail, and composite materials may be allowed, if constructed to manufacturer's specifications, subject to discretionary review and approval by the director. Otherwise, these materials are generally prohibited. Existing non-conforming chain link fences may be replaced with similar material.

(2) *Interior fences.* Defined as fences within the property fence for specific uses, such as dog runs, swimming pool fences, and other similar situations within the interior of a back yard. These interior fences may be constructed of alternate materials, as long as all exterior and shared fence lines are built to compliance with section 106.06.32(a) and (b) and the alternate interior materials are shorter than the exterior fence and not visible to the public, subject to discretionary review and approval by the director.

(3) *Gate embellishments.* Decorative gate embellishments are allowed; however, they shall not exceed the height of the fence by more than two feet.

(4) *Submittal for review and approval.* Alternate materials and methods that deviate from the fence standards listed above may be submitted, subject to discretionary review and approval by the director.

(Ord. No. 1407, § 2, 8-15-2017)

Sec. 106.06.45 Parking requirements per land use.

(a) *Computation of parking spaces.* In computing the number of parking spaces required for any building or development, the following rules shall govern:

(1) The term "floor area" means the gross floor area of the specific use.

(2) Where fractional spaces result, the parking spaces required shall be constructed to be the next higher whole number.

(3) The parking space requirement for a use not specifically mentioned herein shall be the same as required for a use of similar nature, subject to review and approval by the director.

(b) *Compliance upon changes of use.* Whenever a building or use is changed or enlarged in floor area, number of employees, number of dwelling units, seating capacity, or otherwise, which creates a need for an increase in the number of existing parking spaces, such spaces shall then and thereafter comply with the parking requirements set forth herein.

(c) *Off-street parking.* When a building or structure is constructed or expanded, off-street parking shall be provided, per the following table:

ARTICLE VI, TABLE L	
REQUIRED PARKING RATIOS	
Land Use	Parking Ratio
Amusement, indoor commercial	1 space per 200 square feet of floor area.
Amusement, outdoor commercial	1 space per 1,000 square feet within the outer boundaries of the proposed use, including any buildings, exhibit booths and areas devoted to the use.
Assembly uses (non-profit)	1 space per 4 seats in the main auditorium.
Athletic stadium or field	50 spaces per field for fields without fixed seating.
Bank or similar financial establishment	1 space per 300 square feet of floor area.
Big box	1 space per 250 square feet of floor area.
Bowling alley	6 spaces per lane.
Automobile~~Car~~ wash (automated)	1 space per 200 square feet of floor area; plus adequate stacking spaces per bay; minimum of 2 spaces.
Automobile~~Car~~ wash (self-serve)	2 spaces; plus stacking spaces for each bay.
Child care center	1 space for every 10 students; plus adequate stacking spaces for drop-off lane.
Civic/convention/community center	10 spaces, plus one additional space per 300 square feet of floor area in excess of 2,000 square feet. If an auditorium is included as a part of the building, its floor area shall be deducted from the total and additional parking provided on the basis of 1 space per 4 seats that it contains. The parking ratio can also be determined by a parking demand analysis study for proposed use, subject to review and approval by the director.
College, university or trade school	1 space per classroom, laboratory, or instruction area plus 1 space per 3 students accommodated in the institution.
Convenience store	1 space per 200 square feet of floor area.

Duplex	A concrete drive with a minimum 2 car garage and 2 spaces in driveway per unit.
Golf course	Minimum 30 spaces per 9 holes, plus 1 space per 200 square feet of floor area for country club, retail, office, etc.
Green house or nursery	1 space per 5,000 square feet of outdoor storage area; plus 1 space for each 200 square feet of indoor floor area.
Health/fitness center/ gymnasium	1 space per 200 square feet of floor area.
Hospital	1 space per 2 beds and 1 space per employee on the largest shift.
Hotel	1 space per room, unit or guest accommodation plus 1 space for every 300 square feet of restaurant, office, or conference area
Kennel or stable	1 space per 500 square feet of floor area.
Library or museum	10 spaces, plus 1 space per 300 square feet of floor area.
Lodge, club, or fraternal organization	1 space per 200 square feet of floor area.
Manufacturing, processing, warehousing, and industrial uses	1 space per employee on the maximum working shift plus 1 space for every 1,000 square feet of floor area.
Mini-warehouse (self-storage)	1 space per 5,000 square feet of total floor area.
Mixed use building	See Lakefront Zoning District for parking regulations section 106.04.02.
Mobile home - Manufactured home	A concrete drive with a minimum of 2 spaces, which may include a carport.
Mortuary or funeral home	1 space per 4 seats in funeral service rooms.
Movie theatre or cinema	1 space per 4 seats.
Nursing home	1 space per 6 beds and 1 space for each day staff member.
Office, business or professional	1 space per 300 square feet of floor area.
Office, medical, dental, or health	1 space per 200 square feet of floor area.
Recreational, private or commercial area or building (other than listed)	1 space per 4 persons to be normally accommodated in the establishment.
Restaurant or cafeteria	1 space per 100 square feet of floor area. Outdoor seating areas (covered or not) under 500 square feet are exempt. ~~When part of a multitenant development 15,000 square feet or greater, 1 space for every 200 square feet.~~
Restaurant, pick-up or delivery only	1 space per 200 square feet of floor area.
Retail or personal service	1 space per 200 square feet of floor area.
Retirement housing	1 space per 5 beds.
School, elementary and junior high	1 space per classroom plus 1 space for each 4 seats in any auditorium, gymnasium, or other place of assembly.
School, high school	1 space per classroom, laboratory, or instruction area plus 1 space for every 3 students accommodated in the institution.
Single-Family residential	Minimum 2 car garage with parking for 2 cars in driveway is required. Carports prohibited, unless fully encased with masonry, pitched roof, and attached to the primary residence in the rear yard.

Townhouse	Minimum 2 car garage with parking for 2 cars in driveway is required. Carports prohibited, unless fully encased with masonry, pitched roof, and attached to the primary residence in the rear yard.
Veterinary or animal hospital	1 space per 300 square feet of floor area.

(d) *Parking penalty.* Where parking exceeds the minimum number of required spaces by more than ten percent, landscaping of parking areas shall be increased so that planting islands shall not be spaced greater than every ten spaces rather than the required 12 spaces.

(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1527 , § 2, 10-15-2019)

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Athletic stadium or field	50 spaces per field for fields without fixed seating.
Bank or similar financial establishment	1 space per 300 square feet of floor area.
Big box	1 space per 250 square feet of floor area.
Bowling alley	6 spaces per lane.
Automobile wash (automated)	1 space per 200 square feet of floor area; plus adequate stacking spaces per bay; minimum of 2 spaces.
Automobile wash (self-serve)	2 spaces; plus stacking spaces for each bay.
Child care center	1 space for every 10 students; plus adequate stacking spaces for drop-off lane.
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College, university or trade school	1 space per classroom, laboratory, or instruction area plus 1 space per 3 students accommodated in the institution.
Convenience store	1 space per 200 square feet of floor area.

Duplex	A concrete drive with a minimum 2 car garage and 2 spaces in driveway per unit.
Golf course	Minimum 30 spaces per 9 holes, plus 1 space per 200 square feet of floor area for country club, retail, office, etc.
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Mini-warehouse (self-storage)	1 space per 5,000 square feet of total floor area.
Mixed use building	See Lakefront Zoning District for parking regulations section 106.04.02.
Mobile home - Manufactured home	A concrete drive with a minimum of 2 spaces, which may include a carport.
Mortuary or funeral home	1 space per 4 seats in funeral service rooms.
Movie theatre or cinema	1 space per 4 seats.
Nursing home	1 space per 6 beds and 1 space for each day staff member.
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Office, medical, dental, or health	1 space per 200 square feet of floor area.
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(Ord. No. 1407, § 2, 8-15-2017; Ord. No. 1527 , § 2, 10-15-2019)

Sec. 106.06.46 Stacking standards.

(a) *Minimum size.* A stacking space shall be an area on a site measuring ten feet by 20 feet with direct forward access to a service window or station of a drive-through facility which does not constitute space for any other circulation driveway, parking space, escape lane or maneuvering area.

(b) *Distinctive markings.* All stacking spaces shall be marked with stamped or stained concrete to differentiate the spaces from drive aisles or parking spaces.

(c) *Escape lane.* If the director deems that an escape lane is necessary by to allow vehicles to get out of stacking lane in the event of a stalled vehicle, emergency or accidental entry, it shall be of at least eight feet in width and shall have a negotiable geometric design.

(d) *Minimum number of stacking spaces per land use.* Off-street stacking requirements for drive-through facilities shall be as follows:

ARTICLE VI, TABLE M	
REQUIRED STACKING SPACES	
Type of Land Use	Minimum Number of Stacking Spaces
Banks, financial institutions	3 spaces per line
~~Car~~ Automobile wash, automated self-service	3 spaces per wash bay, including one at the bay exit for drying
~~Car~~ Automobile wash, full-service	3 spaces per car wash line
~~Car~~ Automobile ~~-~~wash, wand-operated self-service	2 spaces per wash bay, including one at the bay exit for drying
Kiosks with drive-thru	2 spaces per line (or per director)
Restaurants with one order window	4 spaces per line
Restaurants with two or more order windows	2 spaces per second line and any subsequent line
Retail, pharmacy, dry cleaners	3 spaces per line

(Ord. No. 1407, § 2, 8-15-2017)

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Automobile wash, wand-operated self-service	2 spaces per wash bay, including one at the bay exit for drying
Kiosks with drive-thru	2 spaces per line (or per director)
Restaurants with one order window	4 spaces per line
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(Ord. No. 1407, § 2, 8-15-2017)

TOWN OF LITTLE ELM
PLANNING & ZONING COMMISSION

12/21/2023

OVERVIEW

Project	PUBLIC HEARING/ Chapter 107 Ordinance Text Amendment
P&Z Hearing	12/21/2023
Council Hearing	January 16, 2023
Size	N/A
Current Zoning	N/A
Proposed Use	N/A
Existing Use	N/A
Future Land Use Plan Designation	N/A
Applicant	N/A
Owner	N/A
Strategic Goal	

Agenda Item

PUBLIC HEARING/ Ordinance Text Amendment. A recommendation regarding proposed text amendments to Chapter 107, Subdivision Ordinance, by amending said chapters and associated appendices in order to establish compliance with new State Statutes as a result of the recent legislative sessions and enable minor corrections or clarification throughout the text.

- Staff Report
- Open Public Hearing
- Receive Public Comment
- Close Public Hearing
- Discussion and Recommendation

Location

N/A

Planning Analysis

Background.

In 1976 the Town of Little Elm first adopted a Subdivision Ordinance through Ordinance No. 70. The Subdivision Ordinance has been or amended several times since it was originally adopted. The most recent comprehensive change to the Subdivision Ordinance occurred in 2018 through Ordinance No. 1444. The Subdivision Ordinance was partially updated in 2019 through Ordinance No. 1531. However, since 2018, there has not been a comprehensive update of the Subdivision Ordinance.

Proposal.
As a result of the 2023 legislative sessions, the legal counsel for the Town has proposed several text amendments to keep the Town compliant with new State Statutes. The engineering team has also proposed several changes to the Subdivision Appendix, specifically the Town's Stormwater and retaining wall sections based in part on new requirements but also creating clearer guidelines. Similar to the planning staff taking the opportunity to make clarifications and minor revisions in Chapter 106, the engineering team are also proposing several amendments to Chapter 107. The proposed changes are specific to the engineering standards details based on their experience with the current standards and developmental and technological shifts in construction science.

Changes suggested by legal counsel have been noted in the red-lined version and the change log to easily differentiate what is a legal requirement versus other proposed changes.

The changes proposed by legal counsel are as follows:

- 107.02.03 "Director of Development Services"
  - Gives Development Services Director the ability to approve plats if there is not sufficient time for P&Z or Council Approval. Recommended by Town Attorney. Should the Director deny a plat, it can be appealed to the Planning and Zoning Commission.

- 107.03.02 "Application Contents"
  - Clarifies that new state statutes allows the Director of Development Services to be allowed to only accept platting submittals on certain days in accordance to a schedule posted on the Town's website. This is how the Town has already been conducting businesses, but the edit to State Statute clarifies that establishing submittal dates is allowed.

- 107.03.03 "Application submittal process, official filing date, request for thirty-day review period extension"
  - This clarifies that the date the applicant submits the plat, along with a completed application, and pays the fee is the day that shall be considered when starting the 30-day review period.

- 107.08.01 "General Subdivision Policies"
  - Added several clauses that will bring the Subdivision Policies into compliance with new State Statutes that pertain to Right of Way dedication.

- 107.08.03
  - Added language that will bring the Subdivision Policies into compliance with new State Statutes that pertain to Right of Way dedication.

Changes proposed by the engineering team are as follows:

- Chapter 107 Appendix
  - Engineering staff have proposed several changes to remain up-to-date on new state regulations, construction technologies, and best practices. See Engineering Change log for more detailed explanations.

Comprehensive Plan.
Staff believe these proposed minor changes are still in line with the intent of the current Subdivision Ordinance, overall vision for the Town, and work towards the goals and objectives set forth in the Comprehensive Plan.

Recommended Action

Staff recommends approval of the suggested changes by legal counsel.

Staff requests the Commission review the staff proposed changes and evaluate the proposals based on the goal of the Town's Comprehensive Plan, shifts in construction science, and staff experience with the Subdivision Ordinance and its appendices. Staff requests direction and welcomes any feedback that might enhance the intended effect of these text changes.

Attachments

Chapter 107 Change Log
Sec._107.02.03 Red lined
Sec._107.02.03
Sec._107.03.02 Red lined
Sec._107.03.02
Sec._107.03.03 Red lined
Sec._107.03.03
Sec._107.08.01 Red lined
Sec._107.08.01
Sec._107.08.03 Red lined
Sec._107.08.03
Sec._107.12.02 Red lined
Sec._107.12.02
Engineering Change Log
Sec._107 [Appendix.] - Engineering Design Standards Red lined
Sec._107 [Appendix.] - Engineering Design Standards
StandardDetails-2024-12

Section	Description	Old	New
107.02.03	Gives Development Services Director the ability to approve plats if there is not sufficient time for P&Z or Council Approval. Recommended by Town Attorney		*Additional Authority* . In the event there is not sufficient time for the Planning and Zoning Commission and/or the Town Council to approve or deny any plat based upon the filing date of such plat, the Planning Director may approve or deny such plat, pursuant to Section 212.0065 of the Texas Local Government Code, as amended. The disapproval of any plat by the Planning Director may be appealed to the Planning and Zoning Commission and/or the City Council.
107.03.02	Adds new state statute reference, Per Town Attorney	Development services staff shall establish submittal deadlines for all applications decided by the director of development services and by the commission. Such submittal schedule will be posted on the town website.	As authorized by Texas Local Government Code Section 212.0015, Development services staff shall establish submittal deadlines for all applications decided by the director of development services and by the commission. Such submittal schedule will be posted on the town website.
107.03.03	Clarification on the Platting process given new legislation, per Town Attorney		...the date the applicant submits the plat, along with a completed plat application and the application fees and other requirements prescribed by Texas Local Government Code Section 212, which date shall also be considered...
107.08.01.b.1	Added new state statute reference, per Town Attorney.		All street and road dedication requirements for land within a subdivision shall comply with Texas Local Government Code Section 212.010(c).
107.08.01.b.3	Added new state statute reference, per Town Attorney.		All street and road dedication requirements for land within a subdivision shall comply with Texas Local Government Code Section 212.010(c).
107.08.03	Added new state statute reference, per Town Attorney.		All street and road dedication requirements for land within a subdivision shall comply with Texas Local Government Code Section 212.010(c).
107 Appendix	Replaced Sec 3.0 and 6.0 with new Sec 3.0 Stormwater design	See Engineering Change log	See Engineering Change log
107 Appendix	Added new Sec 6.0 - Retaining Wall Design Requirements	See Engineering Change log	See Engineering Change log
107 Appendix	Replaced Standard Details	See Engineering Change log	See Engineering Change log

Sec. 107.02.03 Director of development services.

(a) *Responsible official.* The director of development services is the responsible official for the following types of applications, approval of requests for review time extensions, variances, and petitions:

(1) Review and staff report, including a staff recommendation for approval/approval with conditions/disapproval with conditions, for any type of plat;

(2) Approval of requests for an extension of the 30-days review period;

(3) Appeal of a decision on any application for which the town engineer is the responsible official;

(4) Vested rights petition for any application when the director of development services is the responsible official.

(5) Review recommendations by the community development corporation (CDC), and carry out the CDC's decisions, on the following types of applications:

a. Acceptance of fees in lieu of parkland dedication;

b. The portion of an application showing where park land, including trails, is to be dedicated, and whether such dedication is acceptable;

c. Any other portions of applications showing items required by article 107.09, parks and open space.

(b) *Final decision-maker.* The director of development services is the final decision-maker for the following types of applications (subject to any appeal):

(1) Minor plat, as outlined in section 107.04.05, minor plats;

(2) Amending plat, as outlined in section 107.04.08, amending plats;

(3) Extension for a preliminary plat approval, as outlined in section 107.04.03, preliminary plats; and

(4) Certain types of vested rights petitions, as outlined in section 107.10.02, vested rights.

(c) *Additional Authority*. In the event there is not sufficient time for the Planning and Zoning Commission and/or the Town Council to approve or deny any plat based upon the filing date of such plat, the Director of Development Services may approve or deny such plat, pursuant to Section 212.0065 of the Texas Local Government Code, as amended. The disapproval of any plat by the Director of Development Services may be appealed to the Planning and Zoning Commission and/or the City Council.

Commented [BS1]: Suggested by Robert

(Ord. No. 1444, § 2(Att. A), 3-6-2018; Ord. No. 1531, § 2, 11-19-2019)

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(3) Extension for a preliminary plat approval, as outlined in section 107.04.03, preliminary plats; and

(4) Certain types of vested rights petitions, as outlined in section 107.10.02, vested rights.

(c) *Additional Authority*. In the event there is not sufficient time for the Planning and Zoning Commission and/or the Town Council to approve or deny any plat based upon the filing date of such plat, the Director of Development Services may approve or deny such plat, pursuant to Section 212.0065 of the Texas Local Government Code, as amended. The disapproval of any plat by the Director of Development Services may be appealed to the Planning and Zoning Commission and/or the City Council.

(Ord. No. 1444, § 2(Att. A), 3-6-2018; Ord. No. 1531, § 2, 11-19-2019)

Sec. 107.03.02 Application contents.

(a) *Application contents generally.* All applications shall be submitted on a form supplied by the development services staff with the required information and exhibits as stated on the application form. Incomplete applications shall not be accepted. Neither the submission or acceptance of an application, however, shall be considered a filing of a plat application for purposes of triggering the Town's statutorily mandated 30-days review period of plat applications. *See*107.03.03 for determining the filing date for the 30-days review period.

(1) *Application timing.*

a. As authorized by Texas Local Government Code Section 212.0015, Development services staff shall establish submittal deadlines for all applications decided by the director of development services and by the commission. Such submittal schedule will be posted on the town website.

b. An application must be considered officially complete in accordance with section 107.03.03(c), determination of completeness, of this subdivision ordinance prior to being processed for review and consideration.

(2) *Fees required.* Every application shall be accompanied by the prescribed fees set forth in the town's fee schedule, as approved by town council and as may be amended from time to time. Fees are not refundable and are not a guarantee of approval. Review of the application will not begin until the appropriate fees have been processed by the town.

(3) *Proof of paid taxes on property.* An application shall not be deemed complete, nor shall it be approved, if there are delinquent town taxes on the subject property.

(b) *Modification of applications prior to approval.* The applicant may modify any submitted application prior to the expiration of the period during which the town is required to act on the application.

(1) *Modifications requested by the town.* Town requested revisions or modifications to any plat are required to be resubmitted to the department services department a minimum of five calendar days prior to the scheduled date for the planning and zoning commission hearing to allow staff adequate time to review the revisions and modifications for completeness and accuracy. Resubmittals for residential replats that require public noticing must be submitted a minimum of 20 calendar days prior to the scheduled date for the planning and zoning commission hearing to allow staff adequate time to review the revisions and modifications for completeness and accuracy and to publicize the public hearing in the official newspaper of the town, as required by state law.

(2) *Additional revisions.* Should certain requested revisions not be completed to the satisfaction of the town staff, additional revisions may be required from the applicant. The additional comments to be addressed may affect the tentatively scheduled planning and zoning commission hearing date (see section 107.04.04).

(3) *Applicant initiated revisions.* In all other instances (e.g., when the applicant chooses to submit a revised application on his own accord because of a change in development decisions), submittal of a modified application shall be subject to additional town staff review.

(Ord. No. 1444, § 2(Att. A), 3-6-2018; Ord. No. 1531, § 2, 11-19-2019)

Commented [BS1]: Suggested by Robert

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(Ord. No. 1444, § 2(Att. A), 3-6-2018; Ord. No. 1531, § 2, 11-19-2019)

Sec. 107.03.03 Application submittal process, official filing date, request for thirty-day review period extension.

(a) *Initiation by owner.* An application required under this subdivision ordinance may be initiated only by the owner of the land subject to the application, or by the owner's duly authorized representative. If the applicant is a representative of the property owner, the application shall include a written and notarized statement from the property owner, such as a duly executed power of attorney, authorizing the representative to file the application on the owner's behalf.

(b) *Applicability.* The procedures within this chapter shall apply to all applications that are required by the town and submitted in accordance with this subdivision ordinance.

(c) *Official filing date.* The 30-day time period established by state law, and by this subdivision ordinance, for approving, approving with conditions, or disapproving with conditions, shall begin on the official filing date. The official filing date is defined as the date the applicant submits the plat, along with a completed plat application and the application fees and other requirements prescribed by Texas Local Government Code Section 212, which date shall also be considered the date when the application for a plat is determined to be administratively complete. An application is considered administratively complete , and thus filed, upon the occurrence of all of the following: (1) when all necessary forms, supplemental documents, and copies are submitted and accepted by staff; (2) when staff has determined that the application for a plat meet all requirements of applicable town ordinances so that it may be reviewed by the Planning and Zoning Commission; and (3) all fees associated with the application have been paid and the issuance of a fee receipt by staff has occurred; and ~~(4) the plat has been placed on a duly posted agenda for the Planning and Zoning Commission or, if applicable, the Town Council. No plat shall be considered to have been filed, for purposes of triggering the Town's statutorily mandated 30-days review period of plat applications, until the plat is placed on an agenda for the Planning and Zoning Commission or, if applicable, the Town Council.~~

(d) *Request for extension 30-day review period.* Pursuant to Texas Local Government Code, § 212.009(b-2), upon application in writing by the applicant, the Planning and Zoning Commission or, if applicable, the Town Council may approve one or more extensions of right to 30-day action, each such extension not to exceed 30 additional days. The director of development services shall be the responsible official for accepting a request for an extension of the 30-day review period. ~~An applicant may request, in writing, to extend the 30-day review period for a period not to exceed 30 days. The Planning and Zoning Commission or, if applicable, the Town Council shall be required to approve the extension request for the request to be granted.~~

(e) *Owners dedication language.* Refer to the plat checklist for the appropriate owner dedication language to include on the plat.

(Ord. No. 1444, § 2(Att. A), 3-6-2018; Ord. No. 1531, § 2, 11-19-2019)

Commented [BS1]: Suggested by Robert

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(Ord. No. 1444, § 2(Att. A), 3-6-2018; Ord. No. 1531, § 2, 11-19-2019)

Sec. 107.08.01 General subdivision policies.

(a) *Conformance to plans.*

(1) *Public improvements.* Proposed public improvements serving new development shall conform to and be properly related to the public facility elements of the comprehensive plan, other adopted master plans for public facilities and services, and applicable capital improvements plans, and shall at a minimum meet the service levels specified in such plans.

(2) *Conformance with master thoroughfare plan.* All plats within the town and its ETJ, and corresponding construction plans, shall provide for thoroughfares as shown in the master thoroughfare plan. Minor adjustments to thoroughfare alignments may be allowed without amending the master thoroughfare plan if the town engineer determines the new alignment meets the spirit and intent of the master thoroughfare plan and will not compromise public safety or traffic efficiency. The design and construction of all proposed thoroughfares shall be in conformance with the town's engineering design standards, and is subject to approval by the town engineer. Such approvals shall be required prior to any plat approval.

(3) *Master thoroughfare plan amendment.* If a significantly different roadway alignment or a road type from what is shown on the master thoroughfare plan is proposed, then the master thoroughfare plan shall be amended prior to any plat approval. Submission of a traffic impact analysis (TIA) of the proposed amendment by the developer may be required if the director of development services and the town engineer determine that such an analysis is necessary to fully assess the impact of the proposal upon the town's overall thoroughfare network.

(4) *Water and wastewater plans.* The design and construction of the water system and wastewater system to serve the development shall be in conformance with the town's master plans for water and wastewater facilities and with the engineering design standards. The design is subject to approval by the town engineer prior to approval of the construction plans and the final plat.

(5) *Storm drainage standards.* The design and construction of the storm drainage system to serve the development shall be in conformance with, but not limited to, the town's master plans for stormwater drainage, with the town's storm drainage policies (water reuse master plan), and with the engineering design standards. The design is subject to approval by the town engineer prior to approval of the construction plans and the final plat.

(b) *Adequate public facilities.*

(1) *Adequate services for areas proposed for development.* Land proposed for development in the town and in the town's ETJ shall be served adequately by essential public facilities and services, including, but not limited to, water distribution, wastewater collection and treatment, roadways, pedestrian circulation, storm drainage conveyance, and park and recreational facilities. Land shall not be approved for platting or development until adequate public facilities necessary to serve the development exist or provisions have been made for the facilities, whether the facilities are to be located within the property being developed or offsite. All street and road dedication requirements for land within a subdivision shall comply with Texas Local Government Code Section 212.010(c).

Commented [BS1]: Suggested by Robert

a. *Street access.* A plat will not be approved unless all of the proposed lots have safe and reliable street access for daily use and emergency purposes.

1. A plat will not be approved unless all of the proposed lots have access to an improved public street (or a public street that will be improved during construction of the proposed development) that meets the town's minimum design and paving standards, or to an

approved public way or mutual access easement that is connected to an improved public street.

2. Except for lots that are provided access from an approved cul-de-sac, all lots within a development shall have at least two means of access or approach. Where development phasing or constraints of the land prevent the provision of a second, separate means of access, the town may accept a temporary, paved street connection provided that a second permanent access point can be reasonably anticipated with future development of adjacent properties.

3. In certain circumstances where providing two means of access to a site is not feasible, the planning and zoning commission may waive this requirement if staff can demonstrate that the site can be adequately served by emergency vehicles and that life and safety issues have not been compromised.

4. For properties situated adjacent to an existing or planned median-divided thoroughfare, at least one of the required access points shall occur at, or through access easement connection to, a median opening (see diagram 107.13.01, median and cross access).

b. *Water.* A plat will not be approved unless all of the proposed lots are connected to a public water system which is capable of providing adequate water for health and emergency purposes.

1. Except for lots along an approved cul-de-sac, all lots shall be provided service connections from a looped water main providing water flow from two directions or sources.

2. Water service shall be sufficient to meet the fire flow requirements of the proposed development, except where a suitable alternative means of fire protection is approved by the fire chief.

3. The town may require the phasing of development and/or improvements to the water system to ensure adequate fire protection.

4. Plats for residential lots greater than one acre in size may use private well water, at the discretion of the town engineer.

c. *Wastewater.* A plat will not be approved unless all of the proposed lots are served by an approved means of wastewater collection and treatment.

1. The projected wastewater discharge of a proposed development shall not exceed the proposed capacity of the wastewater system.

2. The town may require the phasing of development and/or improvements to the sanitary sewer system so as to maintain adequate wastewater capacity.

3. Plats for residential lots greater than one acre in size may use private septic systems, at the discretion of the town engineer.

d. *Storm drainage.* Increased stormwater runoff attributable to new development shall not cause impacts to adjoining, upstream or downstream properties. Impacts are defined as an increase in runoff between pre- and post-development. Where the projected runoff from a new development exceeds runoff from pre-development conditions, the town may require the phasing of development, the use of control methods such as retention or detention, obtaining off-site drainage easements, and/or the construction of off-site drainage improvements as means of mitigation. All designs shall comply with the engineering design standards, as it exists or may be amended.

(2) *Town's cost of review.* Should the town deem that adequate review of the roadway, water, wastewater, or drainage submittal should be outsourced to a third party, the cost of such review shall be passed through to the developer or applicant.

(3) *Property owner's responsibilities.* The property owner shall be responsible for, but not limited to, the following:

a. *Dedication and construction of improvements.* The property owner shall dedicate all rights-of-way and easements for, and shall construct and extend, all necessary on-site and off-site public improvements for water distribution, wastewater collection and treatment, streets, storm drainage conveyance, and other improvements that are necessary to adequately serve each phase of a proposed development at service levels that are consistent with the town's applicable master facilities plans and engineering design standards. All street and road dedication requirements for land within a subdivision shall comply with Texas Local Government Code Section 212.010(c).

Commented [BS2]: Suggested by Robert

b. *Abutting substandard streets.* Where a substandard street abuts or traverses a proposed development, the town may require the property owner to dedicate additional right-of-way and to improve the street to the current town design and construction standards as set forth in the engineering design standards. Such requirements to improve the substandard street to the town's current standards shall only be imposed following careful review of factors including, but not limited to:

1. The impact of the new development on the street;
2. The timing of the development in relation to need for the street; and
3. The likelihood that adjoining property will develop in a timely manner.

c. In the case of frontage or service roads for state or federally designated highways, the entire abutting right-of-way shall be dedicated to the town and improved to the county, state or federal agency's applicable construction design standards if such improvement is approved by the agency.

d. *Right-turn lanes mandatory.* The town reserves the right to require free right turn lanes into any development from a roadway whose posted speed limit is 40 miles per hour or greater. Should the applicant request a waiver from this requirement, the applicant must provide to the town a study by an acceptable third party that justifies the elimination of the required free right turn lane.

e. *Facilities impact studies.* The town may require that a developer prepare a comprehensive traffic impact analysis (TIA), flood or drainage study or downstream assessment, or other facilities impact studies in order to assist the town in determining whether a proposed development will be supported with adequate levels of public facilities and services concurrent with the demand for the facilities created by the development. The cost of such study or studies shall be borne by the applicant.

f. *Timing and approval of studies.* Any outside study shall be subject to approval by the town engineer prior to approval of the preliminary plat and the construction plans. The town also may require, at the time of approval of a subsequent applications (e.g., final plat), an update of a facilities impact studies that were approved in conjunction with a prior application (e.g., preliminary plat).

g. *Future extension of public facilities.* The property owner shall make provisions for future expansion of the public facilities as needed to serve future developments, subject to the town's oversize participation policies, if applicable.

h. *Operations and maintenance of the public facilities.* The property owner shall provide for all operations and maintenance of the public facilities, or shall provide proof that a separate entity will be responsible for the operations and maintenance of the facilities.

i. *Fiscal security.* The property owner shall provide all fiscal security required for the construction of the public facilities.

j. *Approvals from utility providers.* The property owner shall obtain all necessary approvals from the applicable utility providers other than the town, and shall submit written verification of such approvals to the town with the construction plans.

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b. *Abutting substandard streets.* Where a substandard street abuts or traverses a proposed development, the town may require the property owner to dedicate additional right-of-way and to improve the street to the current town design and construction standards as set forth in the engineering design standards. Such requirements to improve the substandard street to the town's current standards shall only be imposed following careful review of factors including, but not limited to:

1. The impact of the new development on the street;
2. The timing of the development in relation to need for the street; and
3. The likelihood that adjoining property will develop in a timely manner.

c. In the case of frontage or service roads for state or federally designated highways, the entire abutting right-of-way shall be dedicated to the town and improved to the county, state or federal agency's applicable construction design standards if such improvement is approved by the agency.

d. *Right-turn lanes mandatory.* The town reserves the right to require free right turn lanes into any development from a roadway whose posted speed limit is 40 miles per hour or greater. Should the applicant request a waiver from this requirement, the applicant must provide to the town a study by an acceptable third party that justifies the elimination of the required free right turn lane.

e. *Facilities impact studies.* The town may require that a developer prepare a comprehensive traffic impact analysis (TIA), flood or drainage study or downstream assessment, or other facilities impact studies in order to assist the town in determining whether a proposed development will be supported with adequate levels of public facilities and services concurrent with the demand for the facilities created by the development. The cost of such study or studies shall be borne by the applicant.

f. *Timing and approval of studies.* Any outside study shall be subject to approval by the town engineer prior to approval of the preliminary plat and the construction plans. The town also may require, at the time of approval of a subsequent applications (e.g., final plat), an update of a facilities impact studies that were approved in conjunction with a prior application (e.g., preliminary plat).

g. *Future extension of public facilities.* The property owner shall make provisions for future expansion of the public facilities as needed to serve future developments, subject to the town's oversize participation policies, if applicable.

h. *Operations and maintenance of the public facilities.* The property owner shall provide for all operations and maintenance of the public facilities, or shall provide proof that a separate entity will be responsible for the operations and maintenance of the facilities.

i. *Fiscal security.* The property owner shall provide all fiscal security required for the construction of the public facilities.

j. *Approvals from utility providers.* The property owner shall obtain all necessary approvals from the applicable utility providers other than the town, and shall submit written verification of such approvals to the town with the construction plans.

k. *Compliance with utility providers.* The property owner shall comply with all requirements of the utility providers, including the town and applicable utility districts.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 107.08.03 Streets and alleys.

(a) *Streets basic policy.*

(1) *Street improvements.* In platting a new development, the property owner shall provide additional right-of-way needed for existing or future streets as required by the engineering design standards and as shown on the thoroughfare plan (see table B, thoroughfare types and standards). All street and road dedication requirements for land within a subdivision shall comply with Texas Local Government Code Section 212.010(c).

Commented [BS1]: Suggested by Robert

(2) *Existing substandard streets.*

a. When a proposed residential or nonresidential development abuts one or both sides of an existing substandard street, the developer shall be required to improve the substandard street and its appurtenances (such as curbs and gutters, sidewalks, barrier-free ramps, street trees, etc.) to bring the same to town standards, or to replace it with a standard town street, at no cost to the town other than as may be provided in the town's cost-sharing policies, including any ordinances that are in effect at the time of final plat approval.

b. If the proposed development is located along only one side of a substandard street, and if the town makes a determination that it is not feasible to improve the full width of said substandard street at that time the town may require the developer to pay into escrow, in accordance with section 107.05.04, development agreements, funds for the future improvement of the street as a condition of final plat approval for the development.

c. When a traffic impact analysis (TIA) is required or voluntarily submitted, the findings determined shall not be imposed on the requirements, alignment, rights-of-way, and number of lanes shown on the master thoroughfare plan, as it exists or may be amended. The TIA may be used to justify amendments to the thoroughfare plan, but in no case shall dictate such amendments.

(3) *New perimeter streets.*

a. When a proposed residential or nonresidential development is developed abutting an existing or planned major thoroughfare, minor thoroughfare or collector street as shown on the master thoroughfare plan, the developer shall construct a portion of the abutting street and its appurtenances (such as curbs and gutters, sidewalks, barrier-free ramps, street trees, etc.) to the town's standards for that type of street (per the engineering design standards). If the town engineer determines that it is not feasible to construct the abutting street and its appurtenances at the time of development, the town may require the developer to pay into escrow, in accordance with section 107.05.04, development agreements, funds for the future construction of the street as a condition of final plat approval for the development. The funds placed in escrow or the value of the lanes constructed shall be roughly proportional to the amount of traffic estimated to be generated by the development itself.

b. When a proposed residential or nonresidential development is constructed and has designed an unplanned perimeter street in order to provide access to the site and/or adjacent land, the developer shall construct a portion of the abutting street as described in section 107.08.03(a)(4), new internal streets, below, and under the same conditions.

(4) *New internal streets.*

a. All new streets and their appurtenances internal to a proposed residential or nonresidential development shall, at a minimum, be built to a width and design that will adequately serve the

development, and shall conform to the town's standards as described in the engineering design standards. If oversizing of an internal street is deemed necessary by the town engineer for traffic safety or efficiency (such as adjacent to a school or park site), then the town and/or the applicable entity may participate in such oversizing costs as part of a development agreement/facilities agreement with the developer.

b. Streets which temporarily dead-end at power lines, railroads or similar rights-of-way shall be constructed for at least one-half the distance across these rights-of-way, or provision shall be made to place the construction cost for said improvements in escrow with the town in accordance with section 107.05.04, development agreements.

c. When, in the judgment of the town engineer, it is not feasible to construct an internal street or appurtenances at the time of development of the subdivision, the town may require the developer to pay into escrow funds for the future construction of the street or its appurtenances as a condition of final plat approval for the development, in accordance with section 107.05.04, development agreements.

(5) *Impact fees.* All fees due on the project shall be paid in accordance with the town's impact fee ordinance and/or executed development agreement/facilities agreement.

(b) *Street design and appurtenances.*

(1) *Application of requirements.* Street design requirements are subject to the provisions included in the engineering design standards, development agreements and planned development ordinance (if applicable to the subject property) as well as the regulations contained within this subdivision ordinance.

(2) *Conformity to the master thoroughfare plan.* The general location of streets shall conform to the master thoroughfare plan. For streets that are not shown on the master thoroughfare plan, such as local residential streets, the arrangement of such streets shall:

a. Provide for the continuation or appropriate continuation of existing streets or street stubs from or into surrounding areas - refer to street stub requirements outlined in section 107.08.03(b)(8), stub streets, and connectivity requirements in section 107.08.03(b)(9), street connectivity;

b. Conform to any plan for the neighborhood approved or adopted by the town to address a particular situation where topographical or other conditions make continuance or conformity to existing streets impractical; and

c. Not conflict with existing or proposed streets or driveway openings, including those on the opposite side of an existing or planned thoroughfare, as described within the engineering design standards.

d. New streets that cross divided arterials shall align to the greatest extent possible with opposite streets such that median openings can be shared.

(3) *Relation to adjoining street system.* The proposed street system shall extend all existing major and minor arterials and such existing collector and local streets as may be necessary for convenience of traffic circulation and emergency ingress and egress.

(4) *Maximum cul-de-sac street length.* No cul-de-sac street shall be longer than 600 feet.

(5) *Maximum street length.* No street shall be more than 1,000 feet in length without an intersection with another street which will provide some degree of flexibility in traffic patterns and public convenience.

a. See the engineering design standards for specific design requirements.

b. In certain circumstances, the town may consider minor exemptions to the maximum street lengths if sought by the applicant. These circumstances include, but are not limited to:

1. Rerouting of streets;

2. Increasing the lot count by five percent or more from the previously approved preliminary plat or final plat; or

3. Approval by the planning and zoning commission through a subdivision ordinance variance. Any variance approved by the planning and zoning commission shall include the curvilinear requirement and street calming methods, described below.

(6) *Curvilinear requirement.* When a residential street length exceeds 500 feet but is less than 1,000 feet in length, the design of the street shall include a curve of between 100 to 200 feet radius for a length equal to the curve radius.

(7) *Street calming methods.* When a residential street length exceeds 500 feet but is less than 1,000 feet in length, one or more of the following street calming methods shall be incorporated into the design in addition to the curvilinear requirement (above) in order to reduce traffic velocity and increase safety to pedestrians and cyclists, subject to the review and approval of the town engineer:

a. Street width narrowing with landscaped islands placed approximately every 400 feet;

b. Roundabouts placed approximately in the center of the street length; and/or

c. Landscaped medians that include pedestrian crossing oases included for a minimum of one-third of the street length.

(8) *Street widths and rights-of-way.* Street widths and related rights-of-way shall be designed in accordance with the following:

a. Master thoroughfare plan (adopted on March 24, 2016, and as amended);

b. Planned development ordinance (if applicable to the subject property); and

c. All streets shall be paved with a permanent type of pavement in accordance with the engineering design standards.

TABLE B - THOROUGHFARE TYPES AND STANDARDS								
Criteria	Primary Arterial-1	Primary Arterial-2	Primary Arterial-3	Minor Arterial-1	Minor Arterial-2	Minor Arterial-3	Collector	Urban Mix Residential
Designation	P6D-1	P6D-2	P6D-3	M4D-1	M5U-2	M4U-3	C2U	R
Limited to:	(US 380)	(FM 423, 720 and 2931)	Town and ETJ roadways					
Right-of-way	160'	140'	124'	100'	100'	100'	60'	50'
ROW at intersections	Per Texas DOT		134'	110'	100'	100'	60'	50'
Lanes/division			6LD	4LD	5LU	4LU	2LU	2LU
Roadway width (B-B)			37'	37'	63'	49'	37'	31'
Median width			20'	20'	-	-	-	-
Parkway width			15'	15'	9'	25'	11.5'	9.5'
Parking			No	No	No	No	Yes	Yes

(9) *Street names, street name signs, and traffic control signs.*

a. *Street names.* New streets shall be named so as to provide naming continuity with existing streets, and so as to prevent conflict or "sound-alike" confusion with similar street names. All street names shall be approved by the director of development services prior to any plat approval, and prior to approval of the construction plans and should comply with the town's approved street name policy, as it exists or may be amended.

b. *Cost of signs.* The cost of street name signs and traffic control signs shall be paid for and installed by the developer.

c. *Town standards.* All street name signs and traffic control signs shall conform to the town's details for street name sign design and the latest edition of the Texas "Manual of Uniform Traffic Control Devices" (TMUTCD).

(10) *Traffic studies.* The town engineer may require a traffic impact analysis (TIA) or other type of engineering study from the developer prior to any approval for plats or construction plans to ascertain technical data pertaining to the potential traffic impact of the proposed development on the town's street system. For any study required by the town that is outsourced to a third party, the cost of such study shall be passed through to the developer or applicant.

(11) *Stub streets.*

a. See the engineering design standards for all design requirements.

b. Future connections are required to adjacent vacant properties at locations as approved by the director of development services and the town engineer.

c. When a residential development is constructed in phases requiring a temporary stubbed street, a paved temporary turn-around shall be provided for maneuvering by emergency equipment.

d. A note shall be clearly placed on the final plat indicating that the stub street will be extended with future development (see requirements for temporary turn-arounds in the engineering design standards).

e. All stub streets shall have barricades that meet TMUTCD standards.

f. All stub streets shall have a sign prominently posted at the terminus of the street to indicate no through traffic and that the street will be extended in the future.

1. The sign shall comply with standards established by the town engineer, and

2. Installation and cost of the signs shall be the responsibility of the developer.

(12) *Connectivity.*

a. New residential developments shall provide street connections to adjacent developments, as determined by the director of development services, allowing access between developments for neighborhood traffic and to enhance pedestrian and bicycle connectivity as recommended in the comprehensive plan.

b. Residential developments shall not have direct vehicular access to adjacent commercial or retail developments. Pedestrian and/or bicycle access may be provided, as approved by the director of development services.

(13) *Street lighting required.* Street lighting shall be provided by the developer along all streets and thoroughfares in accordance with the engineering design standards. The developer is responsible for the installation of street lighting and they shall be installed to town standards prior to the town accepting responsibility for the future provision of electricity to the street lights. The town engineer

shall be the responsible official for decisions related to street lighting, and may authorize a minor variance to these regulations, in accordance with section 107.10.01, variances, for a street lighting requirement if such variance will not compromise public health, safety, security and convenience.

(14) *Street lighting placement.*

a. Street lights shall be placed at every street intersection.

b. In addition to intersection placement, street lights shall be spaced no greater than 500 feet apart.

c. Street lighting shall be placed within the right-of-way, either the median or the parkway, or if not practical, within a utility easement.

d. Street lighting shall be placed in such a manner to avoid interference of nearby trees or signs with the intended illumination field.

e. Street lighting shall be chosen and installed according to the engineering design standards and shall conform to the Dark Sky Ordinance (Ordinance No. 703 adopted June 7, 2005), and as amended.

(c) *Private streets.*

(1) *Private streets.* Private streets within the town and/or the ETJ may be allowed in accordance with the zoning ordinance. Private streets shall be designed and constructed to the same standards as for public streets, in accordance with the engineering design standards.

(2) *Town council action required.* Dedicated streets and rights-of-way shall not be designated or used as private streets and such use is prohibited, except where specific approval is given by action of the town council for properties within the town's extraterritorial jurisdiction and upon approval of a specific use permit for properties within the town limits. The town council may add any conditions as deemed appropriate as part of the approval of a private street development.

(3) *Private street development generally.* Private street developments are subject to provisions of the master thoroughfare plan and the subdivision ordinance, as it exists or may be amended. Private street developments shall only be permitted by the approval of a specific use permit or through a planned development district. Private street developments shall be restricted to an area that is surrounded on at least three sides, and in any event no less than approximately 75 percent of the perimeter, by natural barriers or similar physical barriers created by man. Examples of natural barriers would be creeks and floodplains. Examples of similar barriers created by man would be a golf course, school location, park, railroad tracks or a limited access roadway. Non-qualifying man-made barriers include screening walls, local roadways, man-made drainage ditches, detention ponds, landscape buffers, earthen berms, utility easements and rights-of-way. Private street developments may not cross an existing or proposed thoroughfare as shown on the town's adopted master thoroughfare plan nor shall a private street development disrupt an existing or proposed hike and bike route.

(4) *Connectivity.* The comprehensive plan calls for all plans for development in the town to include a high degree of connectivity within developments and between one development and another. Any proposed private street development adjacent to an existing public street subdivision that can be reasonable connected, including by constructing a bridge or culvert, for example, should not be approved as a private street development. The two adjacent subdivisions should allow cross-connectivity using public streets. This is especially important when one of the two adjacent subdivisions has a school site within the development that will be accessed by both developments.

(5) *Criteria for approval for private streets in new developments.* Private street developments within the town may be considered through the specific use permit (SUP) process or through a planned development district. The planning and zoning commission and town council shall use any of the following criteria:

a. Non-disruption of planned public roadways or facilities/projects (thoroughfares, parks, park trails, public pedestrian pathways, etc.);

b. Non-disruption to and from properties of future developments either on-site or off-site to the proposed subdivision;

c. No negative effect on traffic circulation on nearby public streets;

d. Not less than 100 feet of street frontage on which to locate the main entrance gate;

e. No more than two gated street entrances, subject to approval by the town engineer, may face the same thoroughfare;

f. No impairment of access to and from public facilities including schools or public parks;

g. No impairment of the adequate and timely provision of essential municipal services (emergency services, water/sewer improvements or maintenance, etc.);

h. The main entrance to the private street development shall have adequate throat depth to provide for residents, their guests and any accidental access and have an escape aisle for those vehicles not admitted into the subdivision, as determined by the town engineer;

i. Existence of natural and/or qualifying manmade boundaries around 75 percent of the development; and/or

j. Absence of a concentration of private street developments in the vicinity of the requested private street development.

(6) *Conversion of public streets to private streets.* The criteria for converting existing public streets to private streets includes all the criteria, issues and procedures involved with new developments, listed above, plus:

a. Submittal of a petition signed by 100 percent of the owners in the existing subdivision requesting conversion to private streets;

b. Existence of a property owners association that would be responsible for owning and maintaining the converted streets and rights-of-way;

c. Applicants must agree to contract with the town for the purchase of the installed infrastructure and rights-of-way from the Town of Little Elm at fair market appraised value for cash in full payment, and agree to maintain the infrastructure and rights-of-way at town standards thereafter prior to the approval of the specific use permit;

d. All documents are subject to the review and approval of the town attorney; and/or

e. Subsequent to the approval of the private street designation, the entire subdivision affected shall be re-platted to reflect the right-of-way ownership changes.

(7) *Conversion of private streets to public streets.* The town may, but is in no way obligated to, accept private streets for public access and maintenance. Requests to convert private streets to public streets shall be subject to all of the following provisions:

a. The homeowners' association (HOA) shall submit a petition signed by at least 67 percent of its members/lot owners (or a greater number of signatures, if required by the HOA documents or declarations).

b. All of the infrastructure shall be in a condition that is acceptable to the town engineer.

c. All security stations and other structures not consistent with a public street development shall be removed by the HOA, at its cost, prior to acceptance of the streets and appurtenances by the town.

d. All monies in the reserve fund for private street maintenance shall be delivered to the town. Money in the reserve fund in excess of what is needed to bring the streets and appurtenances up to town standards will be refunded to the HOA. Private street developments that exist as of the adoption of this ordinance are not required to deliver a reserve fund balance to the town.

e. The HOA shall prepare and submit a replat to development services for review. Upon approval, the HOA shall file the replat to dedicate the streets and appurtenances to the town.

f. The HOA shall modify and re-file, at its cost, the HOA documents to remove requirements specific to private street developments. The town attorney shall review the modified HOA documents prior to their filing. The HOA shall be responsible for the cost of review by the town attorney.

(8) *HOA requirements.* Private street developments and the related HOA shall meet all requirements of section 107.08.09, HOA requirements, of this ordinance.

(d) *Alleys.*

(1) *Alleys optional.* Alleys are optional for all single-family and two-family residential lots that are greater than 40 feet in width at the front building line.

(2) *Alleys required.* Alleys are required for residential lots that are equal to or less than 40 feet in width at the front building line. When so utilized, alleys shall be constructed according to design criteria in the engineering design standards.

(3) *Alley design.* Permanent dead-end and "hammerhead" alleys are prohibited. All alleys shall have adequate turnouts and street entrances such that vehicular traffic flow is continuous and efficient. Where a temporary dead-end alley situation is unavoidable (such as due to project phasing), a temporary, paved turn-around bulb or turnout onto a street, either of which will require a temporary alley easement, shall be shown on the plat.

(4) *Street access when alleys are present.* No driveway shall access a street when an alley is available unless specifically allowed in writing by the town engineer.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 107.08.03 Streets and alleys.

(a) *Streets basic policy.*

(1) *Street improvements.* In platting a new development, the property owner shall provide additional right-of-way needed for existing or future streets as required by the engineering design standards and as shown on the thoroughfare plan (see table B, thoroughfare types and standards). All street and road dedication requirements for land within a subdivision shall comply with Texas Local Government Code Section 212.010(c).

(2) *Existing substandard streets.*

a. When a proposed residential or nonresidential development abuts one or both sides of an existing substandard street, the developer shall be required to improve the substandard street and its appurtenances (such as curbs and gutters, sidewalks, barrier-free ramps, street trees, etc.) to bring the same to town standards, or to replace it with a standard town street, at no cost to the town other than as may be provided in the town's cost-sharing policies, including any ordinances that are in effect at the time of final plat approval.

b. If the proposed development is located along only one side of a substandard street, and if the town makes a determination that it is not feasible to improve the full width of said substandard street at that time the town may require the developer to pay into escrow, in accordance with section 107.05.04, development agreements, funds for the future improvement of the street as a condition of final plat approval for the development.

c. When a traffic impact analysis (TIA) is required or voluntarily submitted, the findings determined shall not be imposed on the requirements, alignment, rights-of-way, and number of lanes shown on the master thoroughfare plan, as it exists or may be amended. The TIA may be used to justify amendments to the thoroughfare plan, but in no case shall dictate such amendments.

(3) *New perimeter streets.*

a. When a proposed residential or nonresidential development is developed abutting an existing or planned major thoroughfare, minor thoroughfare or collector street as shown on the master thoroughfare plan, the developer shall construct a portion of the abutting street and its appurtenances (such as curbs and gutters, sidewalks, barrier-free ramps, street trees, etc.) to the town's standards for that type of street (per the engineering design standards). If the town engineer determines that it is not feasible to construct the abutting street and its appurtenances at the time of development, the town may require the developer to pay into escrow, in accordance with section 107.05.04, development agreements, funds for the future construction of the street as a condition of final plat approval for the development. The funds placed in escrow or the value of the lanes constructed shall be roughly proportional to the amount of traffic estimated to be generated by the development itself.

b. When a proposed residential or nonresidential development is constructed and has designed an unplanned perimeter street in order to provide access to the site and/or adjacent land, the developer shall construct a portion of the abutting street as described in section 107.08.03(a)(4), new internal streets, below, and under the same conditions.

(4) *New internal streets.*

a. All new streets and their appurtenances internal to a proposed residential or nonresidential development shall, at a minimum, be built to a width and design that will adequately serve the

development, and shall conform to the town's standards as described in the engineering design standards. If oversizing of an internal street is deemed necessary by the town engineer for traffic safety or efficiency (such as adjacent to a school or park site), then the town and/or the applicable entity may participate in such oversizing costs as part of a development agreement/facilities agreement with the developer.

b. Streets which temporarily dead-end at power lines, railroads or similar rights-of-way shall be constructed for at least one-half the distance across these rights-of-way, or provision shall be made to place the construction cost for said improvements in escrow with the town in accordance with section 107.05.04, development agreements.

c. When, in the judgment of the town engineer, it is not feasible to construct an internal street or appurtenances at the time of development of the subdivision, the town may require the developer to pay into escrow funds for the future construction of the street or its appurtenances as a condition of final plat approval for the development, in accordance with section 107.05.04, development agreements.

(5) *Impact fees.* All fees due on the project shall be paid in accordance with the town's impact fee ordinance and/or executed development agreement/facilities agreement.

(b) *Street design and appurtenances.*

(1) *Application of requirements.* Street design requirements are subject to the provisions included in the engineering design standards, development agreements and planned development ordinance (if applicable to the subject property) as well as the regulations contained within this subdivision ordinance.

(2) *Conformity to the master thoroughfare plan.* The general location of streets shall conform to the master thoroughfare plan. For streets that are not shown on the master thoroughfare plan, such as local residential streets, the arrangement of such streets shall:

a. Provide for the continuation or appropriate continuation of existing streets or street stubs from or into surrounding areas - refer to street stub requirements outlined in section 107.08.03(b)(8), stub streets, and connectivity requirements in section 107.08.03(b)(9), street connectivity;

b. Conform to any plan for the neighborhood approved or adopted by the town to address a particular situation where topographical or other conditions make continuance or conformity to existing streets impractical; and

c. Not conflict with existing or proposed streets or driveway openings, including those on the opposite side of an existing or planned thoroughfare, as described within the engineering design standards.

d. New streets that cross divided arterials shall align to the greatest extent possible with opposite streets such that median openings can be shared.

(3) *Relation to adjoining street system.* The proposed street system shall extend all existing major and minor arterials and such existing collector and local streets as may be necessary for convenience of traffic circulation and emergency ingress and egress.

(4) *Maximum cul-de-sac street length.* No cul-de-sac street shall be longer than 600 feet.

(5) *Maximum street length.* No street shall be more than 1,000 feet in length without an intersection with another street which will provide some degree of flexibility in traffic patterns and public convenience.

a. See the engineering design standards for specific design requirements.

b. In certain circumstances, the town may consider minor exemptions to the maximum street lengths if sought by the applicant. These circumstances include, but are not limited to:

1. Rerouting of streets;

2. Increasing the lot count by five percent or more from the previously approved preliminary plat or final plat; or

3. Approval by the planning and zoning commission through a subdivision ordinance variance. Any variance approved by the planning and zoning commission shall include the curvilinear requirement and street calming methods, described below.

(6) *Curvilinear requirement.* When a residential street length exceeds 500 feet but is less than 1,000 feet in length, the design of the street shall include a curve of between 100 to 200 feet radius for a length equal to the curve radius.

(7) *Street calming methods.* When a residential street length exceeds 500 feet but is less than 1,000 feet in length, one or more of the following street calming methods shall be incorporated into the design in addition to the curvilinear requirement (above) in order to reduce traffic velocity and increase safety to pedestrians and cyclists, subject to the review and approval of the town engineer:

a. Street width narrowing with landscaped islands placed approximately every 400 feet;

b. Roundabouts placed approximately in the center of the street length; and/or

c. Landscaped medians that include pedestrian crossing oases included for a minimum of one-third of the street length.

(8) *Street widths and rights-of-way.* Street widths and related rights-of-way shall be designed in accordance with the following:

a. Master thoroughfare plan (adopted on March 24, 2016, and as amended);

b. Planned development ordinance (if applicable to the subject property); and

c. All streets shall be paved with a permanent type of pavement in accordance with the engineering design standards.

TABLE B - THOROUGHFARE TYPES AND STANDARDS								
Criteria	Primary Arterial-1	Primary Arterial-2	Primary Arterial-3	Minor Arterial-1	Minor Arterial-2	Minor Arterial-3	Collector	Urban Mix Residential
Designation	P6D-1	P6D-2	P6D-3	M4D-1	M5U-2	M4U-3	C2U	R
Limited to:	(US 380)	(FM 423, 720 and 2931)	Town and ETJ roadways					
Right-of-way	160'	140'	124'	100'	100'	100'	60'	50'
ROW at intersections	Per Texas DOT		134'	110'	100'	100'	60'	50'
Lanes/division			6LD	4LD	5LU	4LU	2LU	2LU
Roadway width (B-B)			37'	37'	63'	49'	37'	31'
Median width			20'	20'	-	-	-	-
Parkway width			15'	15'	9'	25'	11.5'	9.5'
Parking			No	No	No	No	Yes	Yes

(9) *Street names, street name signs, and traffic control signs.*

a. *Street names.* New streets shall be named so as to provide naming continuity with existing streets, and so as to prevent conflict or "sound-alike" confusion with similar street names. All street names shall be approved by the director of development services prior to any plat approval, and prior to approval of the construction plans and should comply with the town's approved street name policy, as it exists or may be amended.

b. *Cost of signs.* The cost of street name signs and traffic control signs shall be paid for and installed by the developer.

c. *Town standards.* All street name signs and traffic control signs shall conform to the town's details for street name sign design and the latest edition of the Texas "Manual of Uniform Traffic Control Devices" (TMUTCD).

(10) *Traffic studies.* The town engineer may require a traffic impact analysis (TIA) or other type of engineering study from the developer prior to any approval for plats or construction plans to ascertain technical data pertaining to the potential traffic impact of the proposed development on the town's street system. For any study required by the town that is outsourced to a third party, the cost of such study shall be passed through to the developer or applicant.

(11) *Stub streets.*

a. See the engineering design standards for all design requirements.

b. Future connections are required to adjacent vacant properties at locations as approved by the director of development services and the town engineer.

c. When a residential development is constructed in phases requiring a temporary stubbed street, a paved temporary turn-around shall be provided for maneuvering by emergency equipment.

d. A note shall be clearly placed on the final plat indicating that the stub street will be extended with future development (see requirements for temporary turn-arounds in the engineering design standards).

e. All stub streets shall have barricades that meet TMUTCD standards.

f. All stub streets shall have a sign prominently posted at the terminus of the street to indicate no through traffic and that the street will be extended in the future.

1. The sign shall comply with standards established by the town engineer, and

2. Installation and cost of the signs shall be the responsibility of the developer.

(12) *Connectivity.*

a. New residential developments shall provide street connections to adjacent developments, as determined by the director of development services, allowing access between developments for neighborhood traffic and to enhance pedestrian and bicycle connectivity as recommended in the comprehensive plan.

b. Residential developments shall not have direct vehicular access to adjacent commercial or retail developments. Pedestrian and/or bicycle access may be provided, as approved by the director of development services.

(13) *Street lighting required.* Street lighting shall be provided by the developer along all streets and thoroughfares in accordance with the engineering design standards. The developer is responsible for the installation of street lighting and they shall be installed to town standards prior to the town accepting responsibility for the future provision of electricity to the street lights. The town engineer

shall be the responsible official for decisions related to street lighting, and may authorize a minor variance to these regulations, in accordance with section 107.10.01, variances, for a street lighting requirement if such variance will not compromise public health, safety, security and convenience.

(14) *Street lighting placement.*

a. Street lights shall be placed at every street intersection.

b. In addition to intersection placement, street lights shall be spaced no greater than 500 feet apart.

c. Street lighting shall be placed within the right-of-way, either the median or the parkway, or if not practical, within a utility easement.

d. Street lighting shall be placed in such a manner to avoid interference of nearby trees or signs with the intended illumination field.

e. Street lighting shall be chosen and installed according to the engineering design standards and shall conform to the Dark Sky Ordinance (Ordinance No. 703 adopted June 7, 2005), and as amended.

(c) *Private streets.*

(1) *Private streets.* Private streets within the town and/or the ETJ may be allowed in accordance with the zoning ordinance. Private streets shall be designed and constructed to the same standards as for public streets, in accordance with the engineering design standards.

(2) *Town council action required.* Dedicated streets and rights-of-way shall not be designated or used as private streets and such use is prohibited, except where specific approval is given by action of the town council for properties within the town's extraterritorial jurisdiction and upon approval of a specific use permit for properties within the town limits. The town council may add any conditions as deemed appropriate as part of the approval of a private street development.

(3) *Private street development generally.* Private street developments are subject to provisions of the master thoroughfare plan and the subdivision ordinance, as it exists or may be amended. Private street developments shall only be permitted by the approval of a specific use permit or through a planned development district. Private street developments shall be restricted to an area that is surrounded on at least three sides, and in any event no less than approximately 75 percent of the perimeter, by natural barriers or similar physical barriers created by man. Examples of natural barriers would be creeks and floodplains. Examples of similar barriers created by man would be a golf course, school location, park, railroad tracks or a limited access roadway. Non-qualifying man-made barriers include screening walls, local roadways, man-made drainage ditches, detention ponds, landscape buffers, earthen berms, utility easements and rights-of-way. Private street developments may not cross an existing or proposed thoroughfare as shown on the town's adopted master thoroughfare plan nor shall a private street development disrupt an existing or proposed hike and bike route.

(4) *Connectivity.* The comprehensive plan calls for all plans for development in the town to include a high degree of connectivity within developments and between one development and another. Any proposed private street development adjacent to an existing public street subdivision that can be reasonable connected, including by constructing a bridge or culvert, for example, should not be approved as a private street development. The two adjacent subdivisions should allow cross-connectivity using public streets. This is especially important when one of the two adjacent subdivisions has a school site within the development that will be accessed by both developments.

(5) *Criteria for approval for private streets in new developments.* Private street developments within the town may be considered through the specific use permit (SUP) process or through a planned development district. The planning and zoning commission and town council shall use any of the following criteria:

a. Non-disruption of planned public roadways or facilities/projects (thoroughfares, parks, park trails, public pedestrian pathways, etc.);

b. Non-disruption to and from properties of future developments either on-site or off-site to the proposed subdivision;

c. No negative effect on traffic circulation on nearby public streets;

d. Not less than 100 feet of street frontage on which to locate the main entrance gate;

e. No more than two gated street entrances, subject to approval by the town engineer, may face the same thoroughfare;

f. No impairment of access to and from public facilities including schools or public parks;

g. No impairment of the adequate and timely provision of essential municipal services (emergency services, water/sewer improvements or maintenance, etc.);

h. The main entrance to the private street development shall have adequate throat depth to provide for residents, their guests and any accidental access and have an escape aisle for those vehicles not admitted into the subdivision, as determined by the town engineer;

i. Existence of natural and/or qualifying manmade boundaries around 75 percent of the development; and/or

j. Absence of a concentration of private street developments in the vicinity of the requested private street development.

(6) *Conversion of public streets to private streets.* The criteria for converting existing public streets to private streets includes all the criteria, issues and procedures involved with new developments, listed above, plus:

a. Submittal of a petition signed by 100 percent of the owners in the existing subdivision requesting conversion to private streets;

b. Existence of a property owners association that would be responsible for owning and maintaining the converted streets and rights-of-way;

c. Applicants must agree to contract with the town for the purchase of the installed infrastructure and rights-of-way from the Town of Little Elm at fair market appraised value for cash in full payment, and agree to maintain the infrastructure and rights-of-way at town standards thereafter prior to the approval of the specific use permit;

d. All documents are subject to the review and approval of the town attorney; and/or

e. Subsequent to the approval of the private street designation, the entire subdivision affected shall be re-platted to reflect the right-of-way ownership changes.

(7) *Conversion of private streets to public streets.* The town may, but is in no way obligated to, accept private streets for public access and maintenance. Requests to convert private streets to public streets shall be subject to all of the following provisions:

a. The homeowners' association (HOA) shall submit a petition signed by at least 67 percent of its members/lot owners (or a greater number of signatures, if required by the HOA documents or declarations).

b. All of the infrastructure shall be in a condition that is acceptable to the town engineer.

c. All security stations and other structures not consistent with a public street development shall be removed by the HOA, at its cost, prior to acceptance of the streets and appurtenances by the town.

d. All monies in the reserve fund for private street maintenance shall be delivered to the town. Money in the reserve fund in excess of what is needed to bring the streets and appurtenances up to town standards will be refunded to the HOA. Private street developments that exist as of the adoption of this ordinance are not required to deliver a reserve fund balance to the town.

e. The HOA shall prepare and submit a replat to development services for review. Upon approval, the HOA shall file the replat to dedicate the streets and appurtenances to the town.

f. The HOA shall modify and re-file, at its cost, the HOA documents to remove requirements specific to private street developments. The town attorney shall review the modified HOA documents prior to their filing. The HOA shall be responsible for the cost of review by the town attorney.

(8) *HOA requirements.* Private street developments and the related HOA shall meet all requirements of section 107.08.09, HOA requirements, of this ordinance.

(d) *Alleys.*

(1) *Alleys optional.* Alleys are optional for all single-family and two-family residential lots that are greater than 40 feet in width at the front building line.

(2) *Alleys required.* Alleys are required for residential lots that are equal to or less than 40 feet in width at the front building line. When so utilized, alleys shall be constructed according to design criteria in the engineering design standards.

(3) *Alley design.* Permanent dead-end and "hammerhead" alleys are prohibited. All alleys shall have adequate turnouts and street entrances such that vehicular traffic flow is continuous and efficient. Where a temporary dead-end alley situation is unavoidable (such as due to project phasing), a temporary, paved turn-around bulb or turnout onto a street, either of which will require a temporary alley easement, shall be shown on the plat.

(4) *Street access when alleys are present.* No driveway shall access a street when an alley is available unless specifically allowed in writing by the town engineer.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 107.12.02 Definitions.

The following definitions shall apply to terms and words used within this subdivision ordinance:

Abutting. Also defined as adjacent, adjoining and contiguous to. It may also mean having a lot line in common with a right-of-way or easement, or with a physical improvement such as a street, waterline, park, or open space.

Access. A means to enter a property or the ability to traverse a property (such as in the use of a mutual access easement.

Acreage, gross. The total acreage included within the boundary line of a particular subdivision, tract, parcel, lot, etc. without any exclusions.

Acreage, net. The acreage included within the boundary line of a particular subdivision, tract, parcel, lot, etc., but excluding all public ways.

Alley. A minor right-of-way, generally dedicated to public use, which affords a secondary means of vehicular access to the back or side of properties otherwise abutting a street, and which may be used for utility service purposes.

Amending plat. See plat, amending.

Amenity. Aesthetic or other physical improvements added to a development that increase its quality, desirability, and/or marketability to the public, and that are described within section 107.08.09(c)(1), elements requiring a HOA, of this ordinance.

Appeal. A request for review of and relief from any decision applying a provision of this ordinance.

Applicant. The person or entity responsible for the submission of an application. The applicant must be the actual owner of the property for which an application is submitted, or shall be a duly authorized representative of the property owner. Also see developer.

Application. The package of materials, including but not limited to an application form, exhibits, completed checklist, tax certificates or other proof of ownership, construction plans, special drawings or studies, and other informational materials, that is required by the town to initiate town review and approval of a development project.

Application, complete. See complete application.

Application form. The written form (as provided by and as may be amended by the town) that is filled out and executed by the Applicant and submitted to the town along with other required materials as a part of an application.

Approval. Approval constitutes a determination by the official, board, commission or town council responsible for such determination that the application is in compliance with the minimum provisions of this ordinance. NOTE: Such approval does not constitute approval of the engineering or surveying contained in the plans, as the design engineer or surveyor that sealed the plans is responsible for the adequacy of such plans.

Arterial. A general term for a street or thoroughfare (see street), which has a more specific meaning when used in conjunction with a class distinction, such as major, minor, Type A, Type B, etc. Each class provides a certain degree of continuity, capacity and accessibility to adjacent land uses.

Arterial, major. A thoroughfare designed to accommodate cross-town traffic movement, distributing traffic to and from minor thoroughfares and collector streets. Major thoroughfares are divided roadways that typically have an ultimate width of six lanes. Such streets shall also be as described within the engineering design standards, and as shown on the thoroughfare plan map. Also is referred to as "Type A-1."

Arterial, minor. A thoroughfare designed to accommodate neighborhood-to-neighborhood (intra-city) traffic movement, distributing traffic to and from collector streets. Major thoroughfares are divided roadways that typically have an ultimate width of four lanes with a median to accommodate turn lanes and landscaping. Such streets shall also be as described within the engineering design standards, and as shown on the thoroughfare plan map. Also is referred to as "Type B."

Block. A grouping of buildings that are partially or fully surrounded by one or more streets. Lots separated only by an alley are within the same block.

Buffer. An area of permanent vegetation that is adjacent to a thoroughfare, residential subdivision or watercourse.

Building. Any structure intended for shelter, occupancy, housing or enclosure for persons, animals or property. When separated by dividing walls without openings, each portion of such structure so separated shall be deemed a separate building.

Building line. A line parallel, or approximately parallel, to any front lot line at a specific distance therefrom, marking the minimum distance from the front lot line that a building may be erected.

Building permit. An official certificate issued by the town through the chief building official that indicates conformance with or approved conditional variance from town regulations and authorizes construction of buildings or other described construction on the premises for which it is issued.

Build-to line. A parallel or approximately parallel line to any front property line at a specific distance determined by zoning district, marking the maximum distance from the front property line that a building may be erected. This distance is generally used in urban areas where wide sidewalks abut the building facades.

Building official. The person so designated by the town manager to provide oversight for and have responsibility of the building inspections; such official issues building permits and certificates of occupancy and enforces the zoning ordinance, building code, and any applicable provisions of this subdivision ordinance. This term shall also include any designee of the building official.

Centerline, streets or alleys. An imaginary line erected midway between the bounding right-of-way lines of a street or alley. Where the bounding right-of-way lines are irregular, the centerline is to be determined by the town engineer.

Certificate of occupancy. An official certificate issued by the town through the chief building official that indicates conformance with or approved conditional variance from town regulations and authorizes legal use of the premises for which it is issued; may be referred to as an occupancy permit.

Certified land division. A map, drawing or chart delineating parcels of land offered for rent or lease for other than agricultural uses and which: is not required by state statute to be filed in the map and plat records of the county; does not involve or require the dedication of public streets or alleys; has been certified by the town council as having met the conditions of this chapter. A certified land division shall be treated as a subdivision plat under these regulations, except that it is properly certified for filing with the town secretary rather than the county clerk. In addition, a plat of the property indicating legal boundaries and any public dedications and easements shall be prepared, reviewed by staff, approved by the town council, and filed with the Denton County Clerk.

Code. Shall mean the entire Town of Little Elm's Code of Ordinances.

Commencement. The date of the official start of the development of the project - usually considered at the initial disturbance of soils.

Commission. The planning and zoning commission of the Town of Little Elm. See planning and zoning commission.

Complete application. An application that meets the standards of this subdivision ordinance, and has been deemed complete by the town in accordance with section 107.03.03(c), Determination of Completeness, of this ordinance and the V.T.C.A., Local Government Code ch. 245, or successor statute.

Comprehensive plan. The town's officially comprehensive plan which includes policies, in written and graphic form, on (but not limited to) thoroughfares, land use, parks, open space, hike and bicycle trails, and other facets of the town's physical form; such policies govern the future development of the town and consist of various components governing specific geographic areas, functions, and services of the town.

Construction plans. The drawings and technical specifications that conform to this ordinance and all other applicable ordinances of the town. Construction plans, including bid documents, contract conditions, and escrow agreements, where applicable, provide a graphic and written description of the character and scope of the work to be performed in construction of a development.

Construction release. Official authorization by the town, through the town engineer, that indicates conformance with town regulations and authorizes construction of improvements or other described construction, in conformance with approved construction plans, on the premises for which it is given.

Crosswalk. A public right-of-way, four feet or more in width between property lines, which provides pedestrian circulations.

Day, business. Shall be defined as Monday through Friday, excluding town-recognized holidays.

Day, calendar. Each day of a particular calendar year.

Dead-end street. A street, other than a cul-de-sac, with only one outlet.

Deed restriction. A limitation on the use of land set forth or referred to in the title deed of such land. Such limitations run with the land and are binding upon present and subsequent owners of the land. Deed restrictions are not enforced by the town.

Developer. A person or entity, limited to the property owner or duly authorized representative thereof, who proposes to undertake or undertakes the division or improvement of land and/or other activities covered by this subdivision ordinance so as to constitute a subdivision, including the preparation of a plat showing the layout of the land and the public improvements involved therein. The word developer is intended to include the terms subdivider, property owner, and, when submitting platting documents, applicant.

Development. Any activities related to the platting or physical subdivision of land including the construction, reconstruction, conversion, or enlargement of buildings or structures; the construction of impervious surfaces (e.g., parking lots); the installation of utilities, roadways, drainage facilities or other infrastructure; or any disturbance of the surface or subsurface of the land in preparation for such construction activities, including grading, drainage, storage, paving, clearing, filling, and/or removal of vegetation or soil, and any mining, dredging, excavation or drilling operations.

Development agreement. A legally binding document authorized and in accordance with V.T.C.A., Local Government Code [§] 10.0212.172 of the between the town and a property owner whenever public improvements to serve a development are deferred until after final plat approval and recordation. Such document outlines the developer's acknowledged responsibility to complete and warranty improvements and to provide financial security for such improvements.

Development application. An application for any type of plat or construction plan/drawing authorized or addressed by this subdivision ordinance. Also may be referred to as a permit within the V.T.C.A., Local Government Code ch. 245.

Director of development services. The person so designated by the town manager to provide oversight for and have responsibility of the development services department; as used for responsibility and review purposes within this subdivision ordinance, this term shall also include any designee of the director of development services.

Director of parks and recreation. The person so designated by the town manager to provide oversight for and have responsibility of the parks and recreation department; as used for responsibility and review purposes within this subdivision ordinance, this term shall also include any designee of the director of parks and recreation.

Driveway. A paved entranceway serving primarily vehicles that allows for access to a lot or facility, and is intended for vehicular movements between the roadway and any portion outside the street right-of-way.

Dwelling unit. Any building, structure or mobile home, or part thereof, which is designed, used or intended to be used for human occupancy as the living quarters, of one housekeeping unit or family.

Easement. A specific right in a particular area of real property that exists because of an express or implied agreement between the landowner and another party that grants the right to use or access the land area, but not ownership.

Engineer. A person who has been duly licensed by the Texas Board of Professional Engineers to engage in the practice of engineering in the State of Texas. (Also known as professional engineer, registered engineer, registered professional engineer, or licensed engineer.)

Engineering design standards. A document which is intended to establish standards for the design and construction of public facilities.

Entry turnaround. An esplanade opening or other accommodation provided at the entrance to a private street development in order to allow vehicles denied access to reenter the public street with a forward motion without unduly disturbing other vehicles at the entrance.

Erosion hazard setback. A defined area adjacent to a stream on which development is prohibited due to significant hazards associated with a flood situation unless major channel stabilization has occurred.

ETJ. See extraterritorial jurisdiction.

Exemption. A specified reason why a particular development is not subject to the requirements to plat or to a specific provision of this ordinance.

Extraterritorial jurisdiction (ETJ). The unincorporated area, not a part of any other municipality, which is contiguous to the corporate limits of the town, the outer limits of which are measured from the extremities of the corporate limits of the town outward for the distance as stipulated in V.T.C.A., Local Government Code ch. 42, according to the population of the town, and in which area the town may regulate subdivisions and enjoin violation of provisions of this subdivision ordinance.

Facilities. Infrastructure and other structures that support a development including, but not limited to, water distribution lines, sanitary sewer collection lines, storm sewer lines and other stormwater management devices, thoroughfares, sidewalks, private utilities, etc.

File/filed/filing. See official filing date and submission.

Fire chief. The person so designated by the town manager to provide oversight for and have responsibility of the fire department; as used for responsibility and review purposes within this subdivision ordinance, this term shall also include any designee of the fire chief.

Fire lane. See definition in the town's adopted fire code.

Green belt. An open space area consisting primarily of natural features that may be located in a floodplain or along a creek channel or be used as a buffer between land uses or be used as an open space linkage between various land uses.

Habitat study. A completed research project that gathers and compiles information pertinent to the natural habitat for threatened or endangered species and habitats used for nesting birds listed in the Migratory Bird Treaty Act.

Hike and bike trail. A paved and maintained pathway for pedestrians and bikers that serves as a linkage for access to recreational and educational areas and facilities.

Homeowners association (HOA). A community association which is organized within a development in which individual owners share common interests and responsibilities for open space, landscaping, amenities or facilities, and which operates under recorded land agreements. This term also includes property owners associations (POAs) and property management Corporations (PMCs) which are more typically formed for multi-family and nonresidential developments.

Improvement. Any man-made fixed item which becomes part of or placed upon real property.

Improvement, public. Any improvement, facility or service together with its associated public site, right-of-way or easement necessary to provide transportation, storm drainage, public or private utilities, parks or recreational, energy or similar essential public services and facilities, for which the town ultimately assumes the responsibility, upon a letter of final acceptance being issued, for maintenance, operation and/or ownership.

Infrastructure. Facilities and services needed to sustain industrial, residential, commercial and all other land use activities. The term infrastructure includes but is not limited to water, sewer lines, and other utilities, streets and roads, communications, and public facilities, such as fire houses, civic buildings, parks, and schools.

iSWM. The acronym for integrated stormwater management, which is a guide for the construction and design of developments. This guide is intended to help mitigate the impact of developments on stormwater runoff by considering such runoff during early site planning and design phases. This guide was created by the North Central Texas Council of Governments (NCTCOG).

Land planner. Any person skilled in the art and science of arranging and designing the layout of land so as to create adequate and desirable building sites, a coordinated street system, and space appropriate to the efficient removal of stormwater and the provision of public services and utilities, all consistent with long range goals and the objectives of the comprehensive plan. A land planner may be trained in any of several specialties; and, where appropriate to his experience, the term may include architects, engineers, landscape architects, and surveyors.

Lot. An undivided tract or parcel of land that is or may be offered for sale, conveyance, or improvement and is occupied or intended to be occupied by a building or group of buildings. A lot has its principal frontage on a public street or on an officially approved private street, as shown on a plat of record or described by metes and bounds.

Lot depth. The horizontal distance measured perpendicularly between two points on the front lot line and two points on the rear lot line which creates an area that meets (or exceeds) the zoning district's minimum width and depth requirements. Lot depth shall not include easements which are located behind the front building line that impair the use of the lot surface as a yard.

Lot frontage. That dimension of a lot or portion of a lot abutting on a street, excluding the side dimension of a corner lot.

Lot lines. The lines bounding a lot as defined herein. May also be referred to as a property line.

Lot line, front. The narrower side of the lot abutting a street. Where two lot lines abutting streets are of equal length, the owner shall have a choice in designating which shall be designated as the front lot line, and therefore the lot frontage. For a lot which has a boundary line which does not abut the front street line, is not a rear lot line and lies along the same general directional orientation as the front and rear lot lines, said line shall be considered a front lot line in establishing minimum setback lines. (see zoning ordinance, appendix A, illustrations).

Lot line, rear. The lot line farthest from and most parallel to the front lot line. For triangular lots, the point opposite the front lot line shall be considered the rear lot line and have a value of zero. (see zoning ordinance, appendix A, illustrations).

Lot line, side. Any lot line not the front or rear lot line.

Lot of record. A lot which is part of a subdivision, the plat of which has been recorded in the office of the county clerk of Denton County or a lot subdivided by metes and bounds description prior to February 1984.

Lot width. The horizontal distance measured between side lot lines parallel to the front lot line, and measured from the point on the building line that is closest to the front lot line.

Lot, corner. A lot which has at least two adjacent sides abutting for their full lengths on a street, provided that the interior angle at the intersection of such two sides is less than 135 degrees.

Lot, double frontage. A lot having a frontage on two non-intersecting streets, as distinguished from a corner lot.

Lot, flag. A lot having access to a street by means of a parcel of land having a depth greater than its frontage, and having a width less than the minimum required lot width. May also be referred to as a panhandle lot.

Lot, interior. A lot other than a corner lot.

Lot, key. A corner lot that is designed such that the lots located directly behind it face the side street of the corner lot and are not separated by an alley.

Major arterial. See arterial, major.

Maximum. For the purposes of this ordinance, "the maximum" is the amount that is the upper limit allowed by this ordinance less than the maximum may be allowed, unless otherwise specified.

Metes and bounds. A method of describing the boundaries of land by directions and distances from a known point of reference.

Minimum. For the purposes of this ordinance, "the minimum" is the amount that is least amount required of a developer but more than the minimum may be provided, unless otherwise specified.

Mobile home park. A tract of land designed, used or intended for the renting or leasing, but not sales, of sites for the location, occupancy, or accommodation of one or more mobile home dwellings.

MS4. The acronym for the town's municipal separate storm sewer system.

Official filing date. The filing date of a preliminary plat, replat or final plat shall be considered the date an applicant submits said plat, along with a completed application and applicable fees, and other requirements prescribed by or under Texas Local Government Code § 212.004, which shall also be considered the date an application is deemed complete by the responsible official in the manner prescribed by section 107.03.03(g), official filing date, of this subdivision ordinance.

Commented [BS1]: Suggested by Robert

Off-site (also known as "off-premises"). Any premises not located within the area of the property to be subdivided, whether or not in common ownership with the applicant submitting an application.

One-hundred-year floodplain. The area defined as having a one percent chance of being equaled or exceeded in any given year, based upon a fully developed watershed and the town's criteria to accommodate a 100-year storm.

Open space. Any land parcel or natural area that is set aside, dedicated, designated or reserved for public use and enjoyment, or for private use and enjoyment of owners and occupants of the land adjoining or neighboring such open space area. Open space shall have no dimension less than 50 feet in any direction, and shall not include remnant property unless it is noted for thoroughfare screening or natural areas where the topography is not impacted, in which case it may be less than 50 feet in width.

Ordinance (also referred to as "this ordinance"). Refers to this subdivision ordinance of the town, as may be amended in the future.

Park. An area developed for active or passive play and recreation that includes open space, sports courts or fields, play equipment, and trails.

Park, community. A park of approximately 40 to 100 acres, serving an area two to three miles in diameter, serving a population of approximately 20,000 persons and encompassing the service areas of four or more neighborhood parks. Community parks may typically contain lighted athletic facilities for more active play purposes, such as ball fields for football, softball, baseball and soccer, and a recreation center or swimming pool. These parks may be located adjacent to existing or proposed greenbelt areas and proposed junior and senior high school sites.

Park, neighborhood. A park of approximately 10 to 20 acres, serving an area one to two miles in diameter and serving a population of approximately 5,000 persons. Neighborhood parks should be designed to service a specific neighborhood area and may include playground apparatus and other space for active recreational purposes, along with some areas for passive use. Whenever possible, neighborhood parks should be located adjacent to existing or proposed greenbelt areas and proposed elementary school sites.

Parks, recreation, and open space master plan. The town's officially adopted plan which includes policies in graphic and text form; such policies govern the future development of the town's park system, open space, and recreation programs, including the hike-and-bike trail system.

Pavement width. The portion of a street available for vehicular traffic. Where curbs are paved, it is the portion between the face of the curbs.

Pedestrian access. A specifically designated place, path, means, or way by which pedestrians shall be provided safe, adequate, and usable circulation through the interior of a property or development.

Permit. A license, certificate, approval, registration, consent, permit, contract or other agreement for the construction or provision of service from a utility owned, operated, or controlled by the town, or other form of authorization required by law, rule, regulation, order, or ordinance, which has been approved by the town, that a person or entity must obtain to perform an action or initiate, continue, or complete a project for which the permit is sought, and for which the application for the permit or information required to be submitted for consideration provides notice of the project to the town.

Person. Any individual, association, firm, corporation, governmental agency or political subdivision.

Planning and zoning commission. A decision-making body appointed by the town council which is responsible for subdivision and plat approval, as permitted by state law, and which has any other authority conferred upon it by the town Charter, this ordinance, or other regulations of the town.

Plat. A map, drawing or exhibit which shows the exact layout and proposed construction of a proposed development into one or more lots, blocks, streets, parks, school sites, easements, alleys and/or any other elements as required by this ordinance, including any engineering or construction standards for related improvements, and which conforms to all requirements of this ordinance and any other applicable town ordinance, and which is subject to approval by the planning and zoning commission, unless otherwise specified.

Plat, amending. A map, drawing or exhibit that modifies a recorded final plat, record plat, or minor plat in accordance with the provisions of this chapter.

Plat, conveyance. A map, drawing or exhibit which conforms to section 107.04.02, conveyance plats, of this subdivision ordinance for the purpose of sale or conveyance. A conveyance plat may be the first step in the development of a project, especially if the project will be developed in phases and off-site easements need to be platted prior to the final platting of the entire tract.

Plat, final. A map, drawing or exhibit which conforms to section 107.04.04, final plats, of this subdivision ordinance and is submitted to the town for consideration for final approval by the planning and zoning commission. The plat illustrates that the subdivision of land is consistent with all standards of this subdivision ordinance pertaining to the adequacy of public facilities and the installation of or provision for public improvements. Once approved, such plat is submitted to the county clerk of Denton County for recording.

Plat, minor. A map, drawing or exhibit dividing land into no more than four lots that meets the submission and approval requirements of section 107.04.05, minor plats, of this ordinance. Such plat may be approved by the director of development services. Such plat is also considered a final plat.

Plat, preliminary. A map, drawing or exhibit which conforms to section 107.04.03, preliminary plats, of this subdivision ordinance and is submitted to the town for consideration for initial approval by the planning and zoning commission. Such plat is not to be recorded, but illustrates the general layout of a proposed subdivision, the adequacy of public facilities needed to serve the proposed subdivision, and the overall compliance of the applicable requirements of this ordinance. Such plat is reviewed and decided prior to approval of a final plat.

Plat, replat. The re-subdivision of all or part or all of any block or blocks of a previously platted subdivision, addition, lot or tract, that is beyond the definition of an amending plat and which does not require the vacation of the entire preceding plat. Such plat also conforms to section 107.04.06, replats, of this subdivision ordinance. A replat may function as a final plat for a property.

Progress (towards completion). Shall have the same meaning set forth in V.T.C.A., Local Government Code § 10.0245.005(c) as it exists or may be amended, unless another meaning is specified.

Project. An endeavor over which the town exerts its jurisdiction and for which more than one permit is required to initiate, continue, or complete the endeavor.

Property owner. The legally recognized proprietor of the land for which an application is being submitted. Also see developer.

Property owners association. An organization established for the ownership, care, and maintenance of private streets and other private commercial facilities.

Public improvement. See improvement, public.

Public way. An officially approved, privately maintained street or roadway, constructed to town street standards, open to unrestricted and irrevocable public access, serving two or more lots that provides the primary means of access and providing fire lane and utility easements.

Record drawings. A group of drawings or plans that depicts the final configuration of the installed or constructed improvements of a development, improvements which have been verified by the contractor as their installation or construction occurs during development. The record drawings shall reflect the construction plans (or working drawings) used, corrected, and/or clarified in the field.

Residential development. The actual or proposed use of land for one or more buildings or structures that are designed or intended to be used, in whole or in part, as dwelling units.

Responsible official. The town staff person who has been designated by the town manager to perform one or more of the following tasks (this term also includes designees): accept an application for filing; review and make recommendations concerning such application; where authorized, to initially decide such applications; initiate enforcement actions; take all other actions necessary for administration of the provisions of this subdivision ordinance with respect to such application.

Right-of-way. A use of land dedicated by plat or metes and bounds to and for use by the public, which is separate and distinct from the lots and parcel abutting it, and which is not included within the dimensions or areas of such lots or parcels. Generally describes an area used for the provision of streets and utilities. Unless otherwise specified, the term right-of-way shall refer to a public right-of-way.

Riparian study. An ecologically based study that addresses the three major components of a stream (channel, floodplain and transitional upland fringe).

Road, or roadway. See street.

Screening. A barrier intended to separate and limit visibility between that which is on either side of the barrier, for example, a thoroughfare and adjacent land uses.

Security station (i.e. guard house). A building and gate system to control vehicular access to private street developments, which may be a mechanical device or a manned structure.

Sketch plan. An informal drawing of initial development ideas superimposed on a topographic map to indicate generally the plan of development and to serve as a working base for noting and incorporating suggestions of the town manager, engineer or others who are consulted prior to the preparation of the preliminary plat.

Stacking area. A vehicle setback measured from a point on a building designed for drive-up service and the area assigned for queuing.

Street. A roadway for vehicular traffic and other public uses, whether designated a street, highway, thoroughfare, parkway, throughway, road, avenue, boulevard, lane, place or however otherwise designated. An alley is not considered a street.

Street, alley. A minor public right-of-way, not intended to provide the primary means of access to abutting lots, which is used primarily for vehicular service access to the back or sides of properties otherwise abutting on a street.

Street, centerline. An imaginary line designated midway between the bounding right-of-way lines of a street or alley.

Street, collector (also feeder streets, secondary thoroughfares, etc.). A paved roadway that provides vehicular circulation within neighborhoods and from minor streets to major thoroughfares. Due to similarity of traffic volume and wheel loadings, streets through commercial and industrial areas are frequently constructed to same design as collector streets.

Street, cul-de-sac. A roadway having but one outlet to another street, and terminated on the opposite end by a vehicular turn-around.

Street, dead-end. A roadway, other than a cul-de-sac, with only one outlet.

Street, improved. A roadway that has been constructed or reconstructed to meet the town's minimum standards regarding right-of-way width, pavement width, and/or pavement type, as defined in the engineering design standards.

Street, local residential (also minor thoroughfares or streets, etc.). A paved roadway that is primarily used for providing direct vehicular access to abutting residential property.

Street, local. A roadway that is intended to provide a high level of access to adjacent developments and, generally, a low level of mobility. Such streets shall also be as described within the comprehensive plan and engineering design standards.

Street, major thoroughfare (also arterial streets, primary thoroughfares, etc.). A paved roadway that provides vehicular movement from one neighborhood to another, to distant points within the urban area or to freeways or highways leading to other communities.

Street, minor thoroughfare. A paved roadway that is primarily used for providing through access from neighborhood to neighborhood or commercial areas.

Street, private. A privately owned roadway within a subdivision for which the private owners assume full responsibility for maintenance and control and which has not been dedicated to the use of the public. This term is inclusive of related alleys.

Street, stub. A roadway that has been designed to allow for the future extension of the street through subsequent subdivisions.

Street, substandard. An existing street that does not meet the current minimum street standards of the town.

Street, unimproved. A roadway that does not meet the town's minimum standards regarding right-of-way width, pavement width, and/or pavement type, as defined in the engineering design standards. Most unimproved streets are former country roads that were built before an area was annexed into the town limits and/or before the town implemented thoroughfare design standards.

Subdivider or developer. An individual, firm, association, syndicate, partnership, corporation, or other organization dividing or proposing to divide land, or making improvements to such land, so as to effect a subdivision of land.

Subdivision. The division of any lot, tract, or parcel of land into two or more lots or sites for the purpose of sale or of building development, whether immediate or future. The term includes resubdivision or replatting of an existing subdivision, building upon, or other development of land, but does not include the division of land into tracts where each resulting lot is more than five acres in size; does not involve or require any new street, alley or easement of access; and no public improvement is being dedicated. As part of a subdivision, if any lot is proposed to be five acres in area or smaller, the entire parent tract must be platted together with such other lots or tracts. When appropriate to context, the term subdivision shall relate to the process of subdividing or to the land subdivided.

Submission. The date an applicant delivers an application or petition under this ordinance to the director of the applicable town department, or the date on which an applicant deposits an application or petition with the United States Postal Service by certified mail addressed to the director of the applicable town department, along with all required fees and documents.

Substandard. A condition of a road or other public improvement that does not meet the town's current right-of-way, design, capacity or construction standards.

Surety. A bond, letter of credit, or letter of financial guarantee from a financial institution.

Surveyor. A person who practices the profession of surveying and is licensed by the State of Texas as a state land surveyor or a registered public surveyor.

TCEQ. The acronym for the Texas Commission on Environmental Quality.

Thoroughfare plan map. A component of the master thoroughfare plan that generally represents the proposed grid-system of major and minor thoroughfares that will support the future land use plan. The exact locations of future roadways cannot be determined without engineering and environmental analysis, but the map should be used as a guide as development occurs in terms of how connections should be made and by what type of thoroughfare. The thoroughfare plan map also shows existing railroads and proposed transit rail stations.

Town. The municipal corporation of the Town of Little Elm, Texas.

Town attorney. The person(s) so designated by the town council to provide oversight for and have legal responsibility for the town. This term shall also include any designee of the town attorney.

Town council. The duly elected governing body of the Town of Little Elm, Texas.

Town engineer. The person so designated by the town manager to provide oversight for and have responsibility of the engineering department; as used for responsibility and review purposes within this subdivision ordinance, this term shall also include any designee of the town engineer.

Town manager. The person so designated by the town council, or the town manager's designee.

Town official or administrator. Any person, elective or appointive, or any employee, or any board or commission authorized or constituted by town ordinance or state law to act on behalf of the municipality.

Tributary. A riparian branch that feeds (i.e., flows into) a major creek, as identified and defined in the town's riparian study, as amended.

TxDOT: The acronym for the Texas Department of Transportation.

Utility easement. An easement dedicated to the public for access, construction, reconstruction, and maintenance to water lines, sanitary sewer lines, storm sewers, and those franchises granted permission by the town, utility district, or county to occupy the easement.

Utility, private. Services, and any related facilities (e.g., distribution lines), not customarily provided by the town or public entities; such services generally include electricity, natural gas, and telecommunications.

Utility, public. Services, and any related facilities (e.g., distribution lines), typically provided by the town, county, or publicly owned entity; such services include potable water distribution, wastewater collection, and stormwater management.

Variance. An exception to a particular standard or requirement of the subdivision ordinance that would substantially limit the applicant's ability to utilize the land in a manner requested.

Variance, major. A significant change to both the standards and intent of this subdivision ordinance, which involves planning and zoning commission approval. A major variance includes any type of variance that is not specifically listed in table 107.13.02.

Variance, minor. A minor change to the standards, but not the intent, of this subdivision ordinance, which involves director of development services or town engineer (as applicable) approval unless otherwise noted. An exclusive list of minor variances is shown in table 107.13.02.

Vegetative study. A study in which the main purpose is identification and consideration of unique vegetative communities that are important for conserving biotic diversity and are rare due to conversion to other land uses.

Violation. Any failure to fully comply with this subdivision ordinance.

Wetland delineation study. A study in which the main purposes are to determine jurisdictional wetlands and to ensure compliance with section 404 of the Clean Water Act and other applicable regulations of the U.S. Army Corps of Engineers.

Wetland. An area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Zoning ordinance. The Town of Little Elm Zoning Ordinance.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 107.12.02 Definitions.

The following definitions shall apply to terms and words used within this subdivision ordinance:

Abutting. Also defined as adjacent, adjoining and contiguous to. It may also mean having a lot line in common with a right-of-way or easement, or with a physical improvement such as a street, waterline, park, or open space.

Access. A means to enter a property or the ability to traverse a property (such as in the use of a mutual access easement.

Acreage, gross. The total acreage included within the boundary line of a particular subdivision, tract, parcel, lot, etc. without any exclusions.

Acreage, net. The acreage included within the boundary line of a particular subdivision, tract, parcel, lot, etc., but excluding all public ways.

Alley. A minor right-of-way, generally dedicated to public use, which affords a secondary means of vehicular access to the back or side of properties otherwise abutting a street, and which may be used for utility service purposes.

Amending plat. See plat, amending.

Amenity. Aesthetic or other physical improvements added to a development that increase its quality, desirability, and/or marketability to the public, and that are described within section 107.08.09(c)(1), elements requiring a HOA, of this ordinance.

Appeal. A request for review of and relief from any decision applying a provision of this ordinance.

Applicant. The person or entity responsible for the submission of an application. The applicant must be the actual owner of the property for which an application is submitted, or shall be a duly authorized representative of the property owner. Also see developer.

Application. The package of materials, including but not limited to an application form, exhibits, completed checklist, tax certificates or other proof of ownership, construction plans, special drawings or studies, and other informational materials, that is required by the town to initiate town review and approval of a development project.

Application, complete. See complete application.

Application form. The written form (as provided by and as may be amended by the town) that is filled out and executed by the Applicant and submitted to the town along with other required materials as a part of an application.

Approval. Approval constitutes a determination by the official, board, commission or town council responsible for such determination that the application is in compliance with the minimum provisions of this ordinance. NOTE: Such approval does not constitute approval of the engineering or surveying contained in the plans, as the design engineer or surveyor that sealed the plans is responsible for the adequacy of such plans.

Arterial. A general term for a street or thoroughfare (see street), which has a more specific meaning when used in conjunction with a class distinction, such as major, minor, Type A, Type B, etc. Each class provides a certain degree of continuity, capacity and accessibility to adjacent land uses.

Arterial, major. A thoroughfare designed to accommodate cross-town traffic movement, distributing traffic to and from minor thoroughfares and collector streets. Major thoroughfares are divided roadways that typically have an ultimate width of six lanes. Such streets shall also be as described within the engineering design standards, and as shown on the thoroughfare plan map. Also is referred to as "Type A-1."

Arterial, minor. A thoroughfare designed to accommodate neighborhood-to-neighborhood (intra-city) traffic movement, distributing traffic to and from collector streets. Major thoroughfares are divided roadways that typically have an ultimate width of four lanes with a median to accommodate turn lanes and landscaping. Such streets shall also be as described within the engineering design standards, and as shown on the thoroughfare plan map. Also is referred to as "Type B."

Block. A grouping of buildings that are partially or fully surrounded by one or more streets. Lots separated only by an alley are within the same block.

Buffer. An area of permanent vegetation that is adjacent to a thoroughfare, residential subdivision or watercourse.

Building. Any structure intended for shelter, occupancy, housing or enclosure for persons, animals or property. When separated by dividing walls without openings, each portion of such structure so separated shall be deemed a separate building.

Building line. A line parallel, or approximately parallel, to any front lot line at a specific distance therefrom, marking the minimum distance from the front lot line that a building may be erected.

Building permit. An official certificate issued by the town through the chief building official that indicates conformance with or approved conditional variance from town regulations and authorizes construction of buildings or other described construction on the premises for which it is issued.

Build-to line. A parallel or approximately parallel line to any front property line at a specific distance determined by zoning district, marking the maximum distance from the front property line that a building may be erected. This distance is generally used in urban areas where wide sidewalks abut the building facades.

Building official. The person so designated by the town manager to provide oversight for and have responsibility of the building inspections; such official issues building permits and certificates of occupancy and enforces the zoning ordinance, building code, and any applicable provisions of this subdivision ordinance. This term shall also include any designee of the building official.

Centerline, streets or alleys. An imaginary line erected midway between the bounding right-of-way lines of a street or alley. Where the bounding right-of-way lines are irregular, the centerline is to be determined by the town engineer.

Certificate of occupancy. An official certificate issued by the town through the chief building official that indicates conformance with or approved conditional variance from town regulations and authorizes legal use of the premises for which it is issued; may be referred to as an occupancy permit.

Certified land division. A map, drawing or chart delineating parcels of land offered for rent or lease for other than agricultural uses and which: is not required by state statute to be filed in the map and plat records of the county; does not involve or require the dedication of public streets or alleys; has been certified by the town council as having met the conditions of this chapter. A certified land division shall be treated as a subdivision plat under these regulations, except that it is properly certified for filing with the town secretary rather than the county clerk. In addition, a plat of the property indicating legal boundaries and any public dedications and easements shall be prepared, reviewed by staff, approved by the town council, and filed with the Denton County Clerk.

Code. Shall mean the entire Town of Little Elm's Code of Ordinances.

Commencement. The date of the official start of the development of the project - usually considered at the initial disturbance of soils.

Commission. The planning and zoning commission of the Town of Little Elm. See planning and zoning commission.

Complete application. An application that meets the standards of this subdivision ordinance, and has been deemed complete by the town in accordance with section 107.03.03(c), Determination of Completeness, of this ordinance and the V.T.C.A., Local Government Code ch. 245, or successor statute.

Comprehensive plan. The town's officially comprehensive plan which includes policies, in written and graphic form, on (but not limited to) thoroughfares, land use, parks, open space, hike and bicycle trails, and other facets of the town's physical form; such policies govern the future development of the town and consist of various components governing specific geographic areas, functions, and services of the town.

Construction plans. The drawings and technical specifications that conform to this ordinance and all other applicable ordinances of the town. Construction plans, including bid documents, contract conditions, and escrow agreements, where applicable, provide a graphic and written description of the character and scope of the work to be performed in construction of a development.

Construction release. Official authorization by the town, through the town engineer, that indicates conformance with town regulations and authorizes construction of improvements or other described construction, in conformance with approved construction plans, on the premises for which it is given.

Crosswalk. A public right-of-way, four feet or more in width between property lines, which provides pedestrian circulations.

Day, business. Shall be defined as Monday through Friday, excluding town-recognized holidays.

Day, calendar. Each day of a particular calendar year.

Dead-end street. A street, other than a cul-de-sac, with only one outlet.

Deed restriction. A limitation on the use of land set forth or referred to in the title deed of such land. Such limitations run with the land and are binding upon present and subsequent owners of the land. Deed restrictions are not enforced by the town.

Developer. A person or entity, limited to the property owner or duly authorized representative thereof, who proposes to undertake or undertakes the division or improvement of land and/or other activities covered by this subdivision ordinance so as to constitute a subdivision, including the preparation of a plat showing the layout of the land and the public improvements involved therein. The word developer is intended to include the terms subdivider, property owner, and, when submitting platting documents, applicant.

Development. Any activities related to the platting or physical subdivision of land including the construction, reconstruction, conversion, or enlargement of buildings or structures; the construction of impervious surfaces (e.g., parking lots); the installation of utilities, roadways, drainage facilities or other infrastructure; or any disturbance of the surface or subsurface of the land in preparation for such construction activities, including grading, drainage, storage, paving, clearing, filling, and/or removal of vegetation or soil, and any mining, dredging, excavation or drilling operations.

Development agreement. A legally binding document authorized and in accordance with V.T.C.A., Local Government Code [§] 10.0212.172 of the between the town and a property owner whenever public improvements to serve a development are deferred until after final plat approval and recordation. Such document outlines the developer's acknowledged responsibility to complete and warranty improvements and to provide financial security for such improvements.

Development application. An application for any type of plat or construction plan/drawing authorized or addressed by this subdivision ordinance. Also may be referred to as a permit within the V.T.C.A., Local Government Code ch. 245.

Director of development services. The person so designated by the town manager to provide oversight for and have responsibility of the development services department; as used for responsibility and review purposes within this subdivision ordinance, this term shall also include any designee of the director of development services.

Director of parks and recreation. The person so designated by the town manager to provide oversight for and have responsibility of the parks and recreation department; as used for responsibility and review purposes within this subdivision ordinance, this term shall also include any designee of the director of parks and recreation.

Driveway. A paved entranceway serving primarily vehicles that allows for access to a lot or facility, and is intended for vehicular movements between the roadway and any portion outside the street right-of-way.

Dwelling unit. Any building, structure or mobile home, or part thereof, which is designed, used or intended to be used for human occupancy as the living quarters, of one housekeeping unit or family.

Easement. A specific right in a particular area of real property that exists because of an express or implied agreement between the landowner and another party that grants the right to use or access the land area, but not ownership.

Engineer. A person who has been duly licensed by the Texas Board of Professional Engineers to engage in the practice of engineering in the State of Texas. (Also known as professional engineer, registered engineer, registered professional engineer, or licensed engineer.)

Engineering design standards. A document which is intended to establish standards for the design and construction of public facilities.

Entry turnaround. An esplanade opening or other accommodation provided at the entrance to a private street development in order to allow vehicles denied access to reenter the public street with a forward motion without unduly disturbing other vehicles at the entrance.

Erosion hazard setback. A defined area adjacent to a stream on which development is prohibited due to significant hazards associated with a flood situation unless major channel stabilization has occurred.

ETJ. See extraterritorial jurisdiction.

Exemption. A specified reason why a particular development is not subject to the requirements to plat or to a specific provision of this ordinance.

Extraterritorial jurisdiction (ETJ). The unincorporated area, not a part of any other municipality, which is contiguous to the corporate limits of the town, the outer limits of which are measured from the extremities of the corporate limits of the town outward for the distance as stipulated in V.T.C.A., Local Government Code ch. 42, according to the population of the town, and in which area the town may regulate subdivisions and enjoin violation of provisions of this subdivision ordinance.

Facilities. Infrastructure and other structures that support a development including, but not limited to, water distribution lines, sanitary sewer collection lines, storm sewer lines and other stormwater management devices, thoroughfares, sidewalks, private utilities, etc.

File/filed/filing. See official filing date and submission.

Fire chief. The person so designated by the town manager to provide oversight for and have responsibility of the fire department; as used for responsibility and review purposes within this subdivision ordinance, this term shall also include any designee of the fire chief.

Fire lane. See definition in the town's adopted fire code.

Green belt. An open space area consisting primarily of natural features that may be located in a floodplain or along a creek channel or be used as a buffer between land uses or be used as an open space linkage between various land uses.

Habitat study. A completed research project that gathers and compiles information pertinent to the natural habitat for threatened or endangered species and habitats used for nesting birds listed in the Migratory Bird Treaty Act.

Hike and bike trail. A paved and maintained pathway for pedestrians and bikers that serves as a linkage for access to recreational and educational areas and facilities.

Homeowners association (HOA). A community association which is organized within a development in which individual owners share common interests and responsibilities for open space, landscaping, amenities or facilities, and which operates under recorded land agreements. This term also includes property owners associations (POAs) and property management Corporations (PMCs) which are more typically formed for multi-family and nonresidential developments.

Improvement. Any man-made fixed item which becomes part of or placed upon real property.

Improvement, public. Any improvement, facility or service together with its associated public site, right-of-way or easement necessary to provide transportation, storm drainage, public or private utilities, parks or recreational, energy or similar essential public services and facilities, for which the town ultimately assumes the responsibility, upon a letter of final acceptance being issued, for maintenance, operation and/or ownership.

Infrastructure. Facilities and services needed to sustain industrial, residential, commercial and all other land use activities. The term infrastructure includes but is not limited to water, sewer lines, and other utilities, streets and roads, communications, and public facilities, such as fire houses, civic buildings, parks, and schools.

iSWM. The acronym for integrated stormwater management, which is a guide for the construction and design of developments. This guide is intended to help mitigate the impact of developments on stormwater runoff by considering such runoff during early site planning and design phases. This guide was created by the North Central Texas Council of Governments (NCTCOG).

Land planner. Any person skilled in the art and science of arranging and designing the layout of land so as to create adequate and desirable building sites, a coordinated street system, and space appropriate to the efficient removal of stormwater and the provision of public services and utilities, all consistent with long range goals and the objectives of the comprehensive plan. A land planner may be trained in any of several specialties; and, where appropriate to his experience, the term may include architects, engineers, landscape architects, and surveyors.

Lot. An undivided tract or parcel of land that is or may be offered for sale, conveyance, or improvement and is occupied or intended to be occupied by a building or group of buildings. A lot has its principal frontage on a public street or on an officially approved private street, as shown on a plat of record or described by metes and bounds.

Lot depth. The horizontal distance measured perpendicularly between two points on the front lot line and two points on the rear lot line which creates an area that meets (or exceeds) the zoning district's minimum width and depth requirements. Lot depth shall not include easements which are located behind the front building line that impair the use of the lot surface as a yard.

Lot frontage. That dimension of a lot or portion of a lot abutting on a street, excluding the side dimension of a corner lot.

Lot lines. The lines bounding a lot as defined herein. May also be referred to as a property line.

Lot line, front. The narrower side of the lot abutting a street. Where two lot lines abutting streets are of equal length, the owner shall have a choice in designating which shall be designated as the front lot line, and therefore the lot frontage. For a lot which has a boundary line which does not abut the front street line, is not a rear lot line and lies along the same general directional orientation as the front and rear lot lines, said line shall be considered a front lot line in establishing minimum setback lines. (see zoning ordinance, appendix A, illustrations).

Lot line, rear. The lot line farthest from and most parallel to the front lot line. For triangular lots, the point opposite the front lot line shall be considered the rear lot line and have a value of zero. (see zoning ordinance, appendix A, illustrations).

Lot line, side. Any lot line not the front or rear lot line.

Lot of record. A lot which is part of a subdivision, the plat of which has been recorded in the office of the county clerk of Denton County or a lot subdivided by metes and bounds description prior to February 1984.

Lot width. The horizontal distance measured between side lot lines parallel to the front lot line, and measured from the point on the building line that is closest to the front lot line.

Lot, corner. A lot which has at least two adjacent sides abutting for their full lengths on a street, provided that the interior angle at the intersection of such two sides is less than 135 degrees.

Lot, double frontage. A lot having a frontage on two non-intersecting streets, as distinguished from a corner lot.

Lot, flag. A lot having access to a street by means of a parcel of land having a depth greater than its frontage, and having a width less than the minimum required lot width. May also be referred to as a panhandle lot.

Lot, interior. A lot other than a corner lot.

Lot, key. A corner lot that is designed such that the lots located directly behind it face the side street of the corner lot and are not separated by an alley.

Major arterial. See arterial, major.

Maximum. For the purposes of this ordinance, "the maximum" is the amount that is the upper limit allowed by this ordinance less than the maximum may be allowed, unless otherwise specified.

Metes and bounds. A method of describing the boundaries of land by directions and distances from a known point of reference.

Minimum. For the purposes of this ordinance, "the minimum" is the amount that is least amount required of a developer but more than the minimum may be provided, unless otherwise specified.

Mobile home park. A tract of land designed, used or intended for the renting or leasing, but not sales, of sites for the location, occupancy, or accommodation of one or more mobile home dwellings.

MS4. The acronym for the town's municipal separate storm sewer system.

Official filing date. The filing date of a preliminary plat, replat or final plat shall be considered the date an applicant submits said plat, along with a completed application and applicable fees, and other requirements prescribed by or under Texas Local Government Code § 212.004, which shall also be considered the date an application is deemed complete by the responsible official in the manner prescribed by section 107.03.03(g), official filing date, of this subdivision ordinance.

Off-site (also known as "off-premises"). Any premises not located within the area of the property to be subdivided, whether or not in common ownership with the applicant submitting an application.

One-hundred-year floodplain. The area defined as having a one percent chance of being equaled or exceeded in any given year, based upon a fully developed watershed and the town's criteria to accommodate a 100-year storm.

Open space. Any land parcel or natural area that is set aside, dedicated, designated or reserved for public use and enjoyment, or for private use and enjoyment of owners and occupants of the land adjoining or neighboring such open space area. Open space shall have no dimension less than 50 feet in any direction, and shall not include remnant property unless it is noted for thoroughfare screening or natural areas where the topography is not impacted, in which case it may be less than 50 feet in width.

Ordinance (also referred to as "this ordinance"). Refers to this subdivision ordinance of the town, as may be amended in the future.

Park. An area developed for active or passive play and recreation that includes open space, sports courts or fields, play equipment, and trails.

Park, community. A park of approximately 40 to 100 acres, serving an area two to three miles in diameter, serving a population of approximately 20,000 persons and encompassing the service areas of four or more neighborhood parks. Community parks may typically contain lighted athletic facilities for more active play purposes, such as ball fields for football, softball, baseball and soccer, and a recreation center or swimming pool. These parks may be located adjacent to existing or proposed greenbelt areas and proposed junior and senior high school sites.

Park, neighborhood. A park of approximately 10 to 20 acres, serving an area one to two miles in diameter and serving a population of approximately 5,000 persons. Neighborhood parks should be designed to service a specific neighborhood area and may include playground apparatus and other space for active recreational purposes, along with some areas for passive use. Whenever possible, neighborhood parks should be located adjacent to existing or proposed greenbelt areas and proposed elementary school sites.

Parks, recreation, and open space master plan. The town's officially adopted plan which includes policies in graphic and text form; such policies govern the future development of the town's park system, open space, and recreation programs, including the hike-and-bike trail system.

Pavement width. The portion of a street available for vehicular traffic. Where curbs are paved, it is the portion between the face of the curbs.

Pedestrian access. A specifically designated place, path, means, or way by which pedestrians shall be provided safe, adequate, and usable circulation through the interior of a property or development.

Permit. A license, certificate, approval, registration, consent, permit, contract or other agreement for the construction or provision of service from a utility owned, operated, or controlled by the town, or other form of authorization required by law, rule, regulation, order, or ordinance, which has been approved by the town, that a person or entity must obtain to perform an action or initiate, continue, or complete a project for which the permit is sought, and for which the application for the permit or information required to be submitted for consideration provides notice of the project to the town.

Person. Any individual, association, firm, corporation, governmental agency or political subdivision.

Planning and zoning commission. A decision-making body appointed by the town council which is responsible for subdivision and plat approval, as permitted by state law, and which has any other authority conferred upon it by the town Charter, this ordinance, or other regulations of the town.

Plat. A map, drawing or exhibit which shows the exact layout and proposed construction of a proposed development into one or more lots, blocks, streets, parks, school sites, easements, alleys and/or any other elements as required by this ordinance, including any engineering or construction standards for related improvements, and which conforms to all requirements of this ordinance and any other applicable town ordinance, and which is subject to approval by the planning and zoning commission, unless otherwise specified.

Plat, amending. A map, drawing or exhibit that modifies a recorded final plat, record plat, or minor plat in accordance with the provisions of this chapter.

Plat, conveyance. A map, drawing or exhibit which conforms to section 107.04.02, conveyance plats, of this subdivision ordinance for the purpose of sale or conveyance. A conveyance plat may be the first step in the development of a project, especially if the project will be developed in phases and off-site easements need to be platted prior to the final platting of the entire tract.

Plat, final. A map, drawing or exhibit which conforms to section 107.04.04, final plats, of this subdivision ordinance and is submitted to the town for consideration for final approval by the planning and zoning commission. The plat illustrates that the subdivision of land is consistent with all standards of this subdivision ordinance pertaining to the adequacy of public facilities and the installation of or provision for public improvements. Once approved, such plat is submitted to the county clerk of Denton County for recording.

Plat, minor. A map, drawing or exhibit dividing land into no more than four lots that meets the submission and approval requirements of section 107.04.05, minor plats, of this ordinance. Such plat may be approved by the director of development services. Such plat is also considered a final plat.

Plat, preliminary. A map, drawing or exhibit which conforms to section 107.04.03, preliminary plats, of this subdivision ordinance and is submitted to the town for consideration for initial approval by the planning and zoning commission. Such plat is not to be recorded, but illustrates the general layout of a proposed subdivision, the adequacy of public facilities needed to serve the proposed subdivision, and the overall compliance of the applicable requirements of this ordinance. Such plat is reviewed and decided prior to approval of a final plat.

Plat, replat. The re-subdivision of all or part or all of any block or blocks of a previously platted subdivision, addition, lot or tract, that is beyond the definition of an amending plat and which does not require the vacation of the entire preceding plat. Such plat also conforms to section 107.04.06, replats, of this subdivision ordinance. A replat may function as a final plat for a property.

Progress (towards completion). Shall have the same meaning set forth in V.T.C.A., Local Government Code § 10.0245.005(c) as it exists or may be amended, unless another meaning is specified.

Project. An endeavor over which the town exerts its jurisdiction and for which more than one permit is required to initiate, continue, or complete the endeavor.

Property owner. The legally recognized proprietor of the land for which an application is being submitted. Also see developer.

Property owners association. An organization established for the ownership, care, and maintenance of private streets and other private commercial facilities.

Public improvement. See improvement, public.

Public way. An officially approved, privately maintained street or roadway, constructed to town street standards, open to unrestricted and irrevocable public access, serving two or more lots that provides the primary means of access and providing fire lane and utility easements.

Record drawings. A group of drawings or plans that depicts the final configuration of the installed or constructed improvements of a development, improvements which have been verified by the contractor as their installation or construction occurs during development. The record drawings shall reflect the construction plans (or working drawings) used, corrected, and/or clarified in the field.

Residential development. The actual or proposed use of land for one or more buildings or structures that are designed or intended to be used, in whole or in part, as dwelling units.

Responsible official. The town staff person who has been designated by the town manager to perform one or more of the following tasks (this term also includes designees): accept an application for filing; review and make recommendations concerning such application; where authorized, to initially decide such applications; initiate enforcement actions; take all other actions necessary for administration of the provisions of this subdivision ordinance with respect to such application.

Right-of-way. A use of land dedicated by plat or metes and bounds to and for use by the public, which is separate and distinct from the lots and parcel abutting it, and which is not included within the dimensions or areas of such lots or parcels. Generally describes an area used for the provision of streets and utilities. Unless otherwise specified, the term right-of-way shall refer to a public right-of-way.

Riparian study. An ecologically based study that addresses the three major components of a stream (channel, floodplain and transitional upland fringe).

Road, or roadway. See street.

Screening. A barrier intended to separate and limit visibility between that which is on either side of the barrier, for example, a thoroughfare and adjacent land uses.

Security station (i.e. guard house). A building and gate system to control vehicular access to private street developments, which may be a mechanical device or a manned structure.

Sketch plan. An informal drawing of initial development ideas superimposed on a topographic map to indicate generally the plan of development and to serve as a working base for noting and incorporating suggestions of the town manager, engineer or others who are consulted prior to the preparation of the preliminary plat.

Stacking area. A vehicle setback measured from a point on a building designed for drive-up service and the area assigned for queuing.

Street. A roadway for vehicular traffic and other public uses, whether designated a street, highway, thoroughfare, parkway, throughway, road, avenue, boulevard, lane, place or however otherwise designated. An alley is not considered a street.

Street, alley. A minor public right-of-way, not intended to provide the primary means of access to abutting lots, which is used primarily for vehicular service access to the back or sides of properties otherwise abutting on a street.

Street, centerline. An imaginary line designated midway between the bounding right-of-way lines of a street or alley.

Street, collector (also feeder streets, secondary thoroughfares, etc.). A paved roadway that provides vehicular circulation within neighborhoods and from minor streets to major thoroughfares. Due to similarity of traffic volume and wheel loadings, streets through commercial and industrial areas are frequently constructed to same design as collector streets.

Street, cul-de-sac. A roadway having but one outlet to another street, and terminated on the opposite end by a vehicular turn-around.

Street, dead-end. A roadway, other than a cul-de-sac, with only one outlet.

Street, improved. A roadway that has been constructed or reconstructed to meet the town's minimum standards regarding right-of-way width, pavement width, and/or pavement type, as defined in the engineering design standards.

Street, local residential (also minor thoroughfares or streets, etc.). A paved roadway that is primarily used for providing direct vehicular access to abutting residential property.

Street, local. A roadway that is intended to provide a high level of access to adjacent developments and, generally, a low level of mobility. Such streets shall also be as described within the comprehensive plan and engineering design standards.

Street, major thoroughfare (also arterial streets, primary thoroughfares, etc.). A paved roadway that provides vehicular movement from one neighborhood to another, to distant points within the urban area or to freeways or highways leading to other communities.

Street, minor thoroughfare. A paved roadway that is primarily used for providing through access from neighborhood to neighborhood or commercial areas.

Street, private. A privately owned roadway within a subdivision for which the private owners assume full responsibility for maintenance and control and which has not been dedicated to the use of the public. This term is inclusive of related alleys.

Street, stub. A roadway that has been designed to allow for the future extension of the street through subsequent subdivisions.

Street, substandard. An existing street that does not meet the current minimum street standards of the town.

Street, unimproved. A roadway that does not meet the town's minimum standards regarding right-of-way width, pavement width, and/or pavement type, as defined in the engineering design standards. Most unimproved streets are former country roads that were built before an area was annexed into the town limits and/or before the town implemented thoroughfare design standards.

Subdivider or developer. An individual, firm, association, syndicate, partnership, corporation, or other organization dividing or proposing to divide land, or making improvements to such land, so as to effect a subdivision of land.

Subdivision. The division of any lot, tract, or parcel of land into two or more lots or sites for the purpose of sale or of building development, whether immediate or future. The term includes resubdivision or replatting of an existing subdivision, building upon, or other development of land, but does not include the division of land into tracts where each resulting lot is more than five acres in size; does not involve or require any new street, alley or easement of access; and no public improvement is being dedicated. As part of a subdivision, if any lot is proposed to be five acres in area or smaller, the entire parent tract must be platted together with such other lots or tracts. When appropriate to context, the term subdivision shall relate to the process of subdividing or to the land subdivided.

Submission. The date an applicant delivers an application or petition under this ordinance to the director of the applicable town department, or the date on which an applicant deposits an application or petition with the United States Postal Service by certified mail addressed to the director of the applicable town department, along with all required fees and documents.

Substandard. A condition of a road or other public improvement that does not meet the town's current right-of-way, design, capacity or construction standards.

Surety. A bond, letter of credit, or letter of financial guarantee from a financial institution.

Surveyor. A person who practices the profession of surveying and is licensed by the State of Texas as a state land surveyor or a registered public surveyor.

TCEQ. The acronym for the Texas Commission on Environmental Quality.

Thoroughfare plan map. A component of the master thoroughfare plan that generally represents the proposed grid-system of major and minor thoroughfares that will support the future land use plan. The exact locations of future roadways cannot be determined without engineering and environmental analysis, but the map should be used as a guide as development occurs in terms of how connections should be made and by what type of thoroughfare. The thoroughfare plan map also shows existing railroads and proposed transit rail stations.

Town. The municipal corporation of the Town of Little Elm, Texas.

Town attorney. The person(s) so designated by the town council to provide oversight for and have legal responsibility for the town. This term shall also include any designee of the town attorney.

Town council. The duly elected governing body of the Town of Little Elm, Texas.

Town engineer. The person so designated by the town manager to provide oversight for and have responsibility of the engineering department; as used for responsibility and review purposes within this subdivision ordinance, this term shall also include any designee of the town engineer.

Town manager. The person so designated by the town council, or the town manager's designee.

Town official or administrator. Any person, elective or appointive, or any employee, or any board or commission authorized or constituted by town ordinance or state law to act on behalf of the municipality.

Tributary. A riparian branch that feeds (i.e., flows into) a major creek, as identified and defined in the town's riparian study, as amended.

TxDOT: The acronym for the Texas Department of Transportation.

Utility easement. An easement dedicated to the public for access, construction, reconstruction, and maintenance to water lines, sanitary sewer lines, storm sewers, and those franchises granted permission by the town, utility district, or county to occupy the easement.

Utility, private. Services, and any related facilities (e.g., distribution lines), not customarily provided by the town or public entities; such services generally include electricity, natural gas, and telecommunications.

Utility, public. Services, and any related facilities (e.g., distribution lines), typically provided by the town, county, or publicly owned entity; such services include potable water distribution, wastewater collection, and stormwater management.

Variance. An exception to a particular standard or requirement of the subdivision ordinance that would substantially limit the applicant's ability to utilize the land in a manner requested.

Variance, major. A significant change to both the standards and intent of this subdivision ordinance, which involves planning and zoning commission approval. A major variance includes any type of variance that is not specifically listed in table 107.13.02.

Variance, minor. A minor change to the standards, but not the intent, of this subdivision ordinance, which involves director of development services or town engineer (as applicable) approval unless otherwise noted. An exclusive list of minor variances is shown in table 107.13.02.

Vegetative study. A study in which the main purpose is identification and consideration of unique vegetative communities that are important for conserving biotic diversity and are rare due to conversion to other land uses.

Violation. Any failure to fully comply with this subdivision ordinance.

Wetland delineation study. A study in which the main purposes are to determine jurisdictional wetlands and to ensure compliance with section 404 of the Clean Water Act and other applicable regulations of the U.S. Army Corps of Engineers.

Wetland. An area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Zoning ordinance. The Town of Little Elm Zoning Ordinance.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

1. Revisions to general notes for clarity and to remove conflicts and redundancies
2. Revised note regarding polymer concrete, antimicrobial concrete, and epoxy coating requirements for manholes
3. Sheet 4 - Added grade requirements to driveway detail
4. Added detail for joints near manholes
5. Revised joints to use #4 rebar
6. Sheet 5 – Added fire lane pavement detail
7. Revised notes
8. Sheet 7&8 – Revised detectable warning surfaces to use replaceable mats instead of brick pavers
9. Sheet 9 – Minor revisions to stamped concrete details
10. Sheet 10 – Revised parking details to match zoning ordinance and TDLR requirements
11. Removed details for pavement marking buttons
12. Sheet 11 – Minor revisions to inlet details
13. Sheet 12 – Added detail for Polyproylene storm sewer
14. Sheet 15 – Added detail for FDC
15. Moved drain valve and blow off detail to sheet 18
16. Revisions to notes to match fire protection ordinance and update Tnemec paint codes
17. Minor revisions to fire hydrant pad detail
18. Sheet 16 – Revised valve cover painting scheme and valve extension requirements
19. Sheet 17 – Added tracer tape and wire requirements for pipes
20. Sheet 20 – Added detail for residential sewer cleanout and stubout
21. Sheet 21 – Added tracer tape and wire requirements for pipes
22. Removed SDR 35 deep encasement detail
23. Revised air release valve detail
24. Added sheets 23 & 24, erosion control details
25. Sheet 25 – Update dumpster enclosure to match zoning ordinance
26. Added light pole base detail
27. Revised lighting fixture schedule
28. Sheet 26 – Revised double swing gate detail.

[Appendix.] Engineering Design Standards

Sec. 1.0 General requirement.

Purpose.

The design criteria and standards section of the subdivision regulations for the Town of Little Elm is intended primarily for use by the developer's engineer. These criteria and standards should enable the engineer to design the required community facilities in a manner acceptable to the town. There may be special circumstances which would call for requirements in excess of those outlined. In most cases, additional requirements will be apparent to the developer's engineer while preparing the plans for the subdivision.

Compliance Required.

Prior to the commission's approval of the final plat, the subdivider shall comply or provide for compliance with the policies and procedures set forth in these regulations for construction of street improvements and utilities. No building, sewer, electrical or plumbing permit shall be issued by the town as to any property in the subdivision until:

1. The preliminary plan has been approved; and
2. The working drawings, specifications and agreements required herein have been reviewed and approved by the affected agencies and, as required, by the town attorney.

Town Design Criteria and Standards.

There are hereby adopted by reference and made a part of these regulations design criteria and standards which shall be controlling in design, construction and installation of street paving, curbs and gutters, sidewalks, utilities and other public improvements required herein. All references to town design criteria and standards shall mean and include those standards and specifications, together with all exhibits, charts, drawings and diagrams appertaining thereto, which have been approved by the town's engineer, adopted by the town council, and placed on file in the office of the town secretary.

Installation and Financing.

The subdivider shall arrange with the town and with utility companies franchised to serve the area in which the subdivision is located for the construction costs of streets and alleys, utility lines and other public improvements. The subdivider shall also arrange for the sequence of work so that underground utilities shall be installed in those portions of streets intended for vehicular traffic before such streets shall be surfaced. If the several improvements required herein have not been installed or constructed prior to submission of the final plat then the final plat shall bear a restriction that no lot shall be occupied and that no municipal services shall be extended thereto until the specified utilities and improvements have been constructed as required.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 2.0 Street standards.

Thoroughfare Design Requirements

A. *Street Widths*

1. Street widths for all subdivisions shall be 31 feet from back of curb to back of curb on residential sections. All streets which are not governed by one of the following conditions shall be considered residential for width design:

2. Designated as a collector (which shall be 37 feet from back of curb to back of curb) or thoroughfare (which shall be 46 feet from back of curb to back of curb) by the town's comprehensive plan.

3. Adjacent to commercial or multifamily land-use where, in the opinion of the town's engineer or the town's planner, additional street width is indicated for proper access and circulation.

4. Where, in the opinion of the town administration or in the opinion of the developer with the concurrence of the town administration, the esthetic value achieved from extra width is dictated by special conditions.

5. In the case of [subsection] (1) above, the section to be constructed shall be in accordance with the comprehensive plan or a revision thereof based on updated conditions. In the case of [subsections] (2) and (3), each condition will be studied individually and approved by the town prior to approval of the subdivision in question.

B. *Street Sections.*

1. Street sections shall be as shown on the following pages for residential, collector and thoroughfare type streets. These sections shall govern except in conditions of [subsections] (2) and (3) above. In those instances, each condition shall be studied by the town's staff individually and designed for the specific situation. Such design must be approved by the town prior to approval of the subdivision in question.

Sidewalk Policy.

Statement of policy on sidewalks.

a. Sidewalks shall be required in those locations where travel by foot is of such a volume as to warrant special protection for pedestrians using the public right-of-way.

b. In general, this requirement shall be considered to have been met when sidewalks are installed along such thoroughfares, arterial streets and other streets that provide major pedestrian access to schools, places of public assembly and commercial centers. Further, sidewalks may be installed by order of the town council upon receipt of a petition signed by more than 60 percent of property owners and 60 percent of properties in any one block face.

c. Sidewalks adjacent to arterials and collectors shall be a minimum of six feet.

d. Sidewalks adjacent to residential streets shall be a minimum of five feet in width.

e. The cost of constructing sidewalks shall be assessed against the abutting property where such property is especially benefited.

f. Developed area criteria.

a. Town initiated. In cases where the town initiates construction of sidewalks, a public hearing shall be held upon the necessity for such construction and the special benefits, if any, that accrue to the property being assessed.

b. Property owner initiated. In cases where sidewalk construction improvements are initiated by a petition of 60 percent or more of the abutting property owners and properties in any one block face, the cost of the improvements shall be assessed against the abutting property owners, following a public hearing upon the necessity for such construction and the special benefits if any, that accrue to the property being assessed.

Criteria for Property Being Developed.

At the option of the developer, required sidewalks shall be installed either with the construction of abutting street improvements or at the building site prior to occupancy. The town may require the construction of the sidewalk improvement in advance of the issuance of a building permit where such sidewalk construction is necessary to protect the public safety.

Street Name Signs.

The subdivider shall install or shall arrange for the installation of street name signs satisfying the specifications of the town.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 3.0 Drainage design requirements

Section 3.1. Introduction

3.1.1 Stormwater Goals and Objectives

The purpose of this manual is to provide *adequate stormwater management* within the Town of Little Elm (Town) and its extraterritorial jurisdiction (ETJ). *Adequate stormwater management* is achieved by the development, adoption, and enforcement of policies and standards for drainage design that achieve the following goals:

1. Protect public health and safety
2. Prevent property damage due to flooding
3. Preserve and enhance water quality and minimize water pollution in Lewisville Lake and other natural waterbodies
4. Stabilize or decrease streambank and channel erosion on creeks, channels, and streams
5. Fully comply with all state, federal, and local regulatory and permitting requirements relating to stormwater and land development
6. Proportionally distribute the cost of necessary drainage improvements
7. Minimize the maintenance cost of drainage facilities constructed
8. Promote sustainable and productive development and redevelopment

This manual is intended to supplement the Town *Code of Ordinances* with procedures and technical criteria to meet the Town's adopted policies. If any policies and requirements set forth herein conflict with, or are inconsistent with, criteria outlined elsewhere, the more stringent criteria shall apply.

3.1.2 Applicability of Stormwater Criteria

The stormwater criteria outlined in this manual applies to development and redevelopment activity within the limits of the Town of Little Elm and its ETJ to the extent legally authorized. Development and redevelopment activities meeting the requirements outlined in **Section 3.1.3.1** require the submittal of a drainage plan for Town review and approval prior to commencement of land disturbing activities.

It is recognized that there will be specific situations not completely addressed by this manual. Unusual circumstances or special designs requiring variance from standards within this manual require the express written approval of the Town Engineer. All requests for variance from the Town's drainage criteria shall be considered based on the standards, procedures, and criteria outlined in **Section 107.10.01** of the Town's *Subdivision Ordinance*.

3.1.3 Stormwater Submittal Requirements

The design of stormwater infrastructure must be performed in accordance with this manual and other applicable Town criteria. All plans and studies with stormwater elements shall be prepared and sealed by a Licensed Professional Engineer with a valid license and a valid registered firm number from the State of Texas.

All applicable calculations, plans, and other documentation necessary to evaluate the design must be provided for review. Upon receiving a stormwater submittal for review, the submittal package will receive a cursory review for completeness of submittal requirements. Incomplete submittals shall be rejected by the City without further review. The Town's review period conforming to State regulations governing subdivision application begins on the date the application is accepted for review.

3.1.3.1 *Stormwater Submittal Elements*

The Town of Little Elm has developed a *Development Application Handbook* to assist developers with the preparation of applications for various types of planning and development activities. Developers shall utilize the applicable forms and checklists in the preparation and submittal of storm drainage plans for development review.

Storm drainage plans shall be prepared for subdivision applications and civil plan submittals that include the following activities:

1. Land disturbing activity or platting of 1.0 acre or more; or
2. Land disturbing activity of less than 1.0 acre where the activity is part of a common plan of development that is 1.0 acre or more.

A common plan of development consists of construction activity that is completed in separate stages, separate phases, or in combination with other construction activities. For the purposes of this policy, this classification may include, but is not limited to, a tract that:

1. Is included in a single concept plan submitted to the Town
2. Is included in a single preliminary plat submitted to the Town
3. Is comprised of contiguous land (or land separated only by roadway and/or drainage rights-of-way or easements) under the same root ownership
4. Is encumbered by a single Master Drainage Study or Plan
5. Is encumbered by a single Developer Agreement, TIF, 380 Agreement or other public/private partnership agreement
6. Is overlaid by a common Homeowner's or Property Owner's Association (HOA or POA), or
7. Is owned or managed by a common Master Developer.

Site developments that do not meet the applicability requirements outlined above will not require a drainage plan submittal. However, all developments with the Town limits and ETJ shall comply with the Town Subdivision Ordinance and development permitting requirements, including but not limited to: building permits, floodplain development permits, SWPPP, and grading permits.

3.1.3.2 *Permitting Requirements*

The engineer must provide proof of compliance with applicable federal, state, and local environmental regulations upon request by the Town. Potential applicable regulations and permits may include, but are not limited to:

1. Section 404 of the Clean Water Act (33 USC 1344)
2. Section 106 of the National Historic Preservation Act
3. Water Rights
4. Section 303(d) Impaired Waters
5. Migratory Bird Treaty Act
6. Water Well Drilling
7. Threatened and Endangered Species Act

8. The Texas Archeological and Research Laboratory Requirements
9. The Antiquities Code of Texas
10. Air Quality
11. TCEQ Dam Requirements

The engineer is responsible for providing documentation of the relevant United States Army Corps of Engineers (USACE)-approved permits prior to beginning modification to the floodplain, or for providing a signed and sealed statement detailing why such permits are unnecessary. A preliminary Section 404 permitting evaluation shall be included as part of the downstream assessment report for the development. Should mitigation be required under Section 404 of the Clean Water Act, the areas shall be identified on the engineering construction plans.

Additional permitting requirements may apply for design of stormwater storage facilities and projects that impact regulatory floodplains. Further guidance is provided in **Sections 3.6.3**, **3.7.3**, and **3.7.4**.

3.1.3.3 *Acceptable Modeling Software*

The design of storm drainage facilities can be aided by and sometimes requires the use of hydrologic and hydraulic modeling programs. **Table 1** lists several widely used modeling software which are acceptable to the Town. The use of a program that is not included in the list requires prior approval by the Town Engineer.

Table 1: Acceptable Hydrologic and Hydraulic Modeling Programs

Software	Hydrologic Calculations	Hydraulic Calculations	FEMA Approved	Water Quality Features
HEC-HMS	X		X	
HEC-RAS		X	X	
Autodesk Suite – Hydraflow, Storm and Sanitary Analysis	X	X		(X)
Bentley Suite – CulvertMaster, FlowMaster, PondPack, StormCAD	X	X	(X)	
Innovyze Suite – ICM, InfoWorks	X	X		X
SWMM (EPA)	X	X		X
XPSWMM	X	X	X	X

The most recent version of the program should be used unless the Town provides an approved effective model developed using a previous version, and in other instances as approved by the Town Engineer. Only Federal Emergency Management Agency (FEMA) approved software can be used for design within the Regulatory Floodplain. Refer to **Chapter 7** for additional guidance on software requirements for floodplain development applications.

Section 3.2. Stormwater Design Standards

3.2.1 Design Frequency for Drainage Features

The design of drainage facilities relies on evaluation of performance during theoretical rainfall events. A rainfall event is classified by its annual exceedance probability (AEP), which describes how likely an event is to occur in a given year. This probability has classically been presented inversely as a return period, giving the estimated time interval between events of a similar size or intensity. For example, the “100-year storm” return period has an AEP of 1%. This does not mean that a storm of this duration or intensity occurs every 100 years—instead, it means that, in any given year, there is a 1% chance of such an event occurring.

Table 2 lists the storm events to be used in the design of drainage facilities.

Table 2: Design Storm Events

Storm Event Name	Storm Event Description	Design Standard
Water Quality	Criteria based on volume of 1.5 inches of rainfall; not a storm frequency.	• Onsite water quality controls
Streambank Protection	2-year return period (50% AEP)	• Low flow channels and velocity check
Conveyance	25-year return period (4% AEP)	• Secondary check for street inundation and open travel lanes
Flood Mitigation	100-year return period (1% AEP)	• Open channels • Primary standard for street and storm drain design

3.2.2 Drainage Impacts

The design of a storm drainage system must account for offsite flows, flows generated by the development, and the impacts on the downstream drainage system. All stormwater discharges from the development shall be conveyed to an adequate outfall. An adequate outfall is a structure or location that is adequately designed as to not cause adverse impacts to adjacent or downstream properties or facilities. An adequate outfall shall have capacity to convey any increased stormwater runoff from the site.

In order to determine the adequate outfall, the engineer must establish the zone of influence for the development. The zone of influence is the point downstream where the discharge from a proposed development no longer has a significant impact upon the receiving stream or storm drainage system. The hydrologic and hydraulic analysis to establish the zone of influence from a proposed development and to demonstrate an adequate outfall for site drainage is called a downstream assessment.

Generally, the zone of influence will be defined by a detailed hydrologic and hydraulic analysis. For watersheds of 100 acres or less at any proposed outfall, the 10% rule of thumb may be used in order to determine the zone of influence. The 10% rule states the zone of influence is considered to be the point where the drainage area controlled by the drainage facility comprises 10% of the total drainage area. If a portion of a larger property is being developed, the zone of influence shall be determined based on the entire property. A detailed study may be required for any drainage area regardless of size at the discretion of the Town Engineer.

It shall be the responsibility of the engineer to contact the Town and inquire about other proposed or approved developments within the zone of influence. At the direction of the Town Engineer, these developments shall be accounted for in the downstream assessment.

Table 3: Zone of Influence (Adequate Outfall) Determination

Item	Parameter	Adverse Impact Determination
1	**Inhabitable Structures**	• No new or increased flooding (0.00 feet) of existing insurable (FEMA) structures (inhabitable buildings).

Item	Parameter	Adverse Impact Determination
2	Flood Elevations	• No increase (0.00 feet) in the 2-, 25-, and 100-year water surface elevations unless contained within the owner's property or within an existing channel, roadway, drainage easement, and ROW. • Dry lane and gutter capacity requirements set forth in **Table 10** shall also be met.
3	Floodplain Ordinance	• Where provisions of the Town's floodplain ordinance may be more restrictive, the floodplain ordinance shall have authority over the above provisions.
4	Channel Velocities	• Proposed channel velocities for 2-, 25-, and 100-year storms cannot exceed the applicable maximum permissible velocity shown in **Table 9**. • If existing channel velocities exceed maximum permissible velocities shown in **Table 9**, no more than a 5% increase in velocities will be allowed. • Exceptions to these criteria will require certified geotechnical/ geomorphologic studies that provide documentation that the higher velocities will not create additional erosion.
5	Downstream Discharges	• No increase in downstream discharges caused by the proposed development that, in combination with existing discharges, exceeds the existing capacity of the downstream storm drainage system or existing right-of-way.
6	Water Quality	• Compliance with water quality standards and requirements outlined in **Chapter 3**.

3.2.3 Drainage Considerations for Site Grading

3.2.3.1 *Grading Plans*

Grading plans shall be submitted for any land disturbance activities. Existing (pre-project) and proposed (post-project) contours shall be shown. The natural flow of surface waters shall not be diverted or impounded in a manner that damages adjacent property.

Residential development shall be type A, B, or C drainage for each lot within the subdivision as described in Housing and Urban Development (HUD) Federal Housing Administration (FHA) Data Sheet 72, as amended. Type 1 or 2 block grading as shown in the HUD information is preferred. Type 3 and 4 block grading are allowed only if:

1. A flume or channel is constructed at the rear of the lot to intercept runoff; or
2. Runoff from no more than 3 lots is accumulated prior to constructing a drainage system to intercept the runoff.

To ensure adequate drainage between lots after final construction of residential structures, the minimum slope between lot lines is required to be at least 50% steeper than the HUD minimums. Alternatively, the builder may provide a written certification that site grading is as prescribed in the grading plan and may be held responsible for drainage complaints by residents.

The engineer may utilize swales to redirect flows. In such cases, the engineer shall provide more detailed information in addition to the lot grading type (A, B, or C) by indicating spot elevations on each lot. If the site is complex and an overall site grading plan cannot be developed in accordance with the HUD standards, an individual grading plan for each lot shall be submitted by the engineer prior to the issuance of building permits. The individual grading plans shall be coordinated with surrounding lots. For these complex plans, an as-built letter shall be submitted by the engineer prior to final inspection.

3.2.3.2 *Minimum Lot and Floor Elevations*

The minimum elevation for the buildable area (including parking areas) of the lot shall be set at or above the 100-year water surface elevation, or as directed by the Town Engineer. Any inhabitable structure shall have a finished floor elevation 2 feet above the 100-year water surface elevation.

For developments outside of the floodplain, minimum floor elevations shall be at or above the street curb, edge of alley, or rear property line, whichever is lower, unless otherwise approved by the Town Engineer. For lots adjacent to or in the influence of a sump area and a positive overflow, the lot elevation will be at or above the sump area top of curb or the possible maximum pool elevation when the positive overflow is functioning, whichever elevation is higher. Refer to **Section 3.5.2.5** for additional information on positive overflow requirements.

3.2.3.3 *Concentrated Runoff from Development*

Site runoff due to development shall not cause adverse impacts as outlined in **Table 3**. When offsite grading is required or when the development discharges concentrated flow on an adjacent property, off-site conveyance to reach an adequate outfall shall be contained within a drainage easement obtained from the affected property owner(s). Drainage easement requirements are further discussed in **Section 3.3.2.1**.

Section 3.3. Stormwater Quality

The Town of Little Elm is one of the fastest growing cities in North Texas, with almost 70 miles of the town limits along the shoreline of Lewisville Lake. New development in the Town has contributed to increased stormwater runoff. Urban stormwater runoff has had detrimental impacts on the Town's receiving waters, including increased flooding potential, stream channel erosion, and reduced stormwater quality. As undeveloped areas of the Town are developed and older areas are redeveloped, it is imperative that a robust stormwater quality program be implemented to protect the Lewisville Lake and the Town's other natural resources and improve the benefits to human health, fish and wildlife habitat, and recreational opportunities.

Additionally, the Town is subject to Environmental Protection Agency (EPA) and Texas Commission on Environmental Quality (TCEQ) permit regulations governing discharges of stormwater from municipal separate storm sewer systems (MS4s) to surface waters of the state (TXR040000). The Town is required to develop, implement, and enforce a Stormwater Management Program (SWMP) to reduce the discharge of pollutants and protect water quality. This program requires oversight of the design, construction, and maintenance of stormwater controls in the Town to protect and enhance stormwater quality.

The following sections outline the Town's commitment to stormwater quality and water quality provisions that apply to the design of storm drainage facilities.

3.3.1 Post-Construction Stormwater Quality

3.3.1.1 *Post-Construction Stormwater Quality Objectives*

This section will establish criteria for the design, operation, and maintenance of post-construction stormwater controls and the preparation of a Stormwater Quality Plan (SWQP). Specific objectives of the Town's post-construction stormwater policies include:

1. Protect the integrity of watersheds and preserve the health of water resources, including Lewisville Lake;
2. Minimize changes to the site hydrology for land disturbance and redevelopment to reduce flooding, streambank erosion, and pollution;
3. Implement beneficial site design practices;
4. Promote the preservation of green space and other conservation areas;
5. Establish administrative procedures for the submission, review, approval, and disapproval of stormwater best management practices, and for the inspection of approved projects;

6. Establish provisions for the long-term responsibility for and maintenance of structural and nonstructural stormwater management to ensure that they continue to function as designed, are maintained appropriately, and pose minimum risk to public safety; and
7. Meet the provisions of the Town's MS4 permit and SWMP.

3.3.1.2 *Stormwater Quality Plan*

A Stormwater Quality Plan (SWQP) shall be prepared for all land disturbing activities of 1 acre or more as part of a subdivision application or civil plan submittal. For land disturbance activities between 1 and 5 acres, the Site Plan can be considered the SWQP. The grading or drainage plans may also be used as the SWQP for capital improvement projects. The SWQP shall be sealed by a Professional Engineer in the State of Texas.

The SWQP shall identify permanent site features and controls that will be included in the design and constructed with the project to minimize and mitigate the project's long-term effects on stormwater quality and quantity. All new development designs shall evaluate site layout to minimize impervious area and impacts to existing natural resources to promote sustainable development.

3.3.1.2.1 Preparation of a SWQP

A preliminary SWQP shall be prepared with the preliminary plat. The final SWQP shall be submitted with the site plan or construction plans. This plan must be accepted by the Town prior to any site activity, including grading. The SWQP shall be developed and coordinated with all portions of the plans, but specifically, the grading plan, the drainage plans, and the landscape plan.

3.3.1.2.2 Post-Construction BMP Selection

Table 4 shows the minimum number of permanent BMPs required based on acreage of post-project impervious area:

Table 4: Minimum Number of Permanent BMPs Required

Impervious Area	Minimum Number of Permanent BMPs
< 5 acres	1
5 acres ≤ Impervious Area ≤ 20 acres	2
> 20 acres	3

The BMPs shall be designed to achieve the water quality design requirements as set forth in **Section 3.3.1.3**. The *iSWM Technical Manual for Site Development Controls* provides guidance on the design and selection of permanent BMPs. It is the responsibility of the engineer to design BMPs that are appropriate address specific site conditions and meet the water quality standards.

Final stabilization of disturbed areas is required for all sites, regardless of size, and shall not be considered a permanent BMP. Final stabilization is defined as 80% coverage with no large bare areas on all portions of the site that are the responsibility of the developer.

3.3.1.3 *Water Quality Design Requirements*

3.3.1.3.1 Floatable Capture Requirements

All storm sewer outfalls to Lewisville Lake shall include a debris separator conforming to the Standard Details. Other applications of debris separators may be approved or required at the discretion of the Town Engineer.

For developments subject to SWQP requirements, debris separators may be considered a permanent BMP to meet the requirements of **Section 3.3.1.2.2**. Where multiple debris separators are installed for a single development, they shall be considered as a single BMP.

3.3.1.3.2 Water Quality Volume Requirements

Studies have shown the 85th percentile storm event (i.e., the storm event that is greater than 85% of the storms that occur) is a reasonable target event to address the vast majority of smaller, pollutant-loaded storms. Based on a rainfall analysis, 1.5 inches of rainfall has been identified as the average depth corresponding to the 85th percentile storm for North Texas. The runoff from these 1.5 inches of rainfall is referred to as the Water Quality Protection Volume (WQ_v).

Developments subject to SWQP requirements are required to demonstrate treatment of the WQ_v by the installation of permanent BMPs. Calculation of the WQ_v shall adhere to procedures outlined in the *iSWM Technical Manual for Water Quality*. Methods to reduce the required WQ_v as outlined in the iSWM manual may also be implemented.

The WQ_v shall not be discharged in a period less than 24 hours. The water quality treatment requirement can be met by providing extended detention in stormwater storage facilities designed for mitigation of peak events. In such instances, these facilities shall be allowed to have a total drawdown time greater than 24 hours but no greater than 48 hours. Refer to **Chapter 6** for additional guidance and requirements concerning the design of stormwater storage facilities.

3.3.1.4 *Permanent Erosion Control*

Adequate control for the erosion is imperative to minimize Total Suspended Solids (TSS) and to protect stormwater quality in natural drainageways. Energy dissipation, channel stabilization and/or permanent erosion control mechanisms are required in instances where the design channel velocities or discharge velocities of pipes, culverts, and flumes exceeds the maximum permissible velocities outlined in **Table 9** and in other instances as determined by the Town Engineer. The *iSWM Technical Manual for Hydraulics* and the *Federal Highway Administration Hydraulic Engineering Circular No. 14* (*FHWA HEC-14*) provide additional guidance on the design of energy dissipators.

3.3.2 Maintenance of Permanent Stormwater Facilities

3.3.2.1 *Drainage Easements*

Easements are required for all public drainage systems that convey stormwater runoff across a development and shall be required for both on-site and off-site public stormwater drainage improvements, including standard engineering channels, storm drain systems, detention and retention facilities, and other stormwater controls. All drainage easements shall be recorded on the plat. The drainage easement must include sufficient area for operation and maintenance of the drainage system, and the developer shall obtain downstream drainage easements until adequate outfall is determined.

Minimum easement requirements are discussed in the following sections. Special circumstances may require additional easement allocation at the discretion of the Town Engineer.

3.3.2.1.1 Open Channels

Drainage easements shall be provided for all open channels. Easements shall encompass all areas lower than a ground elevation defined as being the highest of the following:

1. Two (2) foot above the calculated water surface elevation based on the fully developed 100-year water surface elevation or the 100-year base flood elevation (BFE), whichever is higher.
2. The top of the high bank, if higher than (1) above.

An additional easement of 15 feet on each side of a channel is required by the Town for maintenance and access purposes. For the purposes of this manual, bank slope is measured in a straight line from the toe of the slope to the top of the bank. The slope within the easement shall be no greater than 6:1 (horizontal to vertical) to allow for safe access of crews and equipment. Easements shall be kept free and clear of encroachments, but the

maintenance and access portion of the easement may contain designated fire lanes and parking areas as approved by the Town Engineer.

Engineered channels shall have drainage easements dedicated to meet the requirements of the width of the channel, the 1 foot of freeboard, and access easement.

3.3.2.1.2 Storm Sewer Easements

Easement widths will be rounded up to the nearest 5-foot increment. The minimum width of the storm sewer easement shall be the outside diameter of the storm sewer pipe or horizontal dimension of the storm sewer box plus 10 feet. For pipes or boxes in parallel, the minimum easement shall be equal to the width of the parallel storm drain system plus 10 feet. The minimum storm sewer easement that shall be provided in any case is 15 feet.

3.3.2.1.3 Other Stormwater Facilities

Drainage easements for structural overflows, swales, and berms shall be of sufficient width to encompass the structure or graded area. The proposed centerline of overflow swales shall normally coincide with the centerline of the easement. Drainage easements will generally extend at least 25 feet past an outfall headwall to provide an area for maintenance operations.

Easements for stormwater controls, including detention basins, sediment traps, and retention ponds, shall be negotiated between the Town and the developer but will normally include essential access to all embankment areas and inlet and outlet controls. Essential access is defined as access in at least one location. The entire reach or each section of any drainage facility must be readily accessible to maintenance equipment. Additional easement(s) shall be required at the access point(s), and the access points shall be appropriately designed to restrict access by the public.

3.3.2.2 *Operations and Maintenance Agreements*

All drainage improvements constructed within a development and any existing or natural drainage systems to remain in use shall require a maintenance agreement that identifies responsible parties for maintenance. Both private and public maintenance responsibility shall be negotiated between the municipality and the owner and documented in the agreement. The maintenance agreement shall be written such that it remains in force upon sale of transfer of the property.

The Town will provide for perpetual maintenance, in accordance with adopted Town maintenance standards, of all public drainage facilities located within dedicated easements and constructed to the Town standards. In addition, limited perpetual maintenance may be provided by the Town for riparian areas placed in a drainage easement preserved in their natural state, subject to Town approval. Access shall be provided and dedicated by the developer to all public stormwater facilities in developments for maintenance and inspection by the Town.

A *Stormwater Facility Maintenance Agreement* (SFMA) must be prepared by the engineer for each stormwater control that will not be wholly maintained by the Town. This agreement must outline both preventive maintenance tasks as well as major repairs, identify the schedule for each task, assign clear roles to affected parties, and provide a maintenance checklist to guide future owners. Multiple stormwater controls may be contained within a single SFMA. When areas are identified for detention that also serve other purposes for the development (e.g. parking lots, loading docks) the requirement for a SFMA may be waived.

3.3.2.3 *Inspections*

An annual self-inspection report shall be provided to the Town for all permanent stormwater controls with an active SFMA. The inspection report shall document the condition of the stormwater control and maintenance provisions undertaken to ensure the continued functionality of the stormwater control as designed. Generally, this inspection can be conducted and documented by the owner of the facility unless otherwise stated in the SFMA. An inspection report signed and sealed by a Professional Engineer in the State of Texas shall be submitted to the Town at a minimum of every 5 years, unless otherwise stated in the SFMA. The Town maintains the right, as outlined in

the Town ordinances, to inspect permanent stormwater controls and enforce provisions of the SFMA and this manual.

3.3.3 Temporary Construction Controls

Construction activities shall comply with all applicable federal (EPA), state (TCEQ), and local (Town) stormwater pollution prevention regulations. When the ordinance and applicable regulations are in conflict, the most stringent requirements shall apply.

3.3.3.1 *Stormwater Pollution Prevention Plan*

For all construction projects that will disturb 1 acre or more of land area, the TCEQ requires operators to obtain Texas Pollutant Discharge Elimination System (TPDES) General Permit (TXR150000) coverage for the project. This requires the preparation of a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP shall be provided to the Town and approved prior to the start of any construction. The contractor is responsible for implementing and maintaining the SWPPP, as well as posting and submitting construction site notifications, the Notice of Intent, and the Notice of Termination.

3.3.3.2 *Best Management Practices During Construction*

The SWPPP shall provide a series of best management practices (BMPs) that are appropriate for each phase of construction. The SWPPP shall also identify which owner/operator is responsible for installing, inspecting, and maintaining each BMP during the different phases of construction. All temporary BMPs must be removed after final stabilization is achieved.

Structural BMPs shall comply with the *Town of Little Elm Standard Details*, this manual, and the latest edition of the North Central Texas Council of Governments (NCTCOG) integrated Stormwater Management *(iSWM) Criteria Manual for Site Development and Construction* and *Technical Manual for Construction Controls*. When the iSWM manual, Town Standard Details, or this manual are in conflict, the Standard Details and then this manual shall govern.

Section 3.4. Hydrology

Prior to hydraulic design of drainage facilities, the rate and volume of stormwater runoff at the design point must be determined. The amount of stormwater runoff from a given site is a factor of the intensity and duration of the rainfall event and the size and hydrologic characteristics of the contributing drainage area. The following sections describe the approved hydrologic criteria and procedures to be used in the calculation of design runoff values.

Several sections of this chapter are adapted from the *iSWM Technical Manual for Hydrology*. Please reference the latest edition of the iSWM manual for additional guidance as needed.

3.4.1 Peak Discharges Prepared by Town

Peak discharge data from an appropriate flood study or Town-approved drainage studies shall be used as the design discharges, if such data is available. When no flow rates are available, peak discharges shall be determined by the engineer. All discharge values shall be based on full development of the drainage basin as outlined in the most recently adopted versions of the Town's *Comprehensive Plan*, *Zoning Map*, and *Future Land Use Map*.

3.4.2 Rainfall Intensity

The National Oceanic and Atmospheric Administration (NOAA) *Atlas 14, Volume 11 Precipitation-Frequency Atlas of the United States, Texas (2018)* is recognized as the best available set of rainfall data for the State of Texas. *Atlas 14* provides point precipitation frequency values, with rainfall intensity values varying slightly across the Town. A single coordinate (33.1870, -96.8897) has been selected to define standard rainfall intensity values throughout the Town. The standard rainfall intensities are listed in **Table 5**.

Table 5: Design Rainfall Intensities

Duration		Rainfall Intensity (in/hr) by Return Period and AEP (%)		
Min	**Hr**	**2-Year (50%)**	**25-Year (4%)**	**100-Year (1%)**
5	**0.083**	5.89	9.77	11.92
10	**0.167**	4.69	7.78	9.52
15	**0.25**	3.90	6.44	7.84
30	**0.5**	2.70	4.44	5.40
60	**1**	1.76	2.92	3.56
120	**2**	1.09	1.87	2.33
180	**3**	0.81	1.42	1.79
360	**6**	0.48	0.86	1.11
720	**12**	0.29	0.51	0.66
1440	**24**	0.17	0.30	0.39

3.4.3 Drainage Areas

Drainage area maps and runoff calculations shall include all drainage areas contributing to the site. Separate drainage area maps and runoff calculations shall be prepared for both the existing (pre-project) drainage area and the fully developed (post-project) drainage area. Drainage areas shall follow natural drainage features if future land disturbance is unknown or existing areas will not be changing under fully developed conditions.

Drainage area determinations shall be based on site survey and proposed grading plans, supplemented by recent aerial imagery and topographic maps. Delineations shall be performed utilizing a maximum 2-foot contour interval for existing drainage areas and a maximum 1-foot contour interval for proposed drainage areas. The performance of topographic survey used to delineate drainage areas is the responsibility of the engineer designing the drainage facility.

3.4.4 Time of Concentration

The time of concentration (T_c) is defined as the longest time, without interruption of flow by detention devices, that will be required for water to flow from the upper limit of a drainage area to the point of concentration. Times of concentration can often be assumed based on the typical inlet times shown in **Table 7**.

Alternatively or where no typical inlet time is provided, T_c may be calculated using the National Resource Conservation Service (NRCS, formerly known as the Soil Conservation Service, SCS) methodology. The use of NRCS methodology in lieu of standard inlet times may be at the discretion of the Town Engineer. This method separates the flow through the drainage area into sheet flow, shallow concentrated flow, and open channel flow. The T_c is the sum of travel times for sheet flow, shallow flow and open channel flow. Time of concentration calculations shall be provided by the engineer along with flow path delineations.

Computations for travel time (T_t) for sheet flow, shallow flow, and open channel flow shall adhere to the following methodology.

1. **Sheet Flow:** Sheet flow is the initial flow over the ground surface. The maximum allowable length for sheet flow is 300 feet for undeveloped drainage areas and 100 feet for developed areas. The travel time (T_t) in hours for sheet flow is determined using the following equation:

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5}(S)^{0.4}}$$

T_t = travel time (hr)
n = Manning's roughness coefficient (**Table 9**)

L = flow length (ft)

P_2 = 2-year, 24-hour rainfall, 4.1 in.

S = longitudinal slope (ft/ft)

2. **Shallow Concentrated Flow:** Shallow concentrated flow begins where sheet flow ends. A projected average slope should be established along the flowline for the shallow concentrated flow length. The travel time (T_t) in hours for shallow concentrated flow is determined by the following equation:

$$T_t = \frac{L}{3600V}$$

V = average velocity (fps), calculated as follows:

Unpaved Surfaces = $16.1345 \times S^{0.5}$

Paved Surfaces = $20.3282 \times S^{0.5}$

3. **Open Channel Flow:** Open channel flow is where the runoff is located within a defined channel or in some cases, closed storm systems. The travel time (T_t) for open channel flow is determined using the equation for shallow concentrated flow and using Manning's Equation to determine average velocity (V):

$$V = \frac{1.486 R^{\frac{2}{3}} S^{\frac{1}{2}}}{n}$$

V = average velocity (fps)

R = hydraulic radius (A/P) (ft), where:

A = cross-sectional area (ft^2)

P = wetted perimeter (ft)

S = longitudinal slope (ft/ft)

n = Manning's roughness coefficient (**Table 9**)

3.4.5 Allowable Hydrologic Methods

There are a number of empirical hydrologic methods available to estimate runoff characteristics for a site or drainage subbasin. The following methods have been selected to support hydrologic site analysis for the design methods and procedures included in this manual:

- Rational Method
- Modified Rational Method
- Unit Hydrograph Method

The procedures and approved applications of each method are described in the following sections.

3.4.5.1 *Rational Method*

The rational method is a simple procedure for estimating peak flows from small drainage areas. The use of the rational method is limited to drainage areas of less than 100 acres, unless otherwise approved by the Town Engineer. The formula for calculation of runoff by the rational method is:

$$Q = C_f C i A$$

Q = peak discharge (cfs)

C_f = frequency factor for use with higher intensity storms

C = runoff coefficient

i = rainfall intensity (in/hr) for a period equal to the time of concentration

A = contributing drainage area (acres)

The rational method was initially developed for design applications that considered storms with more frequent return periods than current flood protection standards (less than or equal to 10 years). Less frequent, higher intensity storms require use of a frequency factor (C_f) to account for the fact that infiltration and other initial losses have a proportionally smaller effect on runoff than for more frequent events. **Table 6** provides the frequency factors to be used with rational method applications.

Table 6: Frequency Factors for Rational Formula

Recurrence Interval (years)	Frequency Factor (C_f)
10 or less	1.0
25	1.1
100	1.25

The post-development runoff coefficient "C" shall be based on fully developed conditions. The most intense land use or zoning shall be used to determine the runoff coefficient for the drainage area. **Table 7** gives values for runoff coefficients to be used in applications of the rational method. It is often desirable to develop a composite runoff coefficient based in part on the percentage of different types of surfaces in the drainage area. Composite "C" values and other deviations from the coefficients provided in **Table 7** are subject to the approval of the Town Engineer.

Table 7: Runoff Coefficient Values and Typical Inlet Times

Land Use	Runoff Coefficient "C"	Minimum Inlet Time (min)
Residential:		
Single Family		
Low Density Residential	0.45	10
Medium Density Residential	0.55	10
High Density Residential	0.60	10
Multi-Family		
Manufactured Homes	0.60	10
Light (Townhomes, Duplex)	0.65	10
Heavy (Apartments)	0.85	5
Commercial/Industrial:		
Light	0.70	5
Heavy	0.80	5
Business Districts (Town Center, Office)	0.85	5
Parks and Open Space	0.25	15
Streets, Drives, Walks, and Roofs	0.95	5
Gravel Areas	0.50	
Graded or No Plant Cover	0.40	
Agricultural	0.30	
Forest	0.15	
Streams, Lakes, Water Surfaces	1.00	

3.4.5.2 *Modified Rational Method*

The modified rational method uses the rational method peak flow calculations combined with assumptions about the inflow and outflow hydrographs to compute an approximation of storage volumes for simple detention calculations. Further explanation of the modified rational method and a noniterative approach for detention design calculations are presented in the iSWM manual. The modified rational method is limited in use to applications as described in **Section 3.6.1**.

3.4.5.3 *Unit Hydrograph Method*

The Town requires the use of the NRCS unit hydrograph method for drainage areas larger than 100 acres. The unit hydrograph method requires drainage area, a runoff factor, time of concentration, rainfall, and methodology to consider initial and constant losses. Details of the methodology can and additional guidance can be found in the *SCS National Engineering Handbook, Section 4, Hydrology* and the iSWM manual.

The Town requires the use of HEC-HMS to perform the computations and to develop runoff hydrographs for a drainage area. Additional software may be accepted at the discretion of the Town Engineer. Typical inputs required for development of a HEC-HMS hydrograph are described below.

3.4.5.3.1 Curve Numbers

Use of the runoff curve number (CN) methodology outlined in *Urban Hydrology for Small Watersheds – NRCS Technical Release (TR)-55* is required. Curve numbers indicate the runoff potential of the land cover, considering the combined hydrologic effects of the soil type, land use, hydrologic condition of the soil cover, and the antecedent soil moisture. The NRCS Soil Survey for Denton County may be used to identify the soil group within the watershed subbasins. For computation of design events, an assumption of Antecedent Moisture Condition (AMC) II is required.

The runoff CN values for urban areas provided in *TR-55* are recommended for use. When open space is used as the cover type, fair condition shall generally be assumed. Other CN values may be approved by the Town Engineer. **Table 8** shows the land use categories and corresponding impervious percentages. These values do not supersede the existing conditions, or where proposed impervious conditions are known. For instance, if an industrial area is currently 95% paved, then 95% is the impervious condition that shall be used.

Table 8: Impervious Percentage Values for Land Use Classifications

Land Use	Impervious Condition (%)
Residential:	
Single Family	
Low Density Residential	25
Medium Density Residential	41
High Density Residential	47
Multi-Family	
Manufactured Homes	20
Light (Townhomes, Duplex)	70
Heavy (Apartments)	70
Commercial/Industrial:	
Light	90
Heavy	95
Business Districts (Town Center, Office)	85
Parks and Open Space	6
Streets, Drives, Walks, and Roofs	95
Agricultural	3
Forest	0
Streams, Lakes, Water Surfaces	100

3.4.5.3.2 Design Storm Rainfall

Use of the 24-hour storm duration and SCS Type II distribution is required for peak flow calculations, unless otherwise approved by the Town Engineer.

3.4.5.3.3 Hydrologic Stream Routing

Routing may be needed within the hydrologic model to account for the storage effects of detention facilities or significant channel reaches that are not accounted for in a hydraulic model. Detention and ponding areas shall be modeled using Modified Puls routing with explicit depth-area curves determined from topographic contours. Channel segments shall be modeled using either Modified Puls or Muskingum Cunge methods based on cross sections taken from available topography. For unsteady flow modeling, the routing is accounted for by the hydraulic software being used.

Section 3.5. Hydraulics

Hydraulic design is the process of determining the appropriate capture and transport (or storage) of stormwater that has been generated from a rainfall event to an adequate outfall. Stormwater facilities include, but are not limited to, ditches, streets, inlets, storm drain systems, swales, channels, culverts, ponds, and reservoirs.

Several sections of this chapter are adapted from the *iSWM Technical Manual for Hydraulics*. Please reference the latest edition of the iSWM manual for additional guidance as needed.

3.5.1 Streets and Gutter Flow

Surface drainage along streets is a function of transverse and longitudinal pavement slope, pavement roughness, inlet spacing, and inlet capacity. The design of these elements is dependent on storm frequency and the allowable spread of stormwater. Flow in streets and gutters is governed by Manning's equation for open channel flow:

$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

Q = flow (cfs)

A=cross-sectional flow area (ft^2)

R = hydraulic radius (ft), as defined previously

S = longitudinal slope (ft/ft)

n = Manning's roughness coefficient (**Table 9**)

Table 9 provides Manning's roughness coefficients and maximum permissible velocities to be used in the design of various drainage facilities in the Town. The Manning's roughness coefficient to be used in calculation of flow in concrete streets and gutters shall be 0.016 unless otherwise approved by the Town Engineer. The iSWM manual provides alternate forms of the Manning's equation with tables and nomographs to be used in the calculation of drainage capacities of streets with triangular, composite, and parabolic sections, as well as streets with curb splits.

Table 9: Roughness Coefficients and Maximum Permissible Velocities

Type of Section/Feature	Roughness Coefficient "n"			Maximum Permissible Velocity (fps)
	Minimum	Normal	Maximum	
Natural Streams				
Stream Section				6
Some Grass and Weeds; Little or No Brush	0.027	0.045	0.048	
Dense Growth of Grass or Brush	0.050	0.055	0.055	
Dense Brush and Trees	0.060	0.065	0.080	
Floodplain/Overbank Areas				6
Grass, Weeds; Some Brush and Trees	0.027	0.045	0.048	
Dense Grass, Weeds or Brush	0.050	0.055	0.065	
Dense Brush and Trees	0.070	0.080	0.150	
Buildings		0.500		N/A
Constructed/Modified Open Channels				
Concrete Blocks	0.015	0.035	0.050	15
Gabion	0.015	0.035	0.050	15
Grass (Maintained)	0.027	0.035	0.040	6
Concrete Riprap	0.014	0.016	0.030	15
Stone Riprap	0.033	0.035	0.036	
Streets				
Concrete Section				N/A
Smooth	0.015	0.016	0.017	
Rough	0.017	0.018	0.019	
Asphalt	0.014	0.015	0.019	
Pipes				15
Reinforced Concrete Pipe	0.012	0.013	0.017	
Corrugated Metal Pipe	0.015	0.022	0.033	
High Density Polyethylene Pipe (HDPE)	0.009	0.011	0.025	
Concrete Boxes (Smooth to Rough)	0.012	0.013	0.020	

3.5.1.1 *Street Drainage Criteria*

The surface drainage system and closed storm drain system for a street must be designed such that in combination, the systems provide enough capacity to fully contain the flow from 100-year storm within the street right-of-way or drainage easement. The Town also enforces a set of criteria for allowable spread of gutter flow depending on street classification, as outlined in **Table 10**. An "open" traffic lane is defined for the purposes of this manual as at least a 12-foot section of pavement that remains dry (no ponding or flowing water) for the duration of the rainfall event to allow for the safe passage of vehicles. Storm sewer inlets shall be provided along paved streets at such intervals to prevent the capacity and spread requirements from being exceeded.

Table 10: Street Drainage Criteria

Type of Street	Allowable Spread
Major Thoroughfare	One traffic lane in each direction to remain open
Collector Street	One moving traffic lane to remain open
Residential Street	n/a

Additional street drainage considerations are listed below:

1. The maximum allowable concentrated flow to a street including flow from driveways and flumes is 3 cfs.
2. Street surface drainage shall not be permitted to cross major thoroughfares or collector streets.
3. At any intersection, only one street shall be crossed with surface drainage, and this shall be the lower classified street.

3.5.2 Stormwater Inlets

Inlets are drainage structures used to collect surface drainage and to convey this water to storm drains or direct outlet to culverts. The capacity of an inlet depends upon its geometry and the cross slope, longitudinal slope, total gutter flow, depth of flow, and pavement roughness. Inlets servicing roadway drainage can be divided into three major classes:

- Curb Inlets
- Grate Inlets
- Combination (Grate and Curb-Opening) Inlets

Inlets may be classified as being on a continuous grade or in a sump. The term "on grade" refers to an inlet located on the street with a continuous slope past the inlet with water entering from one direction. The "sump" condition exists when the inlet is located at a low point and water enters from both directions. Artificial low points created by “seesaw” of street or alley grades will not be permitted. All low point inlets shall be designed in accordance with additional standards outlined in **Section 3.5.2.5**.

The procedures and technical criteria outlined in the iSWM manual shall be used for the hydraulic design of stormwater inlets. Additional criteria for various inlet types are summarized in the following sections. Refer to the Town of Little Elm Standard Construction Details for inlet construction and material requirements.

3.5.2.1 *Curb Inlets*

Curb inlets shall be a minimum of 8 feet in length. Recessed curb inlets are required on all collector and arterial streets. The Town Standard Details for both recessed and standard curb inlets include a depressed gutter line.

Where an alley or street intersects a street, inlets shall be placed in the intersecting alley or street whenever the combination of flow down the alley or intersecting street would cause the capacity of the downstream street to be exceeded. Inlets shall be placed upstream from an intersection whenever possible.

3.5.2.2 *Grate Inlets*

The Town’s MS4 program encourages measures to limit the inflow of floatables to the storm system. The installation of grate inlets in lieu of or in combination with the installation of debris separators in nonresidential developments may be permitted to help meet this objective and may be required in some instances by the Town Engineer for sites outfalling to Lewisville Lake. Installation of grate inlets in other instances requires approval by the Town Engineer. Grate inlets shall be designed with a 50% clogging factor due to the tendency of these inlets to collect debris.

3.5.2.3 *Combination Inlets*

Combination inlets consist of both a curb-opening inlet and a grate inlet placed in a side-by-side configuration, but the curb opening may be located in part upstream of the grate. Combination inlets may only be used with the approval of the Town Engineer.

All debris carried by stormwater runoff that is not intercepted by upstream inlets will be concentrated at the inlet located at the low point. Because this will increase the probability of clogging for grated inlets, the capacity of a combination inlet in sump shall be assumed to be the capacity of the curb inlet, neglecting the grate inlet capacity. On a continuous grade, the capacity of an unclogged combination inlet with the curb opening located adjacent to the grate is approximately equal to the capacity of the grate inlet alone. Capacity shall be computed by neglecting the curb opening inlet and following the design procedures for grate inlets.

3.5.2.4 *Drop Inlets*

The Town allows for the installation of drop inlets to collect water in nonpaved areas, such as ditches and swales. If used, grading plans to direct flow into drop inlets shall be included in the construction plans. Drainage interceptor swales or berms should be used, as required, to direct runoff to the drop inlets. Where swales or other means of collecting and directing runoff into drop inlets are needed, they should be contained in drainage easements according to the requirements outlined in **Section 3.3.2.1**.

Drop inlet capacity shall be evaluated with a 50% clogging factor due to the tendency of these inlets to collect debris. Flow into drop inlets shall be calculated using either the weir flow formula for an unsubmerged inlet or the orifice flow formula when depth of flow exceeds the depth of the opening.

The capacity of an unsubmerged inlet operating as a weir is:

$$\frac{Q}{P} = 2.5y^{3/2}$$

Q = flow capacity (cfs)

2.5 = weir coefficient (3.1) adjusted for 50% clogged inlet throat

P = perimeter of opening (ft)

y = head/depth (ft)

and the capacity of a submerged inlet operating as an orifice is:

$$Q = 0.6A(2gH)^{0.5}$$

Q = flow capacity (cfs)

0.6 = orifice discharge coefficient

A = area of inlet opening (ft^2)

g = acceleration due to gravity = 32.2 (ft/s^2)

H = head above centerline of inlet opening height (ft)

Both conditions should be evaluated, and the capacity should be determined from the condition that produces the more conservative value. The capacity calculations for drop inlets will be limited to a maximum head of 1 foot above the flowline of the inlet throat.

3.5.2.5 *Low Point Inlets and Positive Overflow Requirements*

Inlets are required at all low points in the gutter profile. Additionally, the drainage system shall provide for positive overflow at all low points. The term "positive overflow" means that when the inlets do not function properly, or when the design capacity of the conduit is exceeded, the excess flow can be conveyed overland along an open course. Generally, positive overflow is provided along a street or alley, but certain circumstances may require the dedication of drainage easement and construction of a concrete flume sized to carry the overflow. Reasonable judgment should be used to limit the easements on private property to a minimum.

In areas where positive overflow is not feasible, flanking inlets are required on each side of the low point inlet to act in relief of the inlet at the low point if it should become clogged. Flanking inlets shall be located to function before water spread exceeds the allowable spread at the sump location and shall be designed with a combined capacity to match the capacity of the primary sump inlet.

3.5.3 Storm Drain (Closed Systems)

A closed storm drain system shall be required within the right-of-way where the 100-year design storm exceeds the capacity of the street surface drainage system. Closed systems shall be extended to an adequate and acceptable outfall as described in **Table 3**.

3.5.3.1 *Flow in Storm Drains*

3.5.3.1.1 Full and Partial Flow

All storm drains shall be designed by the application of the continuity equation and Manning's equation. The continuity equation is given as:

$$Q = AV$$

Q = flow capacity (cfs)

A = cross-sectional flow area (ft^2)

V = velocity (fps)

Pipe flow shall be determined either through the appropriate charts and nomographs or by direct solutions of the equations. Charts and nomographs for circular pipes flowing full and partially full are included in the iSWM manual. The Texas Department of Transportation (TxDOT) *Hydraulic Design Manual* includes equations for flow in conduits with other cross sections.

Pipes and boxes shall be designed as if flowing full. Design flow depth of less than full to get a lesser wetted perimeter is not acceptable. Four wall wetted perimeter is required in the calculations. There will be hydraulic conditions that cause the conduits to flow partially full. Where this occurs, the hydraulic gradient should be shown at the inside crown of the conduit.

3.5.3.1.2 Hydraulic Gradient and Storm Drain Profile

The hydraulic grade line (HGL) shall be established for all storm drain systems. The 25-year HGL must be at or below the gutter line for pipe systems and 1 foot or more below the top of curb at inlets. For sump conditions

without an existing structural overflow, the 100-year HGL must be 1 foot below the top of curb at the inlet. For systems where no ROW exists, the 100-year HGL must be below finished ground.

Both the fully developed 25-year and 100-year hydraulic gradient lines (HGLs) shall be shown throughout the system. They shall be labeled in the construction plans both in the hydraulic calculations and on the storm drain profile. The design storm HGL shall be below the bottom of the improved subgrade for systems under pavement. For systems outside of the pavement, the HGL shall be lower than all inlet throats. Allowance of additional head may be required for planned future extensions of the storm drainage system.

The HGL shall start at the tailwater elevation or HGL of a connecting feature; the inside top of pipe; or at the HGL determined for a coincident confluence flow condition, whichever is highest. At the discharge end of pipes outfalling to a natural creek or stream, the hydraulic gradient of the creek for the design storm must coincide with the gradient of the storm drainage conduit. If an approved flood hydrograph is available to provide a coincident flow elevation for the system's peak, the table of coincident design frequencies in the iSWM manual can be used to assist with tailwater determination. If an approved flood hydrograph is not available, the starting HGL at the outfall into a creek or channel shall be the 100-year fully developed water surface elevation. Alternatively, a detailed hydrologic and hydraulic study can be performed to determine the coincident tailwater.

3.5.3.1.3 Velocities

Storm drains should operate with velocities of flow sufficient to prevent excessive deposits of solid materials. A minimum full flow velocity of 2.5 fps in the design storm and a minimum slope of 0.5% shall be maintained in the pipe unless otherwise approved by the Town Engineer. Velocities shall not exceed those listed in **Table 9**. Supercritical flow is not allowed in main lines.

3.5.3.1.4 Headlosses

Head losses at structures shall be determined for manholes, junction boxes, wye branches, bends, curves, and changes in pipe sizes in the design of closed conduits. Head losses must be incorporated into the gradient profile. Minimum head loss used at any structure shall be one-tenth (0.10) foot. Refer to the iSWM manual for the equations to calculate energy losses at pipe junctions, bends, manholes, inlets, and other situations.

Pipe direction changes will be curves using radius pipe unless approved by the Town Engineer. Ninety-degree turns on storm sewers or outfalls are prohibited. Laterals shall intersect the trunk line at 60 degrees.

3.5.3.2 *Pipe Material and Roughness Coefficients*

Underground systems shall be constructed with Class III reinforced concrete pipe or as otherwise provided in the Town's standard construction details. Alternate materials may be approved by the Town Engineer. The pipe size shall be a minimum of 18 inches for all public systems. A higher class of pipe may be required when underground storm drainage systems are constructed at shallow or deep elevations. Refer to the pipe manufacturer specifications for cover requirements.

A roughness coefficient will be selected which will represent the average condition of the pipe consistent with the values presented in **Table 9**. Other roughness coefficients may be approved at the discretion of the Town Engineer.

3.5.3.3 *Entrance/Outfall Structures*

Headwalls or sloped end treatments shall be constructed at the pipe ends of all storm drain systems. Sloped end treatments are required along streets when the drainage feature is adjacent and parallel to traffic flow. The sloped end treatment shall be a minimum 6:1 (horizontal to vertical) end section.

Storm drain systems that outfall to a stream, natural channel, or pond shall conform to the existing side slope of the channel and be connected to a headwall. Discharge flowlines of storm sewers are to be 2 feet above the flowline of creeks and channels, unless channel lining is present. Hard armor protection and energy dissipation shall be provided when discharge velocities exceed the maximum allowable velocity in **Table 9** and when specified by the Town Engineer.

3.5.3.4 *Access Points*

A manhole or access lateral shall be constructed at least every 500 feet to provide access into the closed system, or as otherwise directed by the Town Engineer. A lateral used as an access point shall be at least 24 inches in diameter, an approved material, and no more than 50 feet long to an open-air access point. Open air access is considered a designed entrance point or outfall without obstructions.

3.5.4 Open Channels

This section includes the drainage design criteria for ditches, channels, and dams. Land disturbances that include or are adjacent to a stream and result in impacts to the 100-year floodplain shall submit a flood study to meet the requirements of **Chapter 7**. If modifications to a stream or channel are determined to impact the Jurisdictional Waters of the United States (WOTUS), then the plans shall be submitted to the USACE for review and any required permitting shall be performed and approved prior to construction per the requirements of **Section 3.1.3.2.**

3.5.4.1 *Hydraulic Design*

The Town requires a tailwater/headwater analysis on any proposed open channels, upstream and downstream channel transitions, energy dissipation structures, obstructions, or small dams (less than 6 feet). The tailwater/headwater analysis shall be used to determine the actual headwater and tailwater elevations, head losses, capacity, freeboard, and floodplain impacts. If an approved flood hydrograph is available to provide a coincident flow elevation for the system's peak, the table of coincident design frequencies in the iSWM manual can be used to assist with tailwater determination. Alternatively, a detailed hydrologic and hydraulic study will be required.

For channels that require a flood study, a hydrologic routing model and hydraulic analysis will be required to determine impacts on existing floodplains and/or adjacent properties. If a stream or channel has an effective FEMA model and/or a Town Council adopted watershed model, the engineer will be required to use those models for the analysis.

For normal depth (uniform flow) calculations, the Manning's equation and slope-area method is to be used only for initial sizing. Exceptions for small outfall channels will be made at the discretion of the Town Engineer.

Supercritical flow will not be allowed for designed channels. However, for lined channels, the HEC-RAS analysis should include a mixed-flow regime analysis, to make sure no supercritical flow occurs for the designed channel. Mixed or supercritical flow may be allowed for analysis of existing conditions when required.

Upstream or downstream transitions from natural to modified channels along with channel outfalls will require a design based on a hydraulic study and will provide a non-erosive environment. Refer to the iSWM manual for design of channel transitions and energy dissipation.

3.5.4.2 *Types of Channels*

3.5.4.2.1 Unimproved Channels/Natural Streams

Where natural streams connect to improved closed systems and/or improved channels, permanent transitional materials and energy dissipation are required. In areas along natural streams where potentially excessive erosion or head cutting may occur or worsen, grade control structures, drop structures, or other structures may be required to stabilize the stream in order to protect structures or infrastructure.

3.5.4.2.2 Constructed/Modified Open Channels

Where constructed or modified open channels connect to a closed system, natural streams, or a channel of a different material, permanent transitional materials and energy dissipation are required. Modified channels shall be designed with the following minimum criteria:

1. Side Slopes shall be 4:1 (horizontal to vertical) for vegetated channels or as specified by manufacturer for other channel materials.

2. Bottom width shall be at least 6 feet.
3. Minimum channel slope is 1% for vegetated channels and 0.5% for hard armor channels or pilot channels.
4. New channels shall be designed to fully contain the 100-year storm with 1 foot of freeboard at all locations along the channel, or to the elevation of the 100-year flood elevation of Lewisville Lake, whichever is lower.
5. Modification or improvement of existing constructed/modified channels shall at a minimum maintain the existing capacity.
6. The maximum design velocity for all channels shall be as specified in **Table 9**. Higher velocities and/or channel armoring require a sealed geotechnical study for design and approval by the Town Engineer.
7. Each reach of a channel that will require Town maintenance must have a ramp for maintenance access. Ramps shall be at least 10-feet wide and have 15% maximum grade. 12-foot width is required if the ramp is bound by vertical walls.
8. A fence shall be constructed on each side of the channel. Fences are not allowed to cross public channels.
9. New concrete channels are not allowed unless it is required as part of the repair or replacement of an existing concrete channel.

3.5.5 Culverts

3.5.5.1 *General Design Criteria*

Culverts shall be designed based on standard design procedures outlined in the iSWM manual. used to carry ditch or surface flow safely under roadways and driveways in order to meet conveyance standards for the design storm. The driveway or roadway shall have an invert above the pipe for positive overflow. If a culvert is not feasible for a driveway, then the driveway shall be constructed with an invert.

Concrete sloped end treatments are required when culverts are adjacent and parallel to traffic flow. Erosion protection will be provided at the upstream and downstream ends of the sloped end treatment for all culverts. Stabilization and/or energy dissipation shall be provided where allowable channel velocities are exceeded upstream and downstream of the culvert.

Culverts shall be constructed with Class III reinforced concrete pipe or another approved material as shown in the Town's standard construction details. The pipe size shall be a minimum of 24 inches for roadway crossings and 18 inches for driveway culverts. A higher class of pipe may be required when underground storm drainage systems are constructed at shallow or deep elevations. Refer to the pipe manufacturer specifications for cover requirements.

When practical for multiple barrel culverts (3 or more), one of the barrels should be placed at the flowline of the stream with the other barrels at a higher elevation to create a single flow path for lower flows and reduced sediment and debris accumulation.

3.5.5.2 *Minimum Elevations*

Culverts shall be designed with a minimum 1 foot of freeboard between the 100-year headwater elevation and the surface of the road and/or 2 feet of freeboard below any adjacent habitable structure, whichever establishes the more stringent requirement. Other surrounding physical conditions may be cause for an increase in this requirement at the discretion of the Town Engineer.

3.5.5.3 *Slope and Velocity*

The maximum slope using concrete pipe is 10% before pipe-restraining methods must be taken. The minimum slope is 0.5%. Maximum vertical distance from throat of intake to flowline in a drainage structure is 10 feet. Drops greater than 4 feet will require additional structural design.

Velocities in culverts should be limited to no more than 15 feet per second, but downstream conditions very likely will impose more stringent controls. Culvert discharge velocities shall not exceed the maximum permissible

velocities for open channels listed in **Table 9**. Discharge velocities that are too high must be reduced to allowable velocities using appropriate energy dissipation structures or techniques.

3.5.5.4 *Headwater Limitations*

For safety reasons, headwater depth/culvert diameter ratio (HW/D) should not exceed 1.5 for the 100-year event peak flow. Variance to this criteria may be permitted by the Town if justification is provided and sufficient measures are taken to reasonably avoid any safety impacts. Assessment of the impacts caused by exceeding the design headwater depth should account for:

- Hazard to human life and safety.
- Potential damage to the culvert, embankment stability and roadway.
- Traffic interruption in the event of roadway overtopping.
- Anticipated upstream and downstream flood risks, for a range of return frequencies.

The headwater shall be checked for the 100-year storm event elevation to ensure compliance with floodplain management criteria and to ensure it is contained within the right-of-way or easement. The headwater shall not cause damages to the upstream property.

3.5.5.5 *Tailwater Considerations*

If the culvert outlet is operating with a free outfall, the critical depth and equivalent hydraulic grade line shall be determined. If an upstream culvert outlet is located near a downstream culvert inlet, the headwater elevation of the downstream culvert will establish the design tailwater depth for the upstream culvert. For culverts discharging into natural creeks, channels, or ponds, the tailwater shall be assumed to be the 100-year fully developed water surface elevation. If an approved flood hydrograph is available to provide a coincident flow elevation for the system's peak, the table of coincident design frequencies in the iSWM manual can be used to establish the tailwater elevation. Alternatively, a detailed hydrologic and hydraulic study can be performed to establish the tailwater elevation.

3.5.6 Bridges

3.5.6.1 *Hydraulic Design*

A hydrologic and hydraulic analysis using HEC-RAS is required for designing all new bridges, bridge widening, bridge replacement, and roadway profile modifications that may adversely affect the floodplain, even if no structural modifications are necessary. The hydraulic analysis should demonstrate no-rise (0.00 feet) in the water surface elevation for the 100-year storm. Typically, this analysis should include the following:

1. Peak discharges for fully developed watershed conditions,
2. Proposed conditions water surface profiles for design flood and other frequency flood impacts.
3. Consideration of the potential for stream stability problems and scour potential.

Additional discussion on bridge hydraulics is included in the *TxDOT Hydraulic Design Manual*.

3.5.6.1.1 Loss Coefficients for Hydraulic Models

The contraction and expansion of water through the bridge opening creates hydraulic losses. These losses are accounted for through the use of loss coefficients. Contraction (K_c) and Expansion (K_e) Coefficients shall be used at the bridge location in accordance with current FEMA guidelines.

3.5.6.2 *Minimum Elevations*

Bridges shall be designed to pass the 100-year flow with a minimum 1 foot of freeboard between the 100-year surface elevation and the low chord of the bridge. Analysis must consider both the fully developed and FEMA effective discharges, and the freeboard elevation will be set using the most conservative results. Where fully

developed discharges are not available, the Engineer will be required to perform a flood study to determine 100-year water surface elevations.

3.5.6.3 *Scour Analysis*

A scour analysis shall be submitted with bridge design plans. Scour analysis shall be performed in accordance with the latest edition of the TxDOT *Geotechnical Manual*, based on the guidelines and procedures outlined in *HEC-18 Evaluating Scour at Bridges (5th Ed.)*. The HEC-RAS scour routines shall generally be used to perform bridge scour computations. Aerial utility crossings with piers located in the main channel shall also be evaluated for local pier scour using the methodology outlined in *HEC-18*.

Scour revetment shall be provided as needed and shall be designed using the methodology outlined in *HEC-23 Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Guidance*. Alternative methodologies for scour analysis and revetment may be approved at the discretion of the Town Engineer.

Section 3.6. Stormwater Storage Facilities

Proposed stormwater discharge from a site shall not exceed the calculated discharges from existing conditions for the 2-, 25-, and 100-year design storm. On-site detention may be proposed to mitigate the impacts of increased discharges due to site development. In some instances, detention may be shown to exacerbate potential flooding conditions downstream. In lieu of a detention facility, the Engineer may document that the excess flow will not create adverse impacts as defined in **Table 3**.

3.6.1 Detention Storage Calculation

The modified rational method is allowed for planning and conceptual design for watersheds of 200 acres and less. Sizing is not exact and may result in undersized detention/retention pond requirements. For final design purposes, the modified rational method is allowed only for watersheds of 25 acres and less. The modified rational method is not acceptable for basins in series. Detention basins draining watersheds over 25 acres shall be designed using unit hydrograph methodology. The unit hydrograph method is also allowed for basins with watersheds less than 25 acres and may be required at the discretion of the Town Engineer.

A calculation summary shall be provided on construction plans. For detailed calculations of unit hydrograph studies, a separate report shall be provided to the Town for review and referenced with date, engineer, and title on the construction plans. Stage-storage-discharge values shall be tabulated, and flow calculations for discharge structures shall be shown on the construction plans. Routing calculations must be used to demonstrate that the storage volume and outlet structure configuration are adequate.

3.6.2 Pond and Spillway Geometry

The following criteria shall apply:

1. Detention basin embankments shall have a 10-foot crown width.
2. Fencing may be required around the detention area at the discretion of the Town Engineer.
3. Detention Basins shall be designed with at least one maintenance ramp of at least 10 feet wide with a maximum slope of 15%. Twelve (12) feet in width is required next to vertical walls.
4. A freeboard of 1 foot will be required for all detention ponds.
5. Grassed side slopes shall be 4:1 or flatter and less than 20 feet in height. Slopes protected with concrete riprap shall be no steeper than 2:1. A detailed geotechnical investigation and slope stability analysis is required for grass and concrete slope pavement slopes greater than 12 feet in height. A concrete-lined or structural embankment can be steeper with the approval of the Town Engineer.
6. An emergency spillway shall be provided at the 100-year maximum storage elevation with sufficient capacity to convey the fully urbanized flood mitigation storm assuming blockage of the closed conduit

portion outlet works with 6 inches of freeboard. Spillway requirements must also meet all appropriate state and federal criteria. Design calculations will be added for all spillways.

7. Dry detention basins are sized to temporarily store the volume of runoff required to provide flood protection up to the flood mitigation storm, if required. Dry detention basin design should consider multiple uses, such as recreation. As such, pilot channels should follow the edges of the basin to the extent practical.
8. The bottom of the basin shall have a minimum grade of 1%, although swales may have minimum grades of 0.5%. Concrete flumes shall be provided for slopes less than 0.5% and may have slopes as shallow as 0.2%. They shall be at least 6 feet wide.

3.6.3 Permitting and Dam Safety Requirements

All federal, state, and local laws pertaining to the impoundment of surface water relating to the design, construction, and safety of the impounding structure shall apply. Criteria established by the State of Texas for dam safety (*TAC Title 30, Part 1, Chapter 299*) and impoundment of state waters (*Texas Water Code Chapter 11*) shall apply where required by the state, and where required by the Town Engineer. Should the engineer desire to utilize an existing facility that would qualify under these criteria and the use of the facility changes from an agricultural use to another use, the existing facility may need to be brought into compliance with the TCEQ *dam safety criteria*.

If a dam falls under the TCEQ dam safety criteria, the Town will require review and approval from TCEQ prior to authorizing construction. Copies of any federal, state, or local permits issued for the proposed impoundments shall be submitted to the Town Engineer. TCEQ rules and regulations regarding impoundments shall be followed. In accordance with Texas Water Code §11.142, permanent surface impoundments including retention and detention ponds may be required to obtain a water rights permit from the TCEQ.

Section 3.7. Floodplain Development

The following information is included for reference and to supplement the provisions outlined in the Town's *Flood Control and Prevention Ordinance*. Where codified flood protection provisions conflict with the provisions of this manual, the more stringent of the criteria shall apply.

The Town regulates development in all flood-prone areas. Flood-prone areas include areas located within the FEMA Special Flood Hazard Area (SFHA), flood hazards identified as part of a drainage study or Town Council adopted watershed study, or reported flood-prone areas located in Zone X. Reported flood-prone areas are subject to the requirements of this manual even if a flood zone has not been identified for the area.

Any land disturbance that includes impacts to a flood-prone area or could have impacts on floodplain limits for an associated stream shall require a hydraulic analysis (flood study) to determine drainage easements, establish minimum finished floors for insurable structures, and evaluate proposed modifications to existing floodplains or floodways. Depending upon the proposed project, location, and type of stream, the stormwater submittals may include a Flood Study, No Rise Certification, Floodplain Development Permit, FEMA Letter of Concurrent/Approval, and/or a USACE Section 10 and Section 404 Permit.

3.7.1 Effective Models

When available, effective models provided by the Town are required to be utilized to establish existing conditions and evaluate proposed project impacts to the watershed. When Town adopted models are utilized, any submitted models shall be consistent with the base modeling platform and version. Proposed conditions shall be incorporated into the Town's watershed models and submitted for review.

3.7.2 Compensatory Storage

Compensatory storage is required for all storage lost or displaced in a Regulatory Floodplain due to land disturbance. Hydraulically equivalent compensatory storage requirements for fill or structures placed in the SFHA and/or within a riverine flood hazard area identified in a Town Council adopted watershed study shall be at least equal to the volume of the storage lost or displaced. Such compensation areas shall be designed to drain freely and

openly to the channel and shall be located opposite or adjacent to fill areas. The Regulatory Floodplain storage volume lost below the existing 10-year frequency flood elevation must be replaced below the proposed 10-year frequency flood elevation. The Regulatory Floodplain storage volume lost above the 10-year existing frequency flood elevation must be replaced above the proposed 10-year frequency elevation.

3.7.3 Floodplain Development Permit

Any work to be performed within any flood-prone area of the town required a Floodplain Development Permit. Variances will not be issued from this requirement for proposed projects in the SFHA. Applications for a Floodplain Development permit shall be submitted to the Town with the flood study that evaluates existing conditions and proposed project impacts.

3.7.4 FEMA Submittal Requirements

Coordination with and approval from the Town Floodplain Administrator is required for all floodplain submittals. Payment of a review fee to the Town may be required.

All proposed projects located in the SFHA shall be evaluated for the need of a Conditional Letter of Map Revision (CLOMR). A CLOMR shall be submitted to FEMA in the event that the proposed modifications to the SFHA result in a rise greater than 0.0 feet to the effective base flood elevation. The Town reserves the right to require a CLOMR for any proposed project located within the SFHA.

Upon completion of construction within the SFHA, all applicants shall verify that the site was constructed according the proposed conditions. As-built plans, certified by a professional engineer registered in Texas, shall be submitted to the Town for verification of as-built conditions. Hydraulic modeling to reflect as-built conditions is required for projects constructed without conditional approval or where as-built conditions differ from the proposed conditions modeling. In all cases, a Letter of Map Revision (LOMR) shall be submitted to FEMA for approval.

Adoption.

This ordinance is hereby adopted and shall be known as the "Official Drainage and Flood Control Ordinance" of the Town of Little Elm.

Purpose and Scope.

The purpose of policies and design standards set forth herein is to insure adequate stormwater drainage and flood control within the Town of Little Elm. The policies and standards herein are intended to protect public health and safety, to prevent property damage due to flooding, to equitably distribute the cost of necessary drainage improvements, and to minimize the maintenance cost of drainage facilities constructed. Any development or improvement of property affecting storm drainage and flood control in the Town of Little Elm is subject to the provisions of this ordinance.

A. The development of land shall consider all drainage elements normally used in the engineering standards of design.

B. Stormwater design shall consider the maximum results from a 100-year frequency storm. The release rate of stormwater shall be such that the flows of runoff water after the land development is completed shall not exceed the flows existing before land development is started. In cases where the land considered for development is adjacent to Lake Lewisville and a direct discharge system can be directed into the lake area, then the increased runoff may be allowed to flow without consideration of detention systems.

C. Where existing development is in place upstream of the land area under consideration for development, provisions shall be made within the engineering design to provide capacities for the potential full flows which may be created by the upstream properties based on the result of a 100-year rainfall event.

D. All standards of the corps of engineers established around Lake Lewisville will be followed. The developer or his designee shall certify that all standards of the corps of engineers around Lake Lewisville have been met.

Standard Provisions for Storm Drainage.

A. All construction for storm drainage in the development or improvement of real property within the Town of Little Elm and its ETJ shall conform to the following standards and requirements:

B. Storm sewer inlets shall be provided along paved streets at such intervals as are necessary to limit the depth of flow as follows: SPREAD OF WATER

Table 1: Allowable Storm Water Spread

Type of Street	Allowable Speed
Major thoroughfare	One traffic lane in each direction to remain open
Collector street	One moving traffic lane to remain open
Residential street	Maximum depth for design storm as shown on

C. Section VI herein (figure 2) is curb deep.

D. A closed storm sewer system shall be required to accommodate a run-off exceeding the street capacity, as provided above, up to and including the design capacity of a 72-inch concrete pipe.

E. An open channel may be permitted to accommodate run-off exceeding the design capacity of a 72-inch pipe, as provided below:

1. Channels draining an area with a "CA" factor (coefficient of run-off and drainage area, as used in the hereinafter described "rational formula") of less than 600 shall be concrete lined to the design depth, plus six-inch freeboard except that a closed system as provided above may be used. A 20-foot wide access easement shall be provided along at least one side parallel to channel.

2. Channels draining an area with a "CA" factor between 600 and 1,000 shall be improved to a capacity of the 100-year design discharge by excavation, straightening and realignment, as required, and also the construction of a concrete lined channel having a width of not less than the bottom width with concrete lined to a depth of at least two feet. Earthen side slopes shall be no steeper than 4:1, horizontal to vertical, and shall be sodded to prevent erosion.

3. The setback for the building line shall be based on a minimum of five to one setback so that as a minimum of 20 foot of width access and maintenance strip is provided parallel and adjacent to each side of the top bank of all drainage channels in this section.

F. In lieu of the improvements of a channel draining an area with a "CA" factor in excess of 1,000, the town council may elect to accept the dedication of all land within the natural 100-year floodplain of the existing drainage channel as a permanent right-of-way.

G. That the criteria for drainage improvements as hereinabove set forth in paragraphs A. through D. of this section shall be applicable to publicly owned lands solely at the discretion of the Town of Little Elm.

H. Excavation, fill and grading operations within the town limits shall be undertaken only after a proper permit has been obtained from the town.

I. *Responsibility of Owner or Developer for Storm Drainage.*

1. The owner or developer of property to be developed or used shall be responsible for all storm drainage flowing through or abutting such property. This responsibility includes the drainage directed to that property by prior development as well as the drainage naturally flowing through the property by reason of topography. It is the intent of this ordinance that provision be made for storm drainage in accordance with section III above, at such time as any property effected is proposed for development use.

2. Where the improvement or construction of a storm drainage facility is required along a property line common to two or more owners, the owner hereafter proposing development or use of his property, shall be responsible for the required improvements at the time of development, including the dedication of all necessary right-of-way or easements, to accommodate the improvements.

3. Where a property owner proposed development or use of only a portion of his property, provision for storm drainage in accordance with section III above shall only be required in that portion of the property proposed for immediate development or use, except as construction or improvements of a drainage facility outside that designated portion of the property is deemed essential to the development or use of that designated portion.

4. The owner or owners shall dedicate to the town the required drainage easements. Determination of minimum easement required shall be made by the town engineer.

5. In the event that an owner or developer desires to impound stormwater by excavation, filling or construction of a dam within a property, thereby creating a lake, pond, or lagoon as a part of the planned development of that property, the standard provisions for storm drainage as established in section III of this ordinance shall not be applicable, provided:

6. That an engineering plan for such construction, accompanied by complete drainage design information, prepared by a registered professional engineer, shall have been approved by the Town of Little Elm;

7. That the owner or developer shall have agreed to retain under private ownership the lake, pond, or lagoon constructed, and to assume full responsibility for the protection of the general public from any health or safety hazards related to the lake, pond, or lagoon constructed;

8. That the owner or developer shall have agreed to assume full responsibility for the maintenance of the lake, pond, or lagoon constructed;

9. That the obligations herein shall run with the land and shall be a continuing obligation of the owner or owners of such land;

10. That the requirements of the Texas Water Code pertaining to impoundment of surface water are complied with including the design construction and safety of the impounding structure;

11. On any existing structure, the owner will furnish a study proposed by a professional engineer for the town for approval.

J. *Responsibility and Participation of the Town in Storm Drainage Improvements.*

1. The town may, in its sound discretion, participate in the cost of such improvements as are required by this ordinance in an amount not to exceed 20 percent.

2. The town may, in its sound discretion, participate in any project of improvements by the levy of a special assessment against the lands to be enhanced in value by such improvements.

3. The town may acquire drainage easement necessary for such improvements by acceptance of dedication, purchase, or condemnation.

4. The town shall, upon acquisition of the drainage easement and the completion of improvements as hereinabove provided, assume full responsibility for the maintenance of such drainage facilities.

K. *Engineering Design.* The design of all storm drainage facilities shall be in accordance with the following criteria:

A. Design frequency:

Table 2: Design Frequency

Drainage Facility	Storm Frequency
Closed storm sewer systems	10 r. with emergency 100-year overflow
Closed storm sewer system at street low point or sag	25 r. with emergency 100-year overflow
Culverts and bridges	100-year
Concrete lined channels	50 r. with emergency 100-year overflow
Earthen channels	100-year

L. Computation of stormwater run-off shall be by the "rational method", which is based on the principle that the maximum rate of run-off from a given drainage area for an assumed rainfall intensity occurs when all parts of the area are contributing to the flow at the point of discharge. The formula for calculation of run-off by the "rational method" is:

Q = CIA, where

Q = The maximum rate of discharge, expressed in cubic feet per second.

C = A run-off coefficient which varies with the topography, land use and moisture content of the soil at the time the run-off producing rainfall occurs. This run-off coefficient shall be based on the ultimate use of the land as recommended by the master plan for the Town of Little Elm and shall be selected from table I herein on the basis of the used shown on land use and zoning map of the comprehensive zoning ordinance for the Town of Little Elm, if an area has had a change of zoning to give the area land use for which the "C" in table II is higher than use shown on land use and zoning maps, the higher "C" factor shall be used.

M. For drainage areas where the use of the rational method does not provide reliable data, the use of a unit hydrograph flow determination shall be made. The use of a unit Hydrograph calculation will be based upon standard and accepted engineering principles normally used in the profession subject to the approval of the town engineer.

I = Rainfall intensity in inches per hour from the applicable curves of figure 1. time of concentration or duration of rainfall for use in figure 1 shall be calculated by data shown in table 2.

A = The drainage area, expressed in acres, contribution to the runoff at the point in question. Calculation of the drainage area shall be made from a topographic map, a copy of which shall be submitted with the engineering plans for approval.

N. Computation of runoff shall be based on a fully developed drainage area, or watershed, in accordance with the land use projected in the then current comprehensive land use plan for the Town of Little Elm.

Table 3: Design Criteria

Land Use from Master Plan	Value of "C" (Run-off Coefficient)
Flat 0% to 1%	
Park areas—No developable land	0.2
Park and school land tract	0.3
Single-family residential	0.4
Duplex	0.45
Multiple family	0.5
Local business	0.6
Central business	0.75
Commercial	0.75
Industrial	0.7
Rolling - 1% to 3½%	
Park areas—No developable land	0.3
Park and school land tract	0.4
Single-family residential	0.5
Duplex	0.55
Multiple family	0.6
Local business	0.7
Central business	0.8
Commercial	0.8
Industrial	0.75
Rough - 3.5% and over	
Park areas—No developable land	0.35
Park and school land tract	0.45

Single-family residential	0.6
Duplex	0.65
Multiple family	0.7
Local business	0.75
Central business	0.85
Commercial	0.85
Industrial	0.8

Table 4: Average Velocity for Use in Determining Time of Concentration

Description of Water Course	0% to 3% V in f.p.s.	4% to 7% V in f.p.s.	8% to 11% V in f.p.s.	Over 12% V in f.p.s.
Surface drainage	5	10	15	18
Channels	Determine V by Manning's Formula			
Storm sewers	Determine V by Manning's Formula			

f.p.s. = feet per second

P. Average velocity of the runoff for calculating time of concentration or duration of rainfall for use in figure 1. These average velocities in this table shall be used unless the designer shows calculation of velocity by streets and/or storm sewers.

Q. Using the average velocities from this table the designer shall calculate the time of concentration by the following formula unless more data are shown on the plans for calculating time of concentration.

T = "Inlet Time" + D/(V*60)

Where:

T = Time of concentration in minutes for use in figure 1.

D = Distance in feet from point of concentration to upper end of drainage area under consideration.

V = Velocity in feet per second from this table or velocity calculated by designer by streets and/or storm sewers. "Inlet Time" = 5 minutes from property zoned for multiple family, local business, central business, commercial, or industrial.

"Inlet Time" = 10 minutes for property zoned for parks, schools, single family residential, and duplex.

R. The capacity of storm sewers, culverts, bridges, and open channels shall be determined by the use of the Manning's Formula, and the design of the facility derived accordingly. The Manning's Formula is:

$Q = 1.486 R^{2/3} S^{1/2} * A$

Where:

Q = Discharge, expressed in cubic feet per second.

n = Roughness coefficient, based on condition and type of conduit lining.

S = Slope of hydraulic gradient, expressed in feet of vertical rise per foot of horizontal distance.

R = Hydraulic radius (area of flow divided by the wetted perimeter).

A = Cross sectional area of flow in conduit, expressed in square feet.

S. The construction of all concrete improvements shall be in accordance with the standards set forth in the Paving and Drainage Specifications handbook of the Town of Little Elm.

A. The frequency chart in years (figure 1), the inlet capacity for low point inlets (figure 2), the drainage capacity road sections (figure 3), are hereby adopted as a part of this ordinance.

T. Complete engineering plans for storm drainage facilities shall be prepared by a professional engineer, registered in the State of Texas, and experienced in civil engineering work. The total cost for such engineering plans and specifications shall be borne by the owner or the developer and shall be furnished to the town engineer for their review.

U. In any development or improvement of property, the owner may be required to provide at their expense a preliminary drainage study for the total area to be ultimately developed. This study shall be submitted to the town engineer prior to approval of the engineering plans for the total development, or any increment thereof.

Construction in Areas Subject to Flooding.

A. No building or structure shall hereafter be erected or relocated within the 100-year floodplains of the major drainageways, unless the finished floor elevation of such a building or structure is a minimum of two feet above the high water elevation calculated for the runoff from a rainfall having a design frequency of 100 years. In all other areas subject to flooding, the finished floor elevation shall be a minimum of the high water elevation calculated for the runoff from a rainfall having a design frequency of 50 years and shall not flood within the 100-year frequency. The owner or developer shall furnish, at their expense, to the town engineer sufficient engineering design information to confirm that the minimum floor elevation proposed is as required by this paragraph.

B. No building or structure shall be erected or relocated within a floodplain of drainage channel which will obstruct the natural flow of water within that floodplain or channel.

C. No excavation, filling, or construction of embankment, or landscaping shall be permitted within a floodplain or channel which will obstruct the natural flow of the water within that floodplain or channel, unless sufficient engineering design information is furnished to the town engineer in order that they may determine that same will not adversely affect flow characteristics within that floodplain or channel, resulting in damage to that or any other property nearby.

D. Building or Structure Setback Requirement. No building or structure shall hereafter be constructed, reconstructed, or relocated within 20 feet of any open drainage channel. It is the intent of this section to insure that an unobstructed width of at least 20 feet is maintained between the top side slope of any such drainage channel and any building or structure.

E. Construction over Drainage Facilities. No building or structure shall hereafter be constructed, reconstructed, or relocated over or across any storm drainage facility, unless specifically approved by the town engineer pursuant to that criteria established in paragraphs A and B of this section.

F. Construction of buildings or structures may be permitted over or across closed drainage systems, to include concrete box culverts or reinforced concrete pipe. Engineering plans and specifications shall be prepared by a professional engineer registered in the State of Texas and experienced in civil engineering work. The total cost for such engineering plans and specifications shall be borne by the owner or the developer and shall be furnished to the town engineer for their review and approval.

G. Construction of pedestrian bridges or small vehicular crossings may be permitted by the town engineer. Engineering plans and specifications shall be prepared by a professional engineer registered in the State of Texas and experienced in civil engineering work. The total cost for such engineering plans and specifications shall be borne by the developer and shall be furnished to the town engineer for their review and approval.

Storage; General.

Stormwater management programs aimed at controlling increased stream water runoff generated by development are a top priority in urban watershed planning. More frequent flooding, increased rates and volumes of stormwater runoff, increased stream channel erosion and degradation, increased sedimentation, and increased water pollution are all problems intensified by increased stormwater runoff resulting from development. Storage of excess urban storm runoff is one of the most promising methods available in preventing urban flood damage.

1. Storm runoff storage with reduced release rates can hold downstream flood flows to within the safe conveyance capacity of the storm sewer and stream system. In most cases it can be shown that storage is more economical than increasing downstream conveyance capacity. Storage facilities should be planned and designed to assure an effective and efficient operation and maintenance program.

2. Retention and detention are two generalized types of storm runoff storage used to control flooding. Retention storage refers to storm runoff collected and stored for a significant period and released or used after storm runoff has ended. Retention storage usually consists of "wet reservoirs" which often have agricultural, recreational, and/or aesthetic value. Detention storage consists of reducing the rate of runoff for a short period of time to reduce peak flows by controlling the discharge through an outlet structure and by extending the period of runoff.

3. Skillful use of the procedures outlined in this section will provide reasonable solutions to drainage policy requirements. Individual and community experience in the use of these techniques will evolve into a methodology which will allow urban growth without the attendant drainage problems.

Storage Classification. Storage can be classified by location as follows:

a. *Rainfall storage.* The storage of water near the point of rainfall occurrence or before storm runoff accumulates significantly. Rainfall storage is usually accomplished by roof top ponding, parking lot ponding, property line swale ponding, and small on-site ponds.

b. *Runoff storage.* Water stored after storm runoff has accumulated significantly and begun to flow in a drainage system. Runoff storage is usually accomplished by off stream storage, channel storage, or on-stream storage.

Rainfall Storage.

a. Rooftops. The building codes require roof load design for rain and snow. The design load may be converted to equivalent water depth in inches which can be safely contained on flat roofs. The maximum storage allowed for design purposes should not exceed this depth unless a building is designed to withstand a greater roof load. The depth of water can be controlled by proper sizing of downspouts and by constructing scuppers through the parapet walls.

b. Another method of achieving rooftop ponding involves placing loose gravel windrows or dikes a few inches in heights so that storm runoff is trapped as it moves toward the drainage outlet. Individual wedge-shaped ponds form behind the small dikes and slowly drain as the stormwater filters through the gravel. This solution is of limited value, however, as there is no way to assure its permanence.

c. The possibility of overflows exist and will occur quite often during major storms. Overflow drains should be used to protect against roof overloading. Periodic inspection and proper maintenance will reduce the possibility and the hazards of overflows.

d. Special attention must be given to the water tightness of the roof to assure that no leakage occurs due to the accumulation of water.

Parking Lots.

A. Considerable area in urban development is occupied by parking lots. If planned correctly, these paved areas can provide adequate detention with minimum inconvenience to the public and without functional interference.

B. There are two general methods of stormwater detention that can be utilized on parking areas. One form involves the storage of runoff in depressions constructed near drains or outfall structures. The second method of stormwater detention on parking lots consists of using the paved parking areas to channel stormwater to grassed or gravel filled areas for maximum infiltration and decrease in overland flow.

Recreation Areas.

A. Recreation areas, such as sports fields, generally have a substantial area of grass cover which often has a high infiltration rate. Storm runoff from such fields is minimal. A secondary use of such recreation fields can be made by providing for limited detention storage of runoff from adjacent areas.

B. Since these areas are not used during periods of precipitation, detention ponding should not seriously impede their primary use. To minimize after effects, the recreation area should be designed so that it will thoroughly drain. In addition, the vegetation used on the area should be tolerant of periodic inundation and wetness.

Property Line Swales.

A. Subdivision planning and layout requires adequate surface drainage away from buildings. This is obtained by sloping the finished grade in all directions away from the building. The layout often calls for a swale to be located along the back property line, which then drains longitudinally through the block. Where this is used, the design shall include a concrete flume section with baffles to slow the flow of water yet maintain constant point for discharge.

B. Temporary ponding facilities along the rear lot line may include small controlled discharges along the back property line or, if the subsoil conditions are favorable, several inches of rainfall could be expected to percolate into the ground during and after a storm.

C. Prior to planning for property line swale ponding, the engineer should determine that saturation of the subsoil will not have an adverse effect on building foundations. In cases where significant subsoil problems exist, water should not be ponded or percolated into the ground.

Combinations.

In many instances, one on-site detention method cannot conveniently or economically satisfy the required or needed amount of stormwater storage. Limitations in storage capacities, site development conditions, soils limitations and other related constraints may require that more than one method be utilized. For example, roof top, parking lot, and surface pond storage might all be required to compensate for the increase in runoff due to development of a particular site. Whatever combinations are suitable may be incorporated into a site development plan.

Runoff Storage.

A. *Off-stream Storage.* The storage of water in depressed open areas, in reservoirs, and on low lying recreation fields to which storm peak flows are routed in usually termed off-stream storage. It is usually characterized by a side channel spillway or overflow from the main channel.

B. *Channel Storage.* Although all channels inherently store water, channels can be made to attenuate runoff by altering their hydraulic characteristics in a way that will reduce peak flows. Side channels that run essentially parallel to the main stream channel are also a means of temporarily storing water during excessive rainfall events.

C. *On-stream Storage.* The construction of an embankment across a channel so that a storage pond is formed represents on-stream storage. Spillway considerations are important to pass large floods exceeding the storage capacity. Properly protected roadway embankments are well suited for this purpose.

D. *Multipurpose Use.*

a. Rainfall storage and runoff storage systems are most practical when designed for multi-purpose use. For maximum land use efficiency the design engineer must consult early with the planning department and the parks and recreation department of the town.

b. Lower cost recreation. Making use of detention storage areas as parks and greenbelts, ballfields and playing fields, satisfies two needs and reduces the cost of each. The mini-park concept, where small recreational areas are provided in neighborhoods within safe walking distances for children, can be a typical joint effort of the drainage design engineer and the planning and recreational staffs of the town. Provisions must be made for maintenance of such areas.

c. Multi-use criteria. The multiple use of storage areas is a field of endeavor where the fervent disciplines should develop desirable and acceptable criteria fitting the needs of the local community. It is with storage, including both detention and retention storage, that an important potential exists for the reduction of flooding, drainage costs, and to some degree recreation costs.

Hydraulic Design Criteria.

a. *General.* Hydraulic and hydrologic design criteria provide the guidelines for design and construction of stormwater storage facilities. These criteria are a necessary part of a stormwater management program needed to protect low-lying areas by preventing unacceptable increases in runoff rates as urban development progresses. The engineer should be familiar with the drainage policy of this ordinance before considering the feasibility of a storm runoff detention facility. Existing land contours of the property should be a consideration in developing the drainage plan. In many instances, storage can be achieved economically by blocking the overland flow of stormwater runoff with various land forms, curbs, walls, terraces, and other means. The amounts to designing a drainage system that will minimize the reduction in the critical time of concentration as the property is developed. A drainage project located in a watershed that has a master plan may involve additional considerations which require review. Consultation with the town is essential to insure compliance with the overall watershed master plan.

b. *Design factors and procedures.* Before proceeding with engineering design of an on-site storage facility, the physical and technical factors should be identified and the basic design procedures established. A discussion of design factors and procedures follow.

(1) The drainage plans for a particular storage facility should include all property lines, topography, area, location, and all other items necessary to meet policy requirements outlined in the "Drainage Policy for the Town".

(2) Care must be taken to locate, layout, and design the storage facility in a manner to insure safety and ease of maintenance.

c. The rate of inflow to the storage facility (inflow hydrographs) and all hydrologic considerations must assume ultimate development of the site's contributing area. Several inflow hydrographs should be prepared to examine their effect on downstream flooding for the various design storm frequencies. The number of inflow hydrographs to be provided may vary but should always adequately describe the range of flows expected for the design storm frequencies. These various design storm inflow hydrographs and an acceptable flood routing procedure will be necessary in sizing the outlet works for

the storage facility. An emergency spillway should be provided to pass runoff that exceeds the design capacity of the detention facility.

d. The maximum allowable release rate from a storage facility is selected after careful review of runoff rates for all pertinent storms. As a minimum, the pertinent design storm frequencies should include the 10, 25, and 100-year events. However, specific site conditions may require that additional consideration be given a particular area. The town engineering department should be contacted to identify special design conditions. The maximum allowable peak flow released from a particular site is selected to comply with the policy section of this manual. In all cases, the maximum release rate should be calculated using the hydraulic gradient created when the storage area is being utilized at full capacity.

e. Key items to consider in determining the maximum allowable release rate are: a) the peak flow rates for the various design storm frequencies prior to development, b) the capacity of the downstream stormwater channel or storm sewer, c) compliance with a master plan for the watershed (if one exists), d) problems, if any, that are created onsite by the storage of stormwater runoff, e) potential problems created downstream when the onsite storage capacity is fully utilized and the excess runoff flows overland into downstream areas.

f. The stormwater storage volume required is given by the maximum difference, at any time, between cumulative total inflow volume and cumulative outflow volume measured from the beginning of inflow for a 25-year storm. The maximum allowable release rate is not to be exceeded by the outflow peak discharge.

g. The outfall or outlet structures should be designed on the basis of inlet or outlet control, whichever is applicable. The structures should be capable of safely and properly passing the flow range of design storm frequencies including the 100-year storm without causing downstream flooding or exceeding the maximum allowable release rate. Outlet works must also pass all of the runoff from the 100-year design storm within a reasonable length of time or a permit may be required from the Texas Commission on Environmental Quality (TCEQ). Wet ponds will in many cases also require a permit from the TCEQ.

h. Special attention should be given to the provision of an emergency or overflow spillway which would pass excess flows greater than those of the 25-year design storm and overflows caused by clogging of the principal outlets. Downstream watershed considerations such as the potential loss of life and damage to property due to overtopping or failure of the structure and the storage facilities, area and capacity dictate the emergency spillway design storm. It is advisable to contact the state agencies such as the Texas Water Development Board (TWDB) and the TCEQ when planning a storage facility in order to meet their criteria.

i. Surfaces shall be faced with embedded rock or aggregate masonry. Bare concrete shall only be permitted with the express written permission of the town council. Side slopes should be no steeper than 4:1 where feasible for reasons of public safety and maintenance.

H. *Hydraulic Design Methods.*

a. *General.* The two basic methods suggested for predicting the volume of runoff with time and the peak flow rate are the rational method and the standard method. The standard method is best suited for storage analysis of urban runoff but for relatively small drainage areas some form of the rational method if generally acceptable.

b. *Rational method storage analysis.* When designing storage facilities for an area smaller than 400 acres, it is often justifiable to use the rational method to compute the design inflow hydrographs. This method relies heavily upon personal judgment but it is relatively simple and can give acceptable results

if proper procedures are followed. There are several different techniques of employing the rational method that may be used.

(1) One of the rational method techniques has been utilized by the federal aviation agency in designing airport drainage facilities. The procedure is presented in "Airport Drainage", prepared by the Federal Aviation Agency (FAA, 1966). The FAA technique is basically a graphical procedure which represents the cumulative storm runoff volume and the cumulative volume released from the storage facility through an outlet structure as functions of time. The maximum difference between the two volume curves represents the required storage volume of the storage basin. The procedure will consistently result in under designed storage facilities if a constant release rate is assumed from time zero. This is caused by sizing the outlet pipe using the Manning Equation and not recognizing the stage-discharge relationship. A reservoir routing technique unitizing the stage-discharge relationship of the storage facility should be used.

(2) It is recommended that in most instances the contributing drainage area not be more than 25 acres when using this technique.

(3) A second technique that employs the rational method is referred to as the modified rational method analysis. This technique manipulates the Rational Method to reflect the fact that storms with durations greater than the normal time of concentration for a basin will result in a larger volume of runoff even though the pear [peak] discharge is reduced. Even though rainfall intensities and resulting peak discharges associated with longer duration storms are less than those for short duration storms, the inflow may still be considerably greater than the outflow thus requiring more storage than in the case of shorter, higher intensity storms.

(4) This approach becomes more valid on progressively smaller basins. The technique should, therefore, be limited to relatively small areas such as parking lots, roof tops, or other upstream facilities with contributing areas less than 25 acres.

l. *Detention Facilities.*

a. *Intent.* The Town of Little Elm encourages the use of detention basins based on the multi-faceted benefits of the community outlined below:

b. *Control of flood discharges.* The intent of detention basin (storage) design shall be to reduce flood discharges for the ultimate watershed development conditions without increasing peak discharges above the peak discharges for undeveloped watershed conditions. This storage method serves as a key strategy for the stormwater management plan.

c. *Environment.* As development occurs, there is a loss of wildlife and bird life habitat. It is possible to create a natural micro-environment around ponds that can offset this loss of habitat. These "natural" environmental pockets in conjunction with natural open space areas can help maintain the rural setting of the town. Detention ponds also benefit downstream water quality by allowing the sedimentation of pollutants.

d. *Recreation.* Detention basins offer many recreational opportunities in an urban setting; for example, a normally dry detention basin could be used for athletic fields or picnic areas, while the banks of the pond offer valuable park space.

e. *Aesthetics.* As an integral part of the Town of Little Elm, a detention basin needs to blend into the landscape and into the community. Simple yet inexpensive measures, such as gentle side slopes, planting of trees and shrubs, and other landscaping features can transform the detention facility into an attractive amenity for the neighborhood.

f. *Requirements.*

(1) Detailed engineering studies of the entire basin shall be required to evaluate the timing of hydrographs from regional and on-site facilities, as well as backwater calculations to determine the effect of the detention/retention facilities on upstream water surface elevations.

(2) All detention facility designs shall be performed by a professional engineer registered in the State of Texas and shall meet the requirements of Permanent Rule 31, Texas Administration Code (TAC) Chapter 299, and other requirements, as applicable.

(3) The minimum amount of storage volume of the detention basin shall be that volume required to reduce runoff rate to the undeveloped condition rate. Dedicated detention basins shall also include an additional one foot of freeboard and two feet of sediment storage. The volume of runoff storage for drainage areas greater than 160 acres shall be compared using unit hydrograph procedures. Acceptable unit hydrograph procedures include the Soil Conservation Service Dimension less Unit Hydrograph and Snyder's Unit Hydrograph. Manual methods or use of the computer programs TR20, HEC-1, and NUDALLAS are allowed for runoff hydrograph computation and flood routings. The criteria contained in this section shall serve as the minimum requirements for detention basin design. For drainage areas less than 160 acres, the above methods are recommended; however, an approximate routing method may be used subject to approval of the town engineer.

(4) The maximum allowable release rate from any site shall be equal to the 100-year peak runoff rate prior to site development. The maximum design release rate may be less.

(5) Where stormwater management improvements are required in the natural floodway or a permanent greenbelt or open space area, they should be incorporated into existing lakes, or they should be designed in as small an area as feasible to create natural contours. Note, however, that detention basins or retention ponds shall be a minimum of one acre in size to allow for proper maintenance, side slopes and outlet work operation.

(6) Retention/detention ponds shall resemble natural ponds; in addition:

1. The pond should expand gradually from the inlet towards the outlet, insuring that there are no "dead zones". That is, water entering the pond gradually spread out and uniformly displaces the water already present in the pond.

2. The length-to-width ratio should be three to one or greater, to provide a long flow path.

3. The average permanent pond depth should be greater than five feet, where possible.

4. A ten to 20-foot wide shallow bench shall be provided along the shores of the permanent pond for safety and to encourage the development of bottom growth in these areas. This vegetation will enhance the biologic treatment characteristics of the pond and also enhance the "natural" appearance of the pond.

5. If several ponds are required, they should vary in size and shape, and be separated by tree groves, vegetated berms, or similar screening of a natural appearance.

6. Landscape materials should enhance wildlife habitat where feasible.

7. Where slope erosion protection is needed for the side slopes of a pond, rock or geotextiles are required as approved by the town engineer. Exposed concrete [sic]

g. Detention facilities of less than ten acre-feet of flood storage shall have outlet structures designed for the 100-year frequency storm. Facilities greater than ten acre-feet of flood storage shall have outlet structures designed for the ten-year and 100-year frequency storms. The release rates shall be such that the flows after land development are no larger than the flows before land development.

h. Outlets should be provided with a trash rack to prevent plugging with debris and to provide safety to the public. Due to unique design considerations, the town engineer may approve alternative outlet design.

i. All federal, state and county laws pertaining to the impoundment of surface water shall have been compiled with, including the design, construction and safety of the impounding structure. Copies of any federal, state or county permits issued for the proposed impoundments shall be submitted to the town engineer.

j. All detention/retention facilities shall include an additional one foot of freeboard and two feet of sediment in determining the design flood elevation.

k. Provisions (such as emergency spillways or reinforcing of embankments) shall be made for the occurrence of overtopping or failure of the outlet structure. Under no circumstances should the emergency overflow have a direct path to any buildings or other structures used for human occupancy, commerce, or industry. Details of these provisions shall be supplied to the town engineer for approval.

l. The flood storage volume of detention/retention facilities shall be designed to empty in a maximum of 12 hours if said facilities are to be considered an erosion/pollution control facility.

m. Consideration should be given to the stocking of retention ponds with fish to control algae growth.

n. Inlet structures shall be designed to both dissipate the flow energy and drop the inflow elevation to below that of the pond's water surface or basin's flow line.

J. *Duties of the Town and Appeal to the Council.* The interpretation of the criteria herein above set forth in sections III, IV, V, VI, VII, VIII, and IX, of this ordinance shall be made by the town engineer. Any person adversely effected by the decision of the town engineer may, within ten days from the date of such decision, file an appeal in writing to the town council. Such appeal shall be filed with the town engineer and the town secretary and shall define the specific areas of controversy. It shall be the duty of the town council to hear any such appeal within 30 days from the date it is received by the town engineer and town secretary.

K. *Building Permits to be Withheld.* No building permit shall be issued, nor certificate of occupancy approved for any construction, reconstruction, or development upon any land where such construction, reconstruction or development is not in conformity with the requirements and intent of this ordinance. Anyone who violates any of the terms and provisions of this ordinance shall be denied a building permit, until the violation is corrected.

L. *Repealing Clause.* All provisions of other ordinances conflicting with the provisions hereof are hereby repealed. All other ordinances and provisions of such ordinances expressly in conflict with the provisions hereof shall remain in full force and effect.

M. *Maintenance Guarantee.* The contractor shall guarantee the work which he does against defective workmanship and materials for a period of one year from the date of final acceptance for the work by the owner.

a. Where defective workmanship and/or materials are discovered requiring repairs to be made under this guaranty, all such repair work shall be done by the contractor at this own expense within five days after written notice of such defect has been given to him by the owner. Should the contractor fail to repair leaks or correct such defective workmanship and/or materials within five days after being notified the owner may make the necessary repairs and charge the contractor with the actual cost of all labor and materials required.

b. The contractor shall arrange to have his faithful performance bond run for a period of one year after the date of completion of the construction work to cover his guaranty as set forth above.

~~*Severability.* If any section, paragraph, clause, phrase or provision of this ordinance shall be adjudged invalid or held unconstitutional, the same shall not affect the validity of this ordinance as a whole or any part or provision thereof, other than the part so decided to [be] invalid or unconstitutional; not shall such unconstitutionality or invalidity have any effect on any other ordinances or provisions of ordinances of the Town of Little Elm.~~

~~*Penalty.* That any person who shall violate the provisions of this ordinance shall be deemed guilty of a misdemeanor and upon conviction therefore shall be subject to a fine not to exceed $2,000.00.~~

~~(Ord. No. 1444, § 2(Att. A), 3-6-2018)~~

Sec. 4.0 Water and wastewater design requirements.

Water System.

Water lines adequate for domestic supply and for fire protection needs shall be installed to serve each lot, or tract, in every subdivision where connection is to be made immediately to a community or a utility water system in accordance with the Texas Commission on Environmental Quality and town design standards and specifications. In subdivisions outside the town limits, where such connection to a system is not to be made immediately, plans shall be prepared for future installation of a water distribution system to serve each lot or tract.

A. *Water System Extensions.* Water system extensions shall be designed to provide for a domestic supply of at least 100 gallons per capita per day delivered at a minimum pressure of 50 pounds per square inch. The 100-gallon rate of supply shall not be required if, in the opinion of the town's engineer, the proper point of connection to the existing system for the extension is not capable of supplying such a volume. However, the extension shall be designed to convey the 100-gallon rate should the supply point be subsequently improved. If the 50 pounds minimum pressure cannot be provided by existing system pressure or because of the elevation of the tract to be developed, a booster pump system shall be included which will provide that minimum pressure.

B. *All Supply and Distribution Mains.* All supply and distribution mains installed within a subdivision must extend to the borders of the subdivision as required for future extensions of the system, regardless of whether or not such extensions are required for service within the subdivision.

C. *Fire Hydrants.* Fire hydrants shall be provided at locations such that all areas of development are located within a 500-foot radius from a fire hydrant. All such fire hydrants shall be served by a six inch or larger supply or distribution main.

D. *Extension for Single Customer.*

1. When it is necessary to extend a water line to serve a new single customer where only one meter will be installed, the town at its own expense will extend the said water line up to 100 feet.
2. If a greater distance than 100 feet is required to reach the nearest property line of the new single customer, the said single customer shall pay 100 percent of cost extension in excess of 100 feet.
3. If more than one single customer is served by the main extension, 100 feet of main will be allowed for each single customer thus served, and any excess footage will be paid for at 100 percent.
4. No more than one single customer credit of 100 feet will be allowed each lot or tract of record so served regardless of the number of buildings, occupied or otherwise, which might be located on said lot or tract.
5. Payment will be made in advance of construction.

E. *Extensions to Serve Developers.*

1. The developer will pay 100 percent of the construction cost of the size mains required to serve his development, including the approach main, plus ten percent of the developer's share of the construction cost for engineering, supervision and inspection, or six percent if a private engineer approved by the utilities supervisor is employed by the developer and furnishes approved plats and specifications.

2. When the developer desires that water mains be extended to serve his property, he will submit a request in writing to the utilities supervisor. The property to be served shall be listed showing the lot, block and subdivision. Two approved plats of the area to be served shall be attached to the request and shall become the property of the town.

3. If the area to be served is a part of a larger area that is owned or controlled by the developer and which is reasonably expected to be served by water in the future, then two approved plats or approved preliminary plats of the larger area shall also be submitted. A tentative design of a main layout will be made of the entire area, but the cost estimate will be made on that portion of the subdivision to be served immediately.

F. *Materials and Workmanship.* All materials and workmanship incorporated in water system extensions shall be in accordance with the currently adopted town construction specifications.

G. *Water Well Design Requirements.* Water well must be meet current standard design practice.

Wastewater System

Sanitary sewers shall be installed to serve each lot, or tract, in every subdivision where connection is to be made immediately to a community disposal system or to a public sewerage system.

A. *Sewer Extensions.*

1. All sewer extensions shall be designed in accordance with the latest applicable rules and regulations as published by the Texas State Department of Health. No sewer lateral shall be smaller than six inch in nominal diameter. All sewers shall be designed with consideration for serving the full drainage area subject to collection by the sewer in question except as modified with the concurrence of the town's engineer because of the projected rate of development or the financial feasibility of the proposed extension.

2. All subdivisions developed subsequent to this ordinance must be served by community sanitary sewerage collection, treatment and disposal systems approved by the town with exceptions granted only if all of the following conditions exist: (1) the subdivision in question is less than five parcels of land, (2) the existing community type collection, treatment and disposal system is not and cannot feasibly, in the opinion of the town's engineer, be made available to the area of development, and (3) percolation tests run by an independent testing laboratory are submitted to both the town and county health department with results showing that a septic tank and spreader field can be developed to provide adequate disposal of the sewage.

B. *Lateral and Sewer Mains.* All lateral and sewer mains installed within a subdivision must extend to the borders of the subdivision as required for future extensions of the collecting system regardless of whether or not such extensions are required for service within the subdivision.

C. *Lift Stations or Separate Treatment Facilities.* The provision for lift stations or separate treatment facilities will not be permitted unless the cost of constructing such lift stations or separate facilities is at least 20 percent less than the costs of constructing an adequate outfall or approach sewer from the existing system.

D. *Septic Tank.* A septic tank with a capacity of not less than 500 gallons and with a drain field of not less than 150 feet shall be installed on each lot in accordance with the regulations of the county and state health officers.

E. *Extensions for Single Customers.*

1. Where it is necessary to extend a sewer line to serve a new "single customer," the town, at its own expense, will extend said sewer up to 100 feet.

2. If a greater distance than 100 feet should be required to extend the line to the nearest property line of the customer, said single customer shall pay the excess over the 100 feet allowable at the rate of 100 [percent] of cost.

3. If more than one single customer is served by the main extension, 100 lineal feet of sewer will be allowed for each single customer thus served, and any excess footage will be paid for at 100 percent of cost.

4. No more than one single customer credit of 100 feet will be allowed for each lot or tract of record so served regardless of the number of buildings, occupied or otherwise, which might be located on said lot or tract.

5. Payment will be made in advance of construction.

F. *Extensions to Serve Developers.* The developer shall pay 100 percent of the construction cost of all sewers including "approach mains," but excepting "service lines," plus ten percent of the developer's share of the construction cost for engineering, supervision and inspection, or six percent if a private engineer approved by the utilities supervisor is employed by the developer and furnishes approved plans and specifications.

1. The developer will also pay 100 percent of the cost of "service lines" to all lots to be served by a sewer located in the street. Said "service lines" will be constructed at the same time as a part of the same contract as all other sewers in the developer's addition. If the sewers are being constructed by town forces, the "service lines" will be constructed by town forces at the time all other sewers within the addition are constructed.

2. The utilities supervisor shall determine the size of "approach main" required to serve developer's property and the actual size to be constructed. Should the town elect to construct a main larger than the developer's required "approach main," the developer will not be charged for the additional size.

3. The amount of developer's payment shall be determined using unit bid prices contained in the award contract.

G. *Connections.* No connection shall be made to any sanitary sewerage system within the town which will permit the entrance of surface water or waste of other than domestic sewage characteristics without the specific authorization by the town council.

H. *Materials and Workmanship.* All materials and workmanship incorporated in the sewage system extensions shall be in accordance with the currently adopted town construction specifications.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 5.0 Other public improvements.

Street Lighting.

1. The following standards shall apply to all arterial thoroughfares:

a. Street lighting shall be placed in the medians, with spacing not to exceed one hundred eighty feet (180') and no closer than one hundred forty-five feet (145') depending on median breaks and intersections.

b. Unless a photometric analysis suggests the use of a different type of luminaire, street lighting shall use a city-approved, standard 250-watt equivalent LED luminaire with a color temperature of 3,000 kelvins.

2. All traffic signal and street lighting construction, testing, and materials shall be in accordance with the city's current standards, details, and specifications unless otherwise noted. All electrical work shall be in accordance with the most current National Electrical Code, town and TxDOT specifications and standards.

3. All lighting luminaries shall use LED lamps.

4. All site plans should provide a copies of the proposed layout of street lighting standards serving the subdivision. The type of all proposed and existing street lighting shall be indicated on the layout.

5. Contractor shall coordinate electrical services with the town and either ONCOR or COSERV representatives (according to their respective area).

6. The contractor shall coordinate with the appropriate utility company and TxDOT/NTTA (if within TxDOT/NTTA ROW) prior to beginning erection of poles, luminaries and structures located near any overhead or underground utilities.

7. Proposed concrete foundation and conduit alignment shall be staked by the contractor and approved by the town prior to installation.

Gas Lines.

The subdivider shall arrange for and shall file his request at the earliest feasible date for gas service desired for his subdivision. Where a source of gas supply is not within a reasonable distance for present installation, but, wider a gas line extension agreement gas service will be extended within five years following the recording of the final plat, those portions of such lines which will lie within the portions of streets intended for vehicular traffic shall be installed. In lieu of such installation the subdivider may defer the paving of streets and alleys until such lines are installed by making appropriate fiscal arrangements with the town.

Electric Power and Telephone Service.

The subdivider shall arrange with the appropriate utility and shall file his request at the earliest feasible date for electric power and telephone service to his subdivision.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 6.0 ~~Environmental requirements section~~Retaining Wall Design Requirements.

Design and Construction Standards

A. All retaining walls in excess of four feet (4') in height (measured from the bottom of footing to top of wall) shall be designed by a Professional Engineer licensed in the State of Texas.
B. Retaining walls shall be designed and constructed to support the live load and dead load forces they will be subjected to.
C. Retaining walls shall be designed using a cantilevered reinforced concrete structure, masonry gravity structure, or stone gravity structure. Other retaining wall materials may be approved at the discretion of the Town Engineer.
D. Brick shall not be used as a structural element of a retaining wall, but it may be used as a facing material. Timber material, such as railroad ties, is prohibited for use as any part of a retaining wall, regardless of height.

E. Retaining walls shall have proper fall protection as defined within the Building Code as adopted by the Town.

F. Walls that are anticipated to support a fence or screen wall, either integrally or separately, shall be designed to handle the structural forces of the fence imposed on the wall.

G. *Tiered Retaining Wall Systems*

1. Tiered retaining wall systems shall be designed such that the upper wall does not place additional surcharge on the lower wall, beyond the design loads of the lower wall.
2. Tiered retaining wall systems shall be designed such that the height of the upper wall is no greater than the height of the lower wall.

Retaining Wall Building Permit

A. Any earth terracing method that supports a structure or vehicle load, or that is at least four feet (4') in height (measured from the bottom of footing to top of wall) shall require a separate building permit.

B. Application for a retaining wall building permit at least four feet (4') in height, or that supports a structure or vehicle load, shall include the following:

1. A site-specific geotechnical report, sealed by a geotechnical engineer licensed in the State of Texas. This report shall include soil parameters to be used in the design of the retaining wall for sliding and overturning stability. Additionally, global stability analysis shall be included in the geotechnical study for retaining walls with a retained height in excess of ten feet (10') or immediately adjacent to a stream or ponded water.
2. Retaining wall plans, sealed by a professional engineer licensed in the State of Texas.
3. Structural calculations, sealed by a professional engineer licensed in the State of Texas, that utilize the parameters provided in the geotechnical report indicating that the retaining wall is stable in sliding, overturning, and internal failure modes.

C. No building permit, other than for a retaining wall, shall be issued for any lot within a subdivision until all retaining walls are constructed in accordance with a grading plan for the subdivision.

D. Any change from the approved grading plan or design for a retaining wall within a subdivision shall not be permitted unless the applicant has submitted plans for the entire subdivision showing the proposed change in grading and the Town Engineer has approved the proposed change(s).

Retaining Wall Maintenance and Easements

A. If, in the opinion of the Town Engineer, site development construction plans indicate the need for the construction of retaining walls greater than four feet (4') in height, private retaining wall easements showing the location of the retaining wall(s) and the no-build zone shall be dedicated and shown on the Preliminary Plat and Final Plat.

B. The retaining wall easement shall include a no-build zone, extending from the retaining wall on both sides, within which any additional load from future construction would exceed the design capacity of the retaining wall.

a. The no-build zone width shall be at least the clear height of the retaining wall.
b. No structure (other than the retaining wall), swimming pool, or any other feature which adds load to the retaining wall shall be constructed within the no-build zone.
c. Exceptions from these requirements may be granted by the Town Engineer if a design and supporting calculations are provided that demonstrate the wall's ability to support the proposed structure.

C. The width of the retaining wall easement shall be a minimum of five feet (5') or the width of the retaining wall (including subsurface elements), whichever is greater, plus the width of the no-build zone.

D. Retaining walls and no-build zones shall be located entirely on one lot and shall not straddle property lines, unless the wall is constructed within a retaining wall easement dedicating the ownership and maintenance responsibility to the Homeowners' or Property Owners' Association.

E. Retaining walls greater than four feet (4') in height and constructed as part of a Subdivision shall be located in a retaining wall easement dedicated to the Homeowners' or Property Owners' Association, and shall be their responsibility to maintain."

~~*Texas Construction General Permit (CGP)*~~

~~Construction activities that discharge stormwater runoff into or adjacent to any surface water of the state are regulated by the State of Texas under the construction general permit (CGP) (TXR150000). The governing agency is the Texas Commission on Environmental Quality (TCEQ). Construction activities are regulated according to the area of land disturbed.~~

~~*Large construction activities:*~~

~~For sites that disturb five or more acres, or are part of a larger common plan of development that will disturb five or more acres, and meet the definition of an operator, the following applies:~~

~~1. Prepare and implement a stormwater pollution prevention plan (SW3P).~~

~~2. Post a site notice.~~

~~3. Submit a copy of the site notice to the MS4 operator.~~

~~For sites that disturb five or more acres, and meet the definition of a primary operator, the following applies:~~

~~1. Prepare and implement a SW3P.~~

~~2. Submit a notice of intent (NOI) to TCEQ.~~

~~3. Post the NOI and site notice.~~

~~4. Submit a copy of the NOI to MS4 operator~~

~~*Small construction activities:*~~

~~For sites that disturb at least one but less than five acres, or are part of a larger common plan of development that will disturb at least one, but less than five acres and meet the definition of an operator, the following applies:~~

~~1. Prepare and implement a SW3P.~~

~~2. Post a site notice.~~

~~3. Submit a copy of the site notice to the MS4 operator.~~

~~Sites that disturb less than one acre and that are not part of a larger common plan of development that would disturb one or more acres, are not required to have coverage under the general permit. Refer to the General Permit definitions for Operator and Primary Operator. Additional information on the Texas Construction General Permit can be found at the following link: http://www.tceq.texas.gov/permitting/stormwater/~~

~~*Storm Water Pollution Prevention Plan (SW3P).*~~

~~One of the requirements of the construction general permit is to develop an SW3P in accordance with CGP and the SW3P guidance policy for the Town of Little Elm. The purpose of the SW3P is to provide guidelines for minimizing sediment and other pollutants that may originate on the site, from flowing into municipal storm systems, or~~

jurisdictional waters during construction. The plan must also address the principal activities known to disturb significant amounts of ground surface during construction. The stormwater management controls included in the SW3P should focus on providing control of pollutant discharges with practical approaches that use readily available techniques, expertise, materials, and equipment. The SW3P must be implemented prior to the start of construction activity.

Construction Controls.

Structural and non-structural controls may be used for controlling pollutants for stormwater discharges from small and large sites. Structural controls shall comply with details and specifications in the latest edition of the NCTCOG iSWM technical manual and these standards. When the NCTCOG Manual and these standards are in conflict, these standards shall govern. The following are acceptable temporary controls for use during construction:

Non-Structural

- Minimizing the area of disturbance
- Preserving existing vegetation

Structural

- Silt fence
- Inlet protection
- Rock check dams
- Stabilized construction entrances
- Sediment traps
- Vegetated buffer strips
- Temporary detention structure
- Rock check dams
- Hydromulch

Suggested construction controls can be found on the NCTCOG iSWM website. It is the responsibility of the design engineer to select and design appropriate construction controls for each site. If the most appropriate control is not shown in the iSWM technical manual, the design engineer shall submit calculations and references for design of the control to the Department of Engineering Services for review and approval.

Waste and Hazardous Material Controls.

Covered containers shall be provided for waste construction materials and daily trash. Hazardous materials shall be stored in a manner that prevents contact with rainfall and runoff. Onsite fuel tanks and other containers of motor vehicle fluids shall be placed in a bermed area with a liquidtight liner or be provided with other secondary containment and spill prevention controls. The SW3P shall require federal, state and local reporting of any spills and releases of hazardous materials greater than the regulated reportable quantity (RQ) and reporting to engineering services of all spills and releases to the storm drainage system.

Temporary Stabilization.

A. Portions of a site that have been disturbed, but where no work will occur for more than 21 days shall be temporarily stabilized as soon as practicable, and no later than 14 days, except when precluded by seasonal arid conditions, or prolonged drought.

B. Temporary stabilization shall consist of providing a protective cover, designed to reduce erosion on disturbed areas. Temporary stabilization may be achieved using temporary seeding, soil retention blankets, hydro-mulches and other techniques that cover 100 percent of the disturbed areas until either final stabilization can be achieved or until further construction activities take place.

C. Perimeter controls such as silt fence, vegetated buffer strips or other similar perimeter controls are intended to act as controls when stabilization has not occurred. Perimeter controls may remain in place during temporary stabilization.

Final Stabilization.

Final stabilization consists of soil cover such as vegetation, geo-textiles, mulch, rock, or placement of pavement. For stabilizing vegetated drainageways, sod or seeded soil retention blankets shall be used. Hydromulch will not be allowed in vegetated swales, channels or other drainageways. The plan for final stabilization shall be coordinated with permanent controls in the SWMP and with the landscaping plan, if applicable.

Notice of Intent (NOI).

If applicable, copies of the NOI shall be sent to the public works department at least two days prior to construction. The NOI may be emailed to MS4@littleelm.org.

TCEQ Site Notice.

A signed copy of the construction site notice shall be posted at the construction site in a location where it is readily viewed by the general public during all construction activity.

Notice of Termination (NOT).

All parties that submitted a NOI shall submit a NOT within 30 days after final stabilization is established. When the owner of a residential subdivision transfers ownership of individual lots to builders before final stabilization is achieved, the SW3P shall include controls for each individual lot in lieu of final stabilization. These controls shall consist of stabilization of the right-of-way and placement of structural controls at the low point of each individual lot or equivalent measures to retain soil on each lot during construction. All temporary controls must be removed prior to submitting the NOT. Additionally, the builder must submit a valid NOI before an NOT can be submitted by the owner.

Inspection and Maintenance during Construction.

1. The owner shall construct all controls required by the SW3P. The owner shall have qualified personnel inspect the controls every seven days with no additional inspections after rain events. An alternative method may be used as long as it is in accordance with the CGP.
2. Certified inspection reports shall be retained as part of the SW3P. Within seven days of the inspection, controls identified as damaged or deteriorated shall be repaired or replaced, as appropriate. Controls shall also be routinely cleaned to maintain adequate capacity.
3. Changes or additions shall be made to the controls within seven days to prevent discharges from the site. The owner shall implement procedures to remove discharged soil from all portions of the storm drainage system including streets, gutters, inlets, storm drain, channels, creeks, ponds, etc.
4. Notes requiring the inspection and maintenance shall be placed on SW3P drawings. The SW3P shall identify the responsible party for inspecting and maintaining each control. If no party is identified, each owner and operator that submitted a NOI for the site shall be fully responsible for implementing all requirements of the SW3P.

Construction and Maintenance.

The owner shall submit an erosion control plan and site layout for each major phase of the project. These phases, at a minimum, shall include:

1. Initial grading and utility construction.
2. Street and other pavement construction.
3. Post pavement construction.

~~4. Final acceptance to stabilization.~~

~~The owner shall construct all permanent controls and is responsible for maintenance of the controls. When the control falls within a drainage easement, the plat or separate instrument dedicating the easement shall include a statement of the owner's responsibility for maintenance.~~

Sec. 7 GIS/survey requirements.

Coordinate System.

AutoCAD 2010 (or higher) with water, sanitary sewer, paving, grading, storm sewer. The CAD file of project should be referenced with the NAD_1983_StatePlane_Texas_North_Central_FIPS_4202_Feet projected Coordinate System.

Markers.

1. Markers consisting of minimum three-eighths-inch diameter steel rods at least twenty-four inches long with caps identifying responsible surveying firm or RPLS number shall be placed at all:
    a. Lot and block corners (wherever a lot line bearing changes);
    b. Intersection points of alley and block lines;
    c. Curve and tangent points along block, lot and right-of-way lines within the subdivision; and
    d. Right-of-way dedications.

Monuments.

1. Three dimensional coordinates, reported as state plane coordinates, shall be established using the city's monumentation system and using the city's combined scale factor. The coordinates shall be noted on the plat monuments shall be markers and installed at locations shown on the plat.
2. Subdivision Monumentation.
    a. At least two markers shall be placed at property corners in addition to at least two monuments at opposing ends of the property.
3. Capital Improvements Project Monuments.
    a. Found existing right-of-way monuments, survey markers, or property corners, and proposed monuments shall be shown on the construction drawings and located by station and offset, right or left from the control line, base line or center line, or by northing and easting.
4. If new construction will damage, destroy, or alter existing survey markers, monuments, or property corners, they must be reset prior to final acceptance.
5. Prior to final plat acceptance, all required monuments must be found and reset if damaged during construction.
6. The surveyor will provide two monuments acceptable to the town and establish grid coordinates for the monuments in reference to the Town of Little Elm GPS monuments.
7. Elevations will be established on the two monuments on the vertical datum in reference to the Town of Little Elm GPS monuments.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 8.0 Standard details.

TOWN OF LITTLE ELM
STANDARD DETAILS

LITTLE ELM

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STANDARD DETAILS * TOWN OF LITTLE ELM, TEXAS * DECEMBER 2023

CONSTRUCTION
GENERAL NOTES

GENERAL NOTES

1. IT IS NOT THE INTENT OF THESE CONSTRUCTION NOTES TO COVER ALL DETAILS AND/OR SPECIFICATION REQUIREMENTS OF THE TOWN OF LITTLE ELM. WHEN THERE IS A CONFLICT BETWEEN THESE STANDARDS AND OTHER REGULATIONS, THE CONTRACTOR MUST ABIDE BY THE STRICTEST REQUIREMENT.
2. THE EXISTENCE AND LOCATIONS OF ALL UNDERGROUND UTILITIES SHOWN (MAIN LINES, NO LATERAL OR SERVICES SHOWN) ON THE DRAWINGS WERE OBTAINED FROM AVAILABLE RECORDS AND ARE APPROXIMATE. NO WARRANTY IS IMPLIED AS TO THE ACTUAL LOCATION OF EXISTING UTILITIES. NEITHER THE OWNER NOR THE ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES NOT SHOWN OR NOT IN THE LOCATION SHOWN. THE CONTRACTOR SHALL DETERMINE THE DEPTH AND LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO TRENCHING AND SHALL BE REQUIRED TO TAKE ANY PRECAUTIONARY MEASURES TO PROTECT ALL LINES SHOWN AND / OR ANY OTHER UNDERGROUND UTILITIES NOT OF RECORD OR NOT SHOWN ON THE PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL FRANCHISE AND TOWN UTILITIES PRIOR TO CONSTRUCTION.
3. ANY CONTRACTOR / SUBCONTRACTOR PERFORMING WORK ON THIS PROJECT SHALL FAMILIARIZE HIMSELF WITH THE SITE AND SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM HIS OPERATIONS. SAID EXISTING IMPROVEMENTS SHALL INCLUDE BUT NOT BE LIMITED TO BERMS, DITCHES, FENCES, AND VEGETATION. ANY REMOVAL OR DAMAGE TO EXISTING IMPROVEMENTS SHALL BE REPLACED OR REPAIRED BY THE CONTRACTOR AT HIS EXPENSE AND SHALL BE APPROVED BY THE TOWN OF LITTLE ELM.
4. ALL CONSTRUCTION, TESTING, AND MATERIALS SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE TOWN OF LITTLE ELM. ALL SUBMITTALS MUST BE ORIGINALS WITH SIGNATURES WHERE APPLICABLE; FACSIMILES WILL NOT BE ACCEPTED.
5. TESTING SERVICES FOR PUBLIC PROJECTS SHALL BE PROVIDED BY THE TOWN. COSTS ASSOCIATED WITH THESE TESTS SHALL BE PAID BY THE TOWN. RE-TEST OF FAILED AREAS THAT DO NOT MEET THE REQUIREMENTS STATED WITHIN SHALL BE PAID FOR BY THE CONTRACTOR.
6. ALL TRAFFIC CONTROLS SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST REVISION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD). ALL REFERENCE FOR (SIGN) TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) STANDARDS AND CONSTRUCTION DETAILS SHALL BE THE LATEST REVISIONS AND/OR AMENDMENTS THEREOF. THE TOWN OF LITTLE ELM USES RAISED PAVEMENT MARKINGS (BUTTONS) FOR STRIPING AND THERMOPLASTIC MARKINGS IN LIEU OF PAINT. THE MINIMUM SIGN SIZE SHALL BE THE STANDARD SIZE IN THE MANUAL. DETAILS ARE AVAILABLE UPON REQUEST FOR THE TYPE OF BUTTON PATTERNS, POSTS, AND CONNECTIONS REQUIRED FOR THE SIGNS.
7. THE CONTRACTOR SHALL MAKE EVERY EFFORT NOT TO IMPEDE TRAFFIC ON EXISTING STREETS, ALLEYS, OR FIRE LANES OPEN TO THE PUBLIC. IN THE EVENT THE CONSTRUCTION WORK REQUIRES THE CLOSURE OF AN EXISTING STREET, ALLEY, OR FIRE LANE, THE CONTRACTOR SHALL REQUEST THE ROAD CLOSURE THROUGH THE TOWN. IF THE CLOSURE ELIMINATES THE SECOND POINT OF ACCESS TO EXISTING BUILDINGS WITH A CERTIFICATE OF OCCUPANCY, THEN THE ACCESS MAY NOT BE CLOSED FOR MORE THAN FORTY-EIGHT (48) HOURS AND WILL REQUIRE FIRE MARSHAL APPROVAL IN EITHER CASE. UNLESS OTHERWISE SPECIFIED BY THE TOWN, ALL OTHER STREETS OR ALLEYS MAY NOT BE CLOSED FOR MORE THAN SEVENTY-TWO (72) HOURS.
8. THE CONTRACTOR SHALL INSTALL TEMPORARY FENCES ADJACENT TO ALL SIDEWALKS AND ADJACENT DEVELOPED PROPERTIES. THE CONTRACTOR MUST ALSO PROVIDE TEMPORARY FENCING WHEN FENCES OR OTHER SCREENING FEATURES ARE REMOVED FOR THE DURATION OF CONSTRUCTION.
9. ALL CONCRETE STRUCTURES, WHETHER PRECAST OR CAST-IN-PLACE, SHALL BE DESIGNED WITH APPROPRIATE SULFATE RESISTANT CEMENT OR EQUIVALENT BASED ON LOCAL SOIL CONDITIONS PER GEOTECHNICAL REPORT. PRECAST MANHOLES OR OTHER SPECIAL STRUCTURES IN ANY RIGHT-OF-WAY OR FIRE LANE EASEMENTS WILL REQUIRE A CERTIFICATION FROM THE MANUFACTURER THAT THE PRODUCT MEETS THE DESIGN CRITERIA AND TWENTY-EIGHT (28) DAY COMPRESSIVE STRENGTH. CAST-IN-PLACE MANHOLES OR OTHER SPECIAL STRUCTURES IN ANY RIGHT-OF-WAY AND FIRE LANE OR UTILITY EASEMENTS WILL REQUIRE CYLINDERS TO BE MADE FOR STRENGTH TESTS BY AN APPROVED LABORATORY. LABORATORY TEST REPORTS SHALL BE SUBMITTED TO THE DESIGN ENGINEER FOR APPROVAL. SAMPLES FOR STRENGTH TESTS OF EACH CLASS OF CONCRETE PLACED EACH DAY SHALL BE TAKEN NOT LESS THAN ONCE A DAY, NOR LESS THAN ONCE FOR EACH 100-150 CU YD OF CONCRETE, NOR LESS THAN ONCE FOR EACH 5000 SQ FT OF SURFACE AREA FOR SLABS OR WALLS. FOUR (4) CYLINDERS SHALL BE MADE. ONE (1) SHALL BE BROKEN AT SEVEN (7) DAYS, TWO (2) SHALL BE BROKEN AT TWENTY-EIGHT (28) DAYS, AND ONE (1) SHALL BE HELD IN CASE OF DAMAGE OF ANY OF THE OTHER THREE (3). THE AVERAGE STRENGTH OF TWO (2) CYLINDERS FROM THE SAME SAMPLE, TESTED AT TWENTY-EIGHT (28) DAYS, IS REQUIRED FOR EACH STRENGTH TEST; ANY STRENGTH TEST BEYOND TWENTY-EIGHT (28) DAYS IS UNACCEPTABLE. IF THE TWENTY-EIGHT (28) DAY DESIGN STRENGTH IS NOT REACHED UPON STRENGTH TESTING THE CYLINDERS, THE DEFICIENT AREA SHALL BE CORED IMMEDIATELY TO BE PROVED OUT. FOR ANY AREAS DEFICIENT IN STRENGTH BY NOT MORE THAN 500 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN ONE (1) TIME THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO DEFICIENT IN STRENGTH. FOR ANY AREAS DEFICIENT IN STRENGTH BY MORE THAN 500 PSI BUT NOT MORE THAN 1000 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN TWO (2) TIMES THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO DEFICIENT IN STRENGTH. FOR ANY AREAS DEFICIENT IN STRENGTH BY MORE THAN 1000 PSI, THE STRUCTURE SHALL BE REMOVED AND RECONSTRUCTED AT THE FULL EXPENSE OF THE CONTRACTOR. PRIOR TO TOWN ACCEPTANCE OF ANY PENALTY PAYMENTS FOR ANY TRAFFIC BEARING STRUCTURE THAT DOES NOT MEET TWENTY-EIGHT (28) DAY DESIGN STRENGTH, THE DESIGN ENGINEER SHALL PROVIDE A SEALED STRUCTURAL EVALUATION THAT ASSESSES THE PERFORMANCE ADEQUACY OF THE DEFICIENT STRUCTURE AS CONSTRUCTED UNDER THE DESIGN SERVICE LOADS. ALL CORING AND ADDITIONAL LABORATORY TESTING SHALL BE AT THE EXPENSE OF THE CONTRACTOR.
10. BLASTING IS NOT PERMITTED ON THIS PROJECT.
11. ALL CONSTRUCTION OPERATIONS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH APPLICABLE REGULATIONS OF THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION.
12. THESE PLANS DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR ITS EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE REGISTERED PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED IN THE WORK.
13. NO TRENCH EXCAVATION SHALL OCCUR UNTIL THE TOWN APPROVES THE TRENCH SAFETY PLAN SUBMITTED BY THE CONTRACTOR.
14. A PRE-CONSTRUCTION CONFERENCE IS TO BE HELD PRIOR TO BEGINNING CONSTRUCTION. THIS CONFERENCE SHALL TAKE PLACE AT A LOCATION SELECTED BY OWNER & ENGINEER. CONTRACTOR TO ARRANGE A MEETING DATE WITH THE OWNER AT LEAST SEVEN DAYS PRIOR TO THE MEETING TIME.
15. CONTRACTOR SHALL NOTIFY THE OWNER, OWNER'S REPRESENTATIVE, AND TCEQ (IF APPLICABLE) BY TELEPHONE A MINIMUM OF 48 HOURS IN ADVANCE OF CONSTRUCTION STARTUP, FOLLOWED BY A LETTER OF CONFIRMATION.
16. CONTRACTOR SHALL ASSURE HIMSELF THAT ALL CONSTRUCTION PERMITS HAVE BEEN OBTAINED PRIOR TO COMMENCEMENT OF WORK. REQUIRED PERMITS THAT CAN ONLY BE ISSUED TO CONTRACTOR ARE TO BE OBTAINED AT THE CONTRACTORS EXPENSE.
17. CONTRACTOR SHALL GIVE A MINIMUM OF 48 HOURS NOTICE TO ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS, OR PERSONS IN CHARGE OF PRIVATE AND PUBLIC UTILITIES AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK.
18. CONTRACTOR SHALL TAKE ALL DUE PRECAUTIONS TO PROTECT EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES INCURRED AS A RESULT OF THESE CONSTRUCTION OPERATIONS ARE TO BE REPAIRED IMMEDIATELY BY THE CONTRACTOR TO AT LEAST THE PRE-EXISTING CONDITION AT NO ADDITIONAL COST TO OWNER.
19. WHEN UNLOCATED OR INCORRECTLY LOCATED UNDERGROUND PIPING OR A BREAK IN A LINE OR OTHER UTILITIES AND SERVICES ARE ENCOUNTERED DURING SITE WORK OPERATIONS, THE CONTRACTOR SHALL NOTIFY THE APPLICABLE UTILITY COMPANY IMMEDIATELY TO OBTAIN PROCEDURE DIRECTIONS. THE CONTRACTOR SHALL COOPERATE WITH THE APPLICABLE UTILITY COMPANY IN MAINTAINING ACTIVE SERVICES IN OPERATION.
20. THE CONTRACTOR SHALL MAINTAIN ACCESS TO PUBLIC AND PRIVATE FACILITIES DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES TO BE COORDINATED WITH THE OWNER.
21. THE CONTRACTOR SHALL COORDINATE INTERRUPTIONS OF ALL UTILITIES AND SERVICES WITH APPLICABLE UTILITY COMPANY OR COMPANIES. ALL WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE UTILITY COMPANY OR AGENCY INVOLVED.
22. THE CONTRACTOR SHALL LOCATE, PROTECT, AND MAINTAIN BENCHMARKS, MONUMENTS, AND CONTROL POINTS. THE CONTRACTOR SHALL RE-ESTABLISH DISTURBED OR DESTROYED ITEMS BY A REGISTERED PUBLIC SURVEYOR IN THE STATE OF TEXAS, AT NO ADDITIONAL COST TO OWNER.
23. EXISTING PAVING, BUILDING, AND OTHER ITEMS SHOWN ON PLANS NOT SPECIFICALLY RELATED TO THE WORK OF THE CONTRACTOR IS FOR INFORMATION ONLY.
24. DEMOLITION PERMITS (IF NEEDED) ARE TO BE OBTAINED BY THE CONTRACTOR.
25. COORDINATES SHOWN FOR STRUCTURE LOCATIONS ARE REFERENCED TO OUTSIDE FACE OF EXTERIOR WALL AT GRADE OR TO CENTERLINE OF STRUCTURE, UNLESS OTHERWISE ON PLANS.
26. EXISTING SURFACE AND SUBSURFACE STRUCTURES (GAS MAINS, WATER MAINS, STORM SEWERS, TELEPHONE CABLES, ETC.) ARE SHOWN ON THE PLANS IF THEIR LOCATION HAS BEEN DETERMINED, BUT IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO AVOID DAMAGING THESE EXISTING STRUCTURES WHETHER OR NOT THEY ARE SHOWN ON THE PLANS. THE OWNER AND ENGINEER ASSUME NO RESPONSIBILITY FOR FAILURE TO SHOW ANY OR ALL OF THESE STRUCTURES ON THE PLANS OR TO SHOW THEM IN THEIR EXACT LOCATION. IF ANY STRUCTURE IS DAMAGED BY THE CONTRACTOR, IT SHALL BE HIS RESPONSIBILITY TO REPAIR THE DAMAGE AT HIS OWN EXPENSE AND RESTORE THE STRUCTURE TO ITS ORIGINAL CONDITION.
27. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATIONS, ELEVATIONS AND DIMENSIONS OF ADJACENT AND/OR CONFLICTING UTILITIES IN ADVANCE OF CONSTRUCTION IN ORDER THAT ADJUSTMENTS CAN BE MADE TO PROVIDE ADEQUATE CLEARANCES, IF REQUIRED. THE CONTRACTOR SHALL PRESERVE AND PROTECT PUBLIC UTILITIES AT ALL TIMES DURING CONSTRUCTION. ANY DAMAGE TO UTILITIES RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED AT HIS EXPENSE. THE ENGINEER SHALL BE NOTIFIED WHEN PROPOSED FACILITY GRADES CONFLICT WITH EXISTING UTILITY GRADES.
28. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING "AS-RECORDED" PLANS TO THE ENGINEER OF RECORD SHOWING THE LOCATION OF ALL IMPROVEMENTS. THIS INFORMATION SHALL BE PLACED ON THE ENGINEERING PLANS AND MARKED "RECORD DRAWING" PLANS ALONG WITH THE DATE AND THE NAME OF THE CONTRACTOR BY THE ENGINEER OF RECORD. THESE PLANS SHALL BE FURNISHED TO THE TOWN ELECTRONICALLY IN PDF FORMAT.
29. THE CONTRACTOR SHALL FURNISH A MAINTENANCE BOND IN THE AMOUNT OF 10% OF THE TOTAL CONTRACT PRICE OF ALL PUBLIC AND CERTAIN PRIVATE IMPROVEMENTS. THIS BOND SHALL RUN TWO YEARS FROM THE DATE OF FINAL ACCEPTANCE OF THE PROJECT BY THE TOWN. PRIVATE IMPROVEMENTS REQUIRING A MAINTENANCE BOND INCLUDE, BUT ARE NOT LIMITED TO, FIRE LANES, PRIVATE WATER MAINS, FIRE HYDRANTS, ETC.
30. REFER TO THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS (NCTCOG) PUBLIC WORKS CONSTRUCTION STANDARDS AND SPECIFICATIONS (LATEST EDITION) FOR REQUIREMENTS FOR ITEMS NOT INCLUDED IN THIS DOCUMENT. FINAL APPROVAL IS AT THE DISCRETION OF THE TOWN ENGINEER.
31. CONTRACTOR SHALL PROVIDE DAILY STREET SWEEPING AND GENERAL SITE CLEANUP FOR THE AREA SURROUNDING THE PROJECT SITE.
32. CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED TO PROPERTY (PUBLIC OR PRIVATE) WITHIN 48 HOURS OF NOTIFICATION BY THE TOWN.

GENERAL ENVIRONMENTAL NOTES

1. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL REQUIREMENTS REGARDING EXCESS AND WASTE MATERIAL, INCLUDING METHODS OF HANDLING AND DISPOSAL.
2. CONTRACTOR SHALL LOCATE MATERIAL STORAGE AREAS AWAY FROM STORMWATER CONVEYANCE SYSTEMS. PROVIDE PROTECTED STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER POTENTIALLY TOXIC MATERIALS.
3. FUEL STORAGE IS NOT ALLOWED ON THIS PROJECT.
4. THE CONTRACTOR SHALL ADVISE OWNER IMMEDIATELY, VERBALLY AND IN WRITING, OF ANY FUEL OR TOXIC MATERIALS SPILLS WITHIN THE PROJECT/CONSTRUCTION AREA AND THE ACTIONS TO BE TAKEN TO REMEDY THE PROBLEM.
5. THE CONTRACTOR SHALL DISPOSE OF FUELS, HAZARDOUS MATERIALS, AND CONTAMINATED EXCAVATIONS IN A LEGALLY APPROVED MANNER.
6. NO OPEN BURNING IS ALLOWED WITHIN THE CITY LIMITS.

SITE GRADING NOTES

1. THE CONTRACTOR SHALL CONTROL DUST CAUSED BY THE WORK AND COMPLY WITH POLLUTION CONTROL REGULATIONS OF GOVERNING AUTHORITIES.
2. EXCESS EXCAVATED MATERIAL SHALL BE STOCKPILED IN DESIGNATED AREA AS SHOWN ON PLANS OR AS DIRECTED BY THE OWNER. REINFORCED FILTER FABRIC FENCE TO BE INSTALLED AROUND STOCKPILE ON DOWNSTREAM SIDE AND BOTH SIDES ADJACENT TO THE DOWNSTREAM SIDE. STOCKPILES ARE NOT TO TRAP OR POND WATER. TOPSOIL TO BE STOCKPILED SEPARATELY. ALL EXCESS EXCAVATED MATERIAL IS TO BE REMOVED FROM THE SITE. CONTRACTOR TO NOTIFY TCEQ AND THE OWNER'S REPRESENTATIVE OF LOCATION OF DISPOSAL BEFORE MATERIAL IS REMOVED.
3. THE FINISHED GRADE ELEVATIONS SHOWN ARE INTENDED TO PROVIDE ADEQUATE DRAINAGE. MINOR FIELD CHANGES MAY BE NECESSARY TO PROVIDE ADEQUATE DRAINAGE. GRADE UNIFORMLY BETWEEN ELEVATIONS SHOWN TO PROVIDE DRAINAGE.
4. ADJUST MANHOLE COVERS, VALVE BOXES, ELECTRICAL MANHOLES, ETC. TO MATCH PROPOSED FINISHED GRADE (NO SEPARATE PAY).
5. RETAINING WALLS SHALL BE NO GREATER THAN 6' IN HEIGHT AT THE END OF WALL.
6. THE MAXIMUM SLOPE IN THE FRONT AND REAR OF SINGLE FAMILY LOTS IS 6:1 UNLESS APPROVED BY THE TOWN ENGINEER.
7. TYPICAL SLOPES ON COMMERCIAL LOTS IS 6:1 WITH A MAXIMUM SLOPE ALLOWED OF 4:1 UNLESS APPROVED BY TOWN ENGINEER.

EROSION CONTROL & TREE PROTECTION NOTES

1. CONTRACTOR SHALL FOLLOW ALL STORMWATER POLLUTION PREVENTION PLAN (SWPPP) GUIDELINES AND PERMITS THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES.
2. THE CONTRACTOR TO INSTALL AND MAINTAIN EROSION/SEDIMENTATION CONTROLS AND TREE/NATURAL AREA PROTECTIVE FENCING PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING, GRADING, OR EXCAVATION). CONTRACTOR TO REMOVE EROSION/SEDIMENTATION CONTROLS AT THE COMPLETION OF PROJECT AND GRASS RESTORATION.
3. THE PLACEMENT OF EROSION/SEDIMENTATION CONTROLS TO BE IN ACCORDANCE WITH THE PROPOSED SITE GRADING PLAN. DEVIATIONS FROM THE PLAN MUST BE SUBMITTED TO AND APPROVED BY THE OWNER.
4. EROSION AND SEDIMENTATION CONTROLS TO BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN SOIL BUILDUP WITHIN TREE DRIPLINES.
5. TO AVOID SOIL COMPACTION, NO VEHICULAR TRAFFIC, PARKING, OR STORAGE OF EQUIPMENT OR MATERIALS IS ALLOWED IN THE TREE DRIPLINE AREAS.
6. TREES TO BE REMOVED IN A MANNER WHICH DOES NOT IMPACT TREES TO BE PRESERVED.
7. INTENTIONAL RELEASE OF VEHICLE OR EQUIPMENT FLUIDS ONTO THE GROUND IS NOT ALLOWED. CONTAMINATED SOIL RESULTING FROM ACCIDENTAL SPILL TO BE REMOVED AND DISPOSED OF PROPERLY.

NO.	REVISION	DATE

DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
GENERAL CONSTRUCTION NOTES 1 OF 3

LITTLE ELM

SHEET
1 OF 26

DECEMBER 2023

CONSTRUCTION GENERAL NOTES

PAVING NOTES

1. ABSOLUTELY NO EARTHWORK, LIME APPLICATION, OR OTHER PREPARATION OF THE SUBGRADE FOR PAVING OF STREETS, ALLEYS, OR FIRE LANES SHALL BE INITIATED WITHOUT AUTHORIZATION FROM THE TOWN'S CONSTRUCTION INSPECTOR. ONCE ALL TESTING OF UNDERGROUND FACILITIES HAS BEEN COMPLETED AND VERIFIED TO MEET THE TOWN'S SPECIFICATIONS, THE TOWN CONSTRUCTION INSPECTOR WILL ISSUE A LETTER TO THE PROJECT OWNER OR SUPERINTENDENT THAT WILL AUTHORIZE THE INITIATION OF ALL SUBGRADE WORK IN PREPARATION FOR PAVING. ALL STREET, ALLEY, AND FIRE LANE RIGHT-OF-WAY OR EASEMENT WIDTH SHALL BE EXCAVATED FULL WIDTH IN ACCORDANCE WITH THE STREET AND SIDEWALK SECTION TO BE CONSTRUCTED. THE SUBGRADE FOR ALL STREETS, ALLEYS, AND FIRE LANES SHALL BE STABILIZED WITH HYDRATED LIME MATERIAL TO A DISTANCE 12 INCHES BEYOND THE BACK OF CURB OR EDGE OF PAVING AS APPLICABLE. THE AMOUNT OF LIME MATERIAL SHALL BE THAT AMOUNT WHICH WILL REDUCE THE PLASTICITY INDEX (PI) BELOW FIFTEEN (15) AS VERIFIED BY TESTING BY AN APPROVED LABORATORY; THE TOWN WILL ADD ONE (1) PERCENT TO THE LABORATORY RESULTS FOR FIELD VARIATION. LABORATORY TESTING (LIME SERIES) SHALL GENERALLY BE CONDUCTED WHEN ALL UTILITIES ARE COMPLETE AND THE ROADWAY SUBGRADE IS COMPLETE. LIME SHALL BE APPLIED BY PERCENTAGE DRY UNIT WEIGHT OF SOIL TREATED TO A MINIMUM IN PLACE COMPACTED THICKNESS OF SIX (6) INCHES. FOR 6" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 37 POUNDS PER SQUARE YARD; FOR 8" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 54 POUNDS PER SQUARE YARD. AFTER APPLICATION OF LIME, PROVIDE A MELLOWING PERIOD AS INSTRUCTED BY TXDOT PUBLICATION "TREATMENT GUIDELINES FOR SOILS AND BASE IN PAVEMENT STRUCTURES." SULFATE TESTS SHALL ALSO BE CONDUCTED ON ALL PAVING PROJECTS IN THE TOWN UNDER THE DIRECTION OF THE APPROVED LABORATORY. FREQUENCY OF TESTS SHALL NOT BE LESS THAN EVERY 300 LINEAR FEET OF SUBGRADE, ALTERNATING FROM LEFT QUARTER POINT TO CENTER LINE TO RIGHT QUARTER POINT. ADDITIONAL TESTING MAY BE DEEMED NECESSARY BY THE TOWN ENGINEER. ALL TESTING FOR THE PRESENCE OF SULFATES IN THE PAVEMENT SUBGRADE SHALL BE AT THE CONTRACTOR'S EXPENSE. IF THE SULFATES ARE PRESENT AT AN UNACCEPTABLE CONCENTRATION, THE TOWN MAY REQUIRE A RECOMMENDATION FOR FURTHER TREATMENT OF THE SOIL FROM THE APPROVED LABORATORY, WHICH SHALL BE CONFIRMED BY THE DESIGN ENGINEER OF RECORD FOR THE PROJECT.
2. SUBGRADE TESTING REQUIREMENTS: ALL FILL SHALL BE COMPACTED TO NO LESS THAN 95% OF STANDARD PROCTOR DENSITY AT 0 – 4% ABOVE OPTIMUM MOISTURE CONTENT. FREQUENCY OF TESTING SHALL BE AT LEAST EVERY 300 LINEAR FEET PER 2.0' OF LIFT UNTIL FINAL GRADE, STARTING AT 2.0' ABOVE NATURAL/SOUND GRADE TO TOP OF SUBGRADE. ALL STREET, ALLEY, AND FIRE LANE SUBGRADE SHALL BE COMPACTED TO NO LESS THAN 95% OF STANDARD PROCTOR DENSITY AT 0 – 4% ABOVE OPTIMUM MOISTURE CONTENT. FREQUENCY OF TESTS SHALL NOT BE LESS THAN 300 LINEAR FEET OF SUBGRADE, ALTERNATING FROM LEFT QUARTER POINT TO CENTER LINE TO RIGHT QUARTER POINT. VERIFICATION OF LIME DEPTH, TESTING FOR SUBGRADE GRADATIONS & PULVERIZATIONS, AND PLASTICITY INDICES OF THE SOIL SHALL ALSO BE CONDUCTED. THE FREQUENCY OF THIS TESTING SHALL BE AS PREVIOUSLY MENTIONED. ALL TESTING OF MATERIALS REQUIRED FOR THE CONSTRUCTION OF ANY STREET, ALLEY OR FIRE LANE SHALL BE PERFORMED BY AN APPROVED AGENCY FOR TESTING MATERIALS. THE NOMINATION OF THE TESTING LABORATORY AND THE PAYMENT OF SUCH TESTING SERVICES SHALL BE MADE BY THE CONTRACTOR. THE ENGINEER SHALL APPROVE THE LABORATORY NOMINATED TO DO THE TESTING OF MATERIALS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SHOW BY STANDARD TESTING PROCEDURES THAT THE WORK CONSTRUCTED DOES MEET THE REQUIREMENTS OF THE TOWN'S SPECIFICATIONS.
3. ANY EXISTING PAVEMENT, CURBS, AND/OR SIDEWALK DAMAGED OR REMOVED BY THE CONTRACTOR ARE TO BE REPAIRED BY THE CONTRACTOR TO AT LEAST THE PREEXISTING CONDITION AT HIS EXPENSE BEFORE ACCEPTANCE OF THE WORK.
4. ALL TRAFFIC CONTROLS SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST REVISION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
5. REPLACE EXISTING ROADWAY THAT IS CUT BY PIPE TRENCHES WITH SIMILAR ROADWAY.
6. MAINTAIN ALL MANHOLE FRAMES AND COVERS TO BELOW PAVEMENT SUBGRADE ELEVATION UNTIL PLACEMENT OF PAVEMENT BASE HAS BEEN COMPLETED. RAISE MANHOLE FRAMES AND COVERS TO FINISH PAVEMENT GRADES WHEN BASE IS COMPLETE.
7. MINIMUM DESIGN REQUIREMENTS: ALL STREET, ALLEY, PARKING LOT, AND FIRE LANE PAVING SHALL BE DESIGNED AND PERMITTED THROUGH THE TOWN TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3500 PSI AT TWENTY-EIGHT (28) DAYS WITH A MINIMUM OF FIVE SACKS (5 1/2) SACKS OF CEMENT AS VERIFIED BY TESTING IN AN APPROVED LABORATORY. TWO BATCH DESIGNS SHALL BE SUBMITTED TO THE TOWN CONSTRUCTION ENGINEER FOR APPROVAL: ONE FOR MACHINE WORK AND ONE FOR HAND WORK. ALL BATCH DESIGNS MUST BE SIGNED BY THE TESTING LABORATORY AND INCLUDE ALL DOCUMENTATION, SUCH AS RESULTS OF FIELD TRIAL TESTING. IF APPLICABLE, ALL BATCH DESIGNS SHALL SPECIFY AN APPROPRIATE SULFATE RESISTANT CEMENT OR EQUIVALENT. SLUMP SHALL BE 1 – 3 INCHES FOR ALL MACHINE WORK AND 2 – 4 INCHES FOR ALL HAND WORK. STREETS (DEPENDING ON CLASSIFICATION), PARKING LOTS, AND FIRE LANES SHALL HAVE A MINIMUM THICKNESS OF SIX (6) INCHES. ALLEYS SHALL HAVE A MINIMUM THICKNESS OF 8"–5"–6". UPON COMPLETION OF CONSTRUCTION, ALL STREETS AND FIRE LANES SHALL BE CORED FOR DEPTH (2" CORES) AT A SPACING OF 300 FT MAXIMUM, ALTERNATING FROM LEFT QUARTER POINT TO CENTER LINE TO RIGHT QUARTER POINT. ALLEYS SHALL BE CORED FOR DEPTH (2" CORES) AT A SPACING OF 300 FT MAXIMUM ALONG THE CENTER LINE. PAVEMENT OF A THICKNESS LESS THAN THE THICKNESS SHOWN ON THE PLANS BY MORE THAN ONE-QUARTER (1/4) INCH BUT LESS THAN THREE-QUARTER (3/4) INCH WILL BE CONSIDERED DEFICIENT. THE CONTRACTOR SHALL PAY TO THE TOWN TWO (2) TIMES THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO BE DEFICIENT IN THICKNESS AS DEFINED ABOVE. PAVEMENT DEFICIENT IN THICKNESS BY MORE THAN THREE-QUARTER (3/4) INCH SHALL BE REMOVED AND REPLACED COMPLETELY. THE DEFICIENT AREA SHALL BE CORED IMMEDIATELY ON TEN (10) FOOT CENTERS OR ONE (1) PER PANEL TO BE PROVED OUT. ALL STREETS, ALLEYS, PARKING LOTS, AND FIRE LANES WILL REQUIRE CYLINDERS TO BE MADE FOR STRENGTH TESTS BY THE APPROVED LABORATORY. SAMPLES FOR STRENGTH TESTS OF EACH CLASS OF CONCRETE PLACED EACH DAY SHALL BE TAKEN BY AN APPROVED LABORATORY NOT LESS THAN ONCE A DAY, NOR LESS THAN ONCE FOR EACH 100–150 CU YD OF CONCRETE. FOUR (4) CYLINDERS SHALL BE MADE: ONE SHALL BE BROKEN AT 7 DAYS, TWO (2) SHALL BE BROKEN AT TWENTY-EIGHT (28) DAYS, AND ONE SHALL BE HELD IN CASE OF DAMAGE OF ANY OF THE OTHER THREE (3). THE AVERAGE STRENGTH OF TWO (2) CYLINDERS FROM THE SAME SAMPLE, TESTED AT TWENTY-EIGHT (28) DAYS IS REQUIRED FOR EACH STRENGTH TEST; ANY STRENGTH TEST BEYOND TWENTY-EIGHT (28) DAYS IS UNACCEPTABLE. IF THE TWENTY-EIGHT (28) DAY DESIGN STRENGTH IS NOT REACHED UPON STRENGTH TESTING THE CYLINDERS, THE DEFICIENT AREA SHALL BE CORED IMMEDIATELY BE ON TEN (10) FOOT CENTERS OR ONE PER PANEL TO BE PROVED OUT. FOR ANY AREAS DEFICIENT IN STRENGTH BY NOT MORE THAN 500 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN ONE (1) TIME THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO BE DEFICIENT IN STRENGTH. FOR ANY AREAS DEFICIENT IN STRENGTH BY MORE THAN 500 PSI BUT NOT MORE THAN 1000 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN TWO (2) TIMES THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO BE DEFICIENT IN STRENGTH. PAVEMENT DEFICIENT IN STRENGTH BY MORE THAN 1000 PSI SHALL BE REMOVED AND REPLACED COMPLETELY. NO MORE THAN THREE (3) – FOUR (4) INCH CORES SHALL BE EXTRACTED PER PANEL WITHOUT PRIOR TOWN APPROVAL. A REBAR DETECTOR SHALL BE USED TO ENSURE THAT THE CORED AREAS ARE CLEAR OF ANY REBAR. ALL CORING AND ADDITIONAL LABORATORY TESTING SHALL BE AT THE EXPENSE OF THE CONTRACTOR. THE WIDTH TO BE CONSIDERED FOR ANY DEFICIENCIES SHALL BE THE FULL WIDTH OF THE PAVEMENT.
6. ALL REINFORCING BARS SHALL CONFORM TO ASTM A-615/A 615M, GRADE 60.
9. ALL CONCRETE AND REINFORCING STEEL SHALL CONFORM TO CURRENT A.C.I. CODE.
10. ALL WALL STEEL SHALL HAVE A MINIMUM CONCRETE COVER OF 2". SLAB REINFORCING TO HAVE A MINIMUM CONCRETE COVER OF 2" ON TOP AND 3" ON BOTTOM.
11. ALL BAR SPLICES, CORNER DOWELS, AND JOINT DOWELS SHALL HAVE A MINIMUM 40 DIAMETERS, OR 30", WHICHEVER IS GREATER.
12. JOINT AND CORNER DOWELS DESIGNATED AS "EXTRA LENGTH" SHALL HAVE A MINIMUM LAP LENGTH OF 80 BAR DIAMETERS OR 60", WHICHEVER IS GREATER, UNLESS OTHERWISE DIMENSIONED.
13. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4" x 3/4".
14. NO HORIZONTAL CONSTRUCTION JOINTS WILL BE PERMITTED, UNLESS OTHERWISE NOTED. WALL FORMING AND CONCRETE PLACEMENT PLAN, TO ALLOW FOR VERTICAL CONSTRUCTION JOINTS, SHALL BE PREPARED AND SUBMITTED TO THE ENGINEER FOR APPROVAL. ALL VERTICAL CONSTRUCTION JOINTS TO INCLUDE STANDARD KEYWAY AND WATERSTOP.
15. SPEED BUMPS ARE NOT PERMITTED IN COMMERCIAL DRIVES OR STREETS.
16. POURED CONCRETE MUST BE CONSOLIDATED BY THE USE OF MECHANICAL VIBRATORS AT A MAXIMUM INTERVAL OF 18". CONTRACTOR SHALL ENSURE THAT CONCRETE IS WORKED AROUND REINFORCEMENT, OTHER EMBEDDED ITEMS, AND AGAINST FORMS TO ELIMINATE VOID SPACES.
17. FIRE LANES SHALL HAVE A MINIMUM TURNING RADIUS OF 30 FEET UNLESS DESIGNED USING AUTOTURN BY TRANSOFT SOLUTIONS, OR EQUIVALENT SOFTWARE. IN NO CASE SHALL A FIRE LANE RADIUS BE LESS THAN 20 FEET UNLESS APPROVED BY THE TOWN ENGINEER.
18. BITUMINOUS SURFACE TREATMENT (CHIP SEAL) SHALL CONFORM TO ITEM 404.4 IN THE NCTCOG PUBLIC WORKS CONSTRUCTION STANDARDS (5TH EDITION)
19. ASPHALT PAVING SHALL CONFORM TO ITEM 302 IN THE NCTCOG PUBLIC WORKS CONSTRUCTION STANDARDS (5TH EDITION).

STORM SEWER SYSTEM NOTES

1. STORM SEWER PIPE IN RIGHT OF WAY, PUBLIC DRAINAGE EASEMENTS, OR FIRE LANES SHALL BE REINFORCED CONCRETE OR DUAL WALL POLYPROPYLENE PIPE CONFORMING TO ASTM F2881.
2. BOX CULVERTS, AND OTHER STRUCTURES IN RIGHT OF WAY OR FIRE LANES SHALL BE REINFORCED CONCRETE AS PER TOWN SPECIFICATIONS AND SHALL BE CONSTRUCTED AS SHOWN IN THE STANDARD DETAILS UNLESS OTHERWISE APPROVED.
3. DENSITY TESTING REQUIREMENTS: FREQUENCY OF TRENCH COMPACTION TESTS SHALL NOT BE LESS THEN ONE EVERY 300 LINEAR FEET OF PIPE PER 2.0' OF LIFT UNTIL FINAL GRADE, STARTING AT 2.0' ABOVE TOP OF PIPE. EVERY OTHER LATERAL, STUBOUT THAT CROSSES THE EXISTING OR PROPOSED STREET, ALLEY, OR FIRE LANE SUBGRADE; INLET; AND JUNCTION BOX WILL RECEIVE A DENSITY TEST EVERY LIFT. ALL DITCHES SHALL BE MECHANICALLY TAMPED AND COMPACTED TO 95% OF STANDARD PROCTOR DENSITY AT 0 – 4% ABOVE OPTIMUM MOISTURE. WATER JETTING IS NOT PERMITTED.
4. THE JOINTS SHALL BE CONSTRUCTED AND JOINTED TOGETHER IN SUCH A MANNER THAT NO SPILL THROUGH OF BACKFILL WILL OCCUR. THIS INCLUDES THE LIFT HOLES USED IN CERTAIN PIPE OR BOX SIZES. APPROVED JOINT MATERIALS ARE COLD APPLIED, PLASTIC ASPHALT JOINT COMPOUND; RUBBER GASKETS; AND COLD APPLIED, PREFORMED PLASTIC GASKETS.
5. STORM DRAINAGE INLETS SHALL BE AS INDICATED ON THE APPROVED CONSTRUCTION PLANS. FOR SECONDARY AND MAJOR STREET INTERSECTIONS, A RECESSED TYPE INLET WILL BE REQUIRED. FOR INDUSTRIAL AND RESIDENTIAL STREETS, A CURB LINE INLET WILL BE REQUIRED UNLESS OTHERWISE APPROVED. A ROUND MANHOLE COVER WITH LOCKING DEVICE SHALL BE PLACED ON ALL INLET TOPS. THE TOP SHALL BE PLACED NEAR THE OUTLET PIPE. ALL INLETS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
6. ONLY CURB INLETS ARE ALLOWED WITHIN PAVED AREAS. GRATE INLETS ARE ALLOWED ONLY BY TOWN ENGINEER APPROVAL.
7. ALL STORM SEWER OUTFALLS THAT DRAIN TO LAKE LEWISVILLE SHALL INCLUDE A DEBRIS SEPARATOR.
8. ALL STORM SEWER CULVERTS INSTALLED IN PUBLIC RIGHT-OF-WAY OR BENEATH FIRELANES SHALL BE REINFORCED CONCRETE PIPE OR DUAL WALL POLYPROPYLENE PIPE CONFORMING TO ASTM F2881.

DETOURS, BARRICADES, WARNING SIGNS, ETC. NOTES

1. TRAFFIC MUST BE HANDLED THROUGHOUT THE PROJECT DURING CONSTRUCTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE FOR THE SAFE AND COMFORTABLE PASSAGE OF TRAFFIC WITH MINIMAL INCONVENIENCE TO THE PUBLIC AT ALL TIMES. TRAFFIC LANES SHALL BE ENTIRELY OPEN TO TRAFFIC EACH NIGHT AND NO EQUIPMENT SHALL BE LEFT IN A POSITION OVERNIGHT THAT WILL ENDANGER TRAFFIC.
2. A FLAGGER SHALL BE STATIONED WHERE ANY EQUIPMENT IS WORKING ON THE ROAD OR WHERE ANY OTHER HAZARDS DUE TO CONSTRUCTION OPERATIONS EXIST OR AS DIRECTED BY THE ENGINEER.
3. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES THROUGHOUT ALL PHASES OF CONSTRUCTION. ADEQUACY OF ACCESS WILL BE AT THE DISCRETION OF THE ENGINEER. SAFE ENTRANCE AND EXIT TO ALL DRIVEWAYS SHALL BE PROVIDED WITH A MINIMUM OF INCONVENIENCE.
4. THE CONTRACTOR SHALL NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE A HAZARD AND WILL ENDANGER TRAFFIC.
5. THE CONTRACTOR SHALL NOTIFY THE OWNER OF IMPENDING/UPCOMING LANE CLOSURES AS EARLY AS FIVE WORKING DAYS BUT NO LATER THAN 48 HOURS IN ADVANCE OF LANE CLOSURES.
6. FOR THIS PROJECT, UNLESS OTHERWISE NOTED IN THE PLANS AND/OR AS DIRECTED BY THE ENGINEER, NO LANE CLOSURES SHALL BE ALLOWED OTHER THAN THOSE IN THE TRAFFIC CONTROL PLAN.
7. THE CONTRACTOR MAY PROPOSE/RECOMMEND MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDED MODIFICATION BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS PAY ITEMS, IMPACT TO TRAFFIC, EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. THE CONTRACTOR SHALL NOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE/SEQUENCE UNTIL HE/SHE OBTAINS WRITTEN APPROVAL FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE SAFE AND COMFORTABLE MOVEMENT, THE CONTRACTOR SHALL IMMEDIATELY CHANGE HIS OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.
8. THE CONTRACTOR SHALL INSTALL AND MAINTAIN AN ADEQUATE NUMBER OF BARRICADES, WARNING AND DIRECTIONAL SIGNS TO DELINEATE TRAFFIC FOR ANY DETOURS.
9. ALL CONSTRUCTION TRAFFIC SHALL BE REGULATED SO AS TO CAUSE A MINIMUM OF INCONVENIENCE TO THE TRAVELING PUBLIC. AT POINTS WHERE IT IS NECESSARY FOR TRUCKS TO STOP AND UNLOAD, WARNING SIGNS AND FLAGGERS SHALL BE PROVIDED AS NECESSARY TO ADEQUATELY PROTECT TRAVEL.
10. ALL BARRICADES, SIGNS, WARNING LIGHTS, ETC. SHALL BE ACCORDING TO THE LATEST REVISION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
11. THE CONTRACTOR MAY, WITH THE APPROVAL OF AND AS DIRECTED BY THE ENGINEER, BE REQUIRED TO FURNISH ADDITIONAL SIGNS AND BARRICADES TO THOSE INDICATED ON THE PLANS TO MAINTAIN THE SAFE PASSAGE OF TRAFFIC THROUGHOUT THE CONSTRUCTION SITE PARTICULARLY IN THOSE AREAS OF IMMEDIATE WORK.
12. UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE IS MADE, THE CONTRACTOR SHALL SHAPE AND FINISH SUCH PORTIONS OF THE RIGHT-OF-WAY AS MAY HAVE BEEN DISTURBED IN MAKING THE ABOVE PROVISIONS FOR TRAFFIC AND WILL BE REQUIRED TO LEAVE THE ENTIRE RIGHT-OF-WAY IN A SMOOTH, NEAT AND SIGHTLY CONDITION.
13. ALL WORK AND MATERIALS REQUIRED BY THESE PROVISIONS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE CONTRACT, UNLESS OTHERWISE INDICATED IN THE PLANS OR SPECIFICATIONS.
14. CONTRACTOR SHALL HAVE A COMPANY REPRESENTATIVE CERTIFIED IN FLAGGER TRAINING APPROVED BY TXDOT.
15. THE CONTRACTOR IS FULLY RESPONSIBLE FOR THE TRAFFIC CONTROL AND WILL BE RESPONSIBLE FOR FURNISHING ALL TRAFFIC CONTROL DEVICES AND FLAGGERS. THE CONSTRUCTION METHODS SHALL BE CONDUCTED TO PROVIDE THE LEAST POSSIBLE INTERFERENCE TO TRAFFIC SO AS TO PERMIT THE CONTINUOUS MOVEMENT OF TRAFFIC IN ALL ALLOWABLE DIRECTIONS AT ALL TIMES.
16. THE CONTRACTOR SHALL PROVIDE FOR THE PASSAGE OF TRAFFIC THROUGH THE PROJECT WITH SIGNS, LIGHTS AND BARRICADES IN ACCORDANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AS REQUIRED FOR MAINTENANCE ACTIVITIES AND TO THE SATISFACTION OF THE ENGINEER.
17. LANE CLOSURES WILL NOT BE ALLOWED UNLESS PRIOR APPROVAL IS GIVEN BY THE ENGINEER. IF LANE CLOSURES ARE APPROVED, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNER 48 HOURS IN ADVANCE OF THE CLOSURE.

DATE | NO. | REVISION

DESIGN BY: | DRAWN BY: | CHECKED BY: KDM | SCALE: - | JOB NUMBER

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
GENERAL CONSTRUCTION NOTES 2 OF 3

LITTLE ELM

SHEET
2 OF 26

DECEMBER 2023

CONSTRUCTION
GENERAL NOTES

WATER SYSTEM NOTES

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE TOWN'S STANDARD SPECIFICATIONS AND GENERAL DESIGN STANDARDS.
2. ALL TAPPING SLEEVES AND VALVES SHALL BE FULL BODY DUCTILE IRON. WITH PRIOR APPROVAL BY THE TOWN ENGINEER, STAINLESS STEEL SMITH BLAIR 623 MAY BE ALLOWED FOR CONNECTION TO EXISTING LINES TWENTY-INCH (20") OR LARGER.
3. VALVES SHALL BE MUELLER OR WATEROUS, RESILIENT SEATED, 150 PSI TEST.
4. FITTINGS SHALL BE OF THE MECHANICAL JOINT TYPE, FLANGED WHERE APPLICABLE, AND BE MANUFACTURED BY US PIPE, AMERICAN, OR OTHER AS APPROVED BY THE TOWN – CLASS 250. ALL FITTINGS SHALL BE RESTRAINED BY THE USE OF MEGA-LUGS OR APPROVED OTHER AND CONCRETE THRUST BLOCKING.
5. FIRE HYDRANTS SHALL BE MUELLER OR WATEROUS THREE-WAY STANDARD THREAD WITH VALVE IN LEAD OR APPROVED OTHER. ALL MAIN STEAMER NOZZLES SHALL HAVE A NOMINAL INSIDE DIAMETER OF FOUR INCHES (4"). ALL COMMERCIAL FIRE HYDRANTS ARE REQUIRED TO BE INSTALLED WITH 4½"-5" HYDRA-STORZ CONNECTIONS.
6. WATER LINES IN THE AREA OF STORM DRAIN INLETS SHALL BE CONSTRUCTED BEHIND THE INLET BY PULLING THE PIPE USING LONGITUDINAL BENDING IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS. FITTINGS MAY BE USED IF BENDING IS IMPRACTICAL; CONSULT WITH THE TOWN'S CONSTRUCTION INSPECTOR.
7. WATER LINES CROSSING UNDER STORM DRAINS AND SANITARY SEWER LINES SHALL HAVE A MINIMUM OF EIGHTEEN INCHES (18") CLEARANCE BELOW STORM DRAINS AND TWENTY-FOUR INCHES (24") CLEARANCE BELOW SANITARY SEWER LINES OR OTHERWISE AS GOVERNED BY TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) CHAPTER 290 REQUIREMENTS. PARALLEL WATER LINES SHALL BE AT LEAST NINE FEET (9') CLEAR HORIZONTALLY FROM SANITARY SEWER LINES AND MANHOLES. WHERE MINIMUM CLEARANCE CANNOT BE ACHIEVED, WATER LINES SHALL BE ENCASED SIX INCHES (6") AROUND IN CONCRETE TO TEN FEET (10') EITHER SIDE OF THE UTILITY CROSSING. WHERE WATER LINES CROSS CREEKS OR DITCHES THE WATER LINE SHALL BE PROTECTED BY CONCRETE ENCASEMENT AT LEAST TEN FEET (10') PAST THE EMBANKMENT SLOPE ON EACH SIDE.
8. WATER MAINS: ALL WATER MAINS SHALL HAVE A MINIMUM OF FORTY EIGHT (48") COVER OVER THE TOP OF THE PIPE. ALL NEW WATER MAINS SHALL BE PVC PIPE IN ACCORDANCE WITH THE FOLLOWING: C900 DR 14 FOR FOUR-INCH (4") TO SIX-INCH (6"), C900 DR 18 FOR EIGHT-INCH (8") TO TWELVE-INCH (12"), AND C905 DR 18 FOR OVER TWELVE-INCH (12"), ALL "BLUE" IN COLOR AS PER TOWN SPECIFICATIONS; THE PIPE SHALL BE LAID ON A MINIMUM EMBEDMENT (SEE STANDARD CONSTRUCTION DETAILS). WATER MAINS UP TO TWELVE INCHES (12") SHALL BE INSTALLED TWO FEET (2') BACK OF CURB; MAINS LARGER THAN TWELVE INCHES (12") SHALL BE INSTALLED AT LEAST THREE FEET (3') FROM THE BACK OF CURB DEPENDING UPON CONDITIONS. DETECTABLE METALLIC TAPE ("BLUE-CAUTION BURIED WATER BELOW" OR APPROVED OTHER) SHALL BE INSTALLED AFTER INITIAL BACKFILL ON APPROXIMATE CENTERLINE OF PIPE PRIOR TO FINAL BACKFILL ABOVE ALL PVC MAINS.
9. THE CONTRACTOR SHALL INSTALL FIRE HYDRANTS AT THE LOCATIONS SHOWN. A M.J. AND FLANGED TEE WITH A FLANGED END TO M.J. GATE VALVE IS REQUIRED SO THAT THE GATE VALVE IS ANCHORED TO THE MAIN.
10. ALL BOLTS AND NUTS USED WITH MECHANICAL JOINT FITTING SHALL BE "COR-TEN" STEEL OR APPROVED OTHER.
11. THE INSTALLATION OF A BLUE STEMSONITE (OR OTHER) MODEL 88-SSA FIRE HYDRANT MARKER WILL BE INSTALLED OPPOSITE FIRE HYDRANTS JUST OFF CENTER TO THE SIDE OF THE STREET ADJACENT TO THE HYDRANT.
12. POLYETHYLENE ENCASEMENT – THE CONTRACTOR SHALL FURNISH AND INSTALL POLYETHYLENE WRAP AROUND DUCTILE IRON PIPE, RELATED FITTINGS, AND VALVES. THIS WRAP SHALL BE AN 8 MIL. THICKNESS POLYTUBE. SEAMS AND OVERLAPS SHALL BE WRAPPED AND HELD IN PLACE BY TWO-INCH (2") WIDE PLASTIC BACKED ADHESIVE TAPE, POLYKEN 900 OR SCOTCHRAP NO. 50, OR AN APPROVED OTHER, WITH APPROXIMATE TWO-FOOT (2') LAPS ON THE POLYTUBE. THE WRAP ON THE BARREL OF THE PIPE SHALL BE LOOSE ENOUGH TO ALLOW THE FILM TO SHIFT WITH THE SOIL. THE WRAP SHALL BE INSTALLED WITHOUT BREAKS, TEARS, OR HOLES IN THE FILM. THE COST OF THE POLYETHYLENE TUBE WRAP AND COMPLETE INSTALLATION SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE FURNISHING AND THE INSTALLATION OF DUCTILE IRON PIPE, RELATED FITTINGS, AND VALVES.
13. VALVE BOXES SHALL BE FURNISHED AT THE REQUIRED LENGTH IN ORDER TO BE SET TO FINAL GRADE ON EACH GATE VALVE. AFTER THE FINAL CLEAN UP AND ALIGNMENT HAS BEEN COMPLETED, THE CONTRACTOR SHALL POUR A REINFORCED CONCRETE BLOCK 24" X 24" X 6" AROUND ALL VALVE BOXES SO THE FINISHED GRADE IS LEVEL WITH THE FINISHED PARKWAY. ALL VALVE STACK COMPONENTS SHALL BE CAST IRON. VALVE BOXES OVER FOUR FEET (4') DEEP WILL REQUIRE EXTENSIONS. ALL VALVES SHALL BE MARKED WITH A SAW ON THE CURB OR PAVEMENT WITH "V", THE "V" SHALL POINT TO THE LOCATION OF THE VALVE AS FOLLOWS: IF THE VALVE IS IN THE PAVING, THE "V" SHALL BE MARKED UPRIGHT; IF THE VALVE IS OUTSIDE THE PAVING, THE "V" SHALL BE MARKED UPSIDE DOWN.
14. THE CONTRACTOR SHALL COORDINATE OPERATION OF ALL EXISTING VALVES WITH THE TOWN. CONTACT THE TOWN'S PUBLIC WORKS DEPARTMENT AT (972) 377-5556.
15. ALL WATER LINES SHALL BE PRESSURE TESTED TO 200 PSI FOR A THREE (3) HOUR CONTINUOUS PERIOD. LEAKAGE RATE SHALL NOT EXCEED TWENTY-FIVE (25) GALLONS PER INCH OF NOMINAL DIAMETER PER MILE OF PIPE OVER A TWENTY-FOUR (24) HOUR PERIOD. CONTRACTOR SHALL FLUSH AND STERILIZE LINES AND PROVE LINES TO BE FREE OF FECAL COLIFORM ORGANISMS BY OBTAINING SAMPLES FOR LABORATORY TESTS FOR CONTAMINATION. THE CONTRACTOR SHALL REFLUSH AND RESTERILIZE UNTIL ALL SAMPLES PROVE FREE FROM CONTAMINATION.
16. ALL RESIDENTIAL WATER SERVICES SHALL BE AS FOLLOWS:
    A. WATER SERVICES SHALL BE NORMALLY LOCATED AT TWO FOOT (2') OFF EVERY OTHER LOT LINE. A WATER METER BOX, AS APPROVED BY THE TOWN, WITH LOCK LID SHALL BE INSTALLED TWO FEET (2') BACK OF CURB LINE.
    B. SDR-9 POLYETHYLENE SERVICES ARE REQUIRED TO SERVE ALL RESIDENTIAL LOTS AND PATIO HOMES. FOR TOWN HOMES AND DUPLEXES, A SERVICE SHALL BE PROVIDED TO EACH OF THE FAMILY UNITS. SAND EMBEDMENT SHALL BE USED AROUND THE PIPE AND CORPORATION STOP. SURVCIL SADDLES SHALL BE BRASS BODY WITH DOUBLE BRONZE FLATTENED STRAPS (NO BANDED) – FORD, CAMBRIDGE, A.Y. MCDONALD, OR APPROVED OTHER.
    C. THE UTILITY CONTRACTOR SHALL INSTALL THE WATER SERVICES TO A POINT TWO (2) FEET BACK OF THE CURB LINE AT A DEPTH OF 12 INCHES. LINE SHALL BE CONTINUOUS WITH NO FITTINGS UNDER PAVING. THE METER BOX SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AFTER THE PAVING CONTRACTOR HAS COMPLETED THE FINAL GRADING IN BACK OF THE CURB. EACH SERVICE LOCATION WILL BE MARKED ON THE CURB WITH A SINGLE VERTICAL SAW MARK BY THE UTILITY CONTRACTOR AND TIED TO PROPERTY CORNERS ON THE "AS-RECORDED" PLANS.
    D. IF THERE IS A CURB, THE CURB SHALL BE SAWCUT WITH "T" AT THE POINT WHERE THE SERVICE PIPE PASSES THE CURB.
17. FOR NON-RESIDENTIAL WATER SERVICES, THE METER BOX SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AFTER THE PAVING CONTRACTOR HAS COMPLETED THE FINAL GRADING IN BACK OF THE CURB. METER BOXES/VAULTS SHALL BE LOCATED OUTSIDE OF PAVING. EACH SERVICE LOCATION WILL BE MARKED ON THE CURB OR PAVEMENT WITH A SINGLE VERTICAL SAW MARK BY THE UTILITY CONTRACTOR AND TIED TO PROPERTY CORNERS ON THE "AS-RECORDED" PLANS.
18. DENSITY TESTING REQUIREMENTS: FREQUENCY OF TRENCH COMPACTION TESTS SHALL NOT BE LESS THAN ONE (1) FOR ANY PIPE SECTION AND EVERY THREE HUNDRED LINEAR FEET (300') LINEAR FEET OF MAIN PIPE PER TWO FEET (2') OF LIFT UNTIL FINAL GRADE, STARTING AT TWO FEET (2') ABOVE THE TOP OF PIPE. WATER SERVICES ARE TO BE TESTED AT A RATE OF ONE (1) FOR EVERY SIX (6) SERVICES WHICH CROSS THE PROPOSED RIGHT OF WAY OR EVERY THREE HUNDRED LINEAR FEET (300') OF WATER SERVICE INSTALLED. EVERY OTHER FIRE HYDRANT LEAD THAT CROSS THE EXISTING OR PROPOSED STREET, ALLEY, OR FIRE LANE SUBGRADE SHALL ALSO RECEIVE AT LEAST ONE SET OF DENSITY TESTS. ALL DITCHES SHALL BE MECHANICALLY TAMPED AND COMPACTED TO NINETY-FIVE PERCENT (95%) STANDARD PROCTOR DENSITY AT ZERO PERCENT (0%) TO FOUR PERCENT (4%) ABOVE OPTIMUM MOISTURE. WATER JETTING IS NOT PERMITTED.
19. THE CONTRACTOR SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS. INSTALL BENDS AS REQUIRED.
20. THE CONTRACTOR SHALL PROVIDE FITTINGS, PLUGS, AND OTHER DEVICES FOR USE IN FILLING, FLUSHING, TESTING, ETC. (NO SEPARATE PAY).
21. THE CONTRACTOR SHALL PROVIDE ADEQUATE THRUST BLOCKING TO WITHSTAND TEST PRESSURES. (NO SEPARATE PAY).
22. MAINTAIN MINIMUM CLEARANCE OF THREE (3) FEET FROM EDGE OF STRUCTURES TO CLOSEST EDGE OF PIPELINE ADJACENT AND PARALLEL TO EDGE OF STRUCTURE, UNLESS OTHERWISE NOTED ON PLANS.
23. DI-ELECTRIC CONNECTIONS TO BE PREVENTED BY USE OF NON-CONDUCTIVE GASKETS BETWEEN DISSIMILAR PIPING MATERIALS.
24. REFERENCE SPECIFICATIONS FOR REQUIREMENTS ON REQUIRED SEPARATION DISTANCE BETWEEN SEWER AND WATER MAINS AND REQUIREMENTS IN THE EVENT THE SEPARATION DISTANCE CANNOT BE MET.
25. ALL PIPING INSTALLED BY BORING SHALL BE COMPLETED BY DRY BORE METHOD WITHOUT THE USE OF DRILLING FLUID, UNLESS APPROVED BY THE TOWN ENGINEER.

SANITARY SEWER SYSTEM NOTES

1. ALL SANITARY SEWER PIPES FOUR INCHES (4") TO FIFTEEN INCHES (15") NOMINAL SIZE SHALL BE PVC SDR 26 MEETING ASTM D3034. ALL SANITARY SEWER PIPES EIGHTEEN INCHES (18") AND LARGER NOMINAL SIZE SHALL BE PVC MEETING ASTM F679. ALL PIPES SHALL BE "GREEN" IN COLOR AS PER TOWN SPECIFICATIONS AND BE LAID ON A MINIMUM EMBEDMENT (SEE STANDARD CONSTRUCTION DETAILS). DETECTABLE METALLIC TAPE ("GREEN-CAUTION BURIED SEWER BELOW" OR APPROVED OTHER) SHALL BE INSTALLED AFTER INITIAL BACKFILL ON APPROXIMATE CENTERLINE OF PIPE PRIOR TO FINAL BACKFILL.
2. ALL SEWER MAINS SHALL BE A MINIMUM DIAMETER OF EIGHT INCHES (8") AND SHALL MAINTAIN A MINIMUM FLOW VELOCITY OF TWO (2) FEET PER SECOND.
3. ALL RESIDENTIAL SANITARY SEWER SERVICES SHALL BE A MINIMUM FOUR INCHES (4") IN DIAMETER AND EXTENDED TO A POINT TEN FEET (10') INSIDE THE PROPERTY LINE AT A MAXIMUM DEPTH OF FIVE FEET (5'). THE SERVICE SHALL THEN BE EXTENDED AT A FORTY-FIVE DEGREE (45°) ANGLE TO FOUR FEET (4') ABOVE THE FINISHED GRADE AND CAPPED. SEWER SERVICES SHALL BE LOCATED IN THE CENTER OF THE LOT. RESIDENTIAL SEWER SERVICES SHALL NOT TIE INTO MANHOLES.
4. DENSITY TESTING REQUIREMENTS: FREQUENCY OF TRENCH COMPACTION TESTS SHALL NOT BE LESS THAN ONE (1) FOR ANY PIPE SECTION AND EVERY THREE HUNDRED LINEAR FEET (300') OF MAIN PIPE PER TWO FEET (2') OF LIFT UNTIL FINAL GRADE, STARTING AT TWO FEET (2') ABOVE TOP OF PIPE. SEWER SERVICES ARE TO BE TESTED AT A RATE OF ONE (1) FOR EVERY SIX (6) SERVICES STAGGERED OR EVERY THREE HUNDRED LINEAR FEET (300') OF SEWER SERVICE INSTALLED. EACH SEWER MANHOLE WILL RECEIVE A DENSITY TEST EVERY TWO FEET (2') OF LIFT UNTIL FINAL GRADE, ALTERNATING AROUND ALL QUADRANTS. EVERY OTHER MAIN AND STUBOUT THAT CROSSES THE EXISTING OR PROPOSED STREET, ALLEY, OR FIRE LANE SUBGRADE SHALL ALSO RECEIVE AT LEAST ONE SET OF DENSITY TESTS. ALL DITCHES SHALL BE MECHANICALLY TAMPED AND COMPACTED TO NINETY-FIVE PERCENT (95%) STANDARD PROCTOR DENSITY AT ZERO PERCENT (0%) TO FOUR PERCENT (4%) ABOVE OPTIMUM MOISTURE. WATER JETTING IS NOT PERMITTED.
5. AFTER PAVING IS COMPLETED EACH SERVICE LOCATION WILL BE MARKED ON THE CURB WITH A TWO (2) PARALLEL VERTICAL SAW MARKS BY THE UTILITY CONTRACTOR AND TIED TO AT LEAST ONE (1) PROPERTY CORNER ON THE "AS-RECORDED" PLANS. ALL MANHOLES AND CLEANOUTS SHALL BE MARKED ON THE CURB OR PAVEMENT WITH "MH" OR "CO" AS APPLICABLE.
6. VACUUM TESTING OF THE MANHOLES, AND DEFLECTION TESTING ARE REQUIRED ON ALL SEWER LINES. PRIOR TO PAVING, ALL RESIDENTIAL SANITARY SEWER SERVICES SHALL HAVE TV INSPECTIONS.
7. MANHOLES SHALL HAVE A 4000# TRAFFIC BEARING FRAME AND COVER AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT TWENTY-EIGHT (28) DAYS.
8. THE DIAMETER OF A MANHOLE CONSTRUCTED OVER THE CENTER OF A SEWER SHOULD VARY WITH THE SIZE OF THE SEWER. FOR EIGHT-INCH (8"), TEN-INCH (10"), AND TWELVE-INCH (12") SEWERS, THE MANHOLE SHALL BE FOUR-FOOT (4') MINIMUM DIAMETER; FOR FIFTEEN-INCH (15") THROUGH TWENTY-SEVEN-INCH (27") SEWERS, THE MANHOLE SHALL BE FIVE-FOOT (5') MINIMUM DIAMETER; FOR THIRTY-INCH (30") AND THIRTY-SIX-INCH (36") SEWERS, THE MANHOLE SHALL BE SIX-FOOT (6') MINIMUM DIAMETER. MANHOLES DEEPER THAN TWELVE FEET (12') SHALL BE A MINIMUM OF FIVE FOOT (5') DIAMETER.
9. THE CONTRACTOR SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS. INSTALL JOINTS AS REQUIRED.
10. THE CONTRACTOR SHALL PROVIDE FITTINGS, PLUGS, AND OTHER DEVICES FOR USE IN FILLING, FLUSHING, TESTING, ETC. (NO SEPARATE PAY).
11. THE CONTRACTOR SHALL PROVIDE ADEQUATE THRUST BLOCKING TO WITHSTAND TEST PRESSURES. (NO SEPARATE PAY).
12. PIPING DRAWINGS INDICATE INVERT ELEVATIONS FOR GRAVITY FLOW LINES. SLOPE PIPE UNIFORMLY BETWEEN ELEVATIONS SHOWN; NO VALLEYS OR PEAKS PERMITTED IN GRAVITY FLOW LINES. FOR OTHER PIPING, REFER TO DETAIL SHEETS FOR PIPE ELEVATIONS AT EACH STRUCTURE. SITE PIPING DRAWINGS DO NOT INDICATE VERTICAL BENDS AND TRANSITIONS. WHEN NECESSARY, MAKE VERTICAL TRANSITIONS OR FURNISH AND INSTALL VERTICAL BENDS AT NO EXTRA COST. DO NOT EXCEED MANUFACTURER'S RECOMMENDATIONS FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS.
13. MAINTAIN MINIMUM CLEARANCE OF THREE (3) FEET FROM EDGE OF STRUCTURES TO CLOSEST EDGE OF PIPELINE ADJACENT AND PARALLEL TO EDGE OF STRUCTURE, UNLESS OTHERWISE NOTED ON PLANS.
14. DI-ELECTRIC CONNECTIONS TO BE PREVENTED BY USE OF NON-CONDUCTIVE GASKETS BETWEEN DISSIMILAR PIPING MATERIALS.
15. THE INTERIOR SURFACE OF ALL MANHOLES AND LIFT STATION WETWELLS SHALL BE CONSTRUCTED WITH POLYMER CONCRETE, ANTIMICROBIAL CONCRETE ADDITIVES, OR APPROVED EQUAL. EXISTING MANHOLES WHICH RECEIVE TIE INS SHALL BE COATED WITH RAVEN 405 EPOXY OR APPROVED EQUAL IF THEY DO NOT ALREADY HAVE CORROSION PROTECTION.
16. RESIDENTIAL SEWER SERVICES SHALL NOT TIE INTO MANHOLES WITHOUT TOWN ENGINEER APPROVAL.

NO.	REVISION	DATE

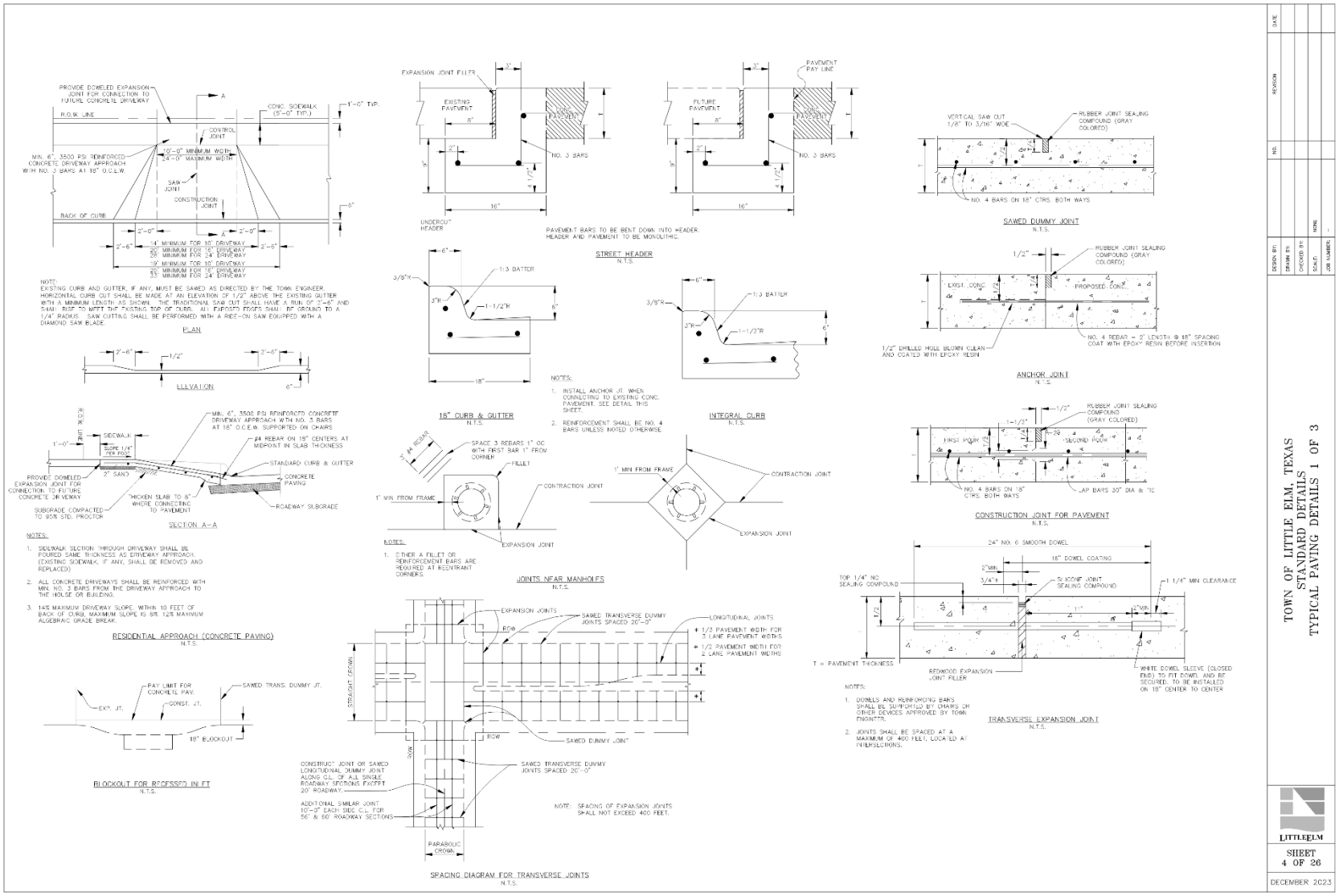
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

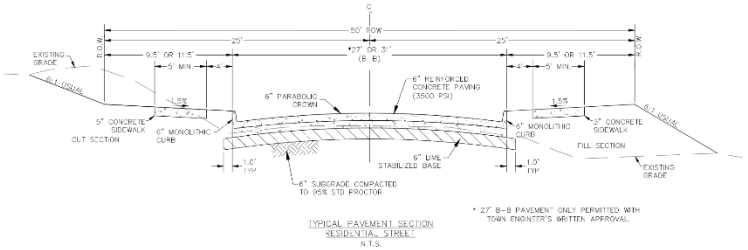
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
GENERAL CONSTRUCTION NOTES 3 OF 3

LITTLE ELM

SHEET
3 OF 26

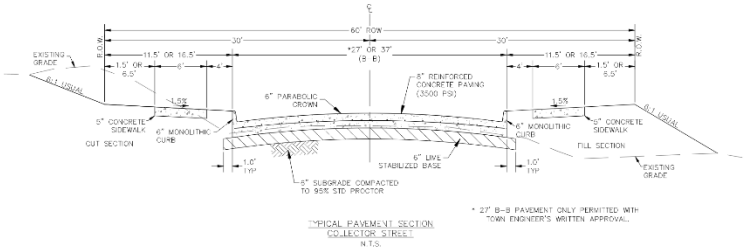
DECEMBER 2023


PLAN
ELEVATION
SECTION A-A
RESIDENTIAL APPROACH (CONCRETE PAVING)
N.T.S.
BLOCKOUT FOR RECESSED INLET
N.T.S.
18" CURB & GUTTER
N.T.S.
STREET HEADER
N.T.S.
INTEGRAL CURB
N.T.S.
JOINTS NEAR MANHOLES
N.T.S.
SPACING DIAGRAM FOR TRANSVERSE JOINTS
N.T.S.
SAWED DUMMY JOINT
N.T.S.
ANCHOR JOINT
N.T.S.
CONSTRUCTION JOINT FOR PAVEMENT
N.T.S.
TRANSVERSE EXPANSION JOINT
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL PAVING DETAILS 1 OF 3
LITTLE ELM
SHEET
4 OF 26
DECEMBER 2023



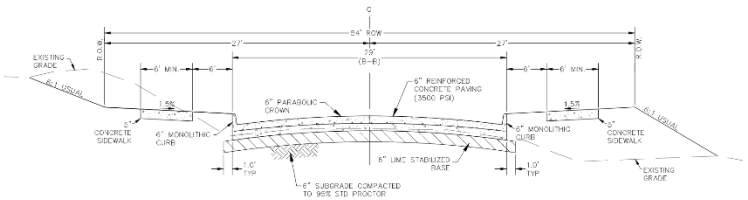
TYPICAL PAVEMENT SECTION
RESIDENTIAL STREET
N.T.S.

* 27' B-B PAVEMENT ONLY PERMITTED WITH TOWN ENGINEER'S WRITTEN APPROVAL.



TYPICAL PAVEMENT SECTION
COLLECTOR STREET
N.T.S.

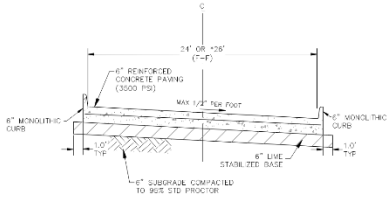
* 27' B-B PAVEMENT ONLY PERMITTED WITH TOWN ENGINEER'S WRITTEN APPROVAL.



RESIDENTIAL STREET
ALTERNATIVE PAVEMENT SECTION
(29'-0" B-B)
N.T.S.

PAVEMENT NOTES:

1. THESE NOTES ARE A REPRESENTATION OF THE MINIMUM REQUIREMENTS FOR PAVEMENT CONSTRUCTION. THE DESIGN ENGINEER IS RESPONSIBLE FOR PAVEMENT DESIGN, INCORPORATING RECOMMENDATIONS OF THE GEOTECHNICAL REPORT (* FOUND TO BE MORE STRINGENT).
2. 3500 PSI MACHINE POUR, 4000 PSI HAND POUR (AT DRIVEWAY APPROACH ONLY). REINFORCED CONCRETE PAVEMENT (5.5 SACK/CY), NO. 4 BARS @ 18" O.C.E.W., WITH 6" MONOLITHIC CURB.
3. BAR LAPS SHALL BE 30 BAR DIAMETERS.
4. BAR CHAIRS SHALL BE PROVIDED BY CONTRACTOR.
5. DO NOT PLACE CONCRETE JOINT WITHIN 2 FEET OF GUTTER LINE AT STREET CONNECTION.
6. LIME SHALL BE APPLIED BY PERCENTAGE DRY UNIT WEIGHT OF SOIL TREATED TO A MINIMUM IN PLACE COMPACTED THICKNESS OF SIX (6) INCHES. FOR 6" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 37 LBS/SQ FT; FOR 8" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 54 LBS/SQ FT.
7. LIME STABILIZATION MAY BE OMITTED IF 6" OF FLEXIBLE BASE WITH TENSAR TX7 GEOGRID IS APPLIED TO THE SUBBASE COMPACTED TO 95% STD PROCTOR.
8. FORMING OF PAVEMENT:
   A. SLIP-FORM: SLIP-FORM PAVEMENT METHOD SHALL BE USED FOR ALL PUBLIC STREETS AND ALLEYS UNLESS OTHERWISE APPROVED BY THE TOWN ENGINEER.
   B. HAND FORM: HAND FORMED PAVEMENT METHOD MAY BE USED FOR TURN LANE, DECELERATION LANE, DRIVEWAY APPROACH, OR REPLACING A PANEL OF PUBLIC STREET OR ALLEY.

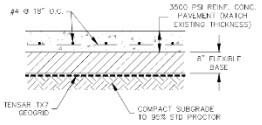


FIRE LANE
N.T.S.

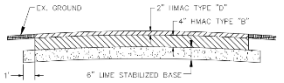
* 28' F-F PAVEMENT REQUIRED WHEN SERVING BUILDINGS 2 STORIES OR HIGHER.

FIRE LANE MAXIMUM RUNNING GRADE IS 6%

SEE FIRE LANE STRIPING DETAIL ON SHEET 10



CONCRETE PAVEMENT REPAIR
TYPICAL SECTION
N.T.S.



ASPHALT TRANSITION
TYPICAL SECTION
N.T.S.

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL PAVING DETAILS 2 OF 3

LITTLE ELM

SHEET
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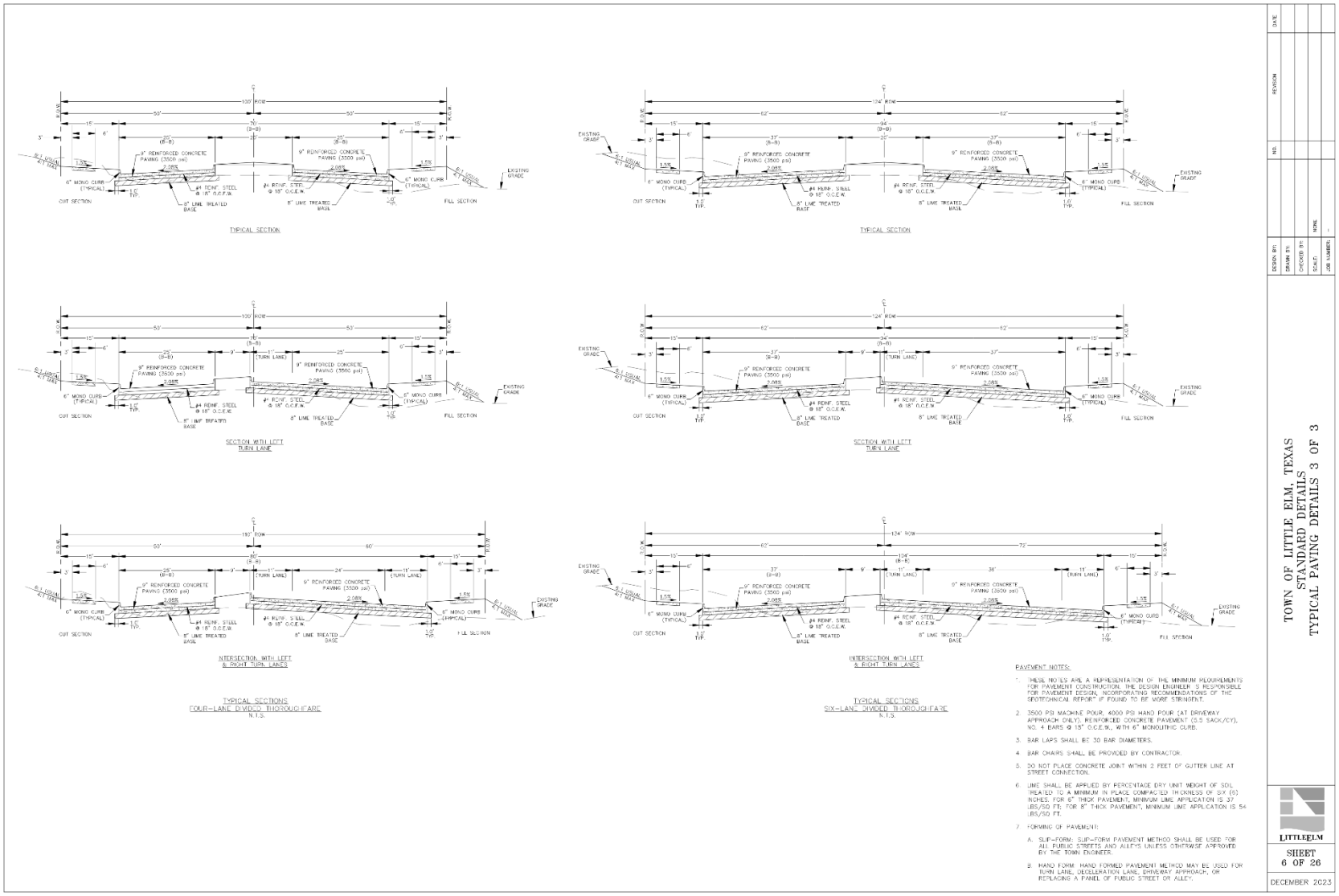
DECEMBER 2023

DATE | REVISION | NO. | DESIGN BY: | DRAWN BY: | CHECKED BY: | SCALE: NONE | JOB NUMBER:


TYPICAL SECTION
TYPICAL SECTION
SECTION WITH LEFT TURN LANE
SECTION WITH LEFT TURN LANE
INTERSECTION WITH LEFT & RIGHT TURN LANES
INTERSECTION WITH LEFT & RIGHT TURN LANES
TYPICAL SECTIONS FOUR-LANE DIVIDED THOROUGHFARE N.T.S.
TYPICAL SECTIONS SIX-LANE DIVIDED THOROUGHFARE N.T.S.
PAVEMENT NOTES:
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3. BAR LAPS SHALL BE 30 BAR DIAMETERS.
4. BAR CHAIRS SHALL BE PROVIDED BY CONTRACTOR.
5. DO NOT PLACE CONCRETE JOINT WITHIN 2 FEET OF GUTTER LINE AT STREET CONNECTION.
6. LIME SHALL BE APPLIED BY PERCENTAGE DRY UNIT WEIGHT OF SOIL TREATED TO A MINIMUM IN PLACE COMPACTED THICKNESS OF SIX (6) INCHES. FOR 6" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 37 LBS/SQ FT. FOR 8" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 54 LBS/SQ FT.
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A. SLIP-FORM: SLIP-FORM PAVEMENT METHOD SHALL BE USED FOR ALL PUBLIC STREETS AND ALLEYS UNLESS OTHERWISE APPROVED BY THE TOWN ENGINEER.
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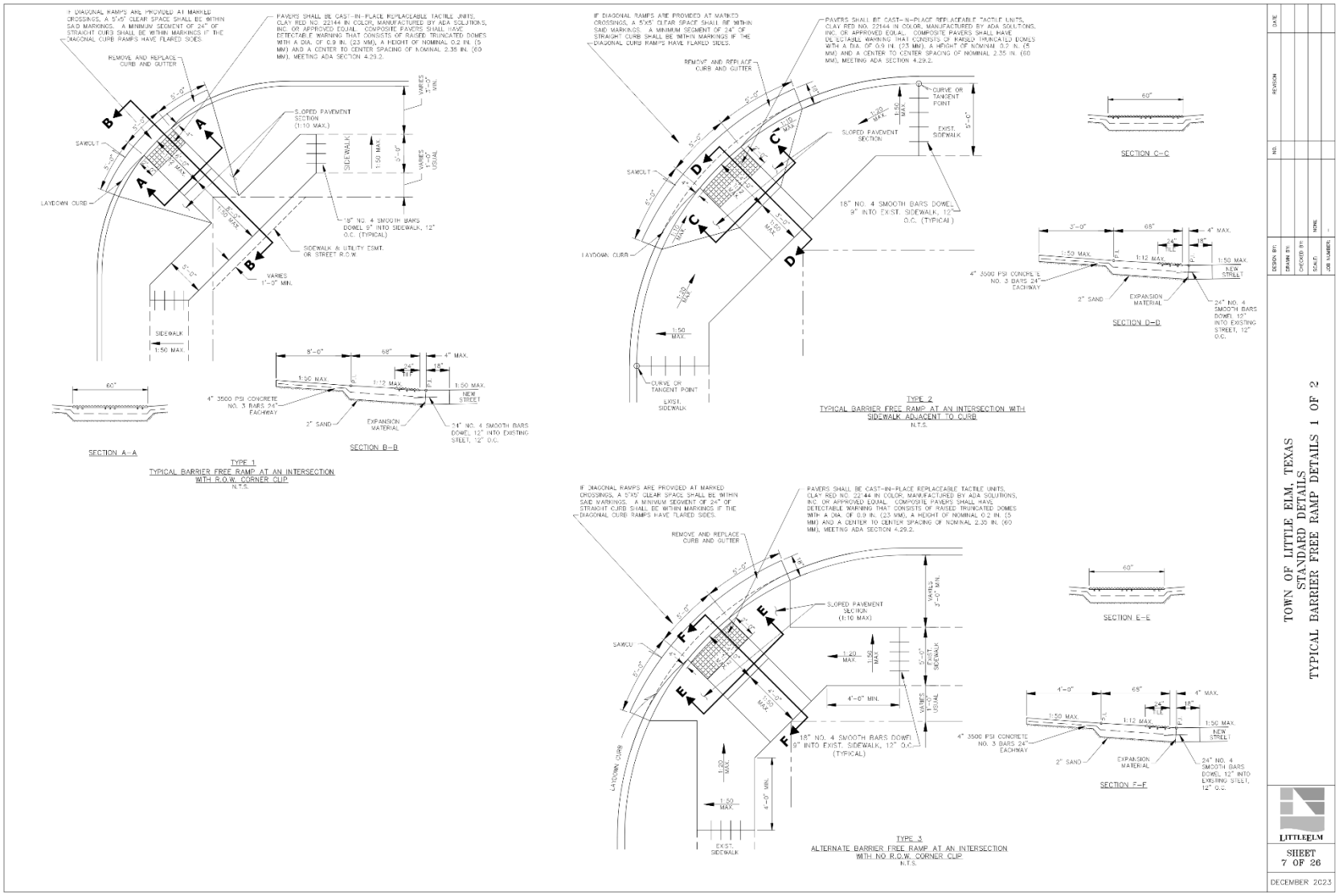
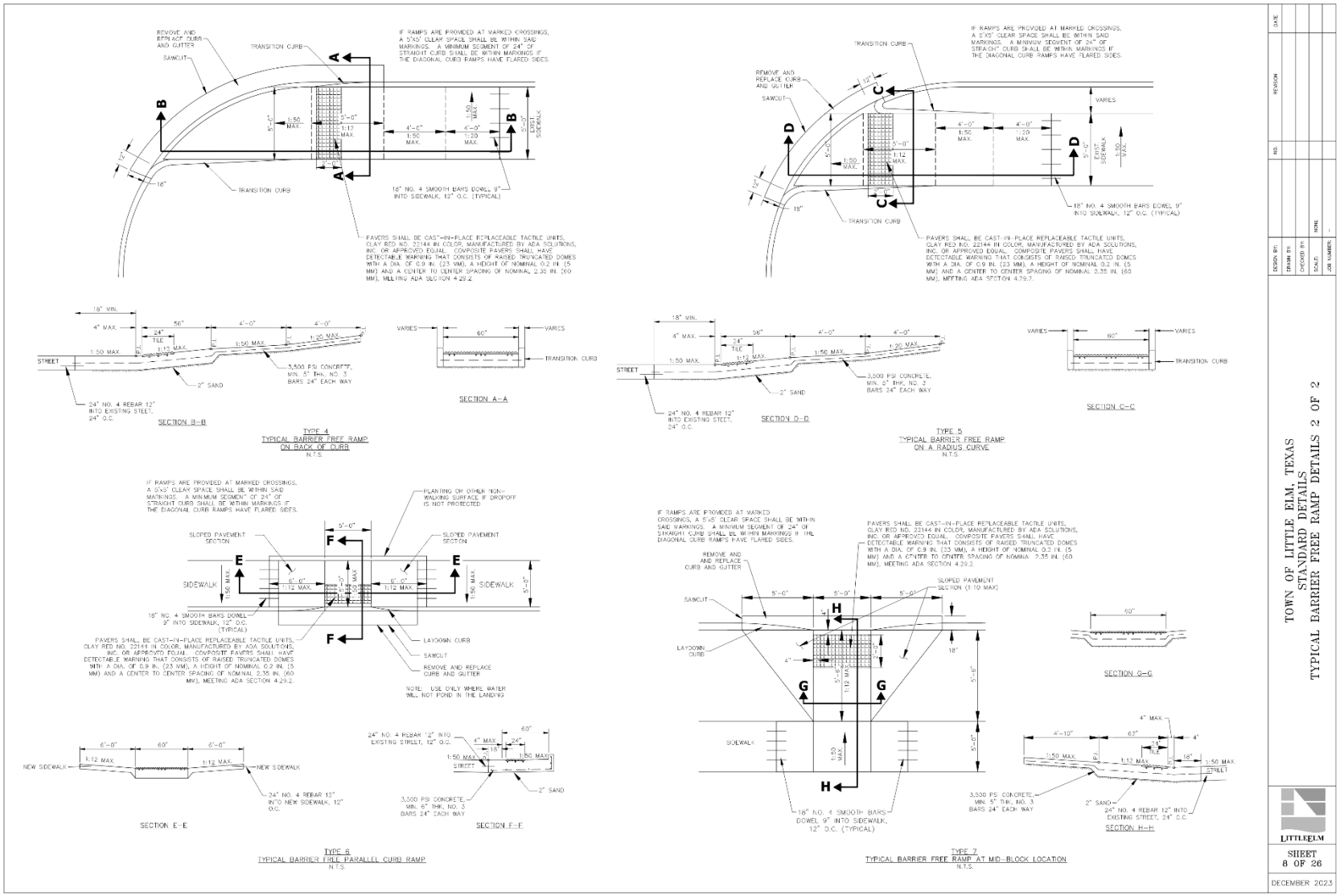
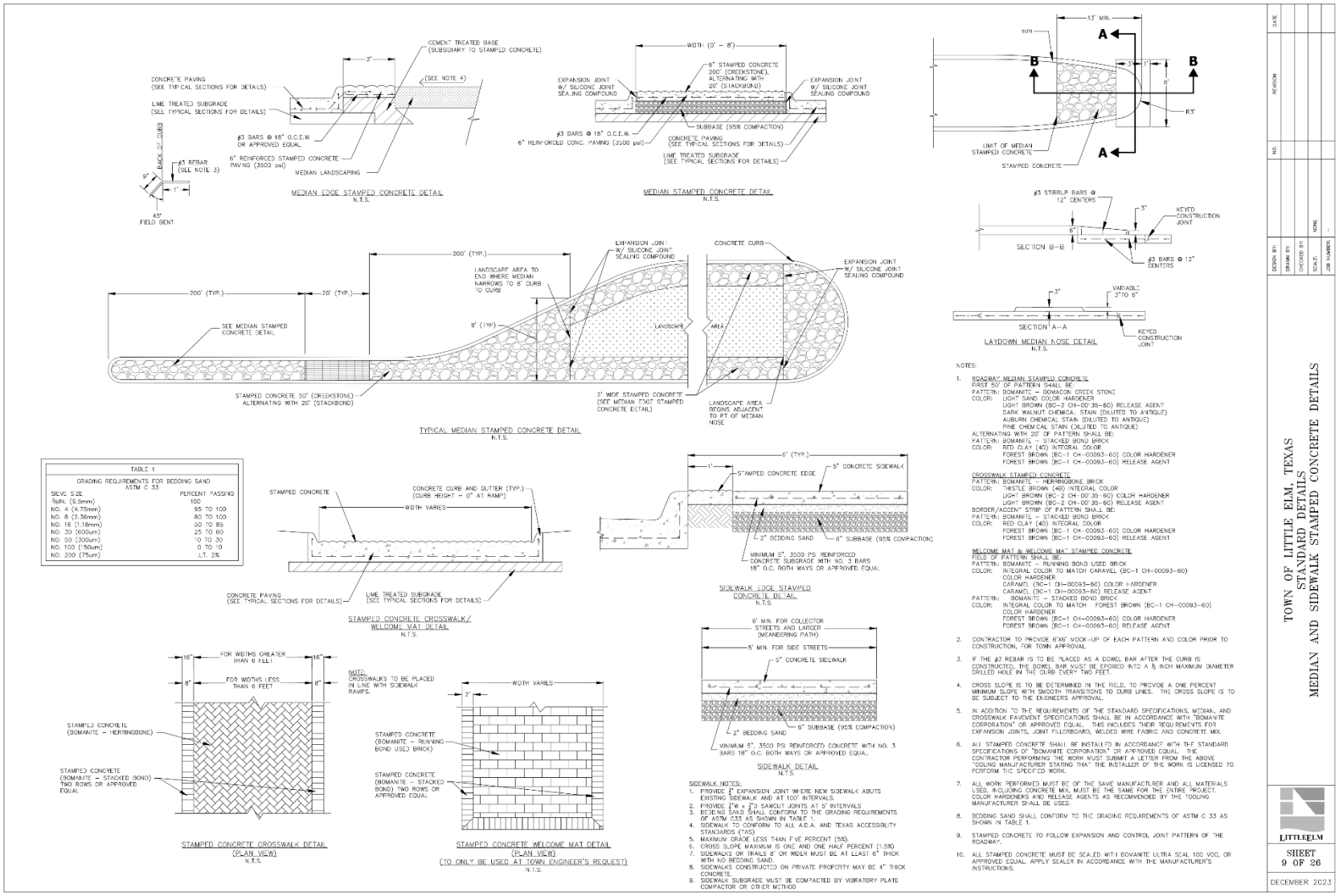
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL PAVING DETAILS 3 OF 3
LITTLE ELM
SHEET 6 OF 26
DECEMBER 2023


TYPE 1
TYPICAL BARRIER FREE RAMP AT AN INTERSECTION WITH R.O.W. CORNER CLIP
N.T.S.
SECTION A–A
SECTION B–B
TYPE 2
TYPICAL BARRIER FREE RAMP AT AN INTERSECTION WITH SIDEWALK ADJACENT TO CURB
N.T.S.
SECTION C–C
SECTION D–D
TYPE 3
ALTERNATE BARRIER FREE RAMP AT AN INTERSECTION WITH NO R.O.W. CORNER CLIP
N.T.S.
SECTION E–E
SECTION F–F
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL BARRIER FREE RAMP DETAILS 1 OF 2
LITTLE ELM
SHEET
7 OF 26
DECEMBER 2023


TYPE 4
TYPICAL BARRIER FREE RAMP
ON BACK OF CURB
N.T.S.
TYPE 5
TYPICAL BARRIER FREE RAMP
ON A RADIUS CURVE
N.T.S.
TYPE 6
TYPICAL BARRIER FREE PARALLEL CURB RAMP
N.T.S.
TYPE 7
TYPICAL BARRIER FREE RAMP AT MID-BLOCK LOCATION
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL BARRIER FREE RAMP DETAILS 2 OF 2
LITTLEELM
SHEET
8 OF 26
DECEMBER 2023


MEDIAN EDGE STAMPED CONCRETE DETAIL
N.T.S.
MEDIAN STAMPED CONCRETE DETAIL
N.T.S.
LAYDOWN MEDIAN NOSE DETAIL
N.T.S.
TYPICAL MEDIAN STAMPED CONCRETE DETAIL
N.T.S.
TABLE 1
GRADING REQUIREMENTS FOR BEDDING SAND
ASTM C 33
STAMPED CONCRETE CROSSWALK/
WELCOME MAT DETAIL
N.T.S.
SIDEWALK EDGE STAMPED
CONCRETE DETAIL
N.T.S.
SIDEWALK DETAIL
N.T.S.
SIDEWALK NOTES:
STAMPED CONCRETE CROSSWALK DETAIL
(PLAN VIEW)
N.T.S.
STAMPED CONCRETE WELCOME MAT DETAIL
(PLAN VIEW)
(TO ONLY BE USED AT TOWN ENGINEER'S REQUEST)
N.T.S.
NOTES:
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
MEDIAN AND SIDEWALK STAMPED CONCRETE DETAILS
LITTLEELM
SHEET
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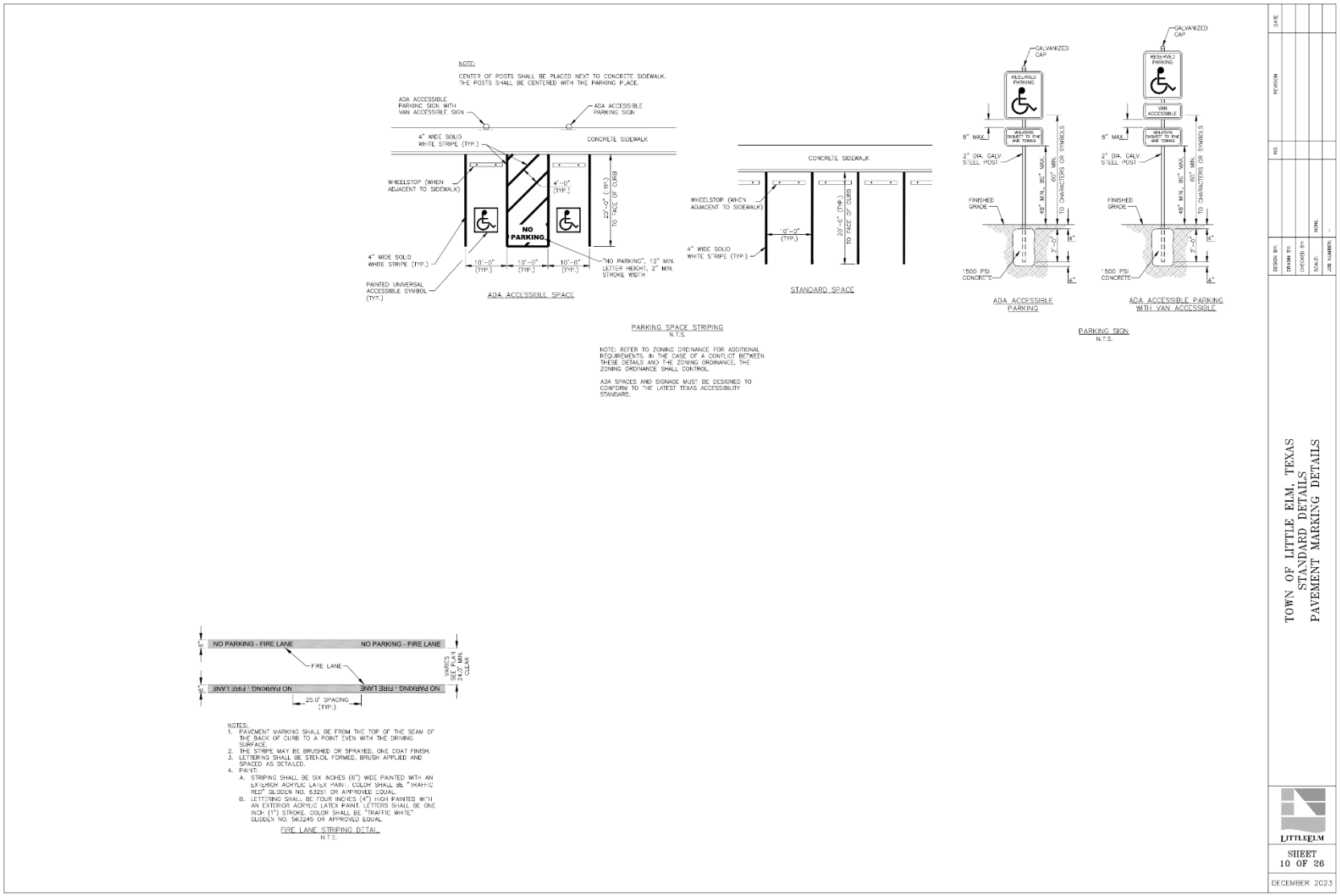
NOTE:
CENTER OF POSTS SHALL BE PLACED NEXT TO CONCRETE SIDEWALK. THE POSTS SHALL BE CENTERED WITH THE PARKING PLACE.
ADA ACCESSIBLE PARKING SIGN WITH VAN ACCESSIBLE SIGN
ADA ACCESSIBLE PARKING SIGN
4" WIDE SOLID WHITE STRIPE (TYP.)
CONCRETE SIDEWALK
WHEELSTOP (WHEN ADJACENT TO SIDEWALK)
4'-0" (TYP.)
20'-0" (TYP.) TO FACE OF CURB
NO PARKING
4" WIDE SOLID WHITE STRIPE (TYP.)
10'-0" (TYP.)
10'-0" (TYP.)
10'-0" (TYP.)
"NO PARKING", 12" MIN. LETTER HEIGHT, 2" MIN. STROKE WIDTH
PAINTED UNIVERSAL ACCESSIBLE SYMBOL (TYP.)
ADA ACCESSIBLE SPACE
CONCRETE SIDEWALK
WHEELSTOP (WHEN ADJACENT TO SIDEWALK)
4" WIDE SOLID WHITE STRIPE (TYP.)
2'-0" (TYP.)
20'-0" (TYP.) TO FACE OF CURB
STANDARD SPACE
PARKING SPACE STRIPING
N.T.S.
NOTE: REFER TO ZONING ORDINANCE FOR ADDITIONAL REQUIREMENTS. IN THE CASE OF A CONFLICT BETWEEN THESE DETAILS AND THE ZONING ORDINANCE, THE ZONING ORDINANCE SHALL CONTROL.
ADA SPACES AND SIGNAGE MUST BE DESIGNED TO CONFORM TO THE LATEST TEXAS ACCESSIBILITY STANDARD.
GALVANIZED CAP
MUST AVOID PARKING
8" MAX.
VIOLATORS SUBJECT TO FINE AND TOWING
2" DIA. GALV. STEEL POST
60" MIN. 84" MAX.
48" MIN.
TO CHARACTERS OR SYMBOLS
FINISHED GRADE
2'-0"
4"
4"
3500 PSI CONCRETE
ADA ACCESSIBLE PARKING
GALVANIZED CAP
MUST AVOID PARKING
VAN ACCESSIBLE
8" MAX.
VIOLATORS SUBJECT TO FINE AND TOWING
2" DIA. GALV. STEEL POST
60" MIN. 84" MAX.
48" MIN.
TO CHARACTERS OR SYMBOLS
FINISHED GRADE
2'-0"
4"
4"
3500 PSI CONCRETE
ADA ACCESSIBLE PARKING WITH VAN ACCESSIBLE
PARKING SIGN
N.T.S.
NO PARKING - FIRE LANE
NO PARKING - FIRE LANE
FIRE LANE
VARIES SEE PLAN 24' CLEAR
NO PARKING - FIRE LANE
NO PARKING - FIRE LANE
25.0' SPACING (TYP.)
NOTES:
1. PAVEMENT MARKING SHALL BE FROM THE TOP OF THE SEAM OF THE BACK OF CURB TO A POINT EVEN WITH THE DRIVING SURFACE.
2. THE STRIPE MAY BE BRUSHED OR SPRAYED, ONE COAT FINISH.
3. LETTERING SHALL BE STENCIL FORMED, BRUSH APPLIED AND SPACED AS DETAILED.
4. PAINT:
A. STRIPING SHALL BE SIX INCHES (6") WIDE PAINTED WITH AN EXTERIOR ACRYLIC LATEX PAINT. COLOR SHALL BE "TRAFFIC RED" GLIDDEN NO. 6329 OR APPROVED EQUAL.
B. LETTERING SHALL BE FOUR INCHES (4") HIGH PAINTED WITH AN EXTERIOR ACRYLIC LATEX PAINT. LETTERS SHALL BE ONE INCH (1") STROKE. COLOR SHALL BE "TRAFFIC WHITE" GLIDDEN NO. 56224 OR APPROVED EQUAL.
FIRE LANE STRIPING DETAIL
N.T.S.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
KONG
JOB NUMBER
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
PAVEMENT MARKING DETAILS
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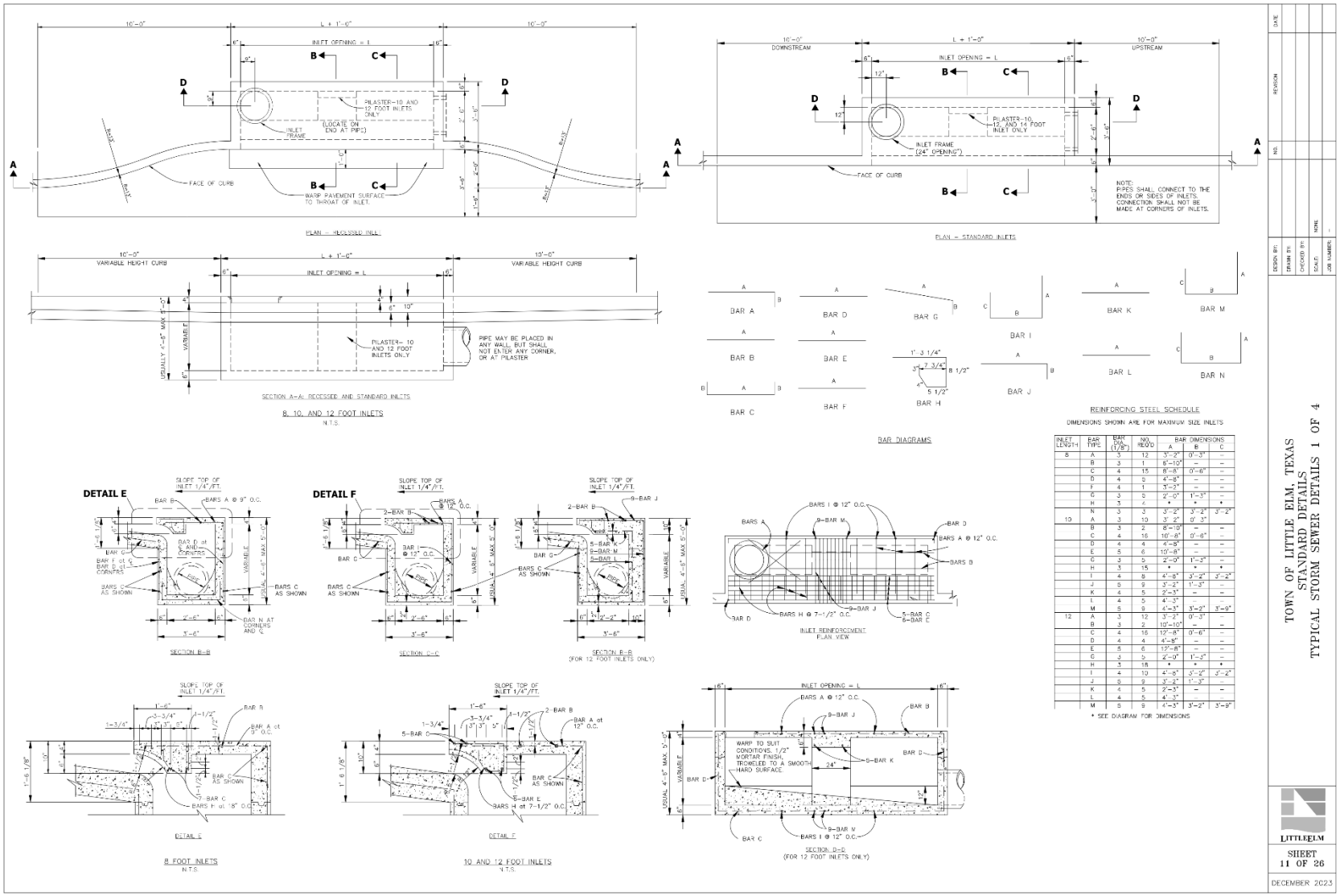
PLAN – RECESSED INLET
PLAN – STANDARD INLETS
SECTION A–A: RECESSED AND STANDARD INLETS
8, 10, AND 12 FOOT INLETS
N.T.S.
BAR DIAGRAMS
REINFORCING STEEL SCHEDULE
DIMENSIONS SHOWN ARE FOR MAXIMUM SIZE INLETS
DETAIL E
DETAIL F
SECTION B–B
SECTION C–C
SECTION E–E
(FOR 12 FOOT INLETS ONLY)
INLET REINFORCEMENT PLAN VIEW
DETAIL E
DETAIL F
8 FOOT INLETS
10 AND 12 FOOT INLETS
SECTION D–D
(FOR 12 FOOT INLETS ONLY)
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 1 OF 4
LITTLE ELM
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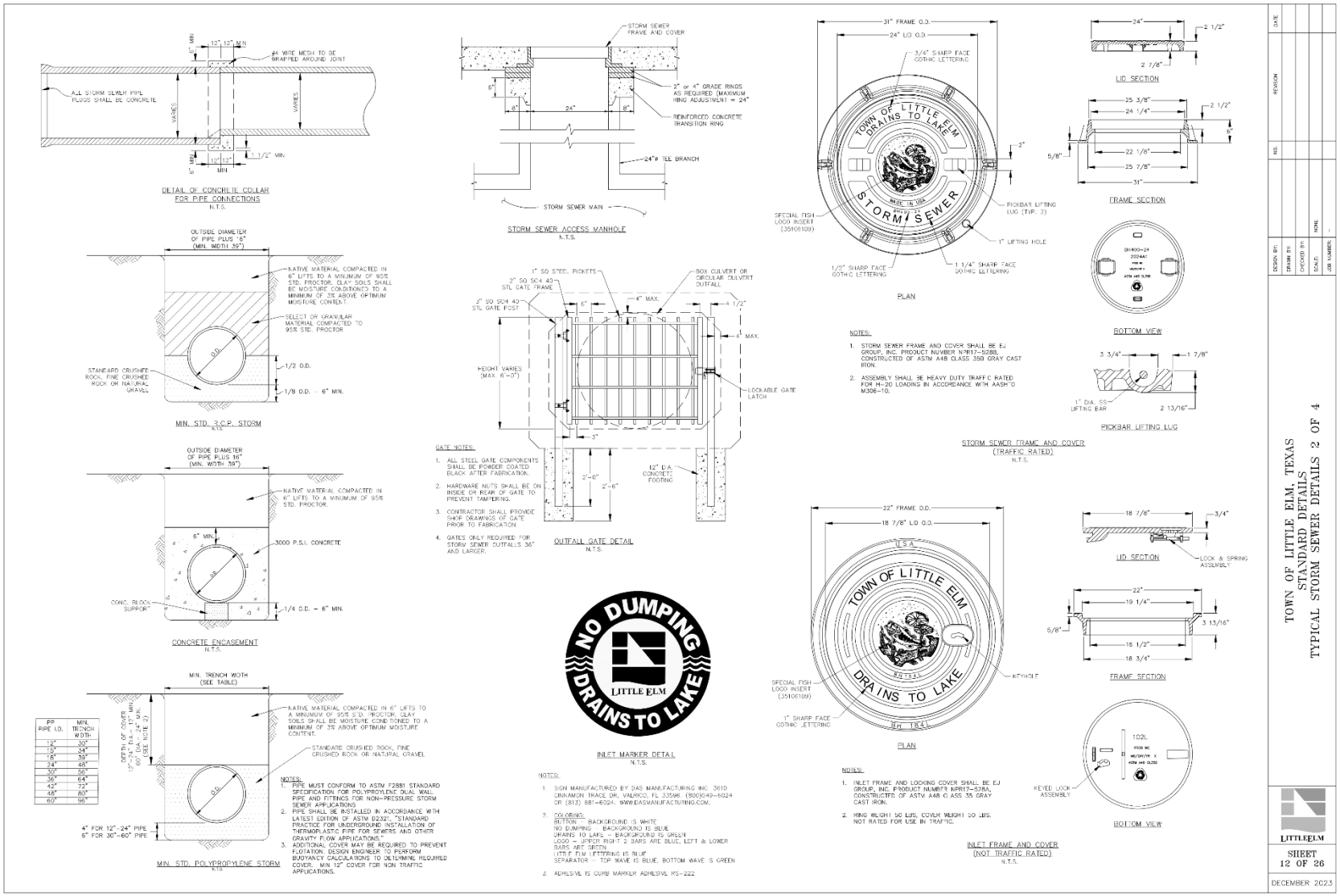
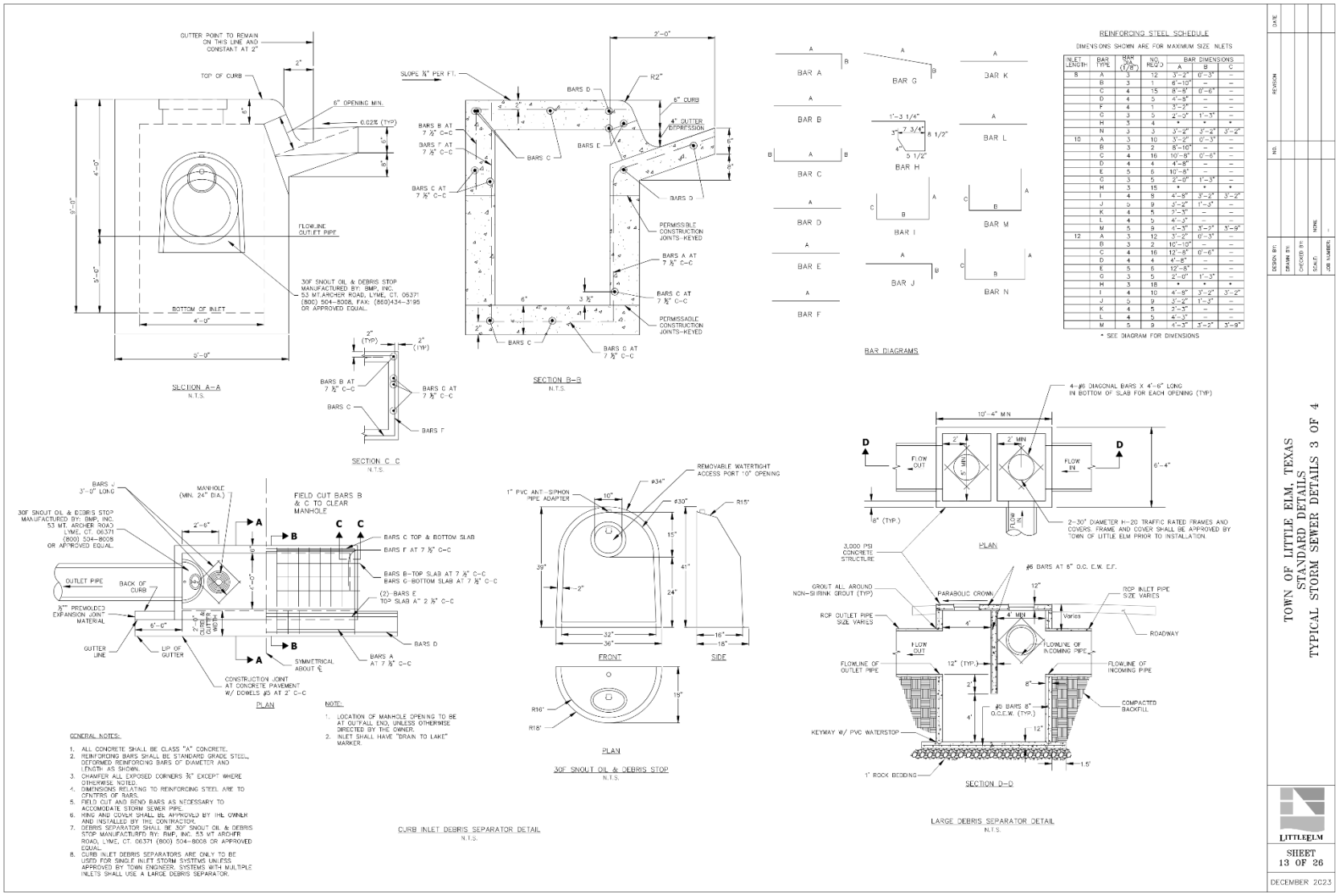

DETAIL OF CONCRETE COLLAR FOR PIPE CONNECTIONS
N.T.S.
STORM SEWER ACCESS MANHOLE
N.T.S.
MIN. STD. R.C.P. STORM
N.T.S.
CONCRETE ENCASEMENT
N.T.S.
MIN. STD. POLYPROPYLENE STORM
N.T.S.
OUTFALL GATE DETAIL
N.T.S.
INLET MARKER DETAIL
N.T.S.
PLAN
LID SECTION
FRAME SECTION
BOTTOM VIEW
PICKBAR LIFTING LUG
STORM SEWER FRAME AND COVER (TRAFFIC RATED)
N.T.S.
INLET FRAME AND COVER (NOT TRAFFIC RATED)
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 2 OF 4
LITTLE ELM
SHEET 12 OF 26
DECEMBER 2023


GUTTER POINT TO REMAIN ON THIS LINE AND CONSTANT AT 2"
TOP OF CURB
6" OPENING MIN.
0.02% (TYP)
FLOWLINE OUTLET PIPE
30F SNOUT OIL & DEBRIS STOP MANUFACTURED BY: BMP, INC. 53 MT. ARCHER ROAD, LYME, CT. 06371 (800) 504-8008, FAX: (860)434-3195 OR APPROVED EQUAL.
BOTTOM OF INLET
SECTION A-A
N.T.S.
SLOPE ¼" PER FT.
BARS D
R2"
6" CURB
4" GUTTER DEPRESSION
BARS B AT 7 ½" C-C
BARS F AT 7 ½" C-C
BARS E
BARS C
BARS C AT 7 ½" C-C
BARS D
PERMISSIBLE CONSTRUCTION JOINTS-KEYED
BARS A AT 7 ½" C-C
BARS C AT 7 ½" C-C
PERMISSIBLE CONSTRUCTION JOINTS-KEYED
BARS C
BARS C AT 7 ½" C-C
SECTION B-B
N.T.S.
BARS B AT 7 ½" C-C
BARS C AT 7 ½" C-C
BARS C
BARS F
SECTION C C
N.T.S.
BAR A
BAR B
BAR C
BAR D
BAR E
BAR F
BAR G
BAR H
BAR I
BAR J
BAR K
BAR L
BAR M
BAR N
BAR DIAGRAMS
REINFORCING STEEL SCHEDULE
DIMENSIONS SHOWN ARE FOR MAXIMUM SIZE INLETS
* SEE DIAGRAM FOR DIMENSIONS
4-#6 DIAGONAL BARS X 4'-6" LONG IN BOTTOM OF SLAB FOR EACH OPENING (TYP)
10'-4" MIN
FLOW OUT
FLOW IN
6'-4"
18" (TYP.)
2-30" DIAMETER H-20 TRAFFIC RATED FRAMES AND COVERS. FRAME AND COVER SHALL BE APPROVED BY TOWN OF LITTLE ELM PRIOR TO INSTALLATION
PLAN
BARS J 3'-0" LONG
MANHOLE (MIN. 24" DIA.)
FIELD CUT BARS B & C TO CLEAR MANHOLE
30F SNOUT OIL & DEBRIS STOP MANUFACTURED BY: BMP, INC. 53 MT. ARCHER ROAD LYME, CT. 06371 (800) 504-8008 OR APPROVED EQUAL.
BARS C TOP & BOTTOM SLAB
BARS F AT 7 ½" C-C
BARS B-TOP SLAB AT 7 ½" C-C
BARS G-BOTTOM SLAB AT 7 ½" C-C
(2)-BARS E TOP SLAB A" 2 ½" C-C
OUTLET PIPE
BACK OF CURB
½" PREMOLDED EXPANSION JOINT MATERIAL
GUTTER LINE
LIP OF GUTTER
BARS D
BARS A AT 7 ½" C-C
SYMMETRICAL ABOUT ℄
CONSTRUCTION JOINT AT CONCRETE PAVEMENT W/ DOWELS #5 AT 2' C-C
PLAN
NOTE:
1. LOCATION OF MANHOLE OPENING TO BE AT OUTFALL END, UNLESS OTHERWISE DIRECTED BY THE OWNER.
2. INLET SHALL HAVE "DRAIN TO LAKE" MARKER.
GENERAL NOTES:
1. ALL CONCRETE SHALL BE CLASS "A" CONCRETE.
2. REINFORCING BARS SHALL BE STANDARD GRADE STEEL, DEFORMED REINFORCING BARS OF DIAMETER AND LENGTH AS SHOWN.
3. CHAMFER ALL EXPOSED CORNERS ¾" EXCEPT WHERE OTHERWISE NOTED.
4. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
5. FIELD CUT AND BEND BARS AS NECESSARY TO ACCOMODATE STORM SEWER PIPE.
6. KING AND COVER SHALL BE APPROVED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
7. DEBRIS SEPARATOR SHALL BE 30F SNOUT OIL & DEBRIS STOP MANUFACTURED BY: BMP, INC. 53 MT ARCHER ROAD, LYME, CT. 06371 (800) 504-8008 OR APPROVED EQUAL.
8. CURB INLET DEBRIS SEPARATORS ARE ONLY TO BE USED FOR SINGLE INLET STORM SYSTEMS UNLESS APPROVED BY TOWN ENGINEER. SYSTEMS WITH MULTIPLE INLETS SHALL USE A LARGE DEBRIS SEPARATOR.
CURB INLET DEBRIS SEPARATOR DETAIL
N.T.S.
1" PVC ANTI-SIPHON PIPE ADAPTER
#34"
#30"
R15"
REMOVABLE WATERTIGHT ACCESS PORT 10" OPENING
FRONT
SIDE
PLAN
30F SNOUT OIL & DEBRIS STOP
N.T.S.
3,000 PSI CONCRETE STRUCTURE
#6 BARS AT 6" O.C. E.W. E.F.
GROUT ALL AROUND NON-SHRINK GROUT (TYP)
PARABOLIC CROWN
RCP INLET PIPE SIZE VARIES
RCP OUTLET PIPE SIZE VARIES
ROADWAY
FLOW OUT
FLOWLINE OF INCOMING PIPE
FLOWLINE OF OUTLET PIPE
FLOWLINE OF INCOMING PIPE
#5 BARS 8" O.C.E.W. (TYP.)
COMPACTED BACKFILL
KEYWAY W/ PVC WATERSTOP
1' ROCK BEDDING
SECTION D-D
LARGE DEBRIS SEPARATOR DETAIL
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 3 OF 4
LITTLE ELM
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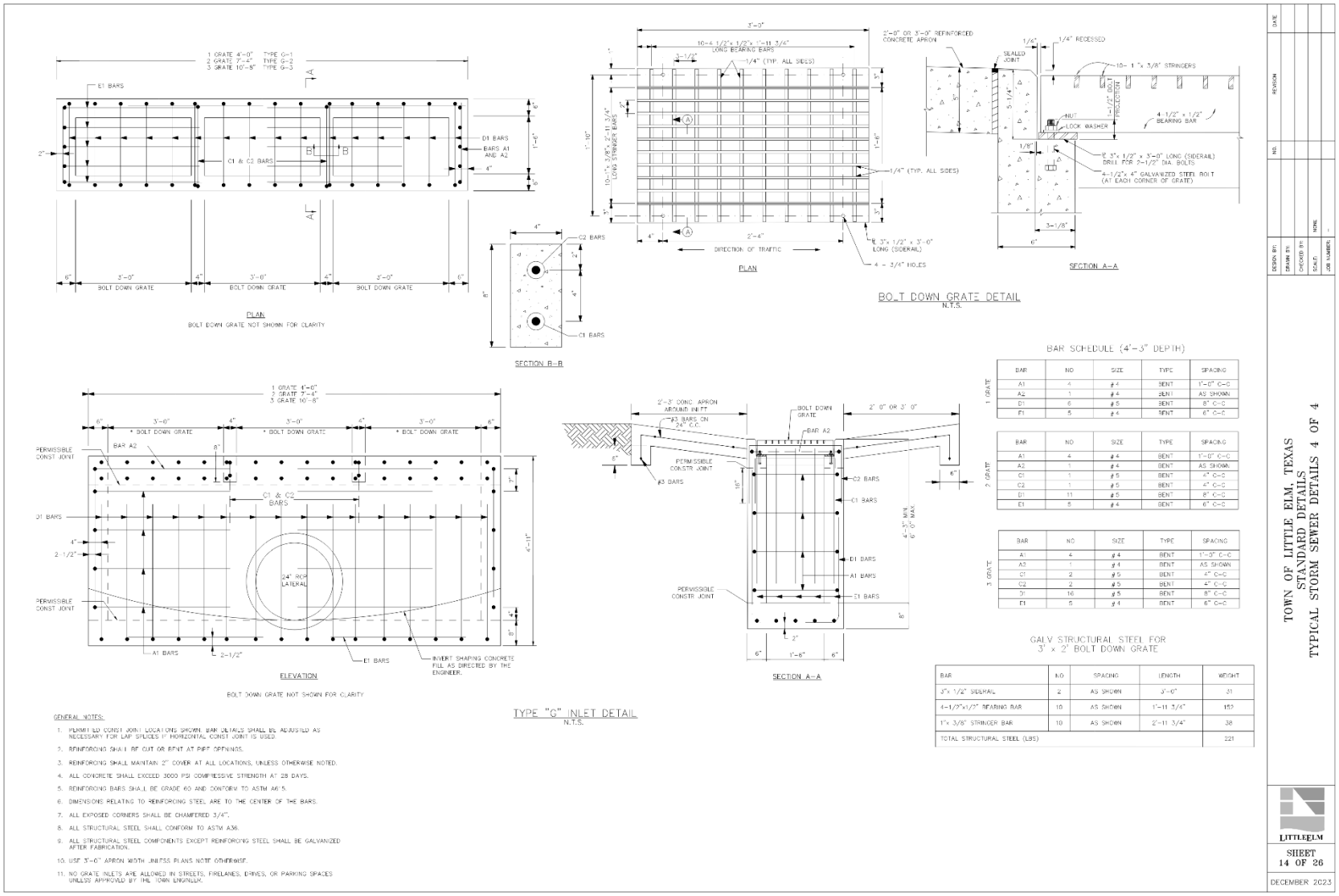
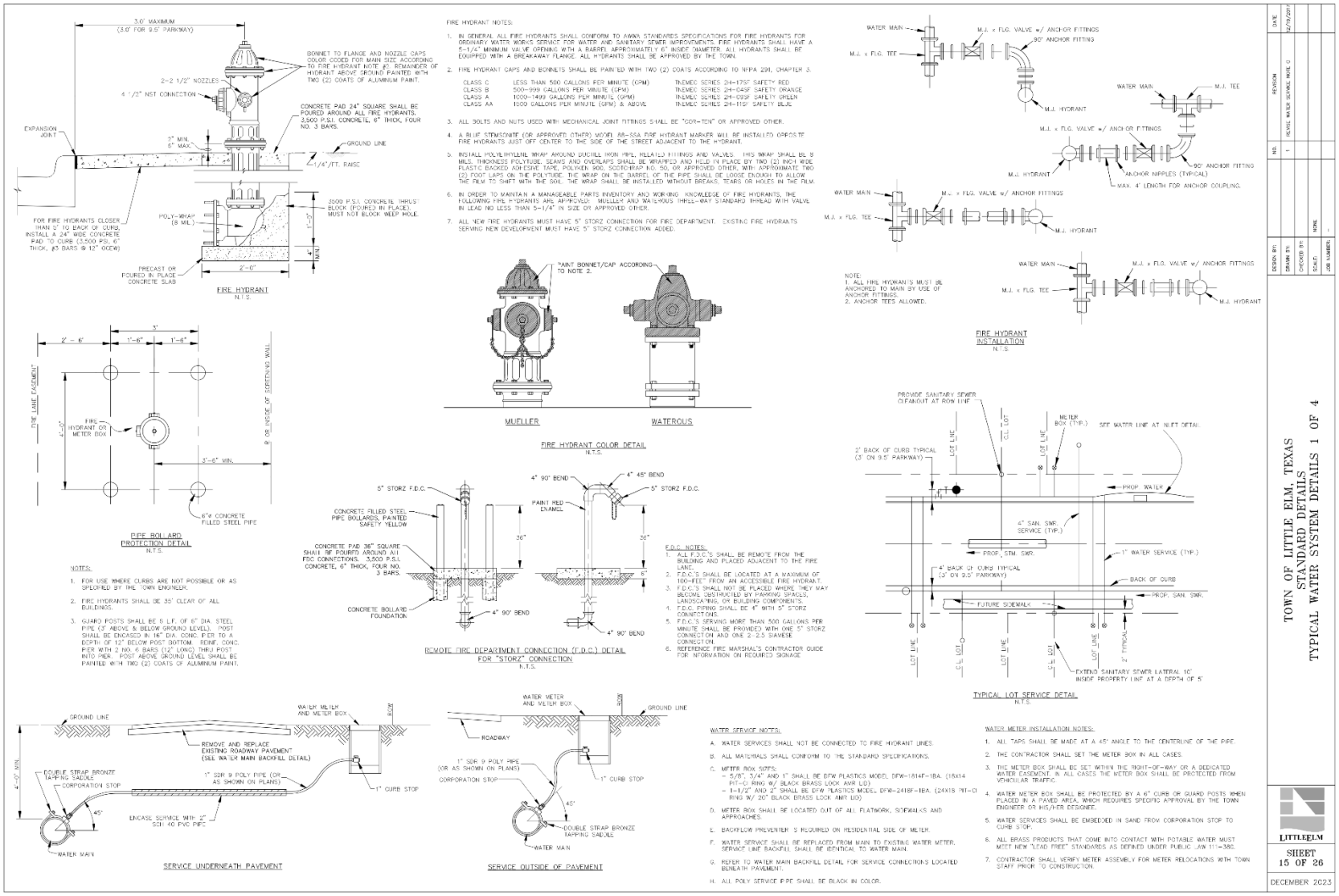

1 GRATE 4'-0" TYPE G-1
2 GRATE 7'-4" TYPE G-2
3 GRATE 10'-8" TYPE G-3
E1 BARS
D1 BARS
BARS A1 AND A2
C1 & C2 BARS
BOLT DOWN GRATE
PLAN
BOLT DOWN GRATE NOT SHOWN FOR CLARITY
SECTION B-B
10-4 1/2"x 1/2"x 1'-11 3/4" LONG BEARING BARS
1/4" (TYP. ALL SIDES)
10-1" x 3/8" x 2'-11 3/4" LONG STRINGER BARS
DIRECTION OF TRAFFIC
2'-0" OR 3'-0" REINFORCED CONCRETE APRON
PL 3"x 1/2" x 3'-0" LONG (SIDERAIL)
4 - 3/4" HOLES
PLAN
SEALED JOINT
1/4" RECESSED
10- 1 "x 3/8" STRINGERS
1/2" BOLT PROJECTION
NUT
LOCK WASHER
4 1/2" x 1/2" BEARING BAR
PL 3"x 1/2" x 3'-0" LONG (SIDERAIL) DRILL FOR 2-1/2" DIA. BOLTS
4-1/2"x 4" GALVANIZED STEEL BOLT (AT EACH CORNER OF GRATE)
SECTION A-A
BOLT DOWN GRATE DETAIL
N.T.S.
1 GRATE 4'-6"
2 GRATE 7'-4"
3 GRATE 10'-8"
* BOLT DOWN GRATE
PERMISSIBLE CONST JOINT
BAR A2
C1 & C2 BARS
D1 BARS
24" RCP LATERAL
A1 BARS
E1 BARS
INVERT SHAPING CONCRETE FILL AS DIRECTED BY THE ENGINEER.
ELEVATION
BOLT DOWN GRATE NOT SHOWN FOR CLARITY
2'-3" CONC. APRON AROUND INLET
#3 BARS ON 24" C.C.
#3 BARS
BOLT DOWN GRATE
2' 0" OR 3' 0"
C2 BARS
C1 BARS
4'-3" MIN. 6' 0" MAX.
SECTION A-A
TYPE "G" INLET DETAIL
N.T.S.
BAR SCHEDULE (4'-3" DEPTH)
1 GRATE
BAR NO SIZE TYPE SPACING
A1 4 # 4 BENT 1'-0" C-C
A2 1 # 4 BENT AS SHOWN
D1 6 # 5 BENT 8" C-C
E1 5 # 4 BENT 6" C-C
2 GRATE
BAR NO SIZE TYPE SPACING
A1 4 # 4 BENT 1'-0" C-C
A2 1 # 4 BENT AS SHOWN
C1 1 # 5 BENT 4" C-C
C2 1 # 5 BENT 4" C-C
D1 11 # 5 BENT 8" C-C
E1 5 # 4 BENT 6" C-C
3 GRATE
BAR NO SIZE TYPE SPACING
A1 4 # 4 BENT 1'-0" C-C
A2 1 # 4 BENT AS SHOWN
C1 2 # 5 BENT 4" C-C
C2 2 # 5 BENT 4" C-C
D1 16 # 5 BENT 8" C-C
E1 5 # 4 BENT 6" C-C
GALV STRUCTURAL STEEL FOR 3' x 2' BOLT DOWN GRATE
BAR NO SPACING LENGTH WEIGHT
3"x 1/2" SIDERAIL 2 AS SHOWN 3'-0" 31
4-1/2"x1/2" BEARING BAR 10 AS SHOWN 1'-11 3/4" 153
1"x 3/8" STRINGER BAR 10 AS SHOWN 2'-11 3/4" 38
TOTAL STRUCTURAL STEEL (LBS) 221
GENERAL NOTES:
1. PERMITTED CONST JOINT LOCATIONS SHOWN. BAR DETAILS SHALL BE ADJUSTED AS NECESSARY FOR LAP SPLICES IF HORIZONTAL CONST JOINT IS USED.
2. REINFORCING SHALL BE CUT OR BENT AT PIPE OPENINGS.
3. REINFORCING SHALL MAINTAIN 2" COVER AT ALL LOCATIONS, UNLESS OTHERWISE NOTED.
4. ALL CONCRETE SHALL EXCEED 3000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
5. REINFORCING BARS SHALL BE GRADE 60 AND CONFORM TO ASTM A615.
6. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO THE CENTER OF THE BARS.
7. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
8. ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A36.
9. ALL STRUCTURAL STEEL COMPONENTS EXCEPT REINFORCING STEEL SHALL BE GALVANIZED AFTER FABRICATION.
10. USE 3'-0" APRON WIDTH UNLESS PLANS NOTE OTHERWISE.
11. NO GRATE INLETS ARE ALLOWED IN STREETS, FIRELANES, DRIVES, OR PARKING SPACES UNLESS APPROVED BY THE TOWN ENGINEER.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 4 OF 4
LITTLE ELM
SHEET 14 OF 26
DECEMBER 2023


FIRE HYDRANT
PIPE BOLLARD PROTECTION DETAIL
FIRE HYDRANT COLOR DETAIL
MUELLER
WATEROUS
FIRE HYDRANT INSTALLATION
REMOTE FIRE DEPARTMENT CONNECTION (F.D.C.) DETAIL FOR "STORZ" CONNECTION
TYPICAL LOT SERVICE DETAIL
SERVICE UNDERNEATH PAVEMENT
SERVICE OUTSIDE OF PAVEMENT
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 1 OF 4
LITTLE ELM
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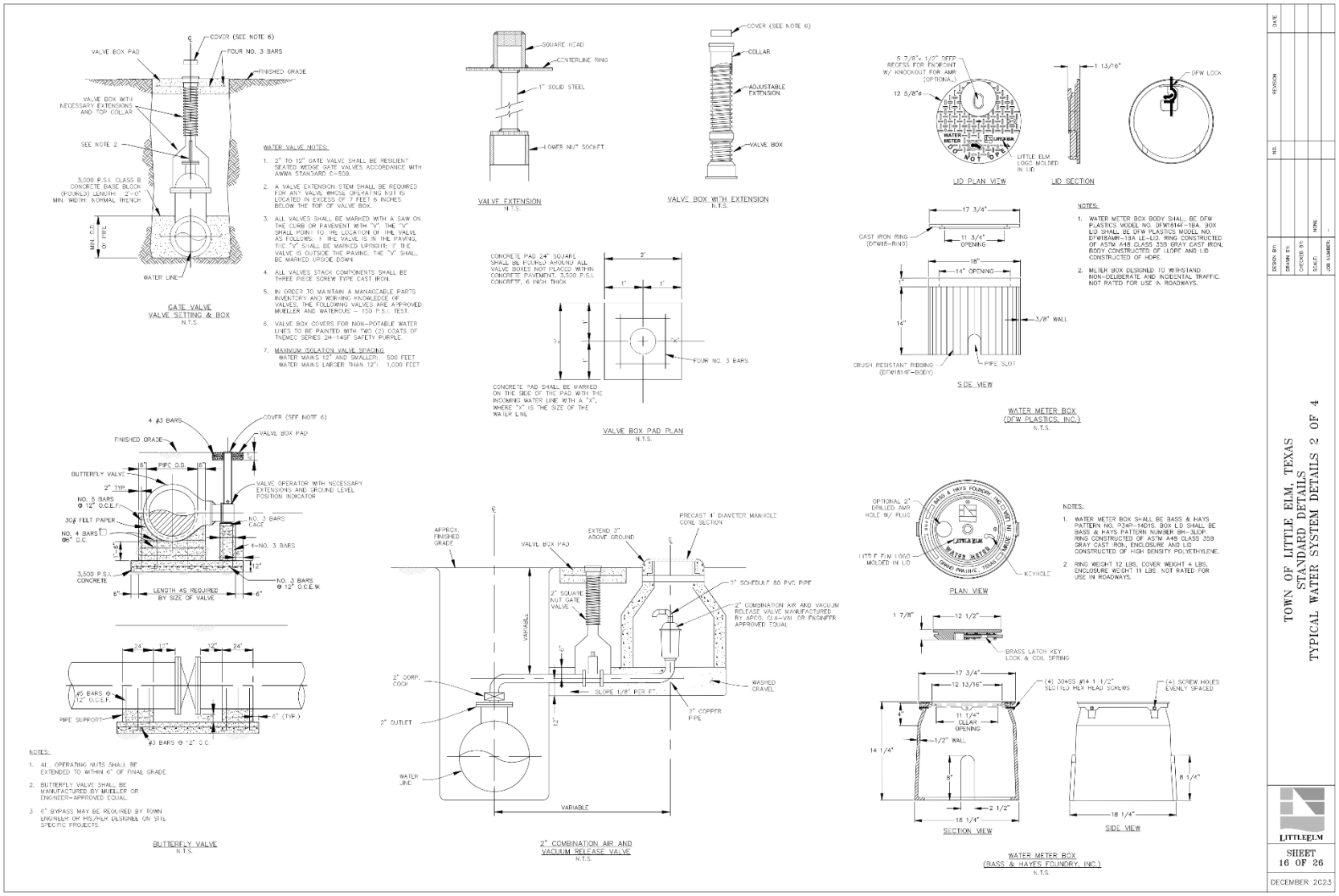
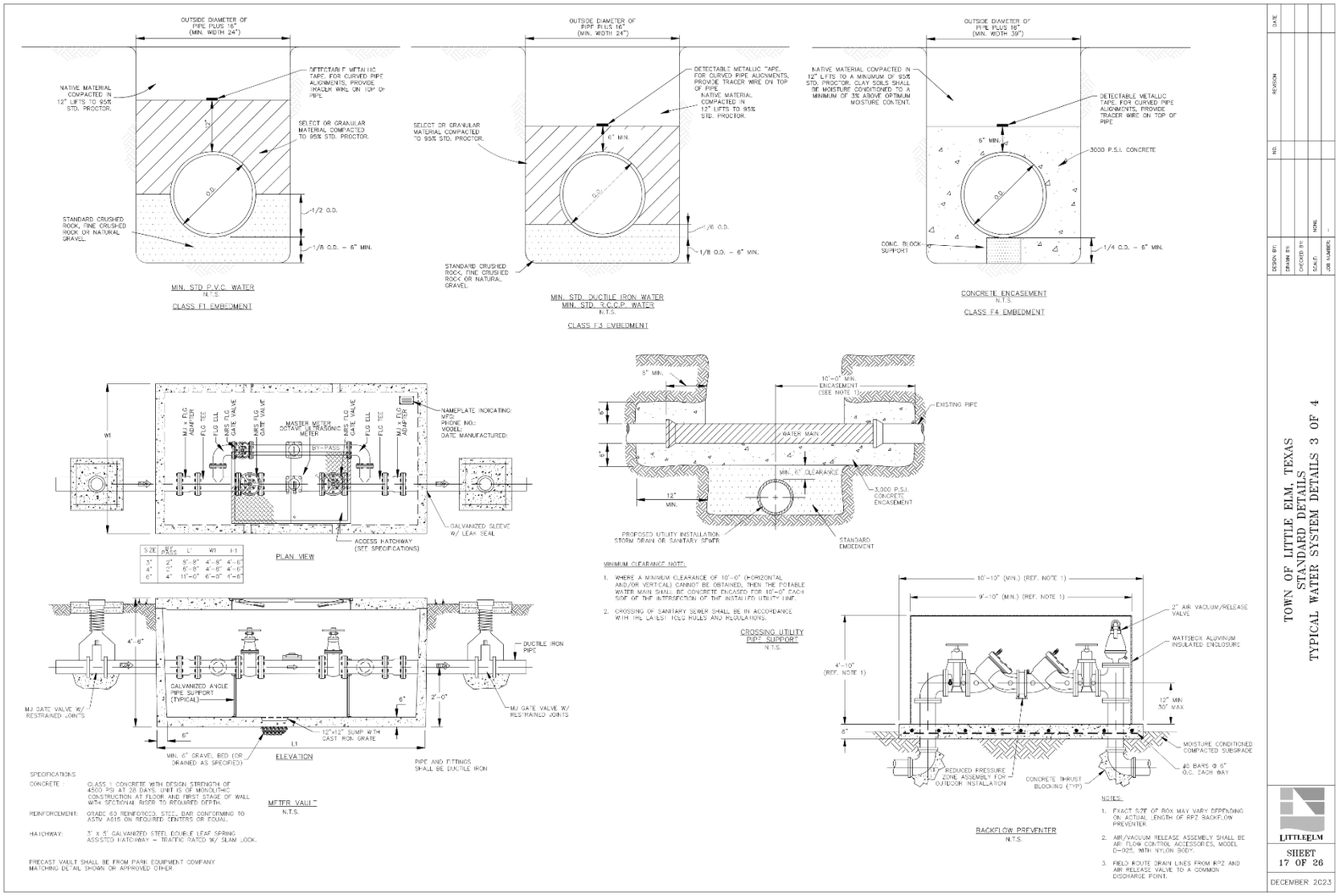
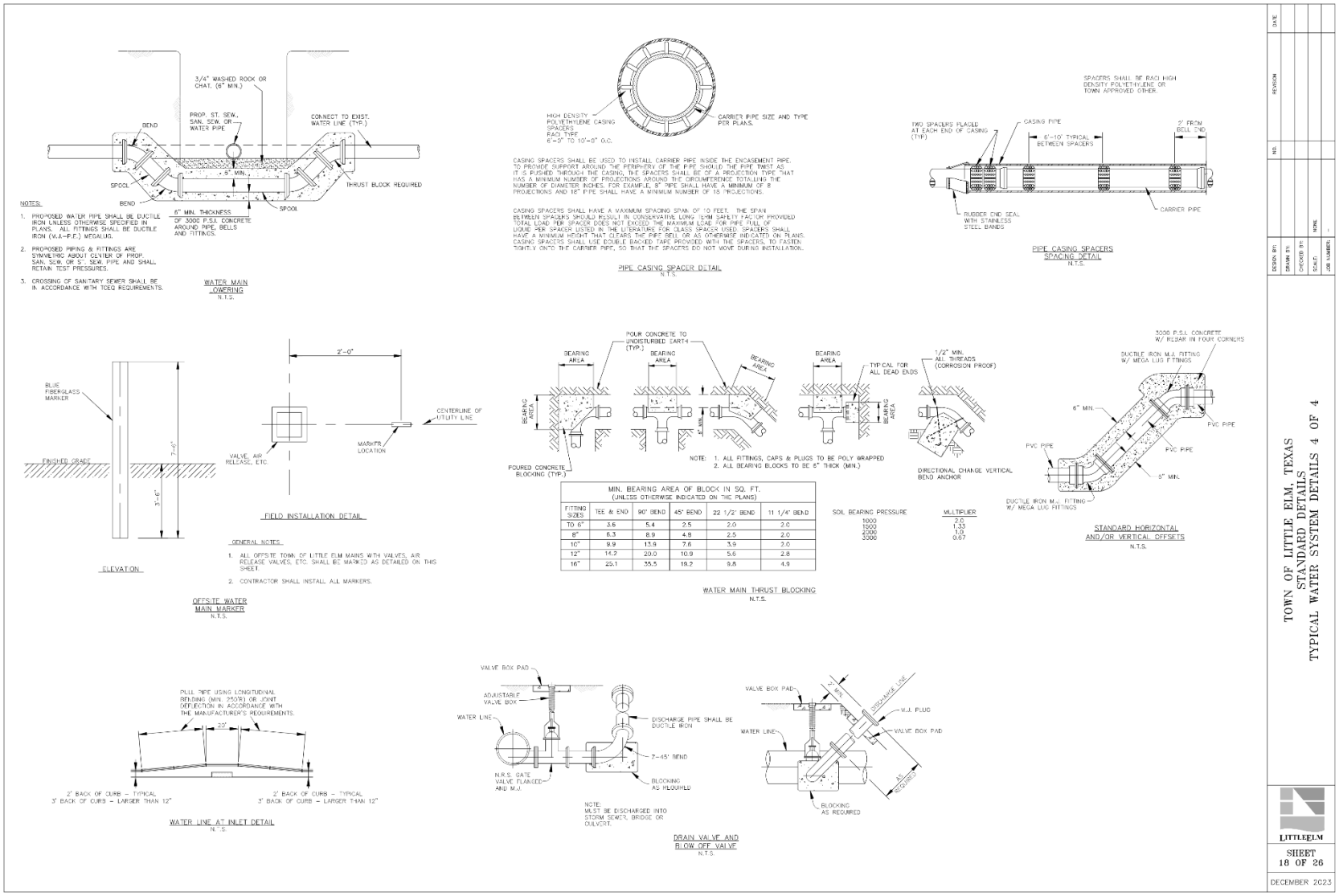
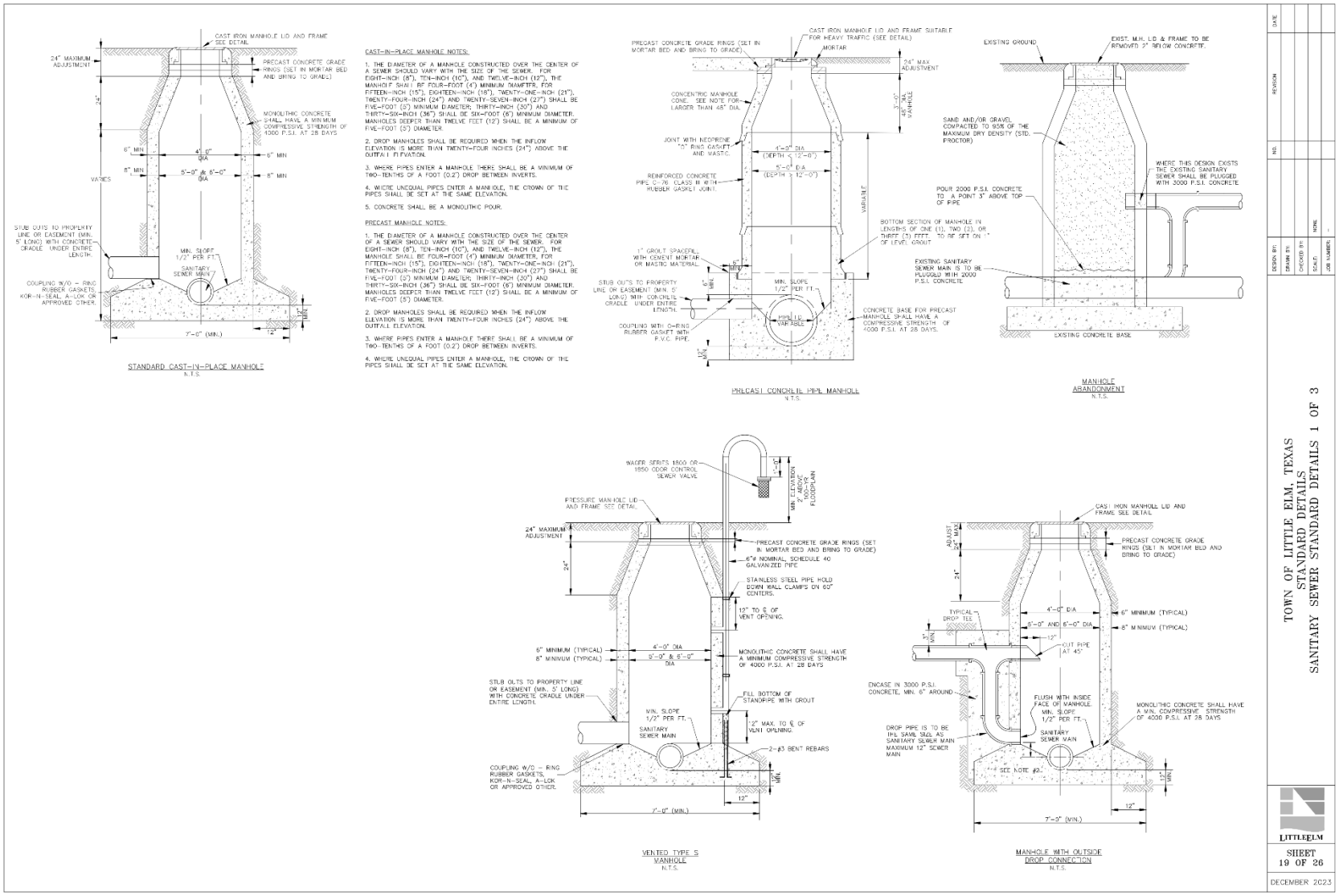

COVER (SEE NOTE 6)
VALVE BOX PAD
FOUR NO. 3 BARS
FINISHED GRADE
VALVE BOX WITH NECESSARY EXTENSIONS AND TOP COLLAR
SEE NOTE 2
3,500 P.S.I. CLASS B CONCRETE BASE BLOCK (POURED) LENGTH: 2'-0" MIN. WIDTH: NORMAL TRENCH
MIN. O.D. OF PIPE
WATER LINE
GATE VALVE VALVE SETTING & BOX
N.T.S.
WATER VALVE NOTES:
1. 2" TO 12" GATE VALVE SHALL BE RESILIENT SEATED WEDGE GATE VALVES ACCORDANCE WITH AWWA STANDARD C-509.
2. A VALVE EXTENSION STEM SHALL BE REQUIRED FOR ANY VALVE WHOSE OPERATING NUT IS LOCATED IN EXCESS OF 7 FEET 6 INCHES BELOW THE TOP OF VALVE BOX.
3. ALL VALVES SHALL BE MARKED WITH A SAW ON THE CURB OR PAVEMENT WITH "V". THE "V" SHALL POINT TO THE LOCATION OF THE VALVE AS FOLLOWS: IF THE VALVE IS IN THE PAVING, THE "V" SHALL BE MARKED UPRIGHT; IF THE VALVE IS OUTSIDE THE PAVING, THE "V" SHALL BE MARKED UPSIDE DOWN.
4. ALL VALVES STACK COMPONENTS SHALL BE THREE PIECE SCREW TYPE CAST IRON.
5. IN ORDER TO MAINTAIN A MANAGEABLE PARTS INVENTORY AND WORKING KNOWLEDGE OF VALVES, THE FOLLOWING VALVES ARE APPROVED: MUELLER AND WATEROUS – 150 P.S.I. TEST.
6. VALVE BOX COVERS FOR NON-POTABLE WATER LINES TO BE PAINTED WITH TWO (2) COATS OF TNEMEC SERIES 2H-1439F SAFETY PURPLE.
7. MAXIMUM ISOLATION VALVE SPACING
WATER MAINS 12" AND SMALLER: 500 FEET
WATER MAINS LARGER THAN 12": 1,000 FEET
SQUARE HEAD
CENTERLINE RING
1" SOLID STEEL
LOWER NUT SOCKET
VALVE EXTENSION
N.T.S.
COVER (SEE NOTE 6)
COLLAR
ADJUSTABLE EXTENSION
VALVE BOX
VALVE BOX WITH EXTENSION
N.T.S.
2 7/8"x 1/2" DEEP RECESS FOR ENDPOINT W/ KNOCKOUT FOR AMR (OPTIONAL)
12 5/8"ø
LID PLAN VIEW
1 13/16"
LITTLE ELM LOGO MOLDED IN LID
LID SECTION
DFW LOCK
CONCRETE PAD 24" SQUARE SHALL BE POURED AROUND ALL VALVE BOXES NOT PLACED WITHIN CONCRETE PAVEMENT, 3,500 P.S.I. CONCRETE, 6 INCH THICK
2'
1'
FOUR NO. 3 BARS
CONCRETE PAD SHALL BE MARKED ON THE SIDE OF THE PAD WITH THE INCOMING WATER LINE WITH A "X", WHERE "X" IS THE SIZE OF THE WATER LINE
VALVE BOX PAD PLAN
N.T.S.
17 3/4"
CAST IRON RING (DFW18-RING)
11 3/4" OPENING
18"
14" OPENING
14"
3/8" WALL
CRUSH RESISTANT RIBBING (DFW1814F-BODY)
PIPE SLOT
SIDE VIEW
WATER METER BOX (DFW PLASTICS, INC.)
N.T.S.
NOTES:
1. WATER METER BOX BODY SHALL BE DFW PLASTICS MODEL NO. DFW1814F-1BA. BOX LID SHALL BE DFW PLASTICS MODEL NO. DFW18AMR-13A LE-LID. RING CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON. BODY CONSTRUCTED OF ULDPE AND LID CONSTRUCTED OF HDPE.
2. METER BOX DESIGNED TO WITHSTAND NON-DELIBERATE AND INCIDENTAL TRAFFIC. NOT RATED FOR USE IN ROADWAYS.
4 #3 BARS
COVER (SEE NOTE 6)
FINISHED GRADE
VALVE BOX PAD
8" PIPE O.D.
6"
BUTTERFLY VALVE
2" TYP.
VALVE OPERATOR WITH NECESSARY EXTENSIONS AND GROUND LEVEL POSITION INDICATOR
NO. 5 BARS @ 12" O.C.E.F.
NO. 3 BARS CAGE
30# FELT PAPER
NO. 4 BARS @6" O.C.
4-NO. 3 BARS
3,500 P.S.I. CONCRETE
12"
NO. 3 BARS @ 12" O.C.E.W.
6"
LENGTH AS REQUIRED BY SIZE OF VALVE
24"
12"
12"
24"
#5 BARS @ 12" O.C.E.F.
PIPE SUPPORT
6" (TYP.)
#3 BARS @ 12" O.C.
NOTES:
1. ALL OPERATING NUTS SHALL BE EXTENDED TO WITHIN 6" OF FINAL GRADE.
2. BUTTERFLY VALVE SHALL BE MANUFACTURED BY MUELLER OR ENGINEER-APPROVED EQUAL.
3. 6" BYPASS MAY BE REQUIRED BY TOWN UNIVERSITY OR MS/MH DESIGNAL ON SPIL SPECIFIC PROJECTS.
BUTTERFLY VALVE
N.T.S.
APPROX. FINISHED GRADE
VALVE BOX PAD
EXTEND 3" ABOVE GROUND
PRECAST 4' DIAMETER MANHOLE CORE SECTION
3" SCHEDULE 80 PVC PIPE
2" SQUARE NUT GATE VALVE
2" COMBINATION AIR AND VACUUM RELEASE VALVE MANUFACTURED BY APCO, CLA-VAL OR ENGINEER APPROVED EQUAL
VARIABLE
2" CORP. COCK
WASHED GRAVEL
SLOPE 1/8" PER FT.
2" OUTLET
3" COPPER PIPE
WATER LINE
VARIABLE
2" COMBINATION AIR AND VACUUM RELEASE VALVE
N.T.S.
OPTIONAL 2" DRILLED AMR HOLE W/ PLUG
LITTLE ELM LOGO MOLDED IN LID
KEYHOLE
PLAN VIEW
NOTES:
1. WATER METER BOX SHALL BE BASS & HAYS PATTERN NO. P34P-1401S. BOX LID SHALL BE BASS & HAYS PATTERN NUMBER BH-3LIDP. RING CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON. ENCLOSURE AND LID CONSTRUCTED OF HIGH DENSITY POLYETHYLENE.
2. RING WEIGHT 12 LBS. COVER WEIGHT 4 LBS. ENCLOSURE WEIGHT 11 LBS. NOT RATED FOR USE IN ROADWAYS.
1 7/8"
12 1/2"
BRASS LATCH KEY LOCK & COIL SPRING
17 3/4"
12 13/16"
(4) 304SS #14 1 1/2" SLOTTED HEX HEAD SCREWS
(4) SCREW HOLES EVENLY SPACED
11 1/4" COLLAR OPENING
1/2" WALL
14 1/4"
5"
2 1/2"
18 1/4"
SECTION VIEW
8 1/4"
18 1/4"
SIDE VIEW
WATER METER BOX (BASS & HAYS FOUNDRY, INC.)
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 2 OF 4
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
JOB NUMBER:
DATE
REVISION
NO.
LITTLE ELM
SHEET 16 OF 26
DECEMBER 2023


OUTSIDE DIAMETER OF PIPE PLUS 16" (MIN. WIDTH 24")
NATIVE MATERIAL COMPACTED IN 12" LIFTS TO 95% STD. PROCTOR.
DETECTABLE METALLIC TAPE, FOR CURVED PIPE ALIGNMENTS, PROVIDE TRACER WIRE ON TOP OF PIPE
SELECT OR GRANULAR MATERIAL COMPACTED TO 95% STD. PROCTOR.
STANDARD CRUSHED ROCK, FINE CRUSHED ROCK OR NATURAL GRAVEL.
1/2 O.D.
1/8 O.D. – 6" MIN.
MIN. STD P.V.C. WATER
N.T.S.
CLASS F1 EMBEDMENT
OUTSIDE DIAMETER OF PIPE PLUS 16" (MIN. WIDTH 24")
DETECTABLE METALLIC TAPE, FOR CURVED PIPE ALIGNMENTS, PROVIDE TRACER WIRE ON TOP OF PIPE
NATIVE MATERIAL COMPACTED IN 12" LIFTS TO 95% STD. PROCTOR.
SELECT OR GRANULAR MATERIAL COMPACTED TO 95% STD. PROCTOR.
6" MIN.
STANDARD CRUSHED ROCK, FINE CRUSHED ROCK OR NATURAL GRAVEL.
1/6 O.D.
1/8 O.D. – 6" MIN.
MIN. STD. DUCTILE IRON WATER
MIN. STD. P.C.C.P. WATER
N.T.S.
CLASS F3 EMBEDMENT
OUTSIDE DIAMETER OF PIPE PLUS 16" (MIN. WIDTH 39")
NATIVE MATERIAL COMPACTED IN 12" LIFTS TO A MINIMUM OF 95% STD. PROCTOR. CLAY SOILS SHALL BE MOISTURE CONDITIONED TO A MINIMUM OF 3% ABOVE OPTIMUM MOISTURE CONTENT.
DETECTABLE METALLIC TAPE, FOR CURVED PIPE ALIGNMENTS, PROVIDE TRACER WIRE ON TOP OF PIPE
6" MIN.
3000 P.S.I. CONCRETE
CONC. BLOCK SUPPORT
1/4 O.D. – 6" MIN.
CONCRETE ENCASEMENT
N.T.S.
CLASS F4 EMBEDMENT
NAMEPLATE INDICATING: MFR: PHONE NO.: MODEL: DATE MANUFACTURED:
MASTER METER OCTAVE NEPTUNE METRASONIC METER
BY-PASS
GALVANIZED SLEEVE W/ LEAK SEAL
ACCESS HATCHWAY (SEE SPECIFICATIONS)
PLAN VIEW
SIZE | BY-PASS | L' | W1 | L1
3" | 2" | 5'-8" | 4'-8" | 4'-6"
4" | 3" | 6'-8" | 4'-8" | 4'-6"
6" | 4" | 11'-0" | 6'-0" | 4'-6"
4'-6"
DUCTILE IRON PIPE
GALVANIZED ANGLE PIPE SUPPORT (TYPICAL)
MJ GATE VALVE W/ RESTRAINED JOINTS
6"
2'-0"
12"x12" SUMP WITH CAST IRON GRATE
L1
MIN. 6" GRAVEL BED (OR DRAINED AS SPECIFIED)
ELEVATION
PIPE AND FITTINGS SHALL BE DUCTILE IRON
SPECIFICATIONS:
CONCRETE: CLASS 1 CONCRETE WITH DESIGN STRENGTH OF 4500 PSI AT 28 DAYS. UNIT IS OF MONOLITHIC CONSTRUCTION AT FLOOR AND FIRST STAGE OF WALL WITH SECTIONAL RISER TO REQUIRED DEPTH.
REINFORCEMENT: GRADE 60 REINFORCED STEEL BAR CONFORMING TO ASTM A615 ON REQUIRED CENTERS OR EQUAL.
HATCHWAY: 3' X 5' GALVANIZED STEEL DOUBLE LEAF SPRING ASSISTED HATCHWAY – TRAFFIC RATED W/ SLAM LOCK.
PRECAST VAULT SHALL BE FROM PARK EQUIPMENT COMPANY MATCHING DETAIL SHOWN OR APPROVED OTHER.
METER VAULT
N.T.S.
6" MIN.
10'-0" MIN. ENCASEMENT (SEE NOTE 1)
EXISTING PIPE
WATER MAIN
MIN. 6" CLEARANCE
12" MIN.
3,000 P.S.I. CONCRETE ENCASEMENT
PROPOSED UTILITY INSTALLATION STORM DRAIN OR SANITARY SEWER
STANDARD EMBEDMENT
MINIMUM CLEARANCE NOTE:
1. WHERE A MINIMUM CLEARANCE OF 10'-0" (HORIZONTAL AND/OR VERTICAL) CANNOT BE OBTAINED, THEN THE POTABLE WATER MAIN SHALL BE CONCRETE ENCASED FOR 10'-0" EACH SIDE OF THE INTERSECTION OF THE INSTALLED UTILITY LINE.
2. CROSSING OF SANITARY SEWER SHALL BE IN ACCORDANCE WITH THE LATEST TCEQ RULES AND REGULATIONS.
CROSSING UTILITY PIPE SUPPORT
N.T.S.
10'-10" (MIN.) (REF. NOTE 1)
9'-10" (MIN.) (REF. NOTE 1)
2" AIR VACUUM/RELEASE VALVE
WATTSBOX ALUMINUM INSULATED ENCLOSURE
4'-10" (REF. NOTE 1)
12" MIN 30" MAX
8"
MOISTURE CONDITIONED COMPACTED SUBGRADE
#5 BARS @ 6" O.C. EACH WAY
REDUCED PRESSURE ZONE ASSEMBLY FOR OUTDOOR INSTALLATION
CONCRETE THRUST BLOCKING (TYP)
BACKFLOW PREVENTER
N.T.S.
NOTES:
1. EXACT SIZE OF BOX MAY VARY DEPENDING ON ACTUAL LENGTH OF RPZ BACKFLOW PREVENTER
2. AIR/VACUUM RELEASE ASSEMBLY SHALL BE AIR FLOW CONTROL ACCESSORIES, MODEL D-025, WITH NYLON BODY.
3. FIELD ROUTE DRAIN LINES FROM RPZ AND AIR RELEASE VALVE TO A COMMON DISCHARGE POINT.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 3 OF 4
LITTLE ELM
SHEET
17 OF 26
DECEMBER 2023


3/4" WASHED ROCK OR CHAT, (6" MIN.)
PROP. ST. SEW., SAN. SEW. OR WATER PIPE
CONNECT TO EXIST. WATER LINE (TYP.)
BEND
SPOOL
6" MIN.
THRUST BLOCK REQUIRED
BEND
SPOOL
NOTES:
1. PROPOSED WATER PIPE SHALL BE DUCTILE IRON UNLESS OTHERWISE SPECIFIED IN PLANS. ALL FITTINGS SHALL BE DUCTILE IRON (M.J.-P.E.) MEGALUG.
2. PROPOSED PIPING & FITTINGS ARE SYMMETRIC ABOUT CENTER OF PROP. SAN. SEW. OR S". SEW. PIPE AND SHALL RETAIN TEST PRESSURES.
3. CROSSING OF SANITARY SEWER SHALL BE IN ACCORDANCE WITH TCEQ REQUIREMENTS.
6" MIN. THICKNESS OF 3000 P.S.I. CONCRETE AROUND PIPE, BELLS AND FITTINGS.
WATER MAIN CWERING
N.T.S.
HIGH DENSITY POLYETHYLENE CASING SPACERS RADI TYPE 6'-0" TO 10'-0" O.C.
CARRIER PIPE SIZE AND TYPE PER PLANS.
CASING SPACERS SHALL BE USED TO INSTALL CARRIER PIPE INSIDE THE ENCASEMENT PIPE. TO PROVIDE SUPPORT AROUND THE PERIPHERY OF THE PIPE SHOULD THE PIPE TWIST AS IT IS PUSHED THROUGH THE CASING, THE SPACERS SHALL BE OF A PROJECTION TYPE THAT HAS A MINIMUM NUMBER OF PROJECTIONS AROUND THE CIRCUMFERENCE TOTALLING THE NUMBER OF DIAMETER INCHES. FOR EXAMPLE, 8" PIPE SHALL HAVE A MINIMUM OF 8 PROJECTIONS AND 18" PIPE SHALL HAVE A MINIMUM NUMBER OF 18 PROJECTIONS.
CASING SPACERS SHALL HAVE A MAXIMUM SPACING SPAN OF 10 FEET. THE SPAN BETWEEN SPACERS SHOULD RESULT IN CONSERVATIVE LONG TERM SAFETY FACTOR PROVIDED TOTAL LOAD PER SPACER DOES NOT EXCEED THE MAXIMUM LOAD FOR PIPE FULL OF LIQUID PER SPACER LISTED IN THE LITERATURE FOR CLASS SPACER USED. SPACERS SHALL HAVE A MINIMUM HEIGHT THAT CLEARS THE PIPE BELL OR AS OTHERWISE INDICATED ON PLANS. CASING SPACERS SHALL USE DOUBLE BACKED TAPE PROVIDED WITH THE SPACERS, TO FASTEN TIGHTLY ONTO THE CARRIER PIPE, SO THAT THE SPACERS DO NOT MOVE DURING INSTALLATION.
PIPE CASING SPACER DETAIL
N.T.S.
SPACERS SHALL BE RADI HIGH DENSITY POLYETHYLENE OR TOWN APPROVED OTHER.
TWO SPACERS PLACED AT EACH END OF CASING (TYP.)
CASING PIPE
6'-10" TYPICAL BETWEEN SPACERS
2' FROM BELL END
RUBBER END SEAL WITH STAINLESS STEEL BANDS
CARRIER PIPE
PIPE CASING SPACERS SPACING DETAIL
N.T.S.
BLUE FIBERGLASS MARKER
FINISHED GRADE
7'-6"
3'-6"
2'-0"
CENTERLINE OF UTILITY LINE
VALVE, AIR RELEASE, ETC.
MARKER LOCATION
ELEVATION
FIELD INSTALLATION DETAIL
GENERAL NOTES
1. ALL OFFSITE TOWN OF LITTLE ELM MAINS WITH VALVES, AIR RELEASE VALVES, ETC. SHALL BE MARKED AS DETAILED ON THIS SHEET.
2. CONTRACTOR SHALL INSTALL ALL MARKERS.
OFFSITE WATER MAIN MARKER
N.T.S.
POUR CONCRETE TO UNDISTURBED EARTH (TYP.)
BEARING AREA
POURED CONCRETE BLOCKING (TYP.)
4" MIN.
NOTE: 1. ALL FITTINGS, CAPS & PLUGS TO BE POLY WRAPPED
2. ALL BEARING BLOCKS TO BE 6" THICK (MIN.)
TYPICAL FOR ALL DEAD ENDS
1/2" MIN. ALL THREADS (CORROSION PROOF)
DIRECTIONAL CHANGE VERTICAL BEND ANCHOR
MIN. BEARING AREA OF BLOCK IN SQ. FT. (UNLESS OTHERWISE INDICATED ON THE PLANS)
FITTING SIZES | TEE & END | 90° BEND | 45° BEND | 22 1/2° BEND | 11 1/4° BEND
TO 6" | 3.6 | 5.4 | 2.5 | 2.0 | 2.0
8" | 6.3 | 8.9 | 4.8 | 2.5 | 2.0
10" | 9.9 | 13.9 | 7.6 | 3.9 | 2.0
12" | 14.2 | 20.0 | 10.9 | 5.6 | 2.8
16" | 25.1 | 35.5 | 19.2 | 9.8 | 4.9
SOIL BEARING PRESSURE | MULTIPLIER
1000 | 2.0
1500 | 1.33
2000 | 1.0
3000 | 0.67
WATER MAIN THRUST BLOCKING
N.T.S.
3000 P.S.I. CONCRETE W/ REBAR IN FOUR CORNERS
DUCTILE IRON M.J. FITTING W/ MEGA LUG FITTINGS
6" MIN.
PVC PIPE
PVC PIPE
PVC PIPE
8" MIN.
DUCTILE IRON M.J. FITTING W/ MEGA LUG FITTINGS
STANDARD HORIZONTAL AND/OR VERTICAL OFFSETS
N.T.S.
PULL PIPE USING LONGITUDINAL BENDING (MIN. 250'R) OR JOINT DEFLECTION IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
2'-0"
2' BACK OF CURB – TYPICAL
3' BACK OF CURB – LARGER THAN 12"
2' BACK OF CURB – TYPICAL
3' BACK OF CURB – LARGER THAN 12"
WATER LINE AT INLET DETAIL
N.T.S.
VALVE BOX PAD
ADJUSTABLE VALVE BOX
WATER LINE
DISCHARGE PIPE SHALL BE DUCTILE IRON
7-45° BEND
N.R.S. GATE VALVE FLANGED AND M.J.
BLOCKING AS REQUIRED
NOTE: MUST BE DISCHARGED INTO STORM SEWER, BRIDGE OR CULVERT.
DRAIN VALVE AND BLOW OFF VALVE
N.T.S.
VALVE BOX PAD
2' MIN.
DISCHARGE LINE
M.J. PLUG
VALVE BOX PAD
WATER LINE
45° BENDS
BLOCKING AS REQUIRED
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
JOB NUMBER
KDMG
-
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 4 OF 4
LITTLEELM
SHEET
18 OF 26
DECEMBER 2023


CAST IRON MANHOLE LID AND FRAME SEE DETAIL
24" MAXIMUM ADJUSTMENT
PRECAST CONCRETE GRADE RINGS (SET IN MORTAR BED AND BRING TO GRADE)
MONOLITHIC CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS
6" MIN
4'-0" DIA
6" MIN
8" MIN
5'-0" & 6'-0" DIA
8" MIN
VARIES
STUB OUTS TO PROPERTY LINE OR EASEMENT (MIN. 5' LONG) WITH CONCRETE CRADLE UNDER ENTIRE LENGTH.
MIN. SLOPE 1/2" PER FT.
SANITARY SEWER MAIN
COUPLING W/O - RING RUBBER GASKETS, KOR-N-SEAL, A-LOK OR APPROVED OTHER.
12" MIN
7'-0" (MIN.)
12"
STANDARD CAST-IN-PLACE MANHOLE
N.T.S.
CAST-IN-PLACE MANHOLE NOTES:
1. THE DIAMETER OF A MANHOLE CONSTRUCTED OVER THE CENTER OF A SEWER SHOULD VARY WITH THE SIZE OF THE SEWER. FOR EIGHT-INCH (8"), TEN-INCH (10"), AND TWELVE-INCH (12"), THE MANHOLE SHALL BE FOUR-FOOT (4') MINIMUM DIAMETER. FOR FIFTEEN-INCH (15"), EIGHTEEN-INCH (18"), TWENTY-ONE-INCH (21"), TWENTY-FOUR-INCH (24") AND TWENTY-SEVEN-INCH (27") SHALL BE FIVE-FOOT (5') MINIMUM DIAMETER; THIRTY-INCH (30") AND THIRTY-SIX-INCH (36") SHALL BE SIX-FOOT (6') MINIMUM DIAMETER. MANHOLES DEEPER THAN TWELVE FEET (12') SHALL BE A MINIMUM OF FIVE-FOOT (5') DIAMETER.
2. DROP MANHOLES SHALL BE REQUIRED WHEN THE INFLOW ELEVATION IS MORE THAN TWENTY-FOUR INCHES (24") ABOVE THE OUTFALL ELEVATION.
3. WHERE PIPES ENTER A MANHOLE THERE SHALL BE A MINIMUM OF TWO-TENTHS OF A FOOT (0.2') DROP BETWEEN INVERTS.
4. WHERE UNEQUAL PIPES ENTER A MANHOLE, THE CROWN OF THE PIPES SHALL BE SET AT THE SAME ELEVATION.
5. CONCRETE SHALL BE A MONOLITHIC POUR.
PRECAST MANHOLE NOTES:
1. THE DIAMETER OF A MANHOLE CONSTRUCTED OVER THE CENTER OF A SEWER SHOULD VARY WITH THE SIZE OF THE SEWER. FOR EIGHT-INCH (8"), TEN-INCH (10"), AND TWELVE-INCH (12"), THE MANHOLE SHALL BE FOUR-FOOT (4') MINIMUM DIAMETER. FOR FIFTEEN-INCH (15"), EIGHTEEN-INCH (18"), TWENTY-ONE-INCH (21"), TWENTY-FOUR-INCH (24") AND TWENTY-SEVEN-INCH (27") SHALL BE FIVE-FOOT (5') MINIMUM DIAMETER; THIRTY-INCH (30") AND THIRTY-SIX-INCH (36") SHALL BE SIX-FOOT (6') MINIMUM DIAMETER. MANHOLES DEEPER THAN TWELVE FEET (12') SHALL BE A MINIMUM OF FIVE-FOOT (5') DIAMETER.
2. DROP MANHOLES SHALL BE REQUIRED WHEN THE INFLOW ELEVATION IS MORE THAN TWENTY-FOUR INCHES (24") ABOVE THE OUTFALL ELEVATION.
3. WHERE PIPES ENTER A MANHOLE THERE SHALL BE A MINIMUM OF TWO-TENTHS OF A FOOT (0.2') DROP BETWEEN INVERTS.
4. WHERE UNEQUAL PIPES ENTER A MANHOLE, THE CROWN OF THE PIPES SHALL BE SET AT THE SAME ELEVATION.
PRECAST CONCRETE GRADE RINGS (SET IN MORTAR BED AND BRING TO GRADE)
CAST IRON MANHOLE LID AND FRAME SUITABLE FOR HEAVY TRAFFIC (SEE DETAIL)
MORTAR
24" MAX ADJUSTMENT
CONCENTRIC MANHOLE CONE. SEE NOTE FOR LARGER THAN 48" DIA.
3'-0" 48" DIA MANHOLE
JOINT WITH NEOPRENE "O" RING GASKET AND MASTIC.
4'-0" DIA (DEPTH < 12'-0")
5'-0" DIA (DEPTH > 12'-0")
REINFORCED CONCRETE PIPE C-76 CLASS III WITH RUBBER GASKET JOINT.
VARIABLE
BOTTOM SECTION OF MANHOLE IN LENGTHS OF ONE (1), TWO (2), OR THREE (3) FEET. TO BE SET ON 1" OF LEVEL GROUT
1" GROUT SPACEFILL WITH CEMENT MORTAR OR MASTIC MATERIAL
8" MIN
6" MIN
STUB OUTS TO PROPERTY LINE OR EASEMENT (MIN. 5' LONG) WITH CONCRETE CRADLE UNDER ENTIRE LENGTH.
MIN. SLOPE 1/2" PER FT.
PIPE I.D. VARIABLE
COUPLING WITH O-RING RUBBER GASKET WITH P.V.C. PIPE.
CONCRETE BASE FOR PRECAST MANHOLE SHALL HAVE A COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS.
PRECAST CONCRETE PIPE MANHOLE
N.T.S.
EXISTING GROUND
EXIST. M.H. LID & FRAME TO BE REMOVED 2" BELOW CONCRETE.
SAND AND/OR GRAVEL COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY (STD. PROCTOR)
WHERE THIS DESIGN EXISTS THE EXISTING SANITARY SEWER SHALL BE PLUGGED WITH 3000 P.S.I. CONCRETE
POUR 2000 P.S.I. CONCRETE TO A POINT 3" ABOVE TOP OF PIPE
EXISTING SANITARY SEWER MAIN IS TO BE PLUGGED WITH 2000 P.S.I. CONCRETE
EXISTING CONCRETE BASE
MANHOLE ABANDONMENT
N.T.S.
WADER SERIES 1800 OR 1950 ODOR CONTROL SEWER VALVE
MIN. ELEVATION 2' ABOVE 100 YR FLOODPLAIN
PRESSURE MANHOLE LID AND FRAME SEE DETAIL
24" MAXIMUM ADJUSTMENT
PRECAST CONCRETE GRADE RINGS (SET IN MORTAR BED AND BRING TO GRADE)
6"ø NOMINAL, SCHEDULE 40 GALVANIZED PIPE
STAINLESS STEEL PIPE HOLD DOWN WALL CLAMPS ON 60" CENTERS.
12" TO 6" OF VENT OPENING.
6" MINIMUM (TYPICAL)
8" MINIMUM (TYPICAL)
4'-0" DIA
5'-0" & 6'-0" DIA
MONOLITHIC CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS
STUB OUTS TO PROPERTY LINE OR EASEMENT (MIN. 5' LONG) WITH CONCRETE CRADLE UNDER ENTIRE LENGTH.
FILL BOTTOM OF STANDPIPE WITH GROUT
MIN. SLOPE 1/2" PER FT.
SANITARY SEWER MAIN
12" MAX. TO 6" OF VENT OPENING.
2-#3 BENT REBARS
COUPLING W/O - RING RUBBER GASKETS, KOR-N-SEAL, A-LOK OR APPROVED OTHER.
12" MIN
12"
7'-0" (MIN.)
VENTED TYPE S MANHOLE
N.T.S.
CAST IRON MANHOLE LID AND FRAME SEE DETAIL
ADJUST 24" MAX
PRECAST CONCRETE GRADE RINGS (SET IN MORTAR BED AND BRING TO GRADE)
TYPICAL DROP TEE
4'-0" DIA
6" MINIMUM (TYPICAL)
5'-0" AND 6'-0" DIA
8" MINIMUM (TYPICAL)
12"
CUT PIPE AT 45°
ENCASE IN 3000 P.S.I. CONCRETE, MIN. 6" AROUND
FLUSH WITH INSIDE FACE OF MANHOLE
MONOLITHIC CONCRETE SHALL HAVE A MIN. COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS
MIN. SLOPE 1/2" PER FT.
DROP PIPE IS TO BE THE SAME SIZE AS SANITARY SEWER MAIN MAXIMUM 12" SEWER MAIN
SANITARY SEWER MAIN
SEE NOTE #2.
12" MIN
12"
7'-0" (MIN.)
MANHOLE WITH OUTSIDE DROP CONNECTION
N.T.S.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
SANITARY SEWER STANDARD DETAILS 1 OF 3
LITTLE ELM
SHEET 19 OF 26
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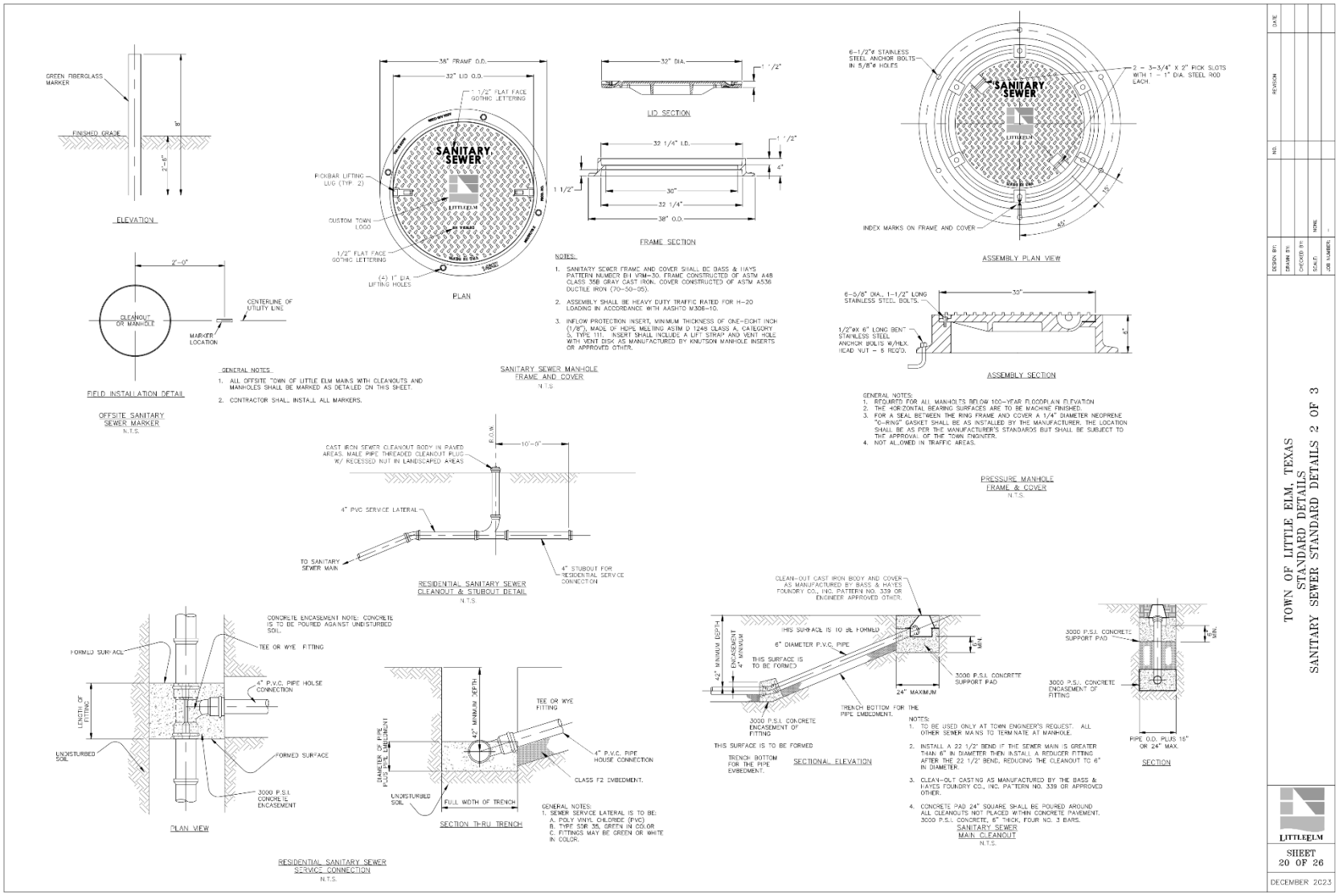
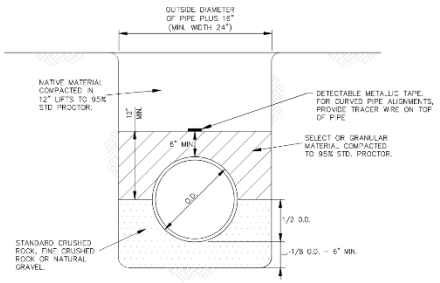
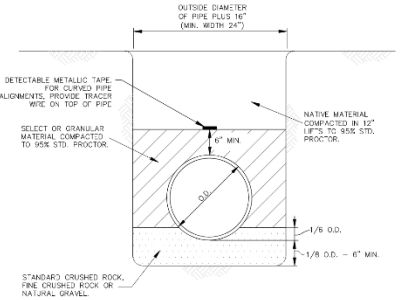
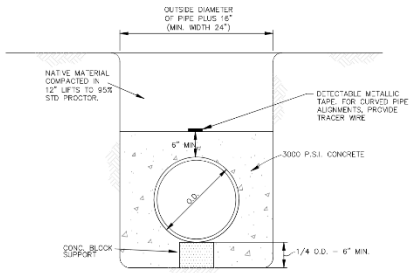

GREEN FIBERGLASS MARKER
FINISHED GRADE
ELEVATION
OFFSITE SANITARY SEWER MARKER
N.T.S.
36" FRAME O.D.
32" LID O.D.
1 1/2" FLAT FACE GOTHIC LETTERING
SANITARY SEWER
PICKBAR LIFTING LUG (TYP. 2)
CUSTOM TOWN LOGO
1/2" FLAT FACE GOTHIC LETTERING
(4) 1" DIA LIFTING HOLES
PLAN
32" DIA.
LID SECTION
32 1/4" I.D.
30"
38" O.D.
FRAME SECTION
NOTES:
1. SANITARY SEWER FRAME AND COVER SHALL BE BASS & HAYS PATTERN NUMBER BH VRM-30. FRAME CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON. COVER CONSTRUCTED OF ASTM A536 DUCTILE IRON (70-50-05).
2. ASSEMBLY SHALL BE HEAVY DUTY TRAFFIC RATED FOR H-20 LOADING IN ACCORDANCE WITH AASHTO M306-10.
3. INFLOW PROTECTION INSERT, MINIMUM THICKNESS OF ONE-EIGHT INCH (1/8"), MADE OF HDPE MELTING ASTM D 1248 CLASS A, CATEGORY 5, TYPE III. INSERT SHALL INCLUDE A LIFT STRAP AND VENT HOLE WITH VENT DISK AS MANUFACTURED BY KNUTSON MANHOLE INSERTS OR APPROVED OTHER.
SANITARY SEWER MANHOLE FRAME AND COVER
N.T.S.
6-1/2"ø STAINLESS STEEL ANCHOR BOLTS IN 5/8"ø HOLES
2 - 3-3/4" X 2" PICK SLOTS WITH 1 - 1" DIA. STEEL ROD EACH.
INDEX MARKS ON FRAME AND COVER
ASSEMBLY PLAN VIEW
6-5/8" DIA., 1-1/2" LONG STAINLESS STEEL BOLTS.
1/2"øX 6" LONG BENT STAINLESS STEEL ANCHOR BOLTS W/HEX. HEAD NUT - 8 REQ'D.
ASSEMBLY SECTION
GENERAL NOTES:
1. REQUIRED FOR ALL MANHOLES BELOW 100-YEAR FLOODPLAIN ELEVATION
2. THE HORIZONTAL BEARING SURFACES ARE TO BE MACHINE FINISHED.
3. FOR A SEAL BETWEEN THE RING FRAME AND COVER A 1/4" DIAMETER NEOPRENE "O-RING" GASKET SHALL BE AS INSTALLED BY THE MANUFACTURER. THE LOCATION SHALL BE AS PER THE MANUFACTURER'S STANDARDS BUT SHALL BE SUBJECT TO THE APPROVAL OF THE TOWN ENGINEER.
4. NOT ALLOWED IN TRAFFIC AREAS.
PRESSURE MANHOLE FRAME & COVER
N.T.S.
2'-0"
CLEANOUT OR MANHOLE
CENTERLINE OF UTILITY LINE
MARKER LOCATION
FIELD INSTALLATION DETAIL
GENERAL NOTES:
1. ALL OFFSITE TOWN OF LITTLE ELM MAINS WITH CLEANOUTS AND MANHOLES SHALL BE MARKED AS DETAILED ON THIS SHEET.
2. CONTRACTOR SHALL INSTALL ALL MARKERS.
CAST IRON SEWER CLEANOUT BODY IN PAVED AREAS. MALE PIPE THREADED CLEANOUT PLUG W/ RECESSED NUT IN LANDSCAPED AREAS
R.O.W.
10'-0"
4" PVC SERVICE LATERAL
TO SANITARY SEWER MAIN
4" STUBOUT FOR RESIDENTIAL SERVICE CONNECTION
RESIDENTIAL SANITARY SEWER CLEANOUT & STUBOUT DETAIL
N.T.S.
CONCRETE ENCASEMENT NOTE: CONCRETE IS TO BE POURED AGAINST UNDISTURBED SOIL.
FORMED SURFACE
TEE OR WYE FITTING
4" P.V.C. PIPE HOUSE CONNECTION
LENGTH OF FITTING
UNDISTURBED SOIL
FORMED SURFACE
3000 P.S.I. CONCRETE ENCASEMENT
PLAN VIEW
TEE OR WYE FITTING
42" MINIMUM DEPTH
DIAMETER OF PIPE PLUS 8"
4" P.V.C. PIPE HOUSE CONNECTION
CLASS F2 EMBEDMENT.
UNDISTURBED SOIL
FULL WIDTH OF TRENCH
SECTION THRU TRENCH
GENERAL NOTES:
1. SEWER SERVICE LATERAL IS TO BE:
A. POLY VINYL CHLORIDE (PVC)
B. TYPE SDR 35, GREEN IN COLOR
C. FITTINGS MAY BE GREEN OR WHITE IN COLOR.
RESIDENTIAL SANITARY SEWER SERVICE CONNECTION
N.T.S.
CLEAN-OUT CAST IRON BODY AND COVER AS MANUFACTURED BY BASS & HAYES FOUNDRY CO., INC. PATTERN NO. 339 OR ENGINEER APPROVED OTHER.
42" MINIMUM DEPTH
ENCASEMENT MINIMUM
THIS SURFACE IS TO BE FORMED
6" DIAMETER P.V.C. PIPE
THIS SURFACE IS TO BE FORMED
3000 P.S.I. CONCRETE SUPPORT PAD
24" MAXIMUM
TRENCH BOTTOM FOR THE PIPE EMBEDMENT.
3000 P.S.I. CONCRETE ENCASEMENT OF FITTING
THIS SURFACE IS TO BE FORMED
TRENCH BOTTOM FOR THE PIPE EMBEDMENT.
SECTIONAL ELEVATION
NOTES:
1. TO BE USED ONLY AT TOWN ENGINEER'S REQUEST. ALL OTHER SEWER MAINS TO TERMINATE AT MANHOLE.
2. INSTALL A 22 1/2° BEND IF THE SEWER MAIN IS GREATER THAN 8" IN DIAMETER THEN INSTALL A REDUCER FITTING AFTER THE 22 1/2° BEND, REDUCING THE CLEANOUT TO 6" IN DIAMETER.
3. CLEAN-OUT CASTING AS MANUFACTURED BY THE BASS & HAYES FOUNDRY CO., INC. PATTERN NO. 339 OR APPROVED OTHER.
4. CONCRETE PAD 24" SQUARE SHALL BE POURED AROUND ALL CLEANOUTS NOT PLACED WITHIN CONCRETE PAVEMENT. 3000 P.S.I. CONCRETE, 6" THICK, FOUR NO. 3 BARS.
SANITARY SEWER MAIN CLEANOUT
N.T.S.
3000 P.S.I. CONCRETE SUPPORT PAD
6" MIN.
3000 P.S.I. CONCRETE ENCASEMENT OF FITTING
PIPE O.D. PLUS 16" OR 24" MAX.
SECTION
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
JOB NUMBER:
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
SANITARY SEWER STANDARD DETAILS 2 OF 3
LITTLE ELM
SHEET
20 OF 26
DECEMBER 2023



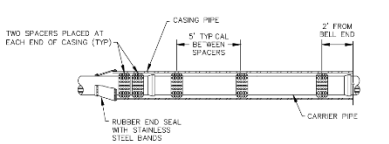
MIN. STD. P.V.C. SEWER
CLASS 1F2 EMBEDMENT
N.T.S.



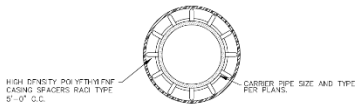
MIN. STD. DUCTILE IRON SEWER
CLASS 1E3 EMBEDMENT
N.T.S.



CONCRETE ENCASEMENT
CLASS 1F4 EMBEDMENT
N.T.S.



PIPE CASING SPACER
SPACING DETAILS

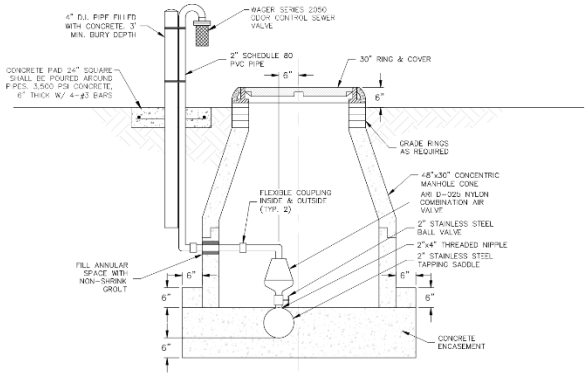


NOTES:

CASING SPACERS SHALL BE USED TO INSTALL CARRIER PIPE INSIDE THE ENCASEMENT PIPE, TO PROVIDE SUPPORT AROUND THE PERIMETRY OF THE PIPE SHOULD THE PIPE TWIST AS IT IS PUSHED THROUGH THE CASING. THE SPACERS SHALL BE OF A PROJECTION TYPE THAT HAS A MINIMUM NUMBER OF PROJECTIONS AROUND THE CIRCUMFERENCE TOTALLING THE NUMBER OF DIAMETER INCHES. FOR EXAMPLE, 8" PIPE SHALL HAVE A MINIMUM OF 8 PROJECTIONS AND 18" PIPE SHALL HAVE A MINIMUM NUMBER OF 18 PROJECTIONS.

CASING SPACERS SHALL HAVE A MAXIMUM SPACING SPAN OF 5 FEET. THE SPAN BETWEEN SPACERS SHOULD RESULT IN CONSERVATIVE LONG TERM SAFETY FACTOR PROVIDED TOTAL LOAD PER SPACER DOES NOT EXCEED THE MAXIMUM LOAD FOR PIPE FULL OF LIQUID PER SPACER LISTED IN THE LITERATURE FOR CLASS SPACER USED. SPACERS SHALL HAVE A MINIMUM HEIGHT THAT CLEARS THE PIPE BELL OR AS OTHERWISE INDICATED ON PLANS. CASING SPACERS SHALL USE DOUBLE BACKED TAPE PROVIDED WITH THE SPACERS, TO FASTEN TOP-TLY ONTO THE CARRIER PIPE, SO THAT THE SPACERS DO NOT MOVE DURING INSTALLATION.

PIPE CASING SPACER DETAIL
N.T.S.



2" AIR RELEASE VALVE
FOR FORCE MAIN
N.T.S.

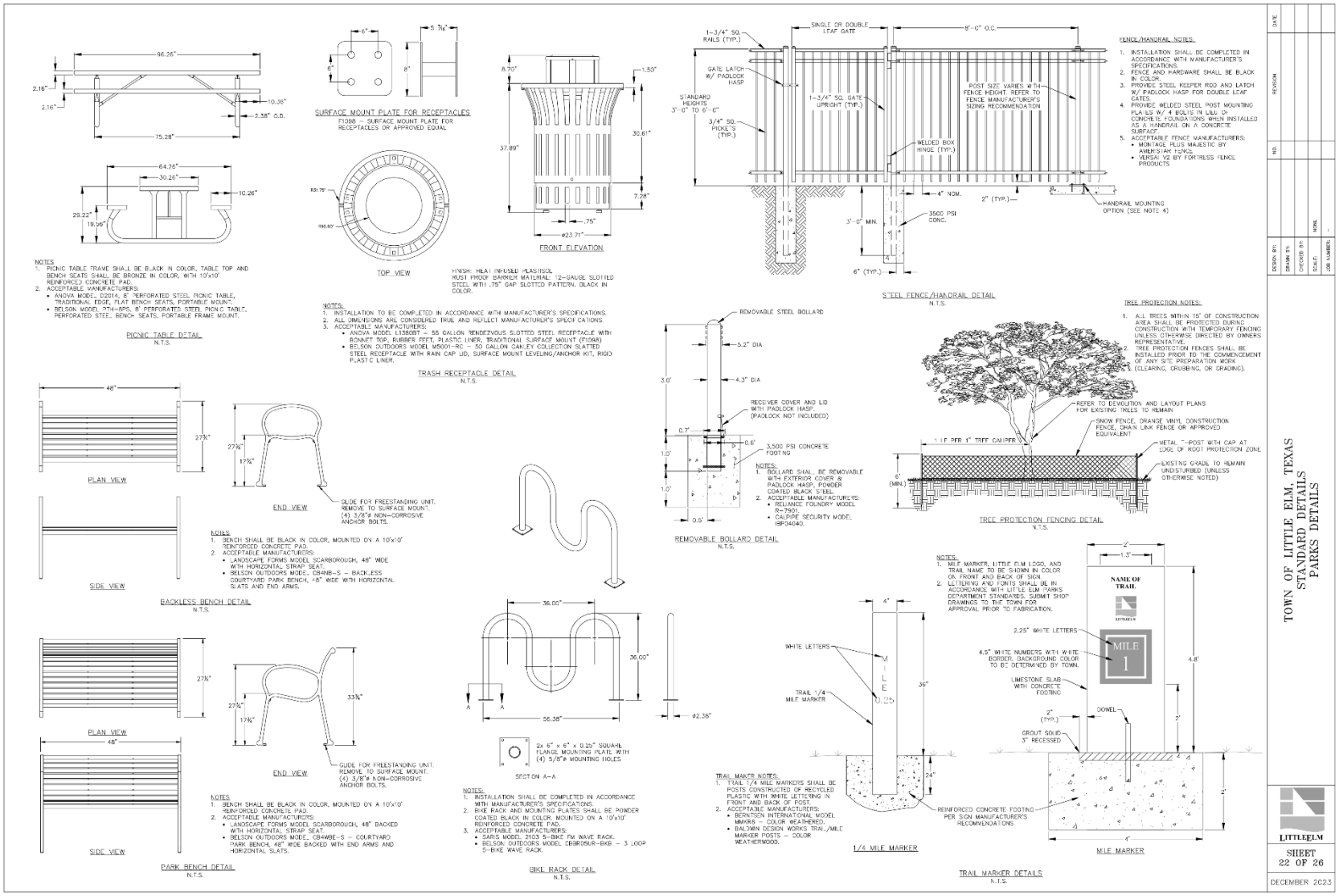
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER:
-

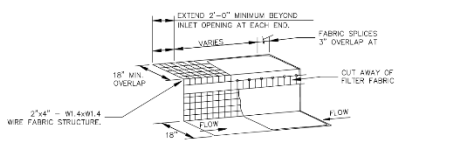
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
SANITARY SEWER STANDARD DETAILS 3 OF 3

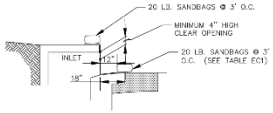
LITTLEELM

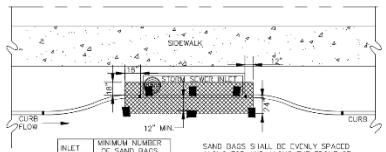
SHEET
21 OF 26

DECEMBER 2023


PICNIC TABLE DETAIL
N.T.S.
SURFACE MOUNT PLATE FOR RECEPTACLES
TOP VIEW
FRONT ELEVATION
TRASH RECEPTACLE DETAIL
N.T.S.
STEEL FENCE/HANDRAIL DETAIL
N.T.S.
FENCE/HANDRAIL NOTES:
TREE PROTECTION NOTES:
TREE PROTECTION FENCING DETAIL
N.T.S.
REMOVABLE BOLLARD DETAIL
N.T.S.
PLAN VIEW
SIDE VIEW
END VIEW
BACKLESS BENCH DETAIL
N.T.S.
PARK BENCH DETAIL
N.T.S.
SECTION A-A
BIKE RACK DETAIL
N.T.S.
1/4 MILE MARKER
MILE MARKER
TRAIL MARKER DETAILS
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
PARKS DETAILS
LITTLEELM
SHEET
22 OF 26
DECEMBER 2023



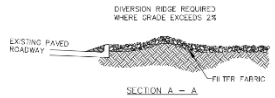




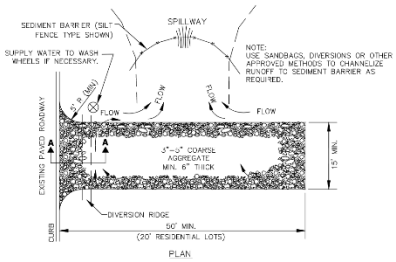
INLET OPENING	MINIMUM NUMBER OF SAND BAGS	
	TOP	FRONT
5'	2	3
10'	3	3
15'	3	4
20'	4	4

SAND BAGS SHALL BE EVENLY SPACED ALONG TOP AND ALONG THE FRONT OF INLET.

CURB INLET ON GRADE PROTECTION DETAIL
N.T.S.

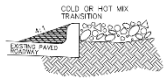


SECTION A – A



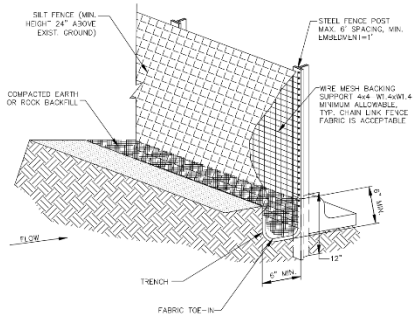
PLAN

WHEN SEDIMENT HAS SUBSTANTIALLY CLOGGED THE VOID AREA BETWEEN THE ROCKS, THE AGGREGATE MAT MUST BE WASHED DOWN OR REPLACED. PERIODIC RE-GRADING AND TOP DRESSING WITH ADDITIONAL STONE MUST BE DONE TO KEEP THE EFFICIENCY OF THE ENTRANCE FROM DIMINISHING.

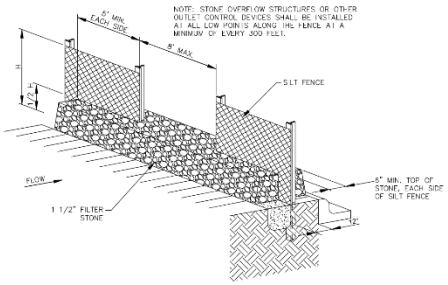


TRANSITION

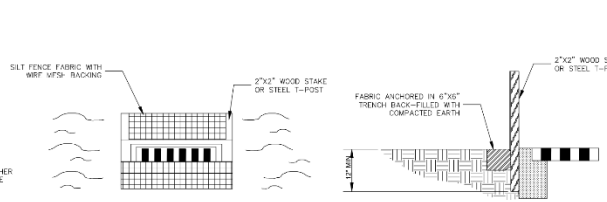
TEMPORARY STONE CONSTRUCTION ENTRANCE/EXIST
N.T.S.



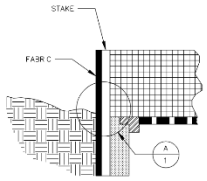
SILT FENCE ISOMETRIC PLAN VIEW
N.T.S.



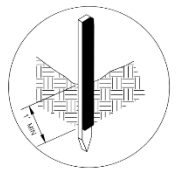
SILT FENCE STONE OVERFLOW STRUCTURE
N.T.S.



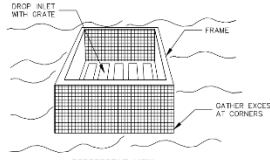
I. STANDARD FILTER BARRIER INSTALLATION
N.T.S.



ELEVATION OF STAKE AND FABRIC ORIENTATION

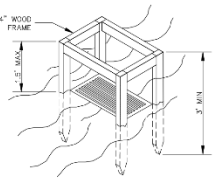


DETAIL A



PERSPECTIVE VIEW

SPECIFIC APPLICATION
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5%) WHERE THE INLET SHEET OR OVER-LAND FLOWS (NOT TO EXCEED 1 C.F.S.) ARE TYPICAL. THIS METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS SUCH AS IN STREETS OR HIGHWAY MEDIANS



PERSPECTIVE VIEW

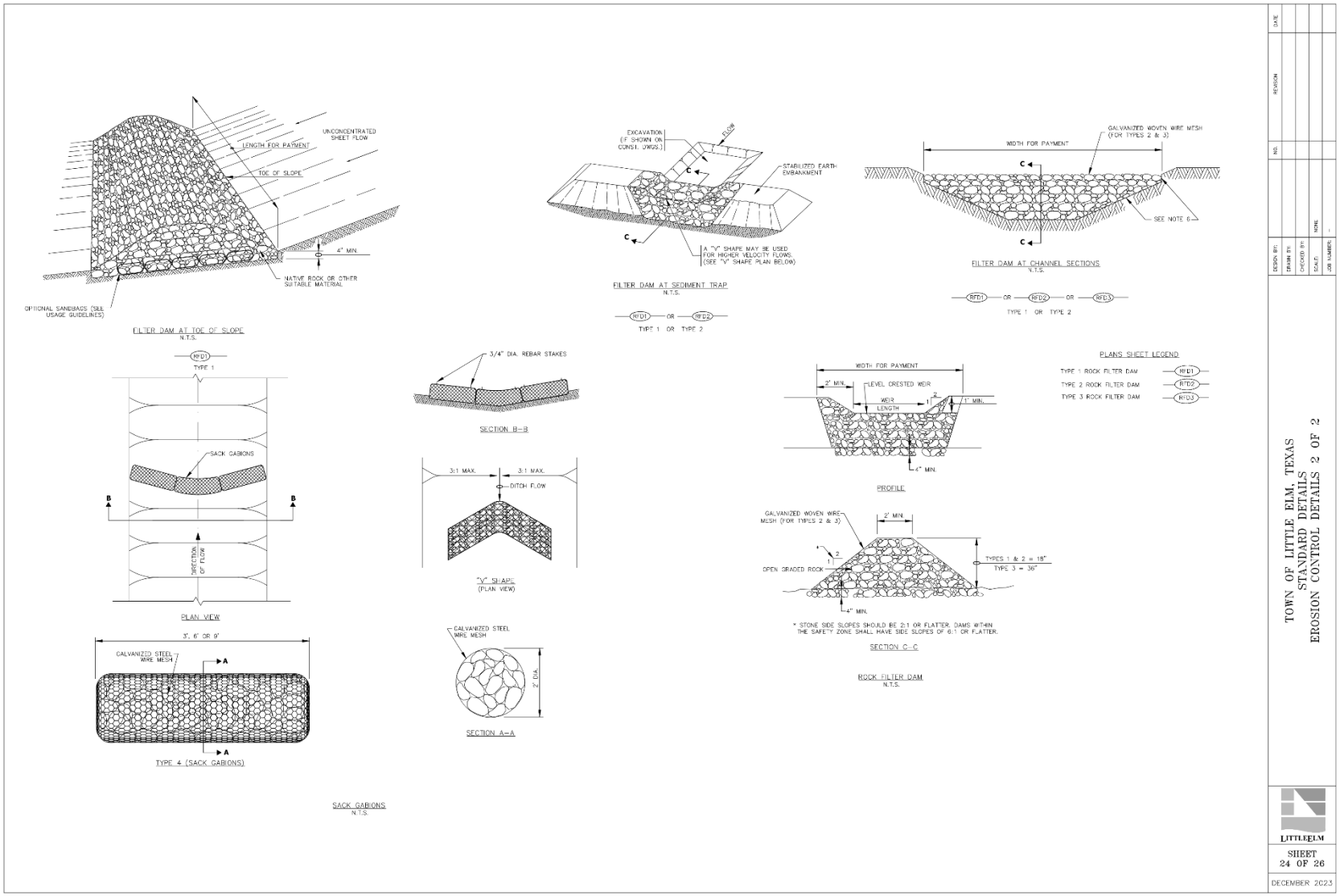
II. ALTERNATE FILTER BARRIER INSTALLATION
N.T.S.

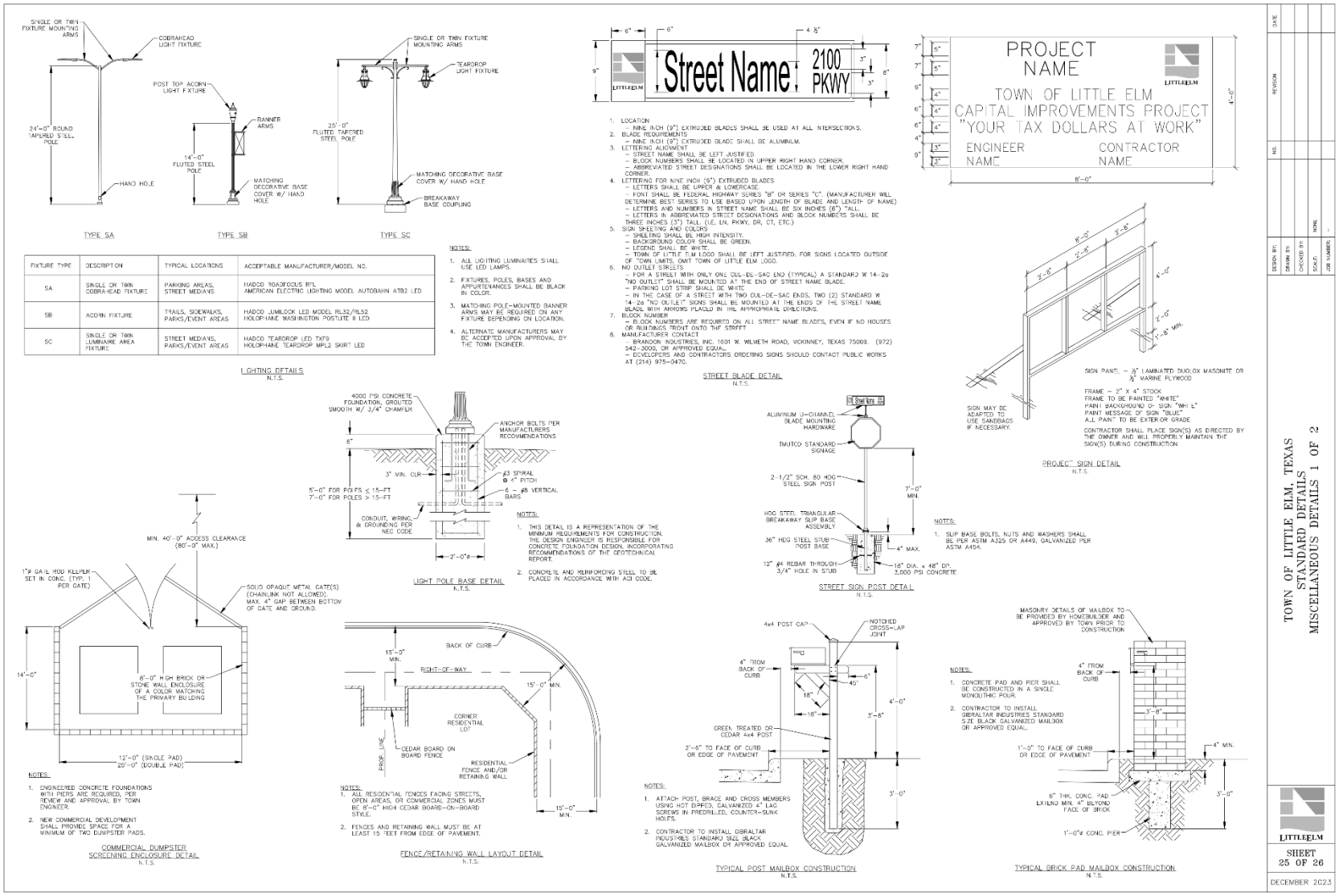
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
EROSION CONTROL DETAILS 1 OF 2

LITTLEELM

SHEET
23 OF 26

DECEMBER 2023


UNCONCENTRATED SHEET FLOW
LENGTH FOR PAYMENT
TOE OF SLOPE
4" MIN.
NATIVE ROCK OR OTHER SUITABLE MATERIAL
OPTIONAL SANDBAGS (SEE USAGE GUIDELINES)
FILTER DAM AT TOE OF SLOPE
N.T.S.
EXCAVATION (IF SHOWN ON CONST. DWGS.)
SLOPE
STABILIZED EARTH EMBANKMENT
A "V" SHAPE MAY BE USED FOR HIGHER VELOCITY FLOWS. (SEE "V" SHAPE PLAN BELOW)
FILTER DAM AT SEDIMENT TRAP
N.T.S.
RFD1 OR RFD2
TYPE 1 OR TYPE 2
GALVANIZED WOVEN WIRE MESH (FOR TYPES 2 & 3)
WIDTH FOR PAYMENT
SEE NOTE 6
FILTER DAM AT CHANNEL SECTIONS
N.T.S.
RFD1 OR RFD2 OR RFD3
TYPE 1 OR TYPE 2
PLANS SHEET LEGEND
TYPE 1 ROCK FILTER DAM
TYPE 2 ROCK FILTER DAM
TYPE 3 ROCK FILTER DAM
RFD1
RFD2
RFD3
RFD1
TYPE 1
SACK GABIONS
DIRECTION OF FLOW
PLAN VIEW
3/4" DIA. REBAR STAKES
SECTION B-B
3:1 MAX.
3:1 MAX.
DITCH FLOW
"V" SHAPE
(PLAN VIEW)
WIDTH FOR PAYMENT
2' MIN.
LEVEL CRESTED WEIR
WEIR LENGTH
2
1
1' MIN.
4" MIN.
PROFILE
GALVANIZED WOVEN WIRE MESH (FOR TYPES 2 & 3)
2' MIN.
2
1
OPEN GRADED ROCK
TYPES 1 & 2 = 18"
TYPE 3 = 36"
4" MIN.
* STONE SIDE SLOPES SHOULD BE 2:1 OR FLATTER; DAMS WITHIN THE SAFETY ZONE SHALL HAVE SIDE SLOPES OF 6:1 OR FLATTER.
SECTION C-C
ROCK FILTER DAM
N.T.S.
3', 6' OR 9'
GALVANIZED STEEL WIRE MESH
A
A
TYPE 4 (SACK GABIONS)
GALVANIZED STEEL WIRE MESH
2' DIA.
SECTION A-A
SACK GABIONS
N.T.S.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
EROSION CONTROL DETAILS 2 OF 2
LITTLEELM
SHEET
24 OF 26
DECEMBER 2023


SINGLE OR TWIN FIXTURE MOUNTING ARMS
COBRAHEAD LIGHT FIXTURE
24'-0" ROUND TAPERED STEEL POLE
HAND HOLE
TYPE SA
POST TOP ACORN LIGHT FIXTURE
BANNER ARMS
14'-0" FLUTED STEEL POLE
MATCHING DECORATIVE BASE COVER W/ HAND HOLE
TYPE SB
SINGLE OR TWIN FIXTURE MOUNTING ARMS
TEARDROP LIGHT FIXTURE
25'-0" FLUTED TAPERED STEEL POLE
MATCHING DECORATIVE BASE COVER W/ HAND HOLE
BREAKAWAY BASE COUPLING
TYPE SC
FIXTURE TYPE | DESCRIPTION | TYPICAL LOCATIONS | ACCEPTABLE MANUFACTURER/MODEL NO.
SA | SINGLE OR TWIN COBRA-HEAD FIXTURE | PARKING AREAS, STREET MEDIANS | HADCO ROADFOCUS RFL, AMERICAN ELECTRIC LIGHTING MODEL AUTOBAHN ATB2 LED
SB | ACORN FIXTURE | TRAILS, SIDEWALKS, PARKS/EVENT AREAS | HADCO JUMBLOCK LED MODEL RLS2/RLS2 HOLOPHANE WASHINGTON POSTLITE II LED
SC | SINGLE OR TWIN LUMINAIRE AREA FIXTURE | STREET MEDIANS, PARKS/EVENT AREAS | HADCO TEARDROP LED TXF9 HOLOPHANE TEARDROP MPL2 SKIRT LED
NOTES:
1. ALL LIGHTING LUMINAIRES SHALL USE LED LAMPS.
2. FIXTURES, POLES, BASES AND APPURTENANCES SHALL BE BLACK IN COLOR.
3. MATCHING POLE-MOUNTED BANNER ARMS MAY BE REQUIRED ON ANY FIXTURE DEPENDING ON LOCATION.
4. ALTERNATE MANUFACTURERS MAY BE ACCEPTED UPON APPROVAL BY THE TOWN ENGINEER.
LIGHTING DETAILS
N.T.S.
6"
6"
4 ½"
9"
Street Name
2100
PKWY
3"
6"
3"
LITTLEELM
1. LOCATION
– NINE INCH (9") EXTRUDED BLADES SHALL BE USED AT ALL INTERSECTIONS.
2. BLADE REQUIREMENTS
– NINE INCH (9") EXTRUDED BLADE SHALL BE ALUMINUM.
3. LETTERING ALIGNMENT
– STREET NAME SHALL BE LEFT JUSTIFIED.
– BLOCK NUMBERS SHALL BE LOCATED IN UPPER RIGHT HAND CORNER.
– ABBREVIATED STREET DESIGNATIONS SHALL BE LOCATED IN THE LOWER RIGHT HAND CORNER.
4. LETTERING FOR NINE INCH (9") EXTRUDED BLADES
– LETTERS SHALL BE UPPER & LOWERCASE.
– FONT SHALL BE FEDERAL HIGHWAY SERIES "B" OR SERIES "C" (MANUFACTURER WILL DETERMINE BEST SERIES TO USE BASED UPON LENGTH OF BLADE AND LENGTH OF NAME)
– LETTERS AND NUMBERS IN STREET NAME SHALL BE SIX INCHES (6") TALL.
– LETTERS IN ABBREVIATED STREET DESIGNATIONS AND BLOCK NUMBERS SHALL BE THREE INCHES (3") TALL (I.E. LN, PKWY, DR, CT, ETC.)
5. SIGN SHEETING AND COLORS
– SHEETING SHALL BE HIGH INTENSITY.
– BACKGROUND COLOR SHALL BE GREEN.
– LEGEND SHALL BE WHITE.
– TOWN OF LITTLE ELM LOGO SHALL BE LEFT JUSTIFIED. FOR SIGNS LOCATED OUTSIDE OF TOWN LIMITS, OMIT TOWN OF LITTLE ELM LOGO.
6. NO OUTLET STREETS
– FOR A STREET WITH ONLY ONE CUL-DE-SAC END (TYPICAL) A STANDARD W 14-2a "NO OUTLET" SHALL BE MOUNTED AT THE END OF STREET NAME BLADE.
– PARKING LOT STRIP SHALL BE WHITE
– IN THE CASE OF A STREET WITH TWO CUL-DE-SAC ENDS, TWO (2) STANDARD W 14-2a "NO OUTLET" SIGNS SHALL BE MOUNTED AT THE ENDS OF THE STREET NAME BLADE WITH ARROWS PLACED IN THE APPROPRIATE DIRECTIONS.
7. BLOCK NUMBER
– BLOCK NUMBERS ARE REQUIRED ON ALL STREET NAME BLADES, EVEN IF NO HOUSES OR BUILDINGS FRONT ONTO THE STREET
8. MANUFACTURER CONTACT
– BRANDON INDUSTRIES, INC. 1601 W. WILMETH ROAD, VICKINNEY, TEXAS 75069. (972) 542-3000, OR APPROVED EQUAL.
– DEVELOPERS AND CONTRACTORS ORDERING SIGNS SHOULD CONTACT PUBLIC WORKS AT (214) 975-0470.
STREET BLADE DETAIL
N.T.S.
PROJECT NAME
LITTLEELM
TOWN OF LITTLE ELM
CAPITAL IMPROVEMENTS PROJECT
"YOUR TAX DOLLARS AT WORK"
ENGINEER NAME
CONTRACTOR NAME
7"
7"
5"
5"
9"
4"
6"
4"
6"
4"
3"
3"
9"
4'-0"
6'-0"
6'-0"
2'-6"
2'-6"
2'-6"
2'-0"
2'-0" MIN.
SIGN MAY BE ADAPTED TO USE SANDBAGS IF NECESSARY.
SIGN PANEL – ¾" LAMINATED DUOLOX MASONITE OR ½" MARINE PLYWOOD
FRAME – 2" X 4" STOCK
FRAME TO BE PAINTED "WHITE"
PAINT BACKGROUND OF SIGN "WHITE"
PAINT MESSAGE OF SIGN "BLUE"
ALL PAINT TO BE EXTERIOR GRADE
CONTRACTOR SHALL PLACE SIGN(S) AS DIRECTED BY THE OWNER AND WILL PROPERLY MAINTAIN THE SIGN(S) DURING CONSTRUCTION
PROJECT SIGN DETAIL
N.T.S.
4000 PSI CONCRETE FOUNDATION, GROUTED SMOOTH W/ 3/4" CHAMFER
ANCHOR BOLTS PER MANUFACTURERS RECOMMENDATIONS
6"
3" MIN. CLR.
#3 SPIRAL @ 4" PITCH
6 – #8 VERTICAL BARS
5'-0" FOR POLES ≤ 15-FT
7'-0" FOR POLES > 15-FT
CONDUIT, WIRING & GROUNDING PER NEC CODE
2'-0"ø
NOTES:
1. THIS DETAIL IS A REPRESENTATION OF THE MINIMUM REQUIREMENTS FOR CONSTRUCTION. THE DESIGN ENGINEER IS RESPONSIBLE FOR CONCRETE FOUNDATION DESIGN, INCORPORATING RECOMMENDATIONS OF THE GEOTECHNICAL REPORT.
2. CONCRETE AND REINFORCING STEEL TO BE PLACED IN ACCORDANCE WITH ACI CODE.
LIGHT POLE BASE DETAIL
N.T.S.
ALUMINUM U-CHANNEL BLADE MOUNTING HARDWARE
TWITCO STANDARD SIGNAGE
2-1/2" SCH. 80 HDG STEEL SIGN POST
7'-0" MIN.
HDG STEEL TRIANGULAR BREAKAWAY SLIP BASE ASSEMBLY
36" HDG STEEL STUB POST BASE
4" MAX.
12" #4 REBAR THROUGH 3/4" HOLE IN STUB
18" DIA. x 48" DP. 3,000 PSI CONCRETE
NOTES:
1. SLIP BASE BOLTS, NUTS AND WASHERS SHALL BE PER ASTM A325 OR A449, GALVANIZED PER ASTM A454.
STREET SIGN POST DETAIL
N.T.S.
MIN. 40'-0" ACCESS CLEARANCE (80'-0" MAX.)
1"ø GATE HOD KEEPER SET IN CONC. (TYP. 1 PER GATE)
SOLID OPAQUE METAL GATE(S) (CHAINLINK NOT ALLOWED) MAX. 4" GAP BETWEEN BOTTOM OF GATE AND GROUND.
14'-0"
8'-0" HIGH BRICK OR STONE WALL ENCLOSURE OF A COLOR MATCHING THE PRIMARY BUILDING
12'-0" (SINGLE PAD)
29'-0" (DOUBLE PAD)
NOTES:
1. ENGINEERED CONCRETE FOUNDATIONS WITH PIERS ARE REQUIRED, PER REVIEW AND APPROVAL BY TOWN ENGINEER.
2. NEW COMMERCIAL DEVELOPMENT SHALL PROVIDE SPACE FOR A MINIMUM OF TWO DUMPSTER PADS.
COMMERCIAL DUMPSTER SCREENING ENCLOSURE DETAIL
N.T.S.
BACK OF CURB
15'-0" MIN.
RIGHT-OF-WAY
15'-0" MIN.
CORNER RESIDENTIAL LOT
PROP. LINE
CEDAR BOARD ON BOARD FENCE
RESIDENTIAL FENCE AND/OR RETAINING WALL
15'-0" MIN.
NOTES:
1. ALL RESIDENTIAL FENCES FACING STREETS, OPEN AREAS, OR COMMERCIAL ZONES MUST BE 6'-0" HIGH CEDAR BOARD-ON-BOARD STYLE.
2. FENCES AND RETAINING WALL MUST BE AT LEAST 15 FEET FROM EDGE OF PAVEMENT.
FENCE/RETAINING WALL LAYOUT DETAIL
N.T.S.
4x4 POST CAP
NOTCHED CROSS-LAP JOINT
4" FROM BACK OF CURB
6"
45°
18"
18"
4'-0"
3'-8"
GREEN TREATED OR CEDAR 4x4 POST
2'-6" TO FACE OF CURB OR EDGE OF PAVEMENT
3'-0"
NOTES:
1. ATTACH POST, BRACE AND CROSS MEMBERS USING HOT DIPPED, GALVANIZED 4" LAG SCREWS IN PREDRILLED, COUNTER-SUNK HOLES.
2. CONTRACTOR TO INSTALL GIBRALTAR INDUSTRIES STANDARD SIZE BLACK GALVANIZED MAILBOX OR APPROVED EQUAL.
TYPICAL POST MAILBOX CONSTRUCTION
N.T.S.
MASONRY DETAILS OF MAILBOX TO BE PROVIDED BY HOMEBUILDER AND APPROVED BY TOWN PRIOR TO CONSTRUCTION
4" FROM BACK OF CURB
3'-8"
1'-0" TO FACE OF CURB OR EDGE OF PAVEMENT
4" MIN.
6" THK. CONC. PAD EXTEND MIN. 4" BEYOND FACE OF BRICK
3'-0"
1'-0"ø CONC. PIER
NOTES:
1. CONCRETE PAD AND PIER SHALL BE CONSTRUCTED IN A SINGLE MONOLITHIC POUR.
2. CONTRACTOR TO INSTALL GIBRALTAR INDUSTRIES STANDARD SIZE BLACK GALVANIZED MAILBOX OR APPROVED EQUAL.
TYPICAL BRICK PAD MAILBOX CONSTRUCTION
N.T.S.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER
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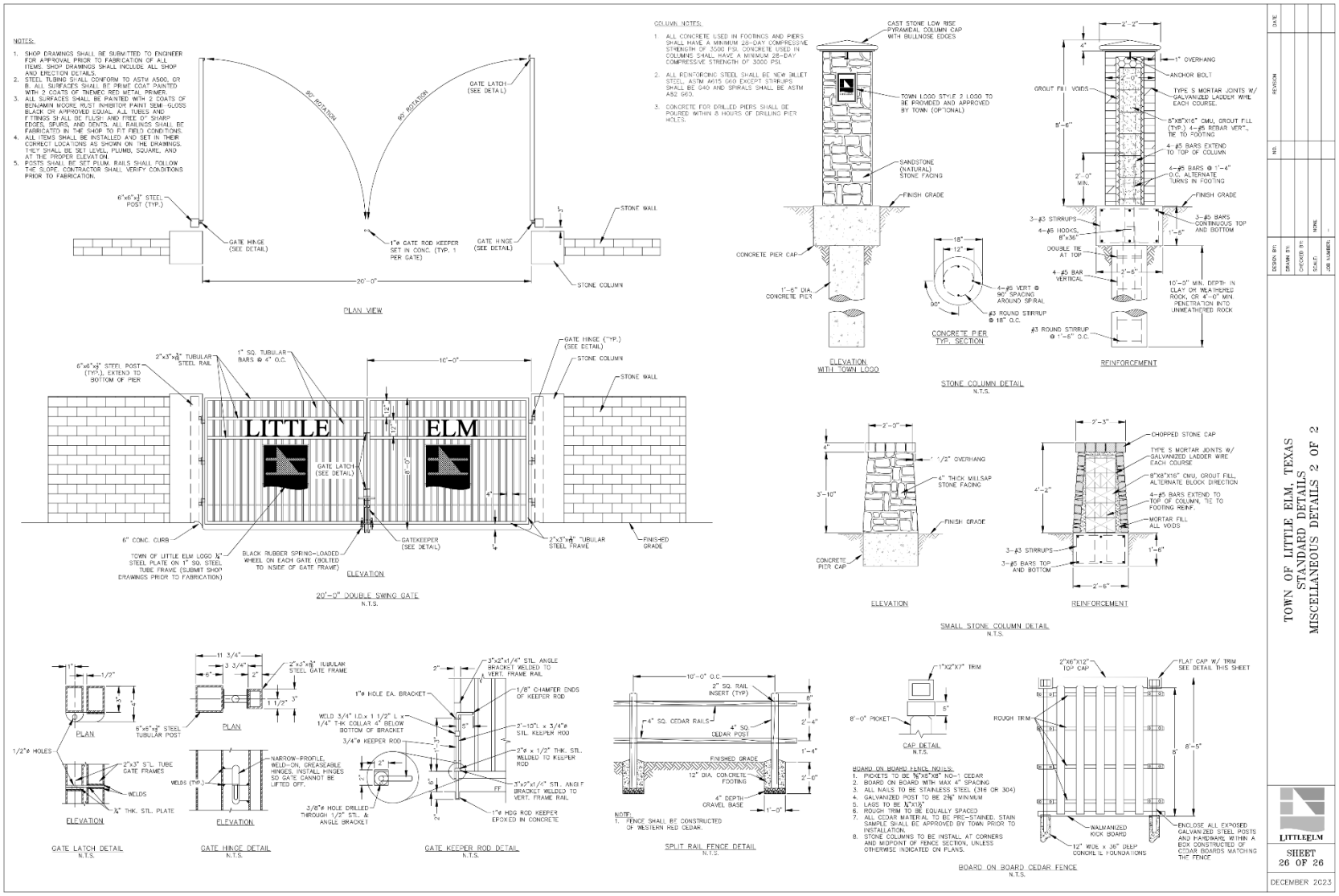
NOTES:
1. SHOP DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION OF ALL ITEMS. SHOP DRAWINGS SHALL INCLUDE ALL SHOP AND ERECTION DETAILS.
2. STEEL TUBING SHALL CONFORM TO ASTM A500, GR B. ALL SURFACES SHALL BE PRIME COAT PAINTED WITH 2 COATS OF TNEMEC RED METAL PRIMER.
3. ALL SURFACES SHALL BE PAINTED WITH 2 COATS OF BENJAMIN MOORE RUST INHIBITOR PAINT SEMI-GLOSS BLACK OR APPROVED EQUAL. ALL TUBES AND FITTINGS SHALL BE FLUSH AND FREE OF SHARP EDGES, SPURS, AND DENTS. ALL RAILINGS SHALL BE FABRICATED IN THE SHOP TO FIT FIELD CONDITIONS.
4. ALL ITEMS SHALL BE INSTALLED AND SET IN THEIR CORRECT LOCATIONS AS SHOWN ON THE DRAWINGS. THEY SHALL BE SET LEVEL, PLUMB, SQUARE, AND AT THE PROPER ELEVATION.
5. POSTS SHALL BE SET PLUM. RAILS SHALL FOLLOW THE SLOPE. CONTRACTOR SHALL VERIFY CONDITIONS PRIOR TO FABRICATION.
90° ROTATION
90° ROTATION
GATE LATCH (SEE DETAIL)
6"x6"x¼" STEEL POST (TYP.)
GATE HINGE (SEE DETAIL)
1"ø GATE ROD KEEPER SET IN CONC. (TYP. 1 PER GATE)
GATE HINGE (SEE DETAIL)
STONE WALL
STONE COLUMN
20'-0"
PLAN VIEW
COLUMN NOTES:
1. ALL CONCRETE USED IN FOOTINGS AND PIERS SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3500 PSI. CONCRETE USED IN COLUMNS SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI.
2. ALL REINFORCING STEEL SHALL BE NEW BILLET STEEL, ASTM A615 GR60 EXCEPT STIRRUPS SHALL BE GR40 AND SPIRALS SHALL BE ASTM A82 GR60.
3. CONCRETE FOR DRILLED PIERS SHALL BE POURED WITHIN 8 HOURS OF DRILLING PIER HOLES.
CAST STONE LOW RISE PYRAMIDAL COLUMN CAP WITH BULLNOSE EDGES
TOWN LOGO STYLE 2 LOGO TO BE PROVIDED AND APPROVED BY TOWN (OPTIONAL)
SANDSTONE (NATURAL) STONE FACING
FINISH GRADE
CONCRETE PIER CAP
1'-6" DIA. CONCRETE PIER
ELEVATION WITH TOWN LOGO
18"
12"
90°
4-#5 VERT @ 90° SPACING AROUND SPIRAL
#3 ROUND STIRRUP @ 18" O.C.
CONCRETE PIER TYP. SECTION
2'-2"
4"
1" OVERHANG
ANCHOR BOLT
GROUT FILL VOIDS
TYPE S MORTAR JOINTS W/ GALVANIZED LADDER WIRE EACH COURSE.
8'-6"
8"x8"x16" CMU, GROUT FILL (TYP.) 4-#5 REBAR VERT., TIE TO FOOTING
4-#5 BARS EXTEND TO TOP OF COLUMN
2'-0" MIN.
4-#5 BARS @ 1'-4" O.C. ALTERNATE TURNS IN FOOTING
FINISH GRADE
3-#3 STIRRUPS
4-#5 HOOKS, 8"x36"
3-#5 BARS CONTINUOUS TOP AND BOTTOM
1'-6"
DOUBLE TIE AT TOP
4-#5 BAR VERTICAL
2'-8"
10'-0" MIN. DEPTH IN CLAY OR WEATHERED ROCK, OR 4'-0" MIN. PENETRATION INTO UNWEATHERED ROCK
#3 ROUND STIRRUP @ 1'-6" O.C.
REINFORCEMENT
STONE COLUMN DETAIL
N.T.S.
2'-0"
4"
1/2" OVERHANG
4" THICK MILLSAP STONE FACING
3'-10"
FINISH GRADE
CONCRETE PIER CAP
ELEVATION
2'-3"
CHOPPED STONE CAP
TYPE S MORTAR JOINTS W/ GALVANIZED LADDER WIRE EACH COURSE
8"X8"X16" CMU, GROUT FILL, ALTERNATE BLOCK DIRECTION
4'-2"
4-#5 BARS EXTEND TO TOP OF COLUMN, TIE TO FOOTING REINF.
MORTAR FILL ALL VOIDS
3-#3 STIRRUPS
3-#5 BARS TOP AND BOTTOM
1'-6"
2'-6"
REINFORCEMENT
SMALL STONE COLUMN DETAIL
N.T.S.
6"x6"x¼" STEEL POST (TYP.), EXTEND TO BOTTOM OF PIER
2"x3"x⅛" TUBULAR STEEL RAIL
1" SQ. TUBULAR BARS @ 4" O.C.
10'-0"
GATE HINGE (TYP.) (SEE DETAIL)
STONE COLUMN
STONE WALL
LITTLE
ELM
GATE LATCH (SEE DETAIL)
6" CONC. CURB
TOWN OF LITTLE ELM LOGO ¼" STEEL PLATE ON 1" SQ. STEEL TUBE FRAME (SUBMIT SHOP DRAWINGS PRIOR TO FABRICATION)
BLACK RUBBER SPRING-LOADED WHEEL ON EACH GATE (BOLTED TO INSIDE OF GATE FRAME)
GATEKEEPER (SEE DETAIL)
2"x3"x¼" TUBULAR STEEL FRAME
FINISHED GRADE
ELEVATION
20'-0" DOUBLE SWING GATE
N.T.S.
1"
1/2"
⅝"
6"x6"x¼" STEEL TUBULAR POST
PLAN
1/2"ø HOLES
2"x3" STL. TUBE GATE FRAMES
WELDS
¼" THK. STL. PLATE
ELEVATION
GATE LATCH DETAIL
N.T.S.
11 3/4"
3 3/4"
6"
2"
2"x3"x⅛" TUBULAR STEEL GATE FRAME
1 1/2"
3"
PLAN
NARROW-PROFILE, WELD-ON, GREASEABLE HINGES. INSTALL HINGES SO GATE CANNOT BE LIFTED OFF.
WELDS (TYP.)
ELEVATION
GATE HINGE DETAIL
N.T.S.
2"
1"ø HOLE EA. BRACKET
WELD 3/4" I.D.x 1 1/2" L x 1/4" THK COLLAR 4" BELOW BOTTOM OF BRACKET
3/4"ø KEEPER ROD
3/8"ø HOLE DRILLED THROUGH 1/2" STL. & ANGLE BRACKET
3"x2"x1/4" STL. ANGLE BRACKET WELDED TO VERT. FRAME RAIL
1/8" CHAMFER ENDS OF KEEPER ROD
2'-10½" L x 3/4"ø STL. KEEPER ROD
2"ø x 1/2" THK. STL. WELDED TO KEEPER ROD
3"x2"x1/4" STL. ANGLE BRACKET WELDED TO VERT. FRAME RAIL
1"ø HDG ROD KEEPER EPOXED IN CONCRETE
GATE KEEPER ROD DETAIL
N.T.S.
10'-0" O.C.
2" SQ. RAIL INSERT (TYP.)
4" SQ. CEDAR RAILS
4" SQ. CEDAR POST
FINISHED GRADE
12" DIA. CONCRETE FOOTING
4" DEPTH GRAVEL BASE
NOTE:
1. FENCE SHALL BE CONSTRUCTED OF WESTERN RED CEDAR.
SPLIT RAIL FENCE DETAIL
N.T.S.
1"X2"X7" TRIM
8'-0" PICKET
CAP DETAIL
N.T.S.
BOARD ON BOARD FENCE NOTES:
1. PICKETS TO BE ¾"x5"x8" NO.1 CEDAR
2. BOARD ON BOARD WITH MAX 4" SPACING
3. ALL NAILS TO BE STAINLESS STEEL (316 OR 304)
4. GALVANIZED POST TO BE 2⅜" MINIMUM
5. LAGS TO BE ¾"X1½"
6. ROUGH TRIM TO BE EQUALLY SPACED
7. ALL CEDAR MATERIAL TO BE PRE-STAINED. STAIN SAMPLE SHALL BE APPROVED BY TOWN PRIOR TO INSTALLATION.
8. STONE COLUMNS TO BE INSTALL AT CORNERS AND MIDPOINT OF FENCE SECTION, UNLESS OTHERWISE INDICATED ON PLANS.
2"X6"X12" TOP CAP
FLAT CAP W/ TRIM SEE DETAIL THIS SHEET
ROUGH TRIM
8'-5"
8'
GALVANIZED KICK BOARD
12" WIDE x 36" DEEP CONCRETE FOUNDATIONS
ENCLOSE ALL EXPOSED GALVANIZED STEEL POSTS AND HARDWARE WITHIN A BOX CONSTRUCTED OF CEDAR BOARDS MATCHING THE FENCE
BOARD ON BOARD CEDAR FENCE
N.T.S.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER:
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CONSTRUCTION
GENERAL NOTES

GENERAL NOTES

1. IT IS NOT THE INTENT OF THESE CONSTRUCTION NOTES TO COVER ALL DETAILS AND/OR SPECIFICATION REQUIREMENTS OF THE TOWN OF LITTLE ELM. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MEET ALL REQUIREMENTS OF THE TOWN OF LITTLE ELM, WHETHER OR NOT THE REQUIREMENTS ARE SPECIFICALLY STATED IN THE PLANS OR SPECIFICATIONS.

2. THE EXISTENCE AND LOCATIONS OF ALL UNDERGROUND UTILITIES SHOWN (MAIN LINES, NO LATERAL OR SERVICES SHOWN) ON THE DRAWINGS WERE OBTAINED FROM AVAILABLE RECORDS AND ARE APPROXIMATE. NO WARRANTY IS IMPLIED AS TO THE ACTUAL LOCATION OF EXISTING UTILITIES. NEITHER THE OWNER NOR THE ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES NOT SHOWN OR NOT IN THE LOCATION SHOWN. THE CONTRACTOR SHALL DETERMINE THE DEPTH AND LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO TRENCHING AND SHALL BE REQUIRED TO TAKE ANY PRECAUTIONARY MEASURES TO PROTECT ALL LINES SHOWN AND / OR ANY OTHER UNDERGROUND UTILITIES NOT OF RECORD OR NOT SHOWN ON THE PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL FRANCHISE AND TOWN UTILITIES PRIOR TO CONSTRUCTION.

3. ANY CONTRACTOR / SUBCONTRACTOR PERFORMING WORK ON THIS PROJECT SHALL FAMILIARIZE HIMSELF WITH THE SITE AND SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM HIS OPERATIONS. SAID EXISTING IMPROVEMENTS SHALL INCLUDE BUT NOT BE LIMITED TO BERMS, DITCHES, FENCES, AND VEGETATION. ANY REMOVAL OR DAMAGE TO EXISTING IMPROVEMENTS SHALL BE REPLACED OR REPAIRED BY THE CONTRACTOR AT HIS EXPENSE AND SHALL BE APPROVED BY THE TOWN OF LITTLE ELM.

4. ALL CONSTRUCTION, TESTING, AND MATERIALS SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE TOWN OF LITTLE ELM. ALL SUBMITTALS MUST BE ORIGINALS WITH SIGNATURES WHERE APPLICABLE; FACSIMILES WILL NOT BE ACCEPTED.

5. TESTING SERVICES FOR PUBLIC PROJECTS SHALL BE PROVIDED BY THE TOWN. COSTS ASSOCIATED WITH THESE TESTS SHALL BE PAID BY THE TOWN. RE-TEST OF FAILED AREAS THAT DO NOT MEET THE REQUIREMENTS STATED WITHIN SHALL BE PAID FOR BY THE CONTRACTOR.

6. THE DEVELOPER ON PRIVATE CONTRACTS OR THE TOWN ON PUBLIC CONTRACTS OR HIS/HER DESIGNEE SHALL BE RESPONSIBLE FOR FURNISHING AND INSTALLING ALL TEMPORARY AND PERMANENT TRAFFIC CONTROL IN ACCORDANCE WITH THE MINIMUM REQUIREMENTS OF THE LATEST REVISION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL HANDBOOK. ALL REFERENCE FOR USING TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) STANDARDS AND CONSTRUCTION DETAILS SHALL BE THE LATEST REVISIONS AND/OR AMENDMENTS THEREOF. THE TOWN OF LITTLE ELM USES RAISED PAVEMENT MARKINGS (BUTTONS) FOR STRIPING AND THERMOPLASTIC MARKINGS IN LIEU OF PAINT. THE MINIMUM SIGN SIZE SHALL BE THE STANDARD SIZE IN THE MANUAL. DETAILS ARE AVAILABLE UPON REQUEST FOR THE TYPE OF BUTTON PATTERNS, POSTS, AND CONNECTIONS REQUIRED FOR THE SIGNS.

7. THE CONTRACTOR SHALL MAKE EVERY EFFORT NOT TO IMPEDE TRAFFIC ON EXISTING STREETS, ALLEYS, OR FIRE LANES OPEN TO THE PUBLIC. IN THE EVENT THE CONSTRUCTION WORK REQUIRES THE CLOSURE OF AN EXISTING STREET, ALLEY, OR FIRE LANE, THE CONTRACTOR SHALL REQUEST THE ROAD CLOSURE THROUGH THE TOWN. IF THE CLOSURE ELIMINATES THE SECOND POINT OF ACCESS TO EXISTING BUILDINGS WITH A CERTIFICATE OF OCCUPANCY, THEN THE ACCESS MAY NOT BE CLOSED FOR MORE THAN FORTY-EIGHT (48) HOURS AND WILL REQUIRE FIRE MARSHAL APPROVAL IN EITHER CASE. UNLESS OTHERWISE SPECIFIED BY THE TOWN, ALL OTHER STREETS OR ALLEYS MAY NOT BE CLOSED FOR MORE THAN SEVENTY-TWO (72) HOURS.

8. THE CONTRACTOR SHALL INSTALL TEMPORARY FENCES TO PROTECT HORSES AND LIVESTOCK WHERE NECESSARY.

9. ALL CONCRETE STRUCTURES, WHETHER PRECAST OR CAST-IN-PLACE, SHALL BE DESIGNED WITH APPROPRIATE SULFATE RESISTANT CEMENT OR EQUIVALENT BASED ON LOCAL SOIL CONDITIONS PER GEOTECHNICAL REPORT. PRECAST MANHOLES OR OTHER SPECIAL STRUCTURES IN ANY RIGHT-OF-WAY OR FIRE LANE EASEMENTS WILL REQUIRE A CERTIFICATION FROM THE MANUFACTURER THAT THE PRODUCT MEETS THE DESIGN CRITERIA AND TWENTY-EIGHT (28) DAY COMPRESSIVE STRENGTH. CAST-IN-PLACE MANHOLES OR OTHER SPECIAL STRUCTURES IN ANY RIGHT-OF-WAY AND FIRE LANE OR UTILITY EASEMENTS WILL REQUIRE CYLINDERS TO BE MADE FOR STRENGTH TESTS BY AN APPROVED LABORATORY. LABORATORY TEST REPORTS SHALL BE SUBMITTED TO THE DESIGN ENGINEER FOR APPROVAL. SAMPLES FOR STRENGTH TESTS OF EACH CLASS OF CONCRETE PLACED EACH DAY SHALL BE TAKEN NOT LESS THAN ONCE A DAY, NOR LESS THAN ONCE FOR EACH 100-150 CU YD OF CONCRETE, NOR LESS THAN ONCE FOR EACH 5000 SQ FT OF SURFACE AREA FOR SLABS OR WALLS. FOUR (4) CYLINDERS SHALL BE MADE: ONE (1) SHALL BE BROKEN AT SEVEN (7) DAYS, TWO (2) SHALL BE BROKEN AT TWENTY-EIGHT (28) DAYS, AND ONE (1) SHALL BE HELD IN CASE OF DAMAGE OF ANY OF THE OTHER THREE (3). THE AVERAGE STRENGTH OF TWO (2) CYLINDERS FROM THE SAME SAMPLE, TESTED AT TWENTY-EIGHT (28) DAYS, IS REQUIRED FOR EACH STRENGTH TEST; ANY STRENGTH TEST BEYOND TWENTY-EIGHT (28) DAYS IS UNACCEPTABLE. IF THE TWENTY-EIGHT (28) DAY DESIGN STRENGTH IS NOT REACHED UPON STRENGTH TESTING THE CYLINDERS, THE DEFICIENT AREA SHALL BE CORED IMMEDIATELY TO BE PROVED OUT. FOR ANY AREAS DEFICIENT IN STRENGTH BY NOT MORE THAN 500 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN ONE (1) TIME THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO DEFICIENT IN STRENGTH. FOR ANY AREAS DEFICIENT IN STRENGTH BY MORE THAN 500 PSI BUT NOT MORE THAN 1000 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN TWO (2) TIMES THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO DEFICIENT IN STRENGTH. FOR ANY AREAS DEFICIENT IN STRENGTH BY MORE THAN 1000 PSI, THE STRUCTURE SHALL BE REMOVED AND RECONSTRUCTED AT THE FULL EXPENSE OF THE CONTRACTOR. PRIOR TO TOWN ACCEPTANCE OF ANY PENALTY PAYMENTS FOR ANY TRAFFIC BEARING STRUCTURE THAT DOES NOT MEET TWENTY-EIGHT (28) DAY DESIGN STRENGTH; THE DESIGN ENGINEER SHALL PROVIDE A SEALED STRUCTURAL EVALUATION THAT ASSESSES THE PERFORMANCE ADEQUACY OF THE DEFICIENT STRUCTURE AS CONSTRUCTED UNDER THE DESIGN SERVICE LOADS. ALL CORING AND ADDITIONAL LABORATORY TESTING SHALL BE AT THE EXPENSE OF THE CONTRACTOR.

10. BLASTING IS NOT PERMITTED ON THIS PROJECT.

11. ALL CONSTRUCTION OPERATIONS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH APPLICABLE REGULATIONS OF THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION.

12. THESE PLANS DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR ITS EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE REGISTERED PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED IN THE WORK.

13. THE TRENCH EXCAVATION AND SHORING SAFETY SYSTEM, AS OUTLINED IN THE TECHNICAL SPECIFICATIONS, WILL BE REQUIRED AS A MINIMUM TRENCH SAFETY MEASURE.

14. A PRE-CONSTRUCTION CONFERENCE IS TO BE HELD PRIOR TO BEGINNING CONSTRUCTION. THIS CONFERENCE SHALL TAKE PLACE AT A LOCATION SELECTED BY OWNER & ENGINEER. CONTRACTOR TO ARRANGE A MEETING DATE WITH THE OWNER AT LEAST SEVEN DAYS PRIOR TO THE MEETING TIME.

15. CONTRACTOR SHALL NOTIFY THE OWNER, OWNER'S REPRESENTATIVE, AND TCEQ (IF APPLICABLE) BY TELEPHONE A MINIMUM OF 48 HOURS IN ADVANCE OF CONSTRUCTION STARTUP, FOLLOWED BY A LETTER OF CONFIRMATION.

16. CONTRACTOR SHALL ASSURE HIMSELF THAT ALL CONSTRUCTION PERMITS HAVE BEEN OBTAINED PRIOR TO COMMENCEMENT OF WORK. REQUIRED PERMITS THAT CAN ONLY BE ISSUED TO CONTRACTOR ARE TO BE OBTAINED AT THE CONTRACTORS EXPENSE.

17. CONTRACTOR SHALL GIVE A MINIMUM OF 48 HOURS NOTICE TO ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS, OR PERSONS IN CHARGE OF PRIVATE AND PUBLIC UTILITIES AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK.

18. CONTRACTOR SHALL TAKE ALL DUE PRECAUTIONS TO PROTECT EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES INCURRED AS A RESULT OF THESE CONSTRUCTION OPERATIONS ARE TO BE REPAIRED IMMEDIATELY BY THE CONTRACTOR TO AT LEAST THE PRE-EXISTING CONDITION AT NO ADDITIONAL COST TO OWNER.

19. WHEN UNLOCATED OR INCORRECTLY LOCATED UNDERGROUND PIPING OR A BREAK IN A LINE OR OTHER UTILITIES AND SERVICES ARE ENCOUNTERED DURING SITE WORK OPERATIONS, THE CONTRACTOR SHALL NOTIFY THE APPLICABLE UTILITY COMPANY IMMEDIATELY TO OBTAIN PROCEDURE DIRECTIONS. THE CONTRACTOR SHALL COOPERATE WITH THE APPLICABLE UTILITY COMPANY IN MAINTAINING ACTIVE SERVICES IN OPERATION.

20. THE CONTRACTOR SHALL MAINTAIN ACCESS TO PUBLIC AND PRIVATE FACILITIES DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES TO BE COORDINATED WITH THE OWNER.

21. THE CONTRACTOR SHALL COORDINATE INTERRUPTIONS OF ALL UTILITIES AND SERVICES WITH APPLICABLE UTILITY COMPANY OR COMPANIES. ALL WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE UTILITY COMPANY OR AGENCY INVOLVED.

22. THE CONTRACTOR SHALL LOCATE, PROTECT, AND MAINTAIN BENCHMARKS, MONUMENTS, AND CONTROL POINTS. THE CONTRACTOR SHALL RE-ESTABLISH DISTURBED OR DESTROYED ITEMS BY A REGISTERED PUBLIC SURVEYOR IN THE STATE OF TEXAS, AT NO ADDITIONAL COST TO OWNER.

23. EXISTING PAVING, BUILDING, AND OTHER ITEMS SHOWN ON PLANS NOT SPECIFICALLY RELATED TO THE WORK OF THE CONTRACTOR IS FOR INFORMATION ONLY.

24. DEMOLITION PERMITS (IF NEEDED) ARE TO BE OBTAINED BY THE CONTRACTOR.

25. COORDINATES SHOWN FOR STRUCTURE LOCATIONS ARE REFERENCED TO OUTSIDE FACE OF EXTERIOR WALL AT GRADE OR TO CENTERLINE OF STRUCTURE, UNLESS OTHERWISE ON PLANS.

26. EXISTING SURFACE AND SUBSURFACE STRUCTURES (GAS MAINS, WATER MAINS, STORM SEWERS, TELEPHONE CABLES, ETC.) ARE SHOWN ON THE PLANS IF THEIR LOCATION HAS BEEN DETERMINED, BUT IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO AVOID DAMAGING THESE EXISTING STRUCTURES WHETHER OR NOT THEY ARE SHOWN ON THE PLANS. THE OWNER AND ENGINEER ASSUME NO RESPONSIBILITY FOR FAILURE TO SHOW ANY OR ALL OF THESE STRUCTURES ON THE PLANS OR TO SHOW THEM IN THEIR EXACT LOCATION. IF ANY STRUCTURE IS DAMAGED BY THE CONTRACTOR, IT SHALL BE HIS RESPONSIBILITY TO REPAIR THE DAMAGE AT HIS OWN EXPENSE AND RESTORE THE STRUCTURE TO ITS ORIGINAL CONDITION.

27. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATIONS, ELEVATIONS AND DIMENSIONS OF ADJACENT AND/OR CONFLICTING UTILITIES IN ADVANCE OF CONSTRUCTION IN ORDER THAT ADJUSTMENTS CAN BE MADE TO PROVIDE ADEQUATE CLEARANCES, IF REQUIRED. THE CONTRACTOR SHALL PRESERVE AND PROTECT PUBLIC UTILITIES AT ALL TIMES DURING CONSTRUCTION. ANY DAMAGE TO UTILITIES RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED AT HIS EXPENSE. THE ENGINEER SHALL BE NOTIFIED WHEN PROPOSED FACILITY GRADES CONFLICT WITH EXISTING UTILITY GRADES.

28. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING "AS-RECORDED" PLANS TO THE ENGINEER OF RECORD SHOWING THE LOCATION OF ALL DRAINAGE STRUCTURES. THIS INFORMATION SHALL BE PLACED ON THE ENGINEERING PLANS AND MARKED "RECORD DRAWING" PLANS ALONG WITH THE DATE AND THE NAME OF THE CONTRACTOR BY THE ENGINEER OF RECORD. COPIES OF THESE "RECORD DRAWING" PLANS SHALL BE FURNISHED TO THE TOWN ON MYLARS, BLACKLINE PRINTS, AND ELECTRONICALLY AS REQUIRED UNDER THE TOWN'S "FINAL ACCEPTANCE CHECKLIST."

29. THE CONTRACTOR SHALL FURNISH A MAINTENANCE BOND IN THE AMOUNT OF 10 % (TEN PERCENT) OF THE TOTAL CONTRACT PRICE TO THE TOWN TO RUN TWO (2) YEARS FROM THE DATE OF FINAL ACCEPTANCE OF THE PROJECT BY THE TOWN.

30. FIRE LANES SHALL HAVE A MINIMUM TURNING RADIUS OF 30 FEET UNLESS DESIGNED USING AUTOTURN BY TRANSOFT SOLUTIONS, OR EQUIVALENT SOFTWARE. IN NO CASE SHALL A FIRE LANE RADIUS BE LESS THAN 20 FEET UNLESS APPROVED BY THE TOWN ENGINEER.

GENERAL ENVIRONMENTAL NOTES

1. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL REQUIREMENTS REGARDING EXCESS AND WASTE MATERIAL, INCLUDING METHODS OF HANDLING AND DISPOSAL.
2. CONTRACTOR SHALL LOCATE MATERIAL STORAGE AREAS AWAY FROM STORMWATER CONVEYANCE SYSTEMS. PROVIDE PROTECTED STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER POTENTIALLY TOXIC MATERIALS.
3. FUEL STORAGE IS NOT ALLOWED ON THIS PROJECT.
4. THE CONTRACTOR SHALL ADVISE OWNER IMMEDIATELY, VERBALLY AND IN WRITING, OF ANY FUEL OR TOXIC MATERIALS SPILLS WITHIN THE PROJECT/CONSTRUCTION AREA AND THE ACTIONS TO BE TAKEN TO REMEDY THE PROBLEM.
5. THE CONTRACTOR SHALL DISPOSE OF FUELS, HAZARDOUS MATERIALS, AND CONTAMINATED EXCAVATIONS IN A LEGALLY APPROVED MANNER.
6. NO OPEN BURNING IS ALLOWED WITHIN THE CITY LIMITS.

STORMWATER NOTES

1. THROUGHOUT THE CONSTRUCTION, AND AT THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL ASSURE THAT DRAINAGE OF STORMWATER RUNOFF IS NOT BLOCKED.
2. DURING CONSTRUCTION, THE STORM WATER RUNOFF FROM ALL DISTURBED AREAS SHALL BE FILTERED BY SILT FENCES AND/OR ROCK BERMS. THESE TEMPORARY EROSION AND SEDIMENTATION CONTROLS ARE TO REMAIN IN PLACE UNTIL THE DISTURBED AREAS ARE REVEGETATED AND THE AREAS HAVE BECOME PERMANENTLY STABILIZED. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS SHALL BE INSPECTED PERIODICALLY FOR DAMAGE CAUSED BY CONSTRUCTION ACTIVITIES AND FOLLOWING EVERY RAINFALL. DAMAGED OR OBSTRUCTED CONTROLS TO BE REPAIRED/REPLACED AS NECESSARY TO MAINTAIN THEIR PROPER OPERATION.

SITE GRADING NOTES

1. THE CONTRACTOR SHALL CONTROL DUST CAUSED BY THE WORK AND COMPLY WITH POLLUTION CONTROL REGULATIONS OF GOVERNING AUTHORITIES.
2. EXCESS EXCAVATED MATERIAL SHALL BE STOCKPILED IN DESIGNATED AREA AS SHOWN ON PLANS OR AS DIRECTED BY THE OWNER. REINFORCED FILTER FABRIC FENCE TO BE INSTALLED AROUND STOCKPILE ON DOWNSTREAM SIDE AND BOTH SIDES ADJACENT TO THE DOWNSTREAM SIDE. STOCKPILES ARE NOT TO TRAP OR POND WATER. TOPSOIL TO BE STOCKPILED SEPARATELY. ALL EXCESS EXCAVATED MATERIAL IS TO BE REMOVED FROM THE SITE, CONTRACTOR TO NOTIFY TCEQ AND THE OWNER'S REPRESENTATIVE OF LOCATION OF DISPOSAL BEFORE MATERIAL IS REMOVED.
3. THE FINISHED GRADE ELEVATIONS SHOWN ARE INTENDED TO PROVIDE ADEQUATE DRAINAGE. MINOR FIELD CHANGES MAY BE NECESSARY TO PROVIDE ADEQUATE DRAINAGE. GRADE UNIFORMLY BETWEEN ELEVATIONS SHOWN TO PROVIDE DRAINAGE.
4. ADJUST MANHOLE COVERS, VALVE BOXES, ELECTRICAL MANHOLES, ETC. TO MATCH PROPOSED FINISHED GRADE (NO SEPARATE PAY).
5. RETAINING WALLS SHALL BE NO GREATER THAN 6" IN HEIGHT AT THE END OF WALL.
6. THE MAXIMUM SLOPE IN THE FRONT AND REAR OF SINGLE FAMILY LOTS IS 6:1 UNLESS APPROVED BY THE TOWN ENGINEER.
7. TYPICAL SLOPES ON COMMERCIAL LOTS IS 6:1 WITH A MAXIMUM SLOPE ALLOWED OF 4:1 UNLESS APPROVED BY TOWN ENGINEER.

EROSION/SEDIMENTATION & TREE PROTECTION NOTES

1. THE CONTRACTOR TO INSTALL AND MAINTAIN EROSION/SEDIMENTATION CONTROLS AND TREE/NATURAL AREA PROTECTIVE FENCING PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING, GRADING, OR EXCAVATION). CONTRACTOR TO REMOVE EROSION/SEDIMENTATION CONTROLS AT THE COMPLETION OF PROJECT AND GRASS RESTORATION.
2. THE PLACEMENT OF EROSION/SEDIMENTATION CONTROLS TO BE IN ACCORDANCE WITH THE PROPOSED SITE GRADING PLAN. DEVIATIONS FROM THE PLAN MUST BE SUBMITTED TO AND APPROVED BY THE OWNER.
3. EROSION AND SEDIMENTATION CONTROLS TO BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN SOIL BUILDUP WITHIN TREE DRIPLINES.
4. TO AVOID SOIL COMPACTION, NO VEHICULAR TRAFFIC, PARKING, OR STORAGE OF EQUIPMENT OR MATERIALS IS ALLOWED IN THE TREE DRIPLINE AREAS.
5. TREES TO BE REMOVED IN A MANNER WHICH DOES NOT IMPACT TREES TO BE PRESERVED.
6. INTENTIONAL RELEASE OF VEHICLE OR EQUIPMENT FLUIDS ONTO THE GROUND IS NOT ALLOWED. CONTAMINATED SOIL RESULTING FROM ACCIDENTAL SPILL TO BE REMOVED AND DISPOSED OF PROPERLY.

NO.	REVISION	DATE

DESIGNED BY: REC
DRAWN BY: REC
CHECKED BY: REC
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
GENERAL CONSTRUCTION NOTES 1 OF 3

LITTLE ELM

SHEET
1 OF 24

OCTOBER 2017

CONSTRUCTION
GENERAL NOTES

PAVING NOTES

1. ABSOLUTELY NO EARTHWORK, LIME APPLICATION, OR OTHER PREPARATION OF THE SUBGRADE FOR PAVING OF STREETS, ALLEYS, OR FIRE LANES SHALL BE INITIATED WITHOUT AUTHORIZATION FROM THE TOWN'S CONSTRUCTION INSPECTOR. ONCE ALL TESTING OF UNDERGROUND FACILITIES HAS BEEN COMPLETED AND VERIFIED TO MEET THE TOWN'S SPECIFICATIONS, THE TOWN CONSTRUCTION INSPECTOR WILL ISSUE A LETTER TO THE PROJECT OWNER OR SUPERINTENDENT THAT WILL AUTHORIZE THE INITIATION OF ALL SUBGRADE WORK IN PREPARATION FOR PAVING. ALL STREET, ALLEY, AND FIRE LANE RIGHT-OF-WAY OR EASEMENT WIDTH SHALL BE EXCAVATED FULL WIDTH IN ACCORDANCE WITH THE STREET AND SIDEWALK SECTION TO BE CONSTRUCTED. THE SUBGRADE FOR ALL STREETS, ALLEYS, AND FIRE LANES SHALL BE STABILIZED WITH HYDRATED LIME MATERIAL TO A DISTANCE 24 INCHES BEYOND THE BACK OF CURB OR EDGE OF PAVING AS APPLICABLE. THE AMOUNT OF LIME MATERIAL SHALL BE THAT AMOUNT WHICH WILL REDUCE THE PLASTICITY INDEX (PI) BELOW FIFTEEN (15) AS VERIFIED BY TESTING BY AN APPROVED LABORATORY; THE TOWN WILL ADD ONE (1) PERCENT TO THE LABORATORY RESULTS FOR FIELD VARIATION. LABORATORY TESTING (LIME SERIES) SHALL GENERALLY BE CONDUCTED WHEN ALL UTILITIES ARE COMPLETE AND THE ROADWAY SUBGRADE IS COMPLETE. LIME SHALL BE APPLIED BY PERCENTAGE DRY UNIT WEIGHT OF SOIL TREATED TO A MINIMUM IN PLACE COMPACTED THICKNESS OF SIX (6) INCHES. FOR 6" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 37 POUNDS PER SQUARE FOOT; FOR 8" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 54 POUNDS PER SQUARE FOOT. SULFATE TESTS SHALL ALSO BE CONDUCTED ON ALL PAVING PROJECTS IN THE TOWN UNDER THE DIRECTION OF THE APPROVED LABORATORY. FREQUENCY OF TESTS SHALL NOT EXCEED EVERY 300 LINEAR FEET OF SUBGRADE, ALTERNATING FROM LEFT QUARTER POINT TO CENTER LINE TO RIGHT QUARTER POINT. ADDITIONAL TESTING MAY BE DEEMED NECESSARY BY THE TOWN ENGINEER. ALL TESTING FOR THE PRESENCE OF SULFATES IN THE PAVEMENT SUBGRADE SHALL BE AT THE CONTRACTOR'S EXPENSE. IF THE SULFATES ARE PRESENT AT AN UNACCEPTABLE CONCENTRATION, THE TOWN MAY REQUIRE A RECOMMENDATION FOR FURTHER TREATMENT OF THE SOIL FROM THE APPROVED LABORATORY, WHICH SHALL BE CONFIRMED BY THE DESIGN ENGINEER OF RECORD FOR THE PROJECT.
2. SUBGRADE TESTING REQUIREMENTS: ALL FILL SHALL BE COMPACTED TO NO LESS THAN 95% OF STANDARD PROCTOR DENSITY AT 0 – 4% ABOVE OPTIMUM MOISTURE CONTENT. FREQUENCY OF TESTING SHALL NOT EXCEED EVERY 300 LINEAR FEET PER 2.0' OF LIFT UNTIL FINAL GRADE, STARTING AT 2.0' ABOVE NATURAL/SOUND GRADE TO TOP OF SUBGRADE. ALL STREET, ALLEY, AND FIRE LANE SUBGRADE SHALL BE COMPACTED TO NO LESS THAN 95% OF STANDARD PROCTOR DENSITY AT 0 – 4% ABOVE OPTIMUM MOISTURE CONTENT. FREQUENCY OF TESTS SHALL NOT EXCEED EVERY 300 LINEAR FEET OF SUBGRADE, ALTERNATING FROM LEFT QUARTER POINT TO CENTER TO RIGHT QUARTER POINT. VERIFICATION OF LIME DEPTH, TESTING FOR SUBGRADE GRADATIONS & PULVERIZATIONS, AND PLASTICITY INDICES OF THE SOIL SHALL ALSO BE CONDUCTED; THE FREQUENCY OF THIS TESTING SHALL BE AS PREVIOUSLY MENTIONED. ALL TESTING OF MATERIALS REQUIRED FOR THE CONSTRUCTION OF ANY STREET, ALLEY OR FIRE LANE SHALL BE PERFORMED BY AN APPROVED AGENCY FOR TESTING MATERIALS. THE NOMINATION OF THE TESTING LABORATORY AND THE PAYMENT OF SUCH TESTING SERVICES SHALL BE MADE BY THE CONTRACTOR. THE ENGINEER SHALL APPROVE THE LABORATORY NOMINATED TO DO THE TESTING OF MATERIALS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SHOW BY STANDARD TESTING PROCEDURES THAT THE WORK CONSTRUCTED DOES MEET THE REQUIREMENTS OF THE TOWN'S SPECIFICATIONS.
3. ANY EXISTING PAVEMENT, CURBS, AND/OR SIDEWALK DAMAGED OR REMOVED BY THE CONTRACTOR ARE TO BE REPAIRED BY THE CONTRACTOR TO AT LEAST THE PREEXISTING CONDITION AT HIS EXPENSE BEFORE ACCEPTANCE OF THE WORK.
4. TRAFFIC CONTROLS DURING CONSTRUCTION TO BE CONTRACTOR'S RESPONSIBILITY AND INSTALLED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
5. REPLACE EXISTING ROADWAY THAT IS CUT BY PIPE TRENCHES WITH SIMILAR ROADWAY.
6. MAINTAIN ALL MANHOLE FRAMES AND COVERS TO BELOW PAVEMENT SUBGRADE ELEVATION UNTIL PLACEMENT OF PAVEMENT BASE HAS BEEN COMPLETED. RAISE MANHOLE FRAMES AND COVERS TO FINISH PAVEMENT GRADES WHEN BASE IS COMPLETE.
7. MINIMUM DESIGN REQUIREMENTS: ALL STREET, ALLEY, PARKING LOT, AND FIRE LANE PAVING SHALL BE DESIGNED AND PERMITTED THROUGH THE TOWN TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3500 PSI AT TWENTY-EIGHT (28) DAYS WITH A MINIMUM OF FIVE AND ONE HALF (5 & 1/2) SACKS OF CEMENT AS VERIFIED BY TESTING IN AN APPROVED LABORATORY. TWO BATCH DESIGNS SHALL BE SUBMITTED TO THE TOWN CONSTRUCTION ENGINEER FOR APPROVAL: ONE FOR MACHINE WORK AND ONE FOR HAND WORK. ALL BATCH DESIGNS MUST BE SIGNED BY THE TESTING LABORATORY AND INCLUDE ALL DOCUMENTATION, SUCH AS RESULTS OF FIELD TRIAL TESTING. IF APPLICABLE, ALL BATCH DESIGNS SHALL SPECIFY AN APPROPRIATE SULFATE RESISTANT CEMENT OR INCLUSION. SLUMP SHALL BE 1 – 3 INCHES FOR ALL MACHINE WORK AND 2 – 4 INCHES FOR ALL HAND WORK. STREETS (DEPENDING ON CLASSIFICATION), PARKING LOTS, AND FIRE LANES SHALL HAVE A MINIMUM THICKNESS OF SIX (6) INCHES; ALLEYS SHALL HAVE A MINIMUM THICKNESS OF 8"–5"–8". UPON COMPLETION OF CONSTRUCTION, ALL STREETS AND FIRE LANES SHALL BE CORED FOR DEPTH (2" CORES) AT A SPACING OF 300 FT MAXIMUM, ALTERNATING FROM LEFT QUARTER POINT TO CENTER LINE TO RIGHT QUARTER POINT. ALLEYS SHALL BE CORED FOR DEPTH (2" CORES) AT A SPACING OF 300 FT MAXIMUM ALONG THE CENTER LINE. PAVEMENT OF A THICKNESS LESS THAN THE THICKNESS SHOWN ON THE PLANS BY MORE THAN ONE-QUARTER (1/4) INCH BUT LESS THAN THREE-QUARTER (3/4) INCH WILL BE CONSIDERED DEFICIENT. THE CONTRACTOR SHALL PAY TO THE TOWN TWO (2) TIMES THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO BE DEFICIENT IN THICKNESS AS DEFINED ABOVE. PAVEMENT DEFICIENT IN THICKNESS BY MORE THAN THREE-QUARTER (3/4) INCH SHALL BE REMOVED AND REPLACED COMPLETELY. THE DEFICIENT AREA SHALL BE CORED IMMEDIATELY ON TEN (10) FOOT CENTERS OR ONE (1) PER PANEL TO BE PROVED OUT. ALL STREETS, ALLEYS, PARKING LOTS, AND FIRE LANES WILL REQUIRE CYLINDERS TO BE MADE FOR STRENGTH TESTS BY THE APPROVED LABORATORY. SAMPLES FOR STRENGTH TESTS OF EACH CLASS OF CONCRETE PLACED EACH DAY SHALL BE TAKEN BY AN APPROVED LABORATORY NOT LESS THAN ONCE A DAY, NOR LESS THAN ONCE FOR EACH 100–150 CU YD OF CONCRETE. FOUR (4) CYLINDERS SHALL BE MADE: ONE SHALL BE BROKEN AT 7 DAYS, TWO (2) SHALL BE BROKEN AT TWENTY-EIGHT (28) DAYS, AND ONE SHALL BE HELD IN CASE OF DAMAGE OF ANY OF THE OTHER THREE (3). THE AVERAGE STRENGTH OF TWO (2) CYLINDERS FROM THE SAME SAMPLE, TESTED AT TWENTY-EIGHT (28) DAYS IS REQUIRED FOR EACH STRENGTH TEST; ANY STRENGTH TEST BEYOND TWENTY-EIGHT (28) DAYS IS UNACCEPTABLE. IF THE TWENTY-EIGHT (28) DAY DESIGN STRENGTH IS NOT REACHED UPON STRENGTH TESTING THE CYLINDERS, THE DEFICIENT AREA SHALL BE CORED IMMEDIATELY BE ON TEN (10) FOOT CENTERS OR ONE PER PANEL TO BE PROVED OUT. FOR ANY AREAS DEFICIENT IN STRENGTH BY NOT MORE THAN 500 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN ONE (1) TIME THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO BE DEFICIENT IN STRENGTH. FOR ANY AREAS DEFICIENT IN STRENGTH BY MORE THAN 500 PSI BUT NOT MORE THAN 1000 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN TWO (2) TIMES THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO BE DEFICIENT IN STRENGTH. PAVEMENT DEFICIENT IN STRENGTH BY MORE THAN 1000 PSI SHALL BE REMOVED AND REPLACED COMPLETELY. NO MORE THAN THREE (3) – FOUR (4) INCH CORES SHALL BE EXTRACTED PER PANEL WITHOUT PRIOR TOWN APPROVAL. A REBAR DETECTOR SHALL BE USED TO ENSURE THAT THE CORED AREAS ARE CLEAR OF ANY REBAR. ALL CORING AND ADDITIONAL LABORATORY TESTING SHALL BE AT THE EXPENSE OF THE CONTRACTOR. THE WIDTH TO BE CONSIDERED FOR ANY DEFICIENCIES SHALL BE THE FULL WIDTH OF THE PAVEMENT.
8. ANY SECTION OF ALL EXISTING PUBLIC OR PRIVATE STREETS, ALLEYS, OR FIRE LANES SHALL BE REPLACED WITHIN SEVENTY TWO (72) HOURS OF REMOVAL.
9. ALL REINFORCING BARS SHALL CONFORM TO ASTM A-615/A 615M, GRADE 60.
10. ALL CONCRETE AND REINFORCING STEEL SHALL CONFORM TO CURRENT A.C.I. CODE.
11. ALL WALL STEEL SHALL HAVE A MINIMUM CONCRETE COVER OF 2". SLAB REINFORCING TO HAVE A MINIMUM CONCRETE COVER OF 2" ON TOP AND 3" ON BOTTOM.
12. ALL BAR SPLICES, CORNER DOWELS, AND JOINT DOWELS SHALL HAVE A MINIMUM 40 DIAMETERS, OR 30", WHICHEVER IS GREATER.
13. JOINT AND CORNER DOWELS DESIGNATED AS "EXTRA LENGTH" SHALL HAVE A MINIMUM LAP LENGTH OF 80 BAR DIAMETERS OR 60", WHICHEVER IS GREATER, UNLESS OTHERWISE DIMENSIONED.
14. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4" x 3/4".
15. NO HORIZONTAL CONSTRUCTION JOINTS WILL BE PERMITTED, UNLESS OTHERWISE NOTED. WALL FORMING AND CONCRETE PLACEMENT PLAN, TO ALLOW FOR VERTICAL CONSTRUCTION JOINTS, SHALL BE PREPARED AND SUBMITTED TO THE ENGINEER FOR APPROVAL. ALL VERTICAL CONSTRUCTION JOINTS TO INCLUDE STANDARD KEYWAY AND WATERSTOP.
16. PARKING LOTS: STANDARD PARKING SPACE SIZE IS 9'x20'. FOR TWO-WAY DRIVE ISLES, MINIMUM WIDTH IS 24'. ONE-WAY DRIVE ISLES, MINIMUM WIDTH IS 15'. MINIMUM WIDTH FOR DRIVE THROUGH LANES IS 12'.
17. SPEED BUMPS ARE NOT PERMITTED IN COMMERCIAL DRIVES OR STREETS.

DETOURS, BARRICADES, WARNING SIGNS, ETC. NOTES

1. TRAFFIC MUST BE HANDLED THROUGHOUT THE PROJECT DURING CONSTRUCTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE FOR THE SAFE AND COMFORTABLE PASSAGE OF TRAFFIC WITH MINIMAL INCONVENIENCE TO THE PUBLIC AT ALL TIMES. TRAFFIC LANES SHALL BE ENTIRELY OPEN TO TRAFFIC EACH NIGHT AND NO EQUIPMENT SHALL BE LEFT IN A POSITION OVERNIGHT THAT WILL ENDANGER TRAFFIC.
2. A FLAGGER SHALL BE STATIONED WHERE ANY EQUIPMENT IS WORKING ON THE ROAD OR WHERE ANY OTHER HAZARDS DUE TO CONSTRUCTION OPERATIONS EXIST OR AS DIRECTED BY THE ENGINEER.
3. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES THROUGHOUT ALL PHASES OF CONSTRUCTION. ADEQUACY OF ACCESS WILL BE AT THE DISCRETION OF THE ENGINEER. SAFE ENTRANCE AND EXIT TO ALL DRIVEWAYS SHALL BE PROVIDED WITH A MINIMUM OF INCONVENIENCE.
4. THE CONTRACTOR SHALL NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE A HAZARD AND WILL ENDANGER TRAFFIC.
5. THE CONTRACTOR SHALL NOTIFY THE OWNER OF IMPENDING/UPCOMING LANE CLOSURES AS EARLY AS FIVE WORKING DAYS BUT NO LATER THAN 48 HOURS IN ADVANCE OF LANE CLOSURES.
6. FOR THIS PROJECT, UNLESS OTHERWISE NOTED IN THE PLANS AND/OR AS DIRECTED BY THE ENGINEER, NO LANE CLOSURES SHALL BE ALLOWED OTHER THAN THOSE IN THE TRAFFIC CONTROL PLAN.
7. THE CONTRACTOR MAY PROPOSE/RECOMMEND MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDED MODIFICATION BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS PAY ITEMS, IMPACT TO TRAFFIC, EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. THE CONTRACTOR SHALL NOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE/SEQUENCE UNTIL HE/SHE OBTAINS WRITTEN APPROVAL FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE SAFE AND COMFORTABLE MOVEMENT, THE CONTRACTOR SHALL IMMEDIATELY CHANGE HIS OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.
8. THE CONTRACTOR SHALL INSTALL AND MAINTAIN AN ADEQUATE NUMBER OF BARRICADES, WARNING AND DIRECTIONAL SIGNS TO DELINEATE TRAFFIC FOR ANY DETOURS.
9. ALL CONSTRUCTION TRAFFIC SHALL BE REGULATED SO AS TO CAUSE A MINIMUM OF INCONVENIENCE TO THE TRAVELING PUBLIC. AT POINTS WHERE IT IS NECESSARY FOR TRUCKS TO STOP AND UNLOAD, WARNING SIGNS AND FLAGGERS SHALL BE PROVIDED AS NECESSARY TO ADEQUATELY PROTECT TRAVEL.
10. ALL BARRICADES, SIGNS, WARNING LIGHTS, ETC. SHALL BE ACCORDING TO THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
11. THE CONTRACTOR MAY, WITH THE APPROVAL OF AND AS DIRECTED BY THE ENGINEER, BE REQUIRED TO FURNISH ADDITIONAL SIGNS AND BARRICADES TO THOSE INDICATED ON THE PLANS TO MAINTAIN THE SAFE PASSAGE OF TRAFFIC THROUGHOUT THE CONSTRUCTION SITE PARTICULARLY IN THOSE AREAS OF IMMEDIATE WORK.
12. UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE IS MADE, THE CONTRACTOR SHALL SHAPE AND FINISH SUCH PORTIONS OF THE RIGHT-OF-WAY AS MAY HAVE BEEN DISTURBED IN MAKING THE ABOVE PROVISIONS FOR TRAFFIC AND WILL BE REQUIRED TO LEAVE THE ENTIRE RIGHT-OF-WAY IN A SMOOTH, NEAT AND SIGHTLY CONDITION.
13. ALL WORK AND MATERIALS REQUIRED BY THESE PROVISIONS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE CONTRACT, UNLESS OTHERWISE INDICATED IN THE PLANS OR SPECIFICATIONS.
14. CONTRACTOR SHALL HAVE A COMPANY REPRESENTATIVE CERTIFIED IN FLAGGER TRAINING APPROVED BY TXDOT
15. THE CONTRACTOR IS FULLY RESPONSIBLE FOR THE TRAFFIC CONTROL AND WILL BE RESPONSIBLE FOR FURNISHING ALL TRAFFIC CONTROL DEVICES AND FLAGGERS. THE CONSTRUCTION METHODS SHALL BE CONDUCTED TO PROVIDE THE LEAST POSSIBLE INTERFERENCE TO TRAFFIC SO AS TO PERMIT THE CONTINUOUS MOVEMENT OF TRAFFIC IN ALL ALLOWABLE DIRECTIONS AT ALL TIMES.
16. THE CONTRACTOR SHALL PROVIDE FOR THE PASSAGE OF TRAFFIC THROUGH THE PROJECT WITH SIGNS, LIGHTS AND BARRICADES IN ACCORDANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AS REQUIRED FOR MAINTENANCE ACTIVITIES AND TO THE SATISFACTION OF THE ENGINEER.
17. LANE CLOSURES WILL NOT BE ALLOWED UNLESS PRIOR APPROVAL IS GIVEN BY THE ENGINEER. IF LANE CLOSURES ARE APPROVED, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNER 48 HOURS IN ADVANCE OF THE CLOSURE.

STORM SEWER SYSTEM NOTES

1. ALL STORM SEWER PIPE, BOX CULVERTS, AND OTHER STRUCTURES IN RIGHT OF WAY OR FIRE LANES SHALL BE REINFORCED CONCRETE AS PER TOWN SPECIFICATIONS AND SHALL BE LAID ON A MINIMUM OF A COMPACTED CRUSHED STONE OR PEA GRAVEL CUSHION, SIX INCHES THICK BELOW THE BOTTOM OF THE PIPE SHELL UNLESS OTHERWISE APPROVED BY THE TOWN. THE INITIAL BACKFILL OF SELECT MATERIAL OR FINE GRANULAR SHALL BE REQUIRED TO A MINIMUM OF THE SPRING LINE OF THE PIPE UNLESS OTHERWISE APPROVED BY THE TOWN.
2. DENSITY TESTING REQUIREMENTS: FREQUENCY OF TRENCH COMPACTION TESTS SHALL NOT BE LESS THEN ONE EVERY 300 LINEAR FEET OF PIPE PER 2.0' OF LIFT UNTIL FINAL GRADE, STARTING AT 2.0' ABOVE TOP OF PIPE. EVERY OTHER LATERAL; STUBOUT THAT CROSSES THE EXISTING OR PROPOSED STREET, ALLEY, OR FIRE LANE SUBGRADE; INLET; AND JUNCTION BOX WILL RECEIVE A DENSITY TEST EVERY LIFT. ALL DITCHES SHALL BE MECHANICALLY TAMPED AND COMPACTED TO 95% OF STANDARD PROCTOR DENSITY AT 0 – 4% ABOVE OPTIMUM MOISTURE. WATER JETTING IS NOT PERMITTED.
3. THE JOINTS SHALL BE CONSTRUCTED AND JOINTED TOGETHER IN SUCH A MANNER THAT NO SPILL THROUGH OF BACKFILL WILL OCCUR. THIS INCLUDES THE LIFT HOLES USED IN CERTAIN PIPE OR BOX SIZES. APPROVED JOINT MATERIALS ARE COLD APPLIED, PLASTIC ASPHALT JOINT COMPOUND; RUBBER GASKETS; AND COLD APPLIED, PREFORMED PLASTIC GASKETS.
4. STORM DRAINAGE INLETS SHALL BE AS INDICATED ON THE APPROVED CONSTRUCTION PLANS. FOR SECONDARY AND MAJOR STREET INTERSECTIONS, A RECESSED TYPE INLET WILL BE REQUIRED. FOR INDUSTRIAL AND RESIDENTIAL STREETS, A CURB LINE INLET WILL BE REQUIRED UNLESS OTHERWISE APPROVED. A ROUND MANHOLE COVER WITH LOCKING DEVICE SHALL BE PLACED ON ALL INLET TOPS. THE TOP SHALL BE PLACED NEAR THE OUTLET PIPE. ALL INLETS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
5. ONLY CURB INLETS ARE ALLOWED WITHIN PAVED AREAS. GRATE INLETS ARE ALLOWED ONLY BY TOWN ENGINEER APPROVAL.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING "AS-RECORDED" PLANS TO THE ENGINEER OF RECORD SHOWING THE LOCATION OF ALL DRAINAGE STRUCTURES. THIS INFORMATION SHALL BE PLACED ON THE ENGINEERING PLANS AND MARKED "RECORD DRAWING" PLANS ALONG WITH THE DATE AND THE NAME OF THE CONTRACTOR BY THE ENGINEER OF RECORD. COPIES OF THESE "RECORD DRAWING" PLANS SHALL BE FURNISHED TO THE TOWN ON MYLARS, BLACKLINE PRINTS, AND ELECTRONICALLY AS REQUIRED UNDER THE TOWN'S "FINAL ACCEPTANCE CHECKLIST."
7. THE CONTRACTOR SHALL FURNISH A MAINTENANCE BOND IN THE AMOUNT OF 10 % (TEN PERCENT) OF THE TOTAL CONTRACT PRICE TO THE TOWN TO RUN TWO (2) YEARS FROM THE DATE OF FINAL ACCEPTANCE OF THE SYSTEM BY THE TOWN.
8. ALL STORM SEWER OUTFALLS THAT DRAIN TO LEWISVILLE LAKE SHALL INCLUDE A DEBRIS SEPARATOR.
9. ALL STORM SEWER CULVERTS INSTALLED IN PUBLIC RIGHT-OF-WAY OR BENEATH FIRELANES SHALL BE REINFORCED CONCRETE PIPE, MINIMUM 12" DIAMETER.
10. FLUMES OR OTHER CUT-THROUGH ITEMS WITHIN PARKING LOT ISLANDS ARE NOT ALLOWED.

DESIGN BY:	TRC	NO.	REVISION	DATE
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SCALE:	NONE			
JOB NUMBER	-			

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
GENERAL CONSTRUCTION NOTES 2 OF 3

LITTLEELM

SHEET
2 OF 24

OCTOBER 2017

CONSTRUCTION
GENERAL NOTES

WATER SYSTEM NOTES

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE TOWN'S STANDARD SPECIFICATIONS AND GENERAL DESIGN STANDARDS.
2. ALL TAPPING SLEEVES AND VALVES SHALL BE FULL BODY DUCTILE IRON. WITH PRIOR APPROVAL BY THE TOWN ENGINEER, STAINLESS STEEL SMITH BLAIR 623 MAY BE ALLOWED FOR CONNECTION TO EXISTING LINES TWENTY-INCH (20") OR LARGER.
3. VALVES SHALL BE MUELLER OR WATEROUS, RESILIENT SEATED, 150 PSI TEST.
4. FITTINGS SHALL BE OF THE MECHANICAL JOINT TYPE, FLANGED WHERE APPLICABLE, AND BE MANUFACTURED BY US PIPE, AMERICAN, OR OTHER AS APPROVED BY THE TOWN – CLASS 250. ALL FITTINGS SHALL BE RESTRAINED BY THE USE OF MEGA-LUGS OR APPROVED OTHER AND CONCRETE THRUST BLOCKING.
5. FIRE HYDRANTS SHALL BE MUELLER OR WATEROUS THREE-WAY STANDARD THREAD WITH VALVE IN LEAD OR APPROVED OTHER. ALL MAIN STEAMER NOZZLES SHALL HAVE A NOMINAL INSIDE DIAMETER OF FOUR INCHES (4"). ALL COMMERCIAL FIRE HYDRANTS ARE REQUIRED TO BE INSTALLED WITH 4½"-5" HYDRA-STORZ CONNECTIONS.
6. WATER LINES IN THE AREA OF STORM DRAIN INLETS SHALL BE CONSTRUCTED BEHIND THE INLET BY PULLING THE PIPE USING LONGITUDINAL BENDING IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS. FITTINGS MAY BE USED IF BENDING IS IMPRACTICAL; CONSULT WITH THE TOWN'S CONSTRUCTION INSPECTOR.
7. WATER LINES CROSSING UNDER STORM DRAINS AND SANITARY SEWER LINES SHALL HAVE A MINIMUM OF EIGHTEEN INCHES (18") CLEARANCE BELOW STORM DRAINS AND TWENTY-FOUR INCHES (24") CLEARANCE BELOW SANITARY SEWER LINES OR OTHERWISE AS GOVERNED BY TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) CHAPTER 290 REQUIREMENTS. PARALLEL WATER LINES SHALL BE AT LEAST NINE FEET (9') CLEAR HORIZONTALLY FROM SANITARY SEWER LINES AND MANHOLES. WHERE MINIMUM CLEARANCE CANNOT BE ACHIEVED, WATER LINES SHALL BE ENCASED SIX INCHES (6") AROUND IN CONCRETE TO TEN FEET (10') EITHER SIDE OF THE UTILITY CROSSING. WHERE WATER LINES CROSS CREEKS OR DITCHES THE WATER LINE SHALL BE PROTECTED BY CONCRETE ENCASEMENT AT LEAST TEN FEET (10') PAST THE EMBANKMENT SLOPE ON EACH SIDE.
8. WATER MAINS: ALL WATER MAINS SHALL HAVE A MINIMUM OF FORTY EIGHT (48") COVER OVER THE TOP OF THE PIPE. ALL NEW WATER MAINS SHALL BE PVC PIPE IN ACCORDANCE WITH THE FOLLOWING: C900 DR 14 FOR FOUR-INCH (4") TO SIX-INCH (6"), C900 DR 18 FOR EIGHT-INCH (8") TO TWELVE-INCH (12"), AND C905 DR 18 FOR OVER TWELVE-INCH (12"), ALL "BLUE" IN COLOR AS PER TOWN SPECIFICATIONS; THE PIPE SHALL BE LAID ON A MINIMUM EMBEDMENT (SEE STANDARD CONSTRUCTION DETAILS). WATER MAINS UP TO TWELVE INCHES (12") SHALL BE INSTALLED TWO FEET (2') BACK OF CURB; MAINS LARGER THAN TWELVE INCHES (12") SHALL BE INSTALLED AT LEAST THREE FEET (3') FROM THE BACK OF CURB DEPENDING UPON CONDITIONS. DETECTABLE METALLIC TAPE ("BLUE-CAUTION BURIED WATER BELOW" OR APPROVED OTHER) SHALL BE INSTALLED AFTER INITIAL BACKFILL ON APPROXIMATE CENTERLINE OF PIPE PRIOR TO FINAL BACKFILL ABOVE ALL PVC MAINS.
9. THE CONTRACTOR SHALL INSTALL FIRE HYDRANTS AT THE LOCATIONS SHOWN. A M.J. AND FLANGED TEE WITH A FLANGED END TO M.J. GATE VALVE IS REQUIRED SO THAT THE GATE VALVE IS ANCHORED TO THE MAIN.
10. ALL FIRE HYDRANTS SHALL BE PAINTED WITH TWO (2) COATS OF TNEMEC SERIES 530 OMNITHANE DIFFUSED ALUMINUM, SILVER PAINT (OR APPROVED EQUIVALENT) OVER ONE (1) SHOP COAT OF PAINT.

    FIRE HYDRANT CAPS AND BONNETS SHALL BE PAINTED WITH TWO (2) COATS ACCORDING TO NFPA 291, CHAPTER 3:

CLASS C	LESS THAN 500 GPM	TNEMEC SERIES 2H-SC09 SAFETY RED
CLASS B	500-999 GPM	TNEMEC SERIES 2H-SC03 SAFETY ORANGE
CLASS A	1000-1499 GPM	TNEMEC SERIES 2H-SC07 SAFETY GREEN
CLASS AA	1500 GPM AND ABOVE	TNEMEC SERIES 2H-SC06 SAFETY BLUE

11. A CONCRETE PAD TWENTY-FOUR (24") SQUARE SHALL BE POURED AROUND ALL FIRE HYDRANTS AND VALVES. CONCRETE SHALL BE 3000 PSI, SIX-INCH (6") THICK WITH FOUR (4) #3 BARS.
12. ALL BOLTS AND NUTS USED WITH MECHANICAL JOINT FITTING SHALL BE "COR-TEN" STEEL OR APPROVED OTHER.
13. THE INSTALLATION OF A BLUE STEMSONITE (OR OTHER) MODEL 88-SSA FIRE HYDRANT MARKER WILL BE INSTALLED OPPOSITE FIRE HYDRANTS JUST OFF CENTER TO THE SIDE OF THE STREET ADJACENT TO THE HYDRANT.
14. POLYETHYLENE ENCASEMENT – THE CONTRACTOR SHALL FURNISH AND INSTALL POLYETHYLENE WRAP AROUND DUCTILE IRON PIPE, RELATED FITTINGS, AND VALVES. THIS WRAP SHALL BE AN 8 MIL THICKNESS POLYTUBE. SEAMS AND OVERLAPS SHALL BE WRAPPED AND HELD IN PLACE BY TWO-INCH (2") WIDE PLASTIC BACKED ADHESIVE TAPE, POLYKEN 900 OR SCOTCHRAP NO. 50, OR AN APPROVED OTHER, WITH APPROXIMATE TWO-FOOT (2') LAPS ON THE POLYTUBE. THE WRAP ON THE BARREL OF THE PIPE SHALL BE LOOSE ENOUGH TO ALLOW THE FILM TO SHIFT WITH THE SOIL. THE WRAP SHALL BE INSTALLED WITHOUT BREAKS, TEARS, OR HOLES IN THE FILM. THE COST OF THE POLYETHYLENE TUBE WRAP AND COMPLETE INSTALLATION SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE FURNISHING AND THE INSTALLATION OF DUCTILE IRON PIPE, RELATED FITTINGS, AND VALVES.
15. VALVE BOXES SHALL BE FURNISHED AT THE REQUIRED LENGTH IN ORDER TO BE SET TO FINAL GRADE ON EACH GATE VALVE. AFTER THE FINAL CLEAN UP AND ALIGNMENT HAS BEEN COMPLETED, THE CONTRACTOR SHALL POUR A REINFORCED CONCRETE BLOCK 24" X 24" X 6" AROUND ALL VALVE BOXES SO THE FINISHED GRADE IS LEVEL WITH THE FINISHED PARKWAY. ALL VALVE STACK COMPONENTS SHALL BE CAST IRON. VALVE BOXES OVER FOUR FEET (4') DEEP WILL REQUIRE EXTENSIONS. ALL VALVES SHALL BE MARKED WITH A SAW ON THE CURB OR PAVEMENT WITH "V". THE "V" SHALL POINT TO THE LOCATION OF THE VALVE AS FOLLOWS: IF THE VALVE IS IN THE PAVING, THE "V" SHALL BE MARKED UPRIGHT; IF THE VALVE IS OUTSIDE THE PAVING, THE "V" SHALL BE MARKED UPSIDE DOWN.
16. THE CONTRACTOR SHALL COORDINATE OPERATION OF ALL EXISTING VALVES WITH THE TOWN. CONTACT THE CONSTRUCTION INSPECTOR IN THE TOWN'S ENGINEERING DEPARTMENT AT (972) 377-5556.
17. ALL WATER LINES SHALL BE PRESSURE TESTED TO 200 PSI FOR A THREE (3) HOUR CONTINUOUS PERIOD. LEAKAGE RATE SHALL NOT EXCEED TWENTY-FIVE (25) GALLONS PER INCH OF NOMINAL DIAMETER PER MILE OF PIPE OVER A TWENTY-FOUR (24) HOUR PERIOD. CONTRACTOR SHALL FLUSH AND STERILIZE LINES AND PROVE LINES TO BE FREE OF FECAL COLIFORM ORGANISMS BY OBTAINING SAMPLES FOR LABORATORY TESTS FOR CONTAMINATION. THE CONTRACTOR SHALL REFLUSH AND RESTERILIZE UNTIL ALL SAMPLES PROVE FREE FROM CONTAMINATION.
18. ALL RESIDENTIAL WATER SERVICES SHALL BE AS FOLLOWS:
    A. WATER SERVICES SHALL BE NORMALLY LOCATED AT TWO FOOT (2') OFF EVERY OTHER LOT LINE. A WATER METER BOX, AS APPROVED BY THE TOWN, WITH LOCK LID SHALL BE INSTALLED TWO FEET (2') BACK OF CURB LINE.
    B. MINIMUM ONE-INCH (1") METER AND ONE-INCH (1") SDR-9 POLYETHYLENE SERVICES ARE REQUIRED TO SERVE ALL RESIDENTIAL LOTS AND PATIO HOMES. FOR TOWN HOMES AND DUPLEXES, A MINIMUM THREE-QUARTER INCH (3/4") METER AND SERVICE SHALL BE PROVIDED TO EACH OF THE FAMILY UNITS. SAND EMBEDMENT SHALL BE USED AROUND THE PIPE AND CORPORATION STOP. SERVICE SADDLES SHALL BE BRASS BODY WITH DOUBLE BRONZE FLATTENED STRAPS (NO BANDED) – FORD, CAMBRIDGE, A.Y. MCDONALD, OR APPROVED OTHER.
    C. THE UTILITY CONTRACTOR SHALL INSTALL THE WATER SERVICES TO A POINT TWO (2) FEET BACK OF THE CURB LINE AT A DEPTH OF 12 INCHES. LINE SHALL BE CONTINUOUS WITH NO FITTINGS UNDER PAVING. THE METER BOX SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AFTER THE PAVING CONTRACTOR HAS COMPLETED THE FINAL GRADING IN BACK OF THE CURB. EACH SERVICE LOCATION WILL BE MARKED ON THE CURB WITH A SINGLE VERTICAL SAW MARK BY THE UTILITY CONTRACTOR AND TIED TO PROPERTY CORNERS ON THE "AS-RECORDED" PLANS.
    D. IF THERE IS A CURB, THE CURB SHALL BE SAWCUT WITH "I" AT THE POINT WHERE THE SERVICE PIPE PASSES THE CURB.
19. FOR NON-RESIDENTIAL WATER SERVICES, THE METER BOX SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AFTER THE PAVING CONTRACTOR HAS COMPLETED THE FINAL GRADING IN BACK OF THE CURB. METER BOXES/VAULTS SHALL BE LOCATED OUTSIDE OF PAVING. EACH SERVICE LOCATION WILL BE MARKED ON THE CURB OR PAVEMENT WITH A SINGLE VERTICAL SAW MARK BY THE UTILITY CONTRACTOR AND TIED TO PROPERTY CORNERS ON THE "AS-RECORDED" PLANS.
20. DENSITY TESTING REQUIREMENTS: FREQUENCY OF TRENCH COMPACTION TESTS SHALL NOT BE LESS THAN ONE (1) FOR ANY PIPE SECTION AND EVERY THREE HUNDRED LINEAR FEET (300') LINEAR FEET OF MAIN PIPE PER TWO FEET (2') OF LIFT UNTIL FINAL GRADE, STARTING AT TWO FEET (2') ABOVE THE TOP OF PIPE. WATER SERVICES ARE TO BE TESTED AT A RATE OF ONE (1) FOR EVERY SIX (6) SERVICES WHICH CROSS THE PROPOSED RIGHT OF WAY OR EVERY THREE HUNDRED LINEAR FEET (300') OF WATER SERVICE INSTALLED. EVERY OTHER FIRE HYDRANT LEAD THAT CROSS THE EXISTING OR PROPOSED STREET, ALLEY, OR FIRE LANE SUBGRADE SHALL ALSO RECEIVE AT LEAST ONE SET OF DENSITY TESTS. ALL DITCHES SHALL BE MECHANICALLY TAMPED AND COMPACTED TO NINETY-FIVE PERCENT (95%) STANDARD PROCTOR DENSITY AT ZERO PERCENT (0%) TO FOUR PERCENT (4%) ABOVE OPTIMUM MOISTURE. WATER JETTING IS NOT PERMITTED.
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING "AS-RECORDED" PLANS TO THE ENGINEER OF RECORD SHOWING THE LOCATION OF WATER SERVICES AND VALVES BY DISTANCES TO LOT LINES. THIS INFORMATION SHALL BE PLACED AND MARKED IN THE "RECORD DRAWING" PLANS ALONG WITH THE DATE AND THE NAME OF THE CONTRACTOR BY THE ENGINEER OF RECORD. COPIES OF THESE "RECORD DRAWING" PLANS SHALL BE FURNISHED TO THE TOWN ON MYLARS, BLACKLINE PRINTS, AND ELECTRONICALLY AS REQUIRED UNDER THE TOWN'S "FINAL ACCEPTANCE CHECKLIST."
22. THE CONTRACTOR SHALL FURNISH, PROGRAM, AND INSTALL PROGRAMMABLE 3M ELECTRONIC MARKER SYSTEM ID BALL MARKERS (1423-XR/ID BLUE) AT A MINIMUM EVERY 200 LINEAR FEET AND/OR AT THE INTERSECTION OF OTHER MAJOR UTILITIES, CHANGE IN LINE DIRECTION, SERVICE STUBS, ROAD CROSSINGS, AND TEES. AN INFORMATION LIST INCLUDING ID NUMBERS AND GPS LOCATION COORDINATES SHALL BE FURNISHED TO THE OWNER.
23. THE CONTRACTOR SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS. INSTALL JOINTS AS REQUIRED.
24. THE CONTRACTOR SHALL PROVIDE FITTINGS, PLUGS, AND OTHER DEVICES FOR USE IN FILLING, FLUSHING, TESTING, ETC. (NO SEPARATE PAY).
25. THE CONTRACTOR SHALL PROVIDE ADEQUATE THRUST BLOCKING TO WITHSTAND TEST PRESSURES. (NO SEPARATE PAY).
26. MAINTAIN MINIMUM CLEARANCE OF THREE (3) FEET FROM EDGE OF STRUCTURES TO CLOSEST EDGE OF PIPELINE ADJACENT AND PARALLEL TO EDGE OF STRUCTURE, UNLESS OTHERWISE NOTED ON PLANS.
27. DI-ELECTRIC CONNECTIONS TO BE PREVENTED BY USE OF NON-CONDUCTIVE GASKETS BETWEEN DISSIMILAR PIPING MATERIALS.
28. REFERENCE SPECIFICATIONS FOR REQUIREMENTS ON REQUIRED SEPARATION DISTANCE BETWEEN SEWER AND WATER MAINS AND REQUIREMENTS IN THE EVENT THE SEPARATION DISTANCE CANNOT BE MET.

SANITARY SEWER SYSTEM NOTES

1. ALL SANITARY SEWER PIPES FOUR INCHES (4") TO FIFTEEN INCHES (15") NOMINAL SIZE SHALL BE PVC SDR 26 MEETING ASTM D3034. ALL SANITARY SEWER PIPES EIGHTEEN INCHES (18") AND LARGER NOMINAL SIZE SHALL BE PVC MEETING ASTM F679. ALL PIPES SHALL BE "GREEN" IN COLOR AS PER TOWN SPECIFICATIONS AND BE LAID ON A MINIMUM EMBEDMENT (SEE STANDARD CONSTRUCTION DETAILS). DETECTABLE METALLIC TAPE ("GREEN-CAUTION BURIED SEWER BELOW" OR APPROVED OTHER) SHALL BE INSTALLED AFTER INITIAL BACKFILL ON APPROXIMATE CENTERLINE OF PIPE PRIOR TO FINAL BACKFILL.
2. ALL SEWER MAINS SHALL BE A MINIMUM DIAMETER OF EIGHT INCHES (8") AND SHALL MAINTAIN A MINIMUM FLOW VELOCITY OF TWO (2) FEET PER SECOND.
3. ALL RESIDENTIAL SANITARY SEWER SERVICES SHALL BE A MINIMUM FOUR INCHES (4") IN DIAMETER AND EXTENDED TO A POINT TEN FEET (10') INSIDE THE PROPERTY LINE AT A MAXIMUM DEPTH OF FIVE FEET (5'). THE SERVICE SHALL THEN BE EXTENDED AT A FORTY-FIVE DEGREE (45°) ANGLE TO FOUR FEET (4') ABOVE THE FINISHED GRADE AND CAPPED. SEWER SERVICES SHALL BE LOCATED IN THE CENTER OF THE LOT.
4. DENSITY TESTING REQUIREMENTS: FREQUENCY OF TRENCH COMPACTION TESTS SHALL NOT BE LESS THAN ONE (1) FOR ANY PIPE SECTION AND EVERY THREE HUNDRED LINEAR FEET (300') OF MAIN PIPE PER TWO FEET (2') OF LIFT UNTIL FINAL GRADE, STARTING AT TWO FEET (2') ABOVE TOP OF PIPE. SEWER SERVICES ARE TO BE TESTED AT A RATE OF ONE (1) FOR EVERY SIX (6) SERVICES STAGGERED OR EVERY THREE HUNDRED LINEAR FEET (300') OF SEWER SERVICE INSTALLED. EACH SEWER MANHOLE WILL RECEIVE A DENSITY TEST EVERY TWO FEET (2') OF LIFT UNTIL FINAL GRADE, ALTERNATING AROUND ALL QUADRANTS. EVERY OTHER MAIN AND STUBOUT THAT CROSSES THE EXISTING OR PROPOSED STREET, ALLEY, OR FIRE LANE SUBGRADE SHALL ALSO RECEIVE AT LEAST ONE SET OF DENSITY TESTS. ALL DITCHES SHALL BE MECHANICALLY TAMPED AND COMPACTED TO NINETY-FIVE PERCENT (95%) STANDARD PROCTOR DENSITY AT ZERO PERCENT (0%) TO FOUR PERCENT (4%) ABOVE OPTIMUM MOISTURE. WATER JETTING IS NOT PERMITTED.
5. AFTER PAVING IS COMPLETED EACH SERVICE LOCATION WILL BE MARKED ON THE CURB WITH A TWO (2) PARALLEL VERTICAL SAW MARKS BY THE UTILITY CONTRACTOR AND TIED TO AT LEAST ONE (1) PROPERTY CORNER ON THE "AS-RECORDED" PLANS. ALL MANHOLES AND CLEANOUTS SHALL BE MARKED ON THE CURB OR PAVEMENT WITH "MH" OR "CO" AS APPLICABLE.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING "AS-RECORDED" PLANS TO THE ENGINEER OF RECORD SHOWING THE LOCATION OF SEWER SERVICES BY DISTANCE TO THE LOT LINES OR PROPERTY LINES. THIS INFORMATION SHALL BE PLACED ON THE ENGINEERING PLANS AND MARKED "RECORD DRAWING" PLANS ALONG WITH THE DATE AND THE NAME OF THE CONTRACTOR BY THE ENGINEER OF RECORD. COPIES OF THESE "RECORD DRAWING" PLANS SHALL BE FURNISHED TO THE TOWN ON MYLARS, BLACKLINE PRINTS, AND ELECTRONICALLY AS REQUIRED UNDER THE TOWN'S "FINAL ACCEPTANCE CHECKLIST." TIES SHALL BE MADE BY DISTANCE MEASUREMENTS FOR ALL MANHOLES, CLEANOUTS AND SERVICES. TV INSPECTIONS, LOW PRESSURE AIR TESTING, VACUUM TESTING OF THE MANHOLES, AND DEFLECTION TESTING ARE REQUIRED ON ALL SEWER LINES. PRIOR TO PAVING, ALL RESIDENTIAL SANITARY SEWER SERVICES SHALL HAVE TV INSPECTIONS.
7. MANHOLES SHALL HAVE A 400# TRAFFIC BEARING FRAME AND COVER AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT TWENTY-EIGHT (28) DAYS.
8. THE DIAMETER OF A MANHOLE CONSTRUCTED OVER THE CENTER OF A SEWER SHOULD VARY WITH THE SIZE OF THE SEWER. FOR EIGHT-INCH (8"), TEN-INCH (10"), AND TWELVE-INCH (12") SEWERS, THE MANHOLE SHALL BE FOUR-FOOT (4') MINIMUM DIAMETER; FOR FIFTEEN-INCH (15") THROUGH TWENTY-SEVEN-INCH (27") SEWERS, THE MANHOLE SHALL BE FIVE-FOOT (5') MINIMUM DIAMETER; FOR THIRTY-INCH (30") AND THIRTY-SIX-INCH (36") SEWERS, THE MANHOLE SHALL BE SIX-FOOT (6') MINIMUM DIAMETER. MANHOLES DEEPER THAN TWELVE FEET (12') SHALL BE A MINIMUM OF FIVE-FOOT (5') DIAMETER.
9. THE CONTRACTOR SHALL FURNISH, PROGRAM, AND INSTALL PROGRAMMABLE 3M ELECTRONIC MARKER SYSTEM ID BALL MARKERS (1424-XR/ID GREEN) AT A MINIMUM EVERY 200 LINEAR FEET AND/OR AT THE INTERSECTION OF OTHER MAJOR UTILITIES, CHANGE IN LINE DIRECTION, SERVICE STUBS, ROAD CROSSINGS, AND TEES. AN INFORMATION LIST INCLUDING ID NUMBERS AND GPS LOCATION COORDINATES SHALL BE FURNISHED TO THE OWNER FOR SANITARY SEWER AND FORCE MAIN.
10. THE CONTRACTOR SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS. INSTALL JOINTS AS REQUIRED.
11. THE CONTRACTOR SHALL PROVIDE FITTINGS, PLUGS, AND OTHER DEVICES FOR USE IN FILLING, FLUSHING, TESTING, ETC. (NO SEPARATE PAY).
12. THE CONTRACTOR SHALL PROVIDE ADEQUATE THRUST BLOCKING TO WITHSTAND TEST PRESSURES. (NO SEPARATE PAY).
13. PIPING DRAWINGS INDICATE INVERT ELEVATIONS FOR GRAVITY FLOW LINES. SLOPE PIPE UNIFORMLY BETWEEN ELEVATIONS SHOWN; NO VALLEYS OR PEAKS PERMITTED IN GRAVITY FLOW LINES. FOR OTHER PIPING, REFER TO DETAIL SHEETS FOR PIPE ELEVATIONS AT EACH STRUCTURE. SITE PIPING DRAWINGS DO NOT INDICATE VERTICAL BENDS AND TRANSITIONS. WHEN NECESSARY, MAKE VERTICAL TRANSITIONS OR FURNISH AND INSTALL VERTICAL BENDS AT NO EXTRA COST. DO NOT EXCEED MANUFACTURER'S RECOMMENDATIONS FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS.
14. MAINTAIN MINIMUM CLEARANCE OF THREE (3) FEET FROM EDGE OF STRUCTURES TO CLOSEST EDGE OF PIPELINE ADJACENT AND PARALLEL TO EDGE OF STRUCTURE, UNLESS OTHERWISE NOTED ON PLANS.
15. DI-ELECTRIC CONNECTIONS TO BE PREVENTED BY USE OF NON-CONDUCTIVE GASKETS BETWEEN DISSIMILAR PIPING MATERIALS.
16. THE INTERIOR SURFACE OF ALL ALL LIFT STATION WETWELLS AND MANHOLES RECEIVING A FORCE MAIN SHALL BE COATED WITH RAVEN 405 EPOXY CORROSION PROTECTION.

NO	REVISION	DATE

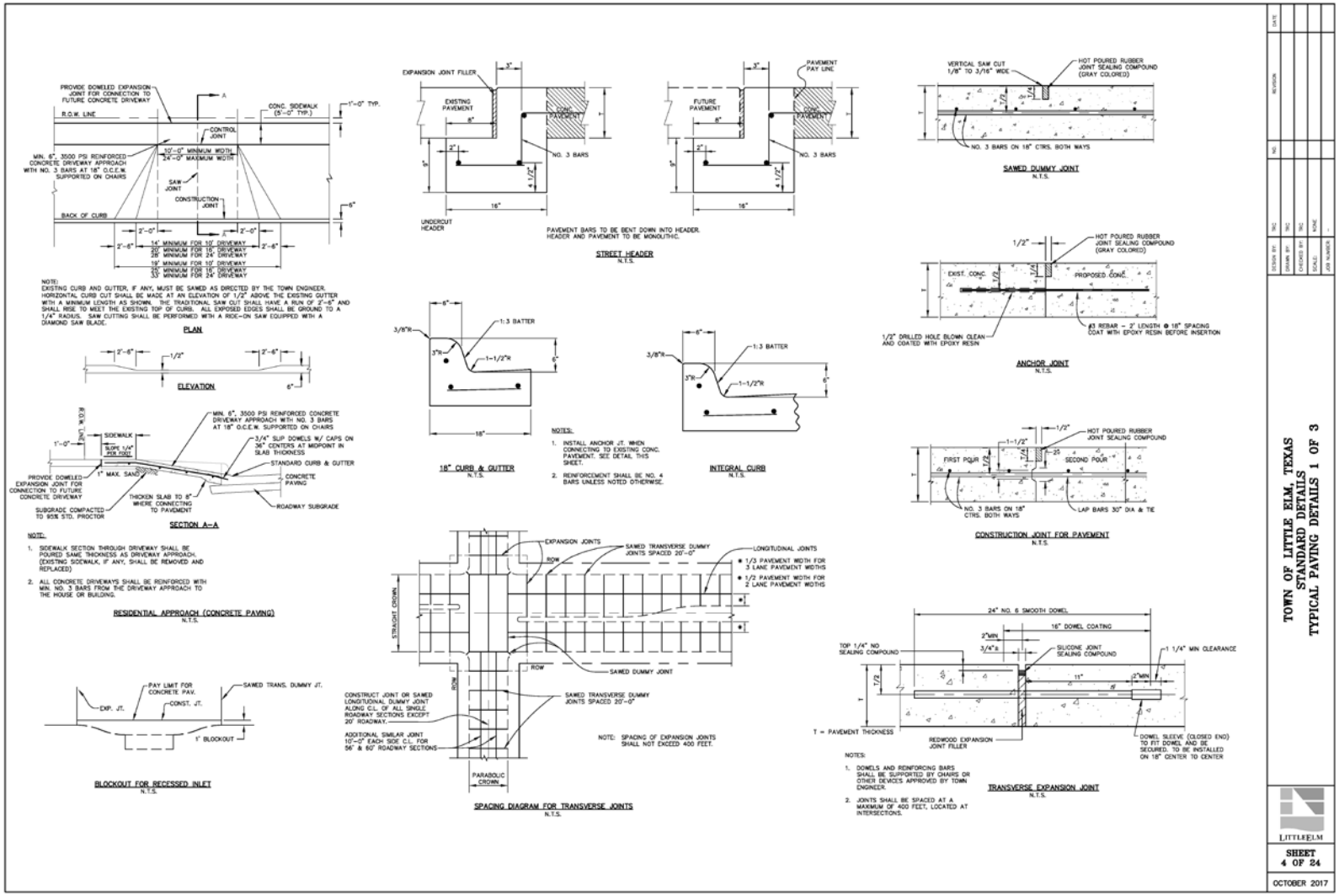
DESIGN BY: TRC
DRAWN BY: TRC
CHECKED BY: TRC
SCALE: NONE
JOB NUMBER: -

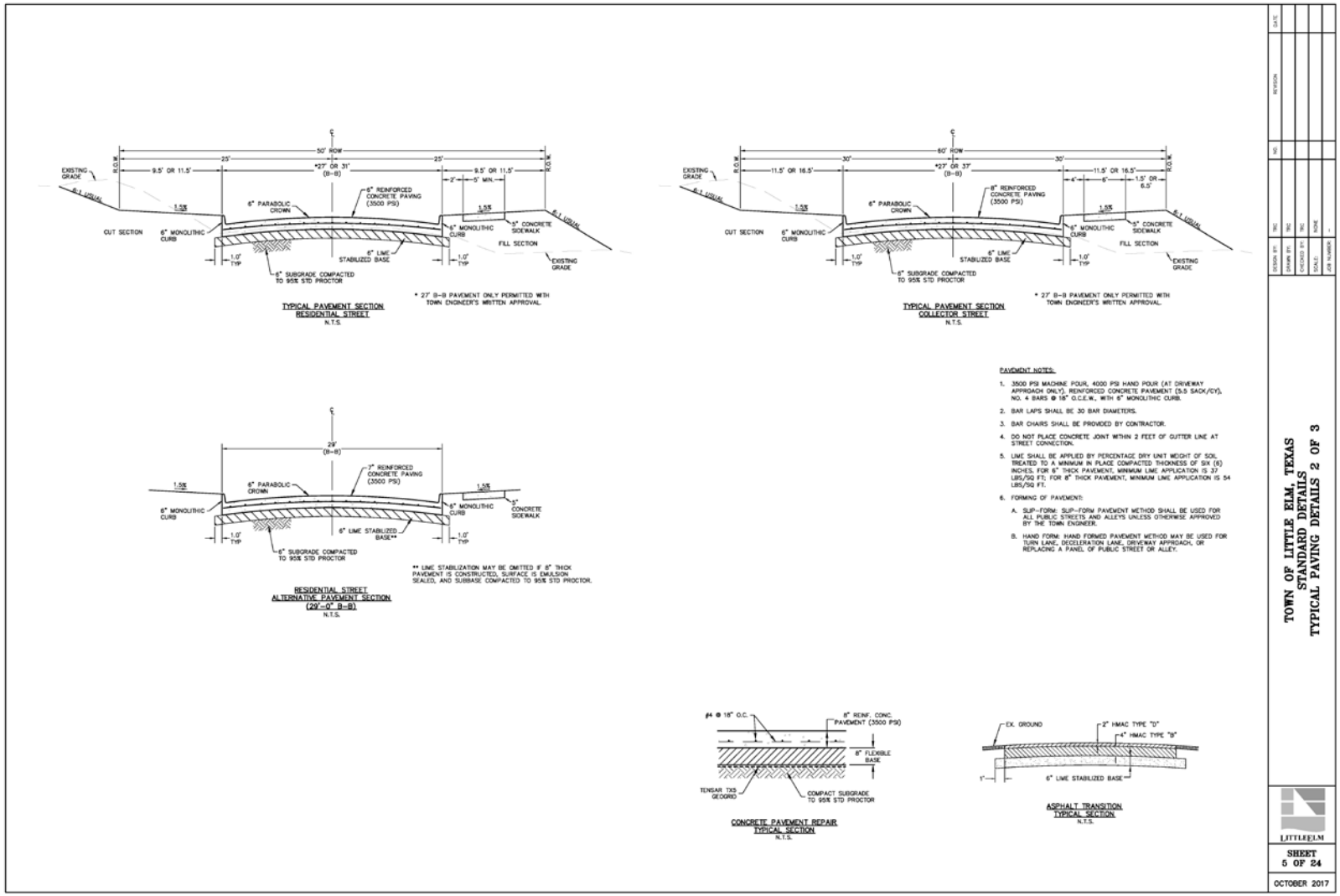
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
GENERAL CONSTRUCTION NOTES 3 OF 3

LITTLE ELM

SHEET 3 OF 24

OCTOBER 2017


PROVIDE DOWELED EXPANSION JOINT FOR CONNECTION TO FUTURE CONCRETE DRIVEWAY
R.O.W. LINE
CONC. SIDEWALK (5'-0" TYP.)
1'-0" TYP.
CONTROL JOINT
10'-0" MINIMUM WIDTH
24'-0" MAXIMUM WIDTH
MIN. 6", 3500 PSI REINFORCED CONCRETE DRIVEWAY APPROACH WITH NO. 3 BARS AT 18" O.C.E.W. SUPPORTED ON CHAIRS
SAW JOINT
CONSTRUCTION JOINT
BACK OF CURB
6"
2'-0"
2'-6"
14' MINIMUM FOR 10' DRIVEWAY
20' MINIMUM FOR 15' DRIVEWAY
28' MINIMUM FOR 24' DRIVEWAY
16' MINIMUM FOR 10' DRIVEWAY
30' MINIMUM FOR 15' DRIVEWAY
33' MINIMUM FOR 24' DRIVEWAY
NOTE:
EXISTING CURB AND GUTTER, IF ANY, MUST BE SAWED AS DIRECTED BY THE TOWN ENGINEER. HORIZONTAL CURB CUT SHALL BE MADE AT AN ELEVATION OF 1/2" ABOVE THE EXISTING GUTTER WITH A MINIMUM LENGTH AS SHOWN. THE TRADITIONAL SAW CUT SHALL HAVE A RUN OF 2'-6" AND SHALL RISE TO MEET THE EXISTING TOP OF CURB. ALL EXPOSED EDGES SHALL BE GROUND TO A 1/4" RADIUS. SAW CUTTING SHALL BE PERFORMED WITH A RIDE-ON SAW EQUIPPED WITH A DIAMOND SAW BLADE.
PLAN
1/2"
ELEVATION
SIDEWALK
SLOPE 1/4" PER FOOT
1" MAX. SAND CUSHION
MIN. 6", 3500 PSI REINFORCED CONCRETE DRIVEWAY APPROACH WITH NO. 3 BARS AT 18" O.C.E.W. SUPPORTED ON CHAIRS
3/4" SLIP DOWELS W/ CAPS ON 36" CENTERS AT MIDPOINT IN SLAB THICKNESS
STANDARD CURB & GUTTER
CONCRETE PAVING
ROADWAY SUBGRADE
PROVIDE DOWELED EXPANSION JOINT FOR CONNECTION TO FUTURE CONCRETE DRIVEWAY
THICKEN SLAB TO 8" WHERE CONNECTING TO PAVEMENT
SUBGRADE COMPACTED TO 95% STD. PROCTOR
SECTION A–A
NOTE:
1. SIDEWALK SECTION THROUGH DRIVEWAY SHALL BE POURED SAME THICKNESS AS DRIVEWAY APPROACH. (EXISTING SIDEWALK, IF ANY, SHALL BE REMOVED AND REPLACED)
2. ALL CONCRETE DRIVEWAYS SHALL BE REINFORCED WITH MIN. NO. 3 BARS FROM THE DRIVEWAY APPROACH TO THE HOUSE OR BUILDING.
RESIDENTIAL APPROACH (CONCRETE PAVING)
N.T.S.
PAY LIMIT FOR CONCRETE PAV.
SAWED TRANS. DUMMY JT.
EXP. JT.
CONST. JT.
1' BLOCKOUT
BLOCKOUT FOR RECESSED INLET
N.T.S.
EXPANSION JOINT FILLER
EXISTING PAVEMENT
CONC. PAVEMENT
NO. 3 BARS
UNDERCUT HEADER
FUTURE PAVEMENT
PAVEMENT PAY LINE
PAVEMENT BARS TO BE BENT DOWN INTO HEADER. HEADER AND PAVEMENT TO BE MONOLITHIC.
STREET HEADER
N.T.S.
1:3 BATTER
18" CURB & GUTTER
N.T.S.
NOTES:
1. INSTALL ANCHOR JT. WHEN CONNECTING TO EXISTING CONC. PAVEMENT. SEE DETAIL THIS SHEET.
2. REINFORCEMENT SHALL BE NO. 4 BARS UNLESS NOTED OTHERWISE.
INTEGRAL CURB
N.T.S.
EXPANSION JOINTS
ROW
SAWED TRANSVERSE DUMMY JOINTS SPACED 20'-0"
LONGITUDINAL JOINTS
* 1/3 PAVEMENT WIDTH FOR 3 LANE PAVEMENT WIDTHS
* 1/2 PAVEMENT WIDTH FOR 2 LANE PAVEMENT WIDTHS
STRAIGHT CROWN
SAWED DUMMY JOINT
CONSTRUCT JOINT OR SAWED LONGITUDINAL DUMMY JOINT ALONG C.L. OF ALL SINGLE ROADWAY SECTIONS EXCEPT 20' ROADWAY.
SAWED TRANSVERSE DUMMY JOINTS SPACED 20'-0"
ADDITIONAL SIMILAR JOINT 10'-0" EACH SIDE C.L. FOR 56' & 80' ROADWAY SECTIONS
NOTE: SPACING OF EXPANSION JOINTS SHALL NOT EXCEED 400 FEET.
PARABOLIC CROWN
SPACING DIAGRAM FOR TRANSVERSE JOINTS
N.T.S.
VERTICAL SAW CUT 1/8" TO 3/16" WIDE
HOT POURED RUBBER JOINT SEALING COMPOUND (GRAY COLORED)
NO. 3 BARS ON 18" CTRS. BOTH WAYS
SAWED DUMMY JOINT
N.T.S.
EXIST. CONC.
PROPOSED CONC.
#3 REBAR – 2' LENGTH @ 18" SPACING COAT WITH EPOXY RESIN BEFORE INSERTION
1/2" DRILLED HOLE BLOWN CLEAN AND COATED WITH EPOXY RESIN
ANCHOR JOINT
N.T.S.
FIRST POUR
SECOND POUR
NO. 3 BARS ON 18" CTRS. BOTH WAYS
LAP BARS 30" DIA & TIE
CONSTRUCTION JOINT FOR PAVEMENT
N.T.S.
24" NO. 6 SMOOTH DOWEL
16" DOWEL COATING
TOP 1/4" NO. SEALING COMPOUND
SILICONE JOINT SEALING COMPOUND
1 1/4" MIN CLEARANCE
T = PAVEMENT THICKNESS
REDWOOD EXPANSION JOINT FILLER
DOWEL SLEEVE (CLOSED END) TO FIT DOWEL AND BE SECURED. TO BE INSTALLED ON 18" CENTER TO CENTER
NOTES:
1. DOWELS AND REINFORCING BARS SHALL BE SUPPORTED BY CHAIRS OR OTHER DEVICES APPROVED BY TOWN ENGINEER.
2. JOINTS SHALL BE SPACED AT A MAXIMUM OF 400 FEET, LOCATED AT INTERSECTIONS.
TRANSVERSE EXPANSION JOINT
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL PAVING DETAILS 1 OF 3
LITTLE ELM
SHEET 4 OF 24
OCTOBER 2017


TYPICAL PAVEMENT SECTION
RESIDENTIAL STREET
N.T.S.
* 27' B-B PAVEMENT ONLY PERMITTED WITH TOWN ENGINEER'S WRITTEN APPROVAL.
TYPICAL PAVEMENT SECTION
COLLECTOR STREET
N.T.S.
* 27' B-B PAVEMENT ONLY PERMITTED WITH TOWN ENGINEER'S WRITTEN APPROVAL.
RESIDENTIAL STREET
ALTERNATIVE PAVEMENT SECTION
(29'-0" B-B)
N.T.S.
** LIME STABILIZATION MAY BE OMITTED IF 8" THICK PAVEMENT IS CONSTRUCTED, SURFACE IS EMULSION SEALED, AND SUBBASE COMPACTED TO 95% STD PROCTOR.
PAVEMENT NOTES:
1. 3500 PSI MACHINE POUR, 4000 PSI HAND POUR (AT DRIVEWAY APPROACH ONLY), REINFORCED CONCRETE PAVEMENT (5.5 SACK/CY), NO. 4 BARS @ 18" O.C.E.W., WITH 6" MONOLITHIC CURB.
2. BAR LAPS SHALL BE 30 BAR DIAMETERS.
3. BAR CHAIRS SHALL BE PROVIDED BY CONTRACTOR.
4. DO NOT PLACE CONCRETE JOINT WITHIN 2 FEET OF GUTTER LINE AT STREET CONNECTION.
5. LIME SHALL BE APPLIED BY PERCENTAGE DRY UNIT WEIGHT OF SOIL TREATED TO A MINIMUM IN PLACE COMPACTED THICKNESS OF SIX (6) INCHES. FOR 6" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 37 LBS/SQ FT; FOR 8" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 54 LBS/SQ FT.
6. FORMING OF PAVEMENT:
A. SLIP-FORM: SLIP-FORM PAVEMENT METHOD SHALL BE USED FOR ALL PUBLIC STREETS AND ALLEYS UNLESS OTHERWISE APPROVED BY THE TOWN ENGINEER.
B. HAND FORM: HAND FORMED PAVEMENT METHOD MAY BE USED FOR TURN LANE, DECELERATION LANE, DRIVEWAY APPROACH, OR REPLACING A PANEL OF PUBLIC STREET OR ALLEY.
CONCRETE PAVEMENT REPAIR
TYPICAL SECTION
N.T.S.
ASPHALT TRANSITION
TYPICAL SECTION
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL PAVING DETAILS 2 OF 3
LITTLEELM
SHEET
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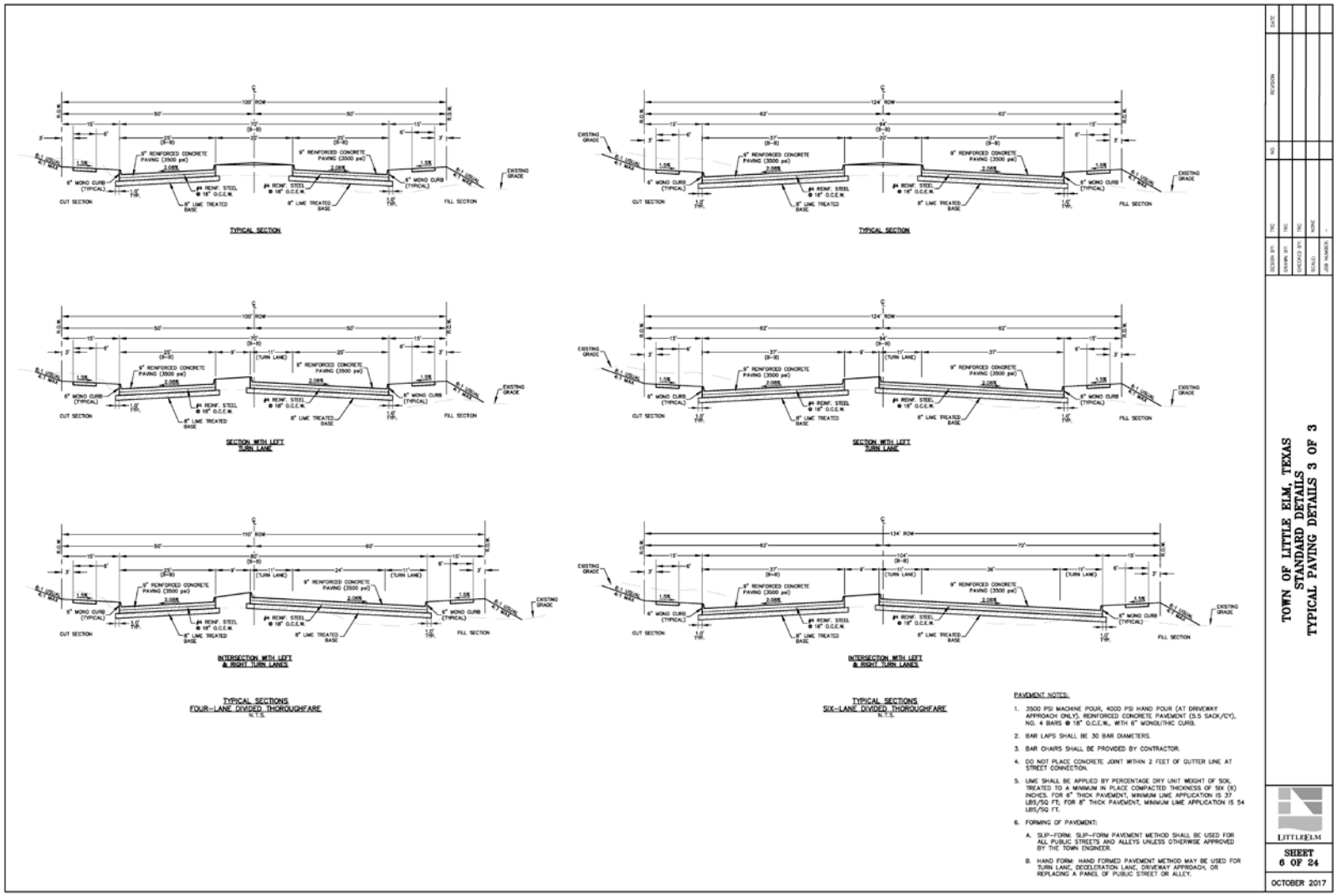
TYPICAL SECTION
TYPICAL SECTION
SECTION WITH LEFT TURN LANE
SECTION WITH LEFT TURN LANE
INTERSECTION WITH LEFT & RIGHT TURN LANES
INTERSECTION WITH LEFT & RIGHT TURN LANES
TYPICAL SECTIONS FOUR-LANE DIVIDED THOROUGHFARE N.T.S.
TYPICAL SECTIONS SIX-LANE DIVIDED THOROUGHFARE N.T.S.
PAVEMENT NOTES:
1. 3500 PSI MACHINE POUR, 4000 PSI HAND POUR (AT DRIVEWAY APPROACH ONLY), REINFORCED CONCRETE PAVEMENT (5.5 SACK/CY), NO. 4 BARS @ 18" O.C.E.W., WITH 6" MONOLITHIC CURB.
2. BAR LAPS SHALL BE 30 BAR DIAMETERS.
3. BAR CHAIRS SHALL BE PROVIDED BY CONTRACTOR.
4. DO NOT PLACE CONCRETE JOINT WITHIN 2 FEET OF GUTTER LINE AT STREET CONNECTION.
5. LIME SHALL BE APPLIED BY PERCENTAGE DRY UNIT WEIGHT OF SOIL, TREATED TO A MINIMUM IN PLACE COMPACTED THICKNESS OF SIX (6) INCHES. FOR 6" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 37 LBS/SQ FT; FOR 8" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 54 LBS/SQ FT.
6. FORMING OF PAVEMENT:
A. SLIP-FORM: SLIP-FORM PAVEMENT METHOD SHALL BE USED FOR ALL PUBLIC STREETS AND ALLEYS UNLESS OTHERWISE APPROVED BY THE TOWN ENGINEER.
B. HAND FORM: HAND FORMED PAVEMENT METHOD MAY BE USED FOR TURN LANE, DECELERATION LANE, DRIVEWAY APPROACH, OR REPLACING A PANEL OF PUBLIC STREET OR ALLEY.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL PAVING DETAILS 3 OF 3
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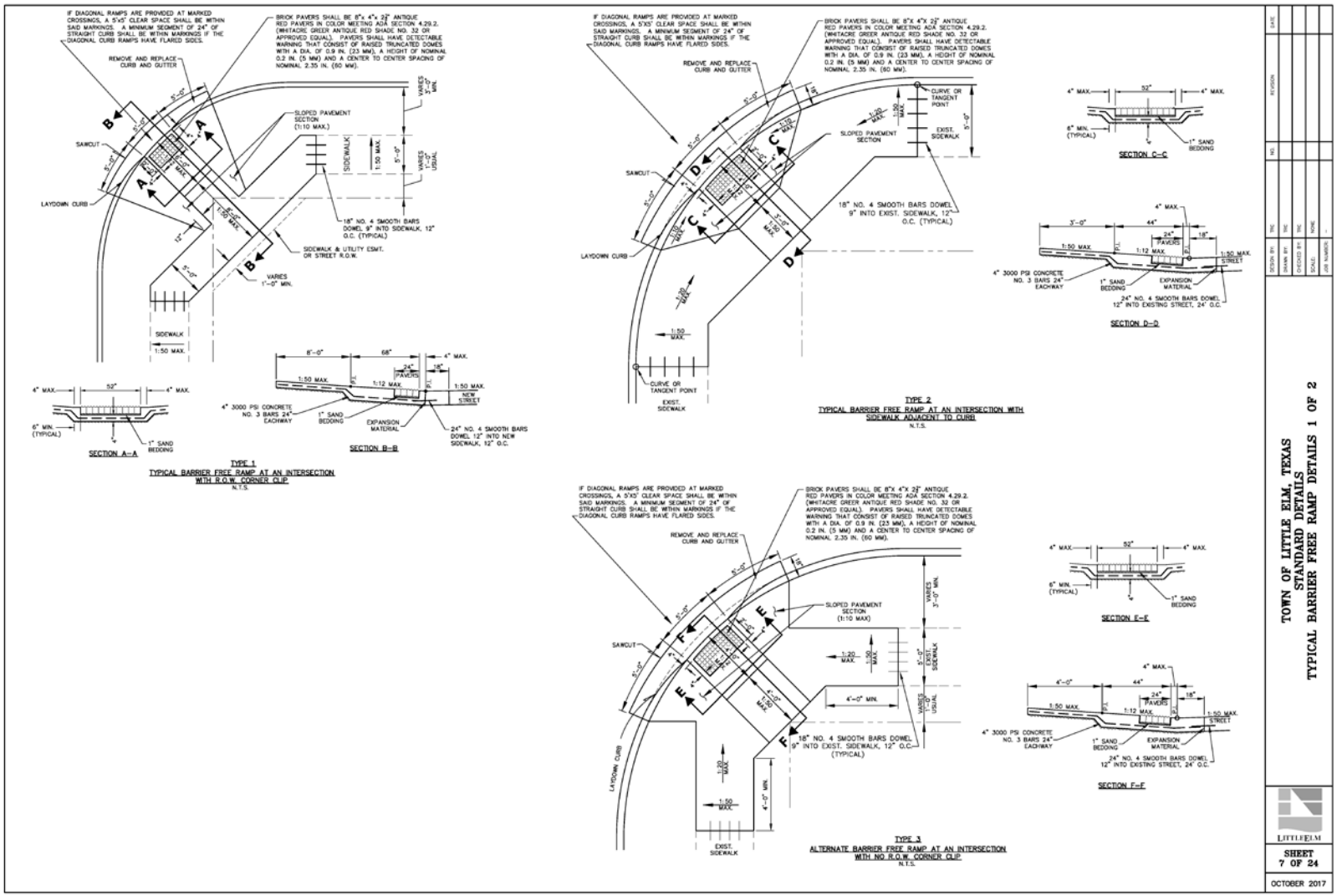
IF DIAGONAL RAMPS ARE PROVIDED AT MARKED CROSSINGS, A 5'x5' CLEAR SPACE SHALL BE WITHIN SAID MARKINGS. A MINIMUM SEGMENT OF 24" OF STRAIGHT CURB SHALL BE WITHIN MARKINGS IF THE DIAGONAL CURB RAMPS HAVE FLARED SIDES.
BRICK PAVERS SHALL BE 8"x 4"x 2½" ANTIQUE RED PAVERS IN COLOR MEETING ADA SECTION 4.29.2. (WHITACRE GREER ANTIQUE RED SHADE NO. 32 OR APPROVED EQUAL). PAVERS SHALL HAVE DETECTABLE WARNING THAT CONSIST OF RAISED TRUNCATED DOMES WITH A DIA. OF 0.9 IN. (23 MM), A HEIGHT OF NOMINAL 0.2 IN. (5 MM) AND A CENTER TO CENTER SPACING OF NOMINAL 2.35 IN. (60 MM).
REMOVE AND REPLACE CURB AND GUTTER
SAWCUT
LAYDOWN CURB
SLOPED PAVEMENT SECTION (1:10 MAX.)
SIDEWALK
18" NO. 4 SMOOTH BARS DOWEL, 9" INTO SIDEWALK, 12" O.C. (TYPICAL)
SIDEWALK & UTILITY ESMT. OR STREET R.O.W.
VARIES 1'-0" MIN.
SECTION A–A
SECTION B–B
4" 3000 PSI CONCRETE NO. 3 BARS 24" EACHWAY
1" SAND BEDDING
EXPANSION MATERIAL
24" NO. 4 SMOOTH BARS DOWEL, 12" INTO NEW SIDEWALK, 12" O.C.
TYPE 1
TYPICAL BARRIER FREE RAMP AT AN INTERSECTION WITH R.O.W. CORNER CLIP
N.T.S.
CURVE OR TANGENT POINT
EXIST. SIDEWALK
18" NO. 4 SMOOTH BARS DOWEL 9" INTO EXIST. SIDEWALK, 12" O.C. (TYPICAL)
SECTION C–C
SECTION D–D
TYPE 2
TYPICAL BARRIER FREE RAMP AT AN INTERSECTION WITH SIDEWALK ADJACENT TO CURB
N.T.S.
SECTION E–E
SECTION F–F
18" NO. 4 SMOOTH BARS DOWEL 9" INTO EXIST. SIDEWALK, 12" O.C. (TYPICAL)
TYPE 3
ALTERNATE BARRIER FREE RAMP AT AN INTERSECTION WITH NO R.O.W. CORNER CLIP
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL BARRIER FREE RAMP DETAILS 1 OF 2
LITTLE ELM
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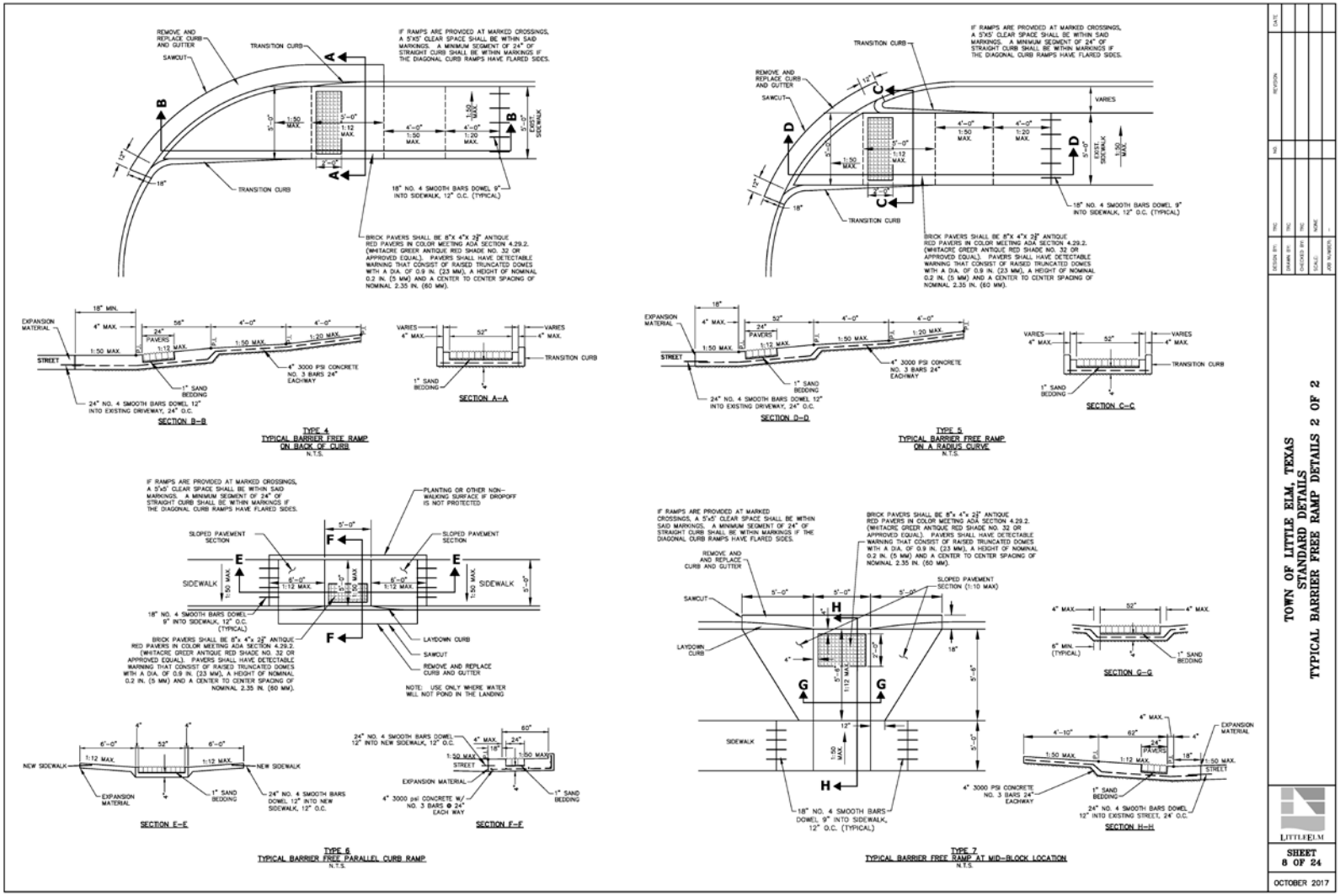
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL BARRIER FREE RAMP DETAILS 2 OF 2
SHEET
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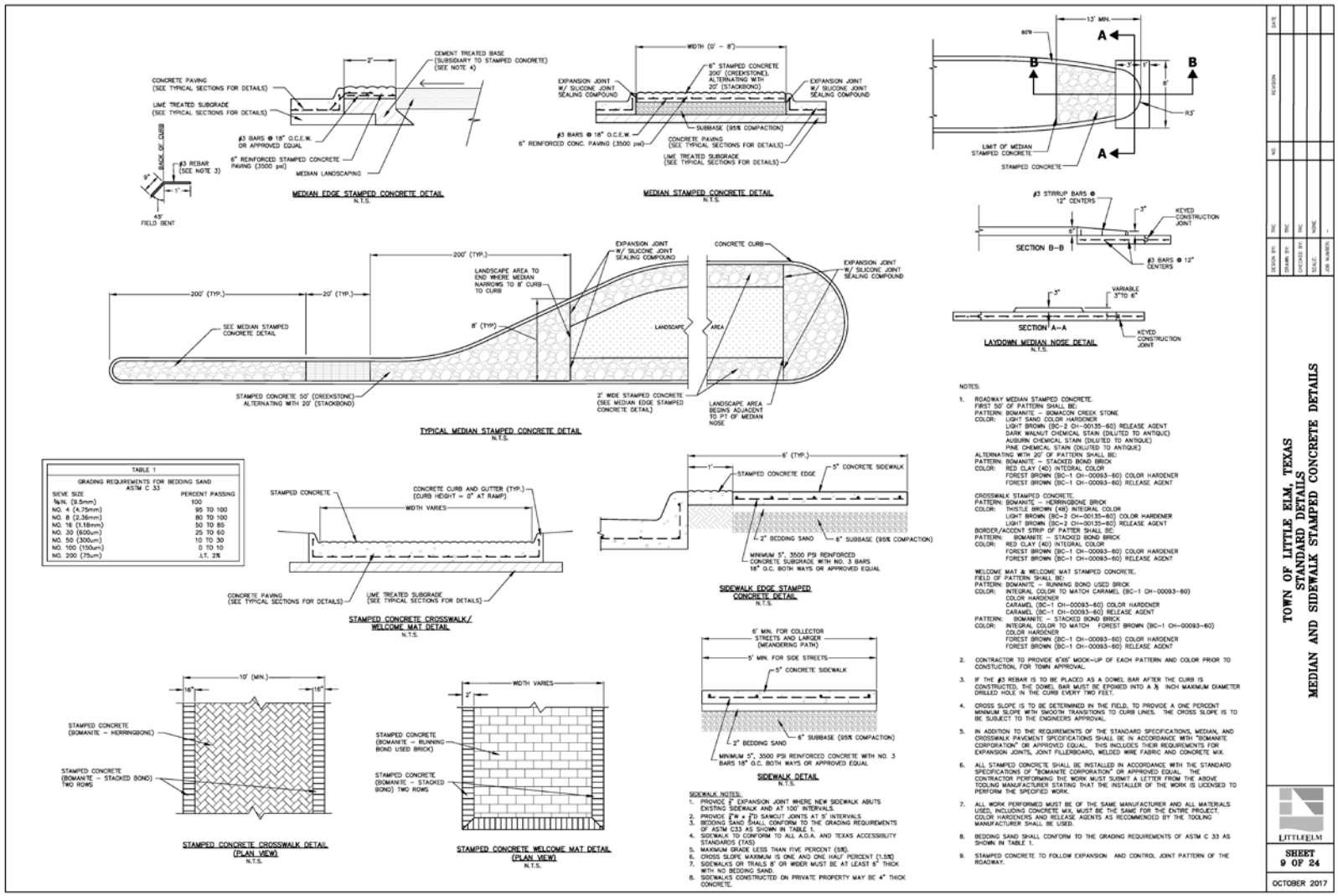
TYPE 4
TYPICAL BARRIER FREE RAMP
ON BACK OF CURB
TYPE 5
TYPICAL BARRIER FREE RAMP
ON A RADIUS CURVE
TYPE 6
TYPICAL BARRIER FREE PARALLEL CURB RAMP
TYPE 7
TYPICAL BARRIER FREE RAMP AT MID-BLOCK LOCATION
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
SECTION H-H


MEDIAN EDGE STAMPED CONCRETE DETAIL
N.T.S.
MEDIAN STAMPED CONCRETE DETAIL
N.T.S.
LAYDOWN MEDIAN NOSE DETAIL
N.T.S.
TYPICAL MEDIAN STAMPED CONCRETE DETAIL
N.T.S.
TABLE 1
GRADING REQUIREMENTS FOR BEDDING SAND
ASTM C 33
SIEVE SIZE
PERCENT PASSING
STAMPED CONCRETE CROSSWALK/ WELCOME MAT DETAIL
N.T.S.
SIDEWALK EDGE STAMPED CONCRETE DETAIL
N.T.S.
SIDEWALK DETAIL
N.T.S.
STAMPED CONCRETE CROSSWALK DETAIL (PLAN VIEW)
N.T.S.
STAMPED CONCRETE WELCOME MAT DETAIL (PLAN VIEW)
N.T.S.
NOTES:
SIDEWALK NOTES:
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
MEDIAN AND SIDEWALK STAMPED CONCRETE DETAILS
LITTLEELM
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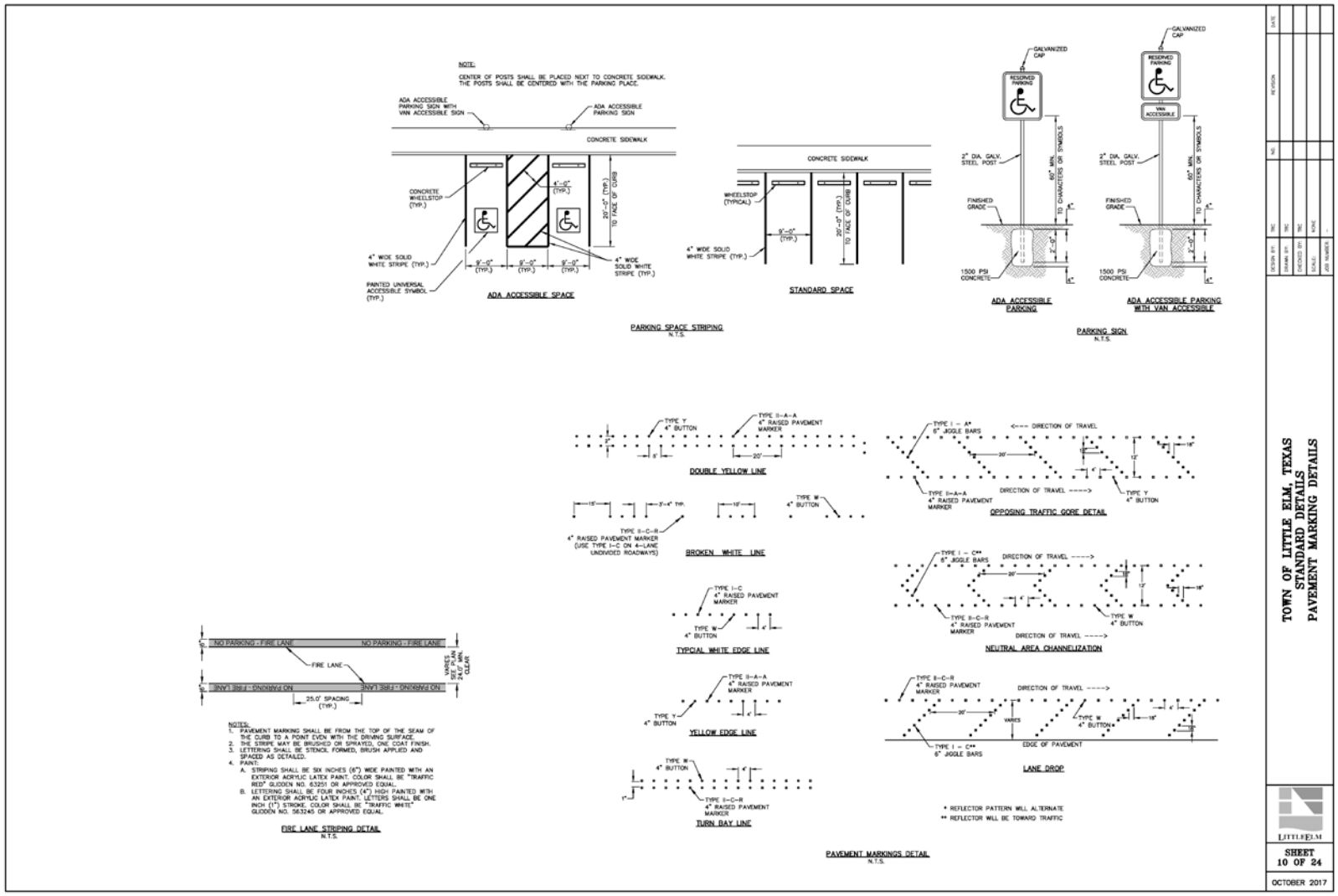
NOTE:
CENTER OF POSTS SHALL BE PLACED NEXT TO CONCRETE SIDEWALK. THE POSTS SHALL BE CENTERED WITH THE PARKING PLACE.
ADA ACCESSIBLE PARKING SIGN WITH VAN ACCESSIBLE SIGN
ADA ACCESSIBLE PARKING SIGN
CONCRETE SIDEWALK
CONCRETE WHEELSTOP (TYP.)
4'-0" (TYP.)
20'-0" (TYP.) TO FACE OF CURB
4" WIDE SOLID WHITE STRIPE (TYP.)
9'-0" (TYP.)
4" WIDE SOLID WHITE STRIPE (TYP.)
PAINTED UNIVERSAL ACCESSIBLE SYMBOL (TYP.)
ADA ACCESSIBLE SPACE
WHEELSTOP (TYPICAL)
STANDARD SPACE
PARKING SPACE STRIPING
N.T.S.
GALVANIZED CAP
RESERVED PARKING
VAN ACCESSIBLE
2" DIA. GALV. STEEL POST
60" MIN. TO CHARACTERS OR SYMBOLS
FINISHED GRADE
2'-0"
1500 PSI CONCRETE
ADA ACCESSIBLE PARKING
ADA ACCESSIBLE PARKING WITH VAN ACCESSIBLE
PARKING SIGN
N.T.S.
TYPE Y 4" BUTTON
TYPE II-A-A 4" RAISED PAVEMENT MARKER
20'
DOUBLE YELLOW LINE
TYPE I - A* 6" JIGGLE BARS
<--- DIRECTION OF TRAVEL
TYPE II-A-A 4" RAISED PAVEMENT MARKER
DIRECTION OF TRAVEL ---->
OPPOSING TRAFFIC GORE DETAIL
TYPE W 4" BUTTON
TYPE II-C-R 4" RAISED PAVEMENT MARKER (USE TYPE I-C ON 4-LANE UNDIVIDED ROADWAYS)
BROKEN WHITE LINE
TYPE I-C 4" RAISED PAVEMENT MARKER
TYPICAL WHITE EDGE LINE
TYPE I - C** 6" JIGGLE BARS
TYPE II-C-R 4" RAISED PAVEMENT MARKER
NEUTRAL AREA CHANNELIZATION
NO PARKING - FIRE LANE
FIRE LANE
VARIES BETWEEN 24.0' MIN. CLEAR
25.0' SPACING (TYP.)
NOTES:
1. PAVEMENT MARKING SHALL BE FROM THE TOP OF THE SEAM OF THE CURB TO A POINT EVEN WITH THE DRIVING SURFACE.
2. THE STRIPE MAY BE BRUSHED OR SPRAYED, ONE COAT FINISH.
3. LETTERING SHALL BE STENCIL FORMED, BRUSH APPLIED AND SPACED AS DETAILED.
4. PAINT:
A. STRIPING SHALL BE SIX INCHES (6") WIDE PAINTED WITH AN EXTERIOR ACRYLIC LATEX PAINT. COLOR SHALL BE "TRAFFIC RED" GLIDDEN NO. 53251 OR APPROVED EQUAL.
B. LETTERING SHALL BE FOUR INCHES (4") HIGH PAINTED WITH AN EXTERIOR ACRYLIC LATEX PAINT. LETTERS SHALL BE ONE INCH (1") STROKE. COLOR SHALL BE "TRAFFIC WHITE" GLIDDEN NO. 563245 OR APPROVED EQUAL.
FIRE LANE STRIPING DETAIL
N.T.S.
TYPE Y 4" BUTTON
TYPE II-A-A 4" RAISED PAVEMENT MARKER
YELLOW EDGE LINE
TYPE W 4" BUTTON
TYPE II-C-R 4" RAISED PAVEMENT MARKER
TURN BAY LINE
TYPE II-C-R 4" RAISED PAVEMENT MARKER
DIRECTION OF TRAVEL ---->
VARIES
TYPE W 4" BUTTON
TYPE I - C** 6" JIGGLE BARS
EDGE OF PAVEMENT
LANE DROP
* REFLECTOR PATTERN WILL ALTERNATE
** REFLECTOR WILL BE TOWARD TRAFFIC
PAVEMENT MARKINGS DETAIL
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
PAVEMENT MARKING DETAILS
LITTLE ELM
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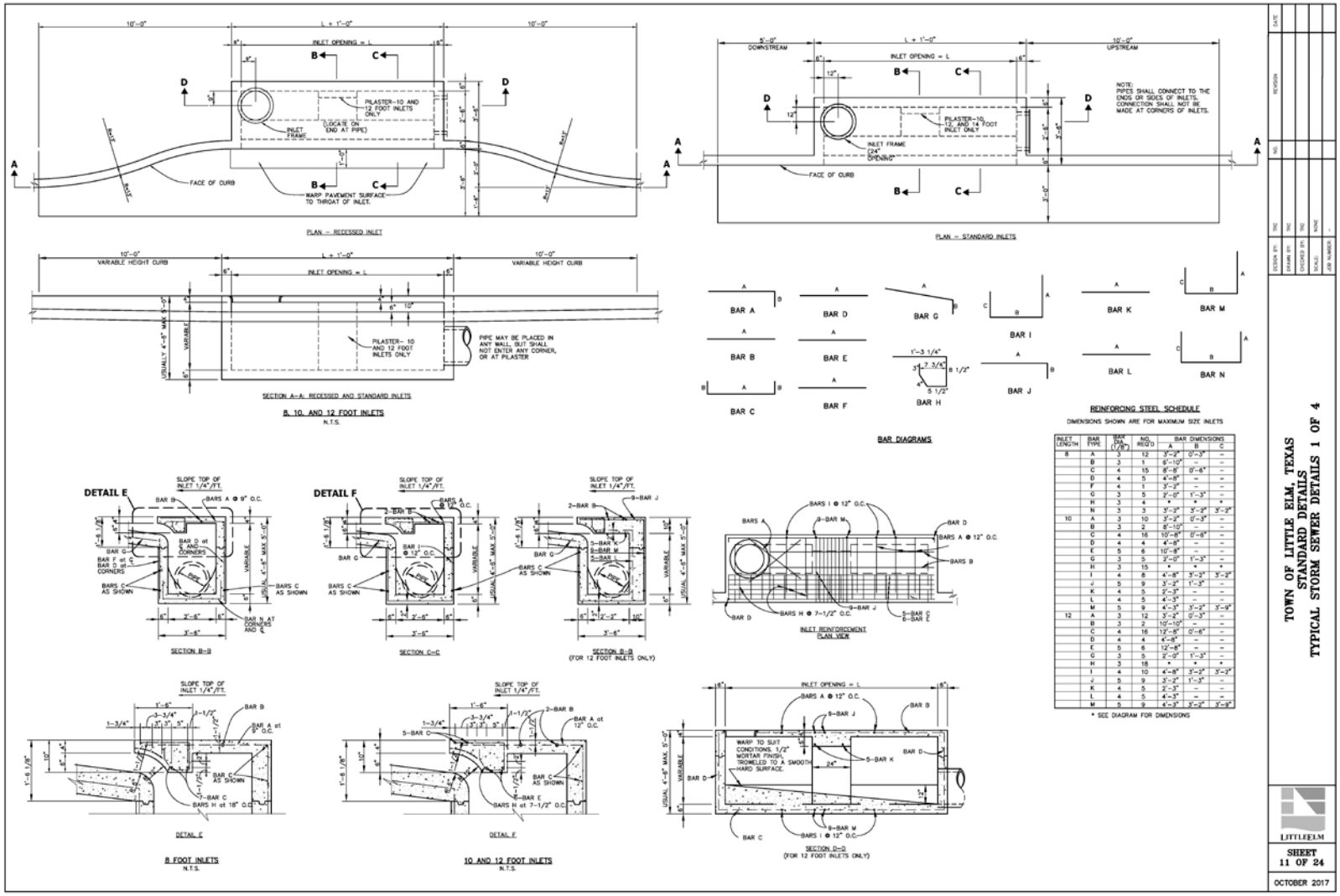
PLAN – RECESSED INLET
PLAN – STANDARD INLETS
SECTION A–A: RECESSED AND STANDARD INLETS
8, 10, AND 12 FOOT INLETS
N.T.S.
BAR DIAGRAMS
REINFORCING STEEL SCHEDULE
DIMENSIONS SHOWN ARE FOR MAXIMUM SIZE INLETS
* SEE DIAGRAM FOR DIMENSIONS
DETAIL E
DETAIL F
SECTION B–B
SECTION C–C
SECTION B–B (FOR 12 FOOT INLETS ONLY)
INLET REINFORCEMENT PLAN VIEW
SECTION D–D (FOR 12 FOOT INLETS ONLY)
8 FOOT INLETS
N.T.S.
10 AND 12 FOOT INLETS
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 1 OF 4
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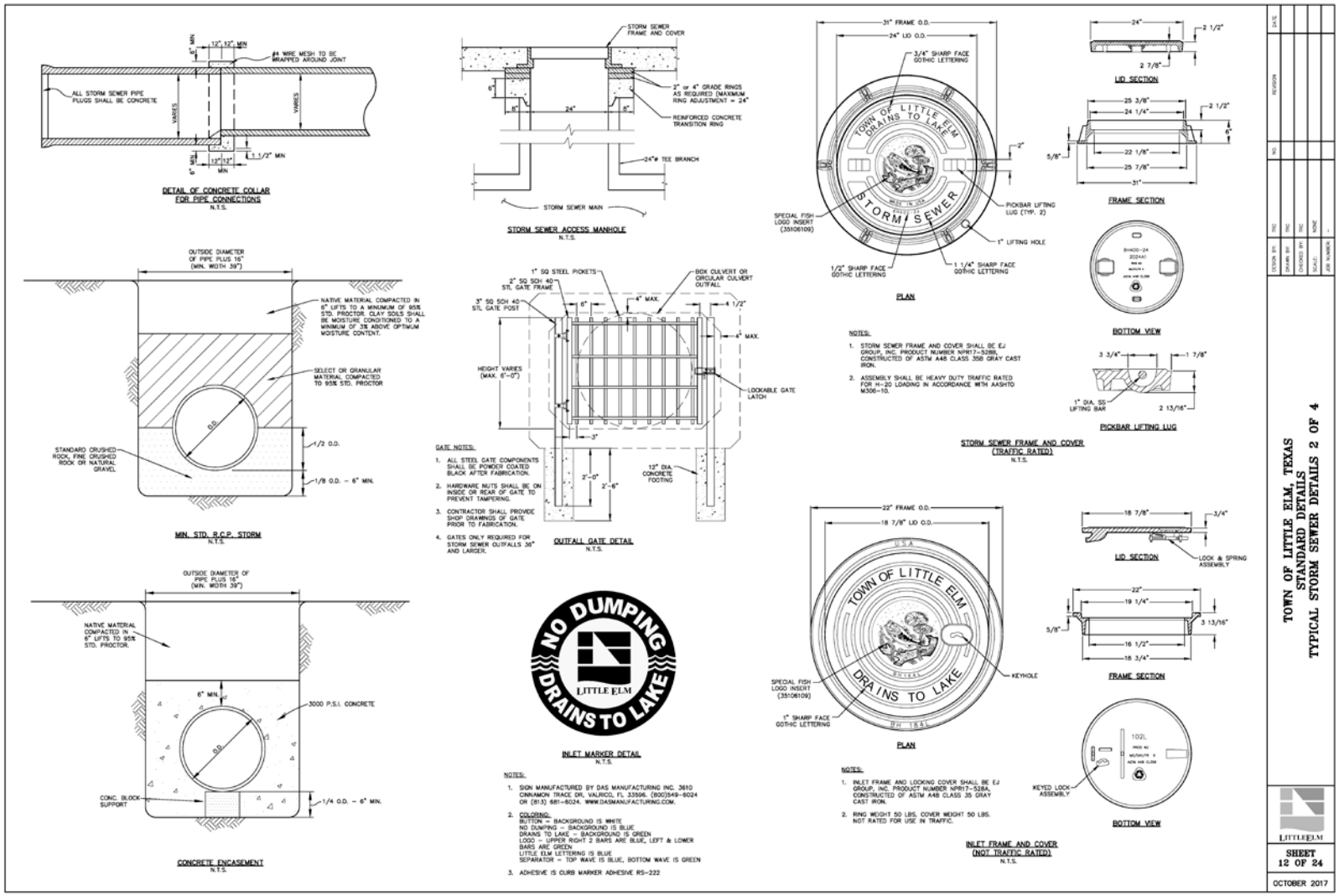
DETAIL OF CONCRETE COLLAR FOR PIPE CONNECTIONS
N.T.S.
STORM SEWER ACCESS MANHOLE
N.T.S.
PLAN
LID SECTION
FRAME SECTION
BOTTOM VIEW
PICKBAR LIFTING LUG
STORM SEWER FRAME AND COVER (TRAFFIC RATED)
N.T.S.
MIN. STD. R.C.P. STORM
N.T.S.
OUTFALL GATE DETAIL
N.T.S.
CONCRETE ENCASEMENT
N.T.S.
INLET MARKER DETAIL
N.T.S.
INLET FRAME AND COVER (NOT TRAFFIC RATED)
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 2 OF 4
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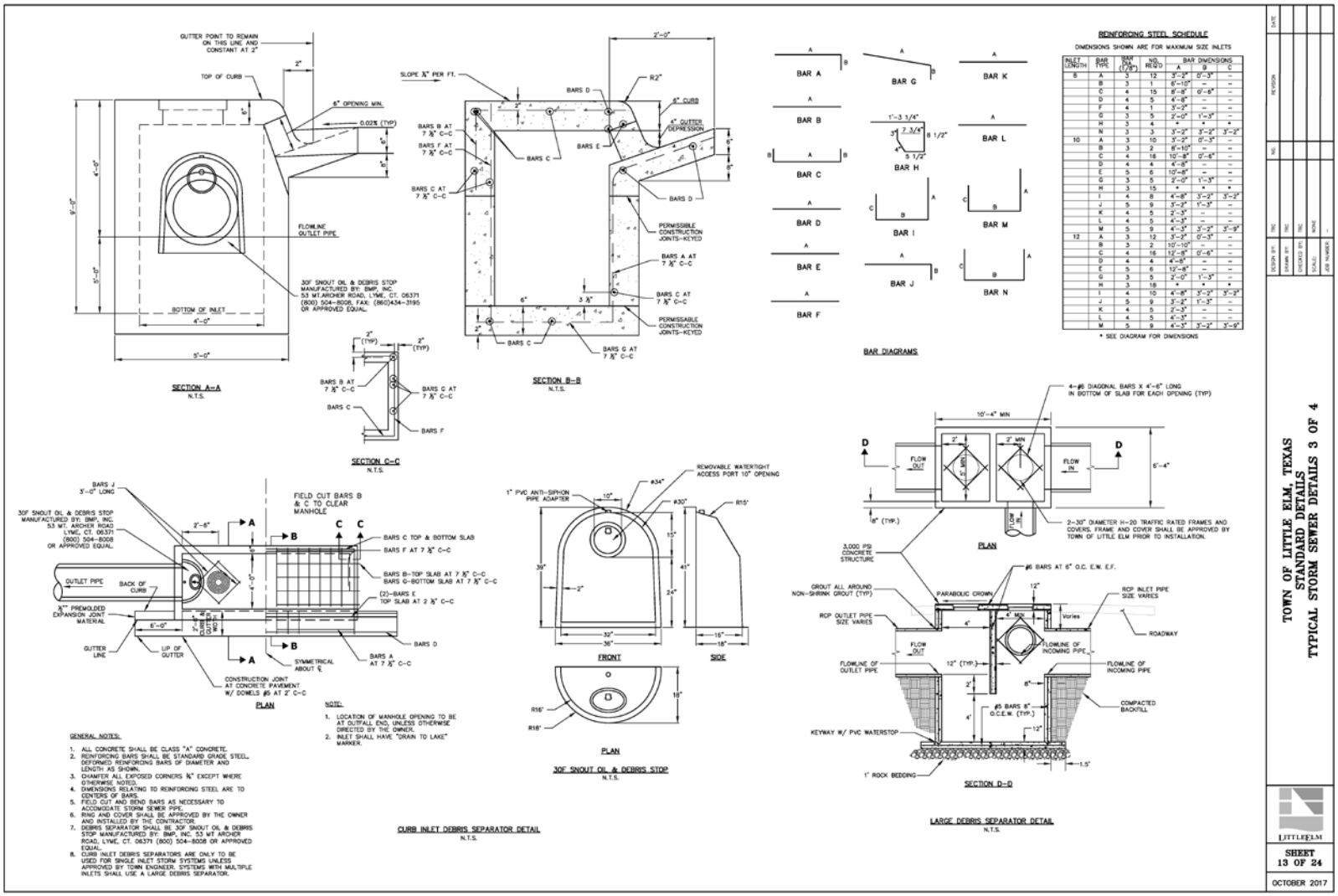
SECTION A–A
N.T.S.
SECTION B–B
N.T.S.
SECTION C–C
N.T.S.
BAR DIAGRAMS
REINFORCING STEEL SCHEDULE
DIMENSIONS SHOWN ARE FOR MAXIMUM SIZE INLETS
* SEE DIAGRAM FOR DIMENSIONS
PLAN
SECTION D–D
LARGE DEBRIS SEPARATOR DETAIL
N.T.S.
PLAN
FRONT
SIDE
30F SNOUT OIL & DEBRIS STOP
N.T.S.
PLAN
CURB INLET DEBRIS SEPARATOR DETAIL
N.T.S.
GENERAL NOTES:
1. ALL CONCRETE SHALL BE CLASS "A" CONCRETE.
2. REINFORCING BARS SHALL BE STANDARD GRADE STEEL, DEFORMED REINFORCING BARS OF DIAMETER AND LENGTH AS SHOWN.
3. CHAMFER ALL EXPOSED CORNERS ¾" EXCEPT WHERE OTHERWISE NOTED.
4. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
5. FIELD CUT AND BEND BARS AS NECESSARY TO ACCOMODATE STORM SEWER PIPE.
6. RING AND COVER SHALL BE APPROVED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
7. DEBRIS SEPARATOR SHALL BE 30F SNOUT OIL & DEBRIS STOP MANUFACTURED BY: BMP, INC. 53 MT ARCHER ROAD, LYME, CT. 06371 (800) 504-8008 OR APPROVED EQUAL.
8. CURB INLET DEBRIS SEPARATORS ARE ONLY TO BE USED FOR SINGLE INLET STORM SYSTEMS UNLESS APPROVED BY TOWN ENGINEER. SYSTEMS WITH MULTIPLE INLETS SHALL USE A LARGE DEBRIS SEPARATOR.
NOTE:
1. LOCATION OF MANHOLE OPENING TO BE AT OUTFALL END, UNLESS OTHERWISE DIRECTED BY THE OWNER.
2. INLET SHALL HAVE "DRAIN TO LAKE" MARKER.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 3 OF 4
LITTLE ELM
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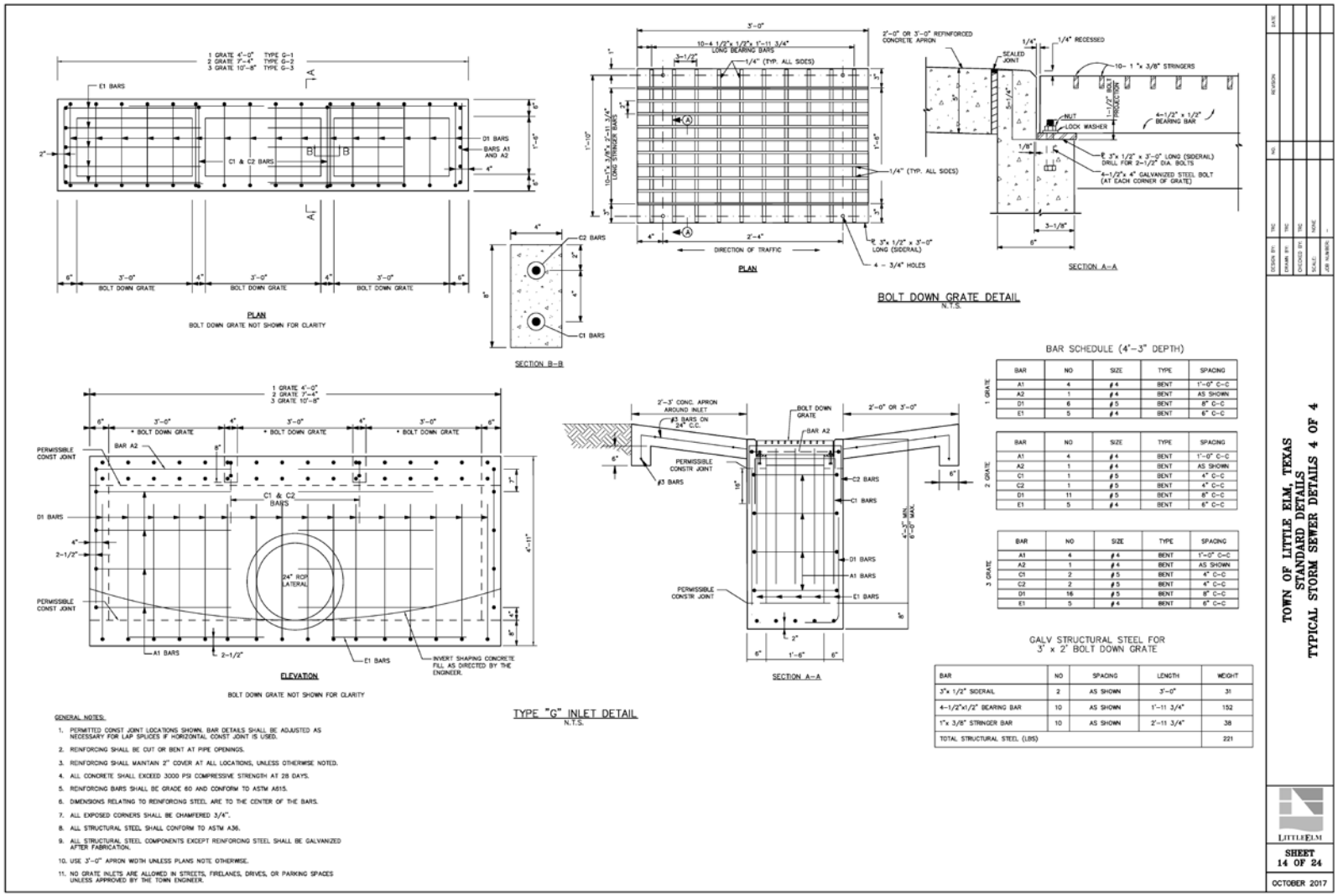


BAR	NO	SIZE	TYPE	SPACING
A1	4	# 4	BENT	1'–0" C–C
A2	1	# 4	BENT	AS SHOWN
D1	6	# 5	BENT	8" C–C
E1	5	# 4	BENT	6" C–C

1 GRATE

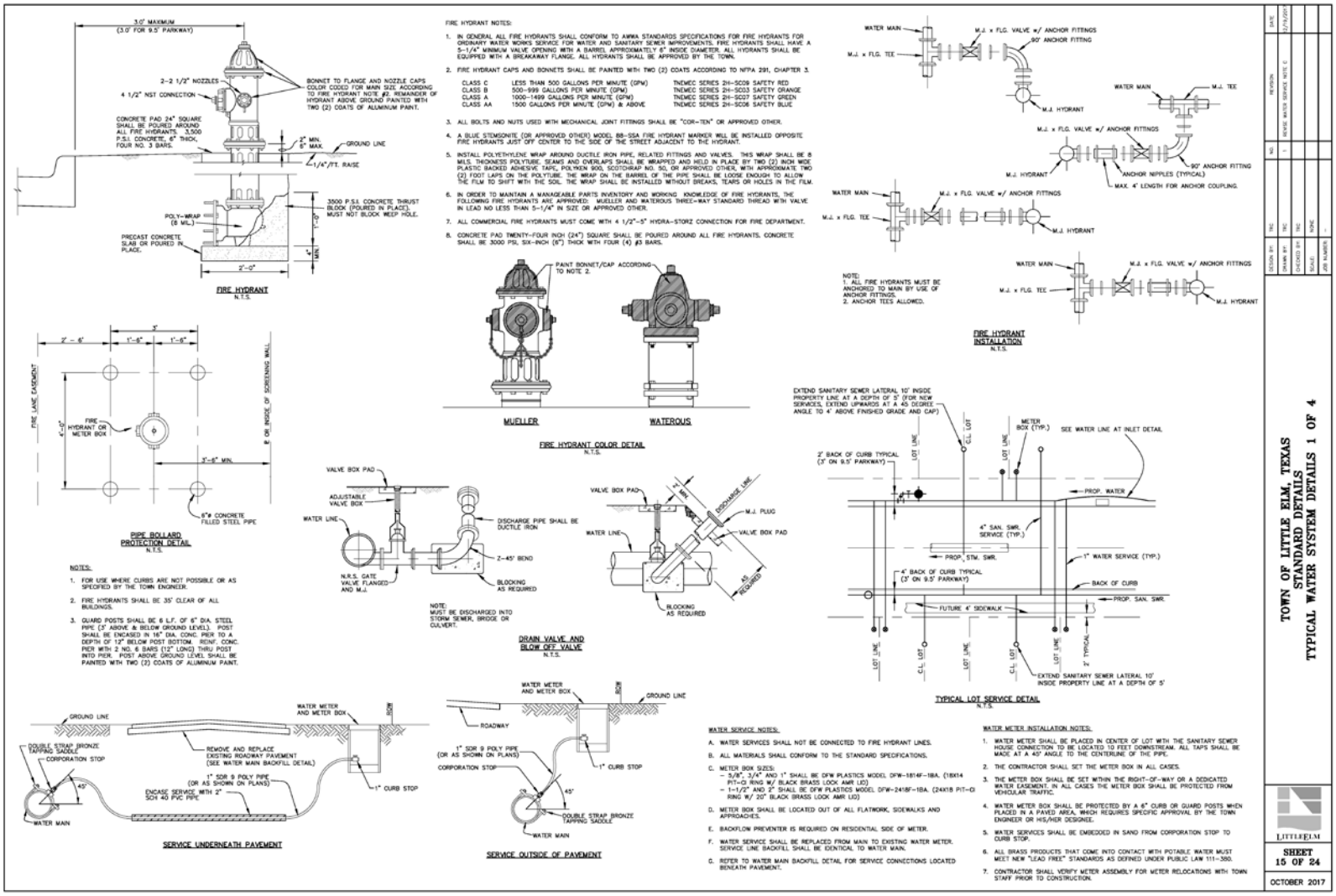
BAR	NO	SIZE	TYPE	SPACING
A1	4	# 4	BENT	1'–0" C–C
A2	1	# 4	BENT	AS SHOWN
C1	1	# 5	BENT	4" C–C
C2	1	# 5	BENT	4" C–C
D1	11	# 5	BENT	8" C–C
E1	5	# 4	BENT	6" C–C

2 GRATE

BAR	NO	SIZE	TYPE	SPACING
A1	4	# 4	BENT	1'–0" C–C
A2	1	# 4	BENT	AS SHOWN
C1	2	# 5	BENT	4" C–C
C2	2	# 5	BENT	4" C–C
D1	16	# 5	BENT	8" C–C
E1	5	# 4	BENT	6" C–C

3 GRATE

BAR	NO	SPACING	LENGTH	WEIGHT
3"x 1/2" SIDERAIL	2	AS SHOWN	3'–0"	31
4–1/2"x1/2" BEARING BAR	10	AS SHOWN	1'–11 3/4"	152
1"x 3/8" STRINGER BAR	10	AS SHOWN	2'–11 3/4"	38
TOTAL STRUCTURAL STEEL (LBS)				221


FIRE HYDRANT NOTES:
1. IN GENERAL ALL FIRE HYDRANTS SHALL CONFORM TO AWWA STANDARDS SPECIFICATIONS FOR FIRE HYDRANTS FOR ORDINARY WATER WORKS SERVICE FOR WATER AND SANITARY SEWER IMPROVEMENTS. FIRE HYDRANTS SHALL HAVE A 5-1/4" MINIMUM VALVE OPENING WITH A BARREL APPROXIMATELY 6" INSIDE DIAMETER. ALL HYDRANTS SHALL BE EQUIPPED WITH A BREAKAWAY FLANGE. ALL HYDRANTS SHALL BE APPROVED BY THE TOWN.
2. FIRE HYDRANT CAPS AND BONNETS SHALL BE PAINTED WITH TWO (2) COATS ACCORDING TO NFPA 291, CHAPTER 3.
CLASS C LESS THAN 500 GALLONS PER MINUTE (GPM) TNEMEC SERIES 2H-SC08 SAFETY RED
CLASS B 500-999 GALLONS PER MINUTE (GPM) TNEMEC SERIES 2H-SC03 SAFETY ORANGE
CLASS A 1000-1499 GALLONS PER MINUTE (GPM) TNEMEC SERIES 2H-SC07 SAFETY GREEN
CLASS AA 1500 GALLONS PER MINUTE (GPM) & ABOVE TNEMEC SERIES 2H-SC08 SAFETY BLUE
3. ALL BOLTS AND NUTS USED WITH MECHANICAL JOINT FITTINGS SHALL BE "COR-TEN" OR APPROVED OTHER.
4. A BLUE STEMSONITE (OR APPROVED OTHER) MODEL 88-SSA FIRE HYDRANT MARKER WILL BE INSTALLED OPPOSITE FIRE HYDRANTS JUST OFF CENTER TO THE SIDE OF THE STREET ADJACENT TO THE HYDRANT.
5. INSTALL POLYETHYLENE WRAP AROUND DUCTILE IRON PIPE, RELATED FITTINGS AND VALVES. THIS WRAP SHALL BE 8 MILS. THICKNESS POLYTUBE. SEAMS AND OVERLAPS SHALL BE WRAPPED AND HELD IN PLACE BY TWO (2) INCH WIDE PLASTIC BACKED ADHESIVE TAPE, POLYKEN 900, SCOTCHRAP NO. 50, OR APPROVED OTHER, WITH APPROXIMATE TWO (2) FOOT LAPS ON THE POLYTUBE. THE WRAP ON THE BARREL OF THE PIPE SHALL BE LOOSE ENOUGH TO ALLOW THE FILM TO SHIFT WITH THE SOIL. THE WRAP SHALL BE INSTALLED WITHOUT BREAKS, TEARS OR HOLES IN THE FILM.
6. IN ORDER TO MAINTAIN A MANAGEABLE PARTS INVENTORY AND WORKING KNOWLEDGE OF FIRE HYDRANTS, THE FOLLOWING FIRE HYDRANTS ARE APPROVED: MUELLER AND WATEROUS THREE-WAY STANDARD THREAD WITH VALVE IN LEAD NO LESS THAN 5-1/4" IN SIZE OR APPROVED OTHER.
7. ALL COMMERCIAL FIRE HYDRANTS MUST COME WITH 4 1/2"-5" HYDRA-STORZ CONNECTION FOR FIRE DEPARTMENT.
8. CONCRETE PAD TWENTY-FOUR INCH (24") SQUARE SHALL BE POURED AROUND ALL FIRE HYDRANTS. CONCRETE SHALL BE 3000 PSI, SIX-INCH (6") THICK WITH FOUR (4) #3 BARS.
3.0' MAXIMUM (3.0' FOR 9.5' PARKWAY)
2-2 1/2" NOZZLES
4 1/2" NST CONNECTION
BONNET TO FLANGE AND NOZZLE CAPS COLOR CODED FOR MAIN SIZE ACCORDING TO FIRE HYDRANT NOTE #2. REMAINDER OF HYDRANT ABOVE GROUND PAINTED WITH TWO (2) COATS OF ALUMINUM PAINT.
CONCRETE PAD 24" SQUARE SHALL BE POURED AROUND ALL FIRE HYDRANTS. 3,500 P.S.I. CONCRETE, 6" THICK, FOUR NO. 3 BARS.
2" MIN. 6" MAX.
GROUND LINE
1/4"/FT. RAISE
3500 P.S.I. CONCRETE THRUST BLOCK (POURED IN PLACE). MUST NOT BLOCK WEEP HOLE.
POLY-WRAP (8 MIL.)
PRECAST CONCRETE SLAB OR POURED IN PLACE.
2'-0"
4" MIN.
FIRE HYDRANT
N.T.S.
PAINT BONNET/CAP ACCORDING TO NOTE 2.
MUELLER
WATEROUS
FIRE HYDRANT COLOR DETAIL
N.T.S.
WATER MAIN
M.J. x FLG. VALVE w/ ANCHOR FITTINGS
90° ANCHOR FITTING
M.J. x FLG. TEE
M.J. HYDRANT
M.J. TEE
ANCHOR NIPPLES (TYPICAL)
MAX. 4' LENGTH FOR ANCHOR COUPLING.
NOTE:
1. ALL FIRE HYDRANTS MUST BE ANCHORED TO MAIN BY USE OF ANCHOR FITTINGS.
2. ANCHOR TEES ALLOWED.
FIRE HYDRANT INSTALLATION
N.T.S.
FIRE LANE EASEMENT
FIRE HYDRANT OR METER BOX
3'-6" MIN.
6"ø CONCRETE FILLED STEEL PIPE
PIPE BOLLARD PROTECTION DETAIL
N.T.S.
NOTES:
1. FOR USE WHERE CURBS ARE NOT POSSIBLE OR AS SPECIFIED BY THE TOWN ENGINEER.
2. FIRE HYDRANTS SHALL BE 35' CLEAR OF ALL BUILDINGS.
3. GUARD POSTS SHALL BE 6 L.F. OF 6" DIA. STEEL PIPE (3' ABOVE & BELOW GROUND LEVEL). POST SHALL BE ENCASED IN 16" DIA. CONC. PIER TO A DEPTH OF 12" BELOW POST BOTTOM. REINF. CONC. PIER WITH 2 NO. 6 BARS (12" LONG) THRU POST INTO PIER. POST ABOVE GROUND LEVEL SHALL BE PAINTED WITH TWO (2) COATS OF ALUMINUM PAINT.
VALVE BOX PAD
ADJUSTABLE VALVE BOX
WATER LINE
DISCHARGE PIPE SHALL BE DUCTILE IRON
N.R.S. GATE VALVE FLANGED AND M.J.
BLOCKING AS REQUIRED
NOTE: MUST BE DISCHARGED INTO STORM SEWER, BRIDGE OR CULVERT.
M.J. PLUG
DRAIN VALVE AND BLOW OFF VALVE
N.T.S.
EXTEND SANITARY SEWER LATERAL 10' INSIDE PROPERTY LINE AT A DEPTH OF 5' (FOR NEW SERVICES, EXTEND UPWARDS AT A 45 DEGREE ANGLE TO 4' ABOVE FINISHED GRADE AND CAP)
2' BACK OF CURB TYPICAL (3' ON 9.5' PARKWAY)
METER BOX (TYP.)
SEE WATER LINE AT INLET DETAIL
PROP. WATER
4" SAN. SWR. SERVICE (TYP.)
PROP. STM. SWR.
1" WATER SERVICE (TYP.)
4' BACK OF CURB TYPICAL (3' ON 9.5' PARKWAY)
BACK OF CURB
FUTURE 4' SIDEWALK
PROP. SAN. SWR.
EXTEND SANITARY SEWER LATERAL 10' INSIDE PROPERTY LINE AT A DEPTH OF 5'
TYPICAL LOT SERVICE DETAIL
N.T.S.
GROUND LINE
WATER METER AND METER BOX
ROW
DOUBLE STRAP BRONZE TAPPING SADDLE
CORPORATION STOP
REMOVE AND REPLACE EXISTING ROADWAY PAVEMENT (SEE WATER MAIN BACKFILL DETAIL)
1" SDR 9 POLY PIPE (OR AS SHOWN ON PLANS)
ENCASE SERVICE WITH 2" SCH 40 PVC PIPE
1" CURB STOP
WATER MAIN
SERVICE UNDERNEATH PAVEMENT
ROADWAY
1" SDR 9 POLY PIPE (OR AS SHOWN ON PLANS)
SERVICE OUTSIDE OF PAVEMENT
WATER SERVICE NOTES:
A. WATER SERVICES SHALL NOT BE CONNECTED TO FIRE HYDRANT LINES.
B. ALL MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS.
C. METER BOX SIZES:
- 5/8", 3/4" AND 1" SHALL BE DFW PLASTICS MODEL DFW-1814F-1BA. (18X14 PIT-CI RING W/ BLACK BRASS LOCK AMR LID)
- 1-1/2" AND 2" SHALL BE DFW PLASTICS MODEL DFW-2418F-1BA. (24X18 PIT-CI RING W/ 20" BLACK BRASS LOCK AMR LID)
D. METER BOX SHALL BE LOCATED OUT OF ALL FLATWORK, SIDEWALKS AND APPROACHES.
E. BACKFLOW PREVENTER IS REQUIRED ON RESIDENTIAL SIDE OF METER.
F. WATER SERVICE SHALL BE REPLACED FROM MAIN TO EXISTING WATER METER. SERVICE LINE BACKFILL SHALL BE IDENTICAL TO WATER MAIN.
G. REFER TO WATER MAIN BACKFILL DETAIL FOR SERVICE CONNECTIONS LOCATED BENEATH PAVEMENT.
WATER METER INSTALLATION NOTES:
1. WATER METER SHALL BE PLACED IN CENTER OF LOT WITH THE SANITARY SEWER HOUSE CONNECTION TO BE LOCATED TO FEET DOWNSTREAM. ALL TAPS SHALL BE MADE AT A 45° ANGLE TO THE CENTERLINE OF THE PIPE.
2. THE CONTRACTOR SHALL SET THE METER BOX IN ALL CASES.
3. THE METER BOX SHALL BE SET WITHIN THE RIGHT-OF-WAY OR A DEDICATED WATER EASEMENT. IN ALL CASES THE METER BOX SHALL BE PROTECTED FROM VEHICULAR TRAFFIC.
4. WATER METER BOX SHALL BE PROTECTED BY A 6" CURB OR GUARD POSTS WHEN PLACED IN A PAVED AREA, WHICH REQUIRES SPECIFIC APPROVAL BY THE TOWN ENGINEER OR HIS/HER DESIGNEE.
5. WATER SERVICES SHALL BE EMBEDDED IN SAND FROM CORPORATION STOP TO CURB STOP.
6. ALL BRASS PRODUCTS THAT COME INTO CONTACT WITH POTABLE WATER MUST MEET NEW "LEAD FREE" STANDARDS AS DEFINED UNDER PUBLIC LAW 111-380.
7. CONTRACTOR SHALL VERIFY METER ASSEMBLY FOR METER RELOCATIONS WITH TOWN STAFF PRIOR TO CONSTRUCTION.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 1 OF 4
LITTLEELM
SHEET 15 OF 24
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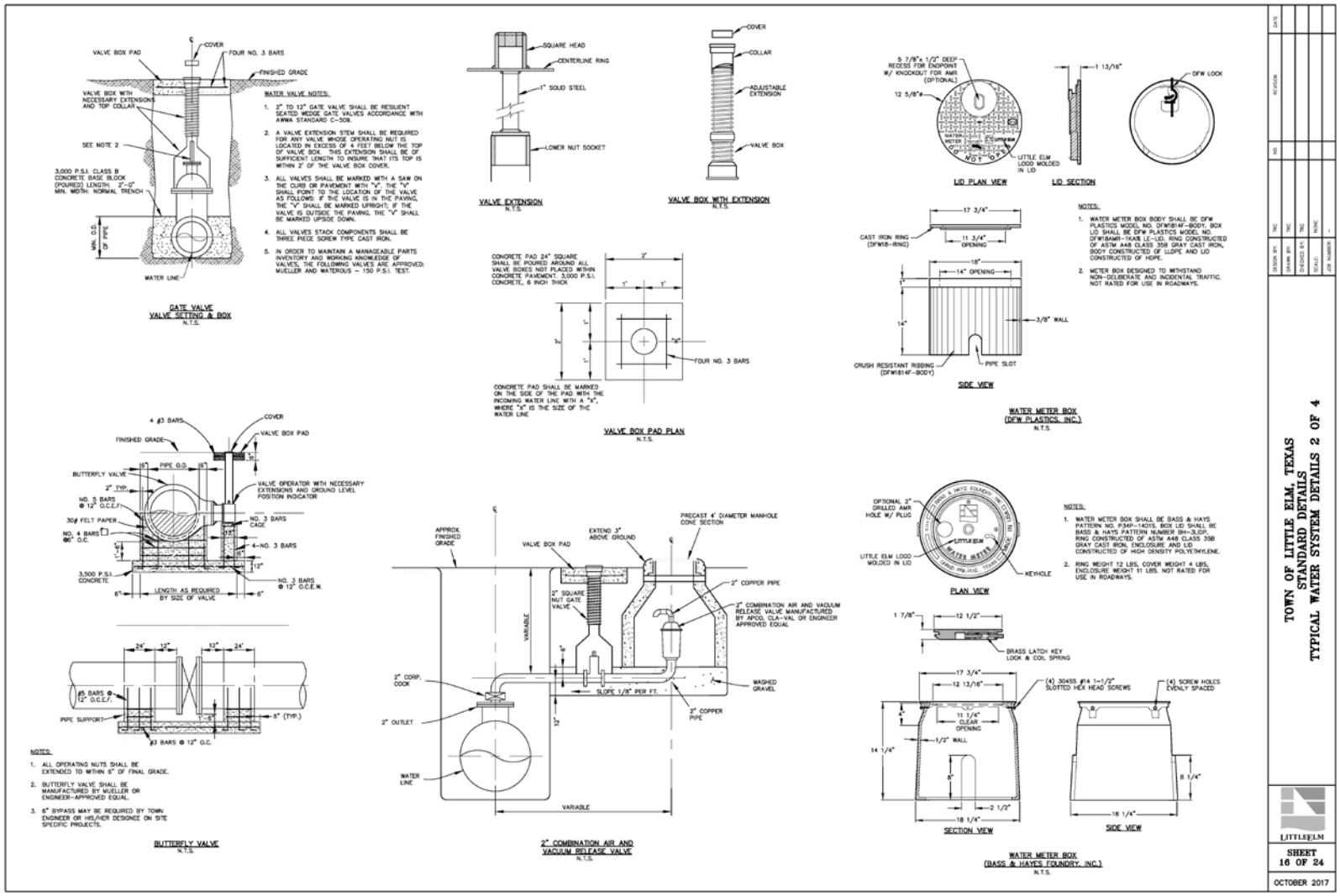
VALVE BOX PAD
COVER
FOUR NO. 3 BARS
FINISHED GRADE
VALVE BOX WITH NECESSARY EXTENSIONS AND TOP COLLAR
SEE NOTE 2
3,000 P.S.I. CLASS B CONCRETE BASE BLOCK (POURED) LENGTH: 2'-0" MIN. WIDTH: NORMAL TRENCH
MIN. O.D. OF PIPE
WATER LINE
WATER VALVE NOTES:
1. 3" TO 12" GATE VALVE SHALL BE RESILIENT SEATED WEDGE GATE VALVES ACCORDANCE WITH AWWA STANDARD C-509.
2. A VALVE EXTENSION STEM SHALL BE REQUIRED FOR ANY VALVE WHOSE OPERATING NUT IS LOCATED IN EXCESS OF 4 FEET BELOW THE TOP OF VALVE BOX. THIS EXTENSION SHALL BE OF SUFFICIENT LENGTH TO INSURE THAT ITS TOP IS WITHIN 2" OF THE VALVE BOX COVER.
3. ALL VALVES SHALL BE MARKED WITH A SAW ON THE CURB OR PAVEMENT WITH "V". THE "V" SHALL POINT TO THE LOCATION OF THE VALVE AS FOLLOWS: IF THE VALVE IS IN THE PAVING, THE "V" SHALL BE MARKED UPRIGHT; IF THE VALVE IS OUTSIDE THE PAVING, THE "V" SHALL BE MARKED UPSIDE DOWN.
4. ALL VALVES STACK COMPONENTS SHALL BE THREE PIECE SCREW TYPE CAST IRON.
5. IN ORDER TO MAINTAIN A MANAGEABLE PARTS INVENTORY AND WORKING KNOWLEDGE OF VALVES, THE FOLLOWING VALVES ARE APPROVED: MUELLER AND WATEROUS – 150 P.S.I. TEST.
GATE VALVE VALVE SETTING & BOX
N.T.S.
SQUARE HEAD
CENTERLINE RING
1" SOLID STEEL
LOWER NUT SOCKET
VALVE EXTENSION
N.T.S.
COVER
COLLAR
ADJUSTABLE EXTENSION
VALVE BOX
VALVE BOX WITH EXTENSION
N.T.S.
5 7/8"x 1/2" DEEP RECESS FOR ENDPOINT W/ KNOCKOUT FOR AMR (OPTIONAL)
12 5/8"
WATER METER
DO NOT DRIVE
LITTLE ELM LOGO MOLDED IN LID
LID PLAN VIEW
1 13/16"
LID SECTION
DFW LOCK
CONCRETE PAD 24" SQUARE SHALL BE POURED AROUND ALL VALVE BOXES NOT PLACED WITHIN CONCRETE PAVEMENT. 3,000 P.S.I. CONCRETE, 6 INCH THICK
FOUR NO. 3 BARS
CONCRETE PAD SHALL BE MARKED ON THE SIDE OF THE PAD WITH THE INCOMING WATER LINE WITH A "V", WHERE "X" IS THE SIZE OF THE WATER LINE
VALVE BOX PAD PLAN
N.T.S.
17 3/4"
CAST IRON RING (DFW18-RING)
11 3/4" OPENING
18"
14" OPENING
3/8" WALL
14"
CRUSH RESISTANT RIBBING (DFW1814F-BODY)
PIPE SLOT
SIDE VIEW
NOTES:
1. WATER METER BOX BODY SHALL BE DFW PLASTICS MODEL NO. DFW1814F-BODY. BOX LID SHALL BE DFW PLASTICS MODEL NO. DFW18AMR-TKA% LE-LID. RING CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON, BODY CONSTRUCTED OF HDPE. LID CONSTRUCTED OF HDPE.
2. METER BOX DESIGNED TO WITHSTAND NON-DELIBERATE AND INCIDENTAL TRAFFIC. NOT RATED FOR USE IN ROADWAYS.
WATER METER BOX (DFW PLASTICS, INC.)
N.T.S.
4 #3 BARS
COVER
VALVE BOX PAD
FINISHED GRADE
PIPE O.D.
BUTTERFLY VALVE
2" TYP.
VALVE OPERATOR WITH NECESSARY EXTENSIONS AND GROUND LEVEL POSITION INDICATOR
NO. 5 BARS @ 12" O.C.E.F.
30# FELT PAPER
NO. 3 BARS CAGE
NO. 4 BARS @6" O.C.
4-NO. 3 BARS
3,500 P.S.I. CONCRETE
NO. 3 BARS @ 12" O.C.E.W.
LENGTH AS REQUIRED BY SIZE OF VALVE
#5 BARS @ 12" O.C.E.F.
PIPE SUPPORT
#3 BARS @ 12" O.C.
NOTES:
1. ALL OPERATING NUTS SHALL BE EXTENDED TO WITHIN 6" OF FINAL GRADE.
2. BUTTERFLY VALVE SHALL BE MANUFACTURED BY MUELLER OR ENGINEER-APPROVED EQUAL.
3. 6" BYPASS MAY BE REQUIRED BY TOWN ENGINEER OR HIS/HER DESIGNEE ON SITE SPECIFIC PROJECTS.
BUTTERFLY VALVE
N.T.S.
APPROX. FINISHED GRADE
VALVE BOX PAD
EXTEND 3" ABOVE GROUND
PRECAST 4' DIAMETER MANHOLE CONE SECTION
2" COPPER PIPE
2" SQUARE NUT GATE VALVE
2" COMBINATION AIR AND VACUUM RELEASE VALVE MANUFACTURED BY APCO, CLA-VAL OR ENGINEER APPROVED EQUAL
VARIABLE
SLOPE 1/8" PER FT.
WASHED GRAVEL
2" CORP. COCK
2" OUTLET
2" COPPER PIPE
WATER LINE
VARIABLE
2" COMBINATION AIR AND VACUUM RELEASE VALVE
N.T.S.
OPTIONAL 2" DRILLED AMR HOLE W/ PLUG
LITTLE ELM LOGO MOLDED IN LID
KEYHOLE
PLAN VIEW
NOTES:
1. WATER METER BOX SHALL BE BASS & HAYS PATTERN NO. P34P-1402IS. BOX LID SHALL BE BASS & HAYS PATTERN NUMBER BH-3LIDP. RING CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON. ENCLOSURE AND LID CONSTRUCTED OF HIGH DENSITY POLYETHYLENE.
2. RING WEIGHT 12 LBS. COVER WEIGHT 4 LBS. ENCLOSURE WEIGHT 11 LBS. NOT RATED FOR USE IN ROADWAYS.
1 7/8"
12 1/2"
BRASS LATCH KEY LOCK & COIL SPRING
17 3/4"
12 13/16"
(4) 304SS #14 1-1/2" SLOTTED HEX HEAD SCREWS
(4) SCREW HOLES EVENLY SPACED
11 1/4" CLEAR OPENING
1/2" WALL
14 1/4"
8"
2 1/2"
18 1/4"
SECTION VIEW
8 1/4"
18 1/4"
SIDE VIEW
WATER METER BOX (BASS & HAYS FOUNDRY, INC.)
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 2 OF 4
LITTLEELM
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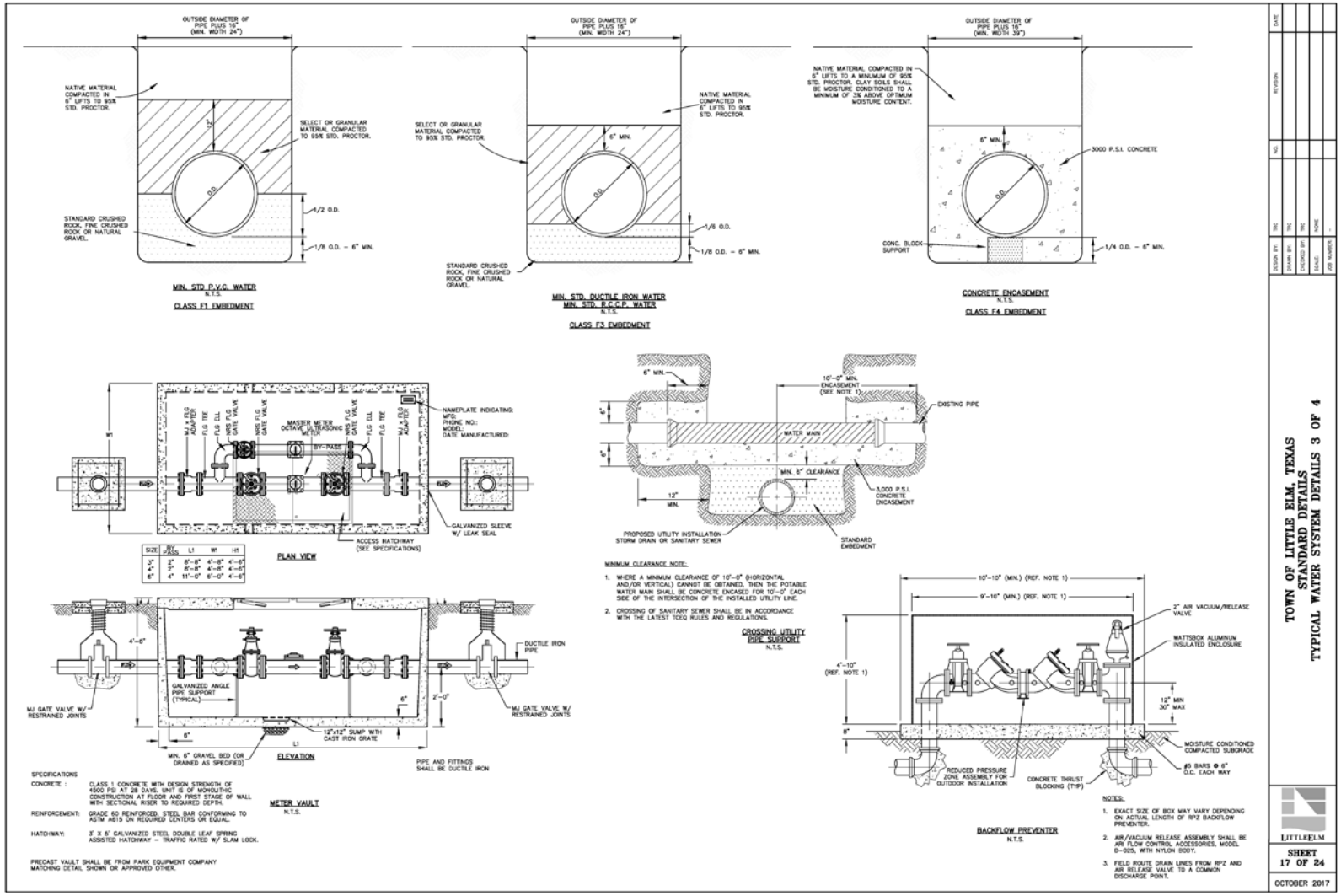
MIN. STD P.V.C. WATER
N.T.S.
CLASS F1 EMBEDMENT
MIN. STD. DUCTILE IRON WATER
MIN. STD. R.C.C.P. WATER
N.T.S.
CLASS F3 EMBEDMENT
CONCRETE ENCASEMENT
N.T.S.
CLASS F4 EMBEDMENT
PLAN VIEW
ELEVATION
METER VAULT
N.T.S.
CROSSING UTILITY PIPE SUPPORT
N.T.S.
BACKFLOW PREVENTER
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 3 OF 4
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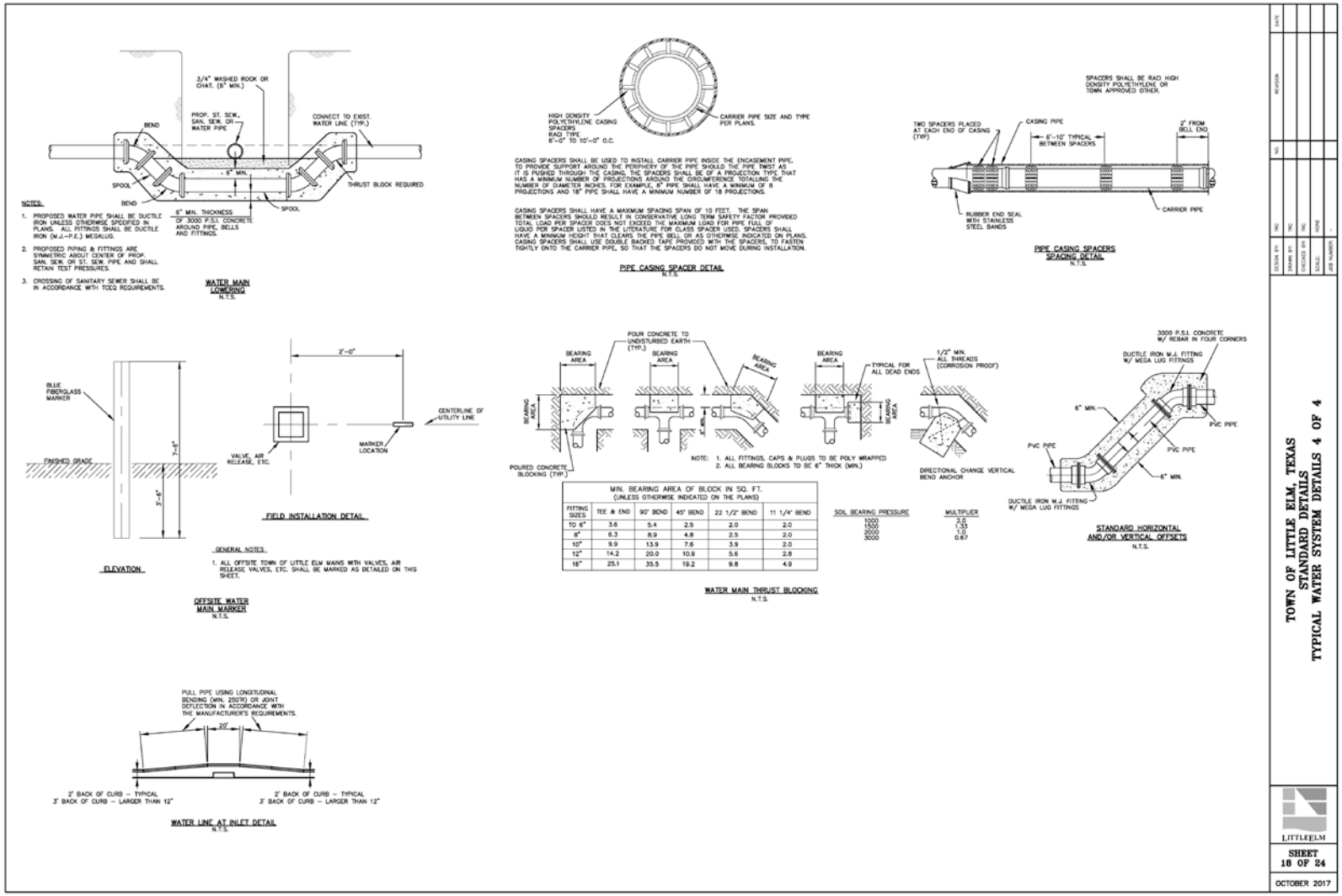
3/4" WASHED ROCK OR CHAT. (6" MIN.)
PROP. ST. SEW., SAN. SEW. OR WATER PIPE
CONNECT TO EXIST. WATER LINE (TYP.)
BEND
SPOOL
6" MIN.
THRUST BLOCK REQUIRED
BEND
SPOOL
6" MIN. THICKNESS OF 3000 P.S.I. CONCRETE AROUND PIPE, BELLS AND FITTINGS.
NOTES:
1. PROPOSED WATER PIPE SHALL BE DUCTILE IRON UNLESS OTHERWISE SPECIFIED IN PLANS. ALL FITTINGS SHALL BE DUCTILE IRON (M.J.-P.E.) MEGALUG.
2. PROPOSED PIPING & FITTINGS ARE SYMMETRIC ABOUT CENTER OF PROP. SAN. SEW. OR ST. SEW. PIPE AND SHALL RETAIN TEST PRESSURES.
3. CROSSING OF SANITARY SEWER SHALL BE IN ACCORDANCE WITH TCEQ REQUIREMENTS.
WATER MAIN LOWDRING
N.T.S.
HIGH DENSITY POLYETHYLENE CASING SPACERS RAD TYPE 6'-0" TO 10'-0" O.C.
CARRIER PIPE SIZE AND TYPE PER PLANS.
CASING SPACERS SHALL BE USED TO INSTALL CARRIER PIPE INSIDE THE ENCASEMENT PIPE. TO PROVIDE SUPPORT AROUND THE PERIPHERY OF THE PIPE SHOULD THE PIPE TWIST AS IT IS PUSHED THROUGH THE CASING. THE SPACERS SHALL BE OF A PROJECTION TYPE THAT HAS A MINIMUM NUMBER OF PROJECTIONS AROUND THE CIRCUMFERENCE TOTALLING THE NUMBER OF DIAMETER INCHES. FOR EXAMPLE, 8" PIPE SHALL HAVE A MINIMUM OF 8 PROJECTIONS AND 18" PIPE SHALL HAVE A MINIMUM NUMBER OF 18 PROJECTIONS.
CASING SPACERS SHALL HAVE A MAXIMUM SPACING SPAN OF 10 FEET. THE SPAN BETWEEN SPACERS SHOULD RESULT IN CONSERVATIVE LONG TERM SAFETY FACTOR PROVIDED TOTAL LOAD PER SPACER DOES NOT EXCEED THE MAXIMUM LOAD FOR PIPE FULL OF LIQUID PER SPACER LISTED IN THE LITERATURE FOR CLASS SPACER USED. SPACERS SHALL HAVE A MINIMUM HEIGHT THAT CLEARS THE PIPE BELL OR AS OTHERWISE INDICATED ON PLANS. CASING SPACERS SHALL USE DOUBLE BACKED TAPE PROVIDED WITH THE SPACERS, TO FASTEN TIGHTLY ONTO THE CARRIER PIPE, SO THAT THE SPACERS DO NOT MOVE DURING INSTALLATION.
PIPE CASING SPACER DETAIL
N.T.S.
SPACERS SHALL BE RAD. HIGH DENSITY POLYETHYLENE OR TOWN APPROVED OTHER.
TWO SPACERS PLACED AT EACH END OF CASING (TYP.)
CASING PIPE
6'-10' TYPICAL BETWEEN SPACERS
2' FROM BELL END
RUBBER END SEAL WITH STAINLESS STEEL BANDS
CARRIER PIPE
PIPE CASING SPACERS SPACING DETAIL
N.T.S.
BLUE FIBERGLASS MARKER
FINISHED GRADE
7'-6"
3'-6"
2'-0"
CENTERLINE OF UTILITY LINE
VALVE, AIR RELEASE, ETC.
MARKER LOCATION
FIELD INSTALLATION DETAIL
ELEVATION
GENERAL NOTES
1. ALL OFFSITE TOWN OF LITTLE ELM MAINS WITH VALVES, AIR RELEASE VALVES, ETC. SHALL BE MARKED AS DETAILED ON THIS SHEET.
OFFSITE WATER MAIN MARKER
N.T.S.
POUR CONCRETE TO UNDISTURBED EARTH (TYP.)
BEARING AREA
POURED CONCRETE BLOCKING (TYP.)
TYPICAL FOR ALL DEAD ENDS
1/2" MIN. ALL THREADS (CORROSION PROOF)
DIRECTIONAL CHANGE VERTICAL BEND ANCHOR
NOTE: 1. ALL FITTINGS, CAPS & PLUGS TO BE POLY WRAPPED
2. ALL BEARING BLOCKS TO BE 6" THICK (MIN.)
MIN. BEARING AREA OF BLOCK IN SQ. FT. (UNLESS OTHERWISE INDICATED ON THE PLANS)
FITTING SIZES | TEE & END | 90° BEND | 45° BEND | 22 1/2° BEND | 11 1/4° BEND
TO 6" | 3.6 | 5.4 | 2.5 | 2.0 | 2.0
8" | 6.3 | 8.9 | 4.8 | 2.5 | 2.0
10" | 9.9 | 13.9 | 7.6 | 3.9 | 2.0
12" | 14.2 | 20.0 | 10.9 | 5.6 | 2.8
16" | 25.1 | 35.5 | 19.2 | 9.8 | 4.9
SOIL BEARING PRESSURE
1000
1500
2000
3000
MULTIPLIER
2.0
1.33
1.0
0.67
WATER MAIN THRUST BLOCKING
N.T.S.
3000 P.S.I. CONCRETE W/ REBAR IN FOUR CORNERS
DUCTILE IRON M.J. FITTING W/ MEGA LUG FITTINGS
6" MIN.
PVC PIPE
PVC PIPE
PVC PIPE
6" MIN.
DUCTILE IRON M.J. FITTING W/ MEGA LUG FITTINGS
STANDARD HORIZONTAL AND/OR VERTICAL OFFSETS
N.T.S.
PULL PIPE USING LONGITUDINAL BENDING (MIN. 250'R) OR JOINT DEFLECTION IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
20'
2' BACK OF CURB – TYPICAL
3' BACK OF CURB – LARGER THAN 12"
2' BACK OF CURB – TYPICAL
3' BACK OF CURB – LARGER THAN 12"
WATER LINE AT INLET DETAIL
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 4 OF 4
LITTLEELM
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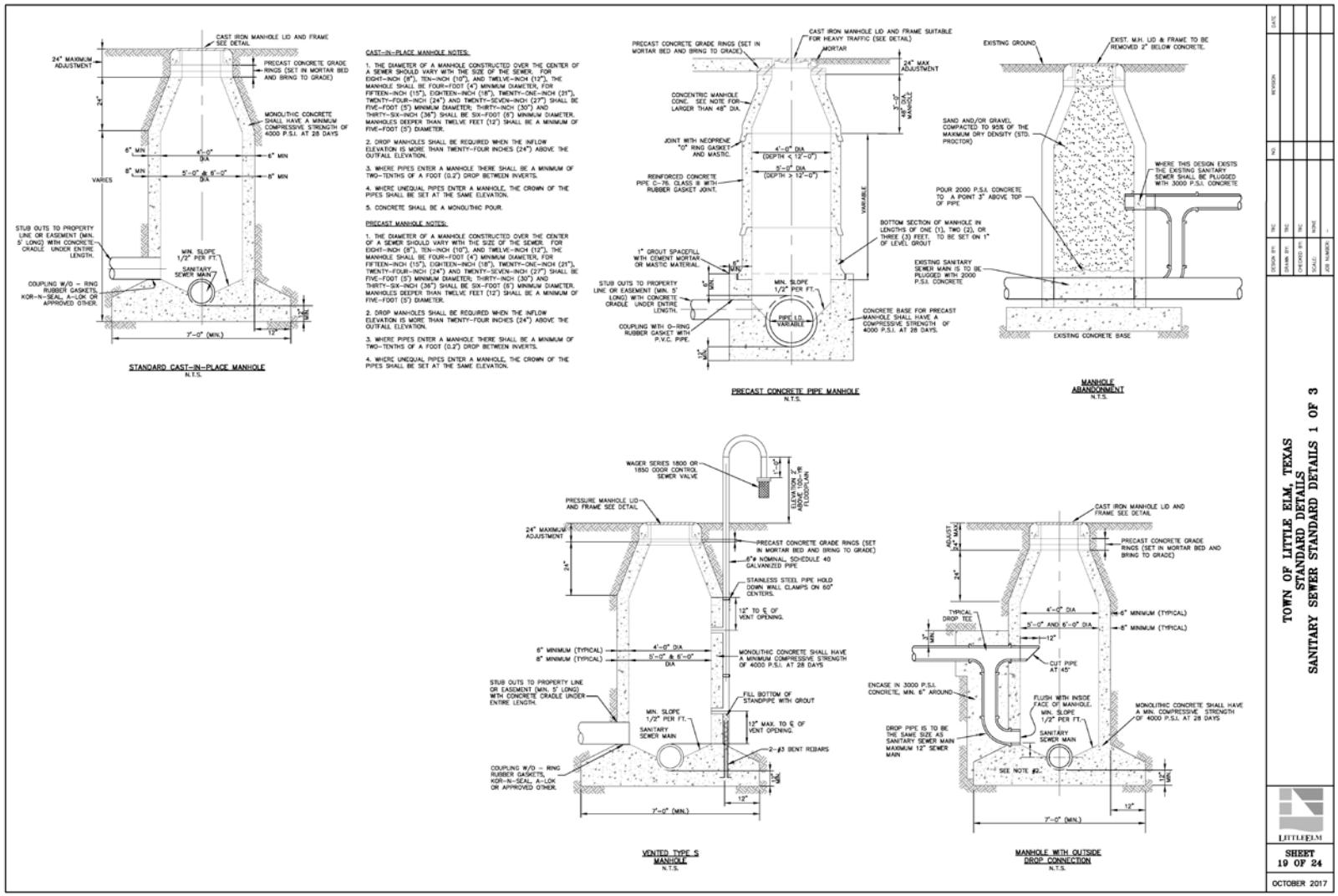
CAST IRON MANHOLE LID AND FRAME SEE DETAIL
24" MAXIMUM ADJUSTMENT
PRECAST CONCRETE GRADE RINGS (SET IN MORTAR BED AND BRING TO GRADE)
MONOLITHIC CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS
6" MIN
4'-0" DIA
6" MIN
VARIES
5'-0" & 6'-0" DIA
STUB OUTS TO PROPERTY LINE OR EASEMENT (MIN. 5' LONG) WITH CONCRETE CRADLE UNDER ENTIRE LENGTH.
MIN. SLOPE 1/2" PER FT.
SANITARY SEWER MAIN
COUPLING W/O – RING RUBBER GASKETS, KOR-N-SEAL, A-LOK OR APPROVED OTHER.
7'-0" (MIN.)
12"
STANDARD CAST-IN-PLACE MANHOLE
N.T.S.
CAST-IN-PLACE MANHOLE NOTES:
1. THE DIAMETER OF A MANHOLE CONSTRUCTED OVER THE CENTER OF A SEWER SHOULD VARY WITH THE SIZE OF THE SEWER. FOR EIGHT-INCH (8"), TEN-INCH (10"), AND TWELVE-INCH (12"), THE MANHOLE SHALL BE FOUR-FOOT (4') MINIMUM DIAMETER, FOR FIFTEEN-INCH (15"), EIGHTEEN-INCH (18"), TWENTY-ONE-INCH (21"), TWENTY-FOUR-INCH (24") AND TWENTY-SEVEN-INCH (27") SHALL BE FIVE-FOOT (5') MINIMUM DIAMETER; THIRTY-INCH (30") AND THIRTY-SIX-INCH (36") SHALL BE SIX-FOOT (6') MINIMUM DIAMETER. MANHOLES DEEPER THAN TWELVE FEET (12') SHALL BE A MINIMUM OF FIVE-FOOT (5') DIAMETER.
2. DROP MANHOLES SHALL BE REQUIRED WHEN THE INFLOW ELEVATION IS MORE THAN TWENTY-FOUR INCHES (24") ABOVE THE OUTFALL ELEVATION.
3. WHERE PIPES ENTER A MANHOLE THERE SHALL BE A MINIMUM OF TWO-TENTHS OF A FOOT (0.2') DROP BETWEEN INVERTS.
4. WHERE UNEQUAL PIPES ENTER A MANHOLE, THE CROWN OF THE PIPES SHALL BE SET AT THE SAME ELEVATION.
5. CONCRETE SHALL BE A MONOLITHIC POUR.
PRECAST MANHOLE NOTES:
1. THE DIAMETER OF A MANHOLE CONSTRUCTED OVER THE CENTER OF A SEWER SHOULD VARY WITH THE SIZE OF THE SEWER. FOR EIGHT-INCH (8"), TEN-INCH (10"), AND TWELVE-INCH (12"), THE MANHOLE SHALL BE FOUR-FOOT (4') MINIMUM DIAMETER, FOR FIFTEEN-INCH (15"), EIGHTEEN-INCH (18"), TWENTY-ONE-INCH (21"), TWENTY-FOUR-INCH (24") AND TWENTY-SEVEN-INCH (27") SHALL BE FIVE-FOOT (5') MINIMUM DIAMETER; THIRTY-INCH (30") AND THIRTY-SIX-INCH (36") SHALL BE SIX-FOOT (6') MINIMUM DIAMETER. MANHOLES DEEPER THAN TWELVE FEET (12') SHALL BE A MINIMUM OF FIVE-FOOT (5') DIAMETER.
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4. WHERE UNEQUAL PIPES ENTER A MANHOLE, THE CROWN OF THE PIPES SHALL BE SET AT THE SAME ELEVATION.
PRECAST CONCRETE GRADE RINGS (SET IN MORTAR BED AND BRING TO GRADE)
CAST IRON MANHOLE LID AND FRAME SUITABLE FOR HEAVY TRAFFIC (SEE DETAIL)
MORTAR
24" MAX ADJUSTMENT
CONCENTRIC MANHOLE CONE. SEE NOTE FOR LARGER THAN 48" DIA.
3'-0" OR 4'-0" DIA MANHOLE
JOINT WITH NEOPRENE "O" RING GASKET AND MASTIC.
4'-0" DIA (DEPTH < 12'-0")
5'-0" DIA (DEPTH > 12'-0")
REINFORCED CONCRETE PIPE C-76, CLASS III WITH RUBBER GASKET JOINT.
VARIABLE
BOTTOM SECTION OF MANHOLE IN LENGTHS OF ONE (1), TWO (2), OR THREE (3) FEET. TO BE SET ON 1" OF LEVEL GROUT
1" GROUT SPACEFILL WITH CEMENT MORTAR OR MASTIC MATERIAL.
STUB OUTS TO PROPERTY LINE OR EASEMENT (MIN. 5' LONG) WITH CONCRETE CRADLE UNDER ENTIRE LENGTH.
MIN. SLOPE 1/2" PER FT.
PIPE I.D. VARIABLE
COUPLING WITH O-RING RUBBER GASKET WITH P.V.C. PIPE.
CONCRETE BASE FOR PRECAST MANHOLE SHALL HAVE A COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS.
PRECAST CONCRETE PIPE MANHOLE
N.T.S.
EXISTING GROUND
EXIST. M.H. LID & FRAME TO BE REMOVED 2" BELOW CONCRETE.
SAND AND/OR GRAVEL COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY (STD. PROCTOR)
WHERE THIS DESIGN EXISTS THE EXISTING SANITARY SEWER SHALL BE PLUGGED WITH 3000 P.S.I. CONCRETE
POUR 2000 P.S.I. CONCRETE TO A POINT 3" ABOVE TOP OF PIPE
EXISTING SANITARY SEWER MAIN IS TO BE PLUGGED WITH 2000 P.S.I. CONCRETE
EXISTING CONCRETE BASE
MANHOLE ABANDONMENT
N.T.S.
WAGER SERIES 1800 OR 1850 ODOR CONTROL SEWER VALVE
ELEVATION 1'-6" ABOVE 100 YR. FLOODPLAIN
PRESSURE MANHOLE LID AND FRAME SEE DETAIL
24" MAXIMUM ADJUSTMENT
PRECAST CONCRETE GRADE RINGS (SET IN MORTAR BED AND BRING TO GRADE)
6"ø NOMINAL, SCHEDULE 40 GALVANIZED PIPE
STAINLESS STEEL PIPE HOLD DOWN WALL CLAMPS ON 60" CENTERS.
12" TO ℄ OF VENT OPENING.
6" MINIMUM (TYPICAL)
8" MINIMUM (TYPICAL)
4'-0" DIA
5'-0" & 6'-0" DIA
MONOLITHIC CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS
STUB OUTS TO PROPERTY LINE OR EASEMENT (MIN. 5' LONG) WITH CONCRETE CRADLE UNDER ENTIRE LENGTH.
FILL BOTTOM OF STANDPIPE WITH GROUT
MIN. SLOPE 1/2" PER FT.
12" MAX. TO ℄ OF VENT OPENING.
SANITARY SEWER MAIN
2-#3 BENT REBARS
COUPLING W/O – RING RUBBER GASKETS, KOR-N-SEAL, A-LOK OR APPROVED OTHER.
7'-0" (MIN.)
12"
VENTED TYPE S MANHOLE
N.T.S.
CAST IRON MANHOLE LID AND FRAME SEE DETAIL
PRECAST CONCRETE GRADE RINGS (SET IN MORTAR BED AND BRING TO GRADE)
TYPICAL DROP TEE
4'-0" DIA
5'-0" AND 6'-0" DIA
6" MINIMUM (TYPICAL)
8" MINIMUM (TYPICAL)
CUT PIPE AT 45°
ENCASE IN 3000 P.S.I. CONCRETE, MIN. 6" AROUND
FLUSH WITH INSIDE FACE OF MANHOLE.
MONOLITHIC CONCRETE SHALL HAVE A MIN. COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS
MIN. SLOPE 1/2" PER FT.
DROP PIPE IS TO BE THE SAME SIZE AS SANITARY SEWER MAIN MAXIMUM 12" SEWER MAIN
SANITARY SEWER MAIN
SEE NOTE #2.
7'-0" (MIN.)
12"
MANHOLE WITH OUTSIDE DROP CONNECTION
N.T.S.
DATE
REVISION
NO.
DESIGN BY: TRC
DRAWN BY: TRC
CHECKED BY: TRC
SCALE: NONE
JOB NUMBER: -
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
SANITARY SEWER STANDARD DETAILS 1 OF 3
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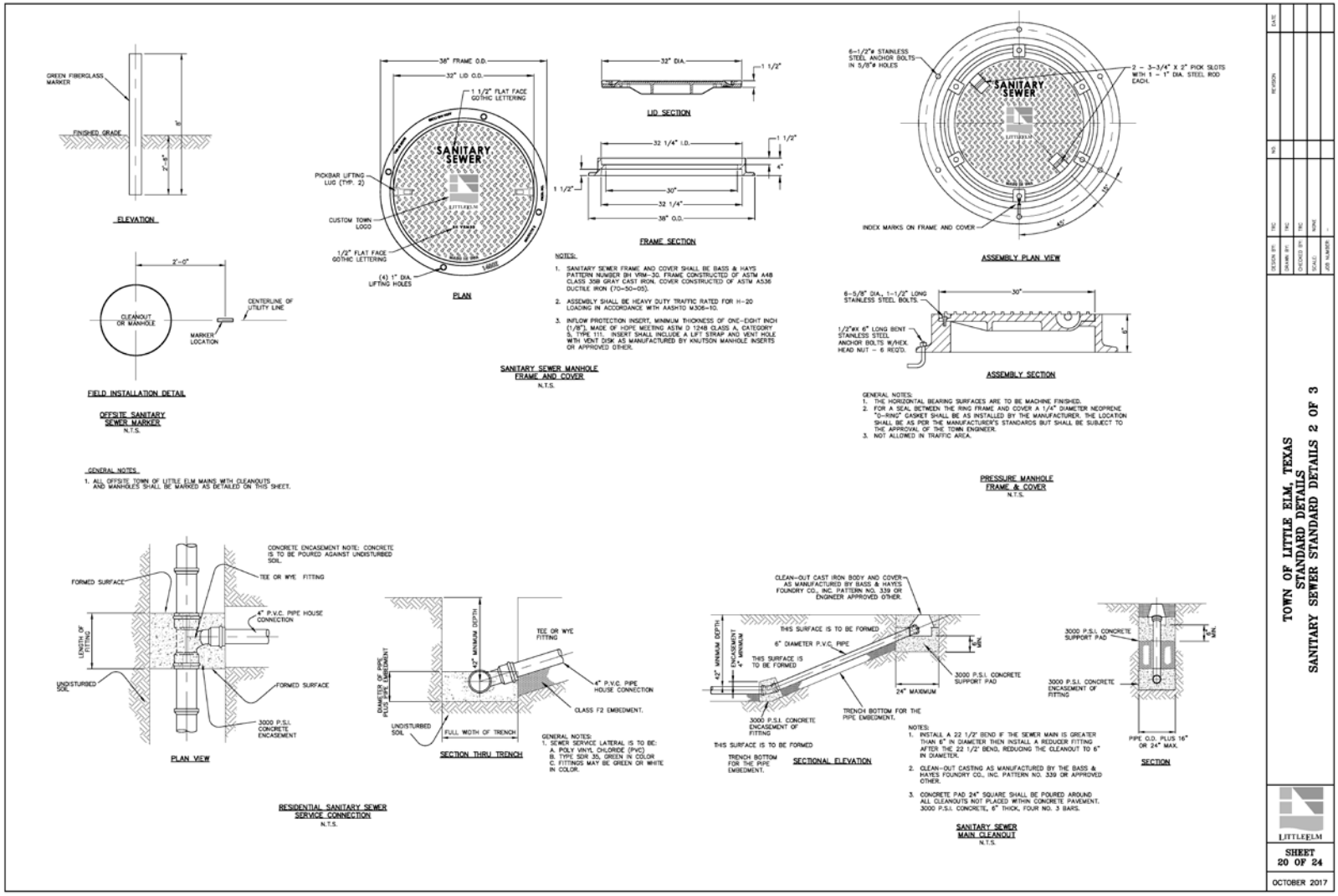
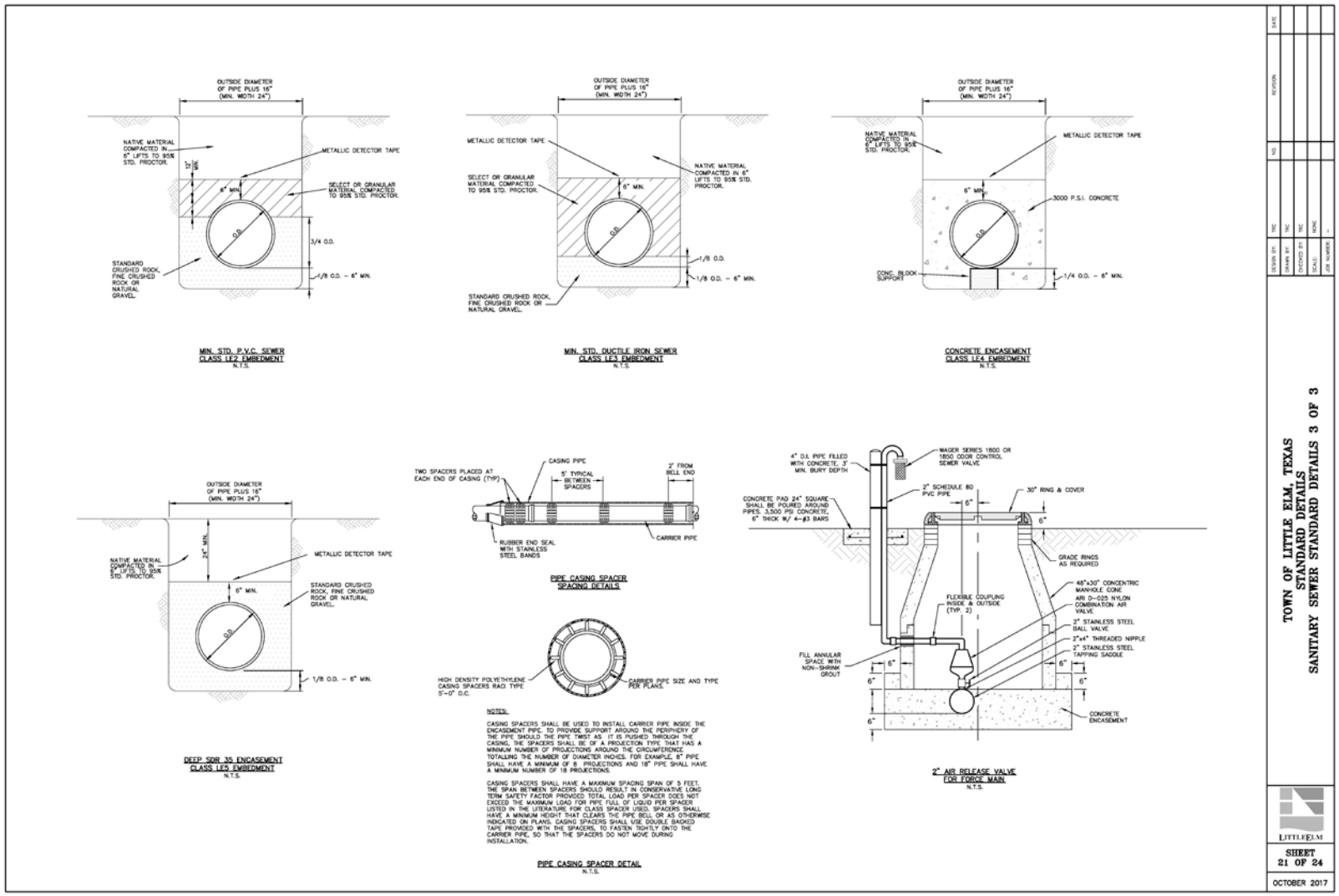
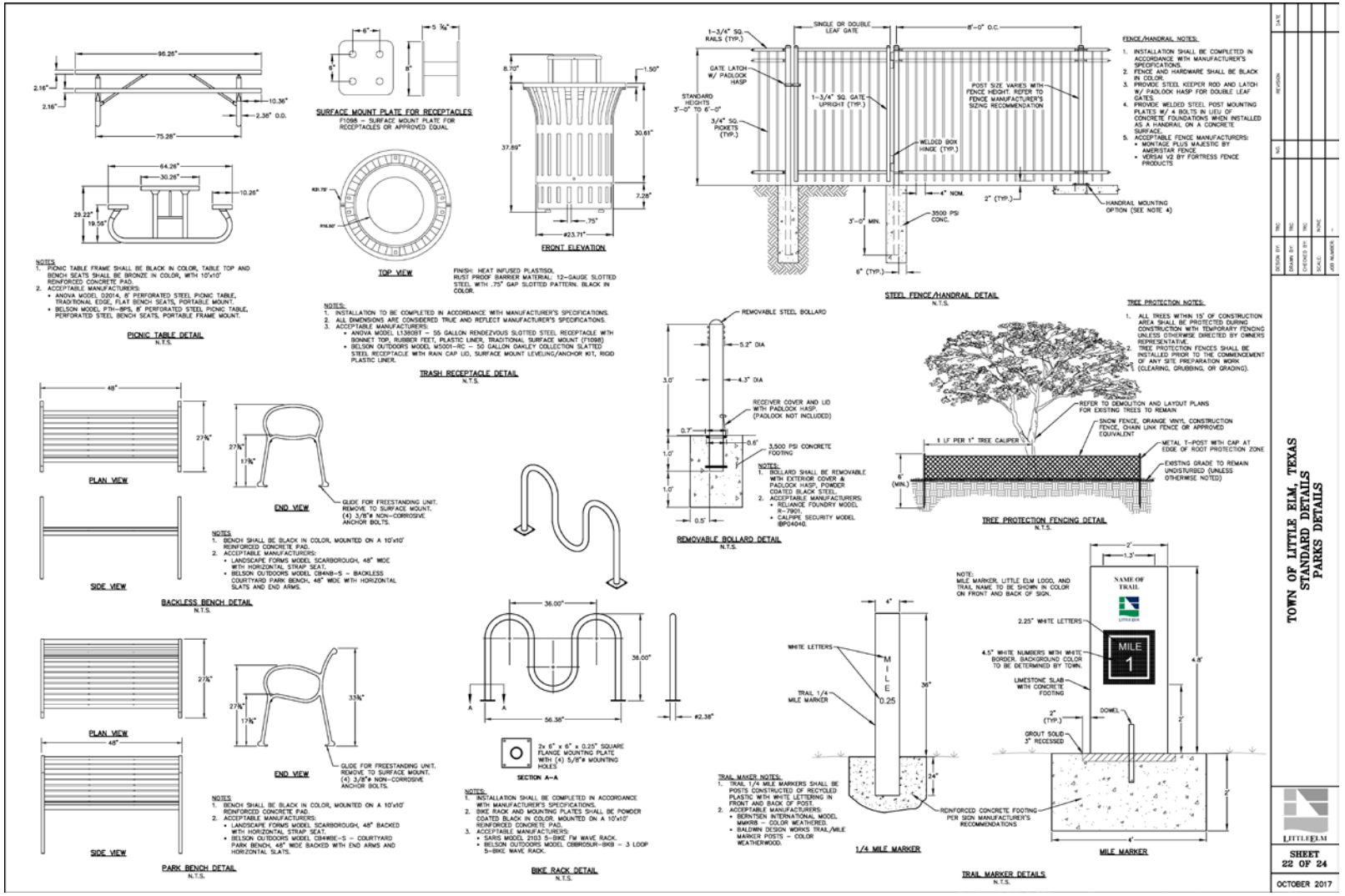

GREEN FIBERGLASS MARKER
FINISHED GRADE
ELEVATION
CLEANOUT OR MANHOLE
CENTERLINE OF UTILITY LINE
MARKER LOCATION
FIELD INSTALLATION DETAIL
OFFSITE SANITARY SEWER MARKER
N.T.S.
GENERAL NOTES
1. ALL OFFSITE TOWN OF LITTLE ELM MAINS WITH CLEANOUTS AND MANHOLES SHALL BE MARKED AS DETAILED ON THIS SHEET.
38" FRAME O.D.
32" LID O.D.
1 1/2" FLAT FACE GOTHIC LETTERING
SANITARY SEWER
PICKBAR LIFTING LUG (TYP. 2)
CUSTOM TOWN LOGO
1/2" FLAT FACE GOTHIC LETTERING
(4) 1" DIA. LIFTING HOLES
PLAN
32" DIA.
1 1/2"
LID SECTION
32 1/4" I.D.
30"
38" O.D.
4"
FRAME SECTION
NOTES:
1. SANITARY SEWER FRAME AND COVER SHALL BE BASS & HAYS PATTERN NUMBER SH VRM-30. FRAME CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON. COVER CONSTRUCTED OF ASTM A536 DUCTILE IRON (70-50-05).
2. ASSEMBLY SHALL BE HEAVY DUTY TRAFFIC RATED FOR H-20 LOADING IN ACCORDANCE WITH AASHTO M306-10.
3. INFLOW PROTECTION INSERT, MINIMUM THICKNESS OF ONE-EIGHT INCH (1/8"), MADE OF HDPE MEETING ASTM D 1248 CLASS A, CATEGORY 5, TYPE 111. INSERT SHALL INCLUDE A LIFT STRAP AND VENT HOLE WITH VENT DISK AS MANUFACTURED BY KNUTSON MANHOLE INSERTS OR APPROVED OTHER.
SANITARY SEWER MANHOLE FRAME AND COVER
N.T.S.
6-1/2"ø STAINLESS STEEL ANCHOR BOLTS IN 5/8"ø HOLES
2 - 3-3/4" X 2" PICK SLOTS WITH 1 - 1" DIA. STEEL ROD EACH.
SANITARY SEWER
INDEX MARKS ON FRAME AND COVER
ASSEMBLY PLAN VIEW
6-5/8" DIA., 1-1/2" LONG STAINLESS STEEL BOLTS.
30"
1/2"øx 6" LONG BENT STAINLESS STEEL ANCHOR BOLTS W/HEX. HEAD NUT - 6 REQ'D.
ASSEMBLY SECTION
GENERAL NOTES:
1. THE HORIZONTAL BEARING SURFACES ARE TO BE MACHINE FINISHED.
2. FOR A SEAL BETWEEN THE RING FRAME AND COVER A 1/4" DIAMETER NEOPRENE "O-RING" GASKET SHALL BE AS INSTALLED BY THE MANUFACTURER. THE LOCATION SHALL BE AS PER THE MANUFACTURER'S STANDARDS BUT SHALL BE SUBJECT TO THE APPROVAL OF THE TOWN ENGINEER.
3. NOT ALLOWED IN TRAFFIC AREA.
PRESSURE MANHOLE FRAME & COVER
N.T.S.
CONCRETE ENCASEMENT NOTE: CONCRETE IS TO BE POURED AGAINST UNDISTURBED SOIL.
FORMED SURFACE
TEE OR WYE FITTING
4" P.V.C. PIPE HOUSE CONNECTION
LENGTH OF FITTING
UNDISTURBED SOIL
FORMED SURFACE
3000 P.S.I. CONCRETE ENCASEMENT
PLAN VIEW
DIAMETER OF PIPE PLUS PIPE EMBEDMENT
12" MINIMUM DEPTH
TEE OR WYE FITTING
4" P.V.C. PIPE HOUSE CONNECTION
CLASS F2 EMBEDMENT.
UNDISTURBED SOIL
FULL WIDTH OF TRENCH
SECTION THRU TRENCH
GENERAL NOTES:
1. SEWER SERVICE LATERAL IS TO BE:
A. POLY VINYL CHLORIDE (PVC)
B. TYPE SDR 35, GREEN IN COLOR
C. FITTINGS MAY BE GREEN OR WHITE IN COLOR.
RESIDENTIAL SANITARY SEWER SERVICE CONNECTION
N.T.S.
CLEAN-OUT CAST IRON BODY AND COVER AS MANUFACTURED BY BASS & HAYES FOUNDRY CO., INC. PATTERN NO. 339 OR ENGINEER APPROVED OTHER.
42" MINIMUM DEPTH
4" MINIMUM ENCASEMENT
THIS SURFACE IS TO BE FORMED
6" DIAMETER P.V.C. PIPE
THIS SURFACE IS TO BE FORMED
3000 P.S.I. CONCRETE SUPPORT PAD
24" MAXIMUM
TRENCH BOTTOM FOR THE PIPE EMBEDMENT.
3000 P.S.I. CONCRETE ENCASEMENT OF FITTING
THIS SURFACE IS TO BE FORMED
TRENCH BOTTOM FOR THE PIPE EMBEDMENT.
SECTIONAL ELEVATION
NOTES:
1. INSTALL A 22 1/2° BEND IF THE SEWER MAIN IS GREATER THAN 6" IN DIAMETER THEN INSTALL A REDUCER FITTING AFTER THE 22 1/2° BEND, REDUCING THE CLEANOUT TO 6" IN DIAMETER.
2. CLEAN-OUT CASTING AS MANUFACTURED BY THE BASS & HAYES FOUNDRY CO., INC. PATTERN NO. 339 OR APPROVED OTHER.
3. CONCRETE PAD 24" SQUARE SHALL BE POURED AROUND ALL CLEANOUTS NOT PLACED WITHIN CONCRETE PAVEMENT. 3000 P.S.I. CONCRETE, 6" THICK, FOUR NO. 3 BARS.
SANITARY SEWER MAIN CLEANOUT
N.T.S.
3000 P.S.I. CONCRETE SUPPORT PAD
3000 P.S.I. CONCRETE ENCASEMENT OF FITTING
PIPE O.D. PLUS 16" OR 24" MAX.
SECTION
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
SANITARY SEWER STANDARD DETAILS 2 OF 3
LITTLEELM
SHEET 20 OF 24
OCTOBER 2017


OUTSIDE DIAMETER OF PIPE PLUS 16" (MIN. WIDTH 24")
NATIVE MATERIAL COMPACTED IN 6" LIFTS TO 95% STD. PROCTOR.
METALLIC DETECTOR TAPE
SELECT OR GRANULAR MATERIAL COMPACTED TO 95% STD. PROCTOR.
6" MIN.
O.D.
3/4 O.D.
1/8 O.D. - 6" MIN.
STANDARD CRUSHED ROCK, FINE CRUSHED ROCK OR NATURAL GRAVEL.
MIN. STD. P.V.C. SEWER CLASS LE2 EMBEDMENT
N.T.S.
METALLIC DETECTOR TAPE
SELECT OR GRANULAR MATERIAL COMPACTED TO 95% STD. PROCTOR.
NATIVE MATERIAL COMPACTED IN 6" LIFTS TO 95% STD. PROCTOR.
6" MIN.
O.D.
1/8 O.D.
1/8 O.D. - 6" MIN.
STANDARD CRUSHED ROCK, FINE CRUSHED ROCK OR NATURAL GRAVEL.
MIN. STD. DUCTILE IRON SEWER CLASS LE3 EMBEDMENT
N.T.S.
NATIVE MATERIAL COMPACTED IN 6" LIFTS TO 95% STD. PROCTOR.
METALLIC DETECTOR TAPE
6" MIN.
3000 P.S.I. CONCRETE
O.D.
CONC. BLOCK SUPPORT
1/4 O.D. - 6" MIN.
CONCRETE ENCASEMENT CLASS LE4 EMBEDMENT
N.T.S.
OUTSIDE DIAMETER OF PIPE PLUS 16" (MIN. WIDTH 24")
NATIVE MATERIAL COMPACTED IN 6" LIFTS TO 95% STD. PROCTOR.
24" MIN.
METALLIC DETECTOR TAPE
6" MIN.
STANDARD CRUSHED ROCK, FINE CRUSHED ROCK OR NATURAL GRAVEL.
O.D.
1/8 O.D. - 6" MIN.
DEEP SDR 35 ENCASEMENT CLASS LE5 EMBEDMENT
N.T.S.
TWO SPACERS PLACED AT EACH END OF CASING (TYP)
CASING PIPE
5' TYPICAL BETWEEN SPACERS
2' FROM BELL END
RUBBER END SEAL WITH STAINLESS STEEL BANDS
CARRIER PIPE
PIPE CASING SPACER SPACING DETAILS
HIGH DENSITY POLYETHYLENE CASING SPACERS RACI TYPE 5'-0" O.C.
CARRIER PIPE SIZE AND TYPE PER PLANS
NOTES:
CASING SPACERS SHALL BE USED TO INSTALL CARRIER PIPE INSIDE THE ENCASEMENT PIPE. TO PROVIDE SUPPORT AROUND THE PERIPHERY OF THE PIPE SHOULD THE PIPE TWIST AS IT IS PUSHED THROUGH THE CASING, THE SPACERS SHALL BE OF A PROJECTION TYPE THAT HAS A MINIMUM NUMBER OF PROJECTIONS AROUND THE CIRCUMFERENCE TOTALLING THE NUMBER OF DIAMETER INCHES. FOR EXAMPLE, 8" PIPE SHALL HAVE A MINIMUM OF 8 PROJECTIONS AND 18" PIPE SHALL HAVE A MINIMUM NUMBER OF 18 PROJECTIONS.
CASING SPACERS SHALL HAVE A MAXIMUM SPACING SPAN OF 5 FEET. THE SPAN BETWEEN SPACERS SHOULD RESULT IN CONSERVATIVE LONG TERM SAFETY FACTOR PROVIDED TOTAL LOAD PER SPACER DOES NOT EXCEED THE MAXIMUM LOAD FOR PIPE FULL OF LIQUID PER SPACER LISTED IN THE LITERATURE FOR CLASS SPACER USED. SPACERS SHALL HAVE A MINIMUM HEIGHT THAT CLEARS THE PIPE BELL OR AS OTHERWISE INDICATED ON PLANS. CASING SPACERS SHALL USE DOUBLE BACKED TAPE PROVIDED WITH THE SPACERS, TO FASTEN TIGHTLY ONTO THE CARRIER PIPE, SO THAT THE SPACERS DO NOT MOVE DURING INSTALLATION.
PIPE CASING SPACER DETAIL
N.T.S.
4" D.I. PIPE FILLED WITH CONCRETE, 3' MIN. BURY DEPTH
WAGER SERIES 1800 OR 1850 ODOR CONTROL SEWER VALVE
2" SCHEDULE 80 PVC PIPE
30" RING & COVER
CONCRETE PAD 24" SQUARE SHALL BE POURED AROUND PIPES. 3,500 PSI CONCRETE, 6" THICK W/ 4-#3 BARS
6"
GRADE RINGS AS REQUIRED
48"x30" CONCENTRIC MANHOLE CONE
FLEXIBLE COUPLING INSIDE & OUTSIDE (TYP. 2)
ARI D-025 NYLON COMBINATION AIR VALVE
2" STAINLESS STEEL BALL VALVE
2"x4" THREADED NIPPLE
2" STAINLESS STEEL TAPPING SADDLE
FILL ANNULAR SPACE WITH NON-SHRINK GROUT
CONCRETE ENCASEMENT
2" AIR RELEASE VALVE FOR FORCE MAIN
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
SANITARY SEWER STANDARD DETAILS 3 OF 3
LITTLE ELM
SHEET 21 OF 24
OCTOBER 2017


PICNIC TABLE DETAIL
N.T.S.
SURFACE MOUNT PLATE FOR RECEPTACLES
TOP VIEW
FRONT ELEVATION
TRASH RECEPTACLE DETAIL
N.T.S.
STEEL FENCE/HANDRAIL DETAIL
N.T.S.
FENCE/HANDRAIL NOTES:
TREE PROTECTION NOTES:
REMOVABLE BOLLARD DETAIL
N.T.S.
TREE PROTECTION FENCING DETAIL
N.T.S.
PLAN VIEW
END VIEW
SIDE VIEW
BACKLESS BENCH DETAIL
N.T.S.
PARK BENCH DETAIL
N.T.S.
SECTION A-A
BIKE RACK DETAIL
N.T.S.
TRAIL MARKER NOTES:
1/4 MILE MARKER
MILE MARKER
TRAIL MARKER DETAILS
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
PARKS DETAILS
LITTLE ELM
SHEET
22 OF 24
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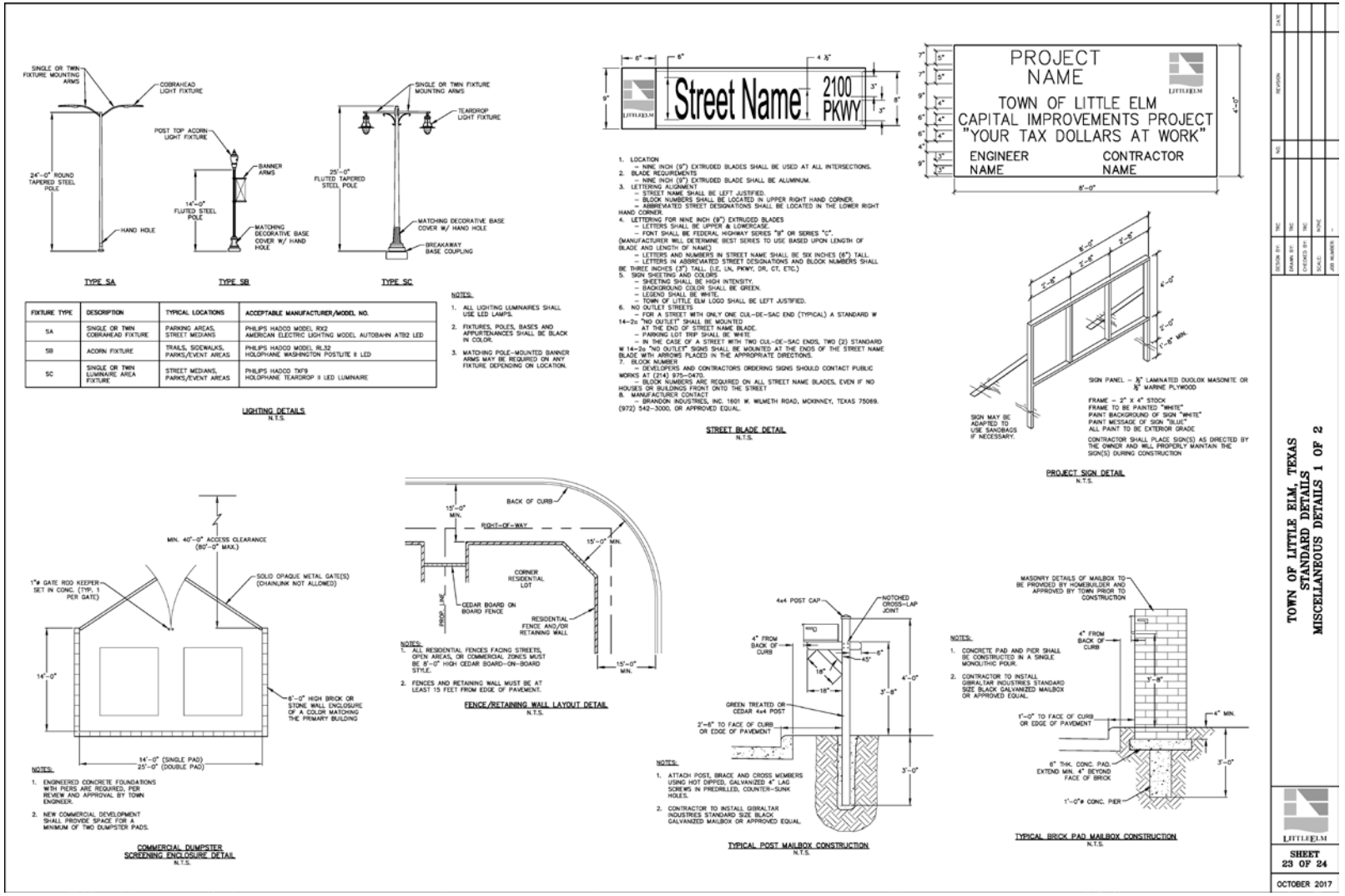
SINGLE OR TWIN FIXTURE MOUNTING ARMS
COBRAHEAD LIGHT FIXTURE
24'-0" ROUND TAPERED STEEL POLE
HAND HOLE
POST TOP ACORN LIGHT FIXTURE
BANNER ARMS
14'-0" FLUTED STEEL POLE
MATCHING DECORATIVE BASE COVER W/ HAND HOLE
SINGLE OR TWIN FIXTURE MOUNTING ARMS
TEARDROP LIGHT FIXTURE
25'-0" FLUTED TAPERED STEEL POLE
MATCHING DECORATIVE BASE COVER W/ HAND HOLE
BREAKAWAY BASE COUPLING
TYPE SA
TYPE SB
TYPE SC
FIXTURE TYPE | DESCRIPTION | TYPICAL LOCATIONS | ACCEPTABLE MANUFACTURER/MODEL NO.
SA | SINGLE OR TWIN COBRAHEAD FIXTURE | PARKING AREAS, STREET MEDIANS | PHILIPS HADCO MODEL RX2 AMERICAN ELECTRIC LIGHTING MODEL AUTOBAHN ATB2 LED
SB | ACORN FIXTURE | TRAILS, SIDEWALKS, PARKS/EVENT AREAS | PHILIPS HADCO MODEL RL32 HOLOPHANE WASHINGTON POSTLITE II LED
SC | SINGLE OR TWIN LUMINAIRE AREA FIXTURE | STREET MEDIANS, PARKS/EVENT AREAS | PHILIPS HADCO TXF9 HOLOPHANE TEARDROP II LED LUMINAIRE
NOTES:
1. ALL LIGHTING LUMINAIRES SHALL USE LED LAMPS.
2. FIXTURES, POLES, BASES AND APPURTENANCES SHALL BE BLACK IN COLOR.
3. MATCHING POLE-MOUNTED BANNER ARMS MAY BE REQUIRED ON ANY FIXTURE DEPENDING ON LOCATION.
LIGHTING DETAILS
N.T.S.
Street Name
2100 PKWY
1. LOCATION
– NINE INCH (9") EXTRUDED BLADES SHALL BE USED AT ALL INTERSECTIONS.
2. BLADE REQUIREMENTS
– NINE INCH (9") EXTRUDED BLADE SHALL BE ALUMINUM.
3. LETTERING ALIGNMENT
– STREET NAME SHALL BE LEFT JUSTIFIED.
– BLOCK NUMBERS SHALL BE LOCATED IN UPPER RIGHT HAND CORNER.
– ABBREVIATED STREET DESIGNATIONS SHALL BE LOCATED IN THE LOWER RIGHT HAND CORNER.
4. LETTERING FOR NINE INCH (9") EXTRUDED BLADES
– LETTERS SHALL BE UPPER & LOWERCASE.
– FONT SHALL BE FEDERAL HIGHWAY SERIES "B" OR SERIES "c". (MANUFACTURER WILL DETERMINE BEST SERIES TO USE BASED UPON LENGTH OF BLADE AND LENGTH OF NAME)
– LETTERS AND NUMBERS IN STREET NAME SHALL BE SIX INCHES (6") TALL.
– LETTERS IN ABBREVIATED STREET DESIGNATIONS AND BLOCK NUMBERS SHALL BE THREE INCHES (3") TALL. (I.E. LN, PKWY, DR, CT, ETC.)
5. SIGN SHEETING AND COLORS
– SHEETING SHALL BE HIGH INTENSITY.
– BACKGROUND COLOR SHALL BE GREEN.
– LEGEND SHALL BE WHITE.
– TOWN OF LITTLE ELM LOGO SHALL BE LEFT JUSTIFIED.
6. NO OUTLET STREETS
– FOR A STREET WITH ONLY ONE CUL-DE-SAC END (TYPICAL) A STANDARD W 14-2o "NO OUTLET" SHALL BE MOUNTED AT THE END OF STREET NAME BLADE.
– PARKING LOT TRIP SHALL BE WHITE.
– IN THE CASE OF A STREET WITH TWO CUL-DE-SAC ENDS, TWO (2) STANDARD W 14-2o "NO OUTLET" SIGNS SHALL BE MOUNTED AT THE ENDS OF THE STREET NAME BLADE WITH ARROWS PLACED IN THE APPROPRIATE DIRECTIONS.
7. BLOCK NUMBER
– DEVELOPERS AND CONTRACTORS ORDERING SIGNS SHOULD CONTACT PUBLIC WORKS AT (214) 975-0470.
– BLOCK NUMBERS ARE REQUIRED ON ALL STREET NAME BLADES, EVEN IF NO HOUSES OR BUILDINGS FRONT ONTO THE STREET
8. MANUFACTURER CONTACT
– BRANDON INDUSTRIES, INC. 1601 W. WILMETH ROAD, MCKINNEY, TEXAS 75069. (972) 542-3000, OR APPROVED EQUAL.
STREET BLADE DETAIL
N.T.S.
PROJECT NAME
TOWN OF LITTLE ELM
CAPITAL IMPROVEMENTS PROJECT
"YOUR TAX DOLLARS AT WORK"
ENGINEER NAME
CONTRACTOR NAME
SIGN MAY BE ADAPTED TO USE SANDBAGS IF NECESSARY.
SIGN PANEL – ¾" LAMINATED DUOLOX MASONITE OR ¾" MARINE PLYWOOD
FRAME – 2" X 4" STOCK
FRAME TO BE PAINTED "WHITE"
PAINT BACKGROUND OF SIGN "WHITE"
PAINT MESSAGE OF SIGN "BLUE"
ALL PAINT TO BE EXTERIOR GRADE
CONTRACTOR SHALL PLACE SIGN(S) AS DIRECTED BY THE OWNER AND WILL PROPERLY MAINTAIN THE SIGN(S) DURING CONSTRUCTION
PROJECT SIGN DETAIL
N.T.S.
MIN. 40'-0" ACCESS CLEARANCE (80'-0" MAX.)
1"ø GATE ROD KEEPER SET IN CONC. (TYP. 1 PER GATE)
SOLID OPAQUE METAL GATE(S) (CHAINLINK NOT ALLOWED)
14'-0"
6'-0" HIGH BRICK OR STONE WALL ENCLOSURE OF A COLOR MATCHING THE PRIMARY BUILDING
14'-0" (SINGLE PAD)
25'-0" (DOUBLE PAD)
NOTES:
1. ENGINEERED CONCRETE FOUNDATIONS WITH PIERS ARE REQUIRED, PER REVIEW AND APPROVAL BY TOWN ENGINEER.
2. NEW COMMERCIAL DEVELOPMENT SHALL PROVIDE SPACE FOR A MINIMUM OF TWO DUMPSTER PADS.
COMMERCIAL DUMPSTER SCREENING ENCLOSURE DETAIL
N.T.S.
BACK OF CURB
15'-0" MIN.
RIGHT-OF-WAY
15'-0" MIN.
CORNER RESIDENTIAL LOT
CEDAR BOARD ON BOARD FENCE
PROP. LINE
RESIDENTIAL FENCE AND/OR RETAINING WALL
15'-0" MIN.
NOTES:
1. ALL RESIDENTIAL FENCES FACING STREETS, OPEN AREAS, OR COMMERCIAL ZONES MUST BE 8'-0" HIGH CEDAR BOARD-ON-BOARD STYLE.
2. FENCES AND RETAINING WALL MUST BE AT LEAST 15 FEET FROM EDGE OF PAVEMENT.
FENCE/RETAINING WALL LAYOUT DETAIL
N.T.S.
4x4 POST CAP
NOTCHED CROSS-LAP JOINT
4" FROM BACK OF CURB
45°
6"
18"
18"
4'-0"
3'-8"
GREEN TREATED OR CEDAR 4x4 POST
2'-6" TO FACE OF CURB OR EDGE OF PAVEMENT
3'-0"
NOTES:
1. ATTACH POST, BRACE AND CROSS MEMBERS USING HOT DIPPED, GALVANIZED 4" LAG SCREWS IN PREDRILLED, COUNTER-SUNK HOLES.
2. CONTRACTOR TO INSTALL GIBRALTAR INDUSTRIES STANDARD SIZE BLACK GALVANIZED MAILBOX OR APPROVED EQUAL.
TYPICAL POST MAILBOX CONSTRUCTION
N.T.S.
MASONRY DETAILS OF MAILBOX TO BE PROVIDED BY HOMEBUILDER AND APPROVED BY TOWN PRIOR TO CONSTRUCTION
NOTES:
1. CONCRETE PAD AND PIER SHALL BE CONSTRUCTED IN A SINGLE MONOLITHIC POUR.
2. CONTRACTOR TO INSTALL GIBRALTAR INDUSTRIES STANDARD SIZE BLACK GALVANIZED MAILBOX OR APPROVED EQUAL.
4" FROM BACK OF CURB
3'-8"
1'-0" TO FACE OF CURB OR EDGE OF PAVEMENT
4" MIN.
3'-0"
6" THK. CONC. PAD EXTEND MIN. 4" BEYOND FACE OF BRICK
1'-0"ø CONC. PIER
TYPICAL BRICK PAD MAILBOX CONSTRUCTION
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
MISCELLANEOUS DETAILS 1 OF 2
LITTLE ELM
SHEET 23 OF 24
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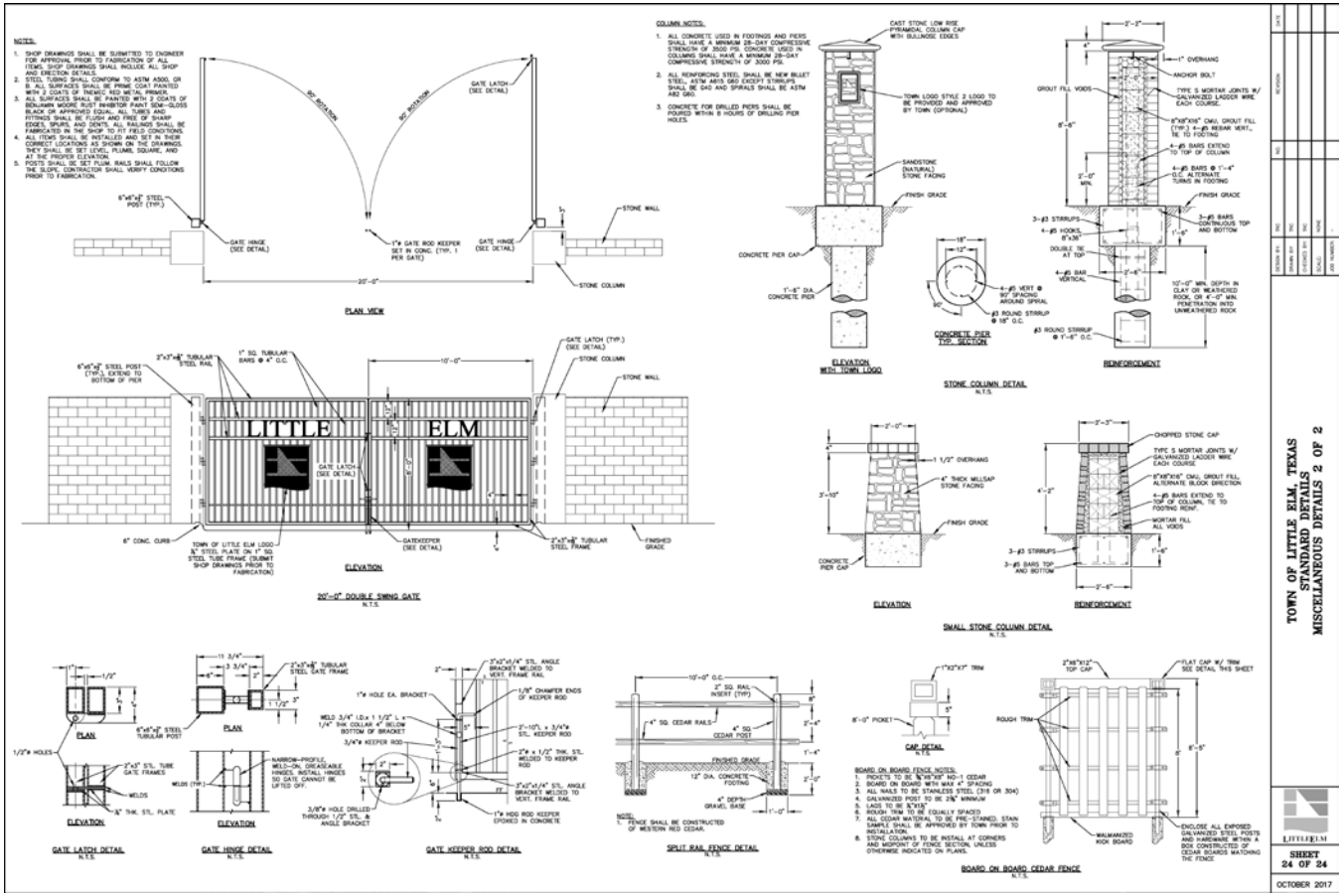

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

[Appendix.] Engineering Design Standards

Sec. 1.0 General requirement.

Purpose.

The design criteria and standards section of the subdivision regulations for the Town of Little Elm is intended primarily for use by the developer's engineer. These criteria and standards should enable the engineer to design the required community facilities in a manner acceptable to the town. There may be special circumstances which would call for requirements in excess of those outlined. In most cases, additional requirements will be apparent to the developer's engineer while preparing the plans for the subdivision.

Compliance Required.

Prior to the commission's approval of the final plat, the subdivider shall comply or provide for compliance with the policies and procedures set forth in these regulations for construction of street improvements and utilities. No building, sewer, electrical or plumbing permit shall be issued by the town as to any property in the subdivision until:

1. The preliminary plan has been approved; and
2. The working drawings, specifications and agreements required herein have been reviewed and approved by the affected agencies and, as required, by the town attorney.

Town Design Criteria and Standards.

There are hereby adopted by reference and made a part of these regulations design criteria and standards which shall be controlling in design, construction and installation of street paving, curbs and gutters, sidewalks, utilities and other public improvements required herein. All references to town design criteria and standards shall mean and include those standards and specifications, together with all exhibits, charts, drawings and diagrams appertaining thereto, which have been approved by the town's engineer, adopted by the town council, and placed on file in the office of the town secretary.

Installation and Financing.

The subdivider shall arrange with the town and with utility companies franchised to serve the area in which the subdivision is located for the construction costs of streets and alleys, utility lines and other public improvements. The subdivider shall also arrange for the sequence of work so that underground utilities shall be installed in those portions of streets intended for vehicular traffic before such streets shall be surfaced. If the several improvements required herein have not been installed or constructed prior to submission of the final plat then the final plat shall bear a restriction that no lot shall be occupied and that no municipal services shall be extended thereto until the specified utilities and improvements have been constructed as required.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 2.0 Street standards.

Thoroughfare Design Requirements

A. *Street Widths*

1. Street widths for all subdivisions shall be 31 feet from back of curb to back of curb on residential sections. All streets which are not governed by one of the following conditions shall be considered residential for width design:

2. Designated as a collector (which shall be 37 feet from back of curb to back of curb) or thoroughfare (which shall be 46 feet from back of curb to back of curb) by the town's comprehensive plan.

3. Adjacent to commercial or multifamily land-use where, in the opinion of the town's engineer or the town's planner, additional street width is indicated for proper access and circulation.

4. Where, in the opinion of the town administration or in the opinion of the developer with the concurrence of the town administration, the esthetic value achieved from extra width is dictated by special conditions.

5. In the case of [subsection] (1) above, the section to be constructed shall be in accordance with the comprehensive plan or a revision thereof based on updated conditions. In the case of [subsections] (2) and (3), each condition will be studied individually and approved by the town prior to approval of the subdivision in question.

B. *Street Sections.*

1. Street sections shall be as shown on the following pages for residential, collector and thoroughfare type streets. These sections shall govern except in conditions of [subsections] (2) and (3) above. In those instances, each condition shall be studied by the town's staff individually and designed for the specific situation. Such design must be approved by the town prior to approval of the subdivision in question.

Sidewalk Policy.

Statement of policy on sidewalks.

a. Sidewalks shall be required in those locations where travel by foot is of such a volume as to warrant special protection for pedestrians using the public right-of-way.

b. In general, this requirement shall be considered to have been met when sidewalks are installed along such thoroughfares, arterial streets and other streets that provide major pedestrian access to schools, places of public assembly and commercial centers. Further, sidewalks may be installed by order of the town council upon receipt of a petition signed by more than 60 percent of property owners and 60 percent of properties in any one block face.

c. Sidewalks adjacent to arterials and collectors shall be a minimum of six feet.

d. Sidewalks adjacent to residential streets shall be a minimum of five feet in width.

e. The cost of constructing sidewalks shall be assessed against the abutting property where such property is especially benefited.

f. Developed area criteria.

a. Town initiated. In cases where the town initiates construction of sidewalks, a public hearing shall be held upon the necessity for such construction and the special benefits, if any, that accrue to the property being assessed.

b. Property owner initiated. In cases where sidewalk construction improvements are initiated by a petition of 60 percent or more of the abutting property owners and properties in any one block face, the cost of the improvements shall be assessed against the abutting property owners, following a public hearing upon the necessity for such construction and the special benefits if any, that accrue to the property being assessed.

Criteria for Property Being Developed.

At the option of the developer, required sidewalks shall be installed either with the construction of abutting street improvements or at the building site prior to occupancy. The town may require the construction of the sidewalk improvement in advance of the issuance of a building permit where such sidewalk construction is necessary to protect the public safety.

Street Name Signs.

The subdivider shall install or shall arrange for the installation of street name signs satisfying the specifications of the town.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 3.0 Drainage design requirements

Section 3.1. Introduction

3.1.1 Stormwater Goals and Objectives

The purpose of this manual is to provide *adequate stormwater management* within the Town of Little Elm (Town) and its extraterritorial jurisdiction (ETJ). *Adequate stormwater management* is achieved by the development, adoption, and enforcement of policies and standards for drainage design that achieve the following goals:

1. Protect public health and safety
2. Prevent property damage due to flooding
3. Preserve and enhance water quality and minimize water pollution in Lewisville Lake and other natural waterbodies
4. Stabilize or decrease streambank and channel erosion on creeks, channels, and streams
5. Fully comply with all state, federal, and local regulatory and permitting requirements relating to stormwater and land development
6. Proportionally distribute the cost of necessary drainage improvements
7. Minimize the maintenance cost of drainage facilities constructed
8. Promote sustainable and productive development and redevelopment

This manual is intended to supplement the Town *Code of Ordinances* with procedures and technical criteria to meet the Town's adopted policies. If any policies and requirements set forth herein conflict with, or are inconsistent with, criteria outlined elsewhere, the more stringent criteria shall apply.

3.1.2 Applicability of Stormwater Criteria

The stormwater criteria outlined in this manual applies to development and redevelopment activity within the limits of the Town of Little Elm and its ETJ to the extent legally authorized. Development and redevelopment activities meeting the requirements outlined in **Section 3.1.3.1** require the submittal of a drainage plan for Town review and approval prior to commencement of land disturbing activities.

It is recognized that there will be specific situations not completely addressed by this manual. Unusual circumstances or special designs requiring variance from standards within this manual require the express written approval of the Town Engineer. All requests for variance from the Town's drainage criteria shall be considered based on the standards, procedures, and criteria outlined in **Section 107.10.01** of the Town's *Subdivision Ordinance*.

3.1.3 Stormwater Submittal Requirements

The design of stormwater infrastructure must be performed in accordance with this manual and other applicable Town criteria. All plans and studies with stormwater elements shall be prepared and sealed by a Licensed Professional Engineer with a valid license and a valid registered firm number from the State of Texas.

All applicable calculations, plans, and other documentation necessary to evaluate the design must be provided for review. Upon receiving a stormwater submittal for review, the submittal package will receive a cursory review for completeness of submittal requirements. Incomplete submittals shall be rejected by the City without further review. The Town's review period conforming to State regulations governing subdivision application begins on the date the application is accepted for review.

3.1.3.1 *Stormwater Submittal Elements*

The Town of Little Elm has developed a *Development Application Handbook* to assist developers with the preparation of applications for various types of planning and development activities. Developers shall utilize the applicable forms and checklists in the preparation and submittal of storm drainage plans for development review.

Storm drainage plans shall be prepared for subdivision applications and civil plan submittals that include the following activities:

1. Land disturbing activity or platting of 1.0 acre or more; or
2. Land disturbing activity of less than 1.0 acre where the activity is part of a common plan of development that is 1.0 acre or more.

A common plan of development consists of construction activity that is completed in separate stages, separate phases, or in combination with other construction activities. For the purposes of this policy, this classification may include, but is not limited to, a tract that:

1. Is included in a single concept plan submitted to the Town
2. Is included in a single preliminary plat submitted to the Town
3. Is comprised of contiguous land (or land separated only by roadway and/or drainage rights-of-way or easements) under the same root ownership
4. Is encumbered by a single Master Drainage Study or Plan
5. Is encumbered by a single Developer Agreement, TIF, 380 Agreement or other public/private partnership agreement
6. Is overlaid by a common Homeowner's or Property Owner's Association (HOA or POA), or
7. Is owned or managed by a common Master Developer.

Site developments that do not meet the applicability requirements outlined above will not require a drainage plan submittal. However, all developments with the Town limits and ETJ shall comply with the Town Subdivision Ordinance and development permitting requirements, including but not limited to: building permits, floodplain development permits, SWPPP, and grading permits.

3.1.3.2 *Permitting Requirements*

The engineer must provide proof of compliance with applicable federal, state, and local environmental regulations upon request by the Town. Potential applicable regulations and permits may include, but are not limited to:

1. Section 404 of the Clean Water Act (33 USC 1344)
2. Section 106 of the National Historic Preservation Act
3. Water Rights
4. Section 303(d) Impaired Waters
5. Migratory Bird Treaty Act
6. Water Well Drilling
7. Threatened and Endangered Species Act

8. The Texas Archeological and Research Laboratory Requirements
9. The Antiquities Code of Texas
10. Air Quality
11. TCEQ Dam Requirements

The engineer is responsible for providing documentation of the relevant United States Army Corps of Engineers (USACE)-approved permits prior to beginning modification to the floodplain, or for providing a signed and sealed statement detailing why such permits are unnecessary. A preliminary Section 404 permitting evaluation shall be included as part of the downstream assessment report for the development. Should mitigation be required under Section 404 of the Clean Water Act, the areas shall be identified on the engineering construction plans.

Additional permitting requirements may apply for design of stormwater storage facilities and projects that impact regulatory floodplains. Further guidance is provided in **Sections 3.6.3**, **3.7.3**, and **3.7.4**.

3.1.3.3 *Acceptable Modeling Software*

The design of storm drainage facilities can be aided by and sometimes requires the use of hydrologic and hydraulic modeling programs. **Table 1** lists several widely used modeling software which are acceptable to the Town. The use of a program that is not included in the list requires prior approval by the Town Engineer.

Table 1: Acceptable Hydrologic and Hydraulic Modeling Programs

Software	Hydrologic Calculations	Hydraulic Calculations	FEMA Approved	Water Quality Features
HEC-HMS	X		X	
HEC-RAS		X	X	
Autodesk Suite – Hydraflow, Storm and Sanitary Analysis	X	X		(X)
Bentley Suite – CulvertMaster, FlowMaster, PondPack, StormCAD	X	X	(X)	
Innovyze Suite – ICM, InfoWorks	X	X		X
SWMM (EPA)	X	X		X
XPSWMM	X	X	X	X

The most recent version of the program should be used unless the Town provides an approved effective model developed using a previous version, and in other instances as approved by the Town Engineer. Only Federal Emergency Management Agency (FEMA) approved software can be used for design within the Regulatory Floodplain. Refer to **Chapter 7** for additional guidance on software requirements for floodplain development applications.

Section 3.2. Stormwater Design Standards

3.2.1 Design Frequency for Drainage Features

The design of drainage facilities relies on evaluation of performance during theoretical rainfall events. A rainfall event is classified by its annual exceedance probability (AEP), which describes how likely an event is to occur in a given year. This probability has classically been presented inversely as a return period, giving the estimated time interval between events of a similar size or intensity. For example, the “100-year storm” return period has an AEP of 1%. This does not mean that a storm of this duration or intensity occurs every 100 years—instead, it means that, in any given year, there is a 1% chance of such an event occurring.

Table 2 lists the storm events to be used in the design of drainage facilities.

Table 2: Design Storm Events

Storm Event Name	Storm Event Description	Design Standard
Water Quality	Criteria based on volume of 1.5 inches of rainfall; not a storm frequency.	• Onsite water quality controls
Streambank Protection	2-year return period (50% AEP)	• Low flow channels and velocity check
Conveyance	25-year return period (4% AEP)	• Secondary check for street inundation and open travel lanes
Flood Mitigation	100-year return period (1% AEP)	• Open channels • Primary standard for street and storm drain design

3.2.2 Drainage Impacts

The design of a storm drainage system must account for offsite flows, flows generated by the development, and the impacts on the downstream drainage system. All stormwater discharges from the development shall be conveyed to an adequate outfall. An adequate outfall is a structure or location that is adequately designed as to not cause adverse impacts to adjacent or downstream properties or facilities. An adequate outfall shall have capacity to convey any increased stormwater runoff from the site.

In order to determine the adequate outfall, the engineer must establish the zone of influence for the development. The zone of influence is the point downstream where the discharge from a proposed development no longer has a significant impact upon the receiving stream or storm drainage system. The hydrologic and hydraulic analysis to establish the zone of influence from a proposed development and to demonstrate an adequate outfall for site drainage is called a downstream assessment.

Generally, the zone of influence will be defined by a detailed hydrologic and hydraulic analysis. For watersheds of 100 acres or less at any proposed outfall, the 10% rule of thumb may be used in order to determine the zone of influence. The 10% rule states the zone of influence is considered to be the point where the drainage area controlled by the drainage facility comprises 10% of the total drainage area. If a portion of a larger property is being developed, the zone of influence shall be determined based on the entire property. A detailed study may be required for any drainage area regardless of size at the discretion of the Town Engineer.

It shall be the responsibility of the engineer to contact the Town and inquire about other proposed or approved developments within the zone of influence. At the direction of the Town Engineer, these developments shall be accounted for in the downstream assessment.

Table 3: Zone of Influence (Adequate Outfall) Determination

Item	Parameter	Adverse Impact Determination
1	**Inhabitable Structures**	• No new or increased flooding (0.00 feet) of existing insurable (FEMA) structures (inhabitable buildings).

Item	Parameter	Adverse Impact Determination
2	**Flood Elevations**	• No increase (0.00 feet) in the 2-, 25-, and 100-year water surface elevations unless contained within the owner's property or within an existing channel, roadway, drainage easement, and ROW. • Dry lane and gutter capacity requirements set forth in **Table 10** shall also be met.
3	**Floodplain Ordinance**	• Where provisions of the Town's floodplain ordinance may be more restrictive, the floodplain ordinance shall have authority over the above provisions.
4	**Channel Velocities**	• Proposed channel velocities for 2-, 25-, and 100-year storms cannot exceed the applicable maximum permissible velocity shown in **Table 9**. • If existing channel velocities exceed maximum permissible velocities shown in **Table 9**, no more than a 5% increase in velocities will be allowed. • Exceptions to these criteria will require certified geotechnical/ geomorphologic studies that provide documentation that the higher velocities will not create additional erosion.
5	**Downstream Discharges**	• No increase in downstream discharges caused by the proposed development that, in combination with existing discharges, exceeds the existing capacity of the downstream storm drainage system or existing right-of-way.
6	**Water Quality**	• Compliance with water quality standards and requirements outlined in **Chapter 3**.

3.2.3 Drainage Considerations for Site Grading

3.2.3.1 *Grading Plans*

Grading plans shall be submitted for any land disturbance activities. Existing (pre-project) and proposed (post-project) contours shall be shown. The natural flow of surface waters shall not be diverted or impounded in a manner that damages adjacent property.

Residential development shall be type A, B, or C drainage for each lot within the subdivision as described in Housing and Urban Development (HUD) Federal Housing Administration (FHA) Data Sheet 72, as amended. Type 1 or 2 block grading as shown in the HUD information is preferred. Type 3 and 4 block grading are allowed only if:

1. A flume or channel is constructed at the rear of the lot to intercept runoff; or
2. Runoff from no more than 3 lots is accumulated prior to constructing a drainage system to intercept the runoff.

To ensure adequate drainage between lots after final construction of residential structures, the minimum slope between lot lines is required to be at least 50% steeper than the HUD minimums. Alternatively, the builder may provide a written certification that site grading is as prescribed in the grading plan and may be held responsible for drainage complaints by residents.

The engineer may utilize swales to redirect flows. In such cases, the engineer shall provide more detailed information in addition to the lot grading type (A, B, or C) by indicating spot elevations on each lot. If the site is complex and an overall site grading plan cannot be developed in accordance with the HUD standards, an individual grading plan for each lot shall be submitted by the engineer prior to the issuance of building permits. The individual grading plans shall be coordinated with surrounding lots. For these complex plans, an as-built letter shall be submitted by the engineer prior to final inspection.

3.2.3.2 *Minimum Lot and Floor Elevations*

The minimum elevation for the buildable area (including parking areas) of the lot shall be set at or above the 100-year water surface elevation, or as directed by the Town Engineer. Any inhabitable structure shall have a finished floor elevation 2 feet above the 100-year water surface elevation.

For developments outside of the floodplain, minimum floor elevations shall be at or above the street curb, edge of alley, or rear property line, whichever is lower, unless otherwise approved by the Town Engineer. For lots adjacent to or in the influence of a sump area and a positive overflow, the lot elevation will be at or above the sump area top of curb or the possible maximum pool elevation when the positive overflow is functioning, whichever elevation is higher. Refer to **Section 3.5.2.5** for additional information on positive overflow requirements.

3.2.3.3 *Concentrated Runoff from Development*

Site runoff due to development shall not cause adverse impacts as outlined in **Table 3**. When offsite grading is required or when the development discharges concentrated flow on an adjacent property, off-site conveyance to reach an adequate outfall shall be contained within a drainage easement obtained from the affected property owner(s). Drainage easement requirements are further discussed in **Section 3.3.2.1**.

Section 3.3. Stormwater Quality

The Town of Little Elm is one of the fastest growing cities in North Texas, with almost 70 miles of the town limits along the shoreline of Lewisville Lake. New development in the Town has contributed to increased stormwater runoff. Urban stormwater runoff has had detrimental impacts on the Town's receiving waters, including increased flooding potential, stream channel erosion, and reduced stormwater quality. As undeveloped areas of the Town are developed and older areas are redeveloped, it is imperative that a robust stormwater quality program be implemented to protect the Lewisville Lake and the Town's other natural resources and improve the benefits to human health, fish and wildlife habitat, and recreational opportunities.

Additionally, the Town is subject to Environmental Protection Agency (EPA) and Texas Commission on Environmental Quality (TCEQ) permit regulations governing discharges of stormwater from municipal separate storm sewer systems (MS4s) to surface waters of the state (TXR040000). The Town is required to develop, implement, and enforce a Stormwater Management Program (SWMP) to reduce the discharge of pollutants and protect water quality. This program requires oversight of the design, construction, and maintenance of stormwater controls in the Town to protect and enhance stormwater quality.

The following sections outline the Town's commitment to stormwater quality and water quality provisions that apply to the design of storm drainage facilities.

3.3.1 Post-Construction Stormwater Quality

3.3.1.1 *Post-Construction Stormwater Quality Objectives*

This section will establish criteria for the design, operation, and maintenance of post-construction stormwater controls and the preparation of a Stormwater Quality Plan (SWQP). Specific objectives of the Town's post-construction stormwater policies include:

1. Protect the integrity of watersheds and preserve the health of water resources, including Lewisville Lake;
2. Minimize changes to the site hydrology for land disturbance and redevelopment to reduce flooding, streambank erosion, and pollution;
3. Implement beneficial site design practices;
4. Promote the preservation of green space and other conservation areas;
5. Establish administrative procedures for the submission, review, approval, and disapproval of stormwater best management practices, and for the inspection of approved projects;

6. Establish provisions for the long-term responsibility for and maintenance of structural and nonstructural stormwater management to ensure that they continue to function as designed, are maintained appropriately, and pose minimum risk to public safety; and
7. Meet the provisions of the Town's MS4 permit and SWMP.

3.3.1.2 *Stormwater Quality Plan*

A Stormwater Quality Plan (SWQP) shall be prepared for all land disturbing activities of 1 acre or more as part of a subdivision application or civil plan submittal. For land disturbance activities between 1 and 5 acres, the Site Plan can be considered the SWQP. The grading or drainage plans may also be used as the SWQP for capital improvement projects. The SWQP shall be sealed by a Professional Engineer in the State of Texas.

The SWQP shall identify permanent site features and controls that will be included in the design and constructed with the project to minimize and mitigate the project's long-term effects on stormwater quality and quantity. All new development designs shall evaluate site layout to minimize impervious area and impacts to existing natural resources to promote sustainable development.

3.3.1.2.1 Preparation of a SWQP

A preliminary SWQP shall be prepared with the preliminary plat. The final SWQP shall be submitted with the site plan or construction plans. This plan must be accepted by the Town prior to any site activity, including grading. The SWQP shall be developed and coordinated with all portions of the plans, but specifically, the grading plan, the drainage plans, and the landscape plan.

3.3.1.2.2 Post-Construction BMP Selection

Table 4 shows the minimum number of permanent BMPs required based on acreage of post-project impervious area:

Table 4: Minimum Number of Permanent BMPs Required

Impervious Area	Minimum Number of Permanent BMPs
< 5 acres	1
5 acres ≤ Impervious Area ≤ 20 acres	2
> 20 acres	3

The BMPs shall be designed to achieve the water quality design requirements as set forth in **Section 3.3.1.3**. The *iSWM Technical Manual for Site Development Controls* provides guidance on the design and selection of permanent BMPs. It is the responsibility of the engineer to design BMPs that are appropriate address specific site conditions and meet the water quality standards.

Final stabilization of disturbed areas is required for all sites, regardless of size, and shall not be considered a permanent BMP. Final stabilization is defined as 80% coverage with no large bare areas on all portions of the site that are the responsibility of the developer.

3.3.1.3 *Water Quality Design Requirements*

3.3.1.3.1 Floatable Capture Requirements

All storm sewer outfalls to Lewisville Lake shall include a debris separator conforming to the Standard Details. Other applications of debris separators may be approved or required at the discretion of the Town Engineer.

For developments subject to SWQP requirements, debris separators may be considered a permanent BMP to meet the requirements of **Section 3.3.1.2.2**. Where multiple debris separators are installed for a single development, they shall be considered as a single BMP.

3.3.1.3.2 Water Quality Volume Requirements

Studies have shown the 85th percentile storm event (i.e., the storm event that is greater than 85% of the storms that occur) is a reasonable target event to address the vast majority of smaller, pollutant-loaded storms. Based on a rainfall analysis, 1.5 inches of rainfall has been identified as the average depth corresponding to the 85th percentile storm for North Texas. The runoff from these 1.5 inches of rainfall is referred to as the Water Quality Protection Volume (WQ_v).

Developments subject to SWQP requirements are required to demonstrate treatment of the WQ_v by the installation of permanent BMPs. Calculation of the WQ_v shall adhere to procedures outlined in the *iSWM Technical Manual for Water Quality*. Methods to reduce the required WQ_v as outlined in the iSWM manual may also be implemented.

The WQ_v shall not be discharged in a period less than 24 hours. The water quality treatment requirement can be met by providing extended detention in stormwater storage facilities designed for mitigation of peak events. In such instances, these facilities shall be allowed to have a total drawdown time greater than 24 hours but no greater than 48 hours. Refer to **Chapter 6** for additional guidance and requirements concerning the design of stormwater storage facilities.

3.3.1.4 *Permanent Erosion Control*

Adequate control for the erosion is imperative to minimize Total Suspended Solids (TSS) and to protect stormwater quality in natural drainageways. Energy dissipation, channel stabilization and/or permanent erosion control mechanisms are required in instances where the design channel velocities or discharge velocities of pipes, culverts, and flumes exceeds the maximum permissible velocities outlined in **Table 9** and in other instances as determined by the Town Engineer. The *iSWM Technical Manual for Hydraulics* and the *Federal Highway Administration Hydraulic Engineering Circular No. 14* (*FHWA HEC-14*) provide additional guidance on the design of energy dissipators.

3.3.2 Maintenance of Permanent Stormwater Facilities

3.3.2.1 *Drainage Easements*

Easements are required for all public drainage systems that convey stormwater runoff across a development and shall be required for both on-site and off-site public stormwater drainage improvements, including standard engineering channels, storm drain systems, detention and retention facilities, and other stormwater controls. All drainage easements shall be recorded on the plat. The drainage easement must include sufficient area for operation and maintenance of the drainage system, and the developer shall obtain downstream drainage easements until adequate outfall is determined.

Minimum easement requirements are discussed in the following sections. Special circumstances may require additional easement allocation at the discretion of the Town Engineer.

3.3.2.1.1 Open Channels

Drainage easements shall be provided for all open channels. Easements shall encompass all areas lower than a ground elevation defined as being the highest of the following:

1. Two (2) foot above the calculated water surface elevation based on the fully developed 100-year water surface elevation or the 100-year base flood elevation (BFE), whichever is higher.
2. The top of the high bank, if higher than (1) above.

An additional easement of 15 feet on each side of a channel is required by the Town for maintenance and access purposes. For the purposes of this manual, bank slope is measured in a straight line from the toe of the slope to the top of the bank. The slope within the easement shall be no greater than 6:1 (horizontal to vertical) to allow for safe access of crews and equipment. Easements shall be kept free and clear of encroachments, but the

maintenance and access portion of the easement may contain designated fire lanes and parking areas as approved by the Town Engineer.

Engineered channels shall have drainage easements dedicated to meet the requirements of the width of the channel, the 1 foot of freeboard, and access easement.

3.3.2.1.2 Storm Sewer Easements

Easement widths will be rounded up to the nearest 5-foot increment. The minimum width of the storm sewer easement shall be the outside diameter of the storm sewer pipe or horizontal dimension of the storm sewer box plus 10 feet. For pipes or boxes in parallel, the minimum easement shall be equal to the width of the parallel storm drain system plus 10 feet. The minimum storm sewer easement that shall be provided in any case is 15 feet.

3.3.2.1.3 Other Stormwater Facilities

Drainage easements for structural overflows, swales, and berms shall be of sufficient width to encompass the structure or graded area. The proposed centerline of overflow swales shall normally coincide with the centerline of the easement. Drainage easements will generally extend at least 25 feet past an outfall headwall to provide an area for maintenance operations.

Easements for stormwater controls, including detention basins, sediment traps, and retention ponds, shall be negotiated between the Town and the developer but will normally include essential access to all embankment areas and inlet and outlet controls. Essential access is defined as access in at least one location. The entire reach or each section of any drainage facility must be readily accessible to maintenance equipment. Additional easement(s) shall be required at the access point(s), and the access points shall be appropriately designed to restrict access by the public.

3.3.2.2 *Operations and Maintenance Agreements*

All drainage improvements constructed within a development and any existing or natural drainage systems to remain in use shall require a maintenance agreement that identifies responsible parties for maintenance. Both private and public maintenance responsibility shall be negotiated between the municipality and the owner and documented in the agreement. The maintenance agreement shall be written such that it remains in force upon sale of transfer of the property.

The Town will provide for perpetual maintenance, in accordance with adopted Town maintenance standards, of all public drainage facilities located within dedicated easements and constructed to the Town standards. In addition, limited perpetual maintenance may be provided by the Town for riparian areas placed in a drainage easement preserved in their natural state, subject to Town approval. Access shall be provided and dedicated by the developer to all public stormwater facilities in developments for maintenance and inspection by the Town.

A *Stormwater Facility Maintenance Agreement* (SFMA) must be prepared by the engineer for each stormwater control that will not be wholly maintained by the Town. This agreement must outline both preventive maintenance tasks as well as major repairs, identify the schedule for each task, assign clear roles to affected parties, and provide a maintenance checklist to guide future owners. Multiple stormwater controls may be contained within a single SFMA. When areas are identified for detention that also serve other purposes for the development (e.g. parking lots, loading docks) the requirement for a SFMA may be waived.

3.3.2.3 *Inspections*

An annual self-inspection report shall be provided to the Town for all permanent stormwater controls with an active SFMA. The inspection report shall document the condition of the stormwater control and maintenance provisions undertaken to ensure the continued functionality of the stormwater control as designed. Generally, this inspection can be conducted and documented by the owner of the facility unless otherwise stated in the SFMA. An inspection report signed and sealed by a Professional Engineer in the State of Texas shall be submitted to the Town at a minimum of every 5 years, unless otherwise stated in the SFMA. The Town maintains the right, as outlined in

the Town ordinances, to inspect permanent stormwater controls and enforce provisions of the SFMA and this manual.

3.3.3 Temporary Construction Controls

Construction activities shall comply with all applicable federal (EPA), state (TCEQ), and local (Town) stormwater pollution prevention regulations. When the ordinance and applicable regulations are in conflict, the most stringent requirements shall apply.

3.3.3.1 *Stormwater Pollution Prevention Plan*

For all construction projects that will disturb 1 acre or more of land area, the TCEQ requires operators to obtain Texas Pollutant Discharge Elimination System (TPDES) General Permit (TXR150000) coverage for the project. This requires the preparation of a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP shall be provided to the Town and approved prior to the start of any construction. The contractor is responsible for implementing and maintaining the SWPPP, as well as posting and submitting construction site notifications, the Notice of Intent, and the Notice of Termination.

3.3.3.2 *Best Management Practices During Construction*

The SWPPP shall provide a series of best management practices (BMPs) that are appropriate for each phase of construction. The SWPPP shall also identify which owner/operator is responsible for installing, inspecting, and maintaining each BMP during the different phases of construction. All temporary BMPs must be removed after final stabilization is achieved.

Structural BMPs shall comply with the *Town of Little Elm Standard Details*, this manual, and the latest edition of the North Central Texas Council of Governments (NCTCOG) integrated Stormwater Management *(iSWM) Criteria Manual for Site Development and Construction* and *Technical Manual for Construction Controls*. When the iSWM manual, Town Standard Details, or this manual are in conflict, the Standard Details and then this manual shall govern.

Section 3.4. Hydrology

Prior to hydraulic design of drainage facilities, the rate and volume of stormwater runoff at the design point must be determined. The amount of stormwater runoff from a given site is a factor of the intensity and duration of the rainfall event and the size and hydrologic characteristics of the contributing drainage area. The following sections describe the approved hydrologic criteria and procedures to be used in the calculation of design runoff values.

Several sections of this chapter are adapted from the *iSWM Technical Manual for Hydrology*. Please reference the latest edition of the iSWM manual for additional guidance as needed.

3.4.1 Peak Discharges Prepared by Town

Peak discharge data from an appropriate flood study or Town-approved drainage studies shall be used as the design discharges, if such data is available. When no flow rates are available, peak discharges shall be determined by the engineer. All discharge values shall be based on full development of the drainage basin as outlined in the most recently adopted versions of the Town's *Comprehensive Plan*, *Zoning Map*, and *Future Land Use Map*.

3.4.2 Rainfall Intensity

The National Oceanic and Atmospheric Administration (NOAA) *Atlas 14, Volume 11 Precipitation-Frequency Atlas of the United States, Texas (2018)* is recognized as the best available set of rainfall data for the State of Texas. *Atlas 14* provides point precipitation frequency values, with rainfall intensity values varying slightly across the Town. A single coordinate (33.1870, -96.8897) has been selected to define standard rainfall intensity values throughout the Town. The standard rainfall intensities are listed in **Table 5**.

Table 5: Design Rainfall Intensities

Duration		Rainfall Intensity (in/hr) by Return Period and AEP (%)		
Min	**Hr**	**2-Year (50%)**	**25-Year (4%)**	**100-Year (1%)**
5	**0.083**	5.89	9.77	11.92
10	**0.167**	4.69	7.78	9.52
15	**0.25**	3.90	6.44	7.84
30	**0.5**	2.70	4.44	5.40
60	**1**	1.76	2.92	3.56
120	**2**	1.09	1.87	2.33
180	**3**	0.81	1.42	1.79
360	**6**	0.48	0.86	1.11
720	**12**	0.29	0.51	0.66
1440	**24**	0.17	0.30	0.39

3.4.3 Drainage Areas

Drainage area maps and runoff calculations shall include all drainage areas contributing to the site. Separate drainage area maps and runoff calculations shall be prepared for both the existing (pre-project) drainage area and the fully developed (post-project) drainage area. Drainage areas shall follow natural drainage features if future land disturbance is unknown or existing areas will not be changing under fully developed conditions.

Drainage area determinations shall be based on site survey and proposed grading plans, supplemented by recent aerial imagery and topographic maps. Delineations shall be performed utilizing a maximum 2-foot contour interval for existing drainage areas and a maximum 1-foot contour interval for proposed drainage areas. The performance of topographic survey used to delineate drainage areas is the responsibility of the engineer designing the drainage facility.

3.4.4 Time of Concentration

The time of concentration (T_c) is defined as the longest time, without interruption of flow by detention devices, that will be required for water to flow from the upper limit of a drainage area to the point of concentration. Times of concentration can often be assumed based on the typical inlet times shown in **Table 7**.

Alternatively or where no typical inlet time is provided, T_c may be calculated using the National Resource Conservation Service (NRCS, formerly known as the Soil Conservation Service, SCS) methodology. The use of NRCS methodology in lieu of standard inlet times may be at the discretion of the Town Engineer. This method separates the flow through the drainage area into sheet flow, shallow concentrated flow, and open channel flow. The T_c is the sum of travel times for sheet flow, shallow flow and open channel flow. Time of concentration calculations shall be provided by the engineer along with flow path delineations.

Computations for travel time (T_t) for sheet flow, shallow flow, and open channel flow shall adhere to the following methodology.

1. **Sheet Flow:** Sheet flow is the initial flow over the ground surface. The maximum allowable length for sheet flow is 300 feet for undeveloped drainage areas and 100 feet for developed areas. The travel time (T_t) in hours for sheet flow is determined using the following equation:

$$\boldsymbol{T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5}(S)^{0.4}}}$$

T_t = travel time (hr)

n = Manning's roughness coefficient (**Table 9**)

L = flow length (ft)

P_2 = 2-year, 24-hour rainfall, 4.1 in.

S = longitudinal slope (ft/ft)

2. **Shallow Concentrated Flow:** Shallow concentrated flow begins where sheet flow ends. A projected average slope should be established along the flowline for the shallow concentrated flow length. The travel time (T_t) in hours for shallow concentrated flow is determined by the following equation:

$$\boldsymbol{T_t = \frac{L}{3600V}}$$

V = average velocity (fps), calculated as follows:

Unpaved Surfaces = $16.1345 \times S^{0.5}$

Paved Surfaces = $20.3282 \times S^{0.5}$

3. **Open Channel Flow:** Open channel flow is where the runoff is located within a defined channel or in some cases, closed storm systems. The travel time (T_t) for open channel flow is determined using the equation for shallow concentrated flow and using Manning's Equation to determine average velocity (V):

$$\boldsymbol{V = \frac{1.486 R^{\frac{2}{3}} S^{\frac{1}{2}}}{n}}$$

V = average velocity (fps)

R = hydraulic radius (A/P) (ft), where:

A = cross-sectional area (ft^2)

P = wetted perimeter (ft)

S = longitudinal slope (ft/ft)

n = Manning's roughness coefficient (**Table 9**)

3.4.5 Allowable Hydrologic Methods

There are a number of empirical hydrologic methods available to estimate runoff characteristics for a site or drainage subbasin. The following methods have been selected to support hydrologic site analysis for the design methods and procedures included in this manual:

- Rational Method
- Modified Rational Method
- Unit Hydrograph Method

The procedures and approved applications of each method are described in the following sections.

3.4.5.1 *Rational Method*

The rational method is a simple procedure for estimating peak flows from small drainage areas. The use of the rational method is limited to drainage areas of less than 100 acres, unless otherwise approved by the Town Engineer. The formula for calculation of runoff by the rational method is:

$$\boldsymbol{Q = C_f CiA}$$

Q = peak discharge (cfs)

C_f = frequency factor for use with higher intensity storms

C = runoff coefficient

i = rainfall intensity (in/hr) for a period equal to the time of concentration

A = contributing drainage area (acres)

The rational method was initially developed for design applications that considered storms with more frequent return periods than current flood protection standards (less than or equal to 10 years). Less frequent, higher intensity storms require use of a frequency factor (C_f) to account for the fact that infiltration and other initial losses have a proportionally smaller effect on runoff than for more frequent events. **Table 6** provides the frequency factors to be used with rational method applications.

Table 6: Frequency Factors for Rational Formula

Recurrence Interval (years)	Frequency Factor (C_f)
10 or less	1.0
25	1.1
100	1.25

The post-development runoff coefficient "C" shall be based on fully developed conditions. The most intense land use or zoning shall be used to determine the runoff coefficient for the drainage area. **Table 7** gives values for runoff coefficients to be used in applications of the rational method. It is often desirable to develop a composite runoff coefficient based in part on the percentage of different types of surfaces in the drainage area. Composite "C" values and other deviations from the coefficients provided in **Table 7** are subject to the approval of the Town Engineer.

Table 7: Runoff Coefficient Values and Typical Inlet Times

Land Use	Runoff Coefficient "C"	Minimum Inlet Time (min)
Residential:		
Single Family		
Low Density Residential	0.45	10
Medium Density Residential	0.55	10
High Density Residential	0.60	10
Multi-Family		
Manufactured Homes	0.60	10
Light (Townhomes, Duplex)	0.65	10
Heavy (Apartments)	0.85	5
Commercial/Industrial:		
Light	0.70	5
Heavy	0.80	5
Business Districts (Town Center, Office)	0.85	5
Parks and Open Space	0.25	15
Streets, Drives, Walks, and Roofs	0.95	5
Gravel Areas	0.50	
Graded or No Plant Cover	0.40	
Agricultural	0.30	
Forest	0.15	
Streams, Lakes, Water Surfaces	1.00	

3.4.5.2 *Modified Rational Method*

The modified rational method uses the rational method peak flow calculations combined with assumptions about the inflow and outflow hydrographs to compute an approximation of storage volumes for simple detention calculations. Further explanation of the modified rational method and a noniterative approach for detention design calculations are presented in the iSWM manual. The modified rational method is limited in use to applications as described in **Section 3.6.1**.

3.4.5.3 *Unit Hydrograph Method*

The Town requires the use of the NRCS unit hydrograph method for drainage areas larger than 100 acres. The unit hydrograph method requires drainage area, a runoff factor, time of concentration, rainfall, and methodology to consider initial and constant losses. Details of the methodology can and additional guidance can be found in the *SCS National Engineering Handbook, Section 4, Hydrology* and the iSWM manual.

The Town requires the use of HEC-HMS to perform the computations and to develop runoff hydrographs for a drainage area. Additional software may be accepted at the discretion of the Town Engineer. Typical inputs required for development of a HEC-HMS hydrograph are described below.

3.4.5.3.1 Curve Numbers

Use of the runoff curve number (CN) methodology outlined in *Urban Hydrology for Small Watersheds – NRCS Technical Release (TR)-55* is required. Curve numbers indicate the runoff potential of the land cover, considering the combined hydrologic effects of the soil type, land use, hydrologic condition of the soil cover, and the antecedent soil moisture. The NRCS Soil Survey for Denton County may be used to identify the soil group within the watershed subbasins. For computation of design events, an assumption of Antecedent Moisture Condition (AMC) II is required.

The runoff CN values for urban areas provided in *TR-55* are recommended for use. When open space is used as the cover type, fair condition shall generally be assumed. Other CN values may be approved by the Town Engineer. **Table 8** shows the land use categories and corresponding impervious percentages. These values do not supersede the existing conditions, or where proposed impervious conditions are known. For instance, if an industrial area is currently 95% paved, then 95% is the impervious condition that shall be used.

Table 8: Impervious Percentage Values for Land Use Classifications

Land Use	Impervious Condition (%)
Residential:	
Single Family	
Low Density Residential	25
Medium Density Residential	41
High Density Residential	47
Multi-Family	
Manufactured Homes	20
Light (Townhomes, Duplex)	70
Heavy (Apartments)	70
Commercial/Industrial:	
Light	90
Heavy	95
Business Districts (Town Center, Office)	85
Parks and Open Space	6
Streets, Drives, Walks, and Roofs	95
Agricultural	3
Forest	0
Streams, Lakes, Water Surfaces	100

3.4.5.3.2 Design Storm Rainfall

Use of the 24-hour storm duration and SCS Type II distribution is required for peak flow calculations, unless otherwise approved by the Town Engineer.

3.4.5.3.3 Hydrologic Stream Routing

Routing may be needed within the hydrologic model to account for the storage effects of detention facilities or significant channel reaches that are not accounted for in a hydraulic model. Detention and ponding areas shall be modeled using Modified Puls routing with explicit depth-area curves determined from topographic contours. Channel segments shall be modeled using either Modified Puls or Muskingum Cunge methods based on cross sections taken from available topography. For unsteady flow modeling, the routing is accounted for by the hydraulic software being used.

Section 3.5. Hydraulics

Hydraulic design is the process of determining the appropriate capture and transport (or storage) of stormwater that has been generated from a rainfall event to an adequate outfall. Stormwater facilities include, but are not limited to, ditches, streets, inlets, storm drain systems, swales, channels, culverts, ponds, and reservoirs.

Several sections of this chapter are adapted from the *iSWM Technical Manual for Hydraulics*. Please reference the latest edition of the iSWM manual for additional guidance as needed.

3.5.1 Streets and Gutter Flow

Surface drainage along streets is a function of transverse and longitudinal pavement slope, pavement roughness, inlet spacing, and inlet capacity. The design of these elements is dependent on storm frequency and the allowable spread of stormwater. Flow in streets and gutters is governed by Manning's equation for open channel flow:

$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

Q = flow (cfs)

A=cross-sectional flow area (ft^2)

R = hydraulic radius (ft), as defined previously

S = longitudinal slope (ft/ft)

n = Manning's roughness coefficient (**Table 9**)

Table 9 provides Manning's roughness coefficients and maximum permissible velocities to be used in the design of various drainage facilities in the Town. The Manning's roughness coefficient to be used in calculation of flow in concrete streets and gutters shall be 0.016 unless otherwise approved by the Town Engineer. The iSWM manual provides alternate forms of the Manning's equation with tables and nomographs to be used in the calculation of drainage capacities of streets with triangular, composite, and parabolic sections, as well as streets with curb splits.

Table 9: Roughness Coefficients and Maximum Permissible Velocities

Type of Section/Feature	Roughness Coefficient "n"			Maximum Permissible Velocity (fps)
	Minimum	Normal	Maximum	
Natural Streams				
Stream Section				6
Some Grass and Weeds; Little or No Brush	0.027	0.045	0.048	
Dense Growth of Grass or Brush	0.050	0.055	0.055	
Dense Brush and Trees	0.060	0.065	0.080	
Floodplain/Overbank Areas				6
Grass, Weeds; Some Brush and Trees	0.027	0.045	0.048	
Dense Grass, Weeds or Brush	0.050	0.055	0.065	
Dense Brush and Trees	0.070	0.080	0.150	
Buildings		0.500		N/A
Constructed/Modified Open Channels				
Concrete Blocks	0.015	0.035	0.050	15
Gabion	0.015	0.035	0.050	15
Grass (Maintained)	0.027	0.035	0.040	6
Concrete Riprap	0.014	0.016	0.030	15
Stone Riprap	0.033	0.035	0.036	
Streets				
Concrete Section				N/A
Smooth	0.015	0.016	0.017	
Rough	0.017	0.018	0.019	
Asphalt	0.014	0.015	0.019	
Pipes				15
Reinforced Concrete Pipe	0.012	0.013	0.017	
Corrugated Metal Pipe	0.015	0.022	0.033	
High Density Polyethylene Pipe (HDPE)	0.009	0.011	0.025	
Concrete Boxes (Smooth to Rough)	0.012	0.013	0.020	

3.5.1.1 *Street Drainage Criteria*

The surface drainage system and closed storm drain system for a street must be designed such that in combination, the systems provide enough capacity to fully contain the flow from 100-year storm within the street right-of-way or drainage easement. The Town also enforces a set of criteria for allowable spread of gutter flow depending on street classification, as outlined in **Table 10**. An "open" traffic lane is defined for the purposes of this manual as at least a 12-foot section of pavement that remains dry (no ponding or flowing water) for the duration of the rainfall event to allow for the safe passage of vehicles. Storm sewer inlets shall be provided along paved streets at such intervals to prevent the capacity and spread requirements from being exceeded.

Table 10: Street Drainage Criteria

Type of Street	Allowable Spread
Major Thoroughfare	One traffic lane in each direction to remain open
Collector Street	One moving traffic lane to remain open
Residential Street	n/a

Additional street drainage considerations are listed below:

1. The maximum allowable concentrated flow to a street including flow from driveways and flumes is 3 cfs.
2. Street surface drainage shall not be permitted to cross major thoroughfares or collector streets.
3. At any intersection, only one street shall be crossed with surface drainage, and this shall be the lower classified street.

3.5.2 Stormwater Inlets

Inlets are drainage structures used to collect surface drainage and to convey this water to storm drains or direct outlet to culverts. The capacity of an inlet depends upon its geometry and the cross slope, longitudinal slope, total gutter flow, depth of flow, and pavement roughness. Inlets servicing roadway drainage can be divided into three major classes:

- Curb Inlets
- Grate Inlets
- Combination (Grate and Curb-Opening) Inlets

Inlets may be classified as being on a continuous grade or in a sump. The term "on grade" refers to an inlet located on the street with a continuous slope past the inlet with water entering from one direction. The "sump" condition exists when the inlet is located at a low point and water enters from both directions. Artificial low points created by “seesaw” of street or alley grades will not be permitted. All low point inlets shall be designed in accordance with additional standards outlined in **Section 3.5.2.5**.

The procedures and technical criteria outlined in the iSWM manual shall be used for the hydraulic design of stormwater inlets. Additional criteria for various inlet types are summarized in the following sections. Refer to the Town of Little Elm Standard Construction Details for inlet construction and material requirements.

3.5.2.1 *Curb Inlets*

Curb inlets shall be a minimum of 8 feet in length. Recessed curb inlets are required on all collector and arterial streets. The Town Standard Details for both recessed and standard curb inlets include a depressed gutter line.

Where an alley or street intersects a street, inlets shall be placed in the intersecting alley or street whenever the combination of flow down the alley or intersecting street would cause the capacity of the downstream street to be exceeded. Inlets shall be placed upstream from an intersection whenever possible.

3.5.2.2 *Grate Inlets*

The Town’s MS4 program encourages measures to limit the inflow of floatables to the storm system. The installation of grate inlets in lieu of or in combination with the installation of debris separators in nonresidential developments may be permitted to help meet this objective and may be required in some instances by the Town Engineer for sites outfalling to Lewisville Lake. Installation of grate inlets in other instances requires approval by the Town Engineer. Grate inlets shall be designed with a 50% clogging factor due to the tendency of these inlets to collect debris.

3.5.2.3 *Combination Inlets*

Combination inlets consist of both a curb-opening inlet and a grate inlet placed in a side-by-side configuration, but the curb opening may be located in part upstream of the grate. Combination inlets may only be used with the approval of the Town Engineer.

All debris carried by stormwater runoff that is not intercepted by upstream inlets will be concentrated at the inlet located at the low point. Because this will increase the probability of clogging for grated inlets, the capacity of a combination inlet in sump shall be assumed to be the capacity of the curb inlet, neglecting the grate inlet capacity. On a continuous grade, the capacity of an unclogged combination inlet with the curb opening located adjacent to the grate is approximately equal to the capacity of the grate inlet alone. Capacity shall be computed by neglecting the curb opening inlet and following the design procedures for grate inlets.

3.5.2.4 *Drop Inlets*

The Town allows for the installation of drop inlets to collect water in nonpaved areas, such as ditches and swales. If used, grading plans to direct flow into drop inlets shall be included in the construction plans. Drainage interceptor swales or berms should be used, as required, to direct runoff to the drop inlets. Where swales or other means of collecting and directing runoff into drop inlets are needed, they should be contained in drainage easements according to the requirements outlined in **Section 3.3.2.1**.

Drop inlet capacity shall be evaluated with a 50% clogging factor due to the tendency of these inlets to collect debris. Flow into drop inlets shall be calculated using either the weir flow formula for an unsubmerged inlet or the orifice flow formula when depth of flow exceeds the depth of the opening.

The capacity of an unsubmerged inlet operating as a weir is:

$$\frac{\boldsymbol{Q}}{\boldsymbol{P}} = \mathbf{2.5}\boldsymbol{y}^{\mathbf{3/2}}$$

Q = flow capacity (cfs)

2.5 = weir coefficient (3.1) adjusted for 50% clogged inlet throat

P = perimeter of opening (ft)

y = head/depth (ft)

and the capacity of a submerged inlet operating as an orifice is:

$$\boldsymbol{Q} = \mathbf{0.6}\boldsymbol{A}(\mathbf{2}\boldsymbol{g}\boldsymbol{H})^{\mathbf{0.5}}$$

Q = flow capacity (cfs)

0.6 = orifice discharge coefficient

A = area of inlet opening (ft^2)

g = acceleration due to gravity = 32.2 (ft/s^2)

H = head above centerline of inlet opening height (ft)

Both conditions should be evaluated, and the capacity should be determined from the condition that produces the more conservative value. The capacity calculations for drop inlets will be limited to a maximum head of 1 foot above the flowline of the inlet throat.

3.5.2.5 *Low Point Inlets and Positive Overflow Requirements*

Inlets are required at all low points in the gutter profile. Additionally, the drainage system shall provide for positive overflow at all low points. The term "positive overflow" means that when the inlets do not function properly, or when the design capacity of the conduit is exceeded, the excess flow can be conveyed overland along an open course. Generally, positive overflow is provided along a street or alley, but certain circumstances may require the dedication of drainage easement and construction of a concrete flume sized to carry the overflow. Reasonable judgment should be used to limit the easements on private property to a minimum.

In areas where positive overflow is not feasible, flanking inlets are required on each side of the low point inlet to act in relief of the inlet at the low point if it should become clogged. Flanking inlets shall be located to function before water spread exceeds the allowable spread at the sump location and shall be designed with a combined capacity to match the capacity of the primary sump inlet.

3.5.3 Storm Drain (Closed Systems)

A closed storm drain system shall be required within the right-of-way where the 100-year design storm exceeds the capacity of the street surface drainage system. Closed systems shall be extended to an adequate and acceptable outfall as described in **Table 3**.

3.5.3.1 *Flow in Storm Drains*

3.5.3.1.1 Full and Partial Flow

All storm drains shall be designed by the application of the continuity equation and Manning's equation. The continuity equation is given as:

$$Q = AV$$

Q = flow capacity (cfs)

A = cross-sectional flow area (ft^2)

V = velocity (fps)

Pipe flow shall be determined either through the appropriate charts and nomographs or by direct solutions of the equations. Charts and nomographs for circular pipes flowing full and partially full are included in the iSWM manual. The Texas Department of Transportation (TxDOT) *Hydraulic Design Manual* includes equations for flow in conduits with other cross sections.

Pipes and boxes shall be designed as if flowing full. Design flow depth of less than full to get a lesser wetted perimeter is not acceptable. Four wall wetted perimeter is required in the calculations. There will be hydraulic conditions that cause the conduits to flow partially full. Where this occurs, the hydraulic gradient should be shown at the inside crown of the conduit.

3.5.3.1.2 Hydraulic Gradient and Storm Drain Profile

The hydraulic grade line (HGL) shall be established for all storm drain systems. The 25-year HGL must be at or below the gutter line for pipe systems and 1 foot or more below the top of curb at inlets. For sump conditions

without an existing structural overflow, the 100-year HGL must be 1 foot below the top of curb at the inlet. For systems where no ROW exists, the 100-year HGL must be below finished ground.

Both the fully developed 25-year and 100-year hydraulic gradient lines (HGLs) shall be shown throughout the system. They shall be labeled in the construction plans both in the hydraulic calculations and on the storm drain profile. The design storm HGL shall be below the bottom of the improved subgrade for systems under pavement. For systems outside of the pavement, the HGL shall be lower than all inlet throats. Allowance of additional head may be required for planned future extensions of the storm drainage system.

The HGL shall start at the tailwater elevation or HGL of a connecting feature; the inside top of pipe; or at the HGL determined for a coincident confluence flow condition, whichever is highest. At the discharge end of pipes outfalling to a natural creek or stream, the hydraulic gradient of the creek for the design storm must coincide with the gradient of the storm drainage conduit. If an approved flood hydrograph is available to provide a coincident flow elevation for the system's peak, the table of coincident design frequencies in the iSWM manual can be used to assist with tailwater determination. If an approved flood hydrograph is not available, the starting HGL at the outfall into a creek or channel shall be the 100-year fully developed water surface elevation. Alternatively, a detailed hydrologic and hydraulic study can be performed to determine the coincident tailwater.

3.5.3.1.3 Velocities

Storm drains should operate with velocities of flow sufficient to prevent excessive deposits of solid materials. A minimum full flow velocity of 2.5 fps in the design storm and a minimum slope of 0.5% shall be maintained in the pipe unless otherwise approved by the Town Engineer. Velocities shall not exceed those listed in **Table 9**. Supercritical flow is not allowed in main lines.

3.5.3.1.4 Headlosses

Head losses at structures shall be determined for manholes, junction boxes, wye branches, bends, curves, and changes in pipe sizes in the design of closed conduits. Head losses must be incorporated into the gradient profile. Minimum head loss used at any structure shall be one-tenth (0.10) foot. Refer to the iSWM manual for the equations to calculate energy losses at pipe junctions, bends, manholes, inlets, and other situations.

Pipe direction changes will be curves using radius pipe unless approved by the Town Engineer. Ninety-degree turns on storm sewers or outfalls are prohibited. Laterals shall intersect the trunk line at 60 degrees.

3.5.3.2 *Pipe Material and Roughness Coefficients*

Underground systems shall be constructed with Class III reinforced concrete pipe or as otherwise provided in the Town's standard construction details. Alternate materials may be approved by the Town Engineer. The pipe size shall be a minimum of 18 inches for all public systems. A higher class of pipe may be required when underground storm drainage systems are constructed at shallow or deep elevations. Refer to the pipe manufacturer specifications for cover requirements.

A roughness coefficient will be selected which will represent the average condition of the pipe consistent with the values presented in **Table 9**. Other roughness coefficients may be approved at the discretion of the Town Engineer.

3.5.3.3 *Entrance/Outfall Structures*

Headwalls or sloped end treatments shall be constructed at the pipe ends of all storm drain systems. Sloped end treatments are required along streets when the drainage feature is adjacent and parallel to traffic flow. The sloped end treatment shall be a minimum 6:1 (horizontal to vertical) end section.

Storm drain systems that outfall to a stream, natural channel, or pond shall conform to the existing side slope of the channel and be connected to a headwall. Discharge flowlines of storm sewers are to be 2 feet above the flowline of creeks and channels, unless channel lining is present. Hard armor protection and energy dissipation shall be provided when discharge velocities exceed the maximum allowable velocity in **Table 9** and when specified by the Town Engineer.

3.5.3.4 *Access Points*

A manhole or access lateral shall be constructed at least every 500 feet to provide access into the closed system, or as otherwise directed by the Town Engineer. A lateral used as an access point shall be at least 24 inches in diameter, an approved material, and no more than 50 feet long to an open-air access point. Open air access is considered a designed entrance point or outfall without obstructions.

3.5.4 Open Channels

This section includes the drainage design criteria for ditches, channels, and dams. Land disturbances that include or are adjacent to a stream and result in impacts to the 100-year floodplain shall submit a flood study to meet the requirements of **Chapter 7**. If modifications to a stream or channel are determined to impact the Jurisdictional Waters of the United States (WOTUS), then the plans shall be submitted to the USACE for review and any required permitting shall be performed and approved prior to construction per the requirements of **Section 3.1.3.2.**

3.5.4.1 *Hydraulic Design*

The Town requires a tailwater/headwater analysis on any proposed open channels, upstream and downstream channel transitions, energy dissipation structures, obstructions, or small dams (less than 6 feet). The tailwater/headwater analysis shall be used to determine the actual headwater and tailwater elevations, head losses, capacity, freeboard, and floodplain impacts. If an approved flood hydrograph is available to provide a coincident flow elevation for the system's peak, the table of coincident design frequencies in the iSWM manual can be used to assist with tailwater determination. Alternatively, a detailed hydrologic and hydraulic study will be required.

For channels that require a flood study, a hydrologic routing model and hydraulic analysis will be required to determine impacts on existing floodplains and/or adjacent properties. If a stream or channel has an effective FEMA model and/or a Town Council adopted watershed model, the engineer will be required to use those models for the analysis.

For normal depth (uniform flow) calculations, the Manning's equation and slope-area method is to be used only for initial sizing. Exceptions for small outfall channels will be made at the discretion of the Town Engineer.

Supercritical flow will not be allowed for designed channels. However, for lined channels, the HEC-RAS analysis should include a mixed-flow regime analysis, to make sure no supercritical flow occurs for the designed channel. Mixed or supercritical flow may be allowed for analysis of existing conditions when required.

Upstream or downstream transitions from natural to modified channels along with channel outfalls will require a design based on a hydraulic study and will provide a non-erosive environment. Refer to the iSWM manual for design of channel transitions and energy dissipation.

3.5.4.2 *Types of Channels*

3.5.4.2.1 Unimproved Channels/Natural Streams

Where natural streams connect to improved closed systems and/or improved channels, permanent transitional materials and energy dissipation are required. In areas along natural streams where potentially excessive erosion or head cutting may occur or worsen, grade control structures, drop structures, or other structures may be required to stabilize the stream in order to protect structures or infrastructure.

3.5.4.2.2 Constructed/Modified Open Channels

Where constructed or modified open channels connect to a closed system, natural streams, or a channel of a different material, permanent transitional materials and energy dissipation are required. Modified channels shall be designed with the following minimum criteria:

1. Side Slopes shall be 4:1 (horizontal to vertical) for vegetated channels or as specified by manufacturer for other channel materials.

2. Bottom width shall be at least 6 feet.
3. Minimum channel slope is 1% for vegetated channels and 0.5% for hard armor channels or pilot channels.
4. New channels shall be designed to fully contain the 100-year storm with 1 foot of freeboard at all locations along the channel, or to the elevation of the 100-year flood elevation of Lewisville Lake, whichever is lower.
5. Modification or improvement of existing constructed/modified channels shall at a minimum maintain the existing capacity.
6. The maximum design velocity for all channels shall be as specified in **Table 9**. Higher velocities and/or channel armoring require a sealed geotechnical study for design and approval by the Town Engineer.
7. Each reach of a channel that will require Town maintenance must have a ramp for maintenance access. Ramps shall be at least 10-feet wide and have 15% maximum grade. 12-foot width is required if the ramp is bound by vertical walls.
8. A fence shall be constructed on each side of the channel. Fences are not allowed to cross public channels.
9. New concrete channels are not allowed unless it is required as part of the repair or replacement of an existing concrete channel.

3.5.5 Culverts

3.5.5.1 *General Design Criteria*

Culverts shall be designed based on standard design procedures outlined in the iSWM manual. used to carry ditch or surface flow safely under roadways and driveways in order to meet conveyance standards for the design storm. The driveway or roadway shall have an invert above the pipe for positive overflow. If a culvert is not feasible for a driveway, then the driveway shall be constructed with an invert.

Concrete sloped end treatments are required when culverts are adjacent and parallel to traffic flow. Erosion protection will be provided at the upstream and downstream ends of the sloped end treatment for all culverts. Stabilization and/or energy dissipation shall be provided where allowable channel velocities are exceeded upstream and downstream of the culvert.

Culverts shall be constructed with Class III reinforced concrete pipe or another approved material as shown in the Town's standard construction details. The pipe size shall be a minimum of 24 inches for roadway crossings and 18 inches for driveway culverts. A higher class of pipe may be required when underground storm drainage systems are constructed at shallow or deep elevations. Refer to the pipe manufacturer specifications for cover requirements.

When practical for multiple barrel culverts (3 or more), one of the barrels should be placed at the flowline of the stream with the other barrels at a higher elevation to create a single flow path for lower flows and reduced sediment and debris accumulation.

3.5.5.2 *Minimum Elevations*

Culverts shall be designed with a minimum 1 foot of freeboard between the 100-year headwater elevation and the surface of the road and/or 2 feet of freeboard below any adjacent habitable structure, whichever establishes the more stringent requirement. Other surrounding physical conditions may be cause for an increase in this requirement at the discretion of the Town Engineer.

3.5.5.3 *Slope and Velocity*

The maximum slope using concrete pipe is 10% before pipe-restraining methods must be taken. The minimum slope is 0.5%. Maximum vertical distance from throat of intake to flowline in a drainage structure is 10 feet. Drops greater than 4 feet will require additional structural design.

Velocities in culverts should be limited to no more than 15 feet per second, but downstream conditions very likely will impose more stringent controls. Culvert discharge velocities shall not exceed the maximum permissible

velocities for open channels listed in **Table 9**. Discharge velocities that are too high must be reduced to allowable velocities using appropriate energy dissipation structures or techniques.

3.5.5.4 *Headwater Limitations*

For safety reasons, headwater depth/culvert diameter ratio (HW/D) should not exceed 1.5 for the 100-year event peak flow. Variance to this criteria may be permitted by the Town if justification is provided and sufficient measures are taken to reasonably avoid any safety impacts. Assessment of the impacts caused by exceeding the design headwater depth should account for:

- Hazard to human life and safety.
- Potential damage to the culvert, embankment stability and roadway.
- Traffic interruption in the event of roadway overtopping.
- Anticipated upstream and downstream flood risks, for a range of return frequencies.

The headwater shall be checked for the 100-year storm event elevation to ensure compliance with floodplain management criteria and to ensure it is contained within the right-of-way or easement. The headwater shall not cause damages to the upstream property.

3.5.5.5 *Tailwater Considerations*

If the culvert outlet is operating with a free outfall, the critical depth and equivalent hydraulic grade line shall be determined. If an upstream culvert outlet is located near a downstream culvert inlet, the headwater elevation of the downstream culvert will establish the design tailwater depth for the upstream culvert. For culverts discharging into natural creeks, channels, or ponds, the tailwater shall be assumed to be the 100-year fully developed water surface elevation. If an approved flood hydrograph is available to provide a coincident flow elevation for the system's peak, the table of coincident design frequencies in the iSWM manual can be used to establish the tailwater elevation. Alternatively, a detailed hydrologic and hydraulic study can be performed to establish the tailwater elevation.

3.5.6 Bridges

3.5.6.1 *Hydraulic Design*

A hydrologic and hydraulic analysis using HEC-RAS is required for designing all new bridges, bridge widening, bridge replacement, and roadway profile modifications that may adversely affect the floodplain, even if no structural modifications are necessary. The hydraulic analysis should demonstrate no-rise (0.00 feet) in the water surface elevation for the 100-year storm. Typically, this analysis should include the following:

1. Peak discharges for fully developed watershed conditions,
2. Proposed conditions water surface profiles for design flood and other frequency flood impacts.
3. Consideration of the potential for stream stability problems and scour potential.

Additional discussion on bridge hydraulics is included in the *TxDOT Hydraulic Design Manual*.

3.5.6.1.1 Loss Coefficients for Hydraulic Models

The contraction and expansion of water through the bridge opening creates hydraulic losses. These losses are accounted for through the use of loss coefficients. Contraction (K_c) and Expansion (K_e) Coefficients shall be used at the bridge location in accordance with current FEMA guidelines.

3.5.6.2 *Minimum Elevations*

Bridges shall be designed to pass the 100-year flow with a minimum 1 foot of freeboard between the 100-year surface elevation and the low chord of the bridge. Analysis must consider both the fully developed and FEMA effective discharges, and the freeboard elevation will be set using the most conservative results. Where fully

developed discharges are not available, the Engineer will be required to perform a flood study to determine 100-year water surface elevations.

3.5.6.3 *Scour Analysis*

A scour analysis shall be submitted with bridge design plans. Scour analysis shall be performed in accordance with the latest edition of the TxDOT *Geotechnical Manual*, based on the guidelines and procedures outlined in *HEC-18 Evaluating Scour at Bridges (5th Ed.)*. The HEC-RAS scour routines shall generally be used to perform bridge scour computations. Aerial utility crossings with piers located in the main channel shall also be evaluated for local pier scour using the methodology outlined in *HEC-18*.

Scour revetment shall be provided as needed and shall be designed using the methodology outlined in *HEC-23 Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Guidance*. Alternative methodologies for scour analysis and revetment may be approved at the discretion of the Town Engineer.

Section 3.6. Stormwater Storage Facilities

Proposed stormwater discharge from a site shall not exceed the calculated discharges from existing conditions for the 2-, 25-, and 100-year design storm. On-site detention may be proposed to mitigate the impacts of increased discharges due to site development. In some instances, detention may be shown to exacerbate potential flooding conditions downstream. In lieu of a detention facility, the Engineer may document that the excess flow will not create adverse impacts as defined in **Table 3**.

3.6.1 Detention Storage Calculation

The modified rational method is allowed for planning and conceptual design for watersheds of 200 acres and less. Sizing is not exact and may result in undersized detention/retention pond requirements. For final design purposes, the modified rational method is allowed only for watersheds of 25 acres and less. The modified rational method is not acceptable for basins in series. Detention basins draining watersheds over 25 acres shall be designed using unit hydrograph methodology. The unit hydrograph method is also allowed for basins with watersheds less than 25 acres and may be required at the discretion of the Town Engineer.

A calculation summary shall be provided on construction plans. For detailed calculations of unit hydrograph studies, a separate report shall be provided to the Town for review and referenced with date, engineer, and title on the construction plans. Stage-storage-discharge values shall be tabulated, and flow calculations for discharge structures shall be shown on the construction plans. Routing calculations must be used to demonstrate that the storage volume and outlet structure configuration are adequate.

3.6.2 Pond and Spillway Geometry

The following criteria shall apply:

1. Detention basin embankments shall have a 10-foot crown width.
2. Fencing may be required around the detention area at the discretion of the Town Engineer.
3. Detention Basins shall be designed with at least one maintenance ramp of at least 10 feet wide with a maximum slope of 15%. Twelve (12) feet in width is required next to vertical walls.
4. A freeboard of 1 foot will be required for all detention ponds.
5. Grassed side slopes shall be 4:1 or flatter and less than 20 feet in height. Slopes protected with concrete riprap shall be no steeper than 2:1. A detailed geotechnical investigation and slope stability analysis is required for grass and concrete slope pavement slopes greater than 12 feet in height. A concrete-lined or structural embankment can be steeper with the approval of the Town Engineer.
6. An emergency spillway shall be provided at the 100-year maximum storage elevation with sufficient capacity to convey the fully urbanized flood mitigation storm assuming blockage of the closed conduit

portion outlet works with 6 inches of freeboard. Spillway requirements must also meet all appropriate state and federal criteria. Design calculations will be added for all spillways.

7. Dry detention basins are sized to temporarily store the volume of runoff required to provide flood protection up to the flood mitigation storm, if required. Dry detention basin design should consider multiple uses, such as recreation. As such, pilot channels should follow the edges of the basin to the extent practical.
8. The bottom of the basin shall have a minimum grade of 1%, although swales may have minimum grades of 0.5%. Concrete flumes shall be provided for slopes less than 0.5% and may have slopes as shallow as 0.2%. They shall be at least 6 feet wide.

3.6.3 Permitting and Dam Safety Requirements

All federal, state, and local laws pertaining to the impoundment of surface water relating to the design, construction, and safety of the impounding structure shall apply. Criteria established by the State of Texas for dam safety (*TAC Title 30, Part 1, Chapter 299*) and impoundment of state waters (*Texas Water Code Chapter 11*) shall apply where required by the state, and where required by the Town Engineer. Should the engineer desire to utilize an existing facility that would qualify under these criteria and the use of the facility changes from an agricultural use to another use, the existing facility may need to be brought into compliance with the TCEQ *dam safety criteria*.

If a dam falls under the TCEQ dam safety criteria, the Town will require review and approval from TCEQ prior to authorizing construction. Copies of any federal, state, or local permits issued for the proposed impoundments shall be submitted to the Town Engineer. TCEQ rules and regulations regarding impoundments shall be followed. In accordance with Texas Water Code §11.142, permanent surface impoundments including retention and detention ponds may be required to obtain a water rights permit from the TCEQ.

Section 3.7. Floodplain Development

The following information is included for reference and to supplement the provisions outlined in the Town's *Flood Control and Prevention Ordinance*. Where codified flood protection provisions conflict with the provisions of this manual, the more stringent of the criteria shall apply.

The Town regulates development in all flood-prone areas. Flood-prone areas include areas located within the FEMA Special Flood Hazard Area (SFHA), flood hazards identified as part of a drainage study or Town Council adopted watershed study, or reported flood-prone areas located in Zone X. Reported flood-prone areas are subject to the requirements of this manual even if a flood zone has not been identified for the area.

Any land disturbance that includes impacts to a flood-prone area or could have impacts on floodplain limits for an associated stream shall require a hydraulic analysis (flood study) to determine drainage easements, establish minimum finished floors for insurable structures, and evaluate proposed modifications to existing floodplains or floodways. Depending upon the proposed project, location, and type of stream, the stormwater submittals may include a Flood Study, No Rise Certification, Floodplain Development Permit, FEMA Letter of Concurrent/Approval, and/or a USACE Section 10 and Section 404 Permit.

3.7.1 Effective Models

When available, effective models provided by the Town are required to be utilized to establish existing conditions and evaluate proposed project impacts to the watershed. When Town adopted models are utilized, any submitted models shall be consistent with the base modeling platform and version. Proposed conditions shall be incorporated into the Town's watershed models and submitted for review.

3.7.2 Compensatory Storage

Compensatory storage is required for all storage lost or displaced in a Regulatory Floodplain due to land disturbance. Hydraulically equivalent compensatory storage requirements for fill or structures placed in the SFHA and/or within a riverine flood hazard area identified in a Town Council adopted watershed study shall be at least equal to the volume of the storage lost or displaced. Such compensation areas shall be designed to drain freely and

openly to the channel and shall be located opposite or adjacent to fill areas. The Regulatory Floodplain storage volume lost below the existing 10-year frequency flood elevation must be replaced below the proposed 10-year frequency flood elevation. The Regulatory Floodplain storage volume lost above the 10-year existing frequency flood elevation must be replaced above the proposed 10-year frequency elevation.

3.7.3 Floodplain Development Permit

Any work to be performed within any flood-prone area of the town required a Floodplain Development Permit. Variances will not be issued from this requirement for proposed projects in the SFHA. Applications for a Floodplain Development permit shall be submitted to the Town with the flood study that evaluates existing conditions and proposed project impacts.

3.7.4 FEMA Submittal Requirements

Coordination with and approval from the Town Floodplain Administrator is required for all floodplain submittals. Payment of a review fee to the Town may be required.

All proposed projects located in the SFHA shall be evaluated for the need of a Conditional Letter of Map Revision (CLOMR). A CLOMR shall be submitted to FEMA in the event that the proposed modifications to the SFHA result in a rise greater than 0.0 feet to the effective base flood elevation. The Town reserves the right to require a CLOMR for any proposed project located within the SFHA.

Upon completion of construction within the SFHA, all applicants shall verify that the site was constructed according the proposed conditions. As-built plans, certified by a professional engineer registered in Texas, shall be submitted to the Town for verification of as-built conditions. Hydraulic modeling to reflect as-built conditions is required for projects constructed without conditional approval or where as-built conditions differ from the proposed conditions modeling. In all cases, a Letter of Map Revision (LOMR) shall be submitted to FEMA for approval.

Sec. 4.0 Water and wastewater design requirements.

Water System.

Water lines adequate for domestic supply and for fire protection needs shall be installed to serve each lot, or tract, in every subdivision where connection is to be made immediately to a community or a utility water system in accordance with the Texas Commission on Environmental Quality and town design standards and specifications. In subdivisions outside the town limits, where such connection to a system is not to be made immediately, plans shall be prepared for future installation of a water distribution system to serve each lot or tract.

A. *Water System Extensions.* Water system extensions shall be designed to provide for a domestic supply of at least 100 gallons per capita per day delivered at a minimum pressure of 50 pounds per square inch. The 100-gallon rate of supply shall not be required if, in the opinion of the town's engineer, the proper point of connection to the existing system for the extension is not capable of supplying such a volume. However, the extension shall be designed to convey the 100-gallon rate should the supply point be subsequently improved. If the 50 pounds minimum pressure cannot be provided by existing system pressure or because of the elevation of the tract to be developed, a booster pump system shall be included which will provide that minimum pressure.

B. *All Supply and Distribution Mains.* All supply and distribution mains installed within a subdivision must extend to the borders of the subdivision as required for future extensions of the system, regardless of whether or not such extensions are required for service within the subdivision.

C. *Fire Hydrants.* Fire hydrants shall be provided at locations such that all areas of development are located within a 500-foot radius from a fire hydrant. All such fire hydrants shall be served by a six inch or larger supply or distribution main.

D. *Extension for Single Customer.*

1. When it is necessary to extend a water line to serve a new single customer where only one meter will be installed, the town at its own expense will extend the said water line up to 100 feet.
2. If a greater distance than 100 feet is required to reach the nearest property line of the new single customer, the said single customer shall pay 100 percent of cost extension in excess of 100 feet.
3. If more than one single customer is served by the main extension, 100 feet of main will be allowed for each single customer thus served, and any excess footage will be paid for at 100 percent.
4. No more than one single customer credit of 100 feet will be allowed each lot or tract of record so served regardless of the number of buildings, occupied or otherwise, which might be located on said lot or tract.
5. Payment will be made in advance of construction.

E. *Extensions to Serve Developers.*

1. The developer will pay 100 percent of the construction cost of the size mains required to serve his development, including the approach main, plus ten percent of the developer's share of the construction cost for engineering, supervision and inspection, or six percent if a private engineer approved by the utilities supervisor is employed by the developer and furnishes approved plats and specifications.
2. When the developer desires that water mains be extended to serve his property, he will submit a request in writing to the utilities supervisor. The property to be served shall be listed showing the

lot, block and subdivision. Two approved plats of the area to be served shall be attached to the request and shall become the property of the town.

3. If the area to be served is a part of a larger area that is owned or controlled by the developer and which is reasonably expected to be served by water in the future, then two approved plats or approved preliminary plats of the larger area shall also be submitted. A tentative design of a main layout will be made of the entire area, but the cost estimate will be made on that portion of the subdivision to be served immediately.

F. *Materials and Workmanship.* All materials and workmanship incorporated in water system extensions shall be in accordance with the currently adopted town construction specifications.

G. *Water Well Design Requirements.* Water well must be meet current standard design practice.

Wastewater System

Sanitary sewers shall be installed to serve each lot, or tract, in every subdivision where connection is to be made immediately to a community disposal system or to a public sewerage system.

A. *Sewer Extensions.*

1. All sewer extensions shall be designed in accordance with the latest applicable rules and regulations as published by the Texas State Department of Health. No sewer lateral shall be smaller than six inch in nominal diameter. All sewers shall be designed with consideration for serving the full drainage area subject to collection by the sewer in question except as modified with the concurrence of the town's engineer because of the projected rate of development or the financial feasibility of the proposed extension.

2. All subdivisions developed subsequent to this ordinance must be served by community sanitary sewerage collection, treatment and disposal systems approved by the town with exceptions granted only if all of the following conditions exist: (1) the subdivision in question is less than five parcels of land, (2) the existing community type collection, treatment and disposal system is not and cannot feasibly, in the opinion of the town's engineer, be made available to the area of development, and (3) percolation tests run by an independent testing laboratory are submitted to both the town and county health department with results showing that a septic tank and spreader field can be developed to provide adequate disposal of the sewage.

B. *Lateral and Sewer Mains.* All lateral and sewer mains installed within a subdivision must extend to the borders of the subdivision as required for future extensions of the collecting system regardless of whether or not such extensions are required for service within the subdivision.

C. *Lift Stations or Separate Treatment Facilities.* The provision for lift stations or separate treatment facilities will not be permitted unless the cost of constructing such lift stations or separate facilities is at least 20 percent less than the costs of constructing an adequate outfall or approach sewer from the existing system.

D. *Septic Tank.* A septic tank with a capacity of not less than 500 gallons and with a drain field of not less than 150 feet shall be installed on each lot in accordance with the regulations of the county and state health officers.

E. *Extensions for Single Customers.*

1. Where it is necessary to extend a sewer line to serve a new "single customer," the town, at its own expense, will extend said sewer up to 100 feet.

2. If a greater distance than 100 feet should be required to extend the line to the nearest property line of the customer, said single customer shall pay the excess over the 100 feet allowable at the rate of 100 [percent] of cost.

3. If more than one single customer is served by the main extension, 100 lineal feet of sewer will be allowed for each single customer thus served, and any excess footage will be paid for at 100 percent of cost.

4. No more than one single customer credit of 100 feet will be allowed for each lot or tract of record so served regardless of the number of buildings, occupied or otherwise, which might be located on said lot or tract.

5. Payment will be made in advance of construction.

F. *Extensions to Serve Developers.* The developer shall pay 100 percent of the construction cost of all sewers including "approach mains," but excepting "service lines," plus ten percent of the developer's share of the construction cost for engineering, supervision and inspection, or six percent if a private engineer approved by the utilities supervisor is employed by the developer and furnishes approved plans and specifications.

1. The developer will also pay 100 percent of the cost of "service lines" to all lots to be served by a sewer located in the street. Said "service lines" will be constructed at the same time as a part of the same contract as all other sewers in the developer's addition. If the sewers are being constructed by town forces, the "service lines" will be constructed by town forces at the time all other sewers within the addition are constructed.

2. The utilities supervisor shall determine the size of "approach main" required to serve developer's property and the actual size to be constructed. Should the town elect to construct a main larger than the developer's required "approach main," the developer will not be charged for the additional size.

3. The amount of developer's payment shall be determined using unit bid prices contained in the award contract.

G. *Connections.* No connection shall be made to any sanitary sewerage system within the town which will permit the entrance of surface water or waste of other than domestic sewage characteristics without the specific authorization by the town council.

H. *Materials and Workmanship.* All materials and workmanship incorporated in the sewage system extensions shall be in accordance with the currently adopted town construction specifications.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 5.0 Other public improvements.

Street Lighting.

1. The following standards shall apply to all arterial thoroughfares:

a. Street lighting shall be placed in the medians, with spacing not to exceed one hundred eighty feet (180') and no closer than one hundred forty-five feet (145') depending on median breaks and intersections.

b. Unless a photometric analysis suggests the use of a different type of luminaire, street lighting shall use a city-approved, standard 250-watt equivalent LED luminaire with a color temperature of 3,000 kelvins.

2. All traffic signal and street lighting construction, testing, and materials shall be in accordance with the city's current standards, details, and specifications unless otherwise noted. All electrical work shall be in accordance with the most current National Electrical Code, town and TxDOT specifications and standards.

3. All lighting luminaries shall use LED lamps.
4. All site plans should provide a copies of the proposed layout of street lighting standards serving the subdivision. The type of all proposed and existing street lighting shall be indicated on the layout.
5. Contractor shall coordinate electrical services with the town and either ONCOR or COSERV representatives (according to their respective area).
6. The contractor shall coordinate with the appropriate utility company and TxDOT/NTTA (if within TxDOT/NTTA ROW) prior to beginning erection of poles, luminaries and structures located near any overhead or underground utilities.
7. Proposed concrete foundation and conduit alignment shall be staked by the contractor and approved by the town prior to installation.

Gas Lines.

The subdivider shall arrange for and shall file his request at the earliest feasible date for gas service desired for his subdivision. Where a source of gas supply is not within a reasonable distance for present installation, but, wider a gas line extension agreement gas service will be extended within five years following the recording of the final plat, those portions of such lines which will lie within the portions of streets intended for vehicular traffic shall be installed. In lieu of such installation the subdivider may defer the paving of streets and alleys until such lines are installed by making appropriate fiscal arrangements with the town.

Electric Power and Telephone Service.

The subdivider shall arrange with the appropriate utility and shall file his request at the earliest feasible date for electric power and telephone service to his subdivision.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 6.0 Retaining Wall Design Requirements.

Design and Construction Standards

A. All retaining walls in excess of four feet (4') in height (measured from the bottom of footing to top of wall) shall be designed by a Professional Engineer licensed in the State of Texas.
B. Retaining walls shall be designed and constructed to support the live load and dead load forces they will be subjected to.
C. Retaining walls shall be designed using a cantilevered reinforced concrete structure, masonry gravity structure, or stone gravity structure. Other retaining wall materials may be approved at the discretion of the Town Engineer.
D. Brick shall not be used as a structural element of a retaining wall, but it may be used as a facing material. Timber material, such as railroad ties, is prohibited for use as any part of a retaining wall, regardless of height.
E. Retaining walls shall have proper fall protection as defined within the Building Code as adopted by the Town.
F. Walls that are anticipated to support a fence or screen wall, either integrally or separately, shall be designed to handle the structural forces of the fence imposed on the wall.
G. *Tiered Retaining Wall Systems*
    1. Tiered retaining wall systems shall be designed such that the upper wall does not place additional surcharge on the lower wall, beyond the design loads of the lower wall.

2. Tiered retaining wall systems shall be designed such that the height of the upper wall is no greater than the height of the lower wall.

Retaining Wall Building Permit

A. Any earth terracing method that supports a structure or vehicle load, or that is at least four feet (4') in height (measured from the bottom of footing to top of wall) shall require a separate building permit.
B. Application for a retaining wall building permit at least four feet (4') in height, or that supports a structure or vehicle load, shall include the following:
    1. A site-specific geotechnical report, sealed by a geotechnical engineer licensed in the State of Texas. This report shall include soil parameters to be used in the design of the retaining wall for sliding and overturning stability. Additionally, global stability analysis shall be included in the geotechnical study for retaining walls with a retained height in excess of ten feet (10') or immediately adjacent to a stream or ponded water.
    2. Retaining wall plans, sealed by a professional engineer licensed in the State of Texas.
    3. Structural calculations, sealed by a professional engineer licensed in the State of Texas, that utilize the parameters provided in the geotechnical report indicating that the retaining wall is stable in sliding, overturning, and internal failure modes.
C. No building permit, other than for a retaining wall, shall be issued for any lot within a subdivision until all retaining walls are constructed in accordance with a grading plan for the subdivision.
D. Any change from the approved grading plan or design for a retaining wall within a subdivision shall not be permitted unless the applicant has submitted plans for the entire subdivision showing the proposed change in grading and the Town Engineer has approved the proposed change(s).

Retaining Wall Maintenance and Easements

A. If, in the opinion of the Town Engineer, site development construction plans indicate the need for the construction of retaining walls greater than four feet (4') in height, private retaining wall easements showing the location of the retaining wall(s) and the no-build zone shall be dedicated and shown on the Preliminary Plat and Final Plat.
B. The retaining wall easement shall include a no-build zone, extending from the retaining wall on both sides, within which any additional load from future construction would exceed the design capacity of the retaining wall.
    a. The no-build zone width shall be at least the clear height of the retaining wall.
    b. No structure (other than the retaining wall), swimming pool, or any other feature which adds load to the retaining wall shall be constructed within the no-build zone.
    c. Exceptions from these requirements may be granted by the Town Engineer if a design and supporting calculations are provided that demonstrate the wall's ability to support the proposed structure.
C. The width of the retaining wall easement shall be a minimum of five feet (5') or the width of the retaining wall (including subsurface elements), whichever is greater, plus the width of the no-build zone.
D. Retaining walls and no-build zones shall be located entirely on one lot and shall not straddle property lines, unless the wall is constructed within a retaining wall easement dedicating the ownership and maintenance responsibility to the Homeowners' or Property Owners' Association.
E. Retaining walls greater than four feet (4') in height and constructed as part of a Subdivision shall be located in a retaining wall easement dedicated to the Homeowners' or Property Owners' Association, and shall be their responsibility to maintain."

Sec. 7 GIS/survey requirements.

Coordinate System.

AutoCAD 2010 (or higher) with water, sanitary sewer, paving, grading, storm sewer. The CAD file of project should be referenced with the NAD_1983_StatePlane_Texas_North_Central_FIPS_4202_Feet projected Coordinate System.

Markers.

1. Markers consisting of minimum three-eighths-inch diameter steel rods at least twenty-four inches long with caps identifying responsible surveying firm or RPLS number shall be placed at all:
    a. Lot and block corners (wherever a lot line bearing changes);
    b. Intersection points of alley and block lines;
    c. Curve and tangent points along block, lot and right-of-way lines within the subdivision; and
    d. Right-of-way dedications.

Monuments.

1. Three dimensional coordinates, reported as state plane coordinates, shall be established using the city's monumentation system and using the city's combined scale factor. The coordinates shall be noted on the plat monuments shall be markers and installed at locations shown on the plat.
2. Subdivision Monumentation.
    a. At least two markers shall be placed at property corners in addition to at least two monuments at opposing ends of the property.
3. Capital Improvements Project Monuments.
    a. Found existing right-of-way monuments, survey markers, or property corners, and proposed monuments shall be shown on the construction drawings and located by station and offset, right or left from the control line, base line or center line, or by northing and easting.
4. If new construction will damage, destroy, or alter existing survey markers, monuments, or property corners, they must be reset prior to final acceptance.
5. Prior to final plat acceptance, all required monuments must be found and reset if damaged during construction.
6. The surveyor will provide two monuments acceptable to the town and establish grid coordinates for the monuments in reference to the Town of Little Elm GPS monuments.
7. Elevations will be established on the two monuments on the vertical datum in reference to the Town of Little Elm GPS monuments.

(Ord. No. 1444, § 2(Att. A), 3-6-2018)

Sec. 8.0 Standard details.

TOWN OF LITTLE ELM
STANDARD DETAILS

LITTLE ELM

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STANDARD DETAILS * TOWN OF LITTLE ELM, TEXAS * DECEMBER 2023

CONSTRUCTION
GENERAL NOTES

GENERAL NOTES

1. IT IS NOT THE INTENT OF THESE CONSTRUCTION NOTES TO COVER ALL DETAILS AND/OR SPECIFICATION REQUIREMENTS OF THE TOWN OF LITTLE ELM. WHEN THERE IS A CONFLICT BETWEEN THESE STANDARDS AND OTHER REGULATIONS, THE CONTRACTOR MUST ABIDE BY THE STRICTEST REQUIREMENT.
2. THE EXISTENCE AND LOCATIONS OF ALL UNDERGROUND UTILITIES SHOWN (MAIN LINES, NO LATERAL OR SERVICES SHOWN) ON THE DRAWINGS WERE OBTAINED FROM AVAILABLE RECORDS AND ARE APPROXIMATE. NO WARRANTY IS IMPLIED AS TO THE ACTUAL LOCATION OF EXISTING UTILITIES. NEITHER THE OWNER NOR THE ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES NOT SHOWN OR NOT IN THE LOCATION SHOWN. THE CONTRACTOR SHALL DETERMINE THE DEPTH AND LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO TRENCHING AND SHALL BE REQUIRED TO TAKE ANY PRECAUTIONARY MEASURES TO PROTECT ALL LINES SHOWN AND // OR ANY OTHER UNDERGROUND UTILITIES NOT OF RECORD OR NOT SHOWN ON THE PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL FRANCHISE AND TOWN UTILITIES PRIOR TO CONSTRUCTION.
3. ANY CONTRACTOR / SUBCONTRACTOR PERFORMING WORK ON THIS PROJECT SHALL FAMILIARIZE HIMSELF WITH THE SITE AND SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM HIS OPERATIONS. SAID EXISTING IMPROVEMENTS SHALL INCLUDE BUT NOT BE LIMITED TO BERMS, DITCHES, FENCES, AND VEGETATION. ANY REMOVAL OR DAMAGE TO EXISTING IMPROVEMENTS SHALL BE REPLACED OR REPAIRED BY THE CONTRACTOR AT HIS EXPENSE AND SHALL BE APPROVED BY THE TOWN OF LITTLE ELM.
4. ALL CONSTRUCTION, TESTING, AND MATERIALS SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE TOWN OF LITTLE ELM. ALL SUBMITTALS MUST BE ORIGINALS WITH SIGNATURES WHERE APPLICABLE; FACSIMILES WILL NOT BE ACCEPTED.
5. TESTING SERVICES FOR PUBLIC PROJECTS SHALL BE PROVIDED BY THE TOWN. COSTS ASSOCIATED WITH THESE TESTS SHALL BE PAID BY THE TOWN. RE-TEST OF FAILED AREAS THAT DO NOT MEET THE REQUIREMENTS STATED WITHIN SHALL BE PAID FOR BY THE CONTRACTOR.
6. ALL TRAFFIC CONTROLS SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST REVISION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). ALL REFERENCE FOR (USING TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) STANDARDS AND CONSTRUCTION DETAILS SHALL BE THE LATEST REVISIONS AND/OR AMENDMENTS THEREOF. THE TOWN OF LITTLE ELM USES RAISED PAVEMENT MARKINGS (BUTTONS) FOR STRIPING AND THERMOPLASTIC MARKINGS IN LIEU OF PAINT. THE MINIMUM SIGN SIZE SHALL BE THE STANDARD SIZE IN THE MANUAL. DETAILS ARE AVAILABLE UPON REQUEST FOR THE TYPE OF BUTTON PATTERNS, POSTS, AND CONNECTIONS REQUIRED FOR THE SIGNS.
7. THE CONTRACTOR SHALL MAKE EVERY EFFORT NOT TO IMPEDE TRAFFIC ON EXISTING STREETS, ALLEYS, OR FIRE LANES OPEN TO THE PUBLIC. IN THE EVENT THE CONSTRUCTION WORK REQUIRES THE CLOSURE OF AN EXISTING STREET, ALLEY, OR FIRE LANE, THE CONTRACTOR SHALL REQUEST THE ROAD CLOSURE THROUGH THE TOWN. IF THE CLOSURE ELIMINATES THE SECOND POINT OF ACCESS TO EXISTING BUILDINGS WITH A CERTIFICATE OF OCCUPANCY, THEN THE ACCESS MAY NOT BE CLOSED FOR MORE THAN FORTY-EIGHT (48) HOURS AND WILL REQUIRE FIRE MARSHAL APPROVAL IN EITHER CASE. UNLESS OTHERWISE SPECIFIED BY THE TOWN, ALL OTHER STREETS OR ALLEYS MAY NOT BE CLOSED FOR MORE THAN SEVENTY-TWO (72) HOURS.
8. THE CONTRACTOR SHALL INSTALL TEMPORARY FENCES ADJACENT TO ALL SIDEWALKS AND ADJACENT DEVELOPED PROPERTIES. THE CONTRACTOR MUST ALSO PROVIDE TEMPORARY FENCING WHEN FENCES OR OTHER SCREENING FEATURES ARE REMOVED FOR THE DURATION OF CONSTRUCTION.
9. ALL CONCRETE STRUCTURES, WHETHER PRECAST OR CAST-IN-PLACE, SHALL BE DESIGNED WITH APPROPRIATE SULFATE RESISTANT CEMENT OR EQUIVALENT BASED ON LOCAL SOIL CONDITIONS PER GEOTECHNICAL REPORT. PRECAST MANHOLES OR OTHER SPECIAL STRUCTURES IN ANY RIGHT-OF-WAY OR FIRE LANE EASEMENTS WILL REQUIRE A CERTIFICATION FROM THE MANUFACTURER THAT THE PRODUCT MEETS THE DESIGN CRITERIA AND TWENTY-EIGHT (28) DAY COMPRESSIVE STRENGTH. CAST-IN-PLACE MANHOLES OR OTHER SPECIAL STRUCTURES IN ANY RIGHT-OF-WAY AND FIRE LANE OR UTILITY EASEMENTS WILL REQUIRE CYLINDERS TO BE MADE FOR STRENGTH TESTS BY AN APPROVED LABORATORY. LABORATORY TEST REPORTS SHALL BE SUBMITTED TO THE DESIGN ENGINEER FOR APPROVAL. SAMPLES FOR STRENGTH TESTS OF EACH CLASS OF CONCRETE PLACED EACH DAY SHALL BE TAKEN NOT LESS THAN ONCE A DAY, NOR LESS THAN ONCE FOR EACH 100-150 CU YD OF CONCRETE, NOR LESS THAN ONCE FOR EACH 5000 SQ FT OF SURFACE AREA FOR SLABS OR WALLS. FOUR (4) CYLINDERS SHALL BE MADE. ONE (1) SHALL BE BROKEN AT SEVEN (7) DAYS, TWO (2) SHALL BE BROKEN AT TWENTY-EIGHT (28) DAYS, AND ONE (1) SHALL BE HELD IN CASE OF DAMAGE OF ANY OF THE OTHER THREE (3). THE AVERAGE STRENGTH OF TWO (2) CYLINDERS FROM THE SAME SAMPLE, TESTED AT TWENTY-EIGHT (28) DAYS, IS REQUIRED FOR EACH STRENGTH TEST; ANY STRENGTH TEST BEYOND TWENTY-EIGHT (28) DAYS IS UNACCEPTABLE. IF THE TWENTY-EIGHT (28) DAY DESIGN STRENGTH IS NOT REACHED UPON STRENGTH TESTING THE CYLINDERS, THE DEFICIENT AREA SHALL BE CORED IMMEDIATELY TO BE PROVED OUT. FOR ANY AREAS DEFICIENT IN STRENGTH BY NOT MORE THAN 500 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN ONE (1) TIME THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO DEFICIENT IN STRENGTH. FOR ANY AREAS DEFICIENT IN STRENGTH BY MORE THAN 500 PSI BUT NOT MORE THAN 1000 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN TWO (2) TIMES THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO DEFICIENT IN STRENGTH. FOR ANY AREAS DEFICIENT IN STRENGTH BY MORE THAN 1000 PSI, THE STRUCTURE SHALL BE REMOVED AND RECONSTRUCTED AT THE FULL EXPENSE OF THE CONTRACTOR. PRIOR TO TOWN ACCEPTANCE OF ANY PENALTY PAYMENTS FOR ANY TRAFFIC BEARING STRUCTURE THAT DOES NOT MEET TWENTY-EIGHT (28) DAY DESIGN STRENGTH, THE DESIGN ENGINEER SHALL PROVIDE A SEALED STRUCTURAL EVALUATION THAT ASSESSES THE PERFORMANCE ADEQUACY OF THE DEFICIENT STRUCTURE AS CONSTRUCTED UNDER THE DESIGN SERVICE LOADS. ALL CORING AND ADDITIONAL LABORATORY TESTING SHALL BE AT THE EXPENSE OF THE CONTRACTOR.
10. BLASTING IS NOT PERMITTED ON THIS PROJECT.
11. ALL CONSTRUCTION OPERATIONS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH APPLICABLE REGULATIONS OF THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION.
12. THESE PLANS DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR ITS EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE REGISTERED PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED IN THE WORK.
13. NO TRENCH EXCAVATION SHALL OCCUR UNTIL THE TOWN APPROVES THE TRENCH SAFETY PLAN SUBMITTED BY THE CONTRACTOR.
14. A PRE-CONSTRUCTION CONFERENCE IS TO BE HELD PRIOR TO BEGINNING CONSTRUCTION. THIS CONFERENCE SHALL TAKE PLACE AT A LOCATION SELECTED BY OWNER & ENGINEER. CONTRACTOR TO ARRANGE A MEETING DATE WITH THE OWNER AT LEAST SEVEN DAYS PRIOR TO THE MEETING TIME.
15. CONTRACTOR SHALL NOTIFY THE OWNER, OWNER'S REPRESENTATIVE, AND TCEQ (IF APPLICABLE) BY TELEPHONE A MINIMUM OF 48 HOURS IN ADVANCE OF CONSTRUCTION STARTUP, FOLLOWED BY A LETTER OF CONFIRMATION.
16. CONTRACTOR SHALL ASSURE HIMSELF THAT ALL CONSTRUCTION PERMITS HAVE BEEN OBTAINED PRIOR TO COMMENCEMENT OF WORK. REQUIRED PERMITS THAT CAN ONLY BE ISSUED TO CONTRACTOR ARE TO BE OBTAINED AT THE CONTRACTORS EXPENSE.
17. CONTRACTOR SHALL GIVE A MINIMUM OF 48 HOURS NOTICE TO ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS, OR PERSONS IN CHARGE OF PRIVATE AND PUBLIC UTILITIES AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK.
18. CONTRACTOR SHALL TAKE ALL DUE PRECAUTIONS TO PROTECT EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES INCURRED AS A RESULT OF THESE CONSTRUCTION OPERATIONS ARE TO BE REPAIRED IMMEDIATELY BY THE CONTRACTOR TO AT LEAST THE PRE-EXISTING CONDITION AT NO ADDITIONAL COST TO OWNER.
19. WHEN UNLOCATED OR INCORRECTLY LOCATED UNDERGROUND PIPING OR A BREAK IN A LINE OR OTHER UTILITIES AND SERVICES ARE ENCOUNTERED DURING SITE WORK OPERATIONS, THE CONTRACTOR SHALL NOTIFY THE APPLICABLE UTILITY COMPANY IMMEDIATELY TO OBTAIN PROCEDURE DIRECTIONS. THE CONTRACTOR SHALL COOPERATE WITH THE APPLICABLE UTILITY COMPANY IN MAINTAINING ACTIVE SERVICES IN OPERATION.
20. THE CONTRACTOR SHALL MAINTAIN ACCESS TO PUBLIC AND PRIVATE FACILITIES DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES TO BE COORDINATED WITH THE OWNER.
21. THE CONTRACTOR SHALL COORDINATE INTERRUPTIONS OF ALL UTILITIES AND SERVICES WITH APPLICABLE UTILITY COMPANY OR COMPANIES. ALL WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE UTILITY COMPANY OR AGENCY INVOLVED.
22. THE CONTRACTOR SHALL LOCATE, PROTECT, AND MAINTAIN BENCHMARKS, MONUMENTS, AND CONTROL POINTS. THE CONTRACTOR SHALL RE-ESTABLISH DISTURBED OR DESTROYED ITEMS BY A REGISTERED PUBLIC SURVEYOR IN THE STATE OF TEXAS, AT NO ADDITIONAL COST TO OWNER.
23. EXISTING PAVING, BUILDING, AND OTHER ITEMS SHOWN ON PLANS NOT SPECIFICALLY RELATED TO THE WORK OF THE CONTRACTOR IS FOR INFORMATION ONLY.
24. DEMOLITION PERMITS (IF NEEDED) ARE TO BE OBTAINED BY THE CONTRACTOR.
25. COORDINATES SHOWN FOR STRUCTURE LOCATIONS ARE REFERENCED TO OUTSIDE FACE OF EXTERIOR WALL AT GRADE OR TO CENTERLINE OF STRUCTURE, UNLESS OTHERWISE ON PLANS.
26. EXISTING SURFACE AND SUBSURFACE STRUCTURES (GAS MAINS, WATER MAINS, STORM SEWERS, TELEPHONE CABLES, ETC.) ARE SHOWN ON THE PLANS IF THEIR LOCATION HAS BEEN DETERMINED, BUT IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO AVOID DAMAGING THESE EXISTING STRUCTURES WHETHER OR NOT THEY ARE SHOWN ON THE PLANS. THE OWNER AND ENGINEER ASSUME NO RESPONSIBILITY FOR FAILURE TO SHOW ANY OR ALL OF THESE STRUCTURES ON THE PLANS OR TO SHOW THEM IN THEIR EXACT LOCATION. IF ANY STRUCTURE IS DAMAGED BY THE CONTRACTOR, IT SHALL BE HIS RESPONSIBILITY TO REPAIR THE DAMAGE AT HIS OWN EXPENSE AND RESTORE THE STRUCTURE TO ITS ORIGINAL CONDITION.
27. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATIONS, ELEVATIONS AND DIMENSIONS OF ADJACENT AND/OR CONFLICTING UTILITIES IN ADVANCE OF CONSTRUCTION IN ORDER THAT ADJUSTMENTS CAN BE MADE TO PROVIDE ADEQUATE CLEARANCES, IF REQUIRED. THE CONTRACTOR SHALL PRESERVE AND PROTECT PUBLIC UTILITIES AT ALL TIMES DURING CONSTRUCTION. ANY DAMAGE TO UTILITIES RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED AT HIS EXPENSE. THE ENGINEER SHALL BE NOTIFIED WHEN PROPOSED FACILITY GRADES CONFLICT WITH EXISTING UTILITY GRADES.
28. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING "AS-RECORDED" PLANS TO THE ENGINEER OF RECORD SHOWING THE LOCATION OF ALL IMPROVEMENTS. THIS INFORMATION SHALL BE PLACED ON THE ENGINEERING PLANS AND MARKED "RECORD DRAWING" PLANS ALONG WITH THE DATE AND THE NAME OF THE CONTRACTOR BY THE ENGINEER OF RECORD. THESE PLANS SHALL BE FURNISHED TO THE TOWN ELECTRONICALLY IN PDF FORMAT.
29. THE CONTRACTOR SHALL FURNISH A MAINTENANCE BOND IN THE AMOUNT OF 10% OF THE TOTAL CONTRACT PRICE OF ALL PUBLIC AND CERTAIN PRIVATE IMPROVEMENTS. THIS BOND SHALL RUN TWO YEARS FROM THE DATE OF FINAL ACCEPTANCE OF THE PROJECT BY THE TOWN. PRIVATE IMPROVEMENTS REQUIRING A MAINTENANCE BOND INCLUDE, BUT ARE NOT LIMITED TO, FIRE LANES, PRIVATE WATER MAINS, FIRE HYDRANTS, ETC.
30. REFER TO THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS (NCTCOG) PUBLIC WORKS CONSTRUCTION STANDARDS AND SPECIFICATIONS (LATEST EDITION) FOR REQUIREMENTS FOR ITEMS NOT INCLUDED IN THIS DOCUMENT. FINAL APPROVAL IS AT THE DISCRETION OF THE TOWN ENGINEER.
31. CONTRACTOR SHALL PROVIDE DAILY STREET SWEEPING AND GENERAL SITE CLEANUP FOR THE AREA SURROUNDING THE PROJECT SITE.
32. CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED TO PROPERTY (PUBLIC OR PRIVATE) WITHIN 48 HOURS OF NOTIFICATION BY THE TOWN.

GENERAL ENVIRONMENTAL NOTES

1. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL REQUIREMENTS REGARDING EXCESS AND WASTE MATERIAL, INCLUDING METHODS OF HANDLING AND DISPOSAL.
2. CONTRACTOR SHALL LOCATE MATERIAL STORAGE AREAS AWAY FROM STORMWATER CONVEYANCE SYSTEMS. PROVIDE PROTECTED STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER POTENTIALLY TOXIC MATERIALS.
3. FUEL STORAGE IS NOT ALLOWED ON THIS PROJECT.
4. THE CONTRACTOR SHALL ADVISE OWNER IMMEDIATELY, VERBALLY AND IN WRITING, OF ANY FUEL OR TOXIC MATERIALS SPILLS WITHIN THE PROJECT/CONSTRUCTION AREA AND THE ACTIONS TO BE TAKEN TO REMEDY THE PROBLEM.
5. THE CONTRACTOR SHALL DISPOSE OF FUELS, HAZARDOUS MATERIALS, AND CONTAMINATED EXCAVATIONS IN A LEGALLY APPROVED MANNER.
6. NO OPEN BURNING IS ALLOWED WITHIN THE CITY LIMITS.

SITE GRADING NOTES

1. THE CONTRACTOR SHALL CONTROL DUST CAUSED BY THE WORK AND COMPLY WITH POLLUTION CONTROL REGULATIONS OF GOVERNING AUTHORITIES.
2. EXCESS EXCAVATED MATERIAL SHALL BE STOCKPILED IN DESIGNATED AREA AS SHOWN ON PLANS OR AS DIRECTED BY THE OWNER. REINFORCED FILTER FABRIC FENCE TO BE INSTALLED AROUND STOCKPILE ON DOWNSTREAM SIDE AND BOTH SIDES ADJACENT TO THE DOWNSTREAM SIDE. STOCKPILES ARE NOT TO TRAP OR POND WATER. TOPSOIL TO BE STOCKPILED SEPARATELY. ALL EXCESS EXCAVATED MATERIAL IS TO BE REMOVED FROM THE SITE. CONTRACTOR TO NOTIFY TCEQ AND THE OWNER'S REPRESENTATIVE OF LOCATION OF DISPOSAL BEFORE MATERIAL IS REMOVED.
3. THE FINISHED GRADE ELEVATIONS SHOWN ARE INTENDED TO PROVIDE ADEQUATE DRAINAGE. MINOR FIELD CHANGES MAY BE NECESSARY TO PROVIDE ADEQUATE DRAINAGE. GRADE UNIFORMLY BETWEEN ELEVATIONS SHOWN TO PROVIDE DRAINAGE.
4. ADJUST MANHOLE COVERS, VALVE BOXES, ELECTRICAL MANHOLES, ETC. TO MATCH PROPOSED FINISHED GRADE (NO SEPARATE PAY).
5. RETAINING WALLS SHALL BE NO GREATER THAN 6' IN HEIGHT AT THE END OF WALL.
6. THE MAXIMUM SLOPE IN THE FRONT AND REAR OF SINGLE FAMILY LOTS IS 6:1 UNLESS APPROVED BY THE TOWN ENGINEER.
7. TYPICAL SLOPES ON COMMERCIAL LOTS IS 6:1 WITH A MAXIMUM SLOPE ALLOWED OF 4:1 UNLESS APPROVED BY TOWN ENGINEER.

EROSION CONTROL & TREE PROTECTION NOTES

1. CONTRACTOR SHALL FOLLOW ALL STORMWATER POLLUTION PREVENTION PLAN (SWPPP) GUIDELINES AND PERMITS THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES.
2. THE CONTRACTOR TO INSTALL AND MAINTAIN EROSION/SEDIMENTATION CONTROLS AND TREE/NATURAL AREA PROTECTIVE FENCING PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING, GRADING, OR EXCAVATION). CONTRACTOR TO REMOVE EROSION/SEDIMENTATION CONTROLS AT THE COMPLETION OF PROJECT AND GRASS RESTORATION.
3. THE PLACEMENT OF EROSION/SEDIMENTATION CONTROLS TO BE IN ACCORDANCE WITH THE PROPOSED SITE GRADING PLAN. DEVIATIONS FROM THE PLAN MUST BE SUBMITTED TO AND APPROVED BY THE OWNER.
4. EROSION AND SEDIMENTATION CONTROLS TO BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN SOIL BUILDUP WITHIN TREE DRIPLINES.
5. TO AVOID SOIL COMPACTION, NO VEHICULAR TRAFFIC, PARKING, OR STORAGE OF EQUIPMENT OR MATERIALS IS ALLOWED IN THE TREE DRIPLINE AREAS.
6. TREES TO BE REMOVED IN A MANNER WHICH DOES NOT IMPACT TREES TO BE PRESERVED.
7. INTENTIONAL RELEASE OF VEHICLE OR EQUIPMENT FLUIDS ONTO THE GROUND IS NOT ALLOWED. CONTAMINATED SOIL RESULTING FROM ACCIDENTAL SPILL TO BE REMOVED AND DISPOSED OF PROPERLY.

NO.	REVISION	DATE

DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
GENERAL CONSTRUCTION NOTES 1 OF 3

LITTLE ELM

SHEET
1 OF 26

DECEMBER 2023

CONSTRUCTION
GENERAL NOTES

PAVING NOTES

1. ABSOLUTELY NO EARTHWORK, LIME APPLICATION, OR OTHER PREPARATION OF THE SUBGRADE FOR PAVING OF STREETS, ALLEYS, OR FIRE LANES SHALL BE INITIATED WITHOUT AUTHORIZATION FROM THE TOWN'S CONSTRUCTION INSPECTOR. ONCE ALL TESTING OF UNDERGROUND FACILITIES HAS BEEN COMPLETED AND VERIFIED TO MEET THE TOWN'S SPECIFICATIONS, THE TOWN CONSTRUCTION INSPECTOR WILL ISSUE A LETTER TO THE PROJECT OWNER OR SUPERINTENDENT THAT WILL AUTHORIZE THE INITIATION OF ALL SUBGRADE WORK IN PREPARATION FOR PAVING. ALL STREET, ALLEY, AND FIRE LANE RIGHT-OF-WAY OR EASEMENT WIDTH SHALL BE EXCAVATED FULL WIDTH IN ACCORDANCE WITH THE STREET AND SIDEWALK SECTION TO BE CONSTRUCTED. THE SUBGRADE FOR ALL STREETS, ALLEYS, AND FIRE LANES SHALL BE STABILIZED WITH HYDRATED LIME MATERIAL TO A DISTANCE 12 INCHES BEYOND THE BACK OF CURB OR EDGE OF PAVING AS APPLICABLE. THE AMOUNT OF LIME MATERIAL SHALL BE THAT AMOUNT WHICH WILL REDUCE THE PLASTICITY INDEX (PI) BELOW FIFTEEN (15) AS VERIFIED BY TESTING BY AN APPROVED LABORATORY; THE TOWN WILL ADD ONE (1) PERCENT TO THE LABORATORY RESULTS FOR FIELD VARIATION. LABORATORY TESTING (LIME SERIES) SHALL GENERALLY BE CONDUCTED WHEN ALL UTILITIES ARE COMPLETE AND THE ROADWAY SUBGRADE IS COMPLETE. LIME SHALL BE APPLIED BY PERCENTAGE DRY UNIT WEIGHT OF SOIL TREATED TO A MINIMUM IN PLACE COMPACTED THICKNESS OF SIX (6) INCHES. FOR 6" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 37 POUNDS PER SQUARE YARD; FOR 8" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 54 POUNDS PER SQUARE YARD. AFTER APPLICATION OF LIME, PROVIDE A MELLOWING PERIOD AS INSTRUCTED BY TXDOT PUBLICATION "TREATMENT GUIDELINES FOR SOILS AND BASE IN PAVEMENT STRUCTURES." SULFATE TESTS SHALL ALSO BE CONDUCTED ON ALL PAVING PROJECTS IN THE TOWN UNDER THE DIRECTION OF THE APPROVED LABORATORY. FREQUENCY OF TESTS SHALL NOT BE LESS THAN EVERY 300 LINEAR FEET OF SUBGRADE, ALTERNATING FROM LEFT QUARTER POINT TO CENTER LINE TO RIGHT QUARTER POINT. ADDITIONAL TESTING MAY BE DEEMED NECESSARY BY THE TOWN ENGINEER. ALL TESTING FOR THE PRESENCE OF SULFATES IN THE PAVEMENT SUBGRADE SHALL BE AT THE CONTRACTOR'S EXPENSE. IF THE SULFATES ARE PRESENT AT AN UNACCEPTABLE CONCENTRATION, THE TOWN MAY REQUIRE A RECOMMENDATION FOR FURTHER TREATMENT OF THE SOIL FROM THE APPROVED LABORATORY, WHICH SHALL BE CONFIRMED BY THE DESIGN ENGINEER OF RECORD FOR THE PROJECT.
2. SUBGRADE TESTING REQUIREMENTS: ALL FILL SHALL BE COMPACTED TO NO LESS THAN 95% OF STANDARD PROCTOR DENSITY AT 0 – 4% ABOVE OPTIMUM MOISTURE CONTENT. FREQUENCY OF TESTING SHALL BE AT LEAST EVERY 300 LINEAR FEET PER 2.0' OF LIFT UNTIL FINAL GRADE, STARTING AT 2.0' ABOVE NATURAL/SOUND GRADE TO TOP OF SUBGRADE. ALL STREET, ALLEY, AND FIRE LANE SUBGRADE SHALL BE COMPACTED TO NO LESS THAN 95% OF STANDARD PROCTOR DENSITY AT 0 – 4% ABOVE OPTIMUM MOISTURE CONTENT. FREQUENCY OF TESTS SHALL NOT BE LESS THAN 300 LINEAR FEET OF SUBGRADE, ALTERNATING FROM LEFT QUARTER POINT TO CENTER LINE TO RIGHT QUARTER POINT. VERIFICATION OF LIME DEPTH, TESTING FOR SUBGRADE GRADATIONS & PULVERIZATIONS, AND PLASTICITY INDICES OF THE SOIL SHALL ALSO BE CONDUCTED; THE FREQUENCY OF THIS TESTING SHALL BE AS PREVIOUSLY MENTIONED. ALL TESTING OF MATERIALS REQUIRED FOR THE CONSTRUCTION OF ANY STREET, ALLEY OR FIRE LANE SHALL BE PERFORMED BY AN APPROVED AGENCY FOR TESTING MATERIALS. THE NOMINATION OF THE TESTING LABORATORY AND THE PAYMENT OF SUCH TESTING SERVICES SHALL BE MADE BY THE CONTRACTOR. THE ENGINEER SHALL APPROVE THE LABORATORY NOMINATED TO DO THE TESTING OF MATERIALS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SHOW BY STANDARD TESTING PROCEDURES THAT THE WORK CONSTRUCTED DOES MEET THE REQUIREMENTS OF THE TOWN'S SPECIFICATIONS.
3. ANY EXISTING PAVEMENT, CURBS, AND/OR SIDEWALK DAMAGED OR REMOVED BY THE CONTRACTOR ARE TO BE REPAIRED BY THE CONTRACTOR TO AT LEAST THE PREEXISTING CONDITION AT HIS EXPENSE BEFORE ACCEPTANCE OF THE WORK.
4. ALL TRAFFIC CONTROLS SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST REVISION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
5. REPLACE EXISTING ROADWAY THAT IS CUT BY PIPE TRENCHES WITH SIMILAR ROADWAY.
6. MAINTAIN ALL MANHOLE FRAMES AND COVERS TO BELOW PAVEMENT SUBGRADE ELEVATION UNTIL PLACEMENT OF PAVEMENT BASE HAS BEEN COMPLETED. RAISE MANHOLE FRAMES AND COVERS TO FINISH PAVEMENT GRADES WHEN BASE IS COMPLETE.
7. MINIMUM DESIGN REQUIREMENTS: ALL STREET, ALLEY, PARKING LOT, AND FIRE LANE PAVING SHALL BE DESIGNED AND PERMITTED THROUGH THE TOWN TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3500 PSI AT TWENTY-EIGHT (28) DAYS WITH A MINIMUM OF FIVE AND ONE HALF (5 1/2) SACKS OF CEMENT AS VERIFIED BY TESTING IN AN APPROVED LABORATORY. TWO BATCH DESIGNS SHALL BE SUBMITTED TO THE TOWN CONSTRUCTION ENGINEER FOR APPROVAL: ONE FOR MACHINE WORK AND ONE FOR HAND WORK. ALL BATCH DESIGNS MUST BE SIGNED BY THE TESTING LABORATORY AND INCLUDE ALL DOCUMENTATION, SUCH AS RESULTS OF FIELD TRIAL TESTING. IF APPLICABLE, ALL BATCH DESIGNS SHALL SPECIFY AN APPROPRIATE SULFATE RESISTANT CEMENT OR EQUIVALENT. SLUMP SHALL BE 1 – 3 INCHES FOR ALL MACHINE WORK AND 2 – 4 INCHES FOR ALL HAND WORK. STREETS (DEPENDING ON CLASSIFICATION), PARKING LOTS, AND FIRE LANES SHALL HAVE A MINIMUM THICKNESS OF SIX (6) INCHES. ALLEYS SHALL HAVE A MINIMUM THICKNESS OF 8"–5"–6". UPON COMPLETION OF CONSTRUCTION, ALL STREETS AND FIRE LANES SHALL BE CORED FOR DEPTH (2" CORES) AT A SPACING OF 300 FT MAXIMUM, ALTERNATING FROM LEFT QUARTER POINT TO CENTER LINE TO RIGHT QUARTER POINT. ALLEYS SHALL BE CORED FOR DEPTH (2" CORES) AT A SPACING OF 300 FT MAXIMUM ALONG THE CENTER LINE. PAVEMENT OF A THICKNESS LESS THAN THE THICKNESS SHOWN ON THE PLANS BY MORE THAN ONE-QUARTER (1/4) INCH BUT LESS THAN THREE-QUARTER (3/4) INCH WILL BE CONSIDERED DEFICIENT. THE CONTRACTOR SHALL PAY TO THE TOWN TWO (2) TIMES THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO BE DEFICIENT IN THICKNESS AS DEFINED ABOVE. PAVEMENT DEFICIENT IN THICKNESS BY MORE THAN THREE-QUARTER (3/4) INCH SHALL BE REMOVED AND REPLACED COMPLETELY. THE DEFICIENT AREA SHALL BE CORED IMMEDIATELY ON TEN (10) FOOT CENTERS OR ONE (1) PER PANEL TO BE PROVED OUT. ALL STREETS, ALLEYS, PARKING LOTS, AND FIRE LANES WILL REQUIRE CYLINDERS TO BE MADE FOR STRENGTH TESTS BY THE APPROVED LABORATORY. SAMPLES FOR STRENGTH TESTS OF EACH CLASS OF CONCRETE PLACED EACH DAY SHALL BE TAKEN BY AN APPROVED LABORATORY NOT LESS THAN ONCE A DAY, NOR LESS THAN ONCE FOR EACH 100–150 CU YD OF CONCRETE. FOUR (4) CYLINDERS SHALL BE MADE: ONE SHALL BE BROKEN AT 7 DAYS, TWO (2) SHALL BE BROKEN AT TWENTY-EIGHT (28) DAYS, AND ONE SHALL BE HELD IN CASE OF DAMAGE OF ANY OF THE OTHER THREE (3). THE AVERAGE STRENGTH OF TWO (2) CYLINDERS FROM THE SAME SAMPLE, TESTED AT TWENTY-EIGHT (28) DAYS IS REQUIRED FOR EACH STRENGTH TEST; ANY STRENGTH TEST BEYOND TWENTY-EIGHT (28) DAYS IS UNACCEPTABLE. IF THE TWENTY-EIGHT (28) DAY DESIGN STRENGTH IS NOT REACHED UPON STRENGTH TESTING THE CYLINDERS, THE DEFICIENT AREA SHALL BE CORED IMMEDIATELY BE ON TEN (10) FOOT CENTERS OR ONE PER PANEL TO BE PROVED OUT. FOR ANY AREAS DEFICIENT IN STRENGTH BY NOT MORE THAN 500 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN ONE (1) TIME THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO BE DEFICIENT IN STRENGTH. FOR ANY AREAS DEFICIENT IN STRENGTH BY MORE THAN 500 PSI BUT NOT MORE THAN 1000 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN TWO (2) TIMES THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO BE DEFICIENT IN STRENGTH. PAVEMENT DEFICIENT IN STRENGTH BY MORE THAN 1000 PSI SHALL BE REMOVED AND REPLACED COMPLETELY. NO MORE THAN THREE (3) – FOUR (4) INCH CORES SHALL BE EXTRACTED PER PANEL WITHOUT PRIOR TOWN APPROVAL. A REBAR DETECTOR SHALL BE USED TO ENSURE THAT THE CORED AREAS ARE CLEAR OF ANY REBAR. ALL CORING AND ADDITIONAL LABORATORY TESTING SHALL BE AT THE EXPENSE OF THE CONTRACTOR. THE WIDTH TO BE CONSIDERED FOR ANY DEFICIENCIES SHALL BE THE FULL WIDTH OF THE PAVEMENT.
6. ALL REINFORCING BARS SHALL CONFORM TO ASTM A-615/A 615M, GRADE 60.
9. ALL CONCRETE AND REINFORCING STEEL SHALL CONFORM TO CURRENT A.C.I. CODE.
10. ALL WALL STEEL SHALL HAVE A MINIMUM CONCRETE COVER OF 2". SLAB REINFORCING TO HAVE A MINIMUM CONCRETE COVER OF 2" ON TOP AND 3" ON BOTTOM.
11. ALL BAR SPLICES, CORNER DOWELS, AND JOINT DOWELS SHALL HAVE A MINIMUM 40 DIAMETERS, OR 30", WHICHEVER IS GREATER.
12. JOINT AND CORNER DOWELS DESIGNATED AS "EXTRA LENGTH" SHALL HAVE A MINIMUM LAP LENGTH OF 80 BAR DIAMETERS OR 60", WHICHEVER IS GREATER, UNLESS OTHERWISE DIMENSIONED.
13. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4" x 3/4".
14. NO HORIZONTAL CONSTRUCTION JOINTS WILL BE PERMITTED, UNLESS OTHERWISE NOTED. WALL FORMING AND CONCRETE PLACEMENT PLAN, TO ALLOW FOR VERTICAL CONSTRUCTION JOINTS, SHALL BE PREPARED AND SUBMITTED TO THE ENGINEER FOR APPROVAL. ALL VERTICAL CONSTRUCTION JOINTS TO INCLUDE STANDARD KEYWAY AND WATERSTOP.
15. SPEED BUMPS ARE NOT PERMITTED IN COMMERCIAL DRIVES OR STREETS.
16. POURED CONCRETE MUST BE CONSOLIDATED BY THE USE OF MECHANICAL VIBRATORS AT A MAXIMUM INTERVAL OF 18". CONTRACTOR SHALL ENSURE THAT CONCRETE IS WORKED AROUND REINFORCEMENT, OTHER EMBEDDED ITEMS, AND AGAINST FORMS TO ELIMINATE VOID SPACES.
17. FIRE LANES SHALL HAVE A MINIMUM TURNING RADIUS OF 30 FEET UNLESS DESIGNED USING AUTOTURN BY TRANSOFT SOLUTIONS, OR EQUIVALENT SOFTWARE. IN NO CASE SHALL A FIRE LANE RADIUS BE LESS THAN 20 FEET UNLESS APPROVED BY THE TOWN ENGINEER.
18. BITUMINOUS SURFACE TREATMENT (CHIP SEAL) SHALL CONFORM TO ITEM 404.4 IN THE NCTCOG PUBLIC WORKS CONSTRUCTION STANDARDS (5TH EDITION)
19. ASPHALT PAVING SHALL CONFORM TO ITEM 302 IN THE NCTCOG PUBLIC WORKS CONSTRUCTION STANDARDS (5TH EDITION).

STORM SEWER SYSTEM NOTES

1. STORM SEWER PIPE IN RIGHT OF WAY, PUBLIC DRAINAGE EASEMENTS, OR FIRE LANES SHALL BE REINFORCED CONCRETE OR DUAL WALL POLYPROPYLENE PIPE CONFORMING TO ASTM F2881.
2. BOX CULVERTS, AND OTHER STRUCTURES IN RIGHT OF WAY OR FIRE LANES SHALL BE REINFORCED CONCRETE AS PER TOWN SPECIFICATIONS AND SHALL BE CONSTRUCTED AS SHOWN IN THE STANDARD DETAILS UNLESS OTHERWISE APPROVED.
3. DENSITY TESTING REQUIREMENTS: FREQUENCY OF TRENCH COMPACTION TESTS SHALL NOT BE LESS THEN ONE EVERY 300 LINEAR FEET OF PIPE PER 2.0' OF LIFT UNTIL FINAL GRADE, STARTING AT 2.0' ABOVE TOP OF PIPE. EVERY OTHER LATERAL, STUBOUT THAT CROSSES THE EXISTING OR PROPOSED STREET, ALLEY, OR FIRE LANE SUBGRADE; INLET; AND JUNCTION BOX WILL RECEIVE A DENSITY TEST EVERY LIFT. ALL DITCHES SHALL BE MECHANICALLY TAMPED AND COMPACTED TO 95% OF STANDARD PROCTOR DENSITY AT 0 – 4% ABOVE OPTIMUM MOISTURE. WATER JETTING IS NOT PERMITTED.
4. THE JOINTS SHALL BE CONSTRUCTED AND JOINTED TOGETHER IN SUCH A MANNER THAT NO SPILL THROUGH OF BACKFILL WILL OCCUR. THIS INCLUDES THE LIFT HOLES USED IN CERTAIN PIPE OR BOX SIZES. APPROVED JOINT MATERIALS ARE COLD APPLIED, PLASTIC ASPHALT JOINT COMPOUND; RUBBER GASKETS; AND COLD APPLIED, PREFORMED PLASTIC GASKETS.
5. STORM DRAINAGE INLETS SHALL BE AS INDICATED ON THE APPROVED CONSTRUCTION PLANS. FOR SECONDARY AND MAJOR STREET INTERSECTIONS, A RECESSED TYPE INLET WILL BE REQUIRED. FOR INDUSTRIAL AND RESIDENTIAL STREETS, A CURB LINE INLET WILL BE REQUIRED UNLESS OTHERWISE APPROVED. A ROUND MANHOLE COVER WITH LOCKING DEVICE SHALL BE PLACED ON ALL INLET TOPS. THE TOP SHALL BE PLACED NEAR THE OUTLET PIPE. ALL INLETS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
6. ONLY CURB INLETS ARE ALLOWED WITHIN PAVED AREAS. GRATE INLETS ARE ALLOWED ONLY BY TOWN ENGINEER APPROVAL.
7. ALL STORM SEWER OUTFALLS THAT DRAIN TO LAKE LEWISVILLE SHALL INCLUDE A DEBRIS SEPARATOR.
8. ALL STORM SEWER CULVERTS INSTALLED IN PUBLIC RIGHT-OF-WAY OR BENEATH FIRELANES SHALL BE REINFORCED CONCRETE PIPE OR DUAL WALL POLYPROPYLENE PIPE CONFORMING TO ASTM F2881.

DETOURS, BARRICADES, WARNING SIGNS, ETC. NOTES

1. TRAFFIC MUST BE HANDLED THROUGHOUT THE PROJECT DURING CONSTRUCTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE FOR THE SAFE AND COMFORTABLE PASSAGE OF TRAFFIC WITH MINIMAL INCONVENIENCE TO THE PUBLIC AT ALL TIMES. TRAFFIC LANES SHALL BE ENTIRELY OPEN TO TRAFFIC EACH NIGHT AND NO EQUIPMENT SHALL BE LEFT IN A POSITION OVERNIGHT THAT WILL ENDANGER TRAFFIC.
2. A FLAGGER SHALL BE STATIONED WHERE ANY EQUIPMENT IS WORKING ON THE ROAD OR WHERE ANY OTHER HAZARDS DUE TO CONSTRUCTION OPERATIONS EXIST OR AS DIRECTED BY THE ENGINEER.
3. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES THROUGHOUT ALL PHASES OF CONSTRUCTION. ADEQUACY OF ACCESS WILL BE AT THE DISCRETION OF THE ENGINEER. SAFE ENTRANCE AND EXIT TO ALL DRIVEWAYS SHALL BE PROVIDED WITH A MINIMUM OF INCONVENIENCE.
4. THE CONTRACTOR SHALL NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE A HAZARD AND WILL ENDANGER TRAFFIC.
5. THE CONTRACTOR SHALL NOTIFY THE OWNER OF IMPENDING/UPCOMING LANE CLOSURES AS EARLY AS FIVE WORKING DAYS BUT NO LATER THAN 48 HOURS IN ADVANCE OF LANE CLOSURES.
6. FOR THIS PROJECT, UNLESS OTHERWISE NOTED IN THE PLANS AND/OR AS DIRECTED BY THE ENGINEER, NO LANE CLOSURES SHALL BE ALLOWED OTHER THAN THOSE IN THE TRAFFIC CONTROL PLAN.
7. THE CONTRACTOR MAY PROPOSE/RECOMMEND MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDED MODIFICATION BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS PAY ITEMS, IMPACT TO TRAFFIC, EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. THE CONTRACTOR SHALL NOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE/SEQUENCE UNTIL HE/SHE OBTAINS WRITTEN APPROVAL FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE SAFE AND COMFORTABLE MOVEMENT, THE CONTRACTOR SHALL IMMEDIATELY CHANGE HIS OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.
8. THE CONTRACTOR SHALL INSTALL AND MAINTAIN AN ADEQUATE NUMBER OF BARRICADES, WARNING AND DIRECTIONAL SIGNS TO DELINEATE TRAFFIC FOR ANY DETOURS.
9. ALL CONSTRUCTION TRAFFIC SHALL BE REGULATED SO AS TO CAUSE A MINIMUM OF INCONVENIENCE TO THE TRAVELING PUBLIC. AT POINTS WHERE IT IS NECESSARY FOR TRUCKS TO STOP AND UNLOAD, WARNING SIGNS AND FLAGGERS SHALL BE PROVIDED AS NECESSARY TO ADEQUATELY PROTECT TRAVEL.
10. ALL BARRICADES, SIGNS, WARNING LIGHTS, ETC. SHALL BE ACCORDING TO THE LATEST REVISION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
11. THE CONTRACTOR MAY, WITH THE APPROVAL OF AND AS DIRECTED BY THE ENGINEER, BE REQUIRED TO FURNISH ADDITIONAL SIGNS AND BARRICADES TO THOSE INDICATED ON THE PLANS TO MAINTAIN THE SAFE PASSAGE OF TRAFFIC THROUGHOUT THE CONSTRUCTION SITE PARTICULARLY IN THOSE AREAS OF IMMEDIATE WORK.
12. UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE IS MADE, THE CONTRACTOR SHALL SHAPE AND FINISH SUCH PORTIONS OF THE RIGHT-OF-WAY AS MAY HAVE BEEN DISTURBED IN MAKING THE ABOVE PROVISIONS FOR TRAFFIC AND WILL BE REQUIRED TO LEAVE THE ENTIRE RIGHT-OF-WAY IN A SMOOTH, NEAT AND SIGHTLY CONDITION.
13. ALL WORK AND MATERIALS REQUIRED BY THESE PROVISIONS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE CONTRACT, UNLESS OTHERWISE INDICATED IN THE PLANS OR SPECIFICATIONS.
14. CONTRACTOR SHALL HAVE A COMPANY REPRESENTATIVE CERTIFIED IN FLAGGER TRAINING APPROVED BY TXDOT.
15. THE CONTRACTOR IS FULLY RESPONSIBLE FOR THE TRAFFIC CONTROL AND WILL BE RESPONSIBLE FOR FURNISHING ALL TRAFFIC CONTROL DEVICES AND FLAGGERS. THE CONSTRUCTION METHODS SHALL BE CONDUCTED TO PROVIDE THE LEAST POSSIBLE INTERFERENCE TO TRAFFIC SO AS TO PERMIT THE CONTINUOUS MOVEMENT OF TRAFFIC IN ALL ALLOWABLE DIRECTIONS AT ALL TIMES.
16. THE CONTRACTOR SHALL PROVIDE FOR THE PASSAGE OF TRAFFIC THROUGH THE PROJECT WITH SIGNS, LIGHTS AND BARRICADES IN ACCORDANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AS REQUIRED FOR MAINTENANCE ACTIVITIES AND TO THE SATISFACTION OF THE ENGINEER.
17. LANE CLOSURES WILL NOT BE ALLOWED UNLESS PRIOR APPROVAL IS GIVEN BY THE ENGINEER. IF LANE CLOSURES ARE APPROVED, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNER 48 HOURS IN ADVANCE OF THE CLOSURE.

DATE | NO. | REVISION

DESIGN BY: | DRAWN BY: | CHECKED BY: KDMG | SCALE: - | JOB NUMBER:

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
GENERAL CONSTRUCTION NOTES 2 OF 3

LITTLE ELM

SHEET
2 OF 26

DECEMBER 2023

CONSTRUCTION
GENERAL NOTES

WATER SYSTEM NOTES

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE TOWN'S STANDARD SPECIFICATIONS AND GENERAL DESIGN STANDARDS.
2. ALL TAPPING SLEEVES AND VALVES SHALL BE FULL BODY DUCTILE IRON. WITH PRIOR APPROVAL BY THE TOWN ENGINEER, STAINLESS STEEL SMITH BLAIR 623 MAY BE ALLOWED FOR CONNECTION TO EXISTING LINES TWENTY-INCH (20") OR LARGER.
3. VALVES SHALL BE MUELLER OR WATEROUS, RESILIENT SEATED, 150 PSI TEST.
4. FITTINGS SHALL BE OF THE MECHANICAL JOINT TYPE, FLANGED WHERE APPLICABLE, AND BE MANUFACTURED BY US PIPE, AMERICAN, OR OTHER AS APPROVED BY THE TOWN – CLASS 250. ALL FITTINGS SHALL BE RESTRAINED BY THE USE OF MEGA-LUGS OR APPROVED OTHER AND CONCRETE THRUST BLOCKING.
5. FIRE HYDRANTS SHALL BE MUELLER OR WATEROUS THREE-WAY STANDARD THREAD WITH VALVE IN LEAD OR APPROVED OTHER. ALL MAIN STEAMER NOZZLES SHALL HAVE A NOMINAL INSIDE DIAMETER OF FOUR INCHES (4"). ALL COMMERCIAL FIRE HYDRANTS ARE REQUIRED TO BE INSTALLED WITH 4½"-5" HYDRA-STORZ CONNECTIONS.
6. WATER LINES IN THE AREA OF STORM DRAIN INLETS SHALL BE CONSTRUCTED BEHIND THE INLET BY PULLING THE PIPE USING LONGITUDINAL BENDING IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS. FITTINGS MAY BE USED IF BENDING IS IMPRACTICAL; CONSULT WITH THE TOWN'S CONSTRUCTION INSPECTOR.
7. WATER LINES CROSSING UNDER STORM DRAINS AND SANITARY SEWER LINES SHALL HAVE A MINIMUM OF EIGHTEEN INCHES (18") CLEARANCE BELOW STORM DRAINS AND TWENTY-FOUR INCHES (24") CLEARANCE BELOW SANITARY SEWER LINES OR OTHERWISE AS GOVERNED BY TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) CHAPTER 290 REQUIREMENTS. PARALLEL WATER LINES SHALL BE AT LEAST NINE FEET (9') CLEAR HORIZONTALLY FROM SANITARY SEWER LINES AND MANHOLES. WHERE MINIMUM CLEARANCE CANNOT BE ACHIEVED, WATER LINES SHALL BE ENCASED SIX INCHES (6") AROUND IN CONCRETE TO TEN FEET (10') EITHER SIDE OF THE UTILITY CROSSING. WHERE WATER LINES CROSS CREEKS OR DITCHES THE WATER LINE SHALL BE PROTECTED BY CONCRETE ENCASEMENT AT LEAST TEN FEET (10') PAST THE EMBANKMENT SLOPE ON EACH SIDE.
8. WATER MAINS: ALL WATER MAINS SHALL HAVE A MINIMUM OF FORTY EIGHT (48") COVER OVER THE TOP OF THE PIPE. ALL NEW WATER MAINS SHALL BE PVC PIPE IN ACCORDANCE WITH THE FOLLOWING: C900 DR 14 FOR FOUR-INCH (4") TO SIX-INCH (6"), C900 DR 18 FOR EIGHT-INCH (8") TO TWELVE-INCH (12"), AND C905 DR 18 FOR OVER TWELVE-INCH (12"), ALL "BLUE" IN COLOR AS PER TOWN SPECIFICATIONS; THE PIPE SHALL BE LAID ON A MINIMUM EMBEDMENT (SEE STANDARD CONSTRUCTION DETAILS). WATER MAINS UP TO TWELVE INCHES (12") SHALL BE INSTALLED TWO FEET (2') BACK OF CURB; MAINS LARGER THAN TWELVE INCHES (12") SHALL BE INSTALLED AT LEAST THREE FEET (3') FROM THE BACK OF CURB DEPENDING UPON CONDITIONS. DETECTABLE METALLIC TAPE ("BLUE-CAUTION BURIED WATER BELOW" OR APPROVED OTHER) SHALL BE INSTALLED AFTER INITIAL BACKFILL ON APPROXIMATE CENTERLINE OF PIPE PRIOR TO FINAL BACKFILL ABOVE ALL PVC MAINS.
9. THE CONTRACTOR SHALL INSTALL FIRE HYDRANTS AT THE LOCATIONS SHOWN. A M.J. AND FLANGED TEE WITH A FLANGED END TO M.J. GATE VALVE IS REQUIRED SO THAT THE GATE VALVE IS ANCHORED TO THE MAIN.
10. ALL BOLTS AND NUTS USED WITH MECHANICAL JOINT FITTING SHALL BE "COR-TEN" STEEL OR APPROVED OTHER.
11. THE INSTALLATION OF A BLUE STEMSONTE (OR OTHER) MODEL 88-SSA FIRE HYDRANT MARKER WILL BE INSTALLED OPPOSITE FIRE HYDRANTS JUST OFF CENTER TO THE SIDE OF THE STREET ADJACENT TO THE HYDRANT.
12. POLYETHYLENE ENCASEMENT – THE CONTRACTOR SHALL FURNISH AND INSTALL POLYETHYLENE WRAP AROUND DUCTILE IRON PIPE, RELATED FITTINGS, AND VALVES. THIS WRAP SHALL BE AN 8 MIL. THICKNESS POLYTUBE. SEAMS AND OVERLAPS SHALL BE WRAPPED AND HELD IN PLACE BY TWO-INCH (2") WIDE PLASTIC BACKED ADHESIVE TAPE, POLYKEN 900 OR SCOTCHRAP NO. 50, OR AN APPROVED OTHER, WITH APPROXIMATE TWO-FOOT (2') LAPS ON THE POLYTUBE. THE WRAP ON THE BARREL OF THE PIPE SHALL BE LOOSE ENOUGH TO ALLOW THE FILM TO SHIFT WITH THE SOIL. THE WRAP SHALL BE INSTALLED WITHOUT BREAKS, TEARS, OR HOLES IN THE FILM. THE COST OF THE POLYETHYLENE TUBE WRAP AND COMPLETE INSTALLATION SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE FURNISHING AND THE INSTALLATION OF DUCTILE IRON PIPE, RELATED FITTINGS, AND VALVES.
13. VALVE BOXES SHALL BE FURNISHED AT THE REQUIRED LENGTH IN ORDER TO BE SET TO FINAL GRADE ON EACH GATE VALVE. AFTER THE FINAL CLEAN UP AND ALIGNMENT HAS BEEN COMPLETED, THE CONTRACTOR SHALL POUR A REINFORCED CONCRETE BLOCK 24" X 24" X 6" AROUND ALL VALVE BOXES SO THE FINISHED GRADE IS LEVEL WITH THE FINISHED PARKWAY. ALL VALVE STACK COMPONENTS SHALL BE CAST IRON. VALVE BOXES OVER FOUR FEET (4') DEEP WILL REQUIRE EXTENSIONS. ALL VALVES SHALL BE MARKED WITH A SAW ON THE CURB OR PAVEMENT WITH "V", THE "V" SHALL POINT TO THE LOCATION OF THE VALVE AS FOLLOWS: IF THE VALVE IS IN THE PAVING, THE "V" SHALL BE MARKED UPRIGHT; IF THE VALVE IS OUTSIDE THE PAVING, THE "V" SHALL BE MARKED UPSIDE DOWN.
14. THE CONTRACTOR SHALL COORDINATE OPERATION OF ALL EXISTING VALVES WITH THE TOWN. CONTACT THE TOWN'S PUBLIC WORKS DEPARTMENT AT (972) 377-5556.
15. ALL WATER LINES SHALL BE PRESSURE TESTED TO 200 PSI FOR A THREE (3) HOUR CONTINUOUS PERIOD. LEAKAGE RATE SHALL NOT EXCEED TWENTY-FIVE (25) GALLONS PER INCH OF NOMINAL DIAMETER PER MILE OF PIPE OVER A TWENTY-FOUR (24) HOUR PERIOD. CONTRACTOR SHALL FLUSH AND STERILIZE LINES AND PROVE LINES TO BE FREE OF FECAL COLIFORM ORGANISMS BY OBTAINING SAMPLES FOR LABORATORY TESTS FOR CONTAMINATION. THE CONTRACTOR SHALL REFLUSH AND RESTERILIZE UNTIL ALL SAMPLES PROVE FREE FROM CONTAMINATION.
16. ALL RESIDENTIAL WATER SERVICES SHALL BE AS FOLLOWS:
    A. WATER SERVICES SHALL BE NORMALLY LOCATED AT TWO FOOT (2') OFF EVERY OTHER LOT LINE. A WATER METER BOX, AS APPROVED BY THE TOWN, WITH LOCK LID SHALL BE INSTALLED TWO FEET (2') BACK OF CURB LINE.
    B. SDR-9 POLYETHYLENE SERVICES ARE REQUIRED TO SERVE ALL RESIDENTIAL LOTS AND PATIO HOMES. FOR TOWN HOMES AND DUPLEXES, A SERVICE SHALL BE PROVIDED TO EACH OF THE FAMILY UNITS. SAND EMBEDMENT SHALL BE USED AROUND THE PIPE AND CORPORATION STOP. SURVCIL SADDLES SHALL BE BRASS MOLY WITH DOUBLE BRONZE FLATTENED STRAPS (NO BANDED) – FORD, CAMBRIDGE, A.Y. MCDONALD, OR APPROVED OTHER.
    C. THE UTILITY CONTRACTOR SHALL INSTALL THE WATER SERVICES TO A POINT TWO (2) FEET BACK OF THE CURB LINE AT A DEPTH OF 12 INCHES. LINE SHALL BE CONTINUOUS WITH NO FITTINGS UNDER PAVING. THE METER BOX SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AFTER THE PAVING CONTRACTOR HAS COMPLETED THE FINAL GRADING IN BACK OF THE CURB. EACH SERVICE LOCATION WILL BE MARKED ON THE CURB WITH A SINGLE VERTICAL SAW MARK BY THE UTILITY CONTRACTOR AND TIED TO PROPERTY CORNERS ON THE "AS-RECORDED" PLANS.
    D. IF THERE IS A CURB, THE CURB SHALL BE SAWCUT WITH "T" AT THE POINT WHERE THE SERVICE PIPE PASSES THE CURB.
17. FOR NON-RESIDENTIAL WATER SERVICES, THE METER BOX SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AFTER THE PAVING CONTRACTOR HAS COMPLETED THE FINAL GRADING IN BACK OF THE CURB. METER BOXES/VAULTS SHALL BE LOCATED OUTSIDE OF PAVING. EACH SERVICE LOCATION WILL BE MARKED ON THE CURB OR PAVEMENT WITH A SINGLE VERTICAL SAW MARK BY THE UTILITY CONTRACTOR AND TIED TO PROPERTY CORNERS ON THE "AS-RECORDED" PLANS.
18. DENSITY TESTING REQUIREMENTS: FREQUENCY OF TRENCH COMPACTION TESTS SHALL NOT BE LESS THAN ONE (1) FOR ANY PIPE SECTION AND EVERY THREE HUNDRED LINEAR FEET (300') LINEAR FEET OF MAIN PIPE PER TWO FEET (2') OF LIFT UNTIL FINAL GRADE, STARTING AT TWO FEET (2') ABOVE THE TOP OF PIPE. WATER SERVICES ARE TO BE TESTED AT A RATE OF ONE (1) FOR EVERY SIX (6) SERVICES WHICH CROSS THE PROPOSED RIGHT OF WAY OR EVERY THREE HUNDRED LINEAR FEET (300') OF WATER SERVICE INSTALLED. EVERY OTHER FIRE HYDRANT LEAD THAT CROSS THE EXISTING OR PROPOSED STREET, ALLEY, OR FIRE LANE SUBGRADE SHALL ALSO RECEIVE AT LEAST ONE SET OF DENSITY TESTS. ALL DITCHES SHALL BE MECHANICALLY TAMPED AND COMPACTED TO NINETY-FIVE PERCENT (95%) STANDARD PROCTOR DENSITY AT ZERO PERCENT (0%) TO FOUR PERCENT (4%) ABOVE OPTIMUM MOISTURE. WATER JETTING IS NOT PERMITTED.
19. THE CONTRACTOR SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS. INSTALL BENDS AS REQUIRED.
20. THE CONTRACTOR SHALL PROVIDE FITTINGS, PLUGS, AND OTHER DEVICES FOR USE IN FILLING, FLUSHING, TESTING, ETC. (NO SEPARATE PAY).
21. THE CONTRACTOR SHALL PROVIDE ADEQUATE THRUST BLOCKING TO WITHSTAND TEST PRESSURES. (NO SEPARATE PAY).
22. MAINTAIN MINIMUM CLEARANCE OF THREE (3) FEET FROM EDGE OF STRUCTURES TO CLOSEST EDGE OF PIPELINE ADJACENT AND PARALLEL TO EDGE OF STRUCTURE, UNLESS OTHERWISE NOTED ON PLANS.
23. DI-ELECTRIC CONNECTIONS TO BE PREVENTED BY USE OF NON-CONDUCTIVE GASKETS BETWEEN DISSIMILAR PIPING MATERIALS.
24. REFERENCE SPECIFICATIONS FOR REQUIREMENTS ON REQUIRED SEPARATION DISTANCE BETWEEN SEWER AND WATER MAINS AND REQUIREMENTS IN THE EVENT THE SEPARATION DISTANCE CANNOT BE MET.
25. ALL PIPING INSTALLED BY BORING SHALL BE COMPLETED BY DRY BORE METHOD WITHOUT THE USE OF DRILLING FLUID, UNLESS APPROVED BY THE TOWN ENGINEER.

SANITARY SEWER SYSTEM NOTES

1. ALL SANITARY SEWER PIPES FOUR INCHES (4") TO FIFTEEN INCHES (15") NOMINAL SIZE SHALL BE PVC SDR 26 MEETING ASTM D3034. ALL SANITARY SEWER PIPES EIGHTEEN INCHES (18") AND LARGER NOMINAL SIZE SHALL BE PVC MEETING ASTM F679. ALL PIPES SHALL BE "GREEN" IN COLOR AS PER TOWN SPECIFICATIONS AND BE LAID ON A MINIMUM EMBEDMENT (SEE STANDARD CONSTRUCTION DETAILS). DETECTABLE METALLIC TAPE ("GREEN-CAUTION BURIED SEWER BELOW" OR APPROVED OTHER) SHALL BE INSTALLED AFTER INITIAL BACKFILL ON APPROXIMATE CENTERLINE OF PIPE PRIOR TO FINAL BACKFILL.
2. ALL SEWER MAINS SHALL BE A MINIMUM DIAMETER OF EIGHT INCHES (8") AND SHALL MAINTAIN A MINIMUM FLOW VELOCITY OF TWO (2) FEET PER SECOND.
3. ALL RESIDENTIAL SANITARY SEWER SERVICES SHALL BE A MINIMUM FOUR INCHES (4") IN DIAMETER AND EXTENDED TO A POINT TEN FEET (10') INSIDE THE PROPERTY LINE AT A MAXIMUM DEPTH OF FIVE FEET (5'). THE SERVICE SHALL THEN BE EXTENDED AT A FORTY-FIVE DEGREE (45°) ANGLE TO FOUR FEET (4') ABOVE THE FINISHED GRADE AND CAPPED. SEWER SERVICES SHALL BE LOCATED IN THE CENTER OF THE LOT. RESIDENTIAL SEWER SERVICES SHALL NOT TIE INTO MANHOLES.
4. DENSITY TESTING REQUIREMENTS: FREQUENCY OF TRENCH COMPACTION TESTS SHALL NOT BE LESS THAN ONE (1) FOR ANY PIPE SECTION AND EVERY THREE HUNDRED LINEAR FEET (300') OF MAIN PIPE PER TWO FEET (2') OF LIFT UNTIL FINAL GRADE, STARTING AT TWO FEET (2') ABOVE TOP OF PIPE. SEWER SERVICES ARE TO BE TESTED AT A RATE OF ONE (1) FOR EVERY SIX (6) SERVICES STAGGERED OR EVERY THREE HUNDRED LINEAR FEET (300') OF SEWER SERVICE INSTALLED. EACH SEWER MANHOLE WILL RECEIVE A DENSITY TEST EVERY TWO FEET (2') OF LIFT UNTIL FINAL GRADE, ALTERNATING AROUND ALL QUADRANTS. EVERY OTHER MAIN AND STUBOUT THAT CROSSES THE EXISTING OR PROPOSED STREET, ALLEY, OR FIRE LANE SUBGRADE SHALL ALSO RECEIVE AT LEAST ONE SET OF DENSITY TESTS. ALL DITCHES SHALL BE MECHANICALLY TAMPED AND COMPACTED TO NINETY-FIVE PERCENT (95%) STANDARD PROCTOR DENSITY AT ZERO PERCENT (0%) TO FOUR PERCENT (4%) ABOVE OPTIMUM MOISTURE. WATER JETTING IS NOT PERMITTED.
5. AFTER PAVING IS COMPLETED EACH SERVICE LOCATION WILL BE MARKED ON THE CURB WITH A TWO (2) PARALLEL VERTICAL SAW MARKS BY THE UTILITY CONTRACTOR AND TIED TO AT LEAST ONE (1) PROPERTY CORNER ON THE "AS-RECORDED" PLANS. ALL MANHOLES AND CLEANOUTS SHALL BE MARKED ON THE CURB OR PAVEMENT WITH "MH" OR "CO" AS APPLICABLE.
6. VACUUM TESTING OF THE MANHOLES, AND DEFLECTION TESTING ARE REQUIRED ON ALL SEWER LINES. PRIOR TO PAVING, ALL RESIDENTIAL SANITARY SEWER SERVICES SHALL HAVE TV INSPECTIONS.
7. MANHOLES SHALL HAVE A 4000# TRAFFIC BEARING FRAME AND COVER AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT TWENTY-EIGHT (28) DAYS.
8. THE DIAMETER OF A MANHOLE CONSTRUCTED OVER THE CENTER OF A SEWER SHOULD VARY WITH THE SIZE OF THE SEWER. FOR EIGHT-INCH (8"), TEN-INCH (10"), AND TWELVE-INCH (12") SEWERS, THE MANHOLE SHALL BE FOUR-FOOT (4') MINIMUM DIAMETER; FOR FIFTEEN-INCH (15") THROUGH TWENTY-SEVEN-INCH (27") SEWERS, THE MANHOLE SHALL BE FIVE-FOOT (5') MINIMUM DIAMETER; FOR THIRTY-INCH (30") AND THIRTY-SIX-INCH (36") SEWERS, THE MANHOLE SHALL BE SIX-FOOT (6') MINIMUM DIAMETER. MANHOLES DEEPER THAN TWELVE FEET (12') SHALL BE A MINIMUM OF FIVE FOOT (5') DIAMETER.
9. THE CONTRACTOR SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS. INSTALL JOINTS AS REQUIRED.
10. THE CONTRACTOR SHALL PROVIDE FITTINGS, PLUGS, AND OTHER DEVICES FOR USE IN FILLING, FLUSHING, TESTING, ETC. (NO SEPARATE PAY).
11. THE CONTRACTOR SHALL PROVIDE ADEQUATE THRUST BLOCKING TO WITHSTAND TEST PRESSURES. (NO SEPARATE PAY).
12. PIPING DRAWINGS INDICATE INVERT ELEVATIONS FOR GRAVITY FLOW LINES. SLOPE PIPE UNIFORMLY BETWEEN ELEVATIONS SHOWN; NO VALLEYS OR PEAKS PERMITTED IN GRAVITY FLOW LINES. FOR OTHER PIPING, REFER TO DETAIL SHEETS FOR PIPE ELEVATIONS AT EACH STRUCTURE. SITE PIPING DRAWINGS DO NOT INDICATE VERTICAL BENDS AND TRANSITIONS. WHEN NECESSARY, MAKE VERTICAL TRANSITIONS OR FURNISH AND INSTALL VERTICAL BENDS AT NO EXTRA COST. DO NOT EXCEED MANUFACTURER'S RECOMMENDATIONS FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS.
13. MAINTAIN MINIMUM CLEARANCE OF THREE (3) FEET FROM EDGE OF STRUCTURES TO CLOSEST EDGE OF PIPELINE ADJACENT AND PARALLEL TO EDGE OF STRUCTURE, UNLESS OTHERWISE NOTED ON PLANS.
14. DI-ELECTRIC CONNECTIONS TO BE PREVENTED BY USE OF NON-CONDUCTIVE GASKETS BETWEEN DISSIMILAR PIPING MATERIALS.
15. THE INTERIOR SURFACE OF ALL MANHOLES AND LIFT STATION WETWELLS SHALL BE CONSTRUCTED WITH POLYMER CONCRETE, ANTIMICROBIAL CONCRETE ADDITIVES, OR APPROVED EQUAL. EXISTING MANHOLES WHICH RECEIVE TIE INS SHALL BE COATED WITH RAVEN 405 EPOXY OR APPROVED EQUAL IF THEY DO NOT ALREADY HAVE CORROSION PROTECTION.
16. RESIDENTIAL SEWER SERVICES SHALL NOT TIE INTO MANHOLES WITHOUT TOWN ENGINEER APPROVAL.

NO.	REVISION	DATE

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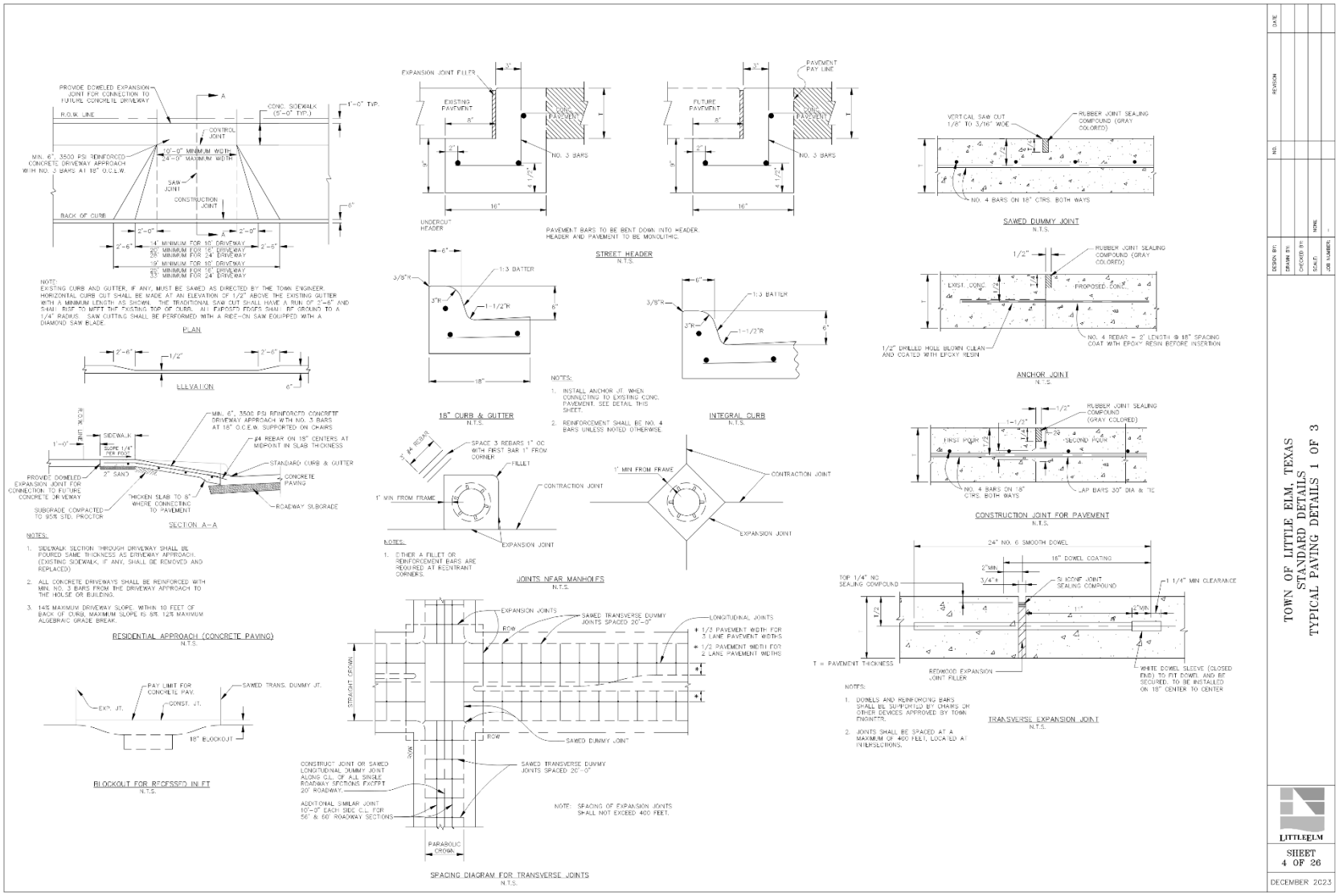
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
GENERAL CONSTRUCTION NOTES 3 OF 3

LITTLE ELM

SHEET
3 OF 26

DECEMBER 2023


PROVIDE DOWELED EXPANSION JOINT FOR CONNECTION TO FUTURE CONCRETE DRIVEWAY
R.O.W. LINE
CONC. SIDEWALK (5'-0" TYP.)
1'-6" TYP.
CONTROL JOINT
10'-0" MINIMUM WIDTH 24'-0" MAXIMUM WIDTH
MIN. 6", 3500 PSI REINFORCED CONCRETE DRIVEWAY APPROACH WITH NO. 3 BARS AT 18" O.C.E.W.
SAW JOINT
CONSTRUCTION JOINT
BACK OF CURB
2'-0"
2'-6"
14' MINIMUM FOR 10' DRIVEWAY
20' MINIMUM FOR 16' DRIVEWAY
28' MINIMUM FOR 24' DRIVEWAY
19' MINIMUM FOR 10' DRIVEWAY
25' MINIMUM FOR 16' DRIVEWAY
33' MINIMUM FOR 24' DRIVEWAY
NOTE:
EXISTING CURB AND GUTTER, IF ANY, MUST BE SAWED AS DIRECTED BY THE TOWN ENGINEER. HORIZONTAL CURB CUT SHALL BE MADE AT AN ELEVATION OF 1/2" ABOVE THE EXISTING GUTTER WITH A MINIMUM LENGTH AS SHOWN. THE TRADITIONAL SAW CUT SHALL HAVE A RUN OF 3"-6" AND SHALL RISE TO MEET THE EXISTING TOP OF CURB. ALL EXPOSED EDGES SHALL BE GROUND TO A 1/4" RADIUS. SAW CUTTING SHALL BE PERFORMED WITH A RIDE-ON SAW EQUIPPED WITH A DIAMOND SAW BLADE.
PLAN
1/2"
ELEVATION
6"
MIN. 6" SIDEWALK
1'-0"
SLOPE 1/4" PER FOOT
MIN. 6", 3500 PSI REINFORCED CONCRETE DRIVEWAY APPROACH WITH NO. 3 BARS AT 18" O.C.E.W. SUPPORTED ON CHAIRS
#4 REBAR ON 18" CENTERS AT MIDPOINT IN SLAB THICKNESS
STANDARD CURB & GUTTER
2" SAND
CONCRETE PAVING
PROVIDE DOWELED EXPANSION JOINT FOR CONNECTION TO FUTURE CONCRETE DRIVEWAY
THICKEN SLAB TO 8" WHERE CONNECTING TO PAVEMENT
ROADWAY SUBGRADE
SUBGRADE COMPACTED TO 95% STD. PROCTOR
SECTION A-A
NOTES:
1. SIDEWALK SECTION THROUGH DRIVEWAY SHALL BE POURED SAME THICKNESS AS DRIVEWAY APPROACH. (EXISTING SIDEWALK, IF ANY, SHALL BE REMOVED AND REPLACED)
2. ALL CONCRETE DRIVEWAYS SHALL BE REINFORCED WITH MIN. NO. 3 BARS FROM THE DRIVEWAY APPROACH TO THE HOUSE OR BUILDING.
3. 14% MAXIMUM DRIVEWAY SLOPE WITHIN 10 FEET OF BACK OF CURB, MAXIMUM SLOPE IS 8% 12% MAXIMUM ALGEBRAIC GRADE BREAK.
RESIDENTIAL APPROACH (CONCRETE PAVING)
N.T.S.
PAY LIMIT FOR CONCRETE PAV.
SAWED TRANS. DUMMY JT.
EXP. JT.
CONST. JT.
18" BLOCKOUT
BLOCKOUT FOR RECESSED INLET
N.T.S.
EXPANSION JOINT FILLER
EXISTING PAVEMENT
CURB (EXCEPT AT DRIVEWAY)
NO. 3 BARS
UNDERCUT HEADER
FUTURE PAVEMENT
PAVEMENT PAY LINE
PAVEMENT BARS TO BE BENT DOWN INTO HEADER. HEADER AND PAVEMENT TO BE MONOLITHIC.
STREET HEADER
N.T.S.
1:3 BATTER
3/8"R
1-1/2"R
18" CURB & GUTTER
N.T.S.
NOTES:
1. INSTALL ANCHOR JT. WHEN CONNECTING TO EXISTING CONC. PAVEMENT. SEE DETAIL THIS SHEET.
2. REINFORCEMENT SHALL BE NO. 4 BARS UNLESS NOTED OTHERWISE.
INTEGRAL CURB
N.T.S.
SPACE 3 REBARS 1" OC WITH FIRST BAR 1" FROM CORNER
FILLET
CONTRACTION JOINT
1' MIN FROM FRAME
EXPANSION JOINT
NOTES:
1. EITHER A FILLET OR REINFORCEMENT BARS ARE REQUIRED AT REENTRANT CORNERS.
JOINTS NEAR MANHOLES
N.T.S.
VERTICAL SAW CUT 1/8" TO 3/16" WIDE
RUBBER JOINT SEALING COMPOUND (GRAY COLORED)
NO. 4 BARS ON 18" CTRS. BOTH WAYS
SAWED DUMMY JOINT
N.T.S.
EXIST. CONC.
PROPOSED CONC.
NO. 4 REBAR - 2' LENGTH @ 18" SPACING COAT WITH EPOXY RESIN BEFORE INSERTION
1/2" DRILLED HOLE BLOWN CLEAN AND COATED WITH EPOXY RESIN
ANCHOR JOINT
N.T.S.
FIRST POUR
SECOND POUR
LAP BARS 30" DIA & TIE
CONSTRUCTION JOINT FOR PAVEMENT
N.T.S.
EXPANSION JOINTS
SAWED TRANSVERSE DUMMY JOINTS SPACED 20'-0"
LONGITUDINAL JOINTS
1/3 PAVEMENT WIDTH FOR 3 LANE PAVEMENT WIDTHS
1/2 PAVEMENT WIDTH FOR 2 LANE PAVEMENT WIDTHS
ROW
STRAIGHT CROWN
SAWED DUMMY JOINT
CONSTRUCT JOINT OR SAWED LONGITUDINAL DUMMY JOINT ALONG C.L. OF ALL SINGLE ROADWAY SECTIONS EXCEPT 20' ROADWAY.
ADDITIONAL SIMILAR JOINT 10'-0" EACH SIDE C.L. FOR 56' & 60' ROADWAY SECTIONS
PARABOLIC CROWN
NOTE: SPACING OF EXPANSION JOINTS SHALL NOT EXCEED 400 FEET.
SPACING DIAGRAM FOR TRANSVERSE JOINTS
N.T.S.
24" NO. 6 SMOOTH DOWEL
18" DOWEL COATING
TOP 1/4" NO SEALING COMPOUND
2" MIN.
3/4"±
SILICONE JOINT SEALING COMPOUND
1 1/4" MIN CLEARANCE
2" MIN.
T = PAVEMENT THICKNESS
REDWOOD EXPANSION JOINT FILLER
WHITE DOWEL SLEEVE (CLOSED END) TO FIT DOWEL AND BE SECURED TO BE INSTALLED ON 18" CENTER TO CENTER
NOTES:
1. DOWELS AND REINFORCING BARS SHALL BE SUPPORTED BY CHAIRS OR OTHER DEVICES APPROVED BY TOWN ENGINEER.
2. JOINTS SHALL BE SPACED AT A MAXIMUM OF 400 FEET, LOCATED AT INTERSECTIONS.
TRANSVERSE EXPANSION JOINT
N.T.S.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL PAVING DETAILS 1 OF 3
LITTLE ELM
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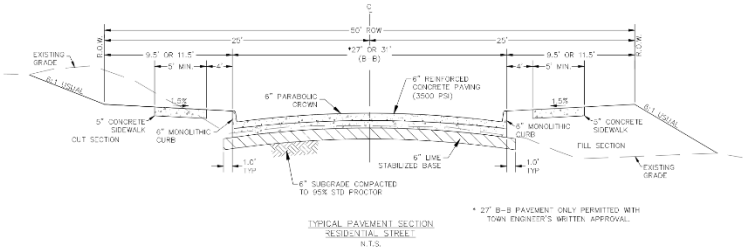
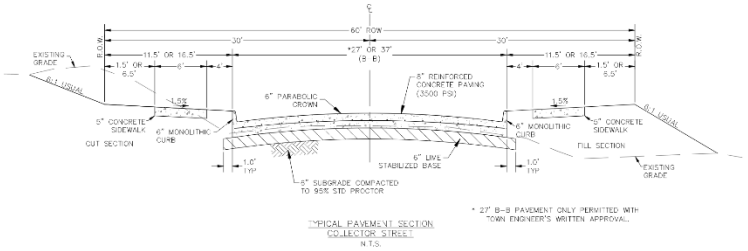
DECEMBER 2023



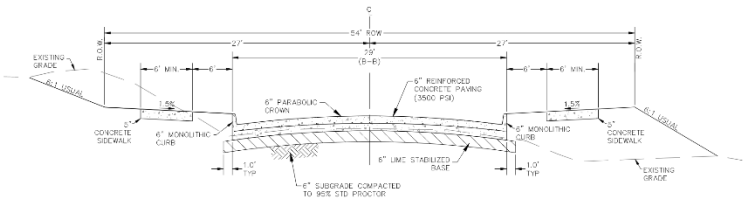
TYPICAL PAVEMENT SECTION
RESIDENTIAL STREET
N.T.S.

* 27' B-B PAVEMENT ONLY PERMITTED WITH TOWN ENGINEER'S WRITTEN APPROVAL.



TYPICAL PAVEMENT SECTION
COLLECTOR STREET
N.T.S.

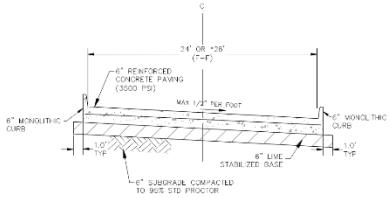
* 27' B-B PAVEMENT ONLY PERMITTED WITH TOWN ENGINEER'S WRITTEN APPROVAL.



RESIDENTIAL STREET
ALTERNATIVE PAVEMENT SECTION
(29'-0" B-B)
N.T.S.

PAVEMENT NOTES:

1. THESE NOTES ARE A REPRESENTATION OF THE MINIMUM REQUIREMENTS FOR PAVEMENT CONSTRUCTION. THE DESIGN ENGINEER IS RESPONSIBLE FOR PAVEMENT DESIGN, INCORPORATING RECOMMENDATIONS OF THE GEOTECHNICAL REPORT (IF FOUND TO BE MORE STRINGENT).
2. 3500 PSI MACHINE POUR, 4000 PSI HAND POUR (AT DRIVEWAY APPROACH ONLY). REINFORCED CONCRETE PAVEMENT (5.5 SACK/CY), NO. 4 BARS @ 18" O.C.E.W., WITH 6" MONOLITHIC CURB.
3. BAR LAPS SHALL BE 30 BAR DIAMETERS.
4. BAR CHAIRS SHALL BE PROVIDED BY CONTRACTOR.
5. DO NOT PLACE CONCRETE JOINT WITHIN 2 FEET OF GUTTER LINE AT STREET CONNECTION.
6. LIME SHALL BE APPLIED BY PERCENTAGE DRY UNIT WEIGHT OF SOIL TREATED TO A MINIMUM IN PLACE COMPACTED THICKNESS OF SIX (6) INCHES. FOR 6" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 37 LBS/SQ FT; FOR 8" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 54 LBS/SQ FT.
7. LIME STABILIZATION MAY BE OMITTED IF 6" OF FLEXIBLE BASE WITH TENSAR TX7 GEOGRID IS APPLIED TO THE SUBBASE COMPACTED TO 95% STD PROCTOR.
8. FORMING OF PAVEMENT:
   A. SLIP-FORM: SLIP-FORM PAVEMENT METHOD SHALL BE USED FOR ALL PUBLIC STREETS AND ALLEYS UNLESS OTHERWISE APPROVED BY THE TOWN ENGINEER.
   B. HAND FORM: HAND FORMED PAVEMENT METHOD MAY BE USED FOR TURN LANE, DECELERATION LANE, DRIVEWAY APPROACH, OR REPLACING A PANEL OF PUBLIC STREET OR ALLEY.

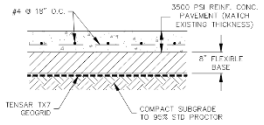


FIRE LANE
N.T.S.

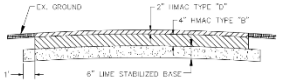
* 28' F-F PAVEMENT REQUIRED WHEN SERVING BUILDINGS 2 STORIES OR HIGHER.

FIRE LANE MAXIMUM RUNNING GRADE IS 6%

SEE FIRE LANE STRIPING DETAIL ON SHEET 10



CONCRETE PAVEMENT REPAIR
TYPICAL SECTION
N.T.S.



ASPHALT TRANSITION
TYPICAL SECTION
N.T.S.

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL PAVING DETAILS 2 OF 3

LITTLE ELM

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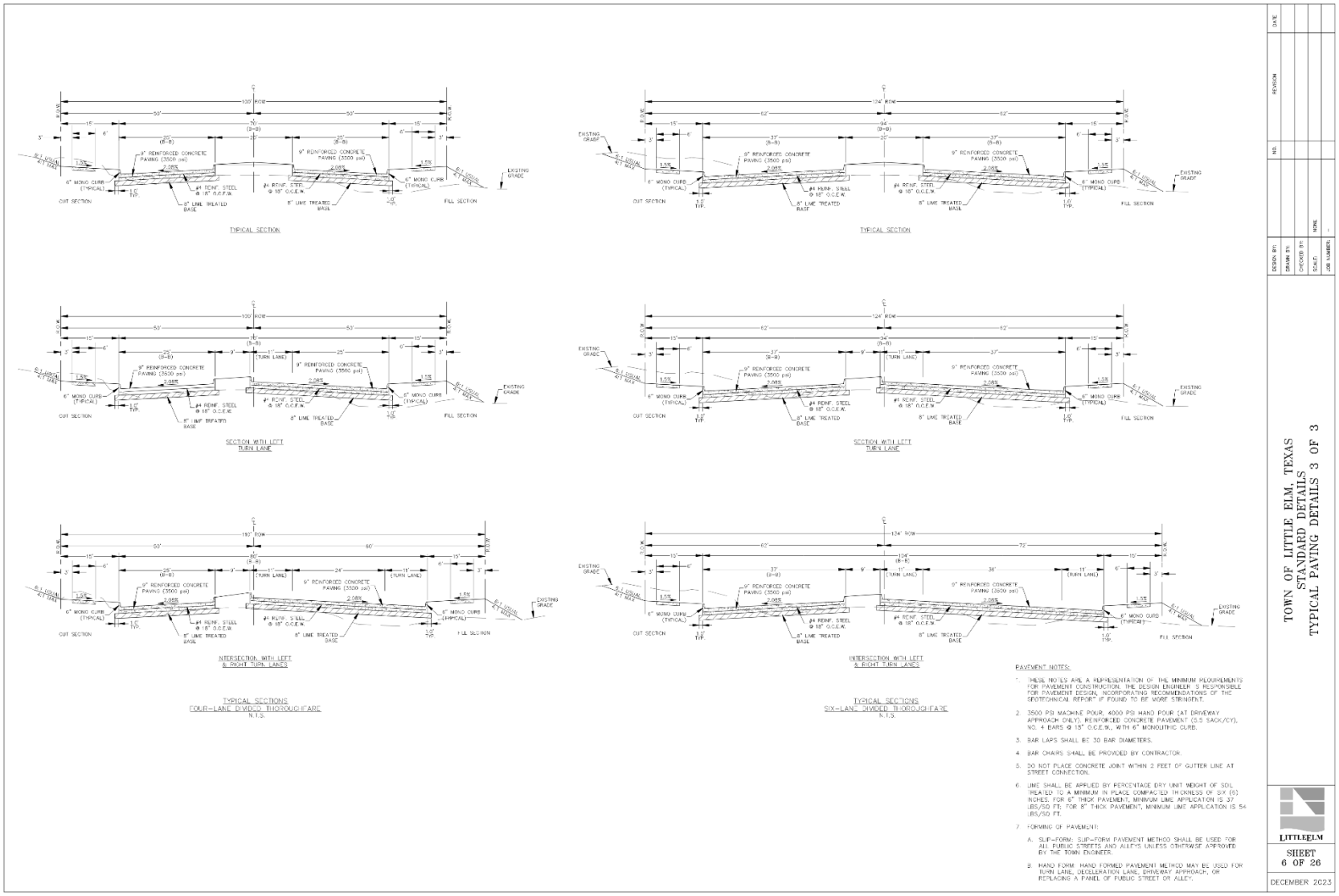
TYPICAL SECTION
TYPICAL SECTION
SECTION WITH LEFT TURN LANE
SECTION WITH LEFT TURN LANE
INTERSECTION WITH LEFT & RIGHT TURN LANES
INTERSECTION WITH LEFT & RIGHT TURN LANES
TYPICAL SECTIONS FOUR-LANE DIVIDED THOROUGHFARE N.T.S.
TYPICAL SECTIONS SIX-LANE DIVIDED THOROUGHFARE N.T.S.
PAVEMENT NOTES:
1. THESE NOTES ARE A REPRESENTATION OF THE MINIMUM REQUIREMENTS FOR PAVEMENT CONSTRUCTION. THE DESIGN ENGINEER IS RESPONSIBLE FOR PAVEMENT DESIGN, INCORPORATING RECOMMENDATIONS OF THE GEOTECHNICAL REPORT IF FOUND TO BE MORE STRINGENT.
2. 3500 PSI MACHINE POUR, 4000 PSI HAND POUR (AT DRIVEWAY APPROACH ONLY), REINFORCED CONCRETE PAVEMENT (5.5 SACK/CY), NO. 4 BARS @ 18" O.C.E.W., WITH 6" MONOLITHIC CURB.
3. BAR LAPS SHALL BE 30 BAR DIAMETERS.
4. BAR CHAIRS SHALL BE PROVIDED BY CONTRACTOR.
5. DO NOT PLACE CONCRETE JOINT WITHIN 2 FEET OF GUTTER LINE AT STREET CONNECTION.
6. LIME SHALL BE APPLIED BY PERCENTAGE DRY UNIT WEIGHT OF SOIL TREATED TO A MINIMUM IN PLACE COMPACTED THICKNESS OF SIX (6) INCHES. FOR 6" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 37 LBS/SQ FT. FOR 8" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 54 LBS/SQ FT.
7. FORMING OF PAVEMENT:
A. SLIP-FORM: SLIP-FORM PAVEMENT METHOD SHALL BE USED FOR ALL PUBLIC STREETS AND ALLEYS UNLESS OTHERWISE APPROVED BY THE TOWN ENGINEER.
B. HAND FORM: HAND FORMED PAVEMENT METHOD MAY BE USED FOR TURN LANE, DECELERATION LANE, DRIVEWAY APPROACH, OR REPLACING A PANEL OF PUBLIC STREET OR ALLEY.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER:
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL PAVING DETAILS 3 OF 3
LITTLEELM
SHEET
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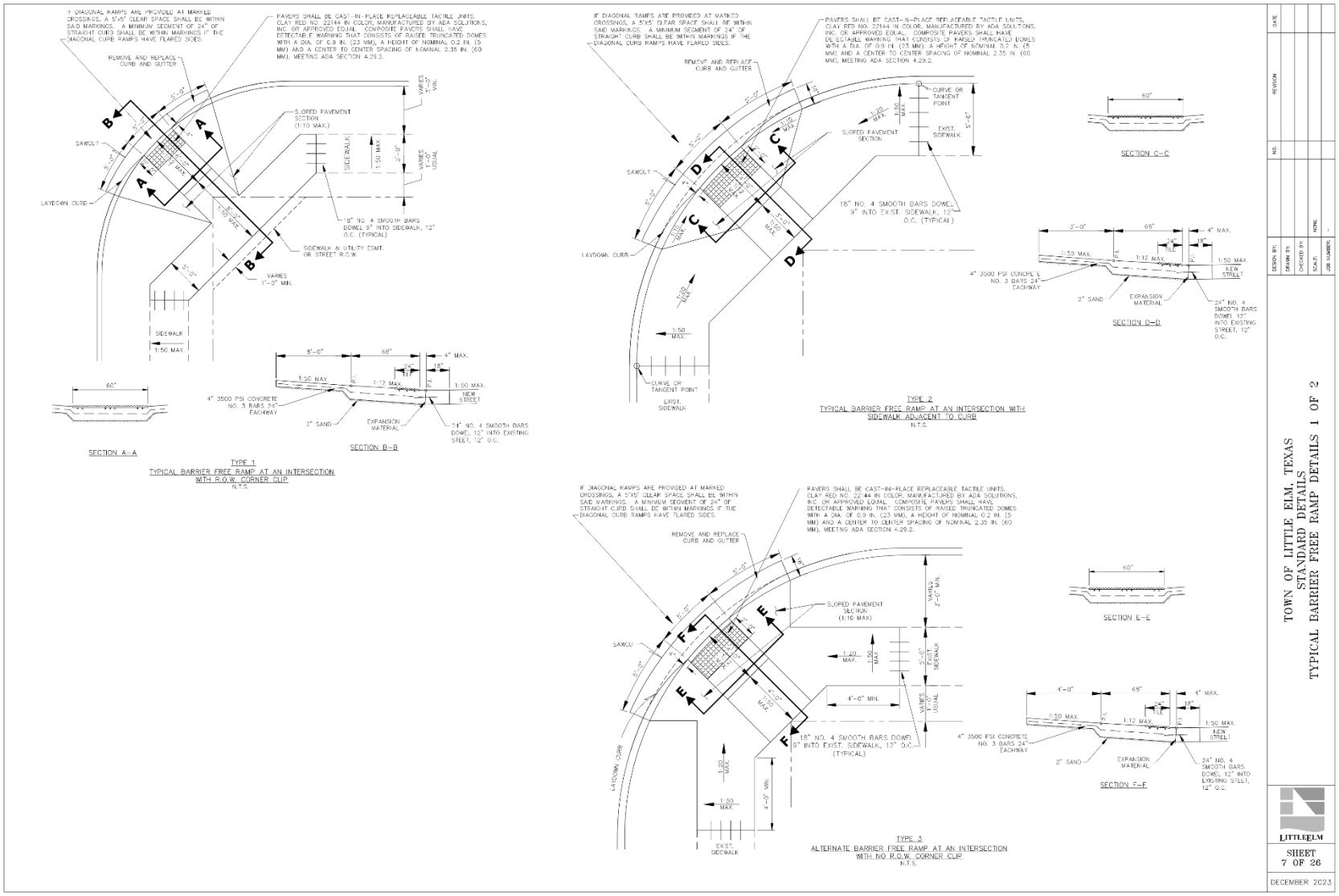
DECEMBER 2023


TYPE 1
TYPICAL BARRIER FREE RAMP AT AN INTERSECTION WITH R.O.W. CORNER CLIP
N.T.S.
SECTION A–A
SECTION B–B
TYPE 2
TYPICAL BARRIER FREE RAMP AT AN INTERSECTION WITH SIDEWALK ADJACENT TO CURB
N.T.S.
SECTION C–C
SECTION D–D
TYPE 3
ALTERNATE BARRIER FREE RAMP AT AN INTERSECTION WITH NO R.O.W. CORNER CLIP
N.T.S.
SECTION E–E
SECTION F–F
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL BARRIER FREE RAMP DETAILS 1 OF 2
LITTLE ELM
SHEET
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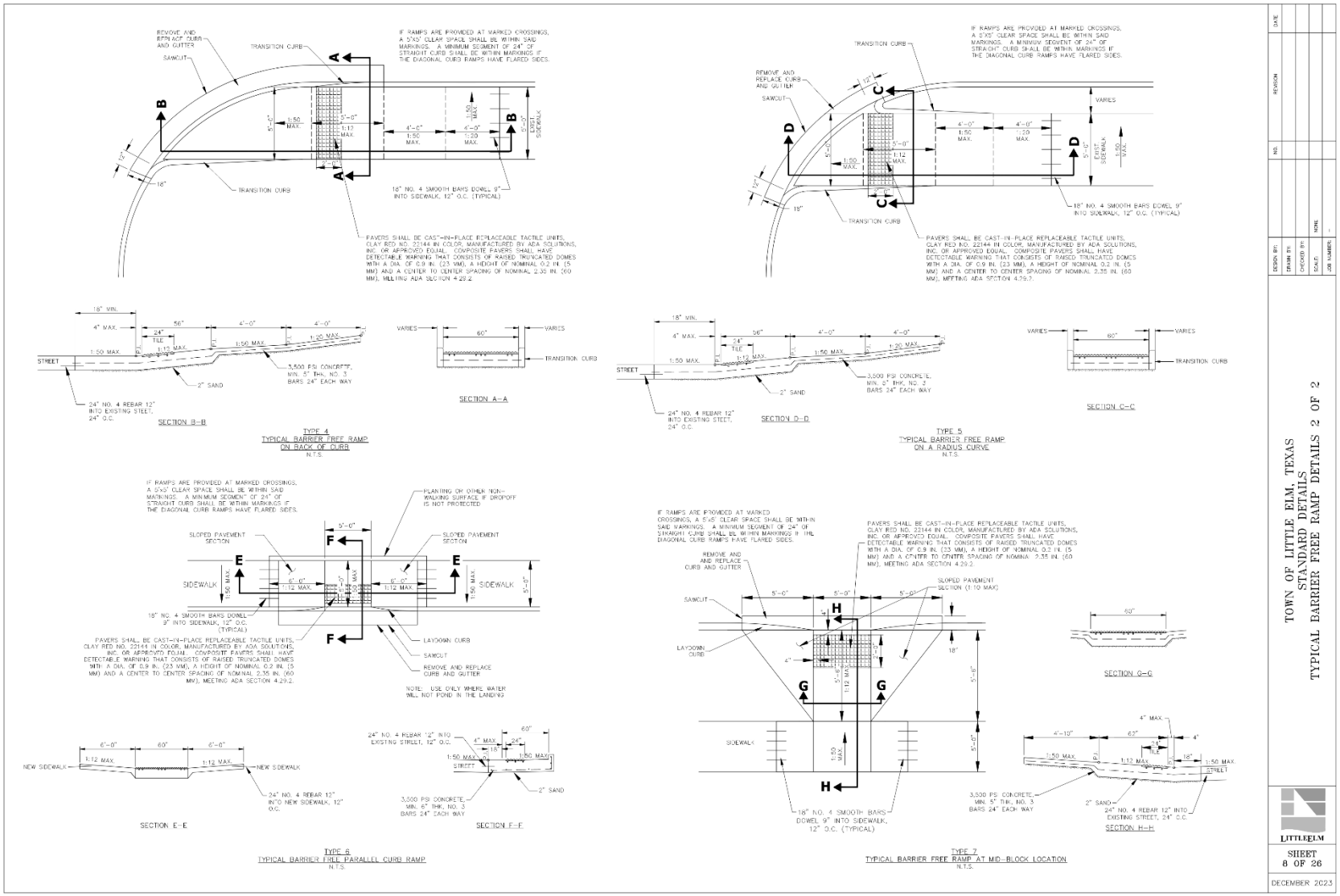
DECEMBER 2023


TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL BARRIER FREE RAMP DETAILS 2 OF 2
LITTLEELM
SHEET
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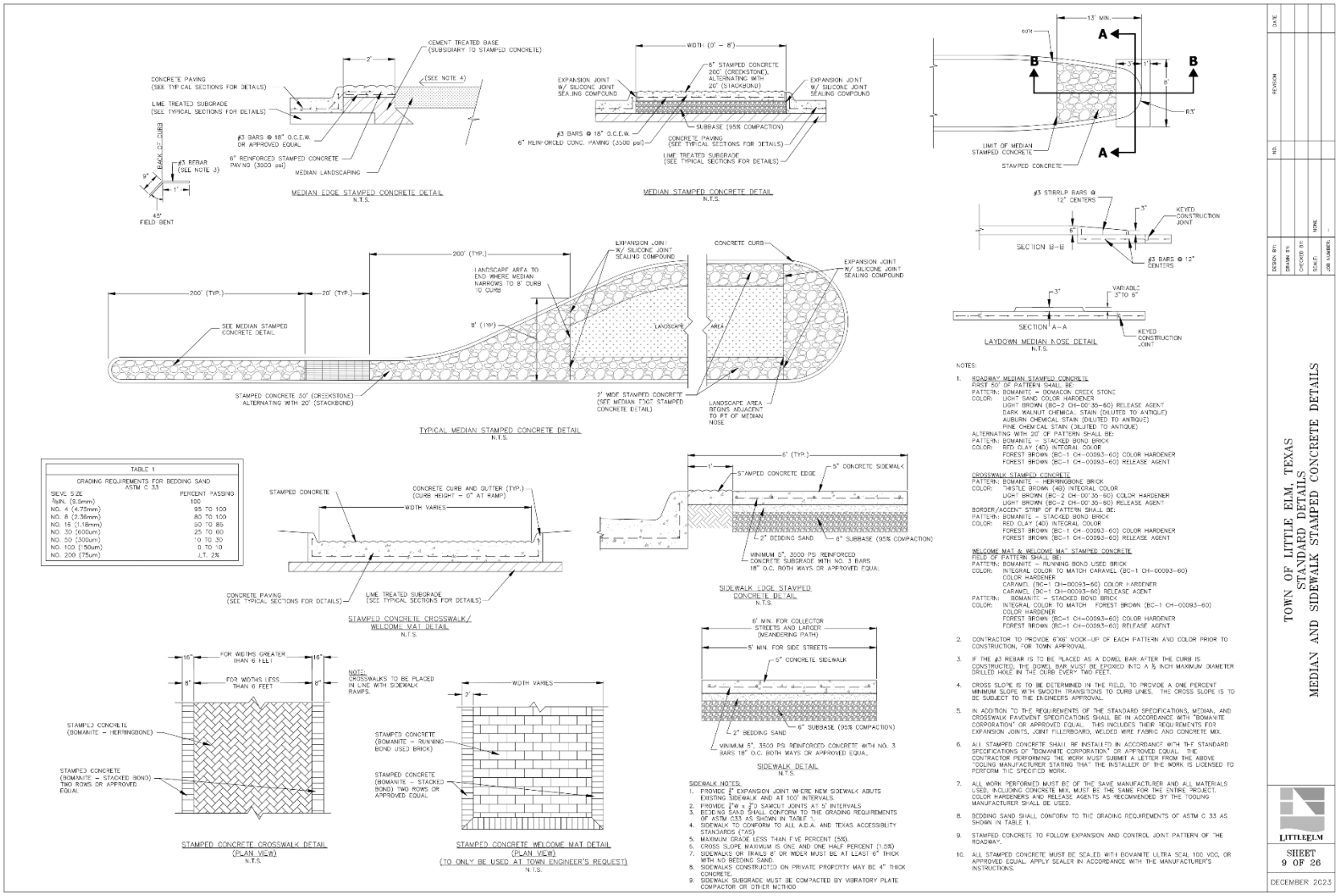
DECEMBER 2023
TYPE 4
TYPICAL BARRIER FREE RAMP
ON BACK OF CURB
N.T.S.
SECTION B-B
SECTION A-A
TYPE 5
TYPICAL BARRIER FREE RAMP
ON A RADIUS CURVE
N.T.S.
SECTION D-D
SECTION C-C
TYPE 6
TYPICAL BARRIER FREE PARALLEL CURB RAMP
N.T.S.
SECTION E-E
SECTION F-F
TYPE 7
TYPICAL BARRIER FREE RAMP AT MID-BLOCK LOCATION
N.T.S.
SECTION G-G
SECTION H-H


MEDIAN EDGE STAMPED CONCRETE DETAIL
N.T.S.
MEDIAN STAMPED CONCRETE DETAIL
N.T.S.
TYPICAL MEDIAN STAMPED CONCRETE DETAIL
N.T.S.
LAYDOWN MEDIAN NOSE DETAIL
N.T.S.
STAMPED CONCRETE CROSSWALK/ WELCOME MAT DETAIL
N.T.S.
SIDEWALK EDGE STAMPED CONCRETE DETAIL
N.T.S.
SIDEWALK DETAIL
N.T.S.
STAMPED CONCRETE CROSSWALK DETAIL (PLAN VIEW)
N.T.S.
STAMPED CONCRETE WELCOME MAT DETAIL (PLAN VIEW)
(TO ONLY BE USED AT TOWN ENGINEER'S REQUEST)
N.T.S.
TABLE 1
GRADING REQUIREMENTS FOR BEDDING SAND ASTM C 33
SIEVE SIZE | PERCENT PASSING
3/8IN. (9.5mm) 100
NO. 4 (4.75mm) 95 TO 100
NO. 8 (2.36mm) 80 TO 100
NO. 16 (1.18mm) 50 TO 85
NO. 30 (600um) 25 TO 60
NO. 50 (300um) 10 TO 30
NO. 100 (150um) 0 TO 10
NO. 200 (75um) LT. 2%
NOTES:
1. ROADWAY MEDIAN STAMPED CONCRETE
FIRST 50' OF PATTERN SHALL BE:
PATTERN: BOMANITE – DOMACON CREEK STONE
COLOR: LIGHT SAND COLOR HARDENER
LIGHT BROWN (BC–2 CH–00130–60) RELEASE AGENT
DARK WALNUT CHEMICAL STAIN (DILUTED TO ANTIQUE)
AUBURN CHEMICAL STAIN (DILUTED TO ANTIQUE)
PINE CHEMICAL STAIN (DILUTED TO ANTIQUE)
ALTERNATING WITH 20' OF PATTERN SHALL BE:
PATTERN: BOMANITE – STACKED BOND BRICK
COLOR: RED CLAY (40) INTEGRAL COLOR
FOREST BROWN (BC–1 CH–00093–60) COLOR HARDENER
FOREST BROWN (BC–1 CH–00093–60) RELEASE AGENT
CROSSWALK STAMPED CONCRETE
PATTERN: BOMANITE – HERRINGBONE BRICK
COLOR: "THISTLE BROWN (48) INTEGRAL COLOR
LIGHT BROWN (BC–2 CH–00130–60) COLOR HARDENER
LIGHT BROWN (BC–2 CH–00130–60) RELEASE AGENT
BORDER/"ACCENT" STRIP OF PATTERN SHALL BE:
PATTERN: BOMANITE – STACKED BOND BRICK
COLOR: RED CLAY (40) INTEGRAL COLOR
FOREST BROWN (BC–1 CH–00093–60) COLOR HARDENER
FOREST BROWN (BC–1 CH–00093–60) RELEASE AGENT
WELCOME MAT & WELCOME MAT STAMPED CONCRETE
FIELD OF PATTERN SHALL BE:
PATTERN: BOMANITE – RUNNING BOND USED BRICK
COLOR: INTEGRAL COLOR TO MATCH CARAMEL (BC–1 CH–00093–60) COLOR HARDENER
CARAMEL (BC–1 CH–00093–60) COLOR HARDENER
CARAMEL (BC–1 CH–00093–60) RELEASE AGENT
PATTERN: – STACKED BOND BRICK
COLOR: INTEGRAL COLOR TO MATCH FOREST BROWN (BC–1 CH–00093–60) COLOR HARDENER
FOREST BROWN (BC–1 CH–00093–60) COLOR HARDENER
FOREST BROWN (BC–1 CH–00093–60) RELEASE AGENT
2. CONTRACTOR TO PROVIDE 6'X6' MOCK–UP OF EACH PATTERN AND COLOR PRIOR TO CONSTRUCTION, FOR TOWN APPROVAL.
3. IF THE #3 REBAR IS TO BE PLACED AS A DOWEL BAR AFTER THE CURB IS CONSTRUCTED, THE DOWEL BAR MUST BE EPOXIED INTO A ½ INCH MAXIMUM DIAMETER DRILLED HOLE IN THE CURB EVERY TWO FEET.
4. CROSS SLOPE IS TO BE DETERMINED IN THE FIELD, TO PROVIDE A ONE PERCENT MINIMUM SLOPE WITH SMOOTH TRANSITIONS TO CURB LINES. THE CROSS SLOPE IS TO BE SUBJECT TO THE ENGINEERS APPROVAL.
5. IN ADDITION TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS, MEDIAN, AND CROSSWALK PAVEMENT SPECIFICATIONS SHALL BE IN ACCORDANCE WITH "BOMANITE CORPORATION" OR APPROVED EQUAL. THIS INCLUDES THEIR REQUIREMENTS FOR EXPANSION JOINTS, JOINT FILLERBOARD, WELDED WIRE FABRIC AND CONCRETE MIX.
6. ALL STAMPED CONCRETE SHALL BE INSTALLED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF "BOMANITE CORPORATION." OR APPROVED EQUAL. THE CONTRACTOR PERFORMING THE WORK MUST SUBMIT A LETTER FROM THE ABOVE "TOOLING MANUFACTURER STATING THA" THE INSTALLER OF THE WORK IS LICENSED TO PERFORM THIS SPECIFIED WORK.
7. ALL WORK PERFORMED MUST BE OF THE SAME MANUFACTURER AND ALL MATERIALS USED, INCLUDING CONCRETE MIX, MUST BE THE SAME FOR THE ENTIRE PROJECT. COLOR HARDENERS AND RELEASE AGENTS AS RECOMMENDED BY THE TOOLING MANUFACTURER SHALL BE USED.
8. BEDDING SAND SHALL CONFORM TO THE GRADING REQUIREMENTS OF ASTM C 33 AS SHOWN IN TABLE 1.
9. STAMPED CONCRETE TO FOLLOW EXPANSION AND CONTROL JOINT PATTERN OF THE ROADWAY.
10. ALL STAMPED CONCRETE MUST BE SEALED WITH BOMANITE ULTRA SEAL 100 VOC, OR APPROVED EQUAL. APPLY SEALER IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
SIDEWALK NOTES:
1. PROVIDE ½" EXPANSION JOINT WHERE NEW SIDEWALK ABUTS EXISTING SIDEWALK AND AT 100' INTERVALS.
2. PROVIDE ¼"W x ¾"D SAWCUT JOINTS AT 5' INTERVALS
3. BEDDING SAND SHALL CONFORM TO THE GRADING REQUIREMENTS OF ASTM C33 AS SHOWN IN TABLE 1.
4. SIDEWALK TO CONFORM TO ALL A.D.A. AND TEXAS ACCESSIBILITY STANDARDS (TAS)
5. MAXIMUM GRADE LESS THAN FIVE PERCENT (5%).
6. CROSS SLOPE MAXIMUM IS ONE AND ONE HALF PERCENT (1.5%)
7. SIDEWALKS OR TRAILS 8' OR WIDER MUST BE AT LEAST 6" THICK WITH NO BEDDING SAND.
8. SIDEWALKS CONSTRUCTED ON PRIVATE PROPERTY MAY BE 4" THICK CONCRETE.
9. SIDEWALK SUBGRADE MUST BE COMPACTED BY VIBRATORY PLATE COMPACTOR OR OTHER METHOD
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
MEDIAN AND SIDEWALK STAMPED CONCRETE DETAILS
LITTLEELM
SHEET
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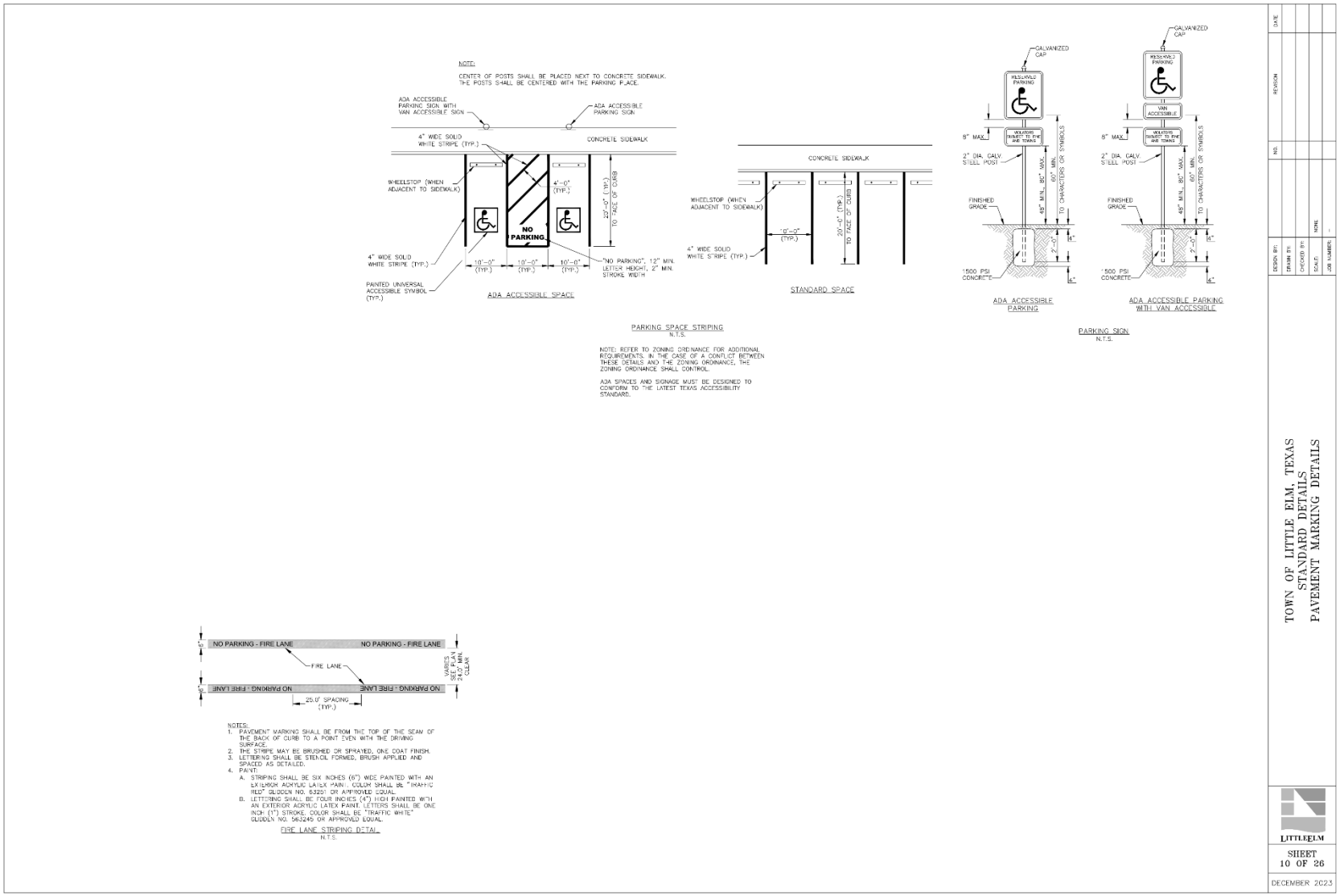
DECEMBER 2023


NOTE:
CENTER OF POSTS SHALL BE PLACED NEXT TO CONCRETE SIDEWALK. THE POSTS SHALL BE CENTERED WITH THE PARKING PLACE.
ADA ACCESSIBLE PARKING SIGN WITH VAN ACCESSIBLE SIGN
ADA ACCESSIBLE PARKING SIGN
4" WIDE SOLID WHITE STRIPE (TYP.)
CONCRETE SIDEWALK
WHEELSTOP (WHEN ADJACENT TO SIDEWALK)
4'-0" (TYP.)
20'-0" (TYP.) TO FACE OF CURB
NO PARKING
4" WIDE SOLID WHITE STRIPE (TYP.)
10'-0" (TYP.)
10'-0" (TYP.)
10'-0" (TYP.)
"NO PARKING", 12" MIN. LETTER HEIGHT, 2" MIN. STROKE WIDTH
PAINTED UNIVERSAL ACCESSIBLE SYMBOL (TYP.)
ADA ACCESSIBLE SPACE
CONCRETE SIDEWALK
WHEELSTOP (WHEN ADJACENT TO SIDEWALK)
4" WIDE SOLID WHITE STRIPE (TYP.)
2'-0" (TYP.)
20'-0" (TYP.) TO FACE OF CURB
STANDARD SPACE
PARKING SPACE STRIPING
N.T.S.
NOTE: REFER TO ZONING ORDINANCE FOR ADDITIONAL REQUIREMENTS. IN THE CASE OF A CONFLICT BETWEEN THESE DETAILS AND THE ZONING ORDINANCE, THE ZONING ORDINANCE SHALL CONTROL.
ADA SPACES AND SIGNAGE MUST BE DESIGNED TO CONFORM TO THE LATEST TEXAS ACCESSIBILITY STANDARD.
GALVANIZED CAP
MUTCD R7-8 PARKING
8" MAX.
VIOLATORS SUBJECT TO FINE AND TOWING
2" DIA. GALV. STEEL POST
60" MIN.
48" MIN.
80" MAX.
TO CHARACTERS OR SYMBOLS
FINISHED GRADE
2'-0"
6"
4"
1500 PSI CONCRETE
ADA ACCESSIBLE PARKING
MUTCD R7-8P VAN ACCESSIBLE
ADA ACCESSIBLE PARKING WITH VAN ACCESSIBLE
PARKING SIGN
N.T.S.
NO PARKING - FIRE LANE
FIRE LANE
VARIES SEE PLAN 24' CLEAR
25.0' SPACING (TYP.)
NOTES:
1. PAVEMENT MARKING SHALL BE FROM THE TOP OF THE SEAM OF THE BACK OF CURB TO A POINT EVEN WITH THE DRIVING SURFACE.
2. THE STRIPE MAY BE BRUSHED OR SPRAYED, ONE COAT FINISH.
3. LETTERING SHALL BE STENCIL FORMED, BRUSH APPLIED AND SPACED AS DETAILED.
4. PAINT:
A. STRIPING SHALL BE SIX INCHES (6") WIDE PAINTED WITH AN EXTERIOR ACRYLIC LATEX PAINT. COLOR SHALL BE "TRAFFIC RED" GLIDDEN NO. 6329 OR APPROVED EQUAL.
B. LETTERING SHALL BE FOUR INCHES (4") HIGH PAINTED WITH AN EXTERIOR ACRYLIC LATEX PAINT. LETTERS SHALL BE ONE INCH (1") STROKE. COLOR SHALL BE "TRAFFIC WHITE" GLIDDEN NO. 56224 OR APPROVED EQUAL.
FIRE LANE STRIPING DETAIL
N.T.S.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
KONG
JOB NUMBER:
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
PAVEMENT MARKING DETAILS
LITTLEELM
SHEET
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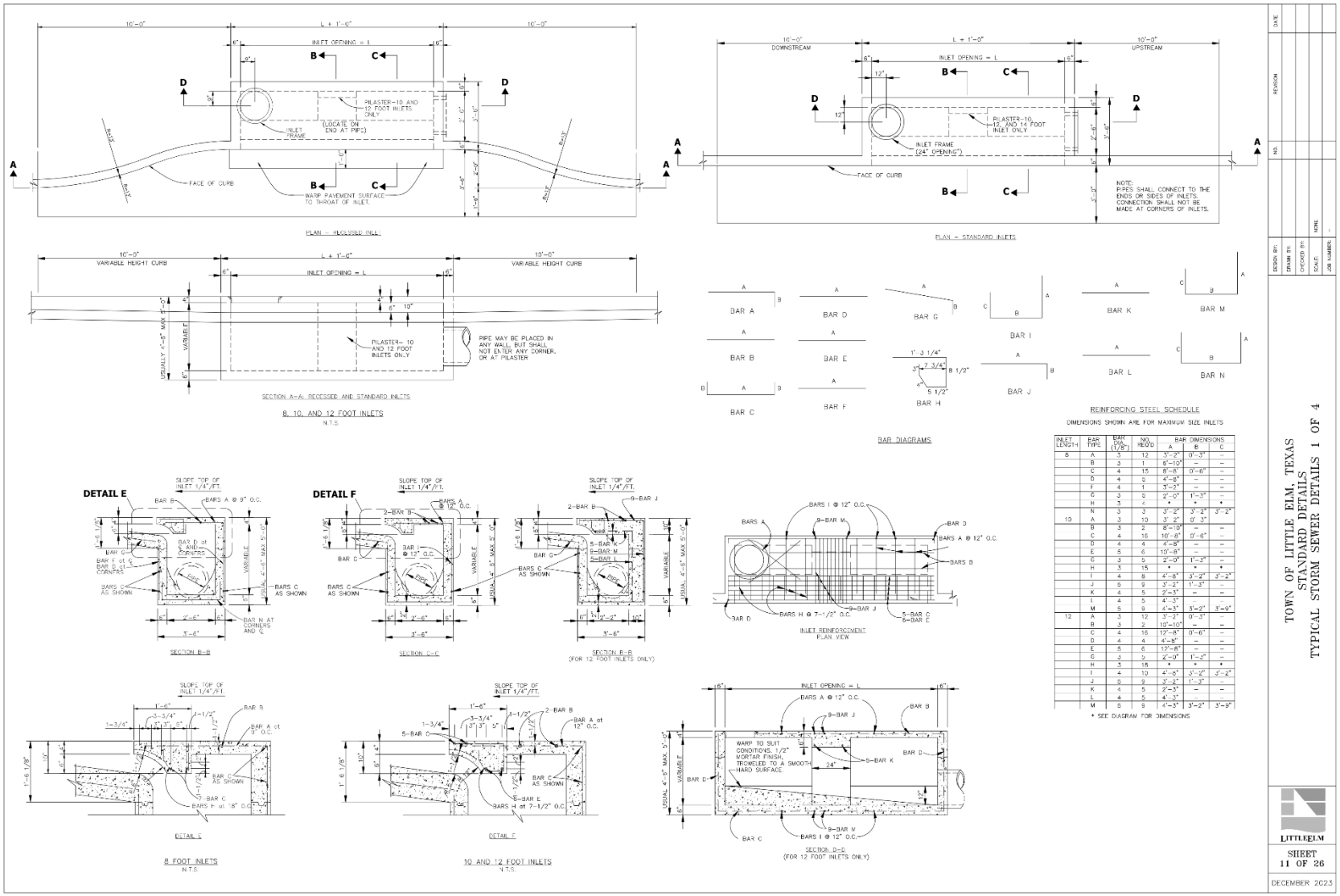
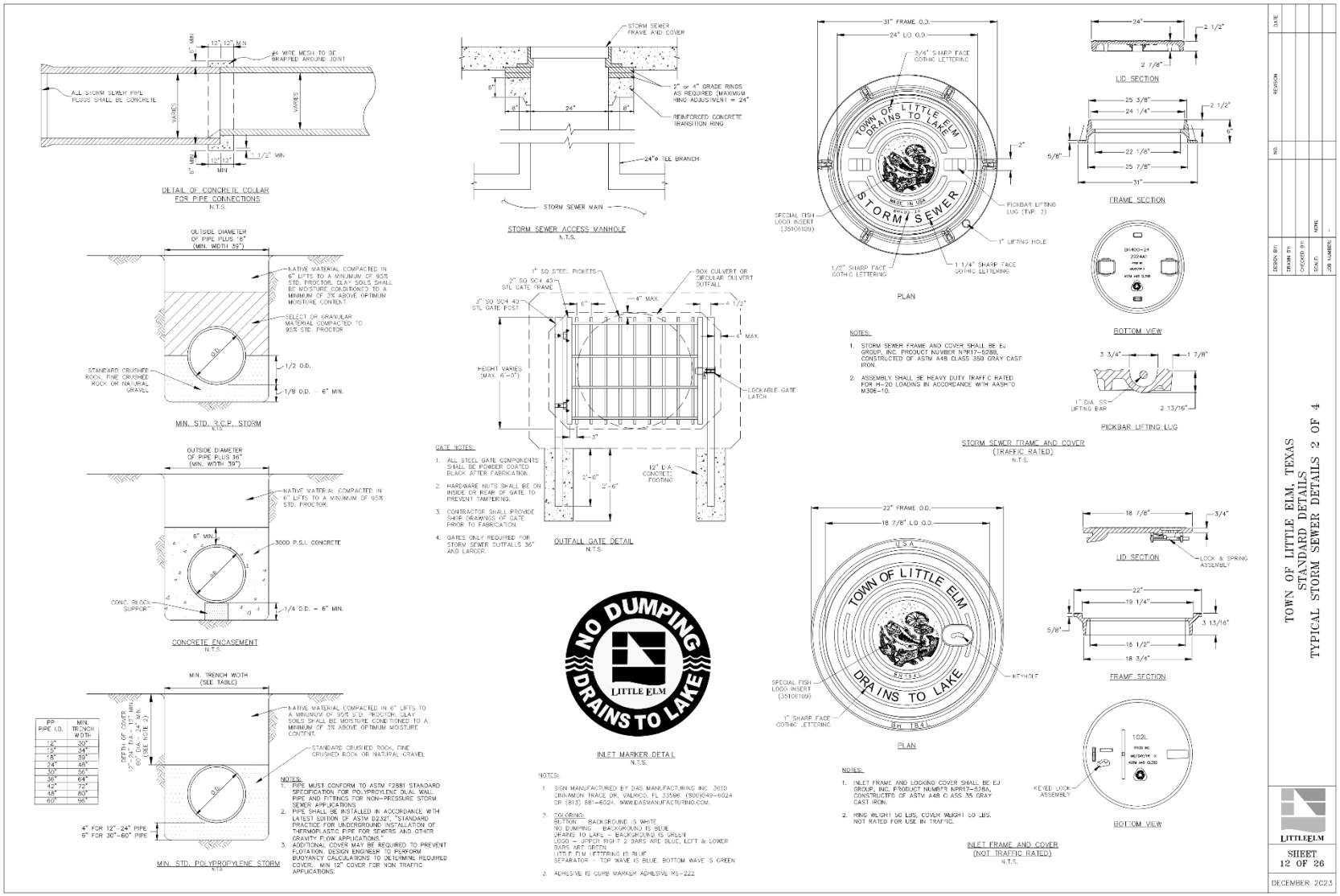
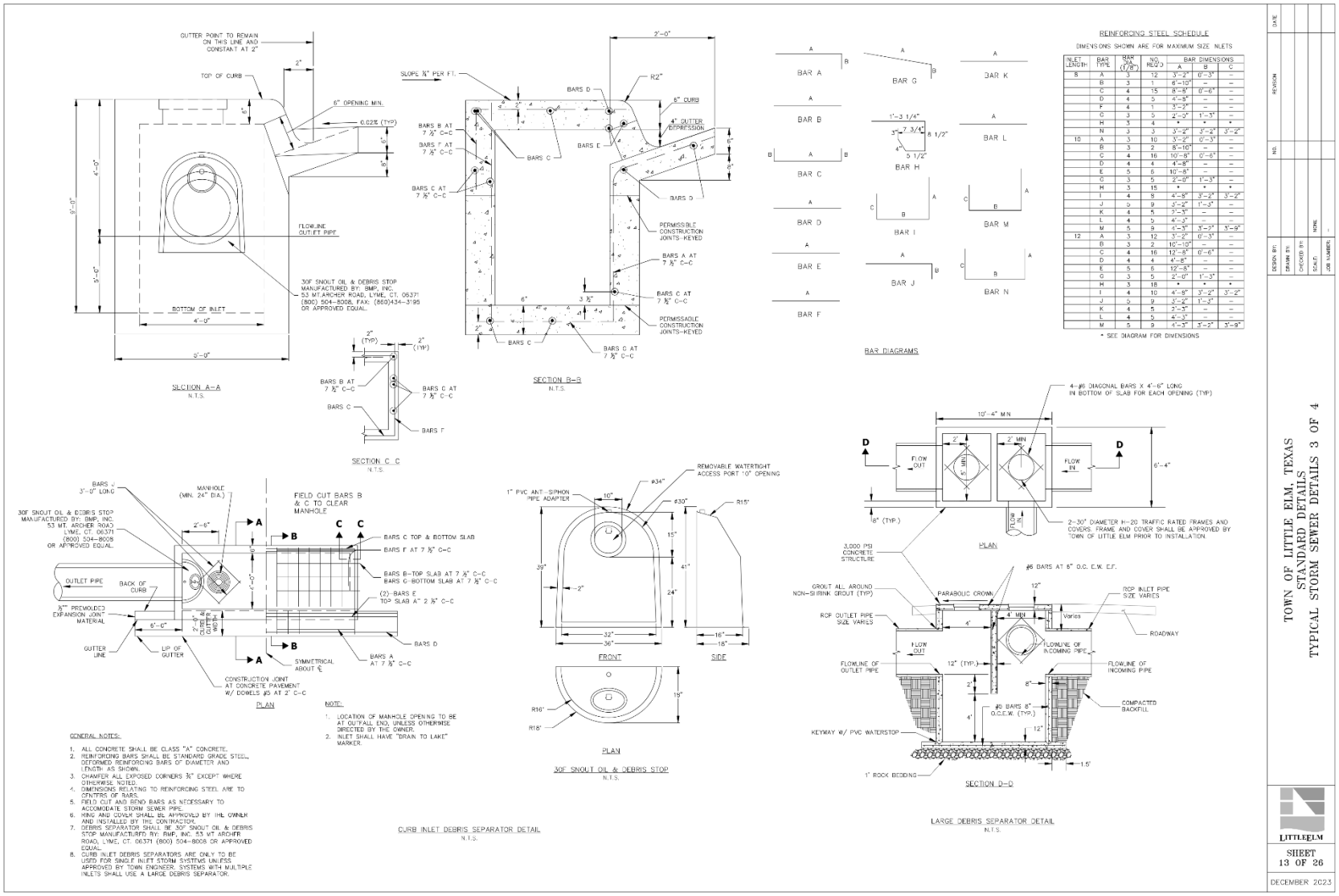
DECEMBER 2023


PLAN – RECESSED INLET
PLAN – STANDARD INLETS
FACE OF CURB
WARP PAVEMENT SURFACE TO THROAT OF INLET.
INLET FRAME
PILASTER–10 AND 12 FOOT INLETS ONLY
(LOCATE ON END AT PIPE)
INLET OPENING = L
VARIABLE HEIGHT CURB
PILASTER– 10 AND 12 FOOT INLETS ONLY
PIPE MAY BE PLACED IN ANY WALL, BUT SHALL NOT ENTER ANY CORNER, OR AT PILASTER
SECTION A–A: RECESSED AND STANDARD INLETS
8, 10, AND 12 FOOT INLETS
N.T.S.
BAR A
BAR B
BAR C
BAR D
BAR E
BAR F
BAR G
BAR H
BAR I
BAR J
BAR K
BAR L
BAR M
BAR N
BAR DIAGRAMS
REINFORCING STEEL SCHEDULE
DIMENSIONS SHOWN ARE FOR MAXIMUM SIZE INLETS
INLET LENGTH | BAR TYPE | BAR DIA (1/8") | NO. REQ'D | BAR DIMENSIONS A | B | C
8 | A | 3 | 12 | 3'–2" | 0'–3" | –
B | 3 | 1 | 6'–10" | – | –
C | 4 | 15 | 8'–8" | 0'–6" | –
D | 4 | 5 | 4'–8" | – | –
F | 4 | 1 | 3'–2" | – | –
G | 3 | 5 | 2'–0" | 1'–3" | –
H | 3 | * | * | * | *
N | 3 | 3 | 3'–2" | 3'–2" | 3'–2"
10 | A | 3 | 10 | 3'–2" | 0'–3" | –
B | 3 | 2 | 8'–10" | – | –
C | 4 | 16 | 10'–8" | 0'–6" | –
D | 4 | 4 | 4'–8" | – | –
E | 5 | 6 | 10'–8" | – | –
G | 3 | 5 | 2'–0" | 1'–3" | –
H | 3 | * | * | * | *
I | 4 | 8 | 4'–8" | 3'–2" | 3'–2"
J | 5 | 9 | 3'–2" | 1'–3" | –
K | 4 | 5 | 2'–3" | – | –
L | 4 | 5 | 4'–3" | – | –
M | 5 | 9 | 4'–3" | 3'–2" | 3'–9"
12 | A | 3 | 12 | 3'–2" | 0'–3" | –
B | 3 | 2 | 10'–10" | – | –
C | 4 | 16 | 12'–8" | 0'–6" | –
D | 4 | 4 | 4'–8" | – | –
E | 5 | 6 | 12'–8" | – | –
G | 3 | 5 | 2'–0" | 1'–3" | –
H | 3 | * | * | * | *
I | 4 | 10 | 4'–8" | 3'–2" | 3'–2"
J | 5 | 9 | 3'–2" | 1'–3" | –
K | 4 | 5 | 2'–3" | – | –
L | 4 | 5 | 4'–3" | – | –
M | 5 | 9 | 4'–3" | 3'–2" | 3'–9"
* SEE DIAGRAM FOR DIMENSIONS
DETAIL E
DETAIL F
SECTION B–B
SECTION C–C
SECTION E–E (FOR 12 FOOT INLETS ONLY)
INLET REINFORCEMENT PLAN VIEW
DETAIL E
DETAIL F
8 FOOT INLETS
N.T.S.
10 AND 12 FOOT INLETS
N.T.S.
SECTION D–D (FOR 12 FOOT INLETS ONLY)
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 1 OF 4
LITTLE ELM
SHEET 11 OF 26
DECEMBER 2023


DETAIL OF CONCRETE COLLAR FOR PIPE CONNECTIONS
N.T.S.
STORM SEWER ACCESS MANHOLE
N.T.S.
MIN. STD. R.C.P. STORM
N.T.S.
CONCRETE ENCASEMENT
N.T.S.
MIN. STD. POLYPROPYLENE STORM
N.T.S.
OUTFALL GATE DETAIL
N.T.S.
INLET MARKER DETAIL
N.T.S.
PLAN
LID SECTION
FRAME SECTION
BOTTOM VIEW
PICKBAR LIFTING LUG
STORM SEWER FRAME AND COVER (TRAFFIC RATED)
N.T.S.
INLET FRAME AND COVER (NOT TRAFFIC RATED)
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 2 OF 4
LITTLE ELM
SHEET 12 OF 26
DECEMBER 2023


SECTION A–A
N.T.S.
SECTION B–B
N.T.S.
SECTION C C
N.T.S.
BAR DIAGRAMS
REINFORCING STEEL SCHEDULE
DIMENSIONS SHOWN ARE FOR MAXIMUM SIZE INLETS
* SEE DIAGRAM FOR DIMENSIONS
PLAN
FRONT
SIDE
30F SNOUT OIL & DEBRIS STOP
N.T.S.
CURB INLET DEBRIS SEPARATOR DETAIL
N.T.S.
SECTION D–D
LARGE DEBRIS SEPARATOR DETAIL
N.T.S.
GENERAL NOTES:
1. ALL CONCRETE SHALL BE CLASS "A" CONCRETE.
2. REINFORCING BARS SHALL BE STANDARD GRADE STEEL, DEFORMED REINFORCING BARS OF DIAMETER AND LENGTH AS SHOWN.
3. CHAMFER ALL EXPOSED CORNERS ¾" EXCEPT WHERE OTHERWISE NOTED.
4. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
5. FIELD CUT AND BEND BARS AS NECESSARY TO ACCOMODATE STORM SEWER PIPE.
6. KIND AND COVER SHALL BE APPROVED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
7. DEBRIS SEPARATOR SHALL BE 30F SNOUT OIL & DEBRIS STOP MANUFACTURED BY: BMP, INC. 53 MT ARCHER ROAD, LYME, CT. 06371 (800) 504-8008 OR APPROVED EQUAL.
8. CURB INLET DEBRIS SEPARATORS ARE ONLY TO BE USED FOR SINGLE INLET STORM SYSTEMS UNLESS APPROVED BY TOWN ENGINEER. SYSTEMS WITH MULTIPLE INLETS SHALL USE A LARGE DEBRIS SEPARATOR.
NOTE:
1. LOCATION OF MANHOLE OPENING TO BE AT OUTFALL END, UNLESS OTHERWISE DIRECTED BY THE OWNER.
2. INLET SHALL HAVE "DRAIN TO LAKE" MARKER.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 3 OF 4
LITTLE ELM
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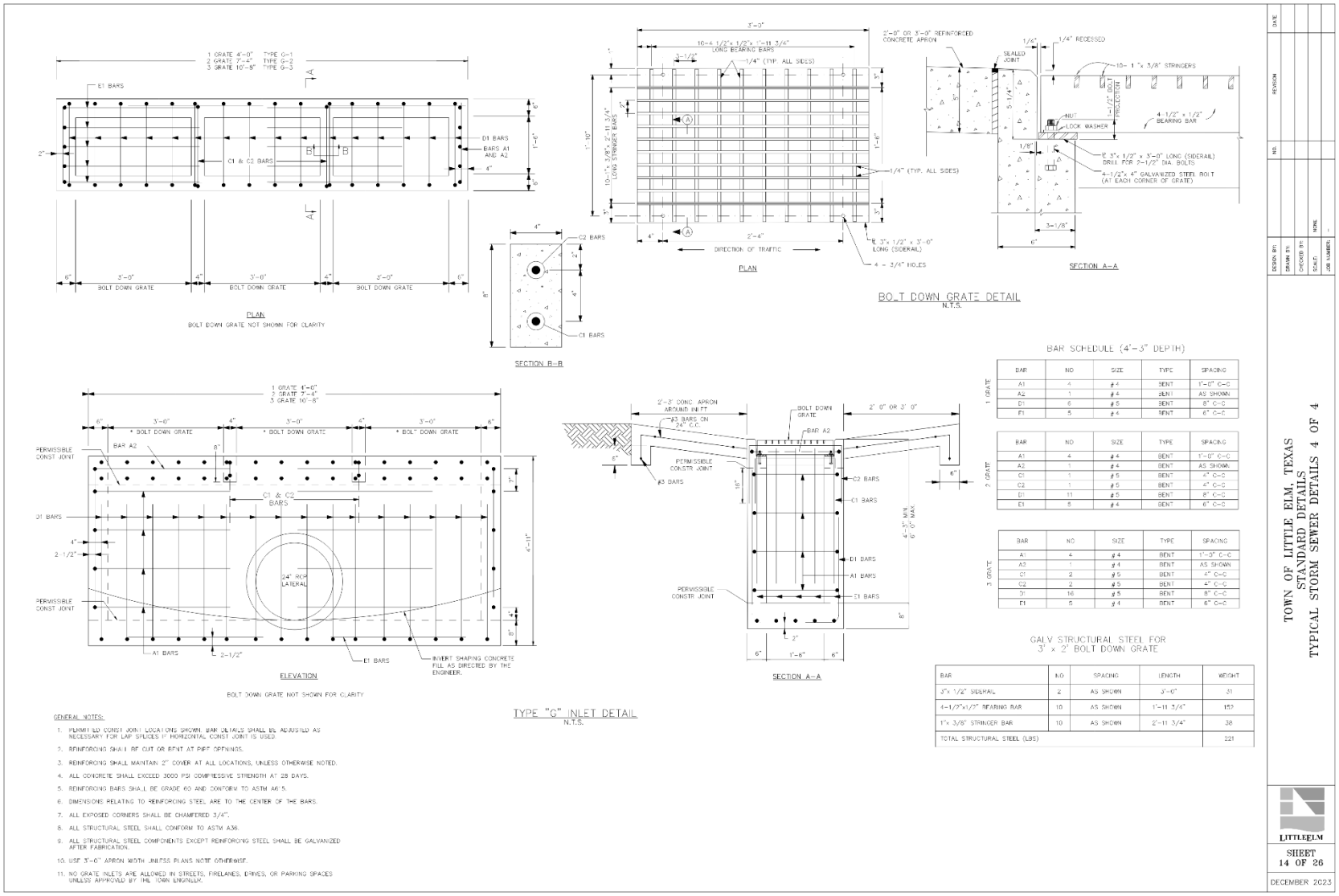

BAR SCHEDULE (4'-3" DEPTH)

1 GRATE

BAR	NO	SIZE	TYPE	SPACING
A1	4	# 4	BENT	1'-0" C-C
A2	1	# 4	BENT	AS SHOWN
D1	6	# 5	BENT	8" C-C
E1	5	# 4	BENT	6" C-C

2 GRATE

BAR	NO	SIZE	TYPE	SPACING
A1	4	# 4	BENT	1'-0" C-C
A2	1	# 4	BENT	AS SHOWN
C1	1	# 5	BENT	4" C-C
C2	1	# 5	BENT	4" C-C
D1	11	# 5	BENT	8" C-C
E1	5	# 4	BENT	6" C-C

3 GRATE

BAR	NO	SIZE	TYPE	SPACING
A1	4	# 4	BENT	1'-0" C-C
A2	1	# 4	BENT	AS SHOWN
C1	2	# 5	BENT	4" C-C
C2	2	# 5	BENT	4" C-C
D1	16	# 5	BENT	8" C-C
E1	5	# 4	BENT	6" C-C

GALV STRUCTURAL STEEL FOR 3' x 2' BOLT DOWN GRATE

BAR	NO	SPACING	LENGTH	WEIGHT
3"x 1/2" SIDERAIL	2	AS SHOWN	3'-0"	31
4-1/2"x1/2" BEARING BAR	10	AS SHOWN	1'-11 3/4"	153
1"x 3/8" STRINGER BAR	10	AS SHOWN	2'-11 3/4"	38
TOTAL STRUCTURAL STEEL (LBS)				221

GENERAL NOTES:

1. PERMITTED CONST JOINT LOCATIONS SHOWN. BAR DETAILS SHALL BE ADJUSTED AS NECESSARY FOR LAP SPLICES IF HORIZONTAL CONST JOINT IS USED.
2. REINFORCING SHALL BE CUT OR BENT AT PIPE OPENINGS.
3. REINFORCING SHALL MAINTAIN 2" COVER AT ALL LOCATIONS, UNLESS OTHERWISE NOTED.
4. ALL CONCRETE SHALL EXCEED 3000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
5. REINFORCING BARS SHALL BE GRADE 60 AND CONFORM TO ASTM A615.
6. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO THE CENTER OF THE BARS.
7. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
8. ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A36.
9. ALL STRUCTURAL STEEL COMPONENTS EXCEPT REINFORCING STEEL SHALL BE GALVANIZED AFTER FABRICATION.
10. USE 3'-0" APRON WIDTH UNLESS PLANS NOTE OTHERWISE.
11. NO GRATE INLETS ARE ALLOWED IN STREETS, FIRELANES, DRIVES, OR PARKING SPACES UNLESS APPROVED BY THE TOWN ENGINEER.

DATE | REVISION | NO. | DESIGN BY: | DRAWN BY: | CHECKED BY: | SCALE: NONE | JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 4 OF 4

LITTLE ELM

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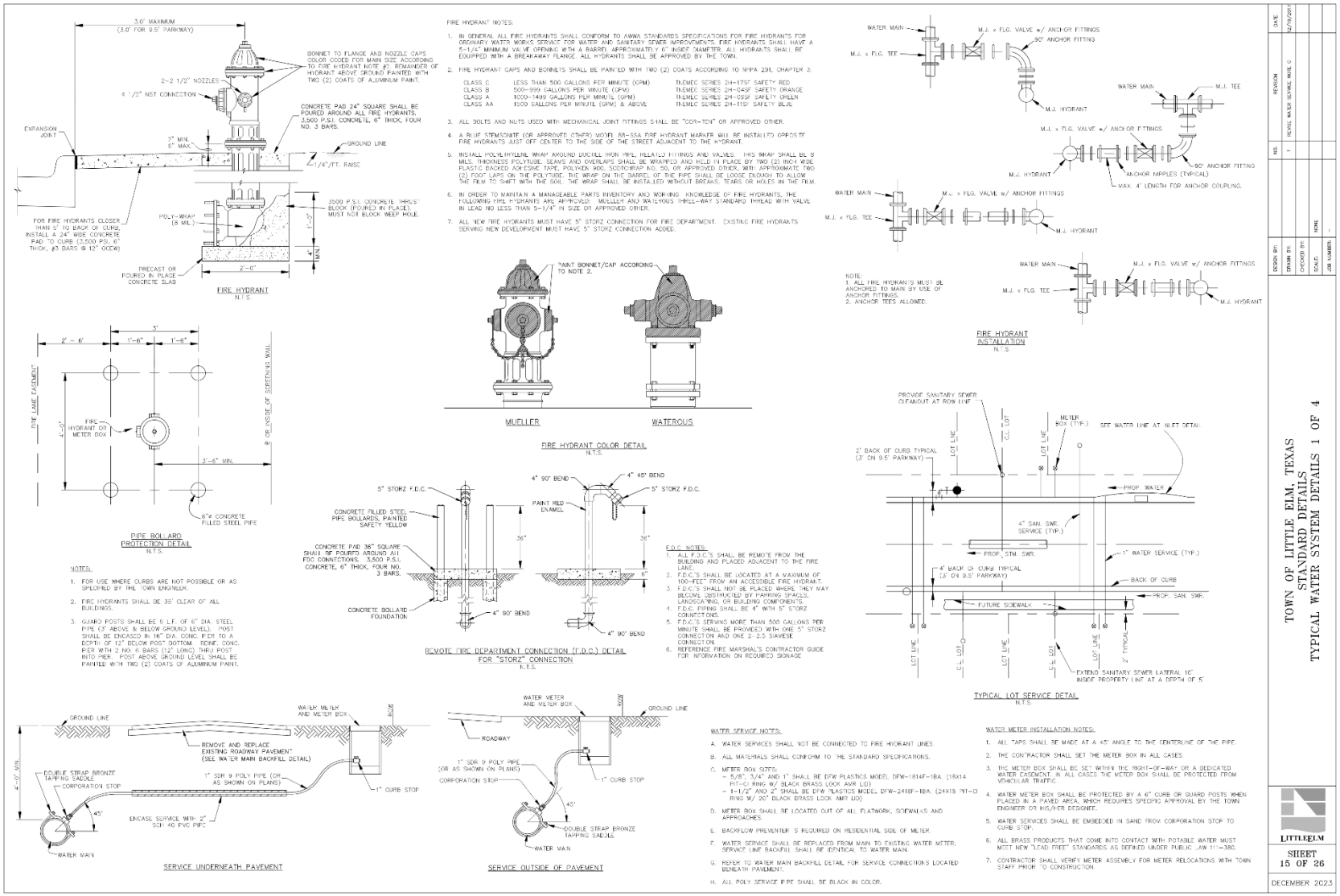
FIRE HYDRANT NOTES:
1. IN GENERAL, ALL FIRE HYDRANTS SHALL CONFORM TO AWWA STANDARDS SPECIFICATIONS FOR FIRE HYDRANTS FOR ORDINARY WATER WORKS SERVICE FOR WATER AND SANITARY SEWER IMPROVEMENTS. FIRE HYDRANTS SHALL HAVE A 5-1/4" MINIMUM VALVE OPENING WITH A BARREL APPROXIMATELY 6" INSIDE DIAMETER. ALL HYDRANTS SHALL BE EQUIPPED WITH A BREAKAWAY FLANGE. ALL HYDRANTS SHALL BE APPROVED BY THE TOWN.
2. FIRE HYDRANT CAPS AND BONNETS SHALL BE PAINTED WITH TWO (2) COATS ACCORDING TO NFPA 291, CHAPTER 3.
CLASS C LESS THAN 500 GALLONS PER MINUTE (GPM) TNEMEC SERIES 2H-1375" SAFETY RED
CLASS B 500~999 GALLONS PER MINUTE (GPM) TNEMEC SERIES 2H-04SF SAFETY ORANGE
CLASS A 1000~1499 GALLONS PER MINUTE (GPM) TNEMEC SERIES 2H-05SF SAFETY GREEN
CLASS AA 1500 GALLONS PER MINUTE (GPM) & ABOVE TNEMEC SERIES 2H-11SF SAFETY BLUE
3. ALL BOLTS AND NUTS USED WITH MECHANICAL JOINT FITTINGS SHALL BE "COR-TEN" OR APPROVED OTHER.
4. A BLUE STEMSONITE (OR APPROVED OTHER) MODEL 88-SSA PVC HYDRANT MARKER WILL BE INSTALLED OPPOSITE FIRE HYDRANTS JUST OFF CENTER TO THE SIDE OF THE STREET ADJACENT TO THE HYDRANT.
5. INSTALL POLYETHYLENE WRAP AROUND DUCTILE IRON PIPE, RELATED FITTINGS AND VALVES. THIS WRAP SHALL BE 8 MILS THICKNESS POLYTUBE, SEAMS AND OVERLAPS SHALL BE WRAPPED AND HELD IN PLACE BY TWO (2) INCH WIDE PLASTIC BACKED ADHESIVE TAPE, POLYKEN 900, SCOTCHWRAP NO. 50, OR APPROVED OTHER, WITH APPROXIMATE TWO (2) FOOT LAPS ON THE POLYTUBE. THE WRAP ON THE BARREL OF THE PIPE SHALL BE LOOSE ENOUGH TO ALLOW THE FILM TO SHIFT WITH THE SOIL. THE WRAP SHALL BE INSTALLED WITHOUT BREAKS, TEARS OR HOLES IN THE FILM.
6. IN ORDER TO MAINTAIN A MANAGEABLE PARTS INVENTORY AND WORKING KNOWLEDGE OF FIRE HYDRANTS, THE FOLLOWING FIRE HYDRANTS ARE APPROVED: MUELLER AND WATEROUS THREE-WAY STANDARD THREAD WITH VALVE IN LEAD NO LESS THAN 5-1/4" IN SIZE OR APPROVED OTHER.
7. ALL NEW FIRE HYDRANTS MUST HAVE 5" STORZ CONNECTION FOR FIRE DEPARTMENT. EXISTING FIRE HYDRANTS SERVING NEW DEVELOPMENT MUST HAVE 5" STORZ CONNECTION ADDED.
3.0' MAXIMUM (3.0' FOR 9.5' PARKWAY)
BONNET TO FLANGE AND NOZZLE CAPS COLOR CODED FOR MAIN SIZE ACCORDING TO FIRE HYDRANT NOTE #2. REMAINDER OF HYDRANT ABOVE GROUND PAINTED WITH TWO (2) COATS OF ALUMINUM PAINT.
2-2 1/2" NOZZLES
4 1/2" NST CONNECTION
CONCRETE PAD 24" SQUARE SHALL BE POURED AROUND ALL FIRE HYDRANTS, 3,500 P.S.I. CONCRETE, 6" THICK, FOUR NO. 3 BARS.
EXPANSION JOINT
3" MIN. 6" MAX.
GROUND LINE
2-1/4"/FT. RAISE
3500 P.S.I. CONCRETE THRUST BLOCK (POURED IN PLACE). MUST NOT BLOCK WEEP HOLE.
POLY-WRAP (8 MIL)
FOR FIRE HYDRANTS CLOSER THAN 5' TO BACK OF CURB, INSTALL A 24" WIDE CONCRETE PAD TO CURB (3,500 PSI, 6" THICK, #3 BARS @ 12" OCEW)
PRECAST OR POURED IN PLACE CONCRETE SLAB
FIRE HYDRANT
N.T.S.
PAINT BONNET/CAP ACCORDING TO NOTE 2.
MUELLER
WATEROUS
FIRE HYDRANT COLOR DETAIL
N.T.S.
WATER MAIN
M.J. x FLG. VALVE w/ ANCHOR FITTINGS
90° ANCHOR FITTING
M.J. x FLG. TEE
M.J. HYDRANT
M.J. TEE
ANCHOR NIPPLES (TYPICAL)
90° ANCHOR FITTING
MAX. 4' LENGTH FOR ANCHOR COUPLING.
NOTE:
1. ALL FIRE HYDRANTS MUST BE ANCHORED TO MAIN BY USE OF ANCHOR FITTINGS.
2. ANCHOR TEES ALLOWED.
FIRE HYDRANT INSTALLATION
N.T.S.
FIRE LANE EASEMENT
FIRE HYDRANT OR METER BOX
6"ø CONCRETE FILLED STEEL PIPE
PIPE BOLLARD PROTECTION DETAIL
N.T.S.
NOTES:
1. FOR USE WHERE CURBS ARE NOT POSSIBLE OR AS SPECIFIED BY THE TOWN ENGINEER.
2. FIRE HYDRANTS SHALL BE 35' CLEAR OF ALL BUILDINGS.
3. GUARD POSTS SHALL BE 6 L.F. OF 6" DIA. STEEL PIPE (3' ABOVE & BELOW GROUND LEVEL). POST SHALL BE ENCASED IN 16" DIA. CONC. PIER TO A DEPTH OF 12" BELOW POST BOTTOM. REINF. CONC. PIER WITH 2 NO. 6 BARS (12' LONG) THRU POST INTO PIER. POST ABOVE GROUND LEVEL SHALL BE PAINTED WITH TWO (2) COATS OF ALUMINUM PAINT.
5" STORZ F.D.C.
4" 90° BEND
4" 45° BEND
PAINT RED ENAMEL
CONCRETE FILLED STEEL PIPE BOLLARDS, PAINTED SAFETY YELLOW
CONCRETE PAD 36" SQUARE SHALL BE POURED AROUND ALL FDC CONNECTIONS. 3,500 P.S.I. CONCRETE, 6" THICK, FOUR NO. 3 BARS.
CONCRETE BOLLARD FOUNDATION
REMOTE FIRE DEPARTMENT CONNECTION (F.D.C.) DETAIL FOR "STORZ" CONNECTION
N.T.S.
F.D.C. NOTES:
1. ALL F.D.C.'S SHALL BE REMOTE FROM THE BUILDING AND PLACED ADJACENT TO THE FIRE LANE.
2. F.D.C.'S SHALL BE LOCATED AT A MAXIMUM OF 100-FEET FROM AN ACCESSIBLE FIRE HYDRANT.
3. F.D.C.'S SHALL NOT BE PLACED WHERE THEY MAY BECOME OBSTRUCTED BY PARKING SPACES, LANDSCAPING, OR BUILDING COMPONENTS.
4. F.D.C. PIPING SHALL BE 4" WITH 5" STORZ CONNECTIONS.
5. F.D.C.'S SERVING MORE THAN 500 GALLONS PER MINUTE SHALL BE PROVIDED WITH ONE 5" STORZ CONNECTION AND ONE 2-2.5 SIAMESE CONNECTION.
6. REFERENCE FIRE MARSHAL'S CONTRACTOR GUIDE FOR INFORMATION ON REQUIRED SIGNAGE
PROVIDE SANITARY SEWER CLEANOUT AT ROW LINE
METER BOX (TYP.)
SEE WATER LINE AT MUET DETAIL
2' BACK OF CURB TYPICAL (3' ON 9.5' PARKWAY)
LOT LINE
C.L. LOT
PROP. WATER
4" SAN. SWR. SERVICE (TYP.)
PROP. STM. SWR.
1" WATER SERVICE (TYP.)
4' BACK OF CURB TYPICAL (3' ON 9.5' PARKWAY)
BACK OF CURB
PROP. SAN. SWR.
FUTURE SIDEWALK
2' TYPICAL
EXTEND SANITARY SEWER LATERAL 10' INSIDE PROPERTY LINE AT A DEPTH OF 5'
TYPICAL LOT SERVICE DETAIL
N.T.S.
GROUND LINE
WATER METER AND METER BOX
REMOVE AND REPLACE EXISTING ROADWAY PAVEMENT (SEE WATER MAIN BACKFILL DETAIL)
DOUBLE STRAP BRONZE TAPPING SADDLE
CORPORATION STOP
1" SDR 9 POLY PIPE (OR AS SHOWN ON PLANS)
1" CURB STOP
45°
ENCASE SERVICE WITH 2" SCH 40 PVC PIPE
WATER MAIN
SERVICE UNDERNEATH PAVEMENT
ROADWAY
SERVICE OUTSIDE OF PAVEMENT
WATER SERVICE NOTES:
A. WATER SERVICES SHALL NOT BE CONNECTED TO FIRE HYDRANT LINES.
B. ALL MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS.
C. METER BOX SIZES:
– 5/8", 3/4" AND 1" SHALL BE DFW PLASTICS MODEL DFW-1814F-1BA. (18X14 PIT-O RING W/ BLACK BRASS LOCK AMR LID)
– 1-1/2" AND 2" SHALL BE DFW PLASTICS MODEL DFW-2418F-1BA. (24X18 PIT-O RING W/ 20" BLACK BRASS LOCK AMR LID)
D. METER BOX SHALL BE LOCATED OUT OF ALL FLATWORK, SIDEWALKS AND APPROACHES.
E. BACKFLOW PREVENTER IS REQUIRED ON RESIDENTIAL SIDE OF METER.
F. WATER SERVICE SHALL BE REPLACED FROM MAIN TO EXISTING WATER METER. SERVICE LINE BACKFILL SHALL BE IDENTICAL TO WATER MAIN.
G. REFER TO WATER MAIN BACKFILL DETAIL FOR SERVICE CONNECTIONS LOCATED BENEATH PAVEMENT.
H. ALL POLY SERVICE PIPE SHALL BE BLACK IN COLOR.
WATER METER INSTALLATION NOTES:
1. ALL TAPS SHALL BE MADE AT A 45° ANGLE TO THE CENTERLINE OF THE PIPE.
2. THE CONTRACTOR SHALL SET THE METER BOX IN ALL CASES.
3. THE METER BOX SHALL BE SET WITHIN THE RIGHT-OF-WAY OR A DEDICATED WATER EASEMENT. IN ALL CASES THE METER BOX SHALL BE PROTECTED FROM VEHICULAR TRAFFIC.
4. WATER METER BOX SHALL BE PROTECTED BY A 6" CURB OR GUARD POSTS WHEN PLACED IN A PAVED AREA, WHICH REQUIRES SPECIFIC APPROVAL BY THE TOWN ENGINEER OR HIS/HER DESIGNEE.
5. WATER SERVICES SHALL BE EMBEDDED IN SAND FROM CORPORATION STOP TO CURB STOP.
6. ALL BRASS PRODUCTS THAT COME INTO CONTACT WITH POTABLE WATER MUST MEET NEW "LEAD FREE" STANDARDS AS DEFINED UNDER PUBLIC LAW 111-380.
7. CONTRACTOR SHALL VERIFY METER ASSEMBLY FOR METER RELOCATIONS WITH TOWN STAFF PRIOR TO CONSTRUCTION.
DATE
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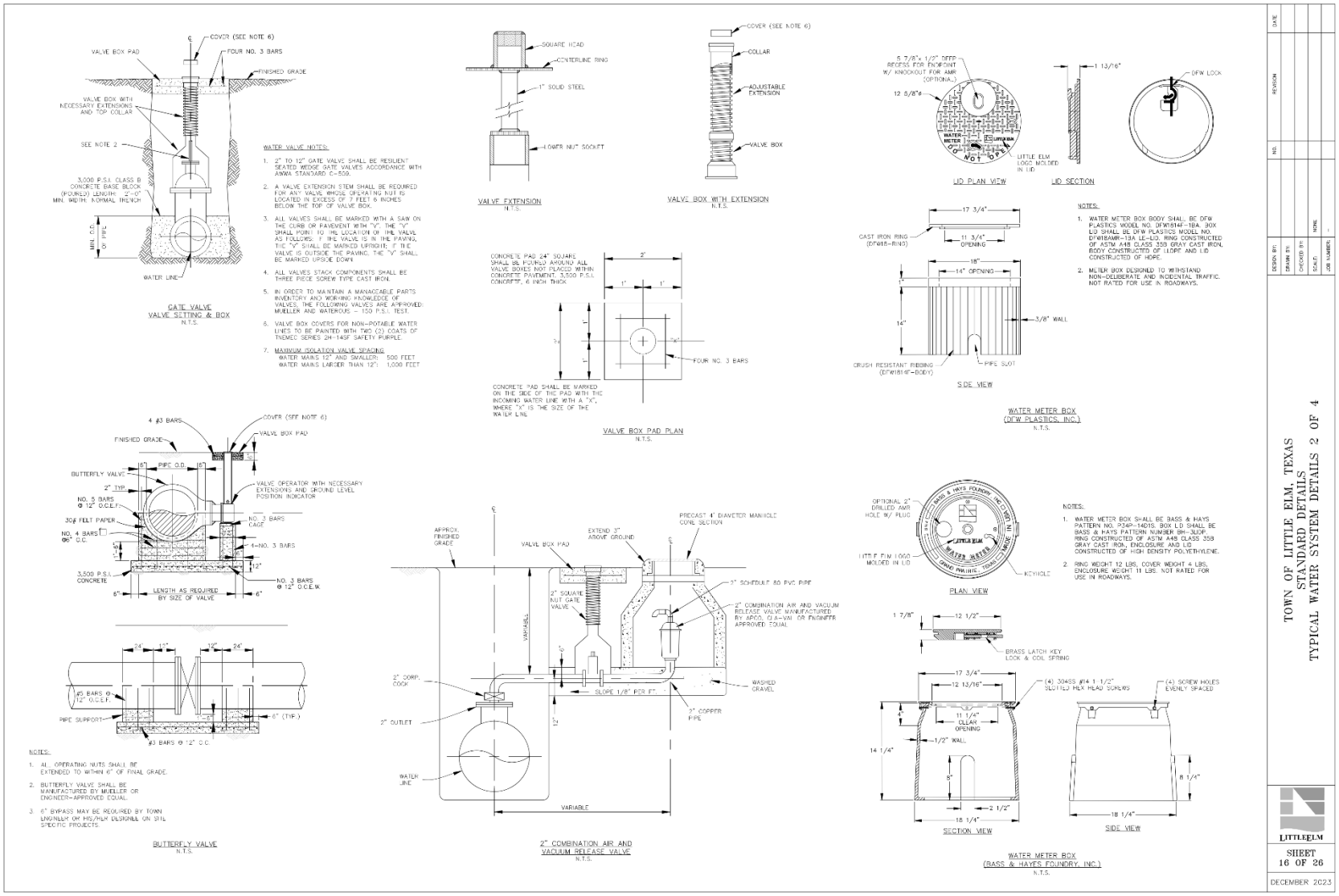
COVER (SEE NOTE 6)
VALVE BOX PAD
FOUR NO. 3 BARS
FINISHED GRADE
VALVE BOX WITH NECESSARY EXTENSIONS AND TOP COLLAR
SEE NOTE 2
3,500 P.S.I. CLASS B CONCRETE BASE BLOCK (POURED) LENGTH: 2'-0" MIN. WIDTH: NORMAL TRENCH
MIN. O.D. OF PIPE
WATER LINE
GATE VALVE VALVE SETTING & BOX
N.T.S.
WATER VALVE NOTES:
1. 2" TO 12" GATE VALVE SHALL BE RESILIENT SEATED WEDGE GATE VALVES ACCORDANCE WITH AWWA STANDARD C-509.
2. A VALVE EXTENSION STEM SHALL BE REQUIRED FOR ANY VALVE WHOSE OPERATING NUT IS LOCATED IN EXCESS OF 7 FEET 6 INCHES BELOW THE TOP OF VALVE BOX.
3. ALL VALVES SHALL BE MARKED WITH A SAW ON THE CURB OR PAVEMENT WITH "V". THE "V" SHALL POINT TO THE LOCATION OF THE VALVE AS FOLLOWS: IF THE VALVE IS IN THE PAVING, THE "V" SHALL BE MARKED UPRIGHT; IF THE VALVE IS OUTSIDE THE PAVING, THE "V" SHALL BE MARKED UPSIDE DOWN.
4. ALL VALVES STACK COMPONENTS SHALL BE THREE PIECE SCREW TYPE CAST IRON.
5. IN ORDER TO MAINTAIN A MANAGEABLE PARTS INVENTORY AND WORKING KNOWLEDGE OF VALVES, THE FOLLOWING VALVES ARE APPROVED: MUELLER AND WATEROUS – 150 P.S.I. TEST.
6. VALVE BOX COVERS FOR NON-POTABLE WATER LINES TO BE PAINTED WITH TWO (2) COATS OF TNEMEC SERIES 2H-1439F SAFETY PURPLE.
7. MAXIMUM ISOLATION VALVE SPACING
WATER MAINS 12" AND SMALLER: 500 FEET
WATER MAINS LARGER THAN 12": 1,000 FEET
SQUARE HEAD
CENTERLINE RING
1" SOLID STEEL
LOWER NUT SOCKET
VALVE EXTENSION
N.T.S.
COVER (SEE NOTE 6)
COLLAR
ADJUSTABLE EXTENSION
VALVE BOX
VALVE BOX WITH EXTENSION
N.T.S.
2" CONCRETE PAD 24" SQUARE SHALL BE POURED AROUND ALL VALVE BOXES NOT PLACED WITHIN CONCRETE PAVEMENT, 3,500 P.S.I. CONCRETE, 6 INCH THICK
FOUR NO. 3 BARS
CONCRETE PAD SHALL BE MARKED ON THE SIDE OF THE PAD WITH THE INCOMING WATER LINE WITH A "X", WHERE "X" IS THE SIZE OF THE WATER LINE
VALVE BOX PAD PLAN
N.T.S.
2 7/8"x 1/2" DEEP RECESS FOR ENGRAVING W/ KNOCKOUT FOR AMR (OPTIONAL)
12 5/8"ø
LITTLE ELM LOGO MOLDED IN LID
1 13/16"
DFW LOCK
LID PLAN VIEW
LID SECTION
17 3/4"
CAST IRON RING (DFW18-RING)
11 3/4" OPENING
18"
14" OPENING
14"
3/8" WALL
CRUSH RESISTANT RIBBING (DFW1814F-BODY)
PIPE SLOT
SIDE VIEW
WATER METER BOX (DFW PLASTICS, INC.)
N.T.S.
NOTES:
1. WATER METER BOX BODY SHALL BE DFW PLASTICS MODEL NO. DFW1814F-1BA. BOX LID SHALL BE DFW PLASTICS MODEL NO. DFW18AMR-13A LE-LID. RING CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON. BODY CONSTRUCTED OF ULDPE AND LID CONSTRUCTED OF HDPE.
2. METER BOX DESIGNED TO WITHSTAND NON-DELIBERATE AND INCIDENTAL TRAFFIC. NOT RATED FOR USE IN ROADWAYS.
4 #3 BARS
COVER (SEE NOTE 6)
FINISHED GRADE
VALVE BOX PAD
8" PIPE O.D.
6"
BUTTERFLY VALVE
2" TYP.
VALVE OPERATOR WITH NECESSARY EXTENSIONS AND GROUND LEVEL POSITION INDICATOR
NO. 5 BARS @ 12" O.C.E.F.
NO. 3 BARS CAGE
30# FELT PAPER
NO. 4 BARS @6" O.C.
4-NO. 3 BARS
12"
3,500 P.S.I. CONCRETE
NO. 3 BARS @ 12" O.C.E.W.
6"
LENGTH AS REQUIRED BY SIZE OF VALVE
24"
12"
12"
24"
#5 BARS @ 12" O.C.E.F.
PIPE SUPPORT
6" (TYP.)
#3 BARS @ 12" O.C.
NOTES:
1. ALL OPERATING NUTS SHALL BE EXTENDED TO WITHIN 6" OF FINAL GRADE.
2. BUTTERFLY VALVE SHALL BE MANUFACTURED BY MUELLER OR ENGINEER-APPROVED EQUAL.
3. 6" BYPASS MAY BE REQUIRED BY TOWN UNIVERSALLY OR HIS/HER DESIGNEE ON SPILL SPECIFIC PROJECTS.
BUTTERFLY VALVE
N.T.S.
APPROX. FINISHED GRADE
VALVE BOX PAD
EXTEND 3" ABOVE GROUND
PRECAST 4' DIAMETER MANHOLE CORE SECTION
3" SCHEDULE 80 PVC PIPE
2" COMBINATION AIR AND VACUUM RELEASE VALVE MANUFACTURED BY APCO, CLA-VAL OR ENGINEER APPROVED EQUAL
2" SQUARE NUT GATE VALVE
VARIABLE
2" CORP. COCK
2" OUTLET
WATER LINE
SLOPE 1/8" PER FT.
WASHED GRAVEL
3" COPPER PIPE
VARIABLE
2" COMBINATION AIR AND VACUUM RELEASE VALVE
N.T.S.
OPTIONAL 2" DRILLED AMR HOLE W/ PLUG
LITTLE ELM LOGO MOLDED IN LID
KEYHOLE
PLAN VIEW
NOTES:
1. WATER METER BOX SHALL BE BASS & HAYS PATTERN NO. P34P-1401S. BOX LID SHALL BE BASS & HAYS PATTERN NUMBER 8H-3LIDP. RING CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON. ENCLOSURE AND LID CONSTRUCTED OF HIGH DENSITY POLYETHYLENE.
2. RING WEIGHT 12 LBS, COVER WEIGHT 4 LBS, ENCLOSURE WEIGHT 11 LBS. NOT RATED FOR USE IN ROADWAYS.
1 7/8"
12 1/2"
BRASS LATCH KEY LOCK & COIL SPRING
17 3/4"
12 13/16"
(4) 304SS #14 1 1/2" SLOTTED HEX HEAD SCREWS
(4) SCREW HOLES EVENLY SPACED
11 1/4" CLEAR OPENING
1/2" WALL
14 1/4"
5"
2 1/2"
18 1/4"
SECTION VIEW
8 1/4"
18 1/4"
SIDE VIEW
WATER METER BOX (BASS & HAYS FOUNDRY, INC.)
N.T.S.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
KHMG
JOB NUMBER:
TOWN OF LITTLE ELM, TEXAS
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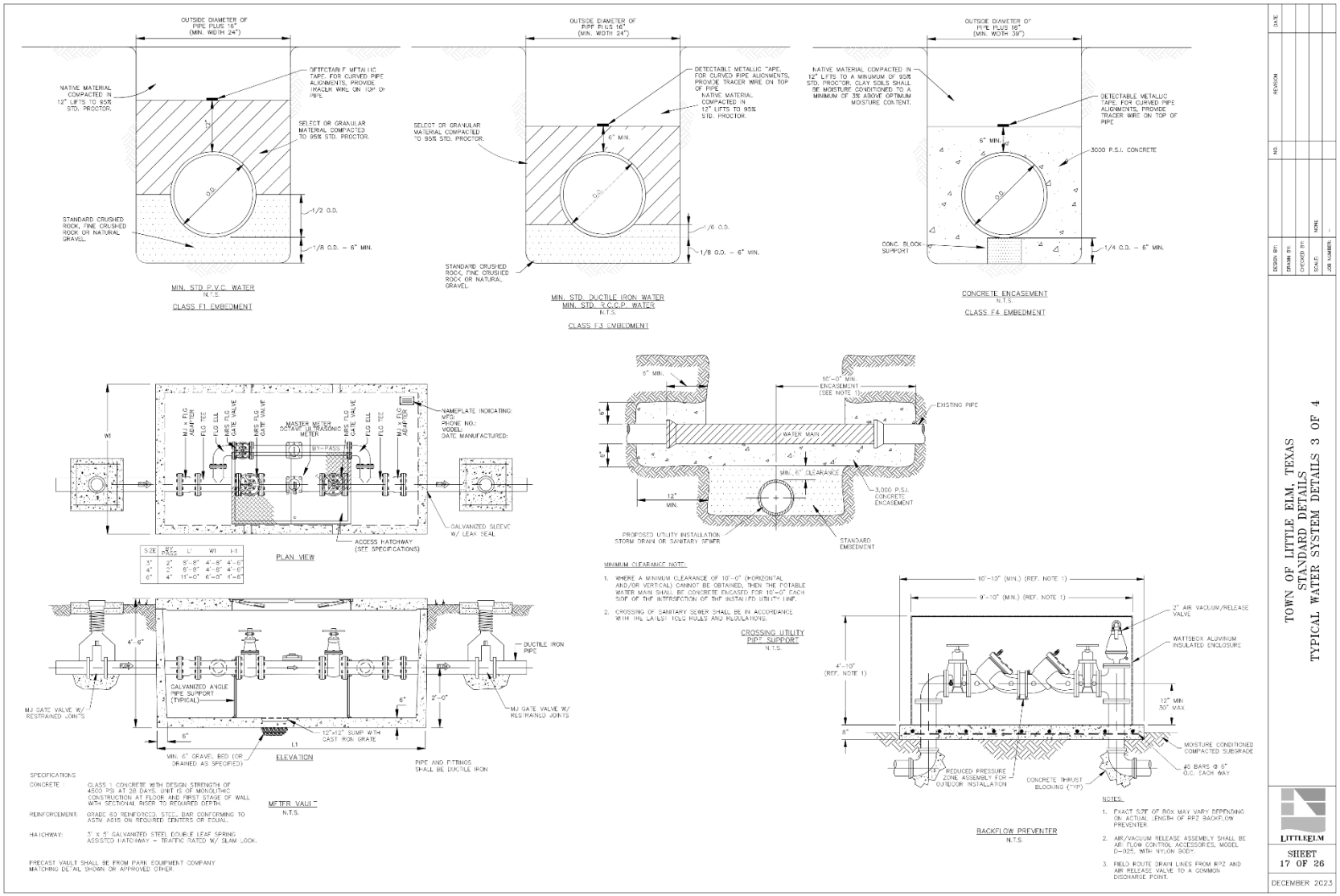
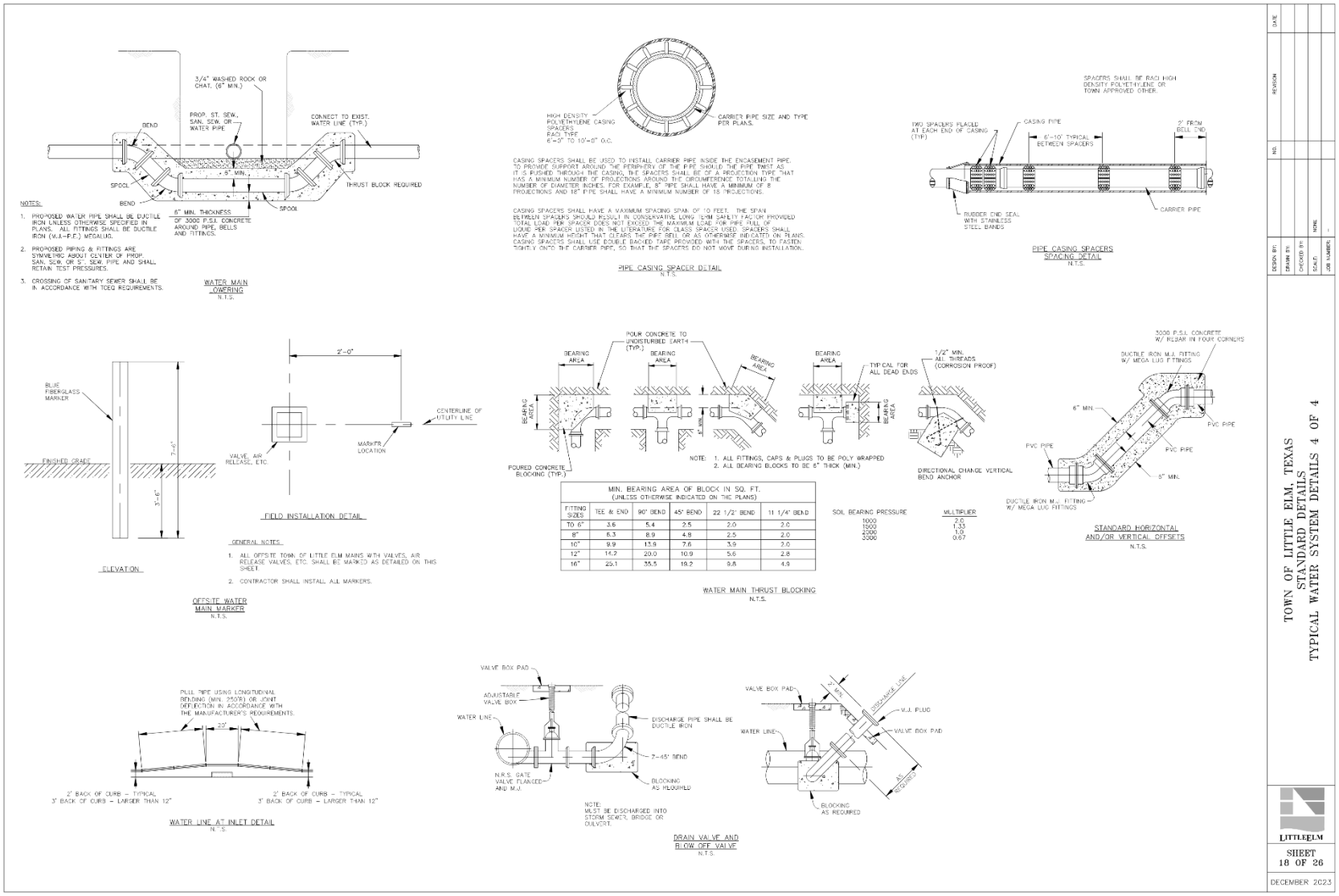
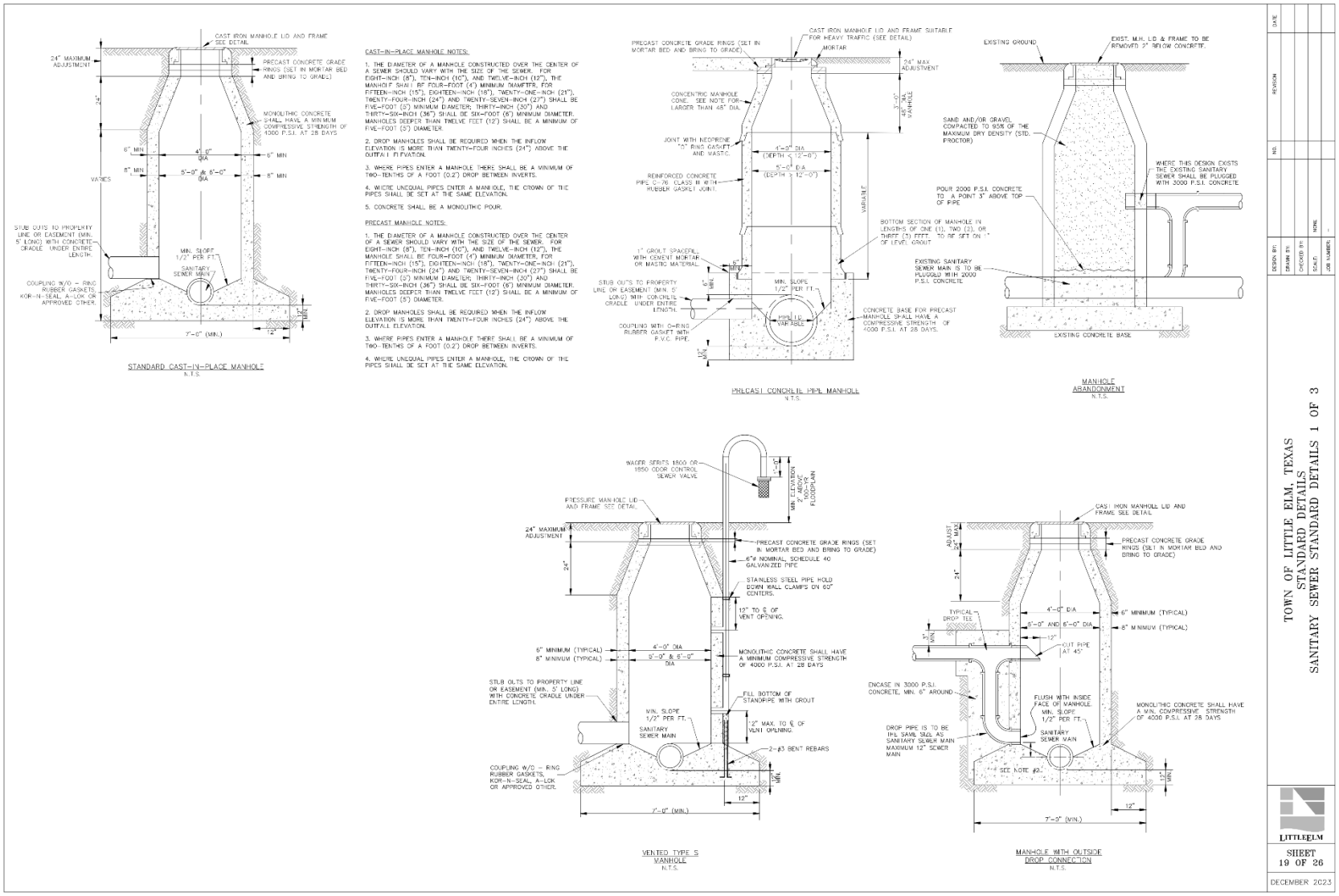
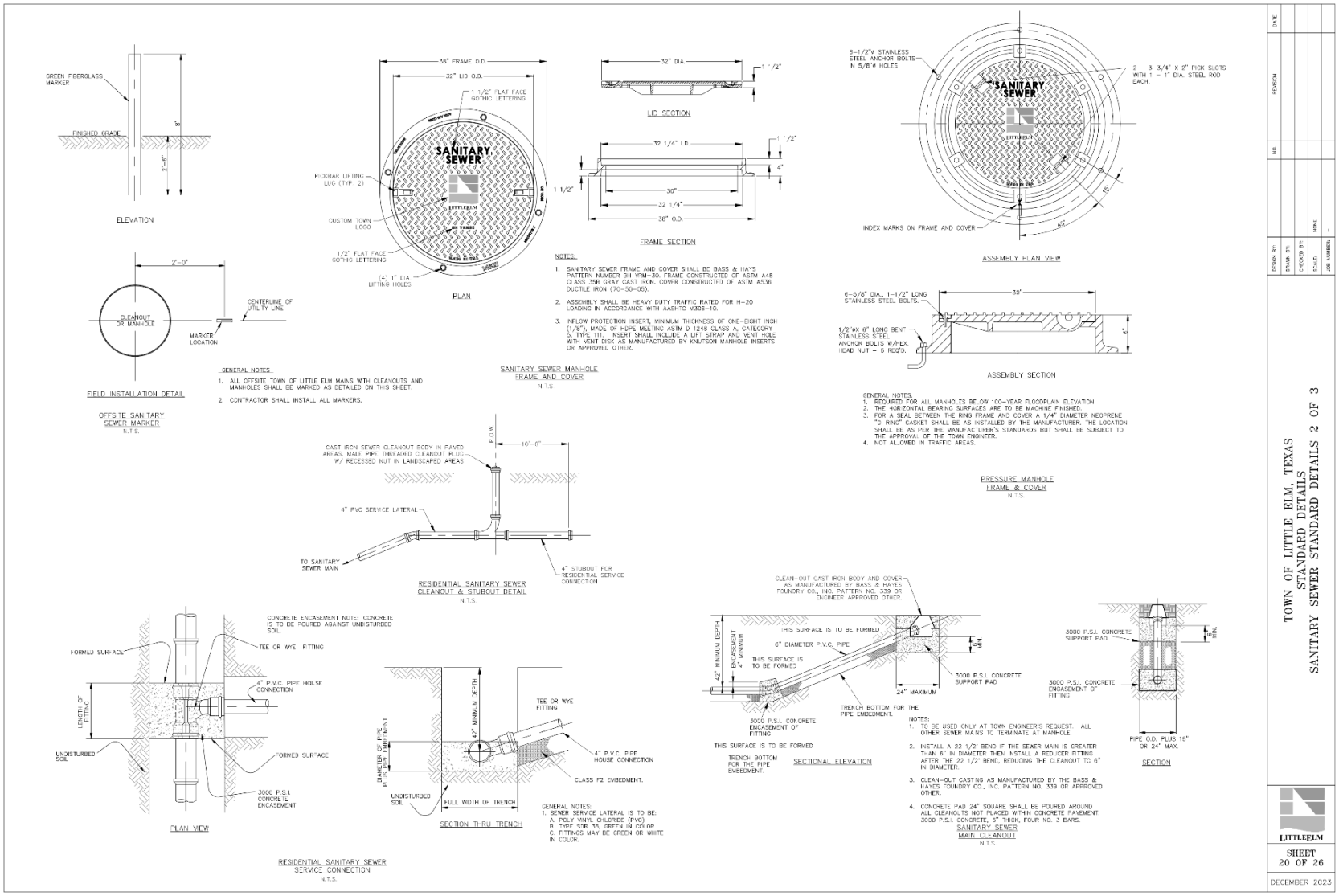
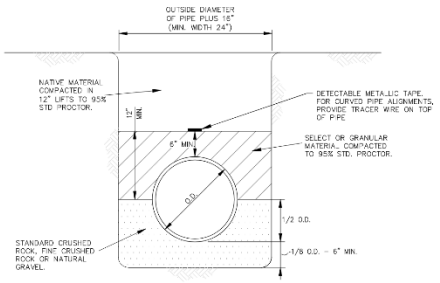

OUTSIDE DIAMETER OF PIPE PLUS 16" (MIN. WIDTH 24")
NATIVE MATERIAL COMPACTED IN 12" LIFTS TO 95% STD. PROCTOR.
DETECTABLE METALLIC TAPE, FOR CURVED PIPE ALIGNMENTS, PROVIDE TRACER WIRE ON TOP OF PIPE
SELECT OR GRANULAR MATERIAL COMPACTED TO 95% STD. PROCTOR.
STANDARD CRUSHED ROCK, FINE CRUSHED ROCK OR NATURAL GRAVEL.
1/2 O.D.
1/8 O.D. – 6" MIN.
MIN. STD P.V.C. WATER
N.T.S.
CLASS F1 EMBEDMENT
6" MIN.
1/6 O.D.
MIN. STD. DUCTILE IRON WATER
MIN. STD. R.C.C.P. WATER
CLASS F3 EMBEDMENT
NATIVE MATERIAL COMPACTED IN 12" LIFTS TO A MINIMUM OF 95% STD. PROCTOR. CLAY SOILS SHALL BE MOISTURE CONDITIONED TO A MINIMUM OF 3% ABOVE OPTIMUM MOISTURE CONTENT.
3000 P.S.I. CONCRETE
CONC. BLOCK SUPPORT
1/4 O.D. – 6" MIN.
CONCRETE ENCASEMENT
CLASS F4 EMBEDMENT
MASTER METER OCTAVE NEPTUNE METRASONIC METER
BY-PASS
NAMEPLATE INDICATING: MFR: PHONE NO.: MODEL: DATE MANUFACTURED:
GALVANIZED SLEEVE W/ LEAK SEAL
ACCESS HATCHWAY (SEE SPECIFICATIONS)
PLAN VIEW
WATER MAIN
EXISTING PIPE
MIN. 6" CLEARANCE
3,000 P.S.I. CONCRETE ENCASEMENT
PROPOSED UTILITY INSTALLATION STORM DRAIN OR SANITARY SEWER
STANDARD EMBEDMENT
MINIMUM CLEARANCE NOTE:
1. WHERE A MINIMUM CLEARANCE OF 10'-0" (HORIZONTAL AND/OR VERTICAL) CANNOT BE OBTAINED, THEN THE POTABLE WATER MAIN SHALL BE CONCRETE ENCASED FOR 10'-0" EACH SIDE OF THE INTERSECTION OF THE INSTALLED UTILITY LINE.
2. CROSSING OF SANITARY SEWER SHALL BE IN ACCORDANCE WITH TNRCC RULES AND REGULATIONS.
CROSSING UTILITY PIPE SUPPORT
N.T.S.
GALVANIZED ANGLE PIPE SUPPORT (TYPICAL)
DUCTILE IRON PIPE
MJ GATE VALVE W/ RESTRAINED JOINTS
12"x12" SUMP WITH CAST IRON GRATE
MIN. 6" GRAVEL BED (OR DRAINED AS SPECIFIED)
ELEVATION
PIPE AND FITTINGS SHALL BE DUCTILE IRON
SPECIFICATIONS:
CONCRETE: CLASS 'A' CONCRETE WITH DESIGN STRENGTH OF 4500 PSI AT 28 DAYS. UNIT IS OF MONOLITHIC CONSTRUCTION AT FLOOR AND FIRST STAGE OF WALL WITH SECTIONAL RISER TO REQUIRED DEPTH.
REINFORCEMENT: GRADE 60 REINFORCED STEEL BAR CONFORMING TO ASTM A615 ON REQUIRED CENTERS OR EQUAL.
HATCHWAY: 3' X 5' GALVANIZED STEEL DOUBLE LEAF SPRING ASSISTED HATCHWAY – TRAFFIC RATED W/ SLAM LOCK.
PRECAST VAULT SHALL BE FROM PARK EQUIPMENT COMPANY MATCHING DETAIL SHOWN OR APPROVED OTHER.
METER VAULT
N.T.S.
10'-10" (MIN.) (REF. NOTE 1)
9'-10" (MIN.) (REF. NOTE 1)
2" AIR VACUUM/RELEASE VALVE
WATTSBOX ALUMINUM INSULATED ENCLOSURE
4'-10" (REF. NOTE 1)
12" MIN 30" MAX
MOISTURE CONDITIONED COMPACTED SUBGRADE
#5 BARS @ 6" O.C. EACH WAY
REDUCED PRESSURE ZONE ASSEMBLY FOR OUTDOOR INSTALLATION
CONCRETE THRUST BLOCKING (TYP)
NOTES:
1. EXACT SIZE OF BOX MAY VARY DEPENDING ON ACTUAL LENGTH OF RPZ BACKFLOW PREVENTER
2. AIR/VACUUM RELEASE ASSEMBLY SHALL BE AIR FLOW CONTROL ACCESSORIES, MODEL D-025, WITH NYLON BODY.
3. FIELD ROUTE DRAIN LINES FROM RPZ AND AIR RELEASE VALVE TO A COMMON DISCHARGE POINT.
BACKFLOW PREVENTER
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 3 OF 4
LITTLEELM
SHEET 17 OF 26
DECEMBER 2023

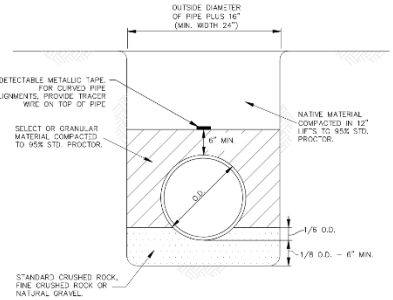

3/4" WASHED ROCK OR CHAT, (6" MIN.)
PROP. ST. SEW., SAN. SEW. OR WATER PIPE
CONNECT TO EXIST. WATER LINE (TYP.)
BEND
SPOOL
6" MIN.
THRUST BLOCK REQUIRED
BEND
SPOOL
6" MIN. THICKNESS OF 3000 P.S.I. CONCRETE AROUND PIPE, BELLS AND FITTINGS.
NOTES:
1. PROPOSED WATER PIPE SHALL BE DUCTILE IRON UNLESS OTHERWISE SPECIFIED IN PLANS. ALL FITTINGS SHALL BE DUCTILE IRON (M.J.-P.E.) MEGALUG.
2. PROPOSED PIPING & FITTINGS ARE SYMMETRIC ABOUT CENTER OF PROP. SAN. SEW. OR S". SEW. PIPE AND SHALL RETAIN TEST PRESSURES.
3. CROSSING OF SANITARY SEWER SHALL BE IN ACCORDANCE WITH TCEQ REQUIREMENTS.
WATER MAIN CWERING
N.T.S.
HIGH DENSITY POLYETHYLENE CASING SPACERS RADI TYPE 6'-0" TO 10'-0" O.C.
CARRIER PIPE SIZE AND TYPE PER PLANS.
CASING SPACERS SHALL BE USED TO INSTALL CARRIER PIPE INSIDE THE ENCASEMENT PIPE. TO PROVIDE SUPPORT AROUND THE PERIPHERY OF THE PIPE SHOULD THE PIPE TWIST AS IT IS PUSHED THROUGH THE CASING. THE SPACERS SHALL BE OF A PROJECTION TYPE THAT HAS A MINIMUM NUMBER OF PROJECTIONS AROUND THE CIRCUMFERENCE TOTALLING THE NUMBER OF DIAMETER INCHES. FOR EXAMPLE, 8" PIPE SHALL HAVE A MINIMUM OF 8 PROJECTIONS AND 18" PIPE SHALL HAVE A MINIMUM NUMBER OF 18 PROJECTIONS.
CASING SPACERS SHALL HAVE A MAXIMUM SPACING SPAN OF 10 FEET. THE SPAN BETWEEN SPACERS SHOULD RESULT IN CONSERVATIVE LONG TERM SAFETY FACTOR PROVIDED TOTAL LOAD PER SPACER DOES NOT EXCEED THE MAXIMUM LOAD FOR PIPE FULL OF LIQUID PER SPACER LISTED IN THE LITERATURE FOR CLASS SPACER USED. SPACERS SHALL HAVE A MINIMUM HEIGHT THAT CLEARS THE PIPE BELL OR AS OTHERWISE INDICATED ON PLANS. CASING SPACERS SHALL USE DOUBLE BACKED TAPE PROVIDED WITH THE SPACERS, TO FASTEN TIGHTLY ONTO THE CARRIER PIPE, SO THAT THE SPACERS DO NOT MOVE DURING INSTALLATION.
PIPE CASING SPACER DETAIL
N.T.S.
SPACERS SHALL BE RADI HIGH DENSITY POLYETHYLENE OR TOWN APPROVED OTHER.
TWO SPACERS PLACED AT EACH END OF CASING (TYP.)
CASING PIPE
6'-10" TYPICAL BETWEEN SPACERS
2' FROM BELL END
RUBBER END SEAL WITH STAINLESS STEEL BANDS
CARRIER PIPE
PIPE CASING SPACERS SPACING DETAIL
N.T.S.
BLUE FIBERGLASS MARKER
FINISHED GRADE
7'-6"
3'-6"
2'-0"
CENTERLINE OF UTILITY LINE
VALVE, AIR RELEASE, ETC.
MARKER LOCATION
FIELD INSTALLATION DETAIL
ELEVATION
GENERAL NOTES
1. ALL OFFSITE TOWN OF LITTLE ELM MAINS WITH VALVES, AIR RELEASE VALVES, ETC. SHALL BE MARKED AS DETAILED ON THIS SHEET.
2. CONTRACTOR SHALL INSTALL ALL MARKERS.
OFFSITE WATER MAIN MARKER
N.T.S.
POUR CONCRETE TO UNDISTURBED EARTH (TYP.)
BEARING AREA
POURED CONCRETE BLOCKING (TYP.)
4" MIN.
NOTE: 1. ALL FITTINGS, CAPS & PLUGS TO BE POLY WRAPPED
2. ALL BEARING BLOCKS TO BE 6" THICK (MIN.)
TYPICAL FOR ALL DEAD ENDS
1/2" MIN. ALL THREADS (CORROSION PROOF)
DIRECTIONAL CHANGE VERTICAL BEND ANCHOR
MIN. BEARING AREA OF BLOCK IN SQ. FT. (UNLESS OTHERWISE INDICATED ON THE PLANS)
FITTING SIZES | TEE & END | 90° BEND | 45° BEND | 22 1/2° BEND | 11 1/4° BEND
TO 6" | 3.6 | 5.4 | 2.5 | 2.0 | 2.0
8" | 6.3 | 8.9 | 4.8 | 2.5 | 2.0
10" | 9.9 | 13.9 | 7.6 | 3.9 | 2.0
12" | 14.2 | 20.0 | 10.9 | 5.6 | 2.8
16" | 25.1 | 35.5 | 19.2 | 9.8 | 4.9
SOIL BEARING PRESSURE | MULTIPLIER
1000 | 2.0
1500 | 1.33
2000 | 1.0
3000 | 0.67
WATER MAIN THRUST BLOCKING
N.T.S.
3000 P.S.I. CONCRETE W/ REBAR IN FOUR CORNERS
DUCTILE IRON M.J. FITTING W/ MEGA LUG FITTINGS
6" MIN.
PVC PIPE
PVC PIPE
PVC PIPE
8" MIN.
DUCTILE IRON M.J. FITTING W/ MEGA LUG FITTINGS
STANDARD HORIZONTAL AND/OR VERTICAL OFFSETS
N.T.S.
PULL PIPE USING LONGITUDINAL BENDING (MIN. 250'R) OR JOINT DEFLECTION IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
2'-0"
2' BACK OF CURB – TYPICAL
3' BACK OF CURB – LARGER THAN 12"
2' BACK OF CURB – TYPICAL
3' BACK OF CURB – LARGER THAN 12"
WATER LINE AT INLET DETAIL
N.T.S.
VALVE BOX PAD
ADJUSTABLE VALVE BOX
WATER LINE
DISCHARGE PIPE SHALL BE DUCTILE IRON
7-45° BEND
N.R.S. GATE VALVE FLANGED AND M.J.
BLOCKING AS REQUIRED
NOTE: MUST BE DISCHARGED INTO STORM SEWER, BRIDGE OR CULVERT.
VALVE BOX PAD
2' MIN.
DISCHARGE LINE
M.J. PLUG
VALVE BOX PAD
WATER LINE
45° (TYP.)
BLOCKING AS REQUIRED
DRAIN VALVE AND BLOW OFF VALVE
N.T.S.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
KDMG
JOB NUMBER
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 4 OF 4
LITTLE ELM
SHEET 18 OF 26
DECEMBER 2023


CAST IRON MANHOLE LID AND FRAME SEE DETAIL
24" MAXIMUM ADJUSTMENT
PRECAST CONCRETE GRADE RINGS (SET IN MORTAR BED AND BRING TO GRADE)
MONOLITHIC CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS
4'-0" DIA
5'-0" & 6'-0" DIA
6" MIN
8" MIN
VARIES
STUB OUTS TO PROPERTY LINE OR EASEMENT (MIN. 5' LONG) WITH CONCRETE CRADLE UNDER ENTIRE LENGTH.
MIN. SLOPE 1/2" PER FT.
SANITARY SEWER MAIN
COUPLING W/O - RING RUBBER GASKETS, KOR-N-SEAL, A-LOK OR APPROVED OTHER.
7'-0" (MIN.)
STANDARD CAST-IN-PLACE MANHOLE
N.T.S.
CAST-IN-PLACE MANHOLE NOTES:
1. THE DIAMETER OF A MANHOLE CONSTRUCTED OVER THE CENTER OF A SEWER SHOULD VARY WITH THE SIZE OF THE SEWER. FOR EIGHT-INCH (8"), TEN-INCH (10"), AND TWELVE-INCH (12"), THE MANHOLE SHALL BE FOUR-FOOT (4') MINIMUM DIAMETER. FOR FIFTEEN-INCH (15"), EIGHTEEN-INCH (18"), TWENTY-ONE-INCH (21"), TWENTY-FOUR-INCH (24") AND TWENTY-SEVEN-INCH (27") SHALL BE FIVE-FOOT (5') MINIMUM DIAMETER; THIRTY-INCH (30") AND THIRTY-SIX-INCH (36") SHALL BE SIX-FOOT (6') MINIMUM DIAMETER. MANHOLES DEEPER THAN TWELVE FEET (12') SHALL BE A MINIMUM OF FIVE-FOOT (5') DIAMETER.
2. DROP MANHOLES SHALL BE REQUIRED WHEN THE INFLOW ELEVATION IS MORE THAN TWENTY-FOUR INCHES (24") ABOVE THE OUTFALL ELEVATION.
3. WHERE PIPES ENTER A MANHOLE THERE SHALL BE A MINIMUM OF TWO-TENTHS OF A FOOT (0.2') DROP BETWEEN INVERTS.
4. WHERE UNEQUAL PIPES ENTER A MANHOLE, THE CROWN OF THE PIPES SHALL BE SET AT THE SAME ELEVATION.
5. CONCRETE SHALL BE A MONOLITHIC POUR.
PRECAST MANHOLE NOTES:
1. THE DIAMETER OF A MANHOLE CONSTRUCTED OVER THE CENTER OF A SEWER SHOULD VARY WITH THE SIZE OF THE SEWER. FOR EIGHT-INCH (8"), TEN-INCH (10"), AND TWELVE-INCH (12"), THE MANHOLE SHALL BE FOUR-FOOT (4') MINIMUM DIAMETER. FOR FIFTEEN-INCH (15"), EIGHTEEN-INCH (18"), TWENTY-ONE-INCH (21"), TWENTY-FOUR-INCH (24") AND TWENTY-SEVEN-INCH (27") SHALL BE FIVE-FOOT (5') MINIMUM DIAMETER; THIRTY-INCH (30") AND THIRTY-SIX-INCH (36") SHALL BE SIX-FOOT (6') MINIMUM DIAMETER. MANHOLES DEEPER THAN TWELVE FEET (12') SHALL BE A MINIMUM OF FIVE-FOOT (5') DIAMETER.
2. DROP MANHOLES SHALL BE REQUIRED WHEN THE INFLOW ELEVATION IS MORE THAN TWENTY-FOUR INCHES (24") ABOVE THE OUTFALL ELEVATION.
3. WHERE PIPES ENTER A MANHOLE THERE SHALL BE A MINIMUM OF TWO-TENTHS OF A FOOT (0.2') DROP BETWEEN INVERTS.
4. WHERE UNEQUAL PIPES ENTER A MANHOLE, THE CROWN OF THE PIPES SHALL BE SET AT THE SAME ELEVATION.
PRECAST CONCRETE GRADE RINGS (SET IN MORTAR BED AND BRING TO GRADE)
CAST IRON MANHOLE LID AND FRAME SUITABLE FOR HEAVY TRAFFIC (SEE DETAIL)
MORTAR
24" MAX ADJUSTMENT
CONCENTRIC MANHOLE CONE. SEE NOTE FOR LARGER THAN 48" DIA.
3'-0" 48" DIA MANHOLE
JOINT WITH NEOPRENE "O" RING GASKET AND MASTIC.
4'-0" DIA (DEPTH < 12'-0")
5'-0" DIA (DEPTH > 12'-0")
REINFORCED CONCRETE PIPE C-76 CLASS III WITH RUBBER GASKET JOINT.
VARIABLE
BOTTOM SECTION OF MANHOLE IN LENGTHS OF ONE (1), TWO (2), OR THREE (3) FEET. TO BE SET ON 1" OF LEVEL GROUT
1" GROUT SPACEFILL WITH CEMENT MORTAR OR MASTIC MATERIAL
6" MIN
STUB OUTS TO PROPERTY LINE OR EASEMENT (MIN. 5' LONG) WITH CONCRETE CRADLE UNDER ENTIRE LENGTH.
MIN. SLOPE 1/2" PER FT.
PIPE I.D. VARIABLE
COUPLING WITH O-RING RUBBER GASKET WITH P.V.C. PIPE.
CONCRETE BASE FOR PRECAST MANHOLE SHALL HAVE A COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS.
PRECAST CONCRETE PIPE MANHOLE
N.T.S.
EXISTING GROUND
EXIST. M.H. LID & FRAME TO BE REMOVED 2" BELOW CONCRETE.
SAND AND/OR GRAVEL COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY (STD. PROCTOR)
WHERE THIS DESIGN EXISTS THE EXISTING SANITARY SEWER SHALL BE PLUGGED WITH 3000 P.S.I. CONCRETE
POUR 2000 P.S.I. CONCRETE TO A POINT 3" ABOVE TOP OF PIPE
EXISTING SANITARY SEWER MAIN IS TO BE PLUGGED WITH 2000 P.S.I. CONCRETE
EXISTING CONCRETE BASE
MANHOLE ABANDONMENT
N.T.S.
WADER SERIES 1800 OR 1950 ODOR CONTROL SEWER VALVE
MIN. ELEVATION 2' ABOVE 100 YR FLOODPLAIN
PRESSURE MANHOLE LID AND FRAME SEE DETAIL
24" MAXIMUM ADJUSTMENT
PRECAST CONCRETE GRADE RINGS (SET IN MORTAR BED AND BRING TO GRADE)
6"ø NOMINAL, SCHEDULE 40 GALVANIZED PIPE
STAINLESS STEEL PIPE HOLD DOWN WALL CLAMPS ON 60" CENTERS.
12" TO 6" OF VENT OPENING.
6" MINIMUM (TYPICAL)
8" MINIMUM (TYPICAL)
4'-0" DIA
5'-0" & 6'-0" DIA
MONOLITHIC CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS
STUB OUTS TO PROPERTY LINE OR EASEMENT (MIN. 5' LONG) WITH CONCRETE CRADLE UNDER ENTIRE LENGTH.
FILL BOTTOM OF STANDPIPE WITH GROUT
MIN. SLOPE 1/2" PER FT.
SANITARY SEWER MAIN
12" MAX. TO 6" OF VENT OPENING.
2-#3 BENT REBARS
COUPLING W/O - RING RUBBER GASKETS, KOR-N-SEAL, A-LOK OR APPROVED OTHER.
12" MIN
12"
7'-0" (MIN.)
VENTED TYPE S MANHOLE
N.T.S.
CAST IRON MANHOLE LID AND FRAME SEE DETAIL
ADJUST 24" MAX
PRECAST CONCRETE GRADE RINGS (SET IN MORTAR BED AND BRING TO GRADE)
TYPICAL DROP TEE
4'-0" DIA
5'-0" AND 6'-0" DIA
6" MINIMUM (TYPICAL)
8" MINIMUM (TYPICAL)
12"
CUT PIPE AT 45°
ENCASE IN 3000 P.S.I. CONCRETE, MIN. 6" AROUND
FLUSH WITH INSIDE FACE OF MANHOLE
MONOLITHIC CONCRETE SHALL HAVE A MIN. COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS
MIN. SLOPE 1/2" PER FT.
DROP PIPE IS TO BE THE SAME SIZE AS SANITARY SEWER MAIN MAXIMUM 12" SEWER MAIN
SANITARY SEWER MAIN
SEE NOTE #2
12" MIN
12"
7'-0" (MIN.)
MANHOLE WITH OUTSIDE DROP CONNECTION
N.T.S.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
SANITARY SEWER STANDARD DETAILS 1 OF 3
LITTLE ELM
SHEET 19 OF 26
DECEMBER 2023

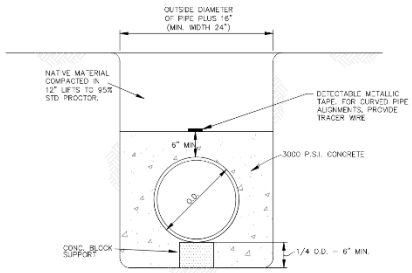

GREEN FIBERGLASS MARKER
FINISHED GRADE
ELEVATION
OFFSITE SANITARY SEWER MARKER
N.T.S.
36" FRAME O.D.
32" LID O.D.
1 1/2" FLAT FACE GOTHIC LETTERING
SANITARY SEWER
PICKBAR LIFTING LUG (TYP. 2)
CUSTOM TOWN LOGO
1/2" FLAT FACE GOTHIC LETTERING
(4) 1" DIA LIFTING HOLES
PLAN
32" DIA.
1 1/2"
LID SECTION
32 1/4" I.D.
30"
38" O.D.
4"
FRAME SECTION
NOTES:
1. SANITARY SEWER FRAME AND COVER SHALL BE BASS & HAYS PATTERN NUMBER BH VRM-30. FRAME CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON. COVER CONSTRUCTED OF ASTM A536 DUCTILE IRON (70-50-05).
2. ASSEMBLY SHALL BE HEAVY DUTY TRAFFIC RATED FOR H-20 LOADING IN ACCORDANCE WITH AASHTO M306-10.
3. INFLOW PROTECTION INSERT, MINIMUM THICKNESS OF ONE-EIGHT INCH (1/8"), MADE OF HDPE MELTING ASTM D 1248 CLASS A, CATEGORY 5, TYPE III. INSERT SHALL INCLUDE A LIFT STRAP AND VENT HOLE WITH VENT DISK AS MANUFACTURED BY KNUTSON MANHOLE INSERTS OR APPROVED OTHER.
SANITARY SEWER MANHOLE FRAME AND COVER
N.T.S.
6-1/2"ø STAINLESS STEEL ANCHOR BOLTS IN 5/8"ø HOLES
2 - 3-3/4" X 2" PICK SLOTS WITH 1 - 1" DIA. STEEL ROD EACH.
INDEX MARKS ON FRAME AND COVER
ASSEMBLY PLAN VIEW
6-5/8" DIA., 1-1/2" LONG STAINLESS STEEL BOLTS.
1/2"ØX 6" LONG BENT STAINLESS STEEL ANCHOR BOLTS W/HEX. HEAD NUT - 8 REQ'D.
30"
ASSEMBLY SECTION
GENERAL NOTES:
1. REQUIRED FOR ALL MANHOLES BELOW 100-YEAR FLOODPLAIN ELEVATION
2. THE HORIZONTAL BEARING SURFACES ARE TO BE MACHINE FINISHED.
3. FOR A SEAL BETWEEN THE RING FRAME AND COVER A 1/4" DIAMETER NEOPRENE "O-RING" GASKET SHALL BE AS INSTALLED BY THE MANUFACTURER. THE LOCATION SHALL BE AS PER THE MANUFACTURER'S STANDARDS BUT SHALL BE SUBJECT TO THE APPROVAL OF THE TOWN ENGINEER.
4. NOT ALLOWED IN TRAFFIC AREAS.
PRESSURE MANHOLE FRAME & COVER
N.T.S.
CLEANOUT OR MANHOLE
CENTERLINE OF UTILITY LINE
MARKER LOCATION
FIELD INSTALLATION DETAIL
GENERAL NOTES:
1. ALL OFFSITE TOWN OF LITTLE ELM MAINS WITH CLEANOUTS AND MANHOLES SHALL BE MARKED AS DETAILED ON THIS SHEET.
2. CONTRACTOR SHALL INSTALL ALL MARKERS.
CAST IRON SEWER CLEANOUT BODY IN PAVED AREAS. MALE PIPE THREADED CLEANOUT PLUG W/ RECESSED NUT IN LANDSCAPED AREAS
R.O.W.
10'-0"
4" PVC SERVICE LATERAL
TO SANITARY SEWER MAIN
4" STUBOUT FOR RESIDENTIAL SERVICE CONNECTION
RESIDENTIAL SANITARY SEWER CLEANOUT & STUBOUT DETAIL
N.T.S.
CONCRETE ENCASEMENT NOTE: CONCRETE IS TO BE POURED AGAINST UNDISTURBED SOIL.
FORMED SURFACE
TEE OR WYE FITTING
4" P.V.C. PIPE HOUSE CONNECTION
LENGTH OF FITTING
UNDISTURBED SOIL
FORMED SURFACE
3000 P.S.I. CONCRETE ENCASEMENT
PLAN VIEW
TEE OR WYE FITTING
42" MINIMUM DEPTH
DIAMETER OF PIPE PLUS 6" EMBEDMENT
4" P.V.C. PIPE HOUSE CONNECTION
CLASS F2 EMBEDMENT.
UNDISTURBED SOIL
FULL WIDTH OF TRENCH
SECTION THRU TRENCH
GENERAL NOTES:
1. SEWER SERVICE LATERAL IS TO BE:
A. POLY VINYL CHLORIDE (PVC)
B. TYPE SDR 35, GREEN IN COLOR
C. FITTINGS MAY BE GREEN OR WHITE IN COLOR.
RESIDENTIAL SANITARY SEWER SERVICE CONNECTION
N.T.S.
CLEAN-OUT CAST IRON BODY AND COVER AS MANUFACTURED BY BASS & HAYES FOUNDRY CO., INC. PATTERN NO. 339 OR ENGINEER APPROVED OTHER.
42" MINIMUM DEPTH
ENCASEMENT MINIMUM
THIS SURFACE IS TO BE FORMED
6" DIAMETER P.V.C. PIPE
THIS SURFACE IS TO BE FORMED
3000 P.S.I. CONCRETE SUPPORT PAD
24" MAXIMUM
TRENCH BOTTOM FOR THE PIPE EMBEDMENT.
3000 P.S.I. CONCRETE ENCASEMENT OF FITTING
THIS SURFACE IS TO BE FORMED
TRENCH BOTTOM FOR THE PIPE EMBEDMENT.
SECTIONAL ELEVATION
NOTES:
1. TO BE USED ONLY AT TOWN ENGINEER'S REQUEST. ALL OTHER SEWER MAINS TO TERMINATE AT MANHOLE.
2. INSTALL A 22 1/2° BEND IF THE SEWER MAIN IS GREATER THAN 8" IN DIAMETER THEN INSTALL A REDUCER FITTING AFTER THE 22 1/2° BEND, REDUCING THE CLEANOUT TO 6" IN DIAMETER.
3. CLEAN-OUT CASTING AS MANUFACTURED BY THE BASS & HAYES FOUNDRY CO., INC. PATTERN NO. 339 OR APPROVED OTHER.
4. CONCRETE PAD 24" SQUARE SHALL BE POURED AROUND ALL CLEANOUTS NOT PLACED WITHIN CONCRETE PAVEMENT. 3000 P.S.I. CONCRETE, 6" THICK, FOUR NO. 3 BARS.
SANITARY SEWER MAIN CLEANOUT
N.T.S.
3000 P.S.I. CONCRETE SUPPORT PAD
6" MIN.
3000 P.S.I. CONCRETE ENCASEMENT OF FITTING
PIPE O.D. PLUS 16" OR 24" MAX.
SECTION
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
JOB NUMBER:
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
SANITARY SEWER STANDARD DETAILS 2 OF 3
LITTLEELM
SHEET
20 OF 26
DECEMBER 2023



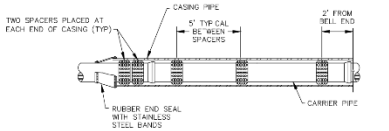
MIN. STD. P.V.C. SEWER
CLASS 1F2 EMBEDMENT
N.T.S.



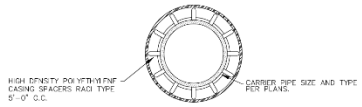
MIN. STD. DUCTILE IRON SEWER
CLASS 1F3 EMBEDMENT
N.T.S.



CONCRETE ENCASEMENT
CLASS 1F4 EMBEDMENT
N.T.S.



PIPE CASING SPACER
SPACING DETAILS

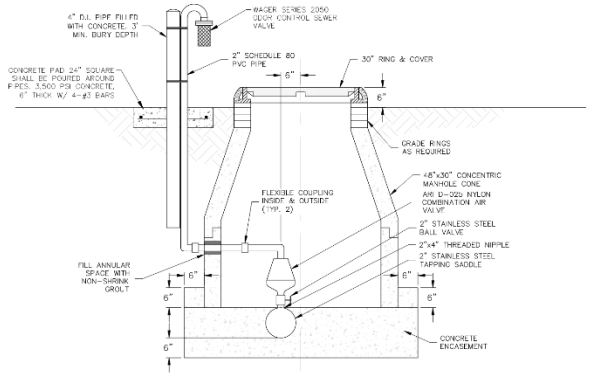


NOTES:

CASING SPACERS SHALL BE USED TO INSTALL CARRIER PIPE INSIDE THE ENCASEMENT PIPE. TO PROVIDE SUPPORT AROUND THE PERIMETRY OF THE PIPE SHOULD THE PIPE TWIST AS IT IS PUSHED THROUGH THE CASING. THE SPACERS SHALL BE OF A PROJECTION TYPE THAT HAS A MINIMUM NUMBER OF PROJECTIONS AROUND THE CIRCUMFERENCE TOTALLING THE NUMBER OF DIAMETER INCHES. FOR EXAMPLE, 8" PIPE SHALL HAVE A MINIMUM OF 8 PROJECTIONS AND 18" PIPE SHALL HAVE A MINIMUM NUMBER OF 18 PROJECTIONS.

CASING SPACERS SHALL HAVE A MAXIMUM SPACING SPAN OF 5 FEET. THE SPAN BETWEEN SPACERS SHOULD RESULT IN CONSERVATIVE LONG TERM SAFETY FACTOR PROVIDED TOTAL LOAD PER SPACER DOES NOT EXCEED THE MAXIMUM LOAD FOR PIPE FULL OF LIQUID PER SPACER LISTED IN THE LITERATURE FOR CLASS SPACER USED. SPACERS SHALL HAVE A MINIMUM HEIGHT THAT CLEARS THE PIPE BELL OR AS OTHERWISE INDICATED ON PLANS. CASING SPACERS SHALL USE DOUBLE BACKED TAPE PROVIDED WITH THE SPACERS, TO FASTEN TOP-TLY ONTO THE CARRIER PIPE, SO THAT THE SPACERS DO NOT MOVE DURING INSTALLATION.

PIPE CASING SPACER DETAIL
N.T.S.



2" AIR RELEASE VALVE
FOR FORCE MAIN
N.T.S.

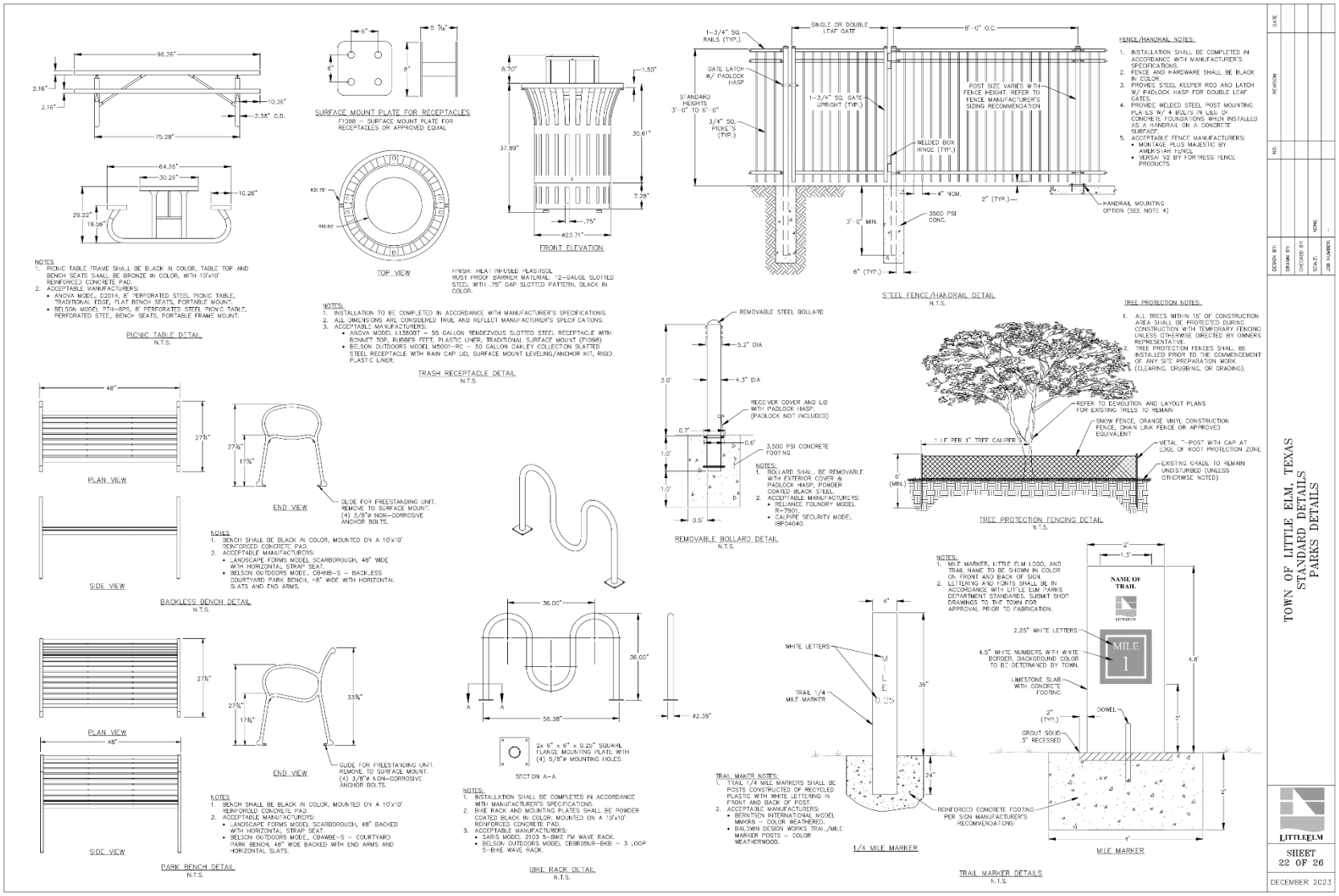
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER:
-

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
SANITARY SEWER STANDARD DETAILS 3 OF 3

LITTLEELM

SHEET
21 OF 26

DECEMBER 2023


PICNIC TABLE DETAIL
N.T.S.
SURFACE MOUNT PLATE FOR RECEPTACLES
TOP VIEW
FRONT ELEVATION
TRASH RECEPTACLE DETAIL
N.T.S.
STEEL FENCE/HANDRAIL DETAIL
N.T.S.
FENCE/HANDRAIL NOTES:
TREE PROTECTION NOTES:
TREE PROTECTION FENCING DETAIL
N.T.S.
REMOVABLE BOLLARD DETAIL
N.T.S.
PLAN VIEW
SIDE VIEW
END VIEW
BACKLESS BENCH DETAIL
N.T.S.
PARK BENCH DETAIL
N.T.S.
SECTION A-A
BIKE RACK DETAIL
N.T.S.
1/4 MILE MARKER
MILE MARKER
TRAIL MARKER DETAILS
N.T.S.
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
PARKS DETAILS
LITTLE ELM
SHEET
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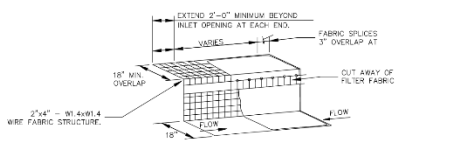
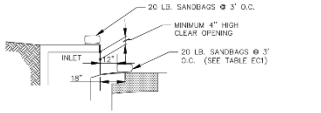
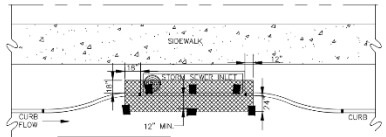


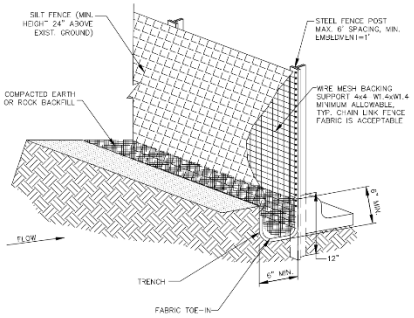




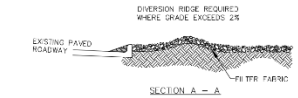
INLET OPENING	MINIMUM NUMBER OF SAND BAGS	
	TOP	FRONT
5'	2	3
10'	3	3
15'	3	4
20'	4	4

SAND BAGS SHALL BE EVENLY SPACED ALONG TOP AND ALONG THE FRONT OF INLET.

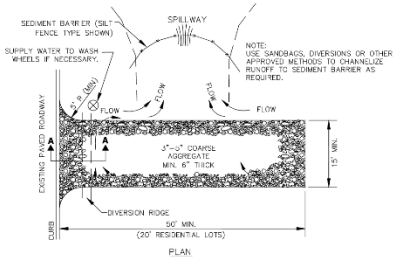
CURB INLET ON GRADE PROTECTION DETAIL
N.T.S.



SILT FENCE ISOMETRIC PLAN VIEW
N.T.S.

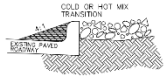


SECTION A – A



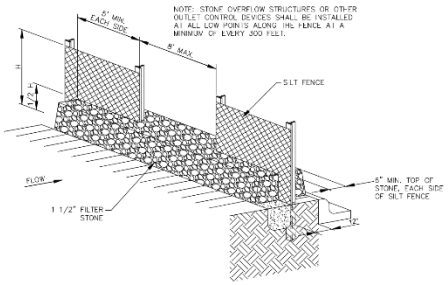
PLAN

WHEN SEDIMENT HAS SUBSTANTIALLY CLOGGED THE VOID AREA BETWEEN THE ROCKS, THE AGGREGATE MAT MUST BE WASHED DOWN OR REPLACED. PERIODIC RE-GRADING AND TOP DRESSING WITH ADDITIONAL STONE MUST BE DONE TO KEEP THE EFFICIENCY OF THE ENTRANCE FROM DIMINISHING.

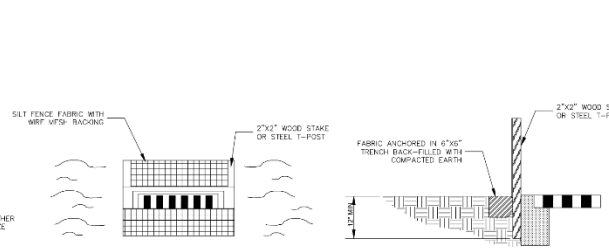


TRANSITION

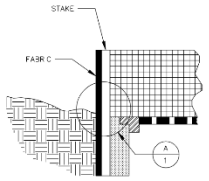
TEMPORARY STONE CONSTRUCTION ENTRANCE/EXIST
N.T.S.



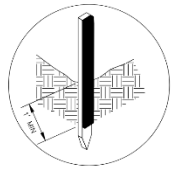
SILT FENCE STONE OVERFLOW STRUCTURE
N.T.S.



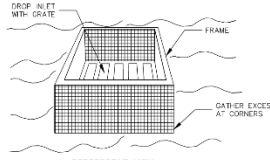
I. STANDARD FILTER BARRIER INSTALLATION
N.T.S.



ELEVATION OF STAKE AND FABRIC ORIENTATION

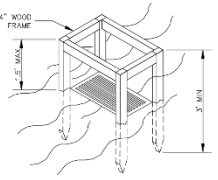


DETAIL A



PERSPECTIVE VIEW

SPECIFIC APPLICATION
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5%) WHERE THE INLET SHEET OR OVER-LAND FLOWS (NOT TO EXCEED 1 C.F.S.) ARE TYPICAL. THIS METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS SUCH AS IN STREETS OR HIGHWAY MEDIANS



PERSPECTIVE VIEW

II. ALTERNATE FILTER BARRIER INSTALLATION
N.T.S.

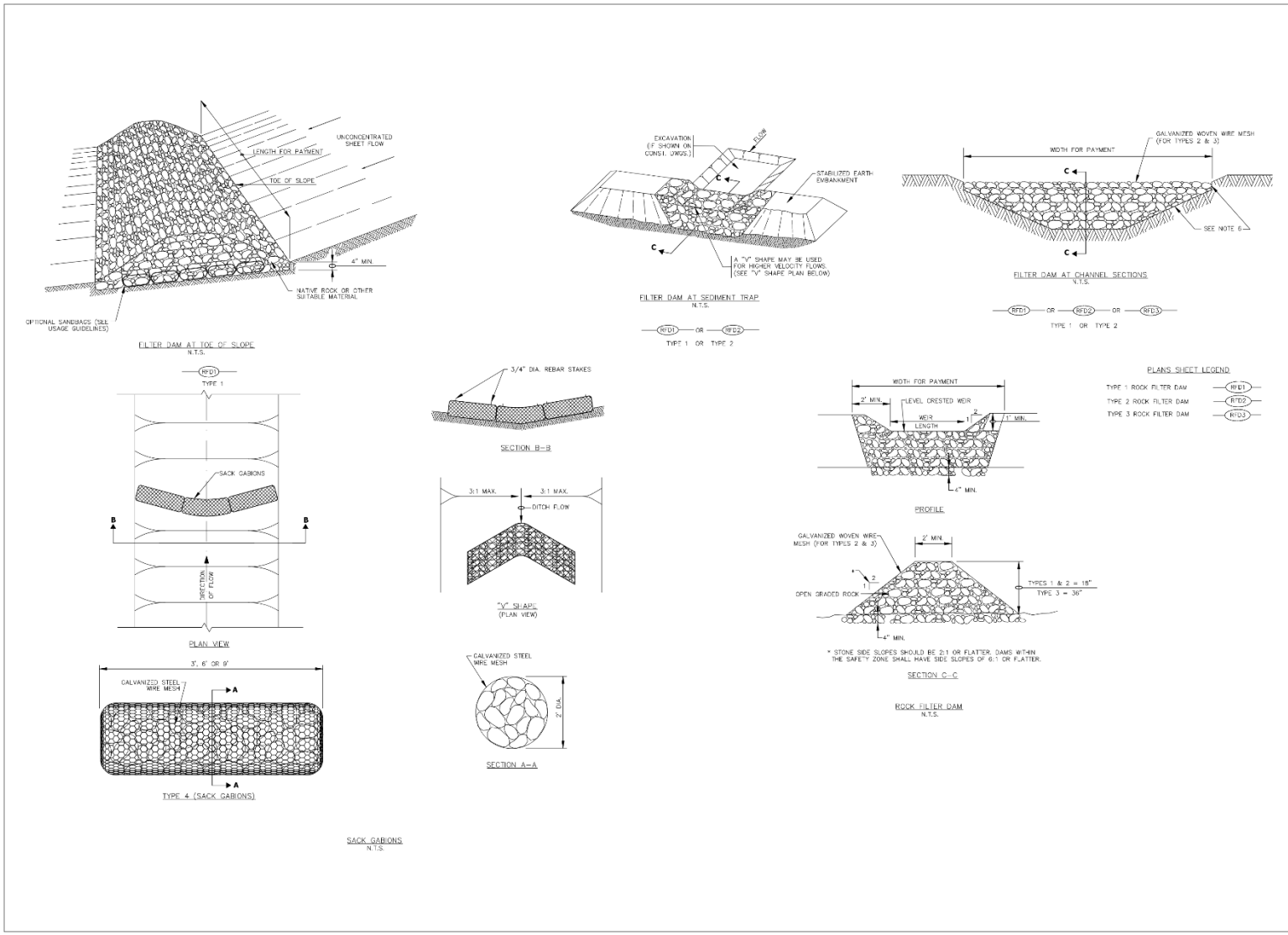
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

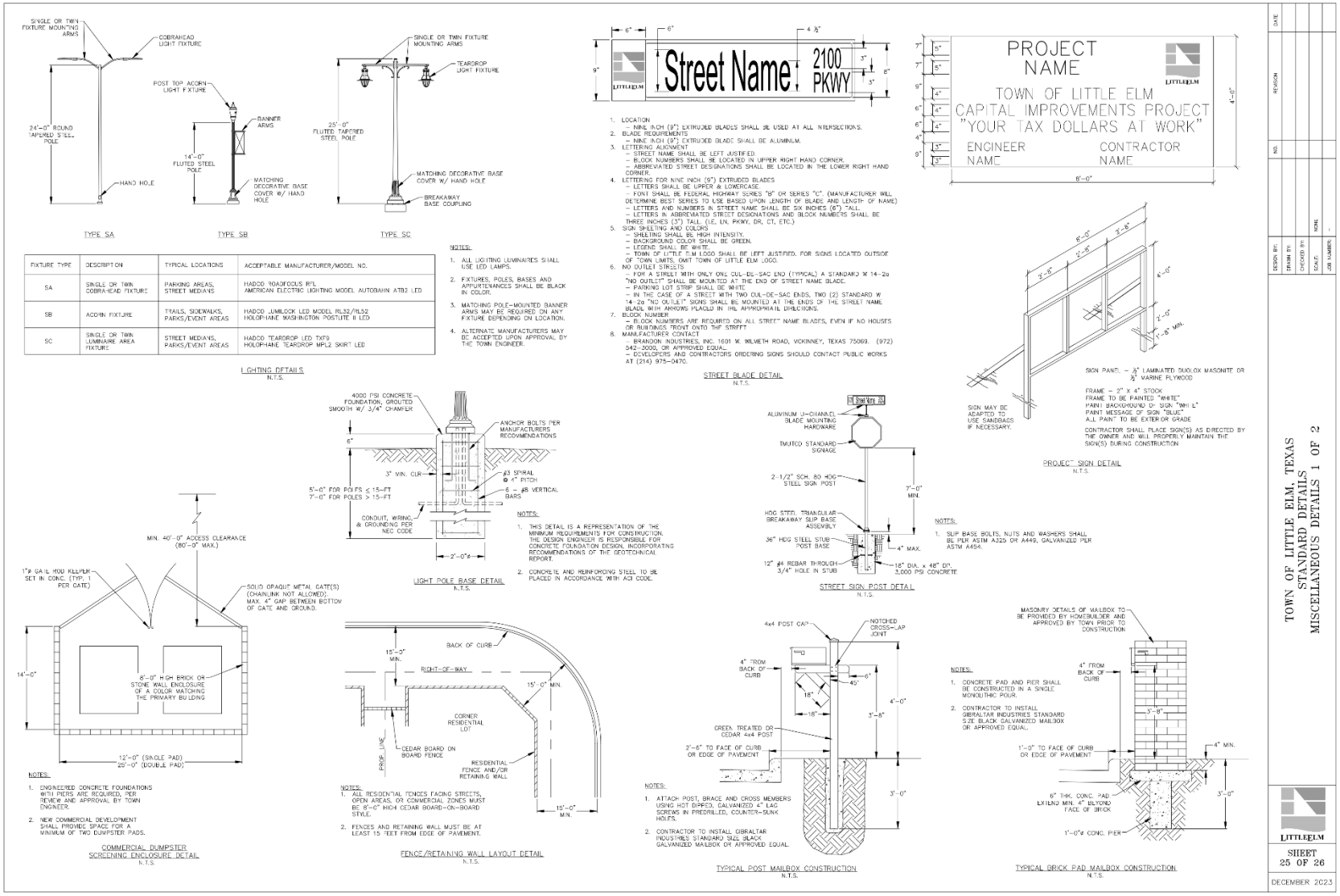
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
EROSION CONTROL DETAILS 1 OF 2

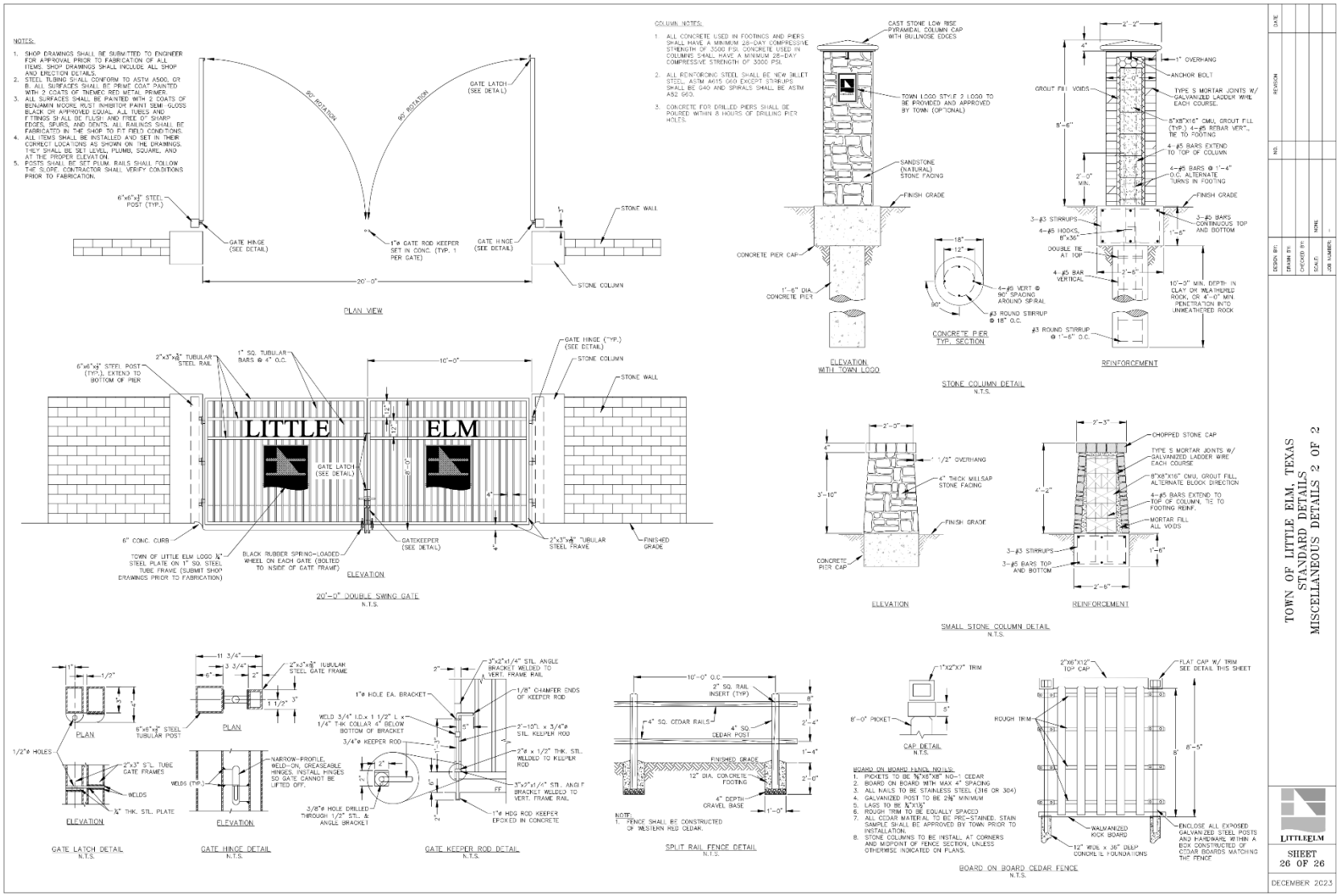
LITTLE ELM

SHEET
23 OF 26

DECEMBER 2023


UNCONCENTRATED SHEET FLOW
LENGTH FOR PAYMENT
TOE OF SLOPE
4" MIN.
NATIVE ROCK OR OTHER SUITABLE MATERIAL
OPTIONAL SANDBAGS (SEE USAGE GUIDELINES)
FILTER DAM AT TOE OF SLOPE
N.T.S.
EXCAVATION (IF SHOWN ON CONST. DWGS.)
SLOPE
STABILIZED EARTH EMBANKMENT
A "V" SHAPE MAY BE USED FOR HIGHER VELOCITY FLOWS. (SEE "V" SHAPE PLAN BELOW)
FILTER DAM AT SEDIMENT TRAP
N.T.S.
RFD1 OR RFD2
TYPE 1 OR TYPE 2
WIDTH FOR PAYMENT
GALVANIZED WOVEN WIRE MESH (FOR TYPES 2 & 3)
SEE NOTE 6
FILTER DAM AT CHANNEL SECTIONS
N.T.S.
RFD1 OR RFD2 OR RFD3
TYPE 1 OR TYPE 2
RFD1
TYPE 1
SACK GABIONS
DIRECTION OF FLOW
PLAN VIEW
3/4" DIA. REBAR STAKES
SECTION B-B
3:1 MAX.
3:1 MAX.
DITCH FLOW
"V" SHAPE
(PLAN VIEW)
3', 6' OR 9'
GALVANIZED STEEL WIRE MESH
TYPE 4 (SACK GABIONS)
GALVANIZED STEEL WIRE MESH
2' DIA.
SECTION A-A
SACK GABIONS
N.T.S.
WIDTH FOR PAYMENT
2' MIN.
LEVEL CRESTED WEIR
WEIR LENGTH
1' MIN.
4" MIN.
PROFILE
GALVANIZED WOVEN WIRE MESH (FOR TYPES 2 & 3)
2' MIN.
OPEN GRADED ROCK
TYPES 1 & 2 = 18"
TYPE 3 = 36"
4" MIN.
* STONE SIDE SLOPES SHOULD BE 2:1 OR FLATTER; DAMS WITHIN THE SAFETY ZONE SHALL HAVE SIDE SLOPES OF 6:1 OR FLATTER.
SECTION C-C
ROCK FILTER DAM
N.T.S.
PLANS SHEET LEGEND
TYPE 1 ROCK FILTER DAM RFD1
TYPE 2 ROCK FILTER DAM RFD2
TYPE 3 ROCK FILTER DAM RFD3
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
EROSION CONTROL DETAILS 2 OF 2
LITTLE ELM
SHEET
24 OF 26
DECEMBER 2023


SINGLE OR TWIN FIXTURE MOUNTING ARMS
COBRAHEAD LIGHT FIXTURE
24'-0" ROUND TAPERED STEEL POLE
HAND HOLE
TYPE SA
POST TOP ACORN LIGHT FIXTURE
BANNER ARMS
14'-0" FLUTED STEEL POLE
MATCHING DECORATIVE BASE COVER W/ HAND HOLE
TYPE SB
SINGLE OR TWIN FIXTURE MOUNTING ARMS
TEARDROP LIGHT FIXTURE
25'-0" FLUTED TAPERED STEEL POLE
MATCHING DECORATIVE BASE COVER W/ HAND HOLE
BREAKAWAY BASE COUPLING
TYPE SC
FIXTURE TYPE | DESCRIPTION | TYPICAL LOCATIONS | ACCEPTABLE MANUFACTURER/MODEL NO.
SA | SINGLE OR TWIN COBRA-HEAD FIXTURE | PARKING AREAS, STREET MEDIANS | HADCO ROADFOCUS RFL AMERICAN ELECTRIC LIGHTING MODEL AUTOBAHN ATB2 LED
SB | ACORN FIXTURE | TRAILS, SIDEWALKS, PARKS/EVENT AREAS | HADCO JUMILOCK LED MODEL RLS2/RLS2 HOLOPHANE WASHINGTON POSTLITE II LED
SC | SINGLE OR TWIN LUMINAIRE AREA FIXTURE | STREET MEDIANS, PARKS/EVENT AREAS | HADCO TEARDROP LED TXF9 HOLOPHANE TEARDROP MPL2 SKIRT LED
NOTES:
1. ALL LIGHTING LUMINAIRES SHALL USE LED LAMPS.
2. FIXTURES, POLES, BASES AND APPURTENANCES SHALL BE BLACK IN COLOR.
3. MATCHING POLE-MOUNTED BANNER ARMS MAY BE REQUIRED ON ANY FIXTURE DEPENDING ON LOCATION.
4. ALTERNATE MANUFACTURERS MAY BE ACCEPTED UPON APPROVAL BY THE TOWN ENGINEER.
LIGHTING DETAILS
N.T.S.
6"
6"
4 ½"
9"
Street Name
2100
PKWY
3"
6"
3"
LITTLEELM
1. LOCATION
– NINE INCH (9") EXTRUDED BLADES SHALL BE USED AT ALL INTERSECTIONS.
2. BLADE REQUIREMENTS
– NINE INCH (9") EXTRUDED BLADE SHALL BE ALUMINUM.
3. LETTERING ALIGNMENT
– STREET NAME SHALL BE LEFT JUSTIFIED.
– BLOCK NUMBERS SHALL BE LOCATED IN UPPER RIGHT HAND CORNER.
– ABBREVIATED STREET DESIGNATIONS SHALL BE LOCATED IN THE LOWER RIGHT HAND CORNER.
4. LETTERING FOR NINE INCH (9") EXTRUDED BLADES
– LETTERS SHALL BE UPPER & LOWERCASE.
– FONT SHALL BE FEDERAL HIGHWAY SERIES "B" OR SERIES "C" (MANUFACTURER WILL DETERMINE BEST SERIES TO USE BASED UPON LENGTH OF BLADE AND LENGTH OF NAME)
– LETTERS AND NUMBERS IN STREET NAME SHALL BE SIX INCHES (6") TALL.
– LETTERS IN ABBREVIATED STREET DESIGNATIONS AND BLOCK NUMBERS SHALL BE THREE INCHES (3") TALL (I.E. LN, PKWY, DR, CT, ETC.)
5. SIGN SHEETING AND COLORS
– SHEETING SHALL BE HIGH INTENSITY.
– BACKGROUND COLOR SHALL BE GREEN.
– LEGEND SHALL BE WHITE.
– TOWN OF LITTLE ELM LOGO SHALL BE LEFT JUSTIFIED. FOR SIGNS LOCATED OUTSIDE OF TOWN LIMITS, OMIT TOWN OF LITTLE ELM LOGO.
6. NO OUTLET STREETS
– FOR A STREET WITH ONLY ONE CUL-DE-SAC END (TYPICAL) A STANDARD W 14-2a "NO OUTLET" SHALL BE MOUNTED AT THE END OF STREET NAME BLADE.
– PARKING LOT STRIP SHALL BE WHITE
– IN THE CASE OF A STREET WITH TWO CUL-DE-SAC ENDS, TWO (2) STANDARD W 14-2a "NO OUTLET" SIGNS SHALL BE MOUNTED AT THE ENDS OF THE STREET NAME BLADE WITH ARROWS PLACED IN THE APPROPRIATE DIRECTIONS.
7. BLOCK NUMBER
– BLOCK NUMBERS ARE REQUIRED ON ALL STREET NAME BLADES, EVEN IF NO HOUSES OR BUILDINGS FRONT ONTO THE STREET.
8. MANUFACTURER CONTACT
– BRANDON INDUSTRIES, INC. 1601 W. WILMETH ROAD, VICKINNEY, TEXAS 75069. (972) 542-3000, OR APPROVED EQUAL.
– DEVELOPERS AND CONTRACTORS ORDERING SIGNS SHOULD CONTACT PUBLIC WORKS AT (214) 975-0470.
STREET BLADE DETAIL
N.T.S.
PROJECT NAME
LITTLEELM
TOWN OF LITTLE ELM
CAPITAL IMPROVEMENTS PROJECT
"YOUR TAX DOLLARS AT WORK"
ENGINEER NAME
CONTRACTOR NAME
7"
5"
7"
5"
9"
4"
6"
4"
6"
4"
4"
3"
3"
9"
4'-0"
6'-0"
6'-0"
2'-6"
2'-6"
2'-6"
2'-0"
2'-0" MIN.
SIGN MAY BE ADAPTED TO USE SANDBAGS IF NECESSARY.
SIGN PANEL – ¾" LAMINATED DUOLOX MASONITE OR ½" MARINE PLYWOOD
FRAME – 2" X 4" STOCK
FRAME TO BE PAINTED "WHITE"
PAINT BACKGROUND OF SIGN "WHITE"
PAINT MESSAGE OF SIGN "BLUE"
ALL PAINT TO BE EXTERIOR GRADE
CONTRACTOR SHALL PLACE SIGN(S) AS DIRECTED BY THE OWNER AND WILL PROPERLY MAINTAIN THE SIGN(S) DURING CONSTRUCTION
PROJECT SIGN DETAIL
N.T.S.
4000 PSI CONCRETE FOUNDATION, GROUTED SMOOTH W/ 3/4" CHAMFER
ANCHOR BOLTS PER MANUFACTURERS RECOMMENDATIONS
6"
3" MIN. CLR
#3 SPIRAL @ 4" PITCH
6 – #8 VERTICAL BARS
5'-0" FOR POLES ≤ 15-FT
7'-0" FOR POLES > 15-FT
CONDUIT, WIRING & GROUNDING PER NEC CODE
2'-0"ø
NOTES:
1. THIS DETAIL IS A REPRESENTATION OF THE MINIMUM REQUIREMENTS FOR CONSTRUCTION. THE DESIGN ENGINEER IS RESPONSIBLE FOR CONCRETE FOUNDATION DESIGN, INCORPORATING RECOMMENDATIONS OF THE GEOTECHNICAL REPORT.
2. CONCRETE AND REINFORCING STEEL TO BE PLACED IN ACCORDANCE WITH ACI CODE.
LIGHT POLE BASE DETAIL
N.T.S.
ALUMINUM U-CHANNEL BLADE MOUNTING HARDWARE
TMUTCD STANDARD SIGNAGE
2-1/2" SCH. 80 HDG STEEL SIGN POST
7'-0" MIN.
HDG STEEL TRIANGULAR BREAKAWAY SLIP BASE ASSEMBLY
36" HDG STEEL STUB POST BASE
4" MAX.
12" #4 REBAR THROUGH 3/4" HOLE IN STUB
18" DIA. x 48" DP. 3,000 PSI CONCRETE
NOTES:
1. SLIP BASE BOLTS, NUTS AND WASHERS SHALL BE PER ASTM A325 OR A449, GALVANIZED PER ASTM A454.
STREET SIGN POST DETAIL
N.T.S.
MIN. 40'-0" ACCESS CLEARANCE (80'-0" MAX.)
1"ø GATE HOD KEEPER SET IN CONC. (TYP. 1 PER GATE)
SOLID OPAQUE METAL GATE(S) (CHAINLINK NOT ALLOWED) MAX. 4" GAP BETWEEN BOTTOM OF GATE AND GROUND.
14'-0"
8'-0" HIGH BRICK OR STONE WALL ENCLOSURE OF A COLOR MATCHING THE PRIMARY BUILDING
12'-0" (SINGLE PAD) 29'-0" (DOUBLE PAD)
NOTES:
1. ENGINEERED CONCRETE FOUNDATIONS WITH PIERS ARE REQUIRED, PER REVIEW AND APPROVAL BY TOWN ENGINEER.
2. NEW COMMERCIAL DEVELOPMENT SHALL PROVIDE SPACE FOR A MINIMUM OF TWO DUMPSTER PADS.
COMMERCIAL DUMPSTER SCREENING ENCLOSURE DETAIL
N.T.S.
BACK OF CURB
15'-0" MIN.
RIGHT-OF-WAY
15'-0" MIN.
CORNER RESIDENTIAL LOT
PROP. LINE
CEDAR BOARD ON BOARD FENCE
RESIDENTIAL FENCE AND/OR RETAINING WALL
15'-0" MIN.
NOTES:
1. ALL RESIDENTIAL FENCES FACING STREETS, OPEN AREAS, OR COMMERCIAL ZONES MUST BE 6'-0" HIGH CEDAR BOARD-ON-BOARD STYLE.
2. FENCES AND RETAINING WALL MUST BE AT LEAST 15 FEET FROM EDGE OF PAVEMENT.
FENCE/RETAINING WALL LAYOUT DETAIL
N.T.S.
4x4 POST CAP
NOTCHED CROSS-LAP JOINT
4" FROM BACK OF CURB
6"
4'-0"
18"
18"
3'-8"
GREEN TREATED OR CEDAR 4x4 POST
2'-6" TO FACE OF CURB OR EDGE OF PAVEMENT
3'-0"
NOTES:
1. ATTACH POST, BRACE AND CROSS MEMBERS USING HOT DIPPED, GALVANIZED 4" LAG SCREWS IN PREDRILLED, COUNTER-SUNK HOLES.
2. CONTRACTOR TO INSTALL GIBRALTAR INDUSTRIES STANDARD SIZE BLACK GALVANIZED MAILBOX OR APPROVED EQUAL.
TYPICAL POST MAILBOX CONSTRUCTION
N.T.S.
MASONRY DETAILS OF MAILBOX TO BE PROVIDED BY HOMEBUILDER AND APPROVED BY TOWN PRIOR TO CONSTRUCTION
4" FROM BACK OF CURB
3'-8"
1'-0" TO FACE OF CURB OR EDGE OF PAVEMENT
4" MIN.
6" THK. CONC. PAD EXTEND MIN. 4" BEYOND FACE OF BRICK
3'-0"
1'-0"ø CONC. PIER
NOTES:
1. CONCRETE PAD AND PIER SHALL BE CONSTRUCTED IN A SINGLE MONOLITHIC POUR.
2. CONTRACTOR TO INSTALL GIBRALTAR INDUSTRIES STANDARD SIZE BLACK GALVANIZED MAILBOX OR APPROVED EQUAL.
TYPICAL BRICK PAD MAILBOX CONSTRUCTION
N.T.S.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
MISCELLANEOUS DETAILS 1 OF 2
LITTLEELM
SHEET
25 OF 26
DECEMBER 2023


NOTES:
1. SHOP DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION OF ALL ITEMS. SHOP DRAWINGS SHALL INCLUDE ALL SHOP AND ERECTION DETAILS.
2. STEEL TUBING SHALL CONFORM TO ASTM A500, GR B. ALL SURFACES SHALL BE PRIME COAT PAINTED WITH 2 COATS OF TNEMEC RED METAL PRIMER.
3. ALL SURFACES SHALL BE PAINTED WITH 2 COATS OF BENJAMIN MOORE RUST INHIBITOR PAINT SEMI-GLOSS BLACK OR APPROVED EQUAL. ALL TUBES AND FITTINGS SHALL BE FLUSH AND FREE OF SHARP EDGES, SPURS, AND DENTS. ALL RAILINGS SHALL BE FABRICATED IN THE SHOP TO FIT FIELD CONDITIONS.
4. ALL ITEMS SHALL BE INSTALLED AND SET IN THEIR CORRECT LOCATIONS AS SHOWN ON THE DRAWINGS. THEY SHALL BE SET LEVEL, PLUMB, SQUARE, AND AT THE PROPER ELEVATION.
5. POSTS SHALL BE SET PLUM. RAILS SHALL FOLLOW THE SLOPE. CONTRACTOR SHALL VERIFY CONDITIONS PRIOR TO FABRICATION.
90° ROTATION
90° ROTATION
GATE LATCH (SEE DETAIL)
6"x6"x¼" STEEL POST (TYP.)
GATE HINGE (SEE DETAIL)
1"ø GATE ROD KEEPER SET IN CONC. (TYP. 1 PER GATE)
GATE HINGE (SEE DETAIL)
STONE WALL
STONE COLUMN
20'-0"
PLAN VIEW
COLUMN NOTES:
1. ALL CONCRETE USED IN FOOTINGS AND PIERS SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3500 PSI. CONCRETE USED IN COLUMNS SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI.
2. ALL REINFORCING STEEL SHALL BE NEW BILLET STEEL, ASTM A615 GR.60 EXCEPT STIRRUPS SHALL BE GR.40 AND SPIRALS SHALL BE ASTM A82 GR.60.
3. CONCRETE FOR DRILLED PIERS SHALL BE POURED WITHIN 8 HOURS OF DRILLING PIER HOLES.
CAST STONE LOW RISE PYRAMIDAL COLUMN CAP WITH BULLNOSE EDGES
TOWN LOGO STYLE 2 LOGO TO BE PROVIDED AND APPROVED BY TOWN (OPTIONAL)
SANDSTONE (NATURAL) STONE FACING
FINISH GRADE
CONCRETE PIER CAP
1'-6" DIA. CONCRETE PIER
ELEVATION WITH TOWN LOGO
18"
12"
90°
4-#5 VERT @ 90° SPACING AROUND SPIRAL
#3 ROUND STIRRUP @ 18" O.C.
CONCRETE PIER TYP. SECTION
2'-2"
4"
1" OVERHANG
ANCHOR BOLT
GROUT FILL VOIDS
TYPE S MORTAR JOINTS W/ GALVANIZED LADDER WIRE EACH COURSE.
8"x8"x16" CMU, GROUT FILL (TYP.) 4-#5 REBAR VERT., TIE TO FOOTING
8'-6"
4-#5 BARS EXTEND TO TOP OF COLUMN
2'-0" MIN.
4-#5 BARS @ 1'-6" O.C. ALTERNATE TURNS IN FOOTING
FINISH GRADE
3-#3 STIRRUPS
4-#5 HOOKS, 8"x36"
3-#5 BARS CONTINUOUS TOP AND BOTTOM
1'-6"
DOUBLE TIE AT TOP
4-#5 BAR VERTICAL
2'-6"
10'-0" MIN. DEPTH IN CLAY OR WEATHERED ROCK, OR 4'-0" MIN. PENETRATION INTO UNWEATHERED ROCK
#3 ROUND STIRRUP @ 1'-6" O.C.
REINFORCEMENT
STONE COLUMN DETAIL
N.T.S.
6"x6"x¼" STEEL POST (TYP.), EXTEND TO BOTTOM OF PIER
2"x3"x¼" TUBULAR STEEL RAIL
1" SQ. TUBULAR BARS @ 4" O.C.
10'-0"
GATE HINGE (TYP.) (SEE DETAIL)
STONE COLUMN
STONE WALL
LITTLE ELM
GATE LATCH (SEE DETAIL)
6" CONC. CURB
TOWN OF LITTLE ELM LOGO ¼" STEEL PLATE ON 1" SQ. STEEL TUBE FRAME (SUBMIT SHOP DRAWINGS PRIOR TO FABRICATION)
BLACK RUBBER SPRING-LOADED WHEEL ON EACH GATE (BOLTED TO INSIDE OF GATE FRAME)
GATEKEEPER (SEE DETAIL)
2"x3"x¼" TUBULAR STEEL FRAME
FINISHED GRADE
ELEVATION
20'-0" DOUBLE SWING GATE
N.T.S.
2'-0"
4"
½" OVERHANG
4" THICK MILLSAP STONE FACING
3'-10"
FINISH GRADE
CONCRETE PIER CAP
ELEVATION
2'-3"
CHOPPED STONE CAP
TYPE S MORTAR JOINTS W/ GALVANIZED LADDER WIRE EACH COURSE
8"X8"X16" CMU, GROUT FILL, ALTERNATE BLOCK DIRECTION
4'-2"
4-#5 BARS EXTEND TO TOP OF COLUMN, TIE TO FOOTING REINF.
MORTAR FILL ALL VOIDS
3-#3 STIRRUPS
3-#5 BARS TOP AND BOTTOM
1'-6"
2'-6"
REINFORCEMENT
SMALL STONE COLUMN DETAIL
N.T.S.
1"
1/2"
PLAN
6"x6"x¼" STEEL TUBULAR POST
1/2"ø HOLES
2"x3" STL. TUBE GATE FRAMES
WELDS
¼" THK. STL. PLATE
ELEVATION
GATE LATCH DETAIL
N.T.S.
11 3/4"
3 3/4"
6"
2"
2"x3"x¼" TUBULAR STEEL GATE FRAME
1 1/2"
3"
PLAN
NARROW-PROFILE, WELD-ON, GREASEABLE HINGES. INSTALL HINGES SO GATE CANNOT BE LIFTED OFF.
WELDS (TYP.)
ELEVATION
GATE HINGE DETAIL
N.T.S.
3"x2"x1/4" STL. ANGLE BRACKET WELDED TO VERT. FRAME RAIL
1"ø HOLE EA. BRACKET
1/8" CHAMFER ENDS OF KEEPER ROD
WELD 3/4" I.D.x 1 1/2" L x 1/4" THK COLLAR 4" BELOW BOTTOM OF BRACKET
3/4"ø KEEPER ROD
2'-10½" L x 3/4"ø STL. KEEPER ROD
2"ø x 1/2" THK. STL. WELDED TO KEEPER ROD
3"x2"x1/4" STL. ANGLE BRACKET WELDED TO VERT. FRAME RAIL
3/8"ø HOLE DRILLED THROUGH 1/2" STL. & ANGLE BRACKET
1"ø HDG ROD KEEPER EPOXIED IN CONCRETE
GATE KEEPER ROD DETAIL
N.T.S.
10'-0" O.C.
2" SQ. RAIL INSERT (TYP.)
4" SQ. CEDAR RAILS
4" SQ. CEDAR POST
FINISHED GRADE
12" DIA. CONCRETE FOOTING
4" DEPTH GRAVEL BASE
1'-0"
NOTE:
1. FENCE SHALL BE CONSTRUCTED OF WESTERN RED CEDAR.
SPLIT RAIL FENCE DETAIL
N.T.S.
1"X2"X7" TRIM
8'-0" PICKET
5"
CAP DETAIL
N.T.S.
BOARD ON BOARD FENCE NOTES:
1. PICKETS TO BE ¾"x5"x8" NO.1 CEDAR
2. BOARD ON BOARD WITH MAX 4" SPACING
3. ALL NAILS TO BE STAINLESS STEEL (316 OR 304)
4. GALVANIZED POST TO BE 2⅜" MINIMUM
5. LAGS TO BE ¾"x1½"
6. ROUGH TRIM TO BE EQUALLY SPACED
7. ALL CEDAR MATERIAL TO BE PRE-STAINED. STAIN SAMPLE SHALL BE APPROVED BY TOWN PRIOR TO INSTALLATION.
8. STONE COLUMNS TO BE INSTALL AT CORNERS AND MIDPOINT OF FENCE SECTION, UNLESS OTHERWISE INDICATED ON PLANS.
2"X6"X12" TOP CAP
FLAT CAP W/ TRIM SEE DETAIL THIS SHEET
ROUGH TRIM
8'-5"
8'
GALVANIZED KICK BOARD
12" WIDE x 36" DEEP CONCRETE FOUNDATIONS
ENCLOSE ALL EXPOSED GALVANIZED STEEL POSTS AND HARDWARE WITHIN A BOX CONSTRUCTED OF CEDAR BOARDS MATCHING THE FENCE
BOARD ON BOARD CEDAR FENCE
N.T.S.
DATE
REVISION
NO.
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE:
NONE
JOB NUMBER:
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
MISCELLANEOUS DETAILS 2 OF 2
LITTLEELM
SHEET
26 OF 26
DECEMBER 2023

TOWN OF LITTLE ELM
STANDARD DETAILS

LITTLE ELM

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STANDARD DETAILS * TOWN OF LITTLE ELM, TEXAS * DECEMBER 2023

CONSTRUCTION
GENERAL NOTES

GENERAL NOTES

1. IT IS NOT THE INTENT OF THESE CONSTRUCTION NOTES TO COVER ALL DETAILS AND/OR SPECIFICATION REQUIREMENTS OF THE TOWN OF LITTLE ELM. WHEN THERE IS A CONFLICT BETWEEN THESE STANDARDS AND OTHER REGULATIONS, THE CONTRACTOR MUST ABIDE BY THE STRICTEST REQUIREMENT.

2. THE EXISTENCE AND LOCATIONS OF ALL UNDERGROUND UTILITIES SHOWN (MAIN LINES, NO LATERAL OR SERVICES SHOWN) ON THE DRAWINGS WERE OBTAINED FROM AVAILABLE RECORDS AND ARE APPROXIMATE. NO WARRANTY IS IMPLIED AS TO THE ACTUAL LOCATION OF EXISTING UTILITIES. NEITHER THE OWNER NOR THE ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES NOT SHOWN OR NOT IN THE LOCATION SHOWN. THE CONTRACTOR SHALL DETERMINE THE DEPTH AND LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO TRENCHING AND SHALL BE REQUIRED TO TAKE ANY PRECAUTIONARY MEASURES TO PROTECT ALL LINES SHOWN AND / OR ANY OTHER UNDERGROUND UTILITIES NOT OF RECORD OR NOT SHOWN ON THE PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL FRANCHISE AND TOWN UTILITIES PRIOR TO CONSTRUCTION.

3. ANY CONTRACTOR / SUBCONTRACTOR PERFORMING WORK ON THIS PROJECT SHALL FAMILIARIZE HIMSELF WITH THE SITE AND SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM HIS OPERATIONS. SAID EXISTING IMPROVEMENTS SHALL INCLUDE BUT NOT BE LIMITED TO BERMS, DITCHES, FENCES, AND VEGETATION. ANY REMOVAL OR DAMAGE TO EXISTING IMPROVEMENTS SHALL BE REPLACED OR REPAIRED BY THE CONTRACTOR AT HIS EXPENSE AND SHALL BE APPROVED BY THE TOWN OF LITTLE ELM.

4. ALL CONSTRUCTION, TESTING, AND MATERIALS SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE TOWN OF LITTLE ELM. ALL SUBMITTALS MUST BE ORIGINALS WITH SIGNATURES WHERE APPLICABLE; FACSIMILES WILL NOT BE ACCEPTED.

5. TESTING SERVICES FOR PUBLIC PROJECTS SHALL BE PROVIDED BY THE TOWN. COSTS ASSOCIATED WITH THESE TESTS SHALL BE PAID BY THE TOWN. RE-TEST OF FAILED AREAS THAT DO NOT MEET THE REQUIREMENTS STATED WITHIN SHALL BE PAID FOR BY THE CONTRACTOR.

6. ALL TRAFFIC CONTROLS SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST REVISION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD). ALL REFERENCE FOR USING TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) STANDARDS AND CONSTRUCTION DETAILS SHALL BE THE LATEST REVISIONS AND/OR AMENDMENTS THEREOF. THE TOWN OF LITTLE ELM USES RAISED PAVEMENT MARKINGS (BUTTONS) FOR STRIPING AND THERMOPLASTIC MARKINGS IN LIEU OF PAINT. THE MINIMUM SIGN SIZE SHALL BE THE STANDARD SIZE IN THE MANUAL. DETAILS ARE AVAILABLE UPON REQUEST FOR THE TYPE OF BUTTON PATTERNS, POSTS, AND CONNECTIONS REQUIRED FOR THE SIGNS.

7. THE CONTRACTOR SHALL MAKE EVERY EFFORT NOT TO IMPEDE TRAFFIC ON EXISTING STREETS, ALLEYS, OR FIRE LANES OPEN TO THE PUBLIC. IN THE EVENT THE CONSTRUCTION WORK REQUIRES THE CLOSURE OF AN EXISTING STREET, ALLEY, OR FIRE LANE, THE CONTRACTOR SHALL REQUEST THE ROAD CLOSURE THROUGH THE TOWN. IF THE CLOSURE ELIMINATES THE SECOND POINT OF ACCESS TO EXISTING BUILDINGS WITH A CERTIFICATE OF OCCUPANCY, THEN THE ACCESS MAY NOT BE CLOSED FOR MORE THAN FORTY-EIGHT (48) HOURS AND WILL REQUIRE FIRE MARSHAL APPROVAL IN EITHER CASE. UNLESS OTHERWISE SPECIFIED BY THE TOWN, ALL OTHER STREETS OR ALLEYS MAY NOT BE CLOSED FOR MORE THAN SEVENTY-TWO (72) HOURS.

8. THE CONTRACTOR SHALL INSTALL TEMPORARY FENCES ADJACENT TO ALL SIDEWALKS AND ADJACENT DEVELOPED PROPERTIES. THE CONTRACTOR MUST ALSO PROVIDE TEMPORARY FENCING WHEN FENCES OR OTHER SCREENING FEATURES ARE REMOVED FOR THE DURATION OF CONSTRUCTION.

9. ALL CONCRETE STRUCTURES, WHETHER PRECAST OR CAST-IN-PLACE, SHALL BE DESIGNED WITH APPROPRIATE SULFATE RESISTANT CEMENT OR EQUIVALENT BASED ON LOCAL SOIL CONDITIONS PER GEOTECHNICAL REPORT. PRECAST MANHOLES OR OTHER SPECIAL STRUCTURES IN ANY RIGHT-OF-WAY OR FIRE LANE EASEMENTS WILL REQUIRE A CERTIFICATION FROM THE MANUFACTURER THAT THE PRODUCT MEETS THE DESIGN CRITERIA AND TWENTY-EIGHT (28) DAY COMPRESSIVE STRENGTH. CAST-IN-PLACE MANHOLES OR OTHER SPECIAL STRUCTURES IN ANY RIGHT-OF-WAY AND FIRE LANE OR UTILITY EASEMENTS WILL REQUIRE CYLINDERS TO BE MADE FOR STRENGTH TESTS BY AN APPROVED LABORATORY. LABORATORY TEST REPORTS SHALL BE SUBMITTED TO THE DESIGN ENGINEER FOR APPROVAL. SAMPLES FOR STRENGTH TESTS OF EACH CLASS OF CONCRETE PLACED EACH DAY SHALL BE TAKEN NOT LESS THAN ONCE A DAY, NOR LESS THAN ONCE FOR EACH 100-150 CU YD OF CONCRETE, NOR LESS THAN ONCE FOR EACH 5000 SQ FT OF SURFACE AREA FOR SLABS OR WALLS. FOUR (4) CYLINDERS SHALL BE MADE: ONE (1) SHALL BE BROKEN AT SEVEN (7) DAYS, TWO (2) SHALL BE BROKEN AT TWENTY-EIGHT (28) DAYS, AND ONE (1) SHALL BE HELD IN CASE OF DAMAGE OF ANY OF THE OTHER THREE (3). THE AVERAGE STRENGTH OF TWO (2) CYLINDERS FROM THE SAME SAMPLE, TESTED AT TWENTY-EIGHT (28) DAYS, IS REQUIRED FOR EACH STRENGTH TEST; ANY STRENGTH TEST BEYOND TWENTY-EIGHT (28) DAYS IS UNACCEPTABLE. IF THE TWENTY-EIGHT (28) DAY DESIGN STRENGTH IS NOT REACHED UPON STRENGTH TESTING THE CYLINDERS, THE DEFICIENT AREA SHALL BE CORED IMMEDIATELY TO BE PROVED OUT. FOR ANY AREAS DEFICIENT IN STRENGTH BY NOT MORE THAN 500 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN ONE (1) TIME THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO DEFICIENT IN STRENGTH. FOR ANY AREAS DEFICIENT IN STRENGTH BY MORE THAN 500 PSI BUT NOT MORE THAN 1000 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN TWO (2) TIMES THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO DEFICIENT IN STRENGTH. FOR ANY AREAS DEFICIENT IN STRENGTH BY MORE THAN 1000 PSI, THE STRUCTURE SHALL BE REMOVED AND RECONSTRUCTED AT THE FULL EXPENSE OF THE CONTRACTOR. PRIOR TO TOWN ACCEPTANCE OF ANY PENALTY PAYMENTS FOR ANY TRAFFIC BEARING STRUCTURE THAT DOES NOT MEET TWENTY-EIGHT (28) DAY DESIGN STRENGTH; THE DESIGN ENGINEER SHALL PROVIDE A SEALED STRUCTURAL EVALUATION THAT ASSESSES THE PERFORMANCE ADEQUACY OF THE DEFICIENT STRUCTURE AS CONSTRUCTED UNDER THE DESIGN SERVICE LOADS. ALL CORING AND ADDITIONAL LABORATORY TESTING SHALL BE AT THE EXPENSE OF THE CONTRACTOR.

10. BLASTING IS NOT PERMITTED ON THIS PROJECT.

11. ALL CONSTRUCTION OPERATIONS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH APPLICABLE REGULATIONS OF THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION.

12. THESE PLANS DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR ITS EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE REGISTERED PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED IN THE WORK.

13. NO TRENCH EXCAVATION SHALL OCCUR UNTIL THE TOWN APPROVES THE TRENCH SAFETY PLAN SUBMITTED BY THE CONTRACTOR.

14. A PRE-CONSTRUCTION CONFERENCE IS TO BE HELD PRIOR TO BEGINNING CONSTRUCTION. THIS CONFERENCE SHALL TAKE PLACE AT A LOCATION SELECTED BY OWNER & ENGINEER. CONTRACTOR TO ARRANGE A MEETING DATE WITH THE OWNER AT LEAST SEVEN DAYS PRIOR TO THE MEETING TIME.

15. CONTRACTOR SHALL NOTIFY THE OWNER, OWNER'S REPRESENTATIVE, AND TCEQ (IF APPLICABLE) BY TELEPHONE A MINIMUM OF 48 HOURS IN ADVANCE OF CONSTRUCTION STARTUP, FOLLOWED BY A LETTER OF CONFIRMATION.

16. CONTRACTOR SHALL ASSURE HIMSELF THAT ALL CONSTRUCTION PERMITS HAVE BEEN OBTAINED PRIOR TO COMMENCEMENT OF WORK. REQUIRED PERMITS THAT CAN ONLY BE ISSUED TO CONTRACTOR ARE TO BE OBTAINED AT THE CONTRACTORS EXPENSE.

17. CONTRACTOR SHALL GIVE A MINIMUM OF 48 HOURS NOTICE TO ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS, OR PERSONS IN CHARGE OF PRIVATE AND PUBLIC UTILITIES AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK.

18. CONTRACTOR SHALL TAKE ALL DUE PRECAUTIONS TO PROTECT EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES INCURRED AS A RESULT OF THESE CONSTRUCTION OPERATIONS ARE TO BE REPAIRED IMMEDIATELY BY THE CONTRACTOR TO AT LEAST THE PRE-EXISTING CONDITION AT NO ADDITIONAL COST TO OWNER.

19. WHEN UNLOCATED OR INCORRECTLY LOCATED UNDERGROUND PIPING OR A BREAK IN A LINE OR OTHER UTILITIES AND SERVICES ARE ENCOUNTERED DURING SITE WORK OPERATIONS, THE CONTRACTOR SHALL NOTIFY THE APPLICABLE UTILITY COMPANY IMMEDIATELY TO OBTAIN PROCEDURE DIRECTIONS. THE CONTRACTOR SHALL COOPERATE WITH THE APPLICABLE UTILITY COMPANY IN MAINTAINING ACTIVE SERVICES IN OPERATION.

20. THE CONTRACTOR SHALL MAINTAIN ACCESS TO PUBLIC AND PRIVATE FACILITIES DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES TO BE COORDINATED WITH THE OWNER.

21. THE CONTRACTOR SHALL COORDINATE INTERRUPTIONS OF ALL UTILITIES AND SERVICES WITH APPLICABLE UTILITY COMPANY OR COMPANIES. ALL WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE UTILITY COMPANY OR AGENCY INVOLVED.

22. THE CONTRACTOR SHALL LOCATE, PROTECT, AND MAINTAIN BENCHMARKS, MONUMENTS, AND CONTROL POINTS. THE CONTRACTOR SHALL RE-ESTABLISH DISTURBED OR DESTROYED ITEMS BY A REGISTERED PUBLIC SURVEYOR IN THE STATE OF TEXAS, AT NO ADDITIONAL COST TO OWNER.

23. EXISTING PAVING, BUILDING, AND OTHER ITEMS SHOWN ON PLANS NOT SPECIFICALLY RELATED TO THE WORK OF THE CONTRACTOR IS FOR INFORMATION ONLY.

24. DEMOLITION PERMITS (IF NEEDED) ARE TO BE OBTAINED BY THE CONTRACTOR.

25. COORDINATES SHOWN FOR STRUCTURE LOCATIONS ARE REFERENCED TO OUTSIDE FACE OF EXTERIOR WALL AT GRADE OR TO CENTERLINE OF STRUCTURE, UNLESS OTHERWISE ON PLANS.

26. EXISTING SURFACE AND SUBSURFACE STRUCTURES (GAS MAINS, WATER MAINS, STORM SEWERS, TELEPHONE CABLES, ETC.) ARE SHOWN ON THE PLANS IF THEIR LOCATION HAS BEEN DETERMINED, BUT IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO AVOID DAMAGING THESE EXISTING STRUCTURES WHETHER OR NOT THEY ARE SHOWN ON THE PLANS. THE OWNER AND ENGINEER ASSUME NO RESPONSIBILITY FOR FAILURE TO SHOW ANY OR ALL OF THESE STRUCTURES ON THE PLANS OR TO SHOW THEM IN THEIR EXACT LOCATION. IF ANY STRUCTURE IS DAMAGED BY THE CONTRACTOR, IT SHALL BE HIS RESPONSIBILITY TO REPAIR THE DAMAGE AT HIS OWN EXPENSE AND RESTORE THE STRUCTURE TO ITS ORIGINAL CONDITION.

27. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATIONS, ELEVATIONS AND DIMENSIONS OF ADJACENT AND/OR CONFLICTING UTILITIES IN ADVANCE OF CONSTRUCTION IN ORDER THAT ADJUSTMENTS CAN BE MADE TO PROVIDE ADEQUATE CLEARANCES, IF REQUIRED. THE CONTRACTOR SHALL PRESERVE AND PROTECT PUBLIC UTILITIES AT ALL TIMES DURING CONSTRUCTION. ANY DAMAGE TO UTILITIES RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED AT HIS EXPENSE. THE ENGINEER SHALL BE NOTIFIED WHEN PROPOSED FACILITY GRADES CONFLICT WITH EXISTING UTILITY GRADES.

28. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING "AS-RECORDED" PLANS TO THE ENGINEER OF RECORD SHOWING THE LOCATION OF ALL IMPROVEMENTS. THIS INFORMATION SHALL BE PLACED ON THE ENGINEERING PLANS AND MARKED "RECORD DRAWING" PLANS ALONG WITH THE DATE AND THE NAME OF THE CONTRACTOR BY THE ENGINEER OF RECORD. THESE PLANS SHALL BE FURNISHED TO THE TOWN ELECTRONICALLY IN PDF FORMAT.

29. THE CONTRACTOR SHALL FURNISH A MAINTENANCE BOND IN THE AMOUNT OF 10% OF THE TOTAL CONTRACT PRICE OF ALL PUBLIC AND CERTAIN PRIVATE IMPROVEMENTS. THIS BOND SHALL RUN TWO YEARS FROM THE DATE OF FINAL ACCEPTANCE OF THE PROJECT BY THE TOWN. PRIVATE IMPROVEMENTS REQUIRING A MAINTENANCE BOND INCLUDE, BUT ARE NOT LIMITED TO, FIRE LANES, PRIVATE WATER MAINS, FIRE HYDRANTS, ETC.

30. REFER TO THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS (NCTCOG) PUBLIC WORKS CONSTRUCTION STANDARDS AND SPECIFICATIONS (LATEST EDITION) FOR REQUIREMENTS FOR ITEMS NOT INCLUDED IN THIS DOCUMENT. FINAL APPROVAL IS AT THE DISCRETION OF THE TOWN ENGINEER.

31. CONTRACTOR SHALL PROVIDE DAILY STREET SWEEPING AND GENERAL SITE CLEANUP FOR THE AREA SURROUNDING THE PROJECT SITE.

32. CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED TO PROPERTY (PUBLIC OR PRIVATE) WITHIN 48 HOURS OF NOTIFICATION BY THE TOWN.

GENERAL ENVIRONMENTAL NOTES

1. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL REQUIREMENTS REGARDING EXCESS AND WASTE MATERIAL, INCLUDING METHODS OF HANDLING AND DISPOSAL.

2. CONTRACTOR SHALL LOCATE MATERIAL STORAGE AREAS AWAY FROM STORMWATER CONVEYANCE SYSTEMS. PROVIDE PROTECTED STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER POTENTIALLY TOXIC MATERIALS.

3. FUEL STORAGE IS NOT ALLOWED ON THIS PROJECT.

4. THE CONTRACTOR SHALL ADVISE OWNER IMMEDIATELY, VERBALLY AND IN WRITING, OF ANY FUEL OR TOXIC MATERIALS SPILLS WITHIN THE PROJECT/CONSTRUCTION AREA AND THE ACTIONS TO BE TAKEN TO REMEDY THE PROBLEM.

5. THE CONTRACTOR SHALL DISPOSE OF FUELS, HAZARDOUS MATERIALS, AND CONTAMINATED EXCAVATIONS IN A LEGALLY APPROVED MANNER.

6. NO OPEN BURNING IS ALLOWED WITHIN THE CITY LIMITS.

SITE GRADING NOTES

1. THE CONTRACTOR SHALL CONTROL DUST CAUSED BY THE WORK AND COMPLY WITH POLLUTION CONTROL REGULATIONS OF GOVERNING AUTHORITIES.

2. EXCESS EXCAVATED MATERIAL SHALL BE STOCKPILED IN DESIGNATED AREA AS SHOWN ON PLANS OR AS DIRECTED BY THE OWNER. REINFORCED FILTER FABRIC FENCE TO BE INSTALLED AROUND STOCKPILE ON DOWNSTREAM SIDE AND BOTH SIDES ADJACENT TO THE DOWNSTREAM SIDE. STOCKPILES ARE NOT TO TRAP OR POND WATER. TOPSOIL TO BE STOCKPILED SEPARATELY. ALL EXCESS EXCAVATED MATERIAL IS TO BE REMOVED FROM THE SITE, CONTRACTOR TO NOTIFY TCEQ AND THE OWNER'S REPRESENTATIVE OF LOCATION OF DISPOSAL BEFORE MATERIAL IS REMOVED.

3. THE FINISHED GRADE ELEVATIONS SHOWN ARE INTENDED TO PROVIDE ADEQUATE DRAINAGE. MINOR FIELD CHANGES MAY BE NECESSARY TO PROVIDE ADEQUATE DRAINAGE. GRADE UNIFORMLY BETWEEN ELEVATIONS SHOWN TO PROVIDE DRAINAGE.

4. ADJUST MANHOLE COVERS, VALVE BOXES, ELECTRICAL MANHOLES, ETC. TO MATCH PROPOSED FINISHED GRADE (NO SEPARATE PAY).

5. RETAINING WALLS SHALL BE NO GREATER THAN 6" IN HEIGHT AT THE END OF WALL.

6. THE MAXIMUM SLOPE IN THE FRONT AND REAR OF SINGLE FAMILY LOTS IS 6:1 UNLESS APPROVED BY THE TOWN ENGINEER.

7. TYPICAL SLOPES ON COMMERCIAL LOTS IS 6:1 WITH A MAXIMUM SLOPE ALLOWED OF 4:1 UNLESS APPROVED BY TOWN ENGINEER.

EROSION CONTROL & TREE PROTECTION NOTES

1. CONTRACTOR SHALL FOLLOW ALL STORMWATER POLLUTION PREVENTION PLAN (SWPPP) GUIDELINES AND PERMITS THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES.

2. THE CONTRACTOR TO INSTALL AND MAINTAIN EROSION/SEDIMENTATION CONTROLS AND TREE/NATURAL AREA PROTECTIVE FENCING PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING, GRADING, OR EXCAVATION). CONTRACTOR TO REMOVE EROSION/SEDIMENTATION CONTROLS AT THE COMPLETION OF PROJECT AND GRASS RESTORATION.

3. THE PLACEMENT OF EROSION/SEDIMENTATION CONTROLS TO BE IN ACCORDANCE WITH THE PROPOSED SITE GRADING PLAN. DEVIATIONS FROM THE PLAN MUST BE SUBMITTED TO AND APPROVED BY THE OWNER.

4. EROSION AND SEDIMENTATION CONTROLS TO BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN SOIL BUILDUP WITHIN TREE DRIPLINES.

5. TO AVOID SOIL COMPACTION, NO VEHICULAR TRAFFIC, PARKING, OR STORAGE OF EQUIPMENT OR MATERIALS IS ALLOWED IN THE TREE DRIPLINE AREAS.

6. TREES TO BE REMOVED IN A MANNER WHICH DOES NOT IMPACT TREES TO BE PRESERVED.

7. INTENTIONAL RELEASE OF VEHICLE OR EQUIPMENT FLUIDS ONTO THE GROUND IS NOT ALLOWED. CONTAMINATED SOIL RESULTING FROM ACCIDENTAL SPILL TO BE REMOVED AND DISPOSED OF PROPERLY.

NO.	REVISION	DATE

DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
GENERAL CONSTRUCTION NOTES 1 OF 3

LITTLE ELM

SHEET
1 OF 26

DECEMBER 2023

CONSTRUCTION
GENERAL NOTES

PAVING NOTES

1. ABSOLUTELY NO EARTHWORK, LIME APPLICATION, OR OTHER PREPARATION OF THE SUBGRADE FOR PAVING OF STREETS, ALLEYS, OR FIRE LANES SHALL BE INITIATED WITHOUT AUTHORIZATION FROM THE TOWN'S CONSTRUCTION INSPECTOR. ONCE ALL TESTING OF UNDERGROUND FACILITIES HAS BEEN COMPLETED AND VERIFIED TO MEET THE TOWN'S SPECIFICATIONS, THE TOWN CONSTRUCTION INSPECTOR WILL ISSUE A LETTER TO THE PROJECT OWNER OR SUPERINTENDENT THAT WILL AUTHORIZE THE INITIATION OF ALL SUBGRADE WORK IN PREPARATION FOR PAVING. ALL STREET, ALLEY, AND FIRE LANE RIGHT-OF-WAY OR EASEMENT WIDTH SHALL BE EXCAVATED FULL WIDTH IN ACCORDANCE WITH THE STREET AND SIDEWALK SECTION TO BE CONSTRUCTED. THE SUBGRADE FOR ALL STREETS, ALLEYS, AND FIRE LANES SHALL BE STABILIZED WITH HYDRATED LIME MATERIAL TO A DISTANCE 12 INCHES BEYOND THE BACK OF CURB OR EDGE OF PAVING AS APPLICABLE. THE AMOUNT OF LIME MATERIAL SHALL BE THAT AMOUNT WHICH WILL REDUCE THE PLASTICITY INDEX (PI) BELOW FIFTEEN (15) AS VERIFIED BY TESTING BY AN APPROVED LABORATORY; THE TOWN WILL ADD ONE (1) PERCENT TO THE LABORATORY RESULTS FOR FIELD VARIATION. LABORATORY TESTING (LIME SERIES) SHALL GENERALLY BE CONDUCTED WHEN ALL UTILITIES ARE COMPLETE AND THE ROADWAY SUBGRADE IS COMPLETE. LIME SHALL BE APPLIED BY PERCENTAGE DRY UNIT WEIGHT OF SOIL TREATED TO A MINIMUM IN PLACE COMPACTED THICKNESS OF SIX (6) INCHES. FOR 6" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 37 POUNDS PER SQUARE YARD; FOR 8" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 54 POUNDS PER SQUARE YARD. AFTER APPLICATION OF LIME, PROVIDE A MELLOWING PERIOD AS INSTRUCTED BY TXDOT PUBLICATION "TREATMENT GUIDELINES FOR SOILS AND BASE IN PAVEMENT STRUCTURES." SULFATE TESTS SHALL ALSO BE CONDUCTED ON ALL PAVING PROJECTS IN THE TOWN UNDER THE DIRECTION OF THE APPROVED LABORATORY. FREQUENCY OF TESTS SHALL NOT BE LESS THAN EVERY 300 LINEAR FEET OF SUBGRADE, ALTERNATING FROM LEFT QUARTER POINT TO CENTER LINE TO RIGHT QUARTER POINT. ADDITIONAL TESTING MAY BE DEEMED NECESSARY BY THE TOWN ENGINEER. ALL TESTING FOR THE PRESENCE OF SULFATES IN THE PAVEMENT SUBGRADE SHALL BE AT THE CONTRACTOR'S EXPENSE. IF THE SULFATES ARE PRESENT AT AN UNACCEPTABLE CONCENTRATION, THE TOWN MAY REQUIRE A RECOMMENDATION FOR FURTHER TREATMENT OF THE SOIL FROM THE APPROVED LABORATORY, WHICH SHALL BE CONFIRMED BY THE DESIGN ENGINEER OF RECORD FOR THE PROJECT.

2. SUBGRADE TESTING REQUIREMENTS: ALL FILL SHALL BE COMPACTED TO NO LESS THAN 95% OF STANDARD PROCTOR DENSITY AT 0 – 4% ABOVE OPTIMUM MOISTURE CONTENT. FREQUENCY OF TESTING SHALL BE AT LEAST EVERY 300 LINEAR FEET PER 2.0' OF LIFT UNTIL FINAL GRADE, STARTING AT 2.0' ABOVE NATURAL/SOUND GRADE TO TOP OF SUBGRADE. ALL STREET, ALLEY, AND FIRE LANE SUBGRADE SHALL BE COMPACTED TO NO LESS THAN 95% OF STANDARD PROCTOR DENSITY AT 0 – 4% ABOVE OPTIMUM MOISTURE CONTENT. FREQUENCY OF TESTS SHALL NOT BE LESS THAN 300 LINEAR FEET OF SUBGRADE, ALTERNATING FROM LEFT QUARTER POINT TO CENTER LINE TO RIGHT QUARTER POINT. VERIFICATION OF LIME DEPTH, TESTING FOR SUBGRADE GRADATIONS & PULVERIZATIONS, AND PLASTICITY INDICES OF THE SOIL SHALL ALSO BE CONDUCTED; THE FREQUENCY OF THIS TESTING SHALL BE AS PREVIOUSLY MENTIONED. ALL TESTING OF MATERIALS REQUIRED FOR THE CONSTRUCTION OF ANY STREET, ALLEY OR FIRE LANE SHALL BE PERFORMED BY AN APPROVED AGENCY FOR TESTING MATERIALS. THE NOMINATION OF THE TESTING LABORATORY AND THE PAYMENT OF SUCH TESTING SERVICES SHALL BE MADE BY THE CONTRACTOR. THE ENGINEER SHALL APPROVE THE LABORATORY NOMINATED TO DO THE TESTING OF MATERIALS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SHOW BY STANDARD TESTING PROCEDURES THAT THE WORK CONSTRUCTED DOES MEET THE REQUIREMENTS OF THE TOWN'S SPECIFICATIONS.

3. ANY EXISTING PAVEMENT, CURBS, AND/OR SIDEWALK DAMAGED OR REMOVED BY THE CONTRACTOR ARE TO BE REPAIRED BY THE CONTRACTOR TO AT LEAST THE PREEXISTING CONDITION AT HIS EXPENSE BEFORE ACCEPTANCE OF THE WORK.

4. ALL TRAFFIC CONTROLS SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST REVISION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).

5. REPLACE EXISTING ROADWAY THAT IS CUT BY PIPE TRENCHES WITH SIMILAR ROADWAY.

6. MAINTAIN ALL MANHOLE FRAMES AND COVERS TO BELOW PAVEMENT SUBGRADE ELEVATION UNTIL PLACEMENT OF PAVEMENT BASE HAS BEEN COMPLETED. RAISE MANHOLE FRAMES AND COVERS TO FINISH PAVEMENT GRADES WHEN BASE IS COMPLETE.

7. MINIMUM DESIGN REQUIREMENTS: ALL STREET, ALLEY, PARKING LOT, AND FIRE LANE PAVING SHALL BE DESIGNED AND PERMITTED THROUGH THE TOWN TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3500 PSI AT TWENTY-EIGHT (28) DAYS WITH A MINIMUM OF FIVE AND ONE HALF (5 & 1/2) SACKS OF CEMENT AS VERIFIED BY TESTING IN AN APPROVED LABORATORY. TWO BATCH DESIGNS SHALL BE SUBMITTED TO THE TOWN CONSTRUCTION ENGINEER FOR APPROVAL: ONE FOR MACHINE WORK AND ONE FOR HAND WORK. ALL BATCH DESIGNS MUST BE SIGNED BY THE TESTING LABORATORY AND INCLUDE ALL DOCUMENTATION, SUCH AS RESULTS OF FIELD TRIAL TESTING. IF APPLICABLE, ALL BATCH DESIGNS SHALL SPECIFY AN APPROPRIATE SULFATE RESISTANT CEMENT OR EQUIVALENT. SLUMP SHALL BE 1 – 3 INCHES FOR ALL MACHINE WORK AND 2 – 4 INCHES FOR ALL HAND WORK. STREETS (DEPENDING ON CLASSIFICATION), PARKING LOTS, AND FIRE LANES SHALL HAVE A MINIMUM THICKNESS OF SIX (6) INCHES; ALLEYS SHALL HAVE A MINIMUM THICKNESS OF 8"-5"-8". UPON COMPLETION OF CONSTRUCTION, ALL STREETS AND FIRE LANES SHALL BE CORED FOR DEPTH (2" CORES) AT A SPACING OF 300 FT MAXIMUM, ALTERNATING FROM LEFT QUARTER POINT TO CENTER LINE TO RIGHT QUARTER POINT. ALLEYS SHALL BE CORED FOR DEPTH (2" CORES) AT A SPACING OF 300 FT MAXIMUM ALONG THE CENTER LINE. PAVEMENT OF A THICKNESS LESS THAN THE THICKNESS SHOWN ON THE PLANS BY MORE THAN ONE-QUARTER (1/4) INCH BUT LESS THAN THREE-QUARTER (3/4) INCH WILL BE CONSIDERED DEFICIENT. THE CONTRACTOR SHALL PAY TO THE TOWN TWO (2) TIMES THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO BE DEFICIENT IN THICKNESS AS DEFINED ABOVE. PAVEMENT DEFICIENT IN THICKNESS BY MORE THAN THREE-QUARTER (3/4) INCH SHALL BE REMOVED AND REPLACED COMPLETELY. THE DEFICIENT AREA SHALL BE CORED IMMEDIATELY ON TEN (10) FOOT CENTERS OR ONE (1) PER PANEL TO BE PROVED OUT. ALL STREETS, ALLEYS, PARKING LOTS, AND FIRE LANES WILL REQUIRE CYLINDERS TO BE MADE FOR STRENGTH TESTS BY THE APPROVED LABORATORY. SAMPLES FOR STRENGTH TESTS OF EACH CLASS OF CONCRETE PLACED EACH DAY SHALL BE TAKEN BY AN APPROVED LABORATORY NOT LESS THAN ONCE A DAY, NOR LESS THAN ONCE FOR EACH 100-150 CU YD OF CONCRETE. FOUR (4) CYLINDERS SHALL BE MADE: ONE SHALL BE BROKEN AT 7 DAYS, TWO (2) SHALL BE BROKEN AT TWENTY-EIGHT (28) DAYS, AND ONE SHALL BE HELD IN CASE OF DAMAGE OF ANY OF THE OTHER THREE (3). THE AVERAGE STRENGTH OF TWO (2) CYLINDERS FROM THE SAME SAMPLE, TESTED AT TWENTY-EIGHT (28) DAYS IS REQUIRED FOR EACH STRENGTH TEST; ANY STRENGTH TEST BEYOND TWENTY-EIGHT (28) DAYS IS UNACCEPTABLE. IF THE TWENTY-EIGHT (28) DAY DESIGN STRENGTH IS NOT REACHED UPON STRENGTH TESTING THE CYLINDERS, THE DEFICIENT AREA SHALL BE CORED IMMEDIATELY BE ON TEN (10) FOOT CENTERS OR ONE PER PANEL TO BE PROVED OUT. FOR ANY AREAS DEFICIENT IN STRENGTH BY NOT MORE THAN 500 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN ONE (1) TIME THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO BE DEFICIENT IN STRENGTH. FOR ANY AREAS DEFICIENT IN STRENGTH BY MORE THAN 500 PSI BUT NOT MORE THAN 1000 PSI, THE CONTRACTOR SHALL PAY TO THE TOWN TWO (2) TIMES THE UNIT BID PRICE PER SQUARE YARD FOR THE AREA DETERMINED TO BE DEFICIENT IN STRENGTH. PAVEMENT DEFICIENT IN STRENGTH BY MORE THAN 1000 PSI SHALL BE REMOVED AND REPLACED COMPLETELY. NO MORE THAN THREE (3) – FOUR (4) INCH CORES SHALL BE EXTRACTED PER PANEL WITHOUT PRIOR TOWN APPROVAL. A REBAR DETECTOR SHALL BE USED TO ENSURE THAT THE CORED AREAS ARE CLEAR OF ANY REBAR. ALL CORING AND ADDITIONAL LABORATORY TESTING SHALL BE AT THE EXPENSE OF THE CONTRACTOR. THE WIDTH TO BE CONSIDERED FOR ANY DEFICIENCIES SHALL BE THE FULL WIDTH OF THE PAVEMENT.

8. ALL REINFORCING BARS SHALL CONFORM TO ASTM A-615/A 615M, GRADE 60.

9. ALL CONCRETE AND REINFORCING STEEL SHALL CONFORM TO CURRENT A.C.I. CODE.

10. ALL WALL STEEL SHALL HAVE A MINIMUM CONCRETE COVER OF 2". SLAB REINFORCING TO HAVE A MINIMUM CONCRETE COVER OF 2" ON TOP AND 3" ON BOTTOM.

11. ALL BAR SPLICES, CORNER DOWELS, AND JOINT DOWELS SHALL HAVE A MINIMUM 40 DIAMETERS, OR 30", WHICHEVER IS GREATER.

12. JOINT AND CORNER DOWELS DESIGNATED AS "EXTRA LENGTH" SHALL HAVE A MINIMUM LAP LENGTH OF 80 BAR DIAMETERS OR 60", WHICHEVER IS GREATER, UNLESS OTHERWISE DIMENSIONED.

13. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4" x 3/4".

14. NO HORIZONTAL CONSTRUCTION JOINTS WILL BE PERMITTED, UNLESS OTHERWISE NOTED. WALL FORMING AND CONCRETE PLACEMENT PLAN, TO ALLOW FOR VERTICAL CONSTRUCTION JOINTS, SHALL BE PREPARED AND SUBMITTED TO THE ENGINEER FOR APPROVAL. ALL VERTICAL CONSTRUCTION JOINTS TO INCLUDE STANDARD KEYWAY AND WATERSTOP.

15. SPEED BUMPS ARE NOT PERMITTED IN COMMERCIAL DRIVES OR STREETS.

16. POURED CONCRETE MUST BE CONSOLIDATED BY THE USE OF MECHANICAL VIBRATORS AT A MAXIMUM INTERVAL OF 18". CONTRACTOR SHALL ENSURE THAT CONCRETE IS WORKED AROUND REINFORCEMENT, OTHER EMBEDDED ITEMS, AND AGAINST FORMS TO ELIMINATE VOID SPACES.

17. FIRE LANES SHALL HAVE A MINIMUM TURNING RADIUS OF 30 FEET UNLESS DESIGNED USING AUTOTURN BY TRANSOFT SOLUTIONS, OR EQUIVALENT SOFTWARE. IN NO CASE SHALL A FIRE LANE RADIUS BE LESS THAN 20 FEET UNLESS APPROVED BY THE TOWN ENGINEER.

18. BITUMINOUS SURFACE TREATMENT (CHIP SEAL) SHALL CONFORM TO ITEM 404.4 IN THE NCTCOG PUBLIC WORKS CONSTRUCTION STANDARDS (5TH EDITION)

19. ASPHALT PAVING SHALL CONFORM TO ITEM 302 IN THE NCTCOG PUBLIC WORKS CONSTRUCTION STANDARDS (5TH EDITION).

STORM SEWER SYSTEM NOTES

1. STORM SEWER PIPE IN RIGHT OF WAY, PUBLIC DRAINAGE EASEMENTS, OR FIRE LANES SHALL BE REINFORCED CONCRETE OR DUAL WALL POLYPROPYLENE PIPE CONFORMING TO ASTM F2881.

2. BOX CULVERTS, AND OTHER STRUCTURES IN RIGHT OF WAY OR FIRE LANES SHALL BE REINFORCED CONCRETE AS PER TOWN SPECIFICATIONS AND SHALL BE CONSTRUCTED AS SHOWN IN THE STANDARD DETAILS UNLESS OTHERWISE APPROVED.

3. DENSITY TESTING REQUIREMENTS: FREQUENCY OF TRENCH COMPACTION TESTS SHALL NOT BE LESS THEN ONE EVERY 300 LINEAR FEET OF PIPE PER 2.0' OF LIFT UNTIL FINAL GRADE, STARTING AT 2.0' ABOVE TOP OF PIPE. EVERY OTHER LATERAL; STUBOUT THAT CROSSES THE EXISTING OR PROPOSED STREET, ALLEY, OR FIRE LANE SUBGRADE; INLET; AND JUNCTION BOX WILL RECEIVE A DENSITY TEST EVERY LIFT. ALL DITCHES SHALL BE MECHANICALLY TAMPED AND COMPACTED TO 95% OF STANDARD PROCTOR DENSITY AT 0 – 4% ABOVE OPTIMUM MOISTURE. WATER JETTING IS NOT PERMITTED.

4. THE JOINTS SHALL BE CONSTRUCTED AND JOINTED TOGETHER IN SUCH A MANNER THAT NO SPILL THROUGH OF BACKFILL WILL OCCUR. THIS INCLUDES THE LIFT HOLES USED IN CERTAIN PIPE OR BOX SIZES. APPROVED JOINT MATERIALS ARE COLD APPLIED, PLASTIC ASPHALT JOINT COMPOUND; RUBBER GASKETS; AND COLD APPLIED, PREFORMED PLASTIC GASKETS.

5. STORM DRAINAGE INLETS SHALL BE AS INDICATED ON THE APPROVED CONSTRUCTION PLANS. FOR SECONDARY AND MAJOR STREET INTERSECTIONS, A RECESSED TYPE INLET WILL BE REQUIRED. FOR INDUSTRIAL AND RESIDENTIAL STREETS, A CURB LINE INLET WILL BE REQUIRED UNLESS OTHERWISE APPROVED. A ROUND MANHOLE COVER WITH LOCKING DEVICE SHALL BE PLACED ON ALL INLET TOPS. THE TOP SHALL BE PLACED NEAR THE OUTLET PIPE. ALL INLETS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.

6. ONLY CURB INLETS ARE ALLOWED WITHIN PAVED AREAS. GRATE INLETS ARE ALLOWED ONLY BY TOWN ENGINEER APPROVAL.

7. ALL STORM SEWER OUTFALLS THAT DRAIN TO LAKE LEWISVILLE SHALL INCLUDE A DEBRIS SEPARATOR.

8. ALL STORM SEWER CULVERTS INSTALLED IN PUBLIC RIGHT-OF-WAY OR BENEATH FIRELANES SHALL BE REINFORCED CONCRETE PIPE OR DUAL WALL POLYPROPYLENE PIPE CONFORMING TO ASTM F2881.

DETOURS, BARRICADES, WARNING SIGNS, ETC. NOTES

1. TRAFFIC MUST BE HANDLED THROUGHOUT THE PROJECT DURING CONSTRUCTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE FOR THE SAFE AND COMFORTABLE PASSAGE OF TRAFFIC WITH MINIMAL INCONVENIENCE TO THE PUBLIC AT ALL TIMES. TRAFFIC LANES SHALL BE ENTIRELY OPEN TO TRAFFIC EACH NIGHT AND NO EQUIPMENT SHALL BE LEFT IN A POSITION OVERNIGHT THAT WILL ENDANGER TRAFFIC.

2. A FLAGGER SHALL BE STATIONED WHERE ANY EQUIPMENT IS WORKING ON THE ROAD OR WHERE ANY OTHER HAZARDS DUE TO CONSTRUCTION OPERATIONS EXIST OR AS DIRECTED BY THE ENGINEER.

3. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES THROUGHOUT ALL PHASES OF CONSTRUCTION. ADEQUACY OF ACCESS WILL BE AT THE DISCRETION OF THE ENGINEER. SAFE ENTRANCE AND EXIT TO ALL DRIVEWAYS SHALL BE PROVIDED WITH A MINIMUM OF INCONVENIENCE.

4. THE CONTRACTOR SHALL NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE A HAZARD AND WILL ENDANGER TRAFFIC.

5. THE CONTRACTOR SHALL NOTIFY THE OWNER OF IMPENDING/UPCOMING LANE CLOSURES AS EARLY AS FIVE WORKING DAYS BUT NO LATER THAN 48 HOURS IN ADVANCE OF LANE CLOSURES.

6. FOR THIS PROJECT, UNLESS OTHERWISE NOTED IN THE PLANS AND/OR AS DIRECTED BY THE ENGINEER, NO LANE CLOSURES SHALL BE ALLOWED OTHER THAN THOSE IN THE TRAFFIC CONTROL PLAN.

7. THE CONTRACTOR MAY PROPOSE/RECOMMEND MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDED MODIFICATION BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS PAY ITEMS, IMPACT TO TRAFFIC, EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. THE CONTRACTOR SHALL NOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE/SEQUENCE UNTIL HE/SHE OBTAINS WRITTEN APPROVAL FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE SAFE AND COMFORTABLE MOVEMENT, THE CONTRACTOR SHALL IMMEDIATELY CHANGE HIS OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.

8. THE CONTRACTOR SHALL INSTALL AND MAINTAIN AN ADEQUATE NUMBER OF BARRICADES, WARNING AND DIRECTIONAL SIGNS TO DELINEATE TRAFFIC FOR ANY DETOURS.

9. ALL CONSTRUCTION TRAFFIC SHALL BE REGULATED SO AS TO CAUSE A MINIMUM OF INCONVENIENCE TO THE TRAVELING PUBLIC. AT POINTS WHERE IT IS NECESSARY FOR TRUCKS TO STOP AND UNLOAD, WARNING SIGNS AND FLAGGERS SHALL BE PROVIDED AS NECESSARY TO ADEQUATELY PROTECT TRAVEL.

10. ALL BARRICADES, SIGNS, WARNING LIGHTS, ETC. SHALL BE ACCORDING TO THE LATEST REVISION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).

11. THE CONTRACTOR MAY, WITH THE APPROVAL OF AND AS DIRECTED BY THE ENGINEER, BE REQUIRED TO FURNISH ADDITIONAL SIGNS AND BARRICADES TO THOSE INDICATED ON THE PLANS TO MAINTAIN THE SAFE PASSAGE OF TRAFFIC THROUGHOUT THE CONSTRUCTION SITE PARTICULARLY IN THOSE AREAS OF IMMEDIATE WORK.

12. UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE IS MADE, THE CONTRACTOR SHALL SHAPE AND FINISH SUCH PORTIONS OF THE RIGHT-OF-WAY AS MAY HAVE BEEN DISTURBED IN MAKING THE ABOVE PROVISIONS FOR TRAFFIC AND WILL BE REQUIRED TO LEAVE THE ENTIRE RIGHT-OF-WAY IN A SMOOTH, NEAT AND SIGHTLY CONDITION.

13. ALL WORK AND MATERIALS REQUIRED BY THESE PROVISIONS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE CONTRACT, UNLESS OTHERWISE INDICATED IN THE PLANS OR SPECIFICATIONS.

14. CONTRACTOR SHALL HAVE A COMPANY REPRESENTATIVE CERTIFIED IN FLAGGER TRAINING APPROVED BY TXDOT.

15. THE CONTRACTOR IS FULLY RESPONSIBLE FOR THE TRAFFIC CONTROL AND WILL BE RESPONSIBLE FOR FURNISHING ALL TRAFFIC CONTROL DEVICES AND FLAGGERS. THE CONSTRUCTION METHODS SHALL BE CONDUCTED TO PROVIDE THE LEAST POSSIBLE INTERFERENCE TO TRAFFIC SO AS TO PERMIT THE CONTINUOUS MOVEMENT OF TRAFFIC IN ALL ALLOWABLE DIRECTIONS AT ALL TIMES.

16. THE CONTRACTOR SHALL PROVIDE FOR THE PASSAGE OF TRAFFIC THROUGH THE PROJECT WITH SIGNS, LIGHTS AND BARRICADES IN ACCORDANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AS REQUIRED FOR MAINTENANCE ACTIVITIES AND TO THE SATISFACTION OF THE ENGINEER.

17. LANE CLOSURES WILL NOT BE ALLOWED UNLESS PRIOR APPROVAL IS GIVEN BY THE ENGINEER. IF LANE CLOSURES ARE APPROVED, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNER 48 HOURS IN ADVANCE OF THE CLOSURE.

NO.	REVISION	DATE

DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
GENERAL CONSTRUCTION NOTES 2 OF 3

LITTLEELM

SHEET
2 OF 26

DECEMBER 2023

CONSTRUCTION
GENERAL NOTES

WATER SYSTEM NOTES

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE TOWN'S STANDARD SPECIFICATIONS AND GENERAL DESIGN STANDARDS.

2. ALL TAPPING SLEEVES AND VALVES SHALL BE FULL BODY DUCTILE IRON. WITH PRIOR APPROVAL BY THE TOWN ENGINEER, STAINLESS STEEL SMITH BLAIR 623 MAY BE ALLOWED FOR CONNECTION TO EXISTING LINES TWENTY–INCH (20") OR LARGER.

3. VALVES SHALL BE MUELLER OR WATEROUS, RESILIENT SEATED, 150 PSI TEST.

4. FITTINGS SHALL BE OF THE MECHANICAL JOINT TYPE, FLANGED WHERE APPLICABLE, AND BE MANUFACTURED BY US PIPE, AMERICAN, OR OTHER AS APPROVED BY THE TOWN – CLASS 250. ALL FITTINGS SHALL BE RESTRAINED BY THE USE OF MEGA–LUGS OR APPROVED OTHER AND CONCRETE THRUST BLOCKING.

5. FIRE HYDRANTS SHALL BE MUELLER OR WATEROUS THREE–WAY STANDARD THREAD WITH VALVE IN LEAD OR APPROVED OTHER. ALL MAIN STEAMER NOZZLES SHALL HAVE A NOMINAL INSIDE DIAMETER OF FOUR INCHES (4"). ALL COMMERCIAL FIRE HYDRANTS ARE REQUIRED TO BE INSTALLED WITH 4½"–5" HYDRA–STORZ CONNECTIONS.

6. WATER LINES IN THE AREA OF STORM DRAIN INLETS SHALL BE CONSTRUCTED BEHIND THE INLET BY PULLING THE PIPE USING LONGITUDINAL BENDING IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS. FITTINGS MAY BE USED IF BENDING IS IMPRACTICAL; CONSULT WITH THE TOWN'S CONSTRUCTION INSPECTOR.

7. WATER LINES CROSSING UNDER STORM DRAINS AND SANITARY SEWER LINES SHALL HAVE A MINIMUM OF EIGHTEEN INCHES (18") CLEARANCE BELOW STORM DRAINS AND TWENTY–FOUR INCHES (24") CLEARANCE BELOW SANITARY SEWER LINES OR OTHERWISE AS GOVERNED BY TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) CHAPTER 290 REQUIREMENTS. PARALLEL WATER LINES SHALL BE AT LEAST NINE FEET (9') CLEAR HORIZONTALLY FROM SANITARY SEWER LINES AND MANHOLES. WHERE MINIMUM CLEARANCE CANNOT BE ACHIEVED, WATER LINES SHALL BE ENCASED SIX INCHES (6") AROUND IN CONCRETE TO TEN FEET (10') EITHER SIDE OF THE UTILITY CROSSING. WHERE WATER LINES CROSS CREEKS OR DITCHES THE WATER LINE SHALL BE PROTECTED BY CONCRETE ENCASEMENT AT LEAST TEN FEET (10') PAST THE EMBANKMENT SLOPE ON EACH SIDE.

8. WATER MAINS: ALL WATER MAINS SHALL HAVE A MINIMUM OF FORTY EIGHT (48") COVER OVER THE TOP OF THE PIPE. ALL NEW WATER MAINS SHALL BE PVC PIPE IN ACCORDANCE WITH THE FOLLOWING: C900 DR 14 FOR FOUR–INCH (4") TO SIX–INCH (6"), C900 DR 18 FOR EIGHT–INCH (8") TO TWELVE–INCH (12"), AND C905 DR 18 FOR OVER TWELVE–INCH (12"), ALL "BLUE" IN COLOR AS PER TOWN SPECIFICATIONS; THE PIPE SHALL BE LAID ON A MINIMUM EMBEDMENT (SEE STANDARD CONSTRUCTION DETAILS). WATER MAINS UP TO TWELVE INCHES (12") SHALL BE INSTALLED TWO FEET (2') BACK OF CURB; MAINS LARGER THAN TWELVE INCHES (12") SHALL BE INSTALLED AT LEAST THREE FEET (3') FROM THE BACK OF CURB DEPENDING UPON CONDITIONS. DETECTABLE METALLIC TAPE ("BLUE–CAUTION BURIED WATER BELOW" OR APPROVED OTHER) SHALL BE INSTALLED AFTER INITIAL BACKFILL ON APPROXIMATE CENTERLINE OF PIPE PRIOR TO FINAL BACKFILL ABOVE ALL PVC MAINS.

9. THE CONTRACTOR SHALL INSTALL FIRE HYDRANTS AT THE LOCATIONS SHOWN. A M.J. AND FLANGED TEE WITH A FLANGED END TO M.J. GATE VALVE IS REQUIRED SO THAT THE GATE VALVE IS ANCHORED TO THE MAIN.

10. ALL BOLTS AND NUTS USED WITH MECHANICAL JOINT FITTING SHALL BE "COR–TEN" STEEL OR APPROVED OTHER.

11. THE INSTALLATION OF A BLUE STEMSONITE (OR OTHER) MODEL 88–SSA FIRE HYDRANT MARKER WILL BE INSTALLED OPPOSITE FIRE HYDRANTS JUST OFF CENTER TO THE SIDE OF THE STREET ADJACENT TO THE HYDRANT.

12. POLYETHYLENE ENCASEMENT – THE CONTRACTOR SHALL FURNISH AND INSTALL POLYETHYLENE WRAP AROUND DUCTILE IRON PIPE, RELATED FITTINGS, AND VALVES. THIS WRAP SHALL BE AN 8 MIL. THICKNESS POLYTUBE. SEAMS AND OVERLAPS SHALL BE WRAPPED AND HELD IN PLACE BY TWO–INCH (2") WIDE PLASTIC BACKED ADHESIVE TAPE, POLYKEN 900 OR SCOTCHRAP NO. 50, OR AN APPROVED OTHER, WITH APPROXIMATE TWO–FOOT (2') LAPS ON THE POLYTUBE. THE WRAP ON THE BARREL OF THE PIPE SHALL BE LOOSE ENOUGH TO ALLOW THE FILM TO SHIFT WITH THE SOIL. THE WRAP SHALL BE INSTALLED WITHOUT BREAKS, TEARS, OR HOLES IN THE FILM. THE COST OF THE POLYETHYLENE TUBE WRAP AND COMPLETE INSTALLATION SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE FURNISHING AND THE INSTALLATION OF DUCTILE IRON PIPE, RELATED FITTINGS, AND VALVES.

13. VALVE BOXES SHALL BE FURNISHED AT THE REQUIRED LENGTH IN ORDER TO BE SET TO FINAL GRADE ON EACH GATE VALVE. AFTER THE FINAL CLEAN UP AND ALIGNMENT HAS BEEN COMPLETED, THE CONTRACTOR SHALL POUR A REINFORCED CONCRETE BLOCK 24" X 24" X 6" AROUND ALL VALVE BOXES SO THE FINISHED GRADE IS LEVEL WITH THE FINISHED PARKWAY. ALL VALVE STACK COMPONENTS SHALL BE CAST IRON. VALVE BOXES OVER FOUR FEET (4') DEEP WILL REQUIRE EXTENSIONS. ALL VALVES SHALL BE MARKED WITH A SAW ON THE CURB OR PAVEMENT WITH "V". THE "V" SHALL POINT TO THE LOCATION OF THE VALVE AS FOLLOWS: IF THE VALVE IS IN THE PAVING, THE "V" SHALL BE MARKED UPRIGHT; IF THE VALVE IS OUTSIDE THE PAVING, THE "V" SHALL BE MARKED UPSIDE DOWN.

14. THE CONTRACTOR SHALL COORDINATE OPERATION OF ALL EXISTING VALVES WITH THE TOWN. CONTACT THE TOWN'S PUBLIC WORKS DEPARTMENT AT (972) 377–5556.

15. ALL WATER LINES SHALL BE PRESSURE TESTED TO 200 PSI FOR A THREE (3) HOUR CONTINUOUS PERIOD. LEAKAGE RATE SHALL NOT EXCEED TWENTY–FIVE (25) GALLONS PER INCH OF NOMINAL DIAMETER PER MILE OF PIPE OVER A TWENTY–FOUR (24) HOUR PERIOD. CONTRACTOR SHALL FLUSH AND STERILIZE LINES AND PROVE LINES TO BE FREE OF FECAL COLIFORM ORGANISMS BY OBTAINING SAMPLES FOR LABORATORY TESTS FOR CONTAMINATION. THE CONTRACTOR SHALL REFLUSH AND RESTERILIZE UNTIL ALL SAMPLES PROVE FREE FROM CONTAMINATION.

16. ALL RESIDENTIAL WATER SERVICES SHALL BE AS FOLLOWS:

    A. WATER SERVICES SHALL BE NORMALLY LOCATED AT TWO FOOT (2') OFF EVERY OTHER LOT LINE. A WATER METER BOX, AS APPROVED BY THE TOWN, WITH LOCK LID SHALL BE INSTALLED TWO FEET (2') BACK OF CURB LINE.
    B. SDR–9 POLYETHYLENE SERVICES ARE REQUIRED TO SERVE ALL RESIDENTIAL LOTS AND PATIO HOMES. FOR TOWN HOMES AND DUPLEXES, A SERVICE SHALL BE PROVIDED TO EACH OF THE FAMILY UNITS. SAND EMBEDMENT SHALL BE USED AROUND THE PIPE AND CORPORATION STOP. SERVICE SADDLES SHALL BE BRASS BODY WITH DOUBLE BRONZE FLATTENED STRAPS (NO BANDED) – FORD, CAMBRIDGE, A.Y. MCDONALD, OR APPROVED OTHER.
    C. THE UTILITY CONTRACTOR SHALL INSTALL THE WATER SERVICES TO A POINT TWO (2) FEET BACK OF THE CURB LINE AT A DEPTH OF 12 INCHES. LINE SHALL BE CONTINUOUS WITH NO FITTINGS UNDER PAVING. THE METER BOX SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AFTER THE PAVING CONTRACTOR HAS COMPLETED THE FINAL GRADING IN BACK OF THE CURB. EACH SERVICE LOCATION WILL BE MARKED ON THE CURB WITH A SINGLE VERTICAL SAW MARK BY THE UTILITY CONTRACTOR AND TIED TO PROPERTY CORNERS ON THE "AS–RECORDED" PLANS.
    D. IF THERE IS A CURB, THE CURB SHALL BE SAWCUT WITH "I" AT THE POINT WHERE THE SERVICE PIPE PASSES THE CURB.

17. FOR NON–RESIDENTIAL WATER SERVICES, THE METER BOX SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AFTER THE PAVING CONTRACTOR HAS COMPLETED THE FINAL GRADING IN BACK OF THE CURB. METER BOXES/VAULTS SHALL BE LOCATED OUTSIDE OF PAVING. EACH SERVICE LOCATION WILL BE MARKED ON THE CURB OR PAVEMENT WITH A SINGLE VERTICAL SAW MARK BY THE UTILITY CONTRACTOR AND TIED TO PROPERTY CORNERS ON THE "AS–RECORDED" PLANS.

18. DENSITY TESTING REQUIREMENTS: FREQUENCY OF TRENCH COMPACTION TESTS SHALL NOT BE LESS THAN ONE (1) FOR ANY PIPE SECTION AND EVERY THREE HUNDRED LINEAR FEET (300') LINEAR FEET OF MAIN PIPE PER TWO FEET (2') OF LIFT UNTIL FINAL GRADE, STARTING AT TWO FEET (2') ABOVE THE TOP OF PIPE. WATER SERVICES ARE TO BE TESTED AT A RATE OF ONE (1) FOR EVERY SIX (6) SERVICES WHICH CROSS THE PROPOSED RIGHT OF WAY OR EVERY THREE HUNDRED LINEAR FEET (300') OF WATER SERVICE INSTALLED. EVERY OTHER FIRE HYDRANT LEAD THAT CROSS THE EXISTING OR PROPOSED STREET, ALLEY, OR FIRE LANE SUBGRADE SHALL ALSO RECEIVE AT LEAST ONE SET OF DENSITY TESTS. ALL DITCHES SHALL BE MECHANICALLY TAMPED AND COMPACTED TO NINETY–FIVE PERCENT (95%) STANDARD PROCTOR DENSITY AT ZERO PERCENT (0%) TO FOUR PERCENT (4%) ABOVE OPTIMUM MOISTURE. WATER JETTING IS NOT PERMITTED.

19. THE CONTRACTOR SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS. INSTALL BENDS AS REQUIRED.

20. THE CONTRACTOR SHALL PROVIDE FITTINGS, PLUGS, AND OTHER DEVICES FOR USE IN FILLING, FLUSHING, TESTING, ETC. (NO SEPARATE PAY).

21. THE CONTRACTOR SHALL PROVIDE ADEQUATE THRUST BLOCKING TO WITHSTAND TEST PRESSURES. (NO SEPARATE PAY).

22. MAINTAIN MINIMUM CLEARANCE OF THREE (3) FEET FROM EDGE OF STRUCTURES TO CLOSEST EDGE OF PIPELINE ADJACENT AND PARALLEL TO EDGE OF STRUCTURE, UNLESS OTHERWISE NOTED ON PLANS.

23. DI–ELECTRIC CONNECTIONS TO BE PREVENTED BY USE OF NON–CONDUCTIVE GASKETS BETWEEN DISSIMILAR PIPING MATERIALS.

24. REFERENCE SPECIFICATIONS FOR REQUIREMENTS ON REQUIRED SEPARATION DISTANCE BETWEEN SEWER AND WATER MAINS AND REQUIREMENTS IN THE EVENT THE SEPARATION DISTANCE CANNOT BE MET.

25. ALL PIPING INSTALLED BY BORING SHALL BE COMPLETED BY DRY BORE METHOD WITHOUT THE USE OF DRILLING FLUID, UNLESS APPROVED BY THE TOWN ENGINEER.

SANITARY SEWER SYSTEM NOTES

1. ALL SANITARY SEWER PIPES FOUR INCHES (4") TO FIFTEEN INCHES (15") NOMINAL SIZE SHALL BE PVC SDR 26 MEETING ASTM D3034. ALL SANITARY SEWER PIPES EIGHTEEN INCHES (18") AND LARGER NOMINAL SIZE SHALL BE PVC MEETING ASTM F679. ALL PIPES SHALL BE "GREEN" IN COLOR AS PER TOWN SPECIFICATIONS AND BE LAID ON A MINIMUM EMBEDMENT (SEE STANDARD CONSTRUCTION DETAILS). DETECTABLE METALLIC TAPE ("GREEN–CAUTION BURIED SEWER BELOW" OR APPROVED OTHER) SHALL BE INSTALLED AFTER INITIAL BACKFILL ON APPROXIMATE CENTERLINE OF PIPE PRIOR TO FINAL BACKFILL.

2. ALL SEWER MAINS SHALL BE A MINIMUM DIAMETER OF EIGHT INCHES (8") AND SHALL MAINTAIN A MINIMUM FLOW VELOCITY OF TWO (2) FEET PER SECOND.

3. ALL RESIDENTIAL SANITARY SEWER SERVICES SHALL BE A MINIMUM FOUR INCHES (4") IN DIAMETER AND EXTENDED TO A POINT TEN FEET (10') INSIDE THE PROPERTY LINE AT A MAXIMUM DEPTH OF FIVE FEET (5'). THE SERVICE SHALL THEN BE EXTENDED AT A FORTY–FIVE DEGREE (45°) ANGLE TO FOUR FEET (4') ABOVE THE FINISHED GRADE AND CAPPED. SEWER SERVICES SHALL BE LOCATED IN THE CENTER OF THE LOT. RESIDENTIAL SEWER SERVICES SHALL NOT TIE INTO MANHOLES.

4. DENSITY TESTING REQUIREMENTS: FREQUENCY OF TRENCH COMPACTION TESTS SHALL NOT BE LESS THAN ONE (1) FOR ANY PIPE SECTION AND EVERY THREE HUNDRED LINEAR FEET (300') OF MAIN PIPE PER TWO FEET (2') OF LIFT UNTIL FINAL GRADE, STARTING AT TWO FEET (2') ABOVE TOP OF PIPE. SEWER SERVICES ARE TO BE TESTED AT A RATE OF ONE (1) FOR EVERY SIX (6) SERVICES STAGGERED OR EVERY THREE HUNDRED LINEAR FEET (300') OF SEWER SERVICE INSTALLED. EACH SEWER MANHOLE WILL RECEIVE A DENSITY TEST EVERY TWO FEET (2') OF LIFT UNTIL FINAL GRADE, ALTERNATING AROUND ALL QUADRANTS. EVERY OTHER MAIN AND STUBOUT THAT CROSSES THE EXISTING OR PROPOSED STREET, ALLEY, OR FIRE LANE SUBGRADE SHALL ALSO RECEIVE AT LEAST ONE SET OF DENSITY TESTS. ALL DITCHES SHALL BE MECHANICALLY TAMPED AND COMPACTED TO NINETY–FIVE PERCENT (95%) STANDARD PROCTOR DENSITY AT ZERO PERCENT (0%) TO FOUR PERCENT (4%) ABOVE OPTIMUM MOISTURE. WATER JETTING IS NOT PERMITTED.

5. AFTER PAVING IS COMPLETED EACH SERVICE LOCATION WILL BE MARKED ON THE CURB WITH A TWO (2) PARALLEL VERTICAL SAW MARKS BY THE UTILITY CONTRACTOR AND TIED TO AT LEAST ONE (1) PROPERTY CORNER ON THE "AS–RECORDED" PLANS. ALL MANHOLES AND CLEANOUTS SHALL BE MARKED ON THE CURB OR PAVEMENT WITH "MH" OR "CO" AS APPLICABLE.

6. VACUUM TESTING OF THE MANHOLES, AND DEFLECTION TESTING ARE REQUIRED ON ALL SEWER LINES. PRIOR TO PAVING, ALL RESIDENTIAL SANITARY SEWER SERVICES SHALL HAVE TV INSPECTIONS.

7. MANHOLES SHALL HAVE A 400# TRAFFIC BEARING FRAME AND COVER AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT TWENTY–EIGHT (28) DAYS.

8. THE DIAMETER OF A MANHOLE CONSTRUCTED OVER THE CENTER OF A SEWER SHOULD VARY WITH THE SIZE OF THE SEWER. FOR EIGHT–INCH (8"), TEN–INCH (10"), AND TWELVE–INCH (12") SEWERS, THE MANHOLE SHALL BE FOUR–FOOT (4') MINIMUM DIAMETER; FOR FIFTEEN–INCH (15") THROUGH TWENTY–SEVEN–INCH (27") SEWERS, THE MANHOLE SHALL BE FIVE–FOOT (5') MINIMUM DIAMETER; FOR THIRTY–INCH (30") AND THIRTY–SIX–INCH (36") SEWERS, THE MANHOLE SHALL BE SIX–FOOT (6') MINIMUM DIAMETER. MANHOLES DEEPER THAN TWELVE FEET (12') SHALL BE A MINIMUM OF FIVE–FOOT (5') DIAMETER.

9. THE CONTRACTOR SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS. INSTALL JOINTS AS REQUIRED.

10. THE CONTRACTOR SHALL PROVIDE FITTINGS, PLUGS, AND OTHER DEVICES FOR USE IN FILLING, FLUSHING, TESTING, ETC. (NO SEPARATE PAY).

11. THE CONTRACTOR SHALL PROVIDE ADEQUATE THRUST BLOCKING TO WITHSTAND TEST PRESSURES. (NO SEPARATE PAY).

12. PIPING DRAWINGS INDICATE INVERT ELEVATIONS FOR GRAVITY FLOW LINES. SLOPE PIPE UNIFORMLY BETWEEN ELEVATIONS SHOWN; NO VALLEYS OR PEAKS PERMITTED IN GRAVITY FLOW LINES. FOR OTHER PIPING, REFER TO DETAIL SHEETS FOR PIPE ELEVATIONS AT EACH STRUCTURE. SITE PIPING DRAWINGS DO NOT INDICATE VERTICAL BENDS AND TRANSITIONS. WHEN NECESSARY, MAKE VERTICAL TRANSITIONS OR FURNISH AND INSTALL VERTICAL BENDS AT NO EXTRA COST. DO NOT EXCEED MANUFACTURER'S RECOMMENDATIONS FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS.

13. MAINTAIN MINIMUM CLEARANCE OF THREE (3) FEET FROM EDGE OF STRUCTURES TO CLOSEST EDGE OF PIPELINE ADJACENT AND PARALLEL TO EDGE OF STRUCTURE, UNLESS OTHERWISE NOTED ON PLANS.

14. DI–ELECTRIC CONNECTIONS TO BE PREVENTED BY USE OF NON–CONDUCTIVE GASKETS BETWEEN DISSIMILAR PIPING MATERIALS.

15. THE INTERIOR SURFACE OF ALL MANHOLES AND LIFT STATION WETWELLS SHALL BE CONSTRUCTED WITH POLYMER CONCRETE, ANTIMICROBIAL CONCRETE ADDITIVES, OR APPROVED EQUAL. EXISTING MANHOLES WHICH RECEIVE TIE INS SHALL BE COATED WITH RAVEN 405 EPOXY OR APPROVED EQUAL IF THEY DO NOT ALREADY HAVE CORROSION PROTECTION.

16. RESIDENTIAL SEWER SERVICES SHALL NOT TIE INTO MANHOLES WITHOUT TOWN ENGINEER APPROVAL.

NO.	REVISION	DATE

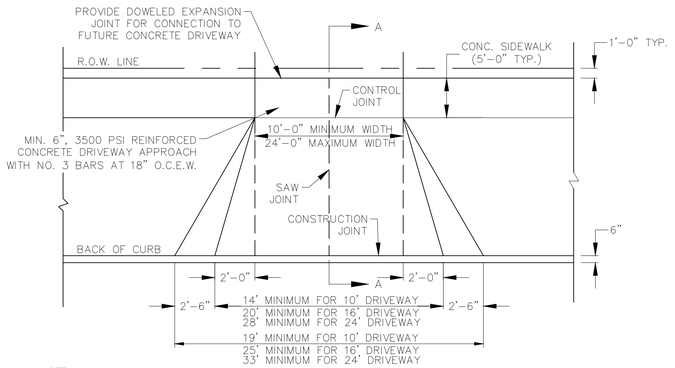
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
GENERAL CONSTRUCTION NOTES 3 OF 3

LITTLE ELM

SHEET
3 OF 26

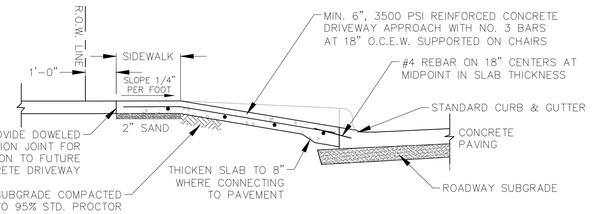
DECEMBER 2023



NOTE:
EXISTING CURB AND GUTTER, IF ANY, MUST BE SAWED AS DIRECTED BY THE TOWN ENGINEER. HORIZONTAL CURB CUT SHALL BE MADE AT AN ELEVATION OF 1/2" ABOVE THE EXISTING GUTTER WITH A MINIMUM LENGTH AS SHOWN. THE TRADITIONAL SAW CUT SHALL HAVE A RUN OF 2'-6" AND SHALL RISE TO MEET THE EXISTING TOP OF CURB. ALL EXPOSED EDGES SHALL BE GROUND TO A 1/4" RADIUS. SAW CUTTING SHALL BE PERFORMED WITH A RIDE-ON SAW EQUIPPED WITH A DIAMOND SAW BLADE.

PLAN

ELEVATION

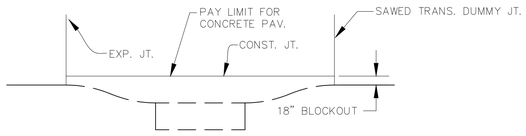


SECTION A–A

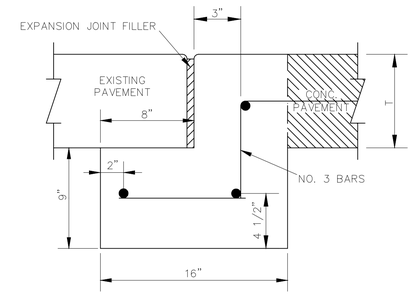
NOTES:

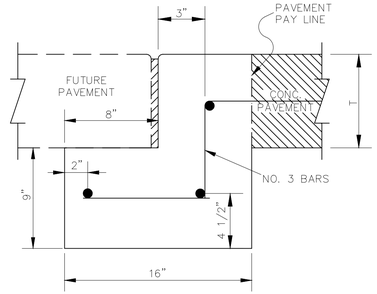
1. SIDEWALK SECTION THROUGH DRIVEWAY SHALL BE POURED SAME THICKNESS AS DRIVEWAY APPROACH. (EXISTING SIDEWALK, IF ANY, SHALL BE REMOVED AND REPLACED)
2. ALL CONCRETE DRIVEWAYS SHALL BE REINFORCED WITH MIN. NO. 3 BARS FROM THE DRIVEWAY APPROACH TO THE HOUSE OR BUILDING.
3. 14% MAXIMUM DRIVEWAY SLOPE. WITHIN 10 FEET OF BACK OF CURB, MAXIMUM SLOPE IS 8%. 12% MAXIMUM ALGEBRAIC GRADE BREAK.

RESIDENTIAL APPROACH (CONCRETE PAVING)
N.T.S.



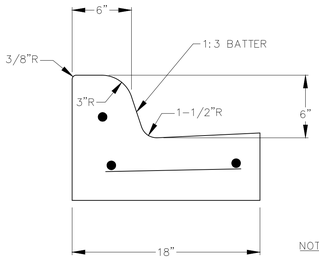
BLOCKOUT FOR RECESSED INLET
N.T.S.



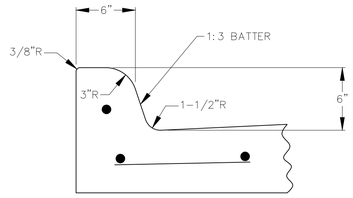


PAVEMENT BARS TO BE BENT DOWN INTO HEADER. HEADER AND PAVEMENT TO BE MONOLITHIC.

STREET HEADER
N.T.S.



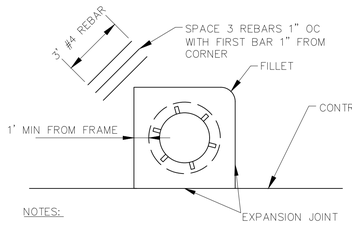
18" CURB & GUTTER
N.T.S.



INTEGRAL CURB
N.T.S.

NOTES:

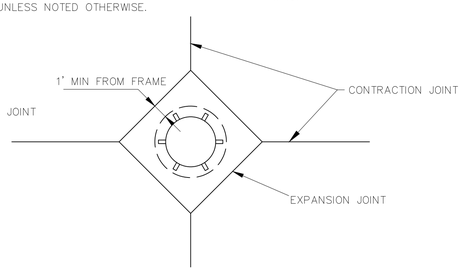
1. INSTALL ANCHOR JT. WHEN CONNECTING TO EXISTING CONC. PAVEMENT. SEE DETAIL THIS SHEET.
2. REINFORCEMENT SHALL BE NO. 4 BARS UNLESS NOTED OTHERWISE.

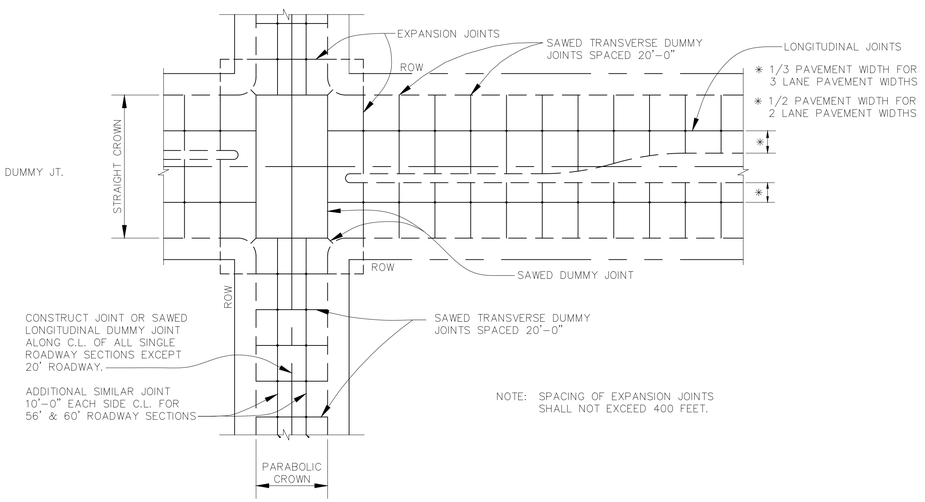


NOTES:

1. EITHER A FILLET OR REINFORCEMENT BARS ARE REQUIRED AT REENTRANT CORNERS.

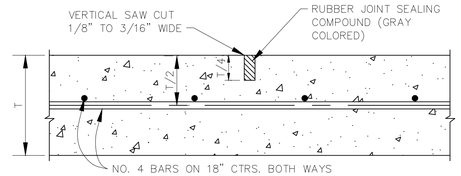
JOINTS NEAR MANHOLES
N.T.S.



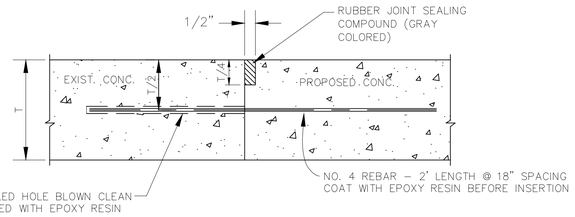


NOTE: SPACING OF EXPANSION JOINTS SHALL NOT EXCEED 400 FEET.

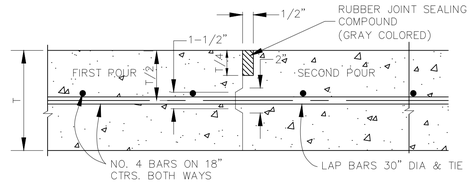
SPACING DIAGRAM FOR TRANSVERSE JOINTS
N.T.S.



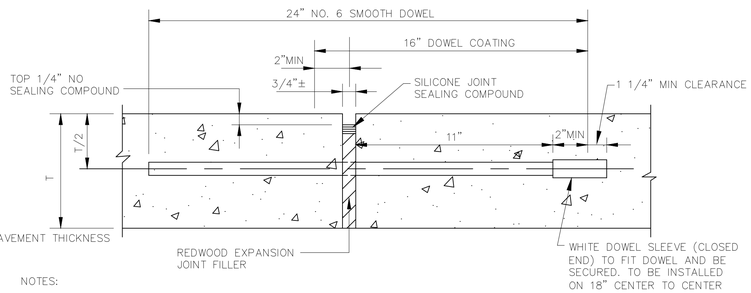
SAWED DUMMY JOINT
N.T.S.



ANCHOR JOINT
N.T.S.



CONSTRUCTION JOINT FOR PAVEMENT
N.T.S.



NOTES:

1. DOWELS AND REINFORCING BARS SHALL BE SUPPORTED BY CHAIRS OR OTHER DEVICES APPROVED BY TOWN ENGINEER.
2. JOINTS SHALL BE SPACED AT A MAXIMUM OF 400 FEET, LOCATED AT INTERSECTIONS.

TRANSVERSE EXPANSION JOINT
N.T.S.

NO.	REVISION	DATE

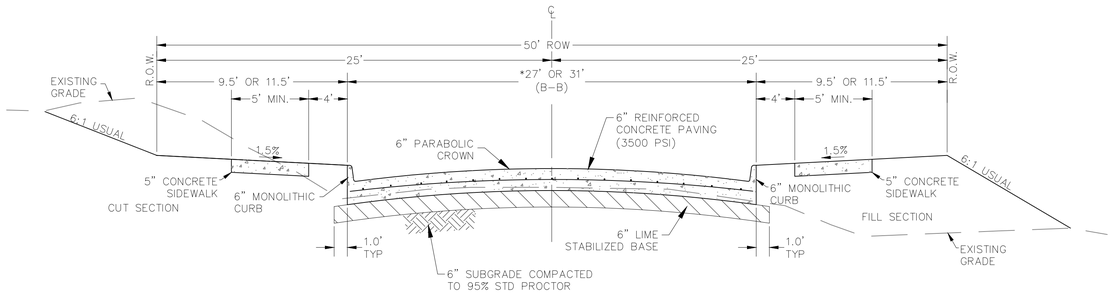
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: 1

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL PAVING DETAILS 1 OF 3

LITTLE ELM

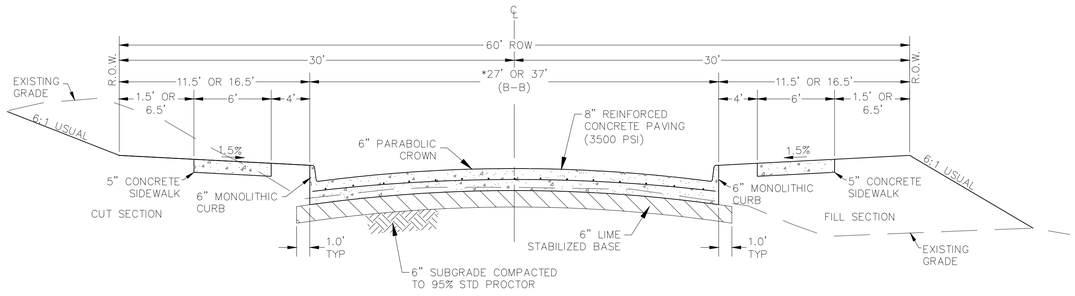
SHEET
4 OF 26

DECEMBER 2023



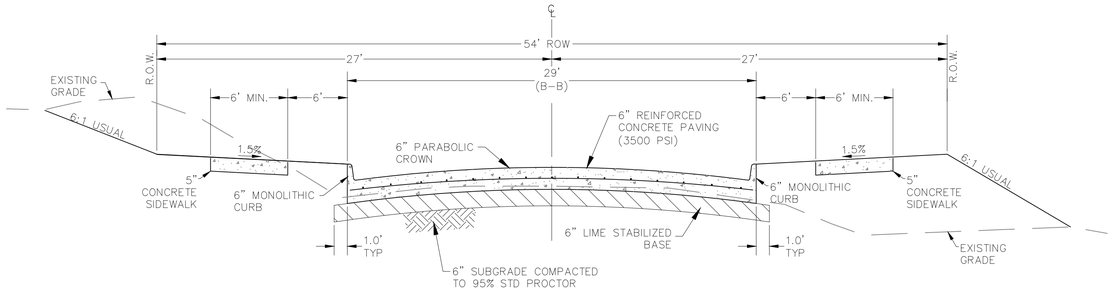
TYPICAL PAVEMENT SECTION
RESIDENTIAL STREET
N.T.S.

* 27' B-B PAVEMENT ONLY PERMITTED WITH TOWN ENGINEER'S WRITTEN APPROVAL.

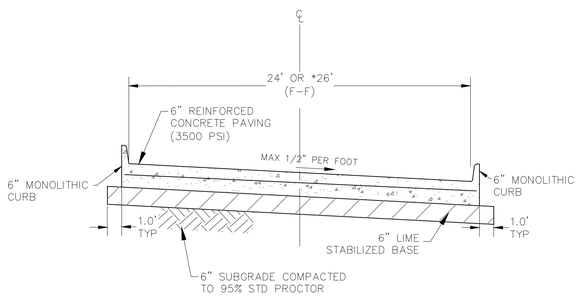


TYPICAL PAVEMENT SECTION
COLLECTOR STREET
N.T.S.

* 27' B-B PAVEMENT ONLY PERMITTED WITH TOWN ENGINEER'S WRITTEN APPROVAL.



RESIDENTIAL STREET
ALTERNATIVE PAVEMENT SECTION
(29'-0" B-B)
N.T.S.

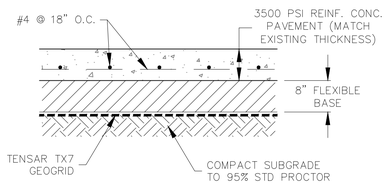


FIRE LANE
N.T.S.

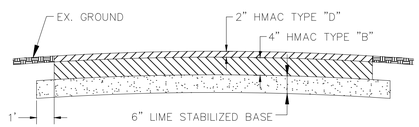
* 26' F-F PAVEMENT REQUIRED WHEN SERVING BUILDINGS 2 STORIES OR HIGHER.

FIRE LANE MAXIMUM RUNNING GRADE IS 6%

SEE FIRE LANE STRIPING DETAIL ON SHEET 10



CONCRETE PAVEMENT REPAIR
TYPICAL SECTION
N.T.S.



ASPHALT TRANSITION
TYPICAL SECTION
N.T.S.

PAVEMENT NOTES:

1. THESE NOTES ARE A REPRESENTATION OF THE MINIMUM REQUIREMENTS FOR PAVEMENT CONSTRUCTION. THE DESIGN ENGINEER IS RESPONSIBLE FOR PAVEMENT DESIGN, INCORPORATING RECOMMENDATIONS OF THE GEOTECHNICAL REPORT IF FOUND TO BE MORE STRINGENT.
2. 3500 PSI MACHINE POUR, 4000 PSI HAND POUR (AT DRIVEWAY APPROACH ONLY). REINFORCED CONCRETE PAVEMENT (5.5 SACK/CY), NO. 4 BARS @ 18" O.C.E.W., WITH 6" MONOLITHIC CURB.
3. BAR LAPS SHALL BE 30 BAR DIAMETERS.
4. BAR CHAIRS SHALL BE PROVIDED BY CONTRACTOR.
5. DO NOT PLACE CONCRETE JOINT WITHIN 2 FEET OF GUTTER LINE AT STREET CONNECTION.
6. LIME SHALL BE APPLIED BY PERCENTAGE DRY UNIT WEIGHT OF SOIL TREATED TO A MINIMUM IN PLACE COMPACTED THICKNESS OF SIX (6) INCHES. FOR 6" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 37 LBS/SQ FT; FOR 8" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 54 LBS/SQ FT
7. LIME STABILIZATION MAY BE OMITTED IF 6" OF FLEXIBLE BASE WITH TENSAR TX7 GEOGRID IS APPLIED TO THE SUBBASE COMPACTED TO 95% STD PROCTOR.
8. FORMING OF PAVEMENT:
   A. SLIP-FORM: SLIP-FORM PAVEMENT METHOD SHALL BE USED FOR ALL PUBLIC STREETS AND ALLEYS UNLESS OTHERWISE APPROVED BY THE TOWN ENGINEER.
   B. HAND FORM: HAND FORMED PAVEMENT METHOD MAY BE USED FOR TURN LANE, DECELERATION LANE, DRIVEWAY APPROACH, OR REPLACING A PANEL OF PUBLIC STREET OR ALLEY.

NO.	REVISION	DATE

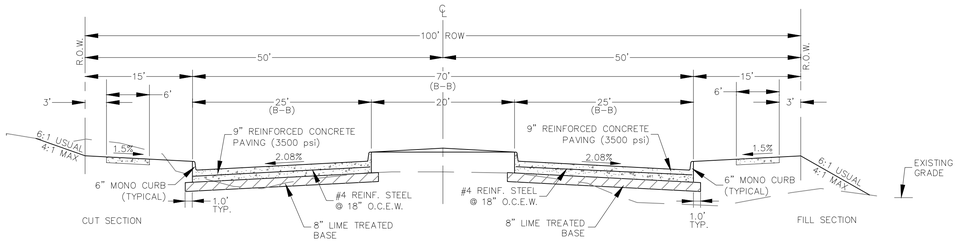
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL PAVING DETAILS 2 OF 3

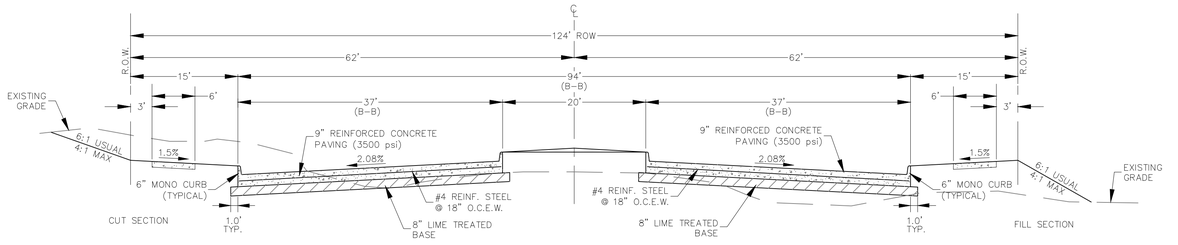
LITTLEELM

SHEET
5 OF 26

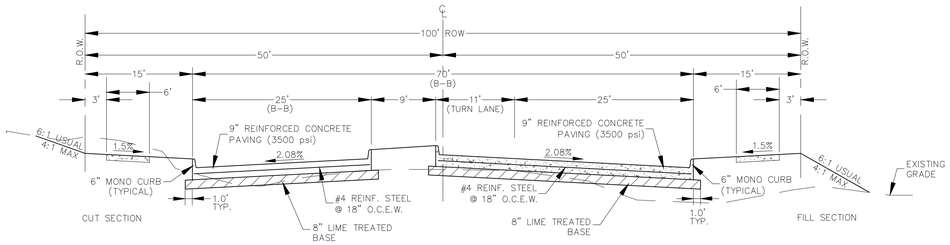
DECEMBER 2023



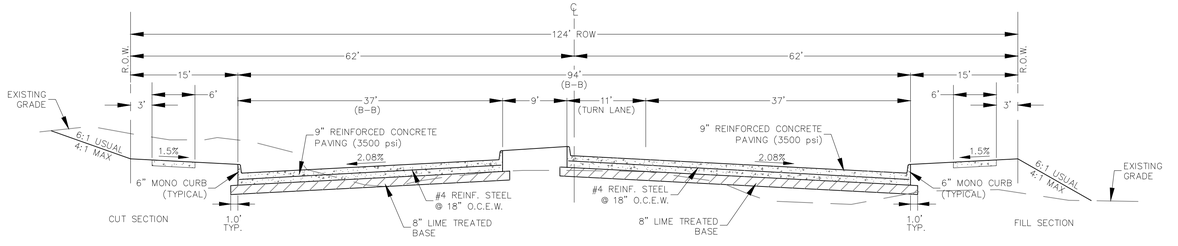
TYPICAL SECTION



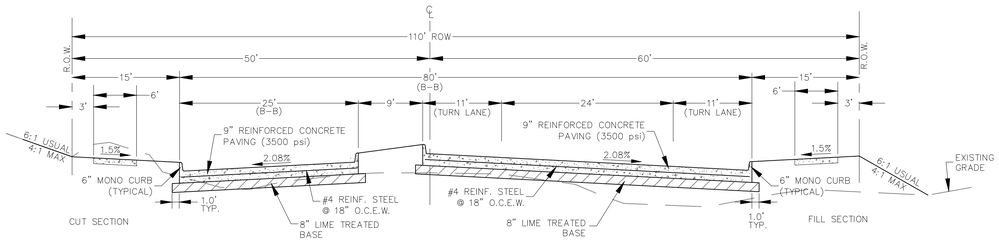
TYPICAL SECTION



SECTION WITH LEFT
TURN LANE

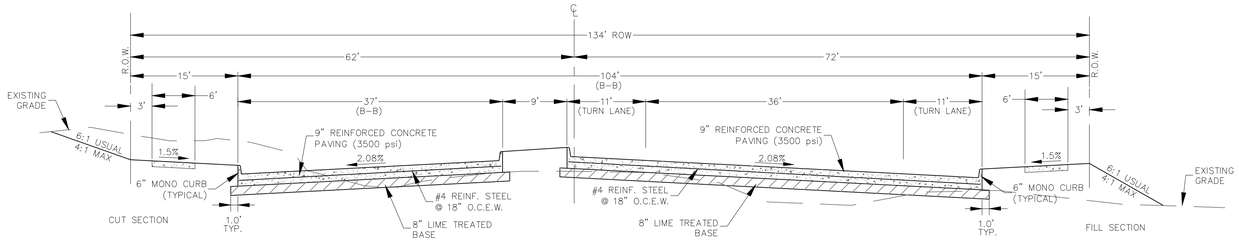


SECTION WITH LEFT
TURN LANE



INTERSECTION WITH LEFT
& RIGHT TURN LANES

TYPICAL SECTIONS
FOUR-LANE DIVIDED THOROUGHFARE
N.T.S.



INTERSECTION WITH LEFT
& RIGHT TURN LANES

TYPICAL SECTIONS
SIX-LANE DIVIDED THOROUGHFARE
N.T.S.

PAVEMENT NOTES:

1. THESE NOTES ARE A REPRESENTATION OF THE MINIMUM REQUIREMENTS FOR PAVEMENT CONSTRUCTION. THE DESIGN ENGINEER IS RESPONSIBLE FOR PAVEMENT DESIGN, INCORPORATING RECOMMENDATIONS OF THE GEOTECHNICAL REPORT IF FOUND TO BE MORE STRINGENT.
2. 3500 PSI MACHINE POUR, 4000 PSI HAND POUR (AT DRIVEWAY APPROACH ONLY). REINFORCED CONCRETE PAVEMENT (5.5 SACK/CY), NO. 4 BARS @ 18" O.C.E.W., WITH 6" MONOLITHIC CURB.
3. BAR LAPS SHALL BE 30 BAR DIAMETERS.
4. BAR CHAIRS SHALL BE PROVIDED BY CONTRACTOR.
5. DO NOT PLACE CONCRETE JOINT WITHIN 2 FEET OF GUTTER LINE AT STREET CONNECTION.
6. LIME SHALL BE APPLIED BY PERCENTAGE DRY UNIT WEIGHT OF SOIL TREATED TO A MINIMUM IN PLACE COMPACTED THICKNESS OF SIX (6) INCHES. FOR 6" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 37 LBS/SQ FT; FOR 8" THICK PAVEMENT, MINIMUM LIME APPLICATION IS 54 LBS/SQ FT.
7. FORMING OF PAVEMENT:
   A. SLIP-FORM: SLIP-FORM PAVEMENT METHOD SHALL BE USED FOR ALL PUBLIC STREETS AND ALLEYS UNLESS OTHERWISE APPROVED BY THE TOWN ENGINEER.
   B. HAND FORM: HAND FORMED PAVEMENT METHOD MAY BE USED FOR TURN LANE, DECELERATION LANE, DRIVEWAY APPROACH, OR REPLACING A PANEL OF PUBLIC STREET OR ALLEY.

NO.	REVISION	DATE

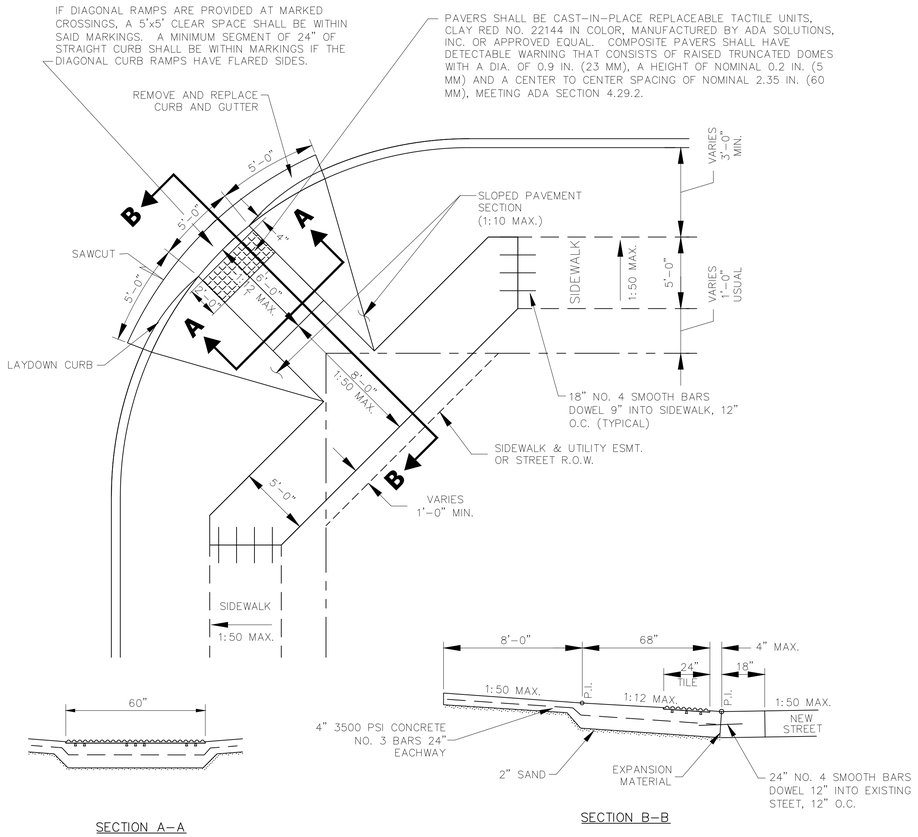
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL PAVING DETAILS 3 OF 3

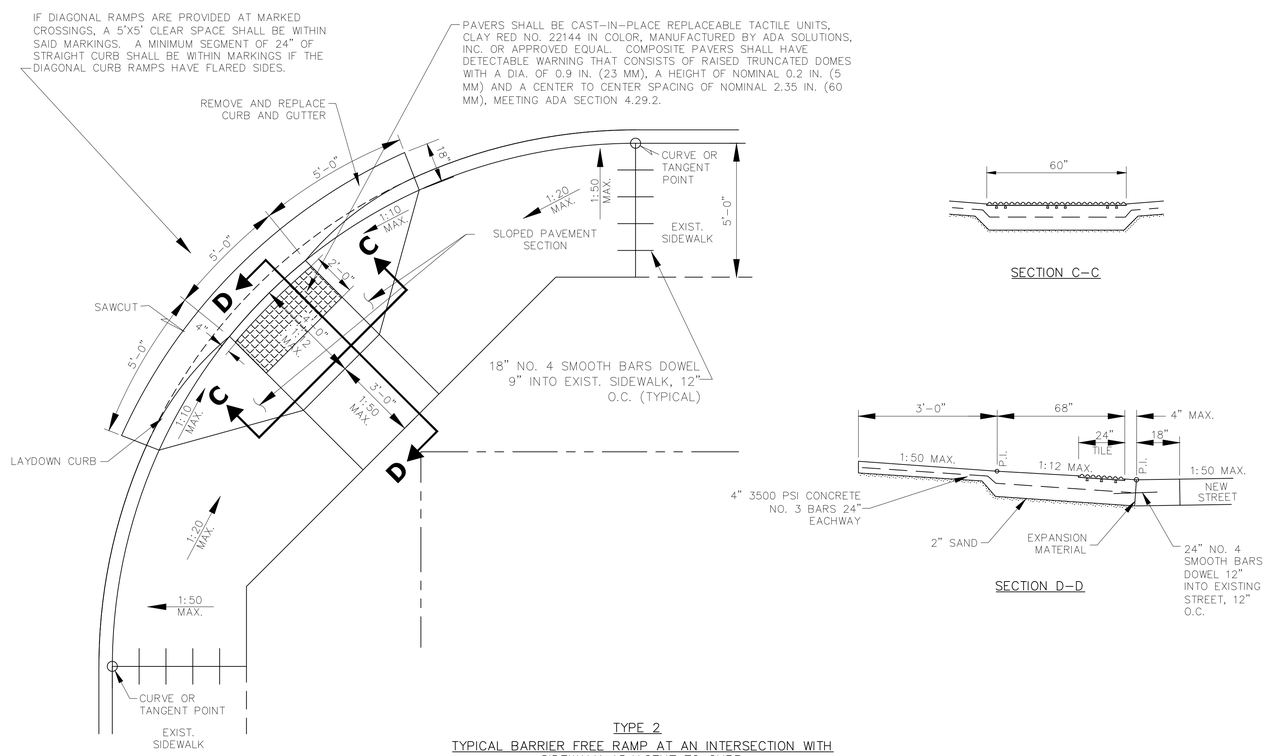
LITTLE ELM

SHEET
6 OF 26

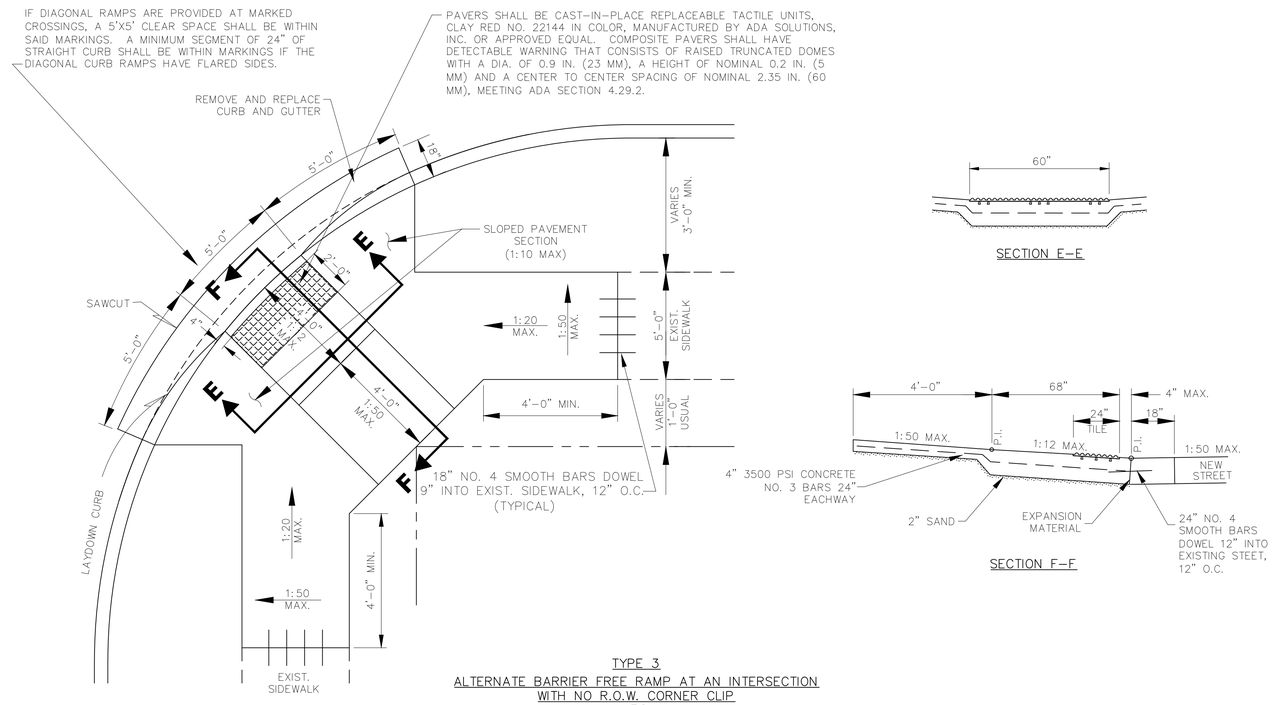
DECEMBER 2023



TYPE 1
TYPICAL BARRIER FREE RAMP AT AN INTERSECTION WITH R.O.W. CORNER CLIP
N.T.S.



TYPE 2
TYPICAL BARRIER FREE RAMP AT AN INTERSECTION WITH SIDEWALK ADJACENT TO CURB
N.T.S.



TYPE 3
ALTERNATE BARRIER FREE RAMP AT AN INTERSECTION WITH NO R.O.W. CORNER CLIP
N.T.S.

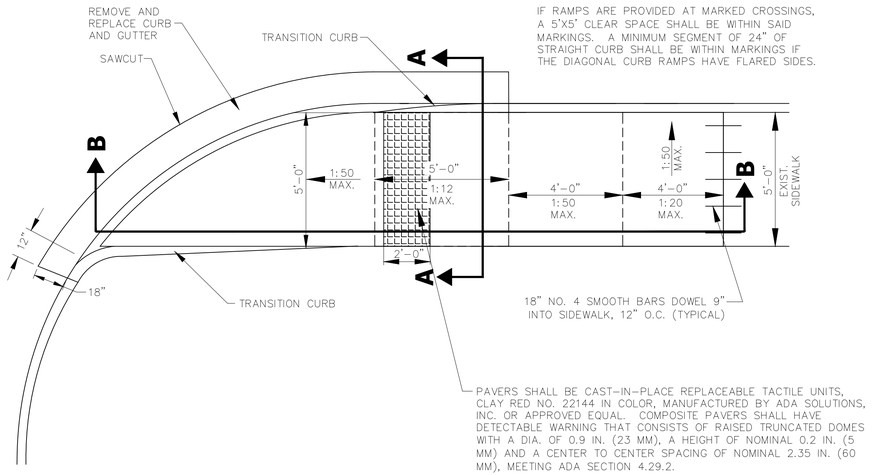
DATE					
REVISION					
NO.					
DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE: NONE	JOB NUMBER:	-

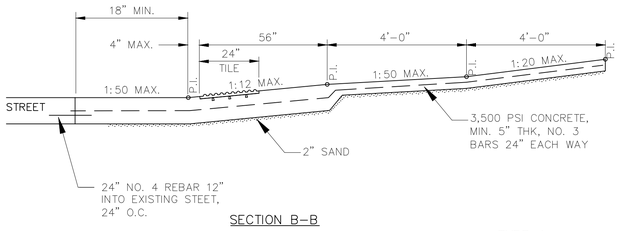
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL BARRIER FREE RAMP DETAILS 1 OF 2

LITTLEELM

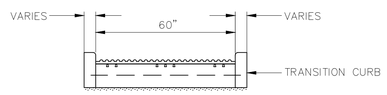
SHEET
7 OF 26

DECEMBER 2023



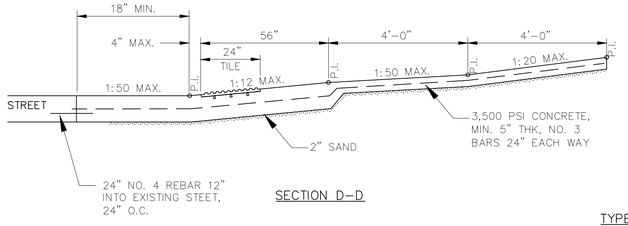


SECTION B–B

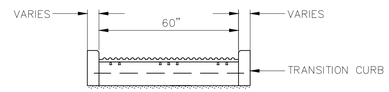


SECTION A–A

TYPE 4
TYPICAL BARRIER FREE RAMP ON BACK OF CURB
N.T.S.

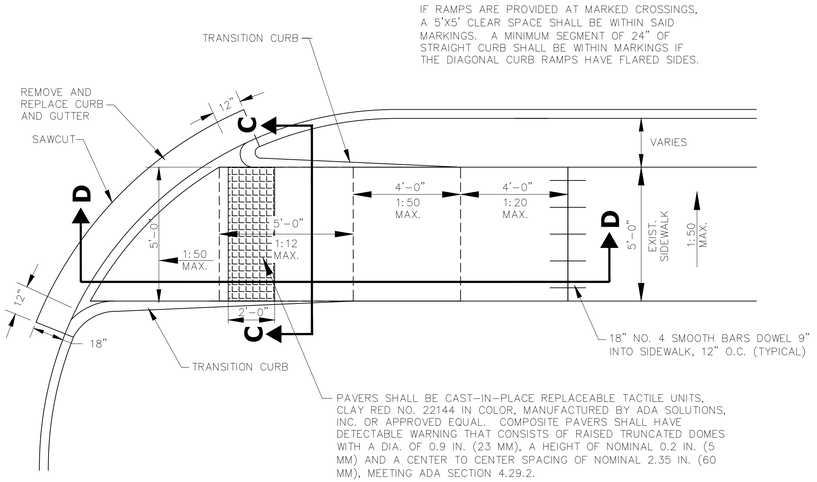


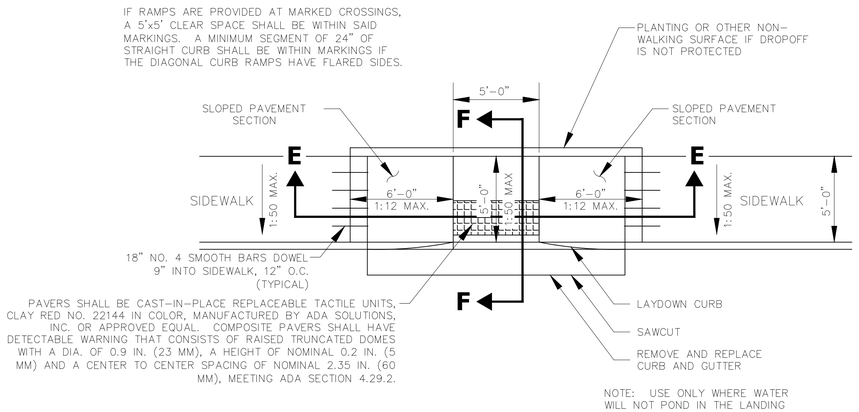
SECTION D–D

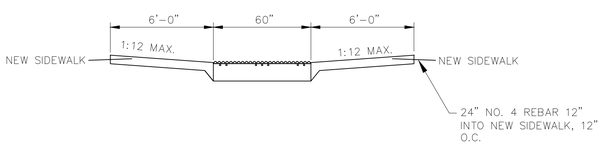


SECTION C–C

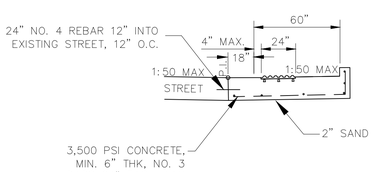
TYPE 5
TYPICAL BARRIER FREE RAMP ON A RADIUS CURVE
N.T.S.





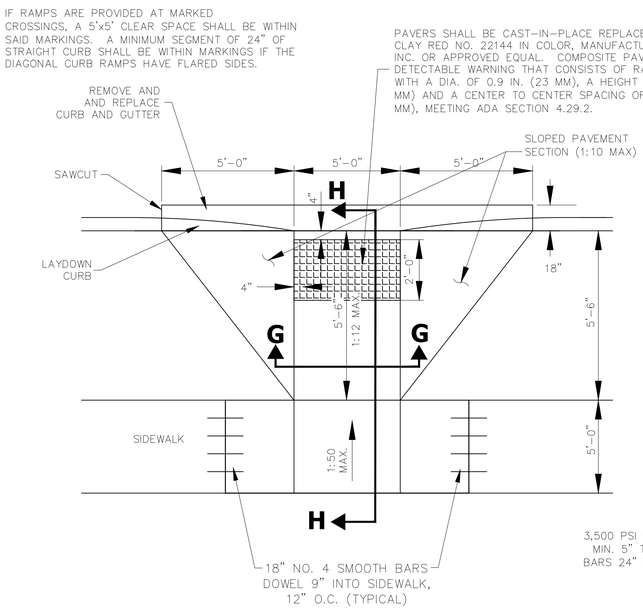


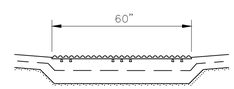
SECTION E–E



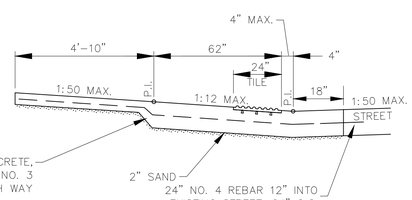
SECTION F–F

TYPE 6
TYPICAL BARRIER FREE PARALLEL CURB RAMP
N.T.S.





SECTION G–G



SECTION H–H

TYPE 7
TYPICAL BARRIER FREE RAMP AT MID-BLOCK LOCATION
N.T.S.

NO.	REVISION	DATE

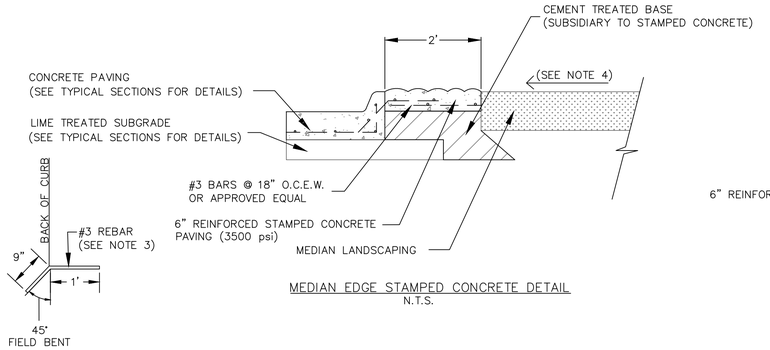
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL BARRIER FREE RAMP DETAILS 2 OF 2

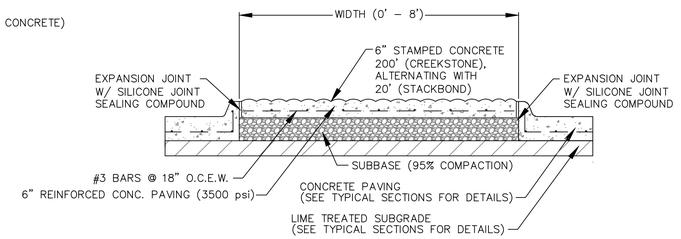
LITTLE ELM

SHEET
8 OF 26

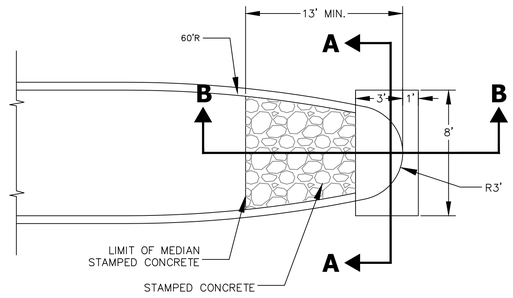
DECEMBER 2023

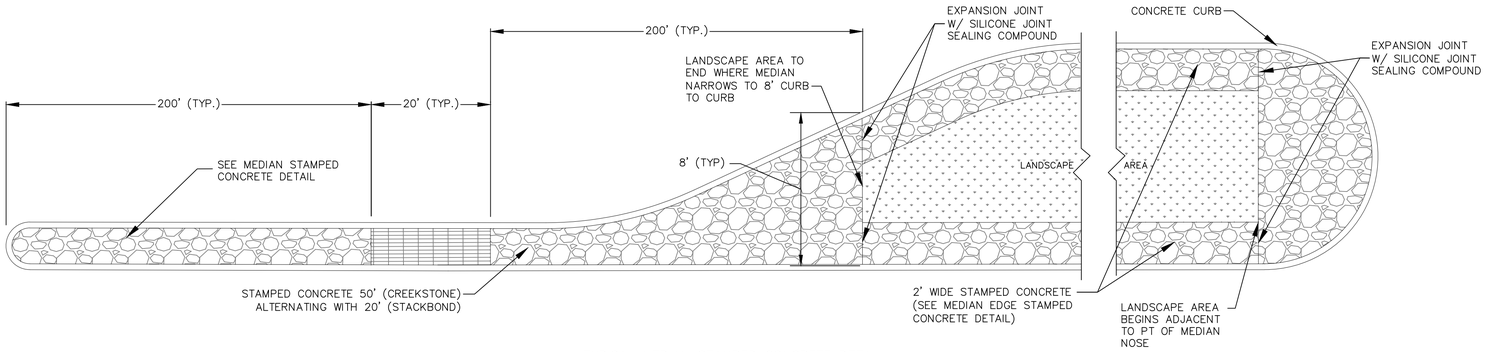


MEDIAN EDGE STAMPED CONCRETE DETAIL
N.T.S.

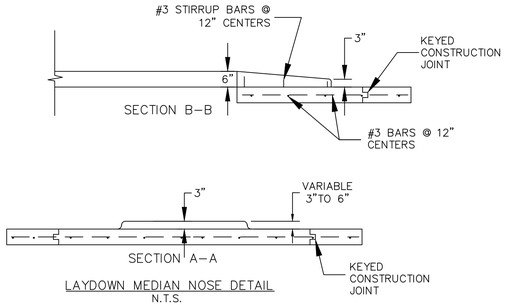


MEDIAN STAMPED CONCRETE DETAIL
N.T.S.





TYPICAL MEDIAN STAMPED CONCRETE DETAIL
N.T.S.



LAYDOWN MEDIAN NOSE DETAIL
N.T.S.

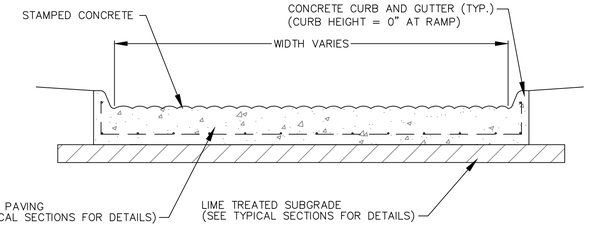
NOTES:

1. ROADWAY MEDIAN STAMPED CONCRETE
   FIRST 50' OF PATTERN SHALL BE:
   PATTERN: BOMANITE – BOMACON CREEK STONE
   COLOR: LIGHT SAND COLOR HARDENER
   LIGHT BROWN (BC–2 CH–00135–60) RELEASE AGENT
   DARK WALNUT CHEMICAL STAIN (DILUTED TO ANTIQUE)
   AUBURN CHEMICAL STAIN (DILUTED TO ANTIQUE)
   PINE CHEMICAL STAIN (DILUTED TO ANTIQUE)
   ALTERNATING WITH 20' OF PATTERN SHALL BE:
   PATTERN: BOMANITE – STACKED BOND BRICK
   COLOR: RED CLAY (4D) INTEGRAL COLOR
   FOREST BROWN (BC–1 CH–00093–60) COLOR HARDENER
   FOREST BROWN (BC–1 CH–00093–60) RELEASE AGENT

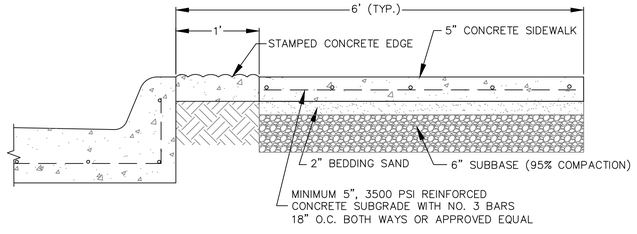
   CROSSWALK STAMPED CONCRETE
   PATTERN: BOMANITE – HERRINGBONE BRICK
   COLOR: THISTLE BROWN (4B) INTEGRAL COLOR
   LIGHT BROWN (BC–2 CH–00135–60) COLOR HARDENER
   LIGHT BROWN (BC–2 CH–00135–60) RELEASE AGENT
   BORDER/ACCENT STRIP OF PATTERN SHALL BE:
   PATTERN: BOMANITE – STACKED BOND BRICK
   COLOR: RED CLAY (4D) INTEGRAL COLOR
   FOREST BROWN (BC–1 CH–00093–60) COLOR HARDENER
   FOREST BROWN (BC–1 CH–00093–60) RELEASE AGENT

   WELCOME MAT & WELCOME MAT STAMPED CONCRETE
   FIELD OF PATTERN SHALL BE:
   PATTERN: BOMANITE – RUNNING BOND USED BRICK
   COLOR: INTEGRAL COLOR TO MATCH CARAMEL (BC–1 CH–00093–60)
   COLOR HARDENER
   CARAMEL (BC–1 CH–00093–60) COLOR HARDENER
   CARAMEL (BC–1 CH–00093–60) RELEASE AGENT
   PATTERN: BOMANITE – STACKED BOND BRICK
   COLOR: INTEGRAL COLOR TO MATCH FOREST BROWN (BC–1 CH–00093–60)
   COLOR HARDENER
   FOREST BROWN (BC–1 CH–00093–60) COLOR HARDENER
   FOREST BROWN (BC–1 CH–00093–60) RELEASE AGENT
2. CONTRACTOR TO PROVIDE 6'X6' MOCK–UP OF EACH PATTERN AND COLOR PRIOR TO CONSTRUCTION, FOR TOWN APPROVAL.
3. IF THE #3 REBAR IS TO BE PLACED AS A DOWEL BAR AFTER THE CURB IS CONSTRUCTED, THE DOWEL BAR MUST BE EPOXIED INTO A ½ INCH MAXIMUM DIAMETER DRILLED HOLE IN THE CURB EVERY TWO FEET.
4. CROSS SLOPE IS TO BE DETERMINED IN THE FIELD, TO PROVIDE A ONE PERCENT MINIMUM SLOPE WITH SMOOTH TRANSITIONS TO CURB LINES. THE CROSS SLOPE IS TO BE SUBJECT TO THE ENGINEERS APPROVAL.
5. IN ADDITION TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS, MEDIAN, AND CROSSWALK PAVEMENT SPECIFICATIONS SHALL BE IN ACCORDANCE WITH "BOMANITE CORPORATION" OR APPROVED EQUAL. THIS INCLUDES THEIR REQUIREMENTS FOR EXPANSION JOINTS, JOINT FILLERBOARD, WELDED WIRE FABRIC AND CONCRETE MIX.
6. ALL STAMPED CONCRETE SHALL BE INSTALLED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF "BOMANITE CORPORATION" OR APPROVED EQUAL. THE CONTRACTOR PERFORMING THE WORK MUST SUBMIT A LETTER FROM THE ABOVE TOOLING MANUFACTURER STATING THAT THE INSTALLER OF THE WORK IS LICENSED TO PERFORM THE SPECIFIED WORK.
7. ALL WORK PERFORMED MUST BE OF THE SAME MANUFACTURER AND ALL MATERIALS USED, INCLUDING CONCRETE MIX, MUST BE THE SAME FOR THE ENTIRE PROJECT. COLOR HARDENERS AND RELEASE AGENTS AS RECOMMENDED BY THE TOOLING MANUFACTURER SHALL BE USED.
8. BEDDING SAND SHALL CONFORM TO THE GRADING REQUIREMENTS OF ASTM C 33 AS SHOWN IN TABLE 1.
9. STAMPED CONCRETE TO FOLLOW EXPANSION AND CONTROL JOINT PATTERN OF THE ROADWAY.
10. ALL STAMPED CONCRETE MUST BE SEALED WITH BOMANITE ULTRA SEAL 100 VOC, OR APPROVED EQUAL. APPLY SEALER IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

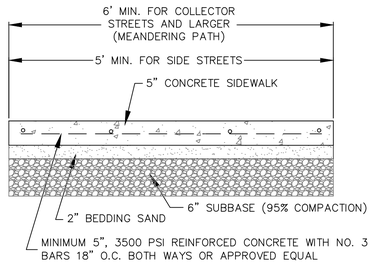
TABLE 1	
GRADING REQUIREMENTS FOR BEDDING SAND ASTM C 33	
SIEVE SIZE	PERCENT PASSING
⅜IN. (9.5mm)	100
NO. 4 (4.75mm)	95 TO 100
NO. 8 (2.36mm)	80 TO 100
NO. 16 (1.18mm)	50 TO 85
NO. 30 (600um)	25 TO 60
NO. 50 (300um)	10 TO 30
NO. 100 (150um)	0 TO 10
NO. 200 (75um)	.LT. 2%



STAMPED CONCRETE CROSSWALK/
WELCOME MAT DETAIL
N.T.S.

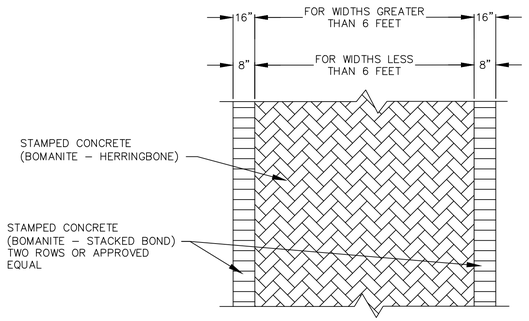


SIDEWALK EDGE STAMPED
CONCRETE DETAIL
N.T.S.



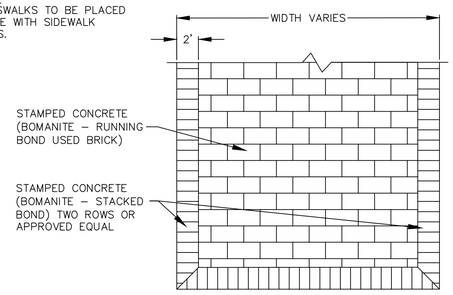
SIDEWALK DETAIL
N.T.S.

SIDEWALK NOTES:
1. PROVIDE ½" EXPANSION JOINT WHERE NEW SIDEWALK ABUTS EXISTING SIDEWALK AND AT 100' INTERVALS.
2. PROVIDE ¼"W x ¾"D SAWCUT JOINTS AT 5' INTERVALS
3. BEDDING SAND SHALL CONFORM TO THE GRADING REQUIREMENTS OF ASTM C33 AS SHOWN IN TABLE 1.
4. SIDEWALK TO CONFORM TO ALL A.D.A. AND TEXAS ACCESSIBLITY STANDARDS (TAS)
5. MAXIMUM GRADE LESS THAN FIVE PERCENT (5%).
6. CROSS SLOPE MAXIMUM IS ONE AND ONE HALF PERCENT (1.5%)
7. SIDEWALKS OR TRAILS 8' OR WIDER MUST BE AT LEAST 6" THICK WITH NO BEDDING SAND.
8. SIDEWALKS CONSTRUCTED ON PRIVATE PROPERTY MAY BE 4" THICK CONCRETE.
9. SIDEWALK SUBGRADE MUST BE COMPACTED BY VIBRATORY PLATE COMPACTOR OR OTHER METHOD



STAMPED CONCRETE CROSSWALK DETAIL
(PLAN VIEW)
N.T.S.

NOTE:
CROSSWALKS TO BE PLACED IN LINE WITH SIDEWALK RAMPS.



STAMPED CONCRETE WELCOME MAT DETAIL
(PLAN VIEW)
(TO ONLY BE USED AT TOWN ENGINEER'S REQUEST)
N.T.S.

DATE				
REVISION				
NO.				
DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE: NONE	JOB NUMBER: 1

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
MEDIAN AND SIDEWALK STAMPED CONCRETE DETAILS

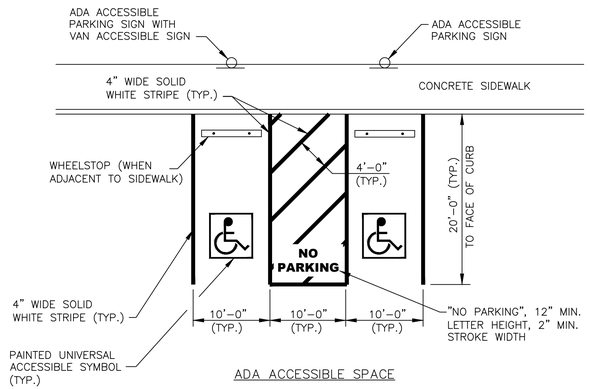
LITTLE ELM

SHEET
9 OF 26

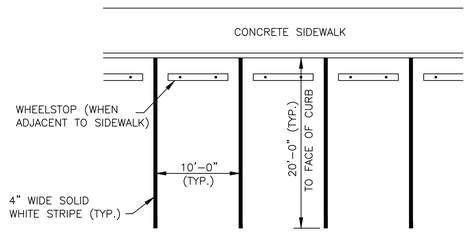
DECEMBER 2023

NOTE:

CENTER OF POSTS SHALL BE PLACED NEXT TO CONCRETE SIDEWALK. THE POSTS SHALL BE CENTERED WITH THE PARKING PLACE.



ADA ACCESSIBLE SPACE

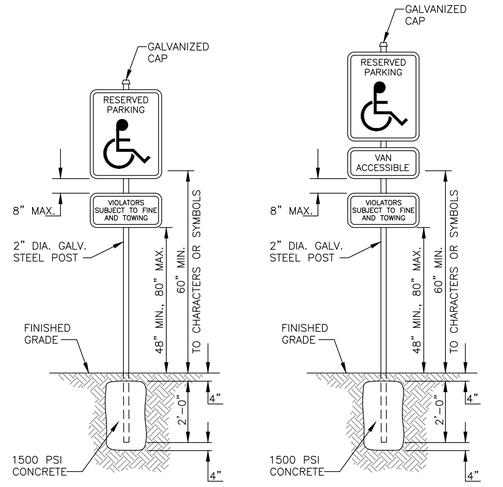


STANDARD SPACE

PARKING SPACE STRIPING
N.T.S.

NOTE: REFER TO ZONING ORDINANCE FOR ADDITIONAL REQUIREMENTS. IN THE CASE OF A CONFLICT BETWEEN THESE DETAILS AND THE ZONING ORDINANCE, THE ZONING ORDINANCE SHALL CONTROL.

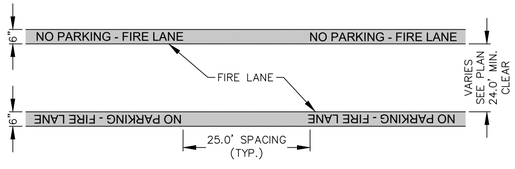
ADA SPACES AND SIGNAGE MUST BE DESIGNED TO CONFORM TO THE LATEST TEXAS ACCESSIBILITY STANDARD.



ADA ACCESSIBLE PARKING

ADA ACCESSIBLE PARKING WITH VAN ACCESSIBLE

PARKING SIGN
N.T.S.



NOTES:
1. PAVEMENT MARKING SHALL BE FROM THE TOP OF THE SEAM OF THE BACK OF CURB TO A POINT EVEN WITH THE DRIVING SURFACE.
2. THE STRIPE MAY BE BRUSHED OR SPRAYED, ONE COAT FINISH.
3. LETTERING SHALL BE STENCIL FORMED, BRUSH APPLIED AND SPACED AS DETAILED.
4. PAINT:
   A. STRIPING SHALL BE SIX INCHES (6") WIDE PAINTED WITH AN EXTERIOR ACRYLIC LATEX PAINT. COLOR SHALL BE "TRAFFIC RED" GLIDDEN NO. 63251 OR APPROVED EQUAL.
   B. LETTERING SHALL BE FOUR INCHES (4") HIGH PAINTED WITH AN EXTERIOR ACRYLIC LATEX PAINT. LETTERS SHALL BE ONE INCH (1") STROKE. COLOR SHALL BE "TRAFFIC WHITE" GLIDDEN NO. 563245 OR APPROVED EQUAL.

FIRE LANE STRIPING DETAIL
N.T.S.

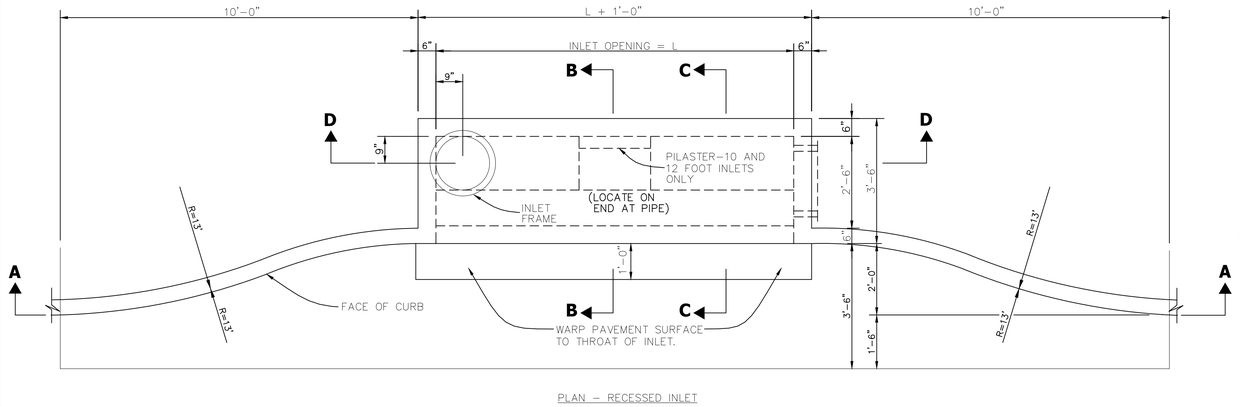
DATE				
REVISION				
NO.				
DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE: NONE	JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
PAVEMENT MARKING DETAILS

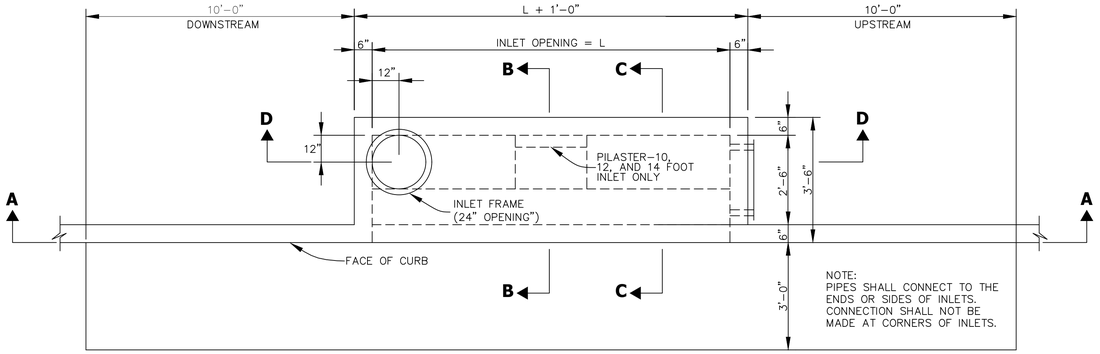
LITTLE ELM

SHEET
10 OF 26

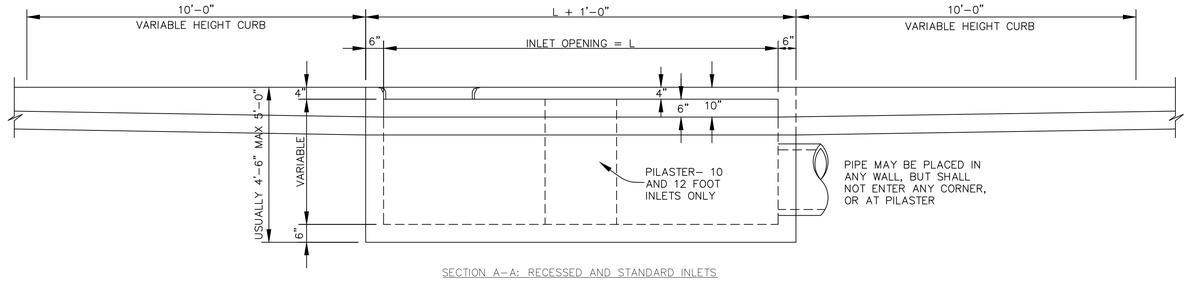
DECEMBER 2023



PLAN – RECESSED INLET



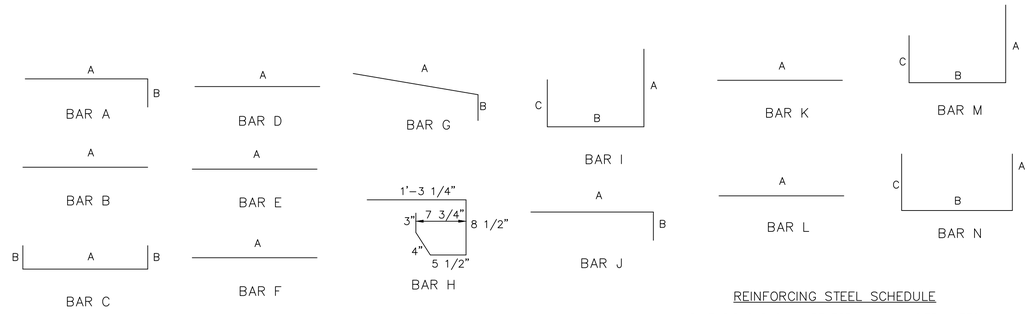
PLAN – STANDARD INLETS



SECTION A–A: RECESSED AND STANDARD INLETS

8, 10, AND 12 FOOT INLETS

N.T.S.



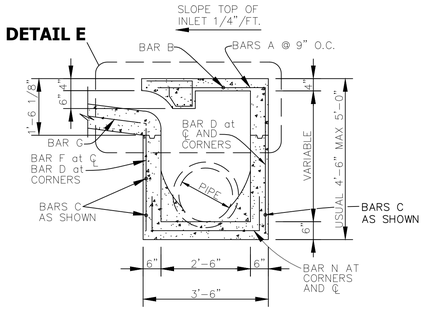
BAR DIAGRAMS

REINFORCING STEEL SCHEDULE

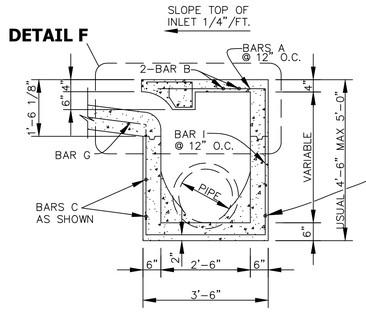
DIMENSIONS SHOWN ARE FOR MAXIMUM SIZE INLETS

INLET LENGTH	BAR TYPE	BAR DIA (1/8")	NO. REQ'D	BAR DIMENSIONS A	B	C
8	A	3	12	3'–2"	0'–3"	–
	B	3	1	6'–10"	–	–
	C	4	15	8'–8"	0'–6"	–
	D	4	5	4'–8"	–	–
	F	4	1	3'–2"	–	–
	G	3	5	2'–0"	1'–3"	–
	H	3	4	*	*	*
	N	3	3	3'–2"	3'–2"	3'–2"
10	A	3	10	3'–2"	0'–3"	–
	B	3	2	8'–10"	–	–
	C	4	16	10'–8"	0'–6"	–
	D	4	4	4'–8"	–	–
	E	5	6	10'–8"	–	–
	G	3	5	2'–0"	1'–3"	–
	H	3	15	*	*	*
	I	4	8	4'–8"	3'–2"	3'–2"
	J	5	9	3'–2"	1'–3"	–
	K	4	5	2'–3"	–	–
	L	4	5	4'–3"	–	–
	M	5	9	4'–3"	3'–2"	3'–9"
12	A	3	12	3'–2"	0'–3"	–
	B	3	2	10'–10"	–	–
	C	4	16	12'–8"	0'–6"	–
	D	4	4	4'–8"	–	–
	E	5	6	12'–8"	–	–
	G	3	5	2'–0"	1'–3"	–
	H	3	18	*	*	*
	I	4	10	4'–8"	3'–2"	3'–2"
	J	5	9	3'–2"	1'–3"	–
	K	4	5	2'–3"	–	–
	L	4	5	4'–3"	–	–
	M	5	9	4'–3"	3'–2"	3'–9"

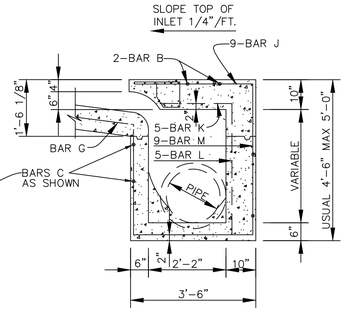
* SEE DIAGRAM FOR DIMENSIONS



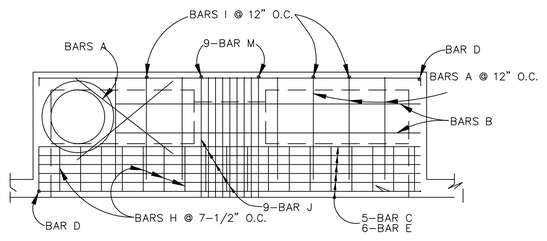
SECTION B–B



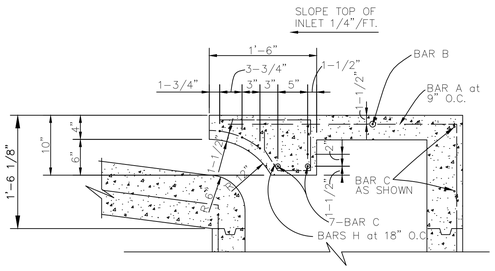
SECTION C–C



SECTION B–B
(FOR 12 FOOT INLETS ONLY)



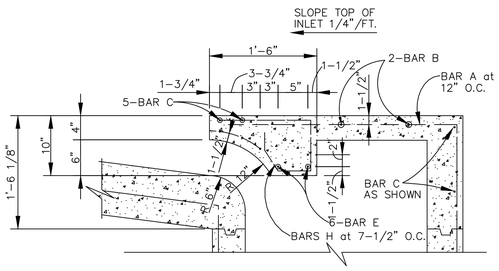
INLET REINFORCEMENT PLAN VIEW



DETAIL E

8 FOOT INLETS

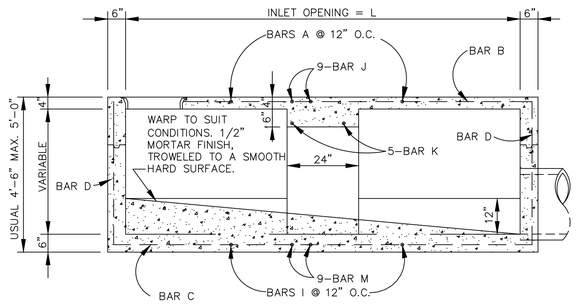
N.T.S.



DETAIL F

10 AND 12 FOOT INLETS

N.T.S.



SECTION D–D
(FOR 12 FOOT INLETS ONLY)

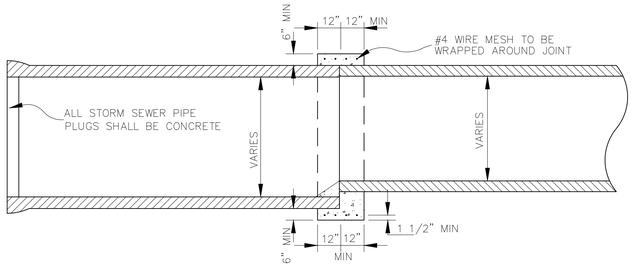
DATE				
REVISION				
NO.				
DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE: NONE	JOB NUMBER: 1

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 1 OF 4

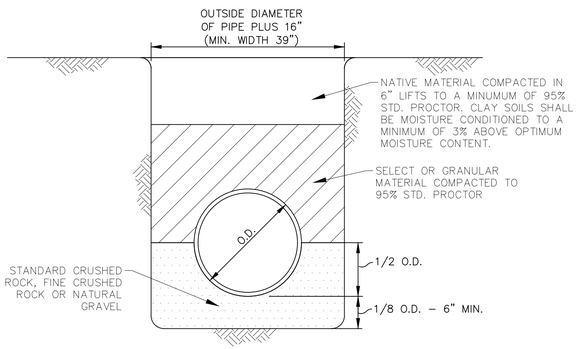
LITTLE ELM

SHEET
11 OF 26

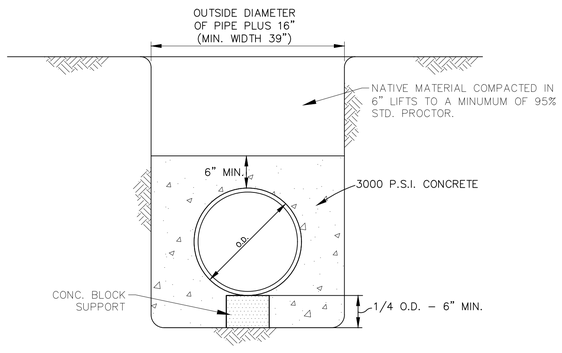
DECEMBER 2023



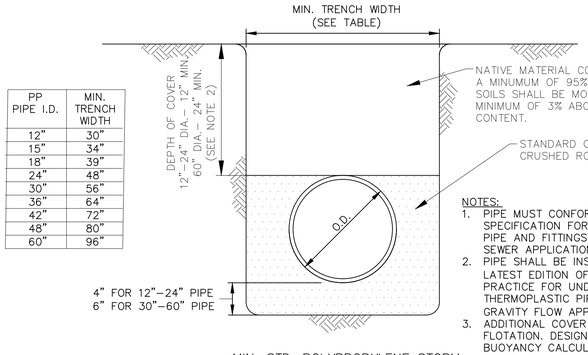
DETAIL OF CONCRETE COLLAR FOR PIPE CONNECTIONS
N.T.S.



MIN. STD. R.C.P. STORM
N.T.S.



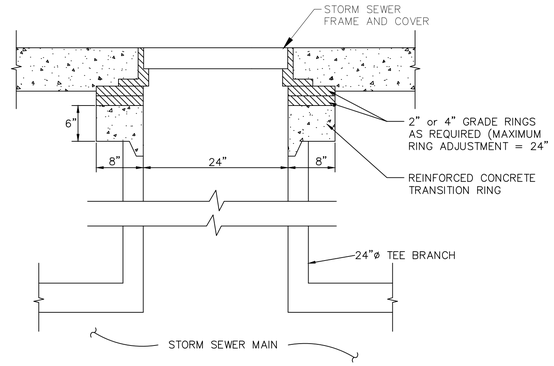
CONCRETE ENCASEMENT
N.T.S.



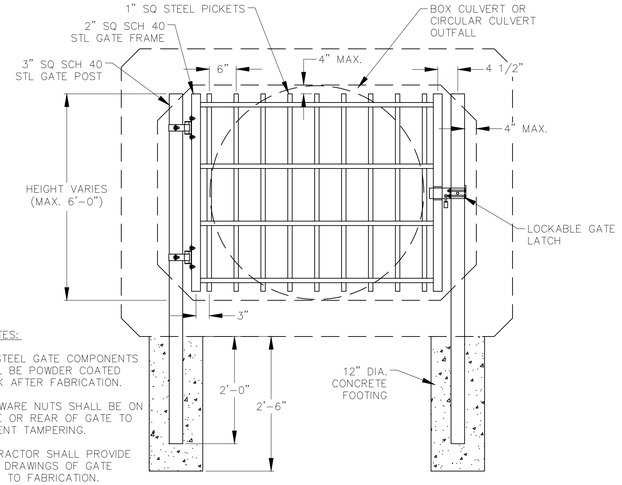
PP PIPE I.D.	MIN. TRENCH WIDTH
12"	30"
15"	34"
18"	39"
24"	48"
30"	56"
36"	64"
42"	72"
48"	80"
60"	96"

MIN. STD. POLYPROPYLENE STORM
N.T.S.

NOTES:
1. PIPE MUST CONFORM TO ASTM F2881 STANDARD SPECIFICATION FOR POLYPROYLENE DUAL WALL PIPE AND FITTINGS FOR NON–PRESSURE STORM SEWER APPLICATIONS
2. PIPE SHALL BE INSTALLED IN ACCORDANCE WITH LATEST EDITION OF ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS."
3. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOTATION. DESIGN ENGINEER TO PERFORM BUOYANCY CALCULATIONS TO DETERMINE REQUIRED COVER. MIN 12" COVER FOR NON TRAFFIC APPLICATIONS.



STORM SEWER ACCESS MANHOLE
N.T.S.

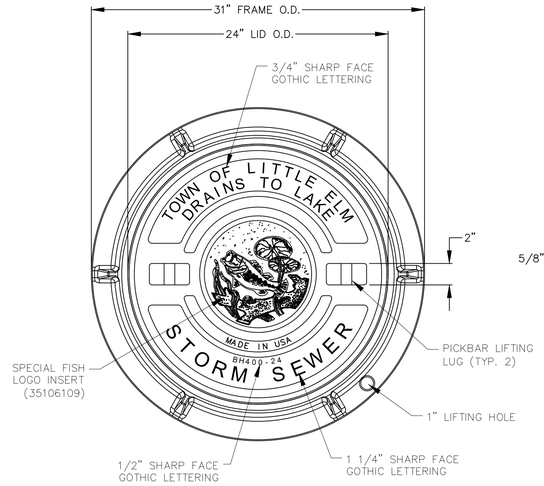


GATE NOTES:
1. ALL STEEL GATE COMPONENTS SHALL BE POWDER COATED BLACK AFTER FABRICATION.
2. HARDWARE NUTS SHALL BE ON INSIDE OR REAR OF GATE TO PREVENT TAMPERING.
3. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF GATE PRIOR TO FABRICATION.
4. GATES ONLY REQUIRED FOR STORM SEWER OUTFALLS 36" AND LARGER.

OUTFALL GATE DETAIL
N.T.S.

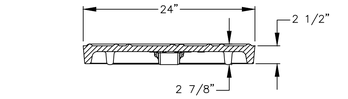
INLET MARKER DETAIL
N.T.S.

NOTES:
1. SIGN MANUFACTURED BY DAS MANUFACTURING INC. 3610 CINNAMON TRACE DR, VALRICO, FL 33596. (800)549–6024 OR (813) 681–6024. WWW.DASMANUFACTURING.COM.
2. COLORING:
   BUTTON – BACKGROUND IS WHITE
   NO DUMPING – BACKGROUND IS BLUE
   DRAINS TO LAKE – BACKGROUND IS GREEN
   LOGO – UPPER RIGHT 2 BARS ARE BLUE, LEFT & LOWER BARS ARE GREEN
   LITTLE ELM LETTERING IS BLUE
   SEPARATOR – TOP WAVE IS BLUE, BOTTOM WAVE IS GREEN
3. ADHESIVE IS CURB MARKER ADHESIVE RS–222

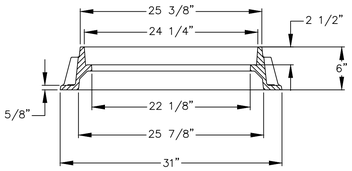


PLAN

NOTES:
1. STORM SEWER FRAME AND COVER SHALL BE EJ GROUP, INC. PRODUCT NUMBER NPR17–528B, CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON.
2. ASSEMBLY SHALL BE HEAVY DUTY TRAFFIC RATED FOR H–20 LOADING IN ACCORDANCE WITH AASHTO M306–10.



LID SECTION



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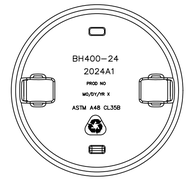
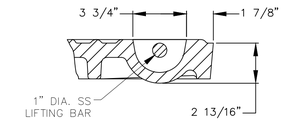
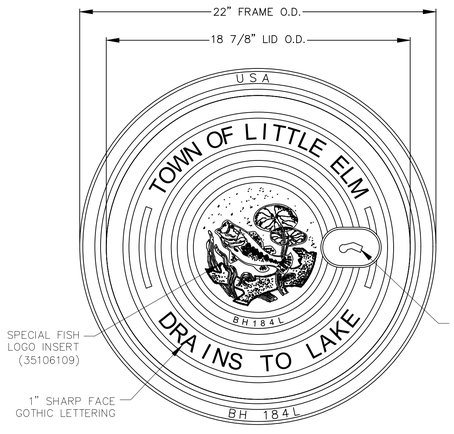


BOTTOM VIEW



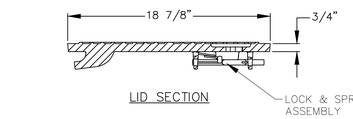
PICKBAR LIFTING LUG

STORM SEWER FRAME AND COVER
(TRAFFIC RATED)
N.T.S.



PLAN

NOTES:
1. INLET FRAME AND LOCKING COVER SHALL BE EJ GROUP, INC. PRODUCT NUMBER NPR17–528A, CONSTRUCTED OF ASTM A48 CLASS 35 GRAY CAST IRON.
2. RING WEIGHT 50 LBS, COVER WEIGHT 50 LBS. NOT RATED FOR USE IN TRAFFIC.



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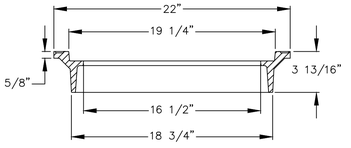
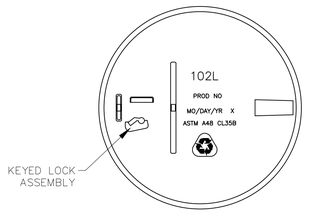


FRAME SECTION



BOTTOM VIEW

INLET FRAME AND COVER
(NOT TRAFFIC RATED)
N.T.S.

NO.	DATE	REVISION

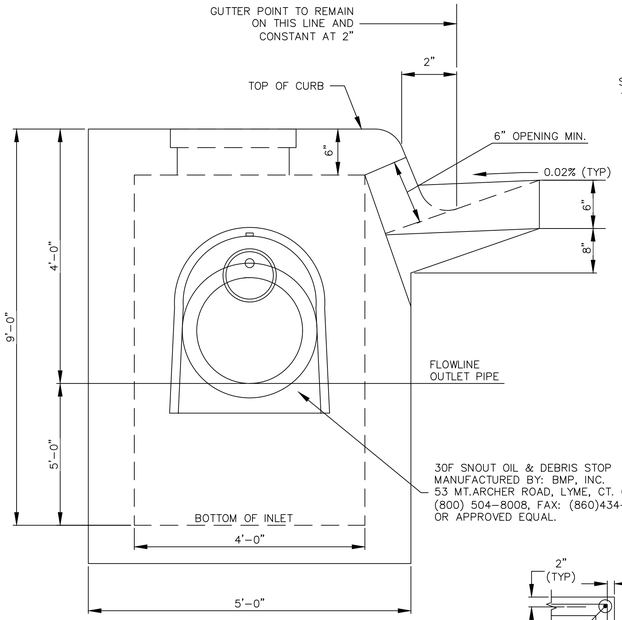
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: 1

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 2 OF 4

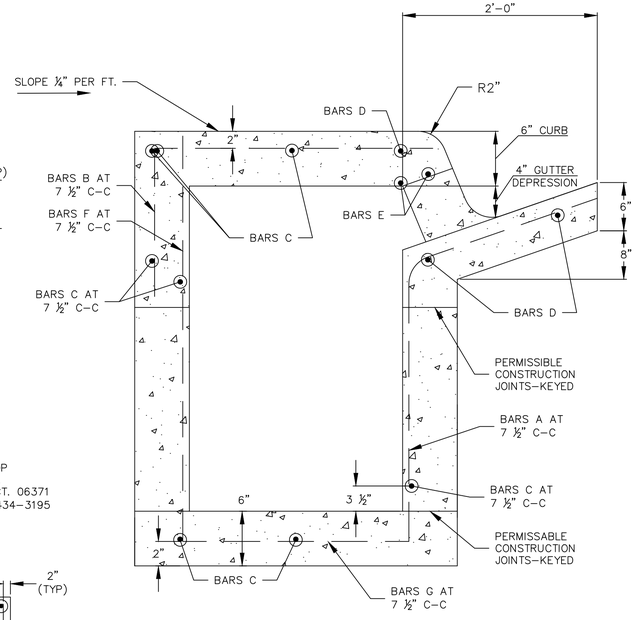
LITTLEELM

SHEET
12 OF 26

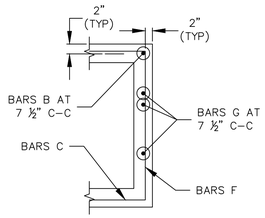
DECEMBER 2023



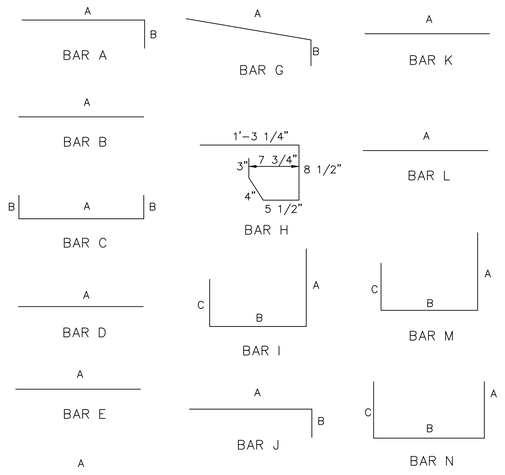
SECTION A–A
N.T.S.



SECTION B–B
N.T.S.



SECTION C–C
N.T.S.



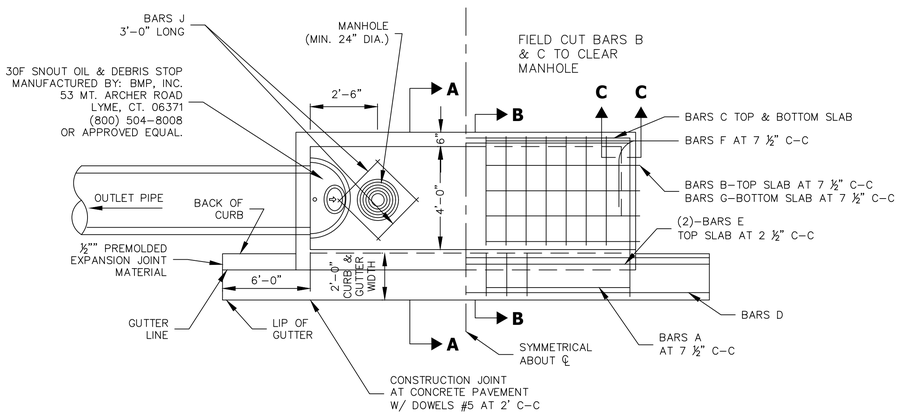
BAR DIAGRAMS

REINFORCING STEEL SCHEDULE

DIMENSIONS SHOWN ARE FOR MAXIMUM SIZE INLETS

INLET LENGTH	BAR TYPE	BAR DIA (1/8")	NO. REQ'D	BAR DIMENSIONS A	B	C
8	A	3	12	3'-2"	0'-3"	–
	B	3	1	6'-10"	–	–
	C	4	15	8'-8"	0'-6"	–
	D	4	5	4'-8"	–	–
	F	4	1	3'-2"	–	–
	G	3	5	2'-0"	1'-3"	–
	H	3	4	*	*	*
	N	3	3	3'-2"	3'-2"	3'-2"
10	A	3	10	3'-2"	0'-3"	–
	B	3	2	8'-10"	–	–
	C	4	16	10'-8"	0'-6"	–
	D	4	4	4'-8"	–	–
	E	5	6	10'-8"	–	–
	G	3	5	2'-0"	1'-3"	–
	H	3	15	*	*	*
	I	4	8	4'-8"	3'-2"	3'-2"
	J	5	9	3'-2"	1'-3"	–
	K	4	5	2'-3"	–	–
	L	4	5	4'-3"	–	–
	M	5	9	4'-3"	3'-2"	3'-9"
12	A	3	12	3'-2"	0'-3"	–
	B	3	2	10'-10"	–	–
	C	4	16	12'-8"	0'-6"	–
	D	4	4	4'-8"	–	–
	E	5	6	12'-8"	–	–
	G	3	5	2'-0"	1'-3"	–
	H	3	18	*	*	*
	I	4	10	4'-8"	3'-2"	3'-2"
	J	5	9	3'-2"	1'-3"	–
	K	4	5	2'-3"	–	–
	L	4	5	4'-3"	–	–
	M	5	9	4'-3"	3'-2"	3'-9"

* SEE DIAGRAM FOR DIMENSIONS



PLAN

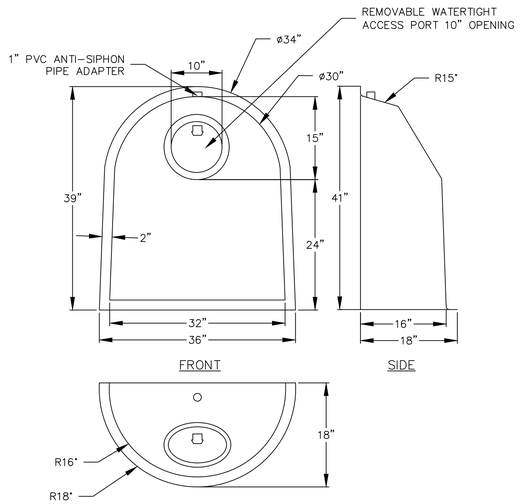
NOTE:

1. LOCATION OF MANHOLE OPENING TO BE AT OUTFALL END, UNLESS OTHERWISE DIRECTED BY THE OWNER.
2. INLET SHALL HAVE "DRAIN TO LAKE" MARKER.

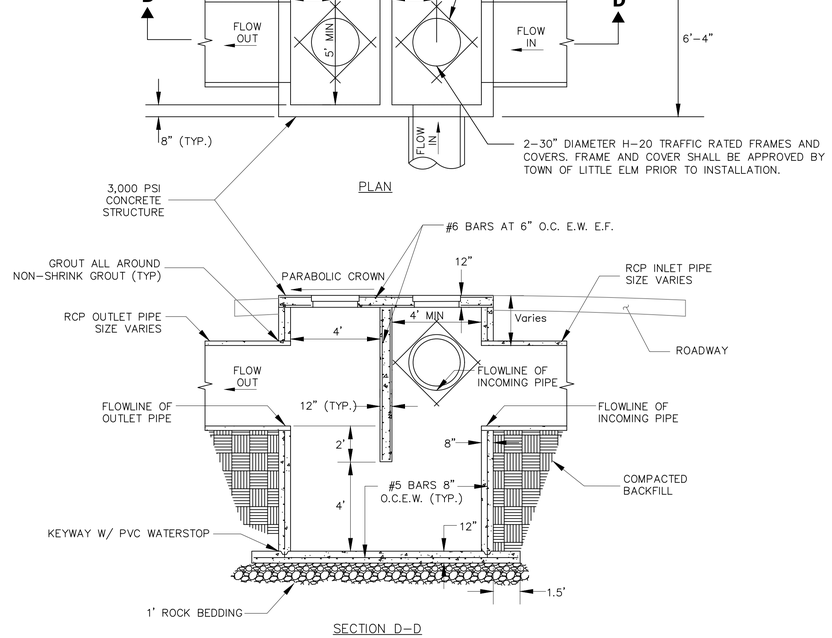
GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS "A" CONCRETE.
2. REINFORCING BARS SHALL BE STANDARD GRADE STEEL, DEFORMED REINFORCING BARS OF DIAMETER AND LENGTH AS SHOWN.
3. CHAMFER ALL EXPOSED CORNERS ¾" EXCEPT WHERE OTHERWISE NOTED.
4. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
5. FIELD CUT AND BEND BARS AS NECESSARY TO ACCOMODATE STORM SEWER PIPE.
6. RING AND COVER SHALL BE APPROVED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
7. DEBRIS SEPARATOR SHALL BE 30F SNOUT OIL & DEBRIS STOP MANUFACTURED BY: BMP, INC. 53 MT ARCHER ROAD, LYME, CT. 06371 (800) 504-8008 OR APPROVED EQUAL.
8. CURB INLET DEBRIS SEPARATORS ARE ONLY TO BE USED FOR SINGLE INLET STORM SYSTEMS UNLESS APPROVED BY TOWN ENGINEER. SYSTEMS WITH MULTIPLE INLETS SHALL USE A LARGE DEBRIS SEPARATOR.

CURB INLET DEBRIS SEPARATOR DETAIL
N.T.S.



30F SNOUT OIL & DEBRIS STOP
N.T.S.



LARGE DEBRIS SEPARATOR DETAIL
N.T.S.

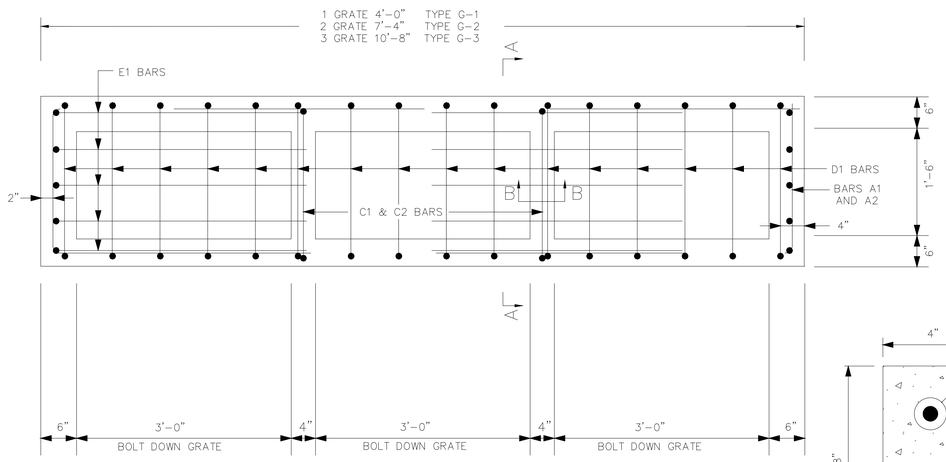
DATE					
REVISION					
NO.					
DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE: NONE	JOB NUMBER:	1

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 3 OF 4

LITTLE ELM

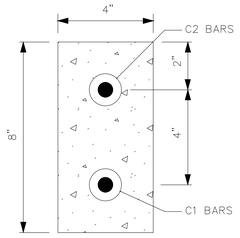
SHEET
13 OF 26

DECEMBER 2023

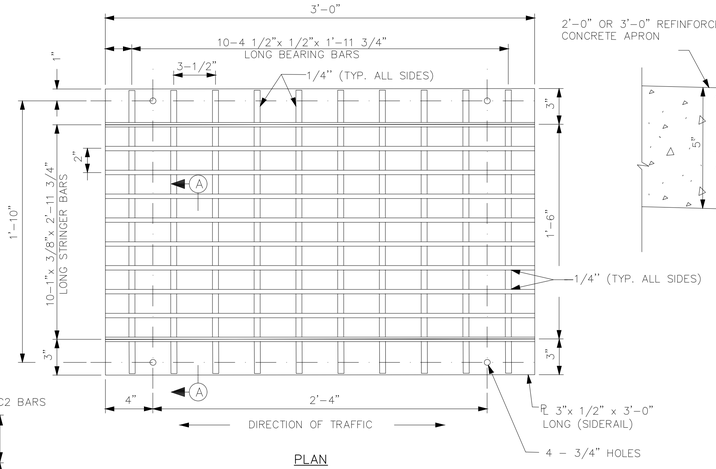


PLAN

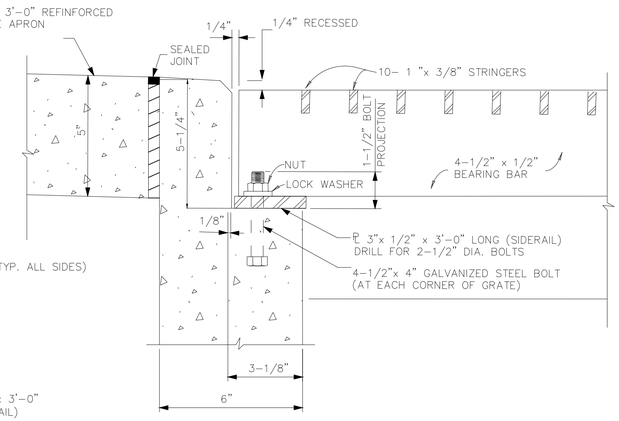
BOLT DOWN GRATE NOT SHOWN FOR CLARITY



SECTION B-B



PLAN



SECTION A-A

BOLT DOWN GRATE DETAIL
N.T.S.

ELEVATION

BOLT DOWN GRATE NOT SHOWN FOR CLARITY

SECTION A-A

TYPE "G" INLET DETAIL
N.T.S.

GENERAL NOTES:

1. PERMITTED CONST JOINT LOCATIONS SHOWN. BAR DETAILS SHALL BE ADJUSTED AS NECESSARY FOR LAP SPLICES IF HORIZONTAL CONST JOINT IS USED.
2. REINFORCING SHALL BE CUT OR BENT AT PIPE OPENINGS.
3. REINFORCING SHALL MAINTAIN 2" COVER AT ALL LOCATIONS, UNLESS OTHERWISE NOTED.
4. ALL CONCRETE SHALL EXCEED 3000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
5. REINFORCING BARS SHALL BE GRADE 60 AND CONFORM TO ASTM A615.
6. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO THE CENTER OF THE BARS.
7. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
8. ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A36.
9. ALL STRUCTURAL STEEL COMPONENTS EXCEPT REINFORCING STEEL SHALL BE GALVANIZED AFTER FABRICATION.
10. USE 3'-0" APRON WIDTH UNLESS PLANS NOTE OTHERWISE.
11. NO GRATE INLETS ARE ALLOWED IN STREETS, FIRELANES, DRIVES, OR PARKING SPACES UNLESS APPROVED BY THE TOWN ENGINEER.

BAR SCHEDULE (4'-3" DEPTH)

1 GRATE

BAR	NO	SIZE	TYPE	SPACING
A1	4	# 4	BENT	1'-0" C-C
A2	1	# 4	BENT	AS SHOWN
D1	6	# 5	BENT	8" C-C
E1	5	# 4	BENT	6" C-C

2 GRATE

BAR	NO	SIZE	TYPE	SPACING
A1	4	# 4	BENT	1'-0" C-C
A2	1	# 4	BENT	AS SHOWN
C1	1	# 5	BENT	4" C-C
C2	1	# 5	BENT	4" C-C
D1	11	# 5	BENT	8" C-C
E1	5	# 4	BENT	6" C-C

3 GRATE

BAR	NO	SIZE	TYPE	SPACING
A1	4	# 4	BENT	1'-0" C-C
A2	1	# 4	BENT	AS SHOWN
C1	2	# 5	BENT	4" C-C
C2	2	# 5	BENT	4" C-C
D1	16	# 5	BENT	8" C-C
E1	5	# 4	BENT	6" C-C

GALV STRUCTURAL STEEL FOR 3' x 2' BOLT DOWN GRATE

BAR	NO	SPACING	LENGTH	WEIGHT
3"x 1/2" SIDERAIL	2	AS SHOWN	3'-0"	31
4-1/2"x1/2" BEARING BAR	10	AS SHOWN	1'-11 3/4"	152
1"x 3/8" STRINGER BAR	10	AS SHOWN	2'-11 3/4"	38
TOTAL STRUCTURAL STEEL (LBS)				221

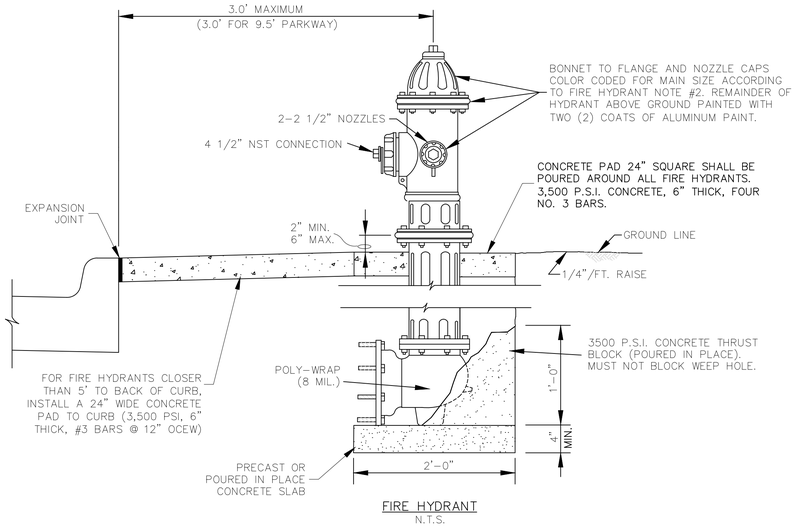
DATE				
REVISION				
NO.				
DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE: NONE	JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL STORM SEWER DETAILS 4 OF 4

LITTLEELM

SHEET
14 OF 26

DECEMBER 2023



FIRE HYDRANT
N.T.S.

FIRE HYDRANT NOTES:

1. IN GENERAL ALL FIRE HYDRANTS SHALL CONFORM TO AWWA STANDARDS SPECIFICATIONS FOR FIRE HYDRANTS FOR ORDINARY WATER WORKS SERVICE FOR WATER AND SANITARY SEWER IMPROVEMENTS. FIRE HYDRANTS SHALL HAVE A 5-1/4" MINIMUM VALVE OPENING WITH A BARREL APPROXIMATELY 6" INSIDE DIAMETER. ALL HYDRANTS SHALL BE EQUIPPED WITH A BREAKAWAY FLANGE. ALL HYDRANTS SHALL BE APPROVED BY THE TOWN.

2. FIRE HYDRANT CAPS AND BONNETS SHALL BE PAINTED WITH TWO (2) COATS ACCORDING TO NFPA 291, CHAPTER 3.

CLASS C	LESS THAN 500 GALLONS PER MINUTE (GPM)	TNEMEC SERIES 2H-17SF SAFETY RED
CLASS B	500-999 GALLONS PER MINUTE (GPM)	TNEMEC SERIES 2H-04SF SAFETY ORANGE
CLASS A	1000-1499 GALLONS PER MINUTE (GPM)	TNEMEC SERIES 2H-09SF SAFETY GREEN
CLASS AA	1500 GALLONS PER MINUTE (GPM) & ABOVE	TNEMEC SERIES 2H-11SF SAFETY BLUE

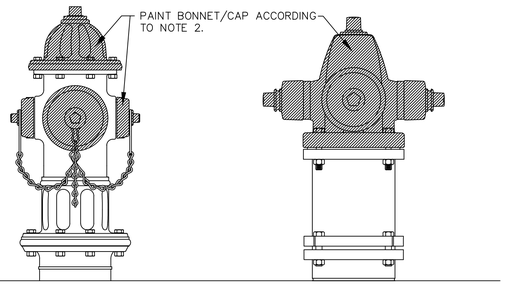
3. ALL BOLTS AND NUTS USED WITH MECHANICAL JOINT FITTINGS SHALL BE "COR-TEN" OR APPROVED OTHER.

4. A BLUE STEMSONITE (OR APPROVED OTHER) MODEL 88-SSA FIRE HYDRANT MARKER WILL BE INSTALLED OPPOSITE FIRE HYDRANTS JUST OFF CENTER TO THE SIDE OF THE STREET ADJACENT TO THE HYDRANT.

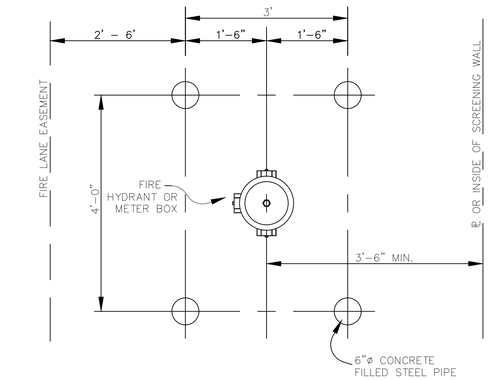
5. INSTALL POLYETHYLENE WRAP AROUND DUCTILE IRON PIPE, RELATED FITTINGS AND VALVES. THIS WRAP SHALL BE 8 MILS. THICKNESS POLYTUBE. SEAMS AND OVERLAPS SHALL BE WRAPPED AND HELD IN PLACE BY TWO (2) INCH WIDE PLASTIC BACKED ADHESIVE TAPE, POLYKEN 900, SCOTCHRAP NO. 50, OR APPROVED OTHER, WITH APPROXIMATE TWO (2) FOOT LAPS ON THE POLYTUBE. THE WRAP ON THE BARREL OF THE PIPE SHALL BE LOOSE ENOUGH TO ALLOW THE FILM TO SHIFT WITH THE SOIL. THE WRAP SHALL BE INSTALLED WITHOUT BREAKS, TEARS OR HOLES IN THE FILM.

6. IN ORDER TO MAINTAIN A MANAGEABLE PARTS INVENTORY AND WORKING KNOWLEDGE OF FIRE HYDRANTS, THE FOLLOWING FIRE HYDRANTS ARE APPROVED: MUELLER AND WATEROUS THREE-WAY STANDARD THREAD WITH VALVE IN LEAD NO LESS THAN 5-1/4" IN SIZE OR APPROVED OTHER.

7. ALL NEW FIRE HYDRANTS MUST HAVE 5" STORZ CONNECTION FOR FIRE DEPARTMENT. EXISTING FIRE HYDRANTS SERVING NEW DEVELOPMENT MUST HAVE 5" STORZ CONNECTION ADDED.



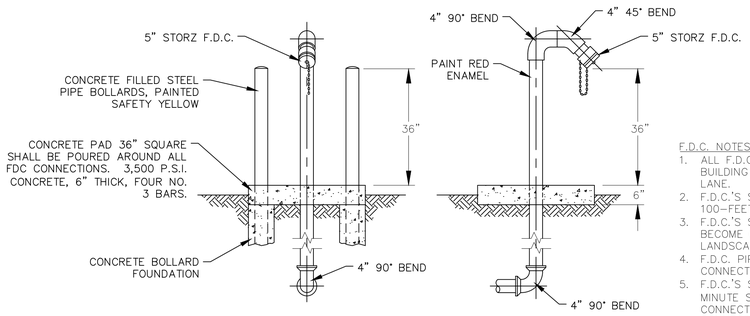
FIRE HYDRANT COLOR DETAIL
N.T.S.



PIPE BOLLARD PROTECTION DETAIL
N.T.S.

NOTES:

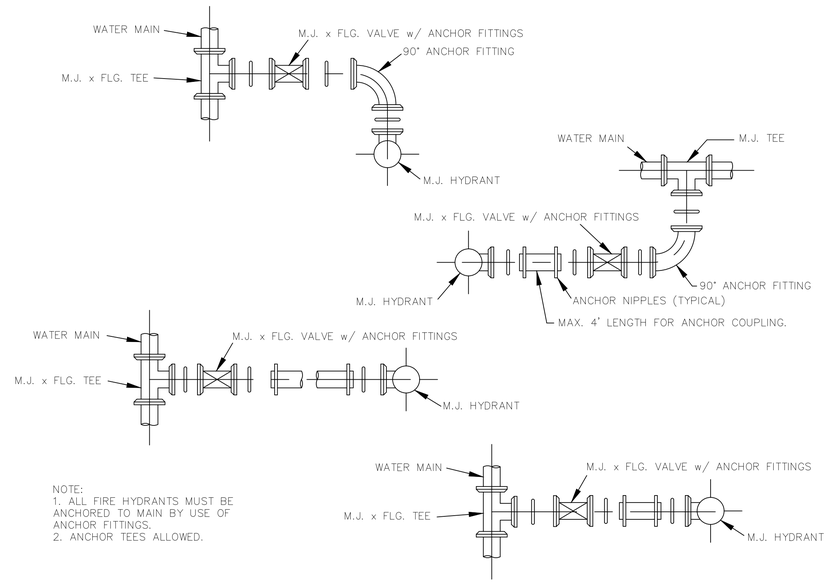
1. FOR USE WHERE CURBS ARE NOT POSSIBLE OR AS SPECIFIED BY THE TOWN ENGINEER.
2. FIRE HYDRANTS SHALL BE 35' CLEAR OF ALL BUILDINGS.
3. GUARD POSTS SHALL BE 6 L.F. OF 6" DIA. STEEL PIPE (3' ABOVE & BELOW GROUND LEVEL). POST SHALL BE ENCASED IN 16" DIA. CONC. PIER TO A DEPTH OF 12" BELOW POST BOTTOM. REINF. CONC. PIER WITH 2 NO. 6 BARS (12" LONG) THRU POST INTO PIER. POST ABOVE GROUND LEVEL SHALL BE PAINTED WITH TWO (2) COATS OF ALUMINUM PAINT.



REMOTE FIRE DEPARTMENT CONNECTION (F.D.C.) DETAIL FOR "STORZ" CONNECTION
N.T.S.

F.D.C. NOTES:

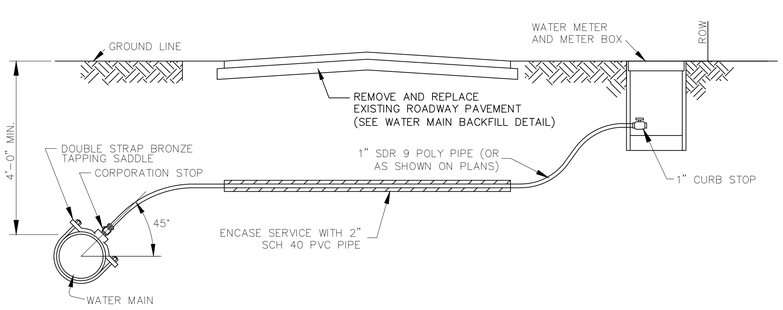
1. ALL F.D.C.'S SHALL BE REMOTE FROM THE BUILDING AND PLACED ADJACENT TO THE FIRE LANE.
2. F.D.C.'S SHALL BE LOCATED AT A MAXIMUM OF 100-FEET FROM AN ACCESSIBLE FIRE HYDRANT.
3. F.D.C.'S SHALL NOT BE PLACED WHERE THEY MAY BECOME OBSTRUCTED BY PARKING SPACES, LANDSCAPING, OR BUILDING COMPONENTS.
4. F.D.C. PIPING SHALL BE 4" WITH 5" STORZ CONNECTIONS.
5. F.D.C.'S SERVING MORE THAN 500 GALLONS PER MINUTE SHALL BE PROVIDED WITH ONE 5" STORZ CONNECTION AND ONE 2-2.5 SIAMESE CONNECTION.
6. REFERENCE FIRE MARSHAL'S CONTRACTOR GUIDE FOR INFORMATION ON REQUIRED SIGNAGE



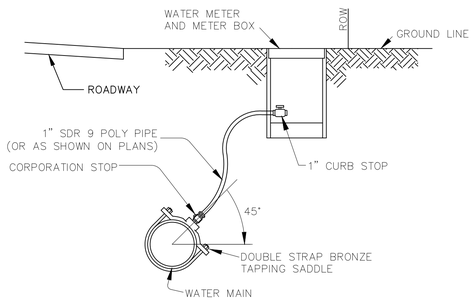
NOTE:
1. ALL FIRE HYDRANTS MUST BE ANCHORED TO MAIN BY USE OF ANCHOR FITTINGS.
2. ANCHOR TEES ALLOWED.

FIRE HYDRANT INSTALLATION
N.T.S.

TYPICAL LOT SERVICE DETAIL
N.T.S.



SERVICE UNDERNEATH PAVEMENT



SERVICE OUTSIDE OF PAVEMENT

WATER SERVICE NOTES:

A. WATER SERVICES SHALL NOT BE CONNECTED TO FIRE HYDRANT LINES.

B. ALL MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS.

C. METER BOX SIZES:
- 5/8", 3/4" AND 1" SHALL BE DFW PLASTICS MODEL DFW-1814F-1BA. (18X14 PIT-CI RING W/ BLACK BRASS LOCK AMR LID)
- 1-1/2" AND 2" SHALL BE DFW PLASTICS MODEL DFW-2418F-1BA. (24X18 PIT-CI RING W/ 20" BLACK BRASS LOCK AMR LID)

D. METER BOX SHALL BE LOCATED OUT OF ALL FLATWORK, SIDEWALKS AND APPROACHES.

E. BACKFLOW PREVENTER IS REQUIRED ON RESIDENTIAL SIDE OF METER.

F. WATER SERVICE SHALL BE REPLACED FROM MAIN TO EXISTING WATER METER. SERVICE LINE BACKFILL SHALL BE IDENTICAL TO WATER MAIN.

G. REFER TO WATER MAIN BACKFILL DETAIL FOR SERVICE CONNECTIONS LOCATED BENEATH PAVEMENT.

H. ALL POLY SERVICE PIPE SHALL BE BLACK IN COLOR.

WATER METER INSTALLATION NOTES:

1. ALL TAPS SHALL BE MADE AT A 45° ANGLE TO THE CENTERLINE OF THE PIPE.
2. THE CONTRACTOR SHALL SET THE METER BOX IN ALL CASES.
3. THE METER BOX SHALL BE SET WITHIN THE RIGHT-OF-WAY OR A DEDICATED WATER EASEMENT. IN ALL CASES THE METER BOX SHALL BE PROTECTED FROM VEHICULAR TRAFFIC.
4. WATER METER BOX SHALL BE PROTECTED BY A 6" CURB OR GUARD POSTS WHEN PLACED IN A PAVED AREA, WHICH REQUIRES SPECIFIC APPROVAL BY THE TOWN ENGINEER OR HIS/HER DESIGNEE.
5. WATER SERVICES SHALL BE EMBEDDED IN SAND FROM CORPORATION STOP TO CURB STOP.
6. ALL BRASS PRODUCTS THAT COME INTO CONTACT WITH POTABLE WATER MUST MEET NEW "LEAD FREE" STANDARDS AS DEFINED UNDER PUBLIC LAW 111-380.
7. CONTRACTOR SHALL VERIFY METER ASSEMBLY FOR METER RELOCATIONS WITH TOWN STAFF PRIOR TO CONSTRUCTION.

NO.	REVISION	DATE
1	REVISE WATER SERVICE NOTE C	12/19/2017

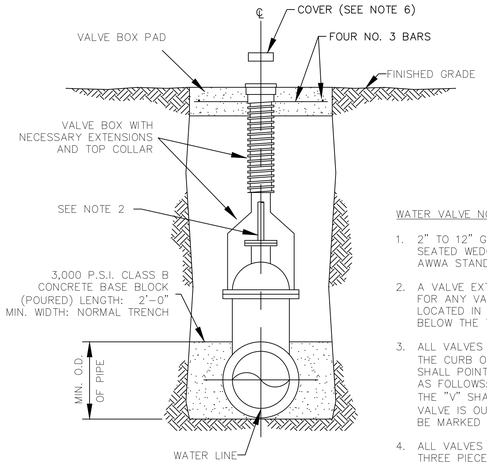
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: 1

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 1 OF 4

LITTLE ELM

SHEET
15 OF 26

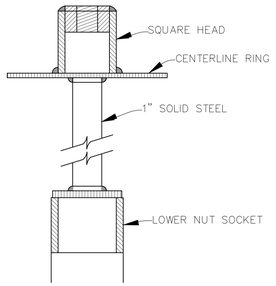
DECEMBER 2023



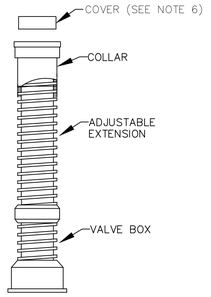
GATE VALVE
VALVE SETTING & BOX
N.T.S.

WATER VALVE NOTES:

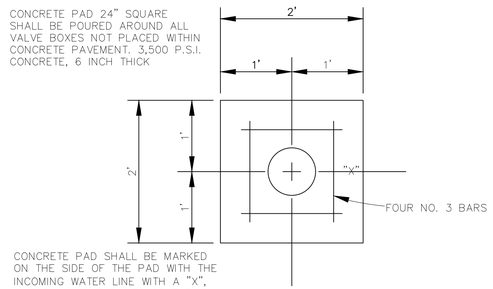
1. 2" TO 12" GATE VALVE SHALL BE RESILIENT SEATED WEDGE GATE VALVES ACCORDANCE WITH AWWA STANDARD C-509.
2. A VALVE EXTENSION STEM SHALL BE REQUIRED FOR ANY VALVE WHOSE OPERATING NUT IS LOCATED IN EXCESS OF 7 FEET 6 INCHES BELOW THE TOP OF VALVE BOX.
3. ALL VALVES SHALL BE MARKED WITH A SAW ON THE CURB OR PAVEMENT WITH "V". THE "V" SHALL POINT TO THE LOCATION OF THE VALVE AS FOLLOWS: IF THE VALVE IS IN THE PAVING, THE "V" SHALL BE MARKED UPRIGHT; IF THE VALVE IS OUTSIDE THE PAVING, THE "V" SHALL BE MARKED UPSIDE DOWN.
4. ALL VALVES STACK COMPONENTS SHALL BE THREE PIECE SCREW TYPE CAST IRON.
5. IN ORDER TO MAINTAIN A MANAGEABLE PARTS INVENTORY AND WORKING KNOWLEDGE OF VALVES, THE FOLLOWING VALVES ARE APPROVED: MUELLER AND WATEROUS - 150 P.S.I. TEST.
6. VALVE BOX COVERS FOR NON-POTABLE WATER LINES TO BE PAINTED WITH TWO (2) COATS OF TNEMEC SERIES 2H-14SF SAFETY PURPLE.
7. MAXIMUM ISOLATION VALVE SPACING
   WATER MAINS 12" AND SMALLER: 500 FEET
   WATER MAINS LARGER THAN 12": 1,000 FEET



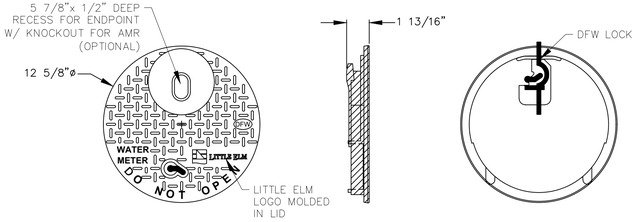
VALVE EXTENSION
N.T.S.



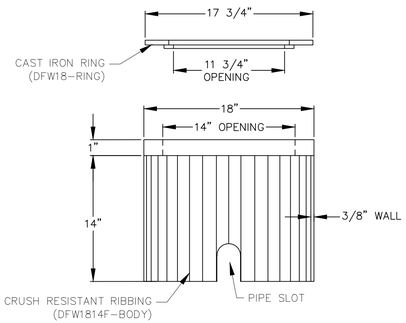
VALVE BOX WITH EXTENSION
N.T.S.



VALVE BOX PAD PLAN
N.T.S.



LID PLAN VIEW LID SECTION



SIDE VIEW

NOTES:

1. WATER METER BOX BODY SHALL BE DFW PLASTICS MODEL NO. DFW1814F-1BA. BOX LID SHALL BE DFW PLASTICS MODEL NO. DFW18AMR-1BA LE-LID. RING CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON, BODY CONSTRUCTED OF LLDPE AND LID CONSTRUCTED OF HDPE.
2. METER BOX DESIGNED TO WITHSTAND NON-DELIBERATE AND INCIDENTAL TRAFFIC. NOT RATED FOR USE IN ROADWAYS.

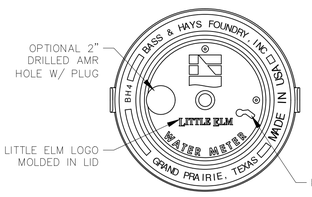
WATER METER BOX
(DFW PLASTICS, INC.)
N.T.S.

NOTES:

1. ALL OPERATING NUTS SHALL BE EXTENDED TO WITHIN 6" OF FINAL GRADE.
2. BUTTERFLY VALVE SHALL BE MANUFACTURED BY MUELLER OR ENGINEER-APPROVED EQUAL.
3. 6" BYPASS MAY BE REQUIRED BY TOWN ENGINEER OR HIS/HER DESIGNEE ON SITE SPECIFIC PROJECTS.

BUTTERFLY VALVE
N.T.S.

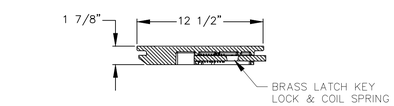
2" COMBINATION AIR AND
VACUUM RELEASE VALVE
N.T.S.

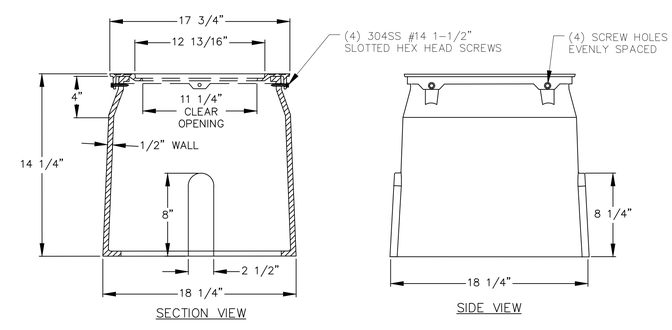


PLAN VIEW

NOTES:

1. WATER METER BOX SHALL BE BASS & HAYS PATTERN NO. P34P-14D1S. BOX LID SHALL BE BASS & HAYS PATTERN NUMBER BH-3LIDP. RING CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON, ENCLOSURE AND LID CONSTRUCTED OF HIGH DENSITY POLYETHYLENE.
2. RING WEIGHT 12 LBS, COVER WEIGHT 4 LBS, ENCLOSURE WEIGHT 11 LBS. NOT RATED FOR USE IN ROADWAYS.





SECTION VIEW SIDE VIEW

WATER METER BOX
(BASS & HAYES FOUNDRY, INC.)
N.T.S.

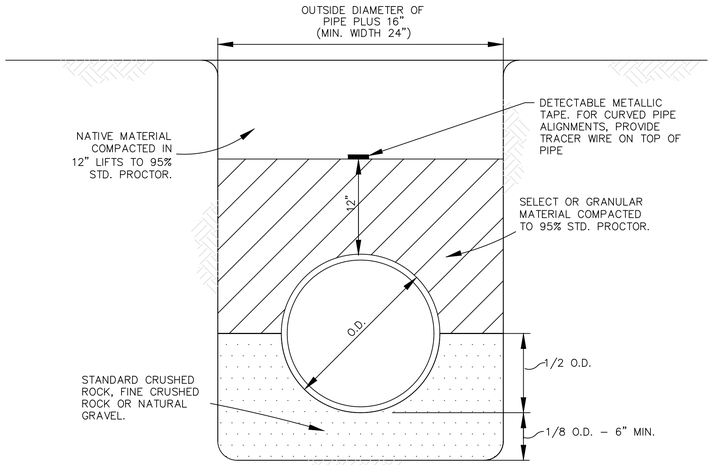
DATE				
REVISION				
NO.				
DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE: NONE	JOB NUMBER: 1

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 2 OF 4

LITTLE ELM

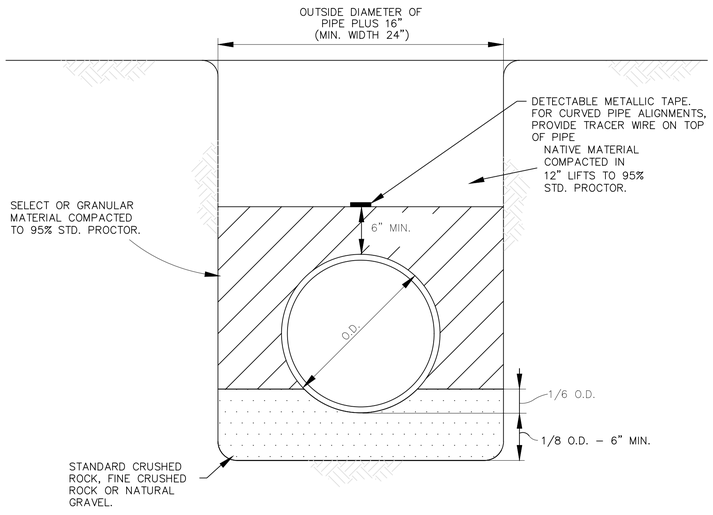
SHEET
16 OF 26

DECEMBER 2023



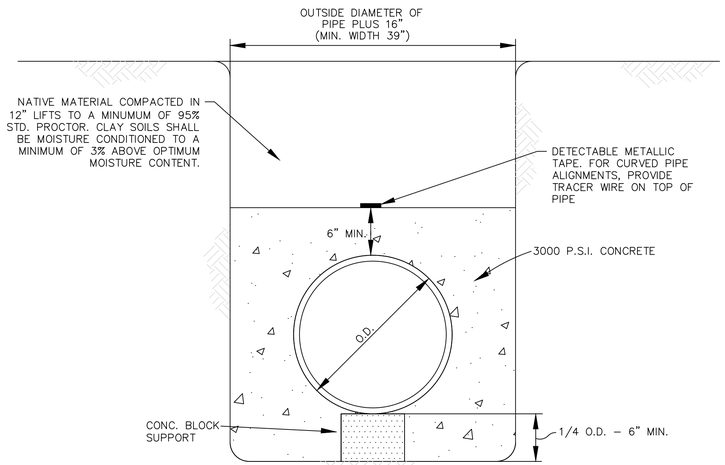
MIN. STD P.V.C. WATER
N.T.S.

CLASS F1 EMBEDMENT



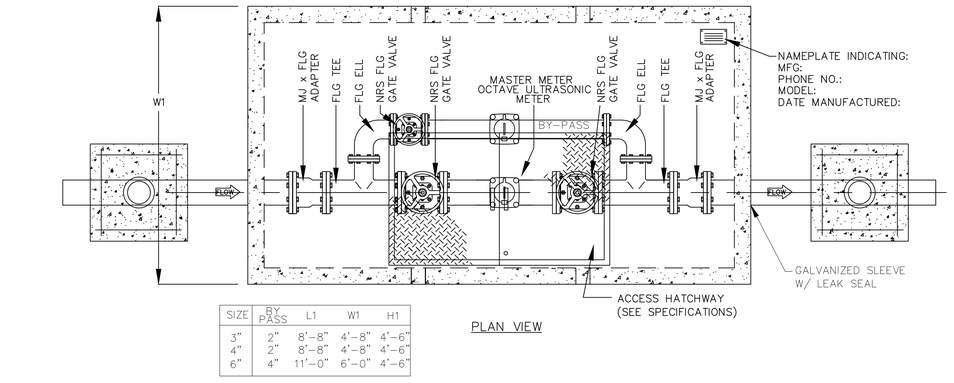
MIN. STD. DUCTILE IRON WATER
MIN. STD. R.C.C.P. WATER
N.T.S.

CLASS F3 EMBEDMENT



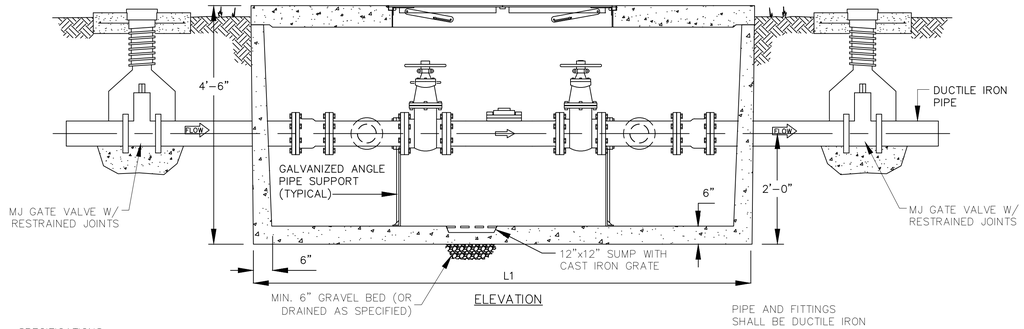
CONCRETE ENCASEMENT
N.T.S.

CLASS F4 EMBEDMENT



SIZE	BY PASS	L1	W1	H1
3"	2"	8'-8"	4'-8"	4'-6"
4"	2"	8'-8"	4'-8"	4'-6"
6"	4"	11'-0"	6'-0"	4'-6"

PLAN VIEW



ELEVATION

PIPE AND FITTINGS SHALL BE DUCTILE IRON

SPECIFICATIONS

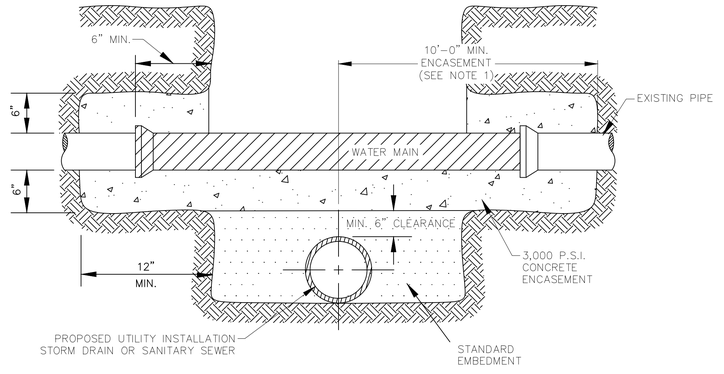
CONCRETE : CLASS 1 CONCRETE WITH DESIGN STRENGTH OF 4500 PSI AT 28 DAYS. UNIT IS OF MONOLITHIC CONSTRUCTION AT FLOOR AND FIRST STAGE OF WALL WITH SECTIONAL RISER TO REQUIRED DEPTH.

REINFORCEMENT: GRADE 60 REINFORCED. STEEL BAR CONFORMING TO ASTM A615 ON REQUIRED CENTERS OR EQUAL.

HATCHWAY: 3' X 5' GALVANIZED STEEL DOUBLE LEAF SPRING ASSISTED HATCHWAY – TRAFFIC RATED W/ SLAM LOCK.

PRECAST VAULT SHALL BE FROM PARK EQUIPMENT COMPANY MATCHING DETAIL SHOWN OR APPROVED OTHER.

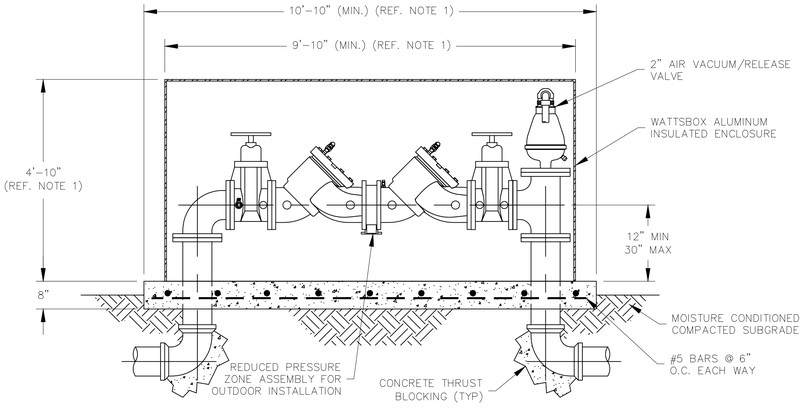
METER VAULT
N.T.S.



MINIMUM CLEARANCE NOTE:

1. WHERE A MINIMUM CLEARANCE OF 10'-0" (HORIZONTAL AND/OR VERTICAL) CANNOT BE OBTAINED, THEN THE POTABLE WATER MAIN SHALL BE CONCRETE ENCASED FOR 10'-0" EACH SIDE OF THE INTERSECTION OF THE INSTALLED UTILITY LINE.
2. CROSSING OF SANITARY SEWER SHALL BE IN ACCORDANCE WITH THE LATEST TCEQ RULES AND REGULATIONS.

CROSSING UTILITY PIPE SUPPORT
N.T.S.



BACKFLOW PREVENTER
N.T.S.

NOTES:

1. EXACT SIZE OF BOX MAY VARY DEPENDING ON ACTUAL LENGTH OF RPZ BACKFLOW PREVENTER.
2. AIR/VACUUM RELEASE ASSEMBLY SHALL BE ARI FLOW CONTROL ACCESSORIES, MODEL D-025, WITH NYLON BODY.
3. FIELD ROUTE DRAIN LINES FROM RPZ AND AIR RELEASE VALVE TO A COMMON DISCHARGE POINT.

NO.	REVISION	DATE

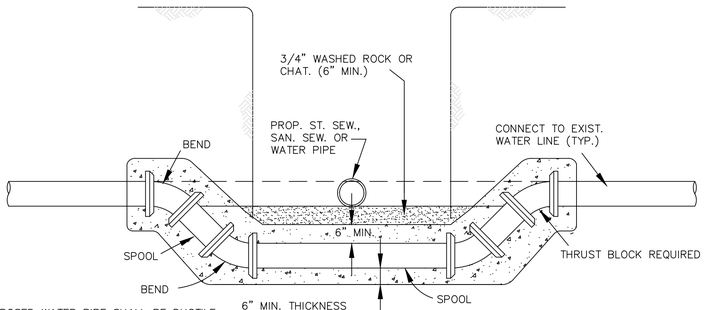
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 3 OF 4

LITTLEELM

SHEET
17 OF 26

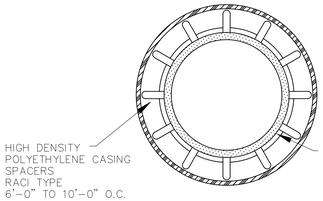
DECEMBER 2023



NOTES:

1. PROPOSED WATER PIPE SHALL BE DUCTILE IRON UNLESS OTHERWISE SPECIFIED IN PLANS. ALL FITTINGS SHALL BE DUCTILE IRON (M.J.–P.E.) MEGALUG.
2. PROPOSED PIPING & FITTINGS ARE SYMMETRIC ABOUT CENTER OF PROP. SAN. SEW. OR ST. SEW. PIPE AND SHALL RETAIN TEST PRESSURES.
3. CROSSING OF SANITARY SEWER SHALL BE IN ACCORDANCE WITH TCEQ REQUIREMENTS.

WATER MAIN LOWERING
N.T.S.

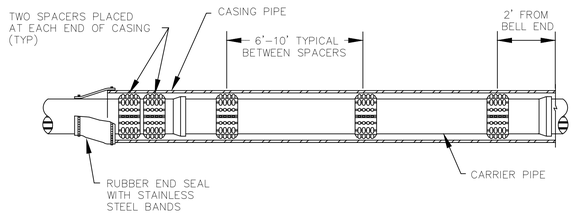


CASING SPACERS SHALL BE USED TO INSTALL CARRIER PIPE INSIDE THE ENCASEMENT PIPE, TO PROVIDE SUPPORT AROUND THE PERIPHERY OF THE PIPE SHOULD THE PIPE TWIST AS IT IS PUSHED THROUGH THE CASING, THE SPACERS SHALL BE OF A PROJECTION TYPE THAT HAS A MINIMUM NUMBER OF PROJECTIONS AROUND THE CIRCUMFERENCE TOTALLING THE NUMBER OF DIAMETER INCHES. FOR EXAMPLE, 8" PIPE SHALL HAVE A MINIMUM OF 8 PROJECTIONS AND 18" PIPE SHALL HAVE A MINIMUM NUMBER OF 18 PROJECTIONS.

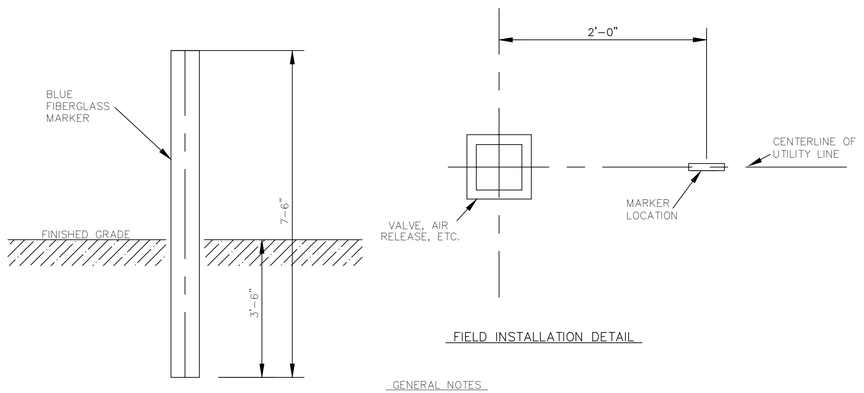
CASING SPACERS SHALL HAVE A MAXIMUM SPACING SPAN OF 10 FEET. THE SPAN BETWEEN SPACERS SHOULD RESULT IN CONSERVATIVE LONG TERM SAFETY FACTOR PROVIDED TOTAL LOAD PER SPACER DOES NOT EXCEED THE MAXIMUM LOAD FOR PIPE FULL OF LIQUID PER SPACER LISTED IN THE LITERATURE FOR CLASS SPACER USED. SPACERS SHALL HAVE A MINIMUM HEIGHT THAT CLEARS THE PIPE BELL OR AS OTHERWISE INDICATED ON PLANS. CASING SPACERS SHALL USE DOUBLE BACKED TAPE PROVIDED WITH THE SPACERS, TO FASTEN TIGHTLY ONTO THE CARRIER PIPE, SO THAT THE SPACERS DO NOT MOVE DURING INSTALLATION.

PIPE CASING SPACER DETAIL
N.T.S.

SPACERS SHALL BE RACI HIGH DENSITY POLYETHYLENE OR TOWN APPROVED OTHER.



PIPE CASING SPACERS SPACING DETAIL
N.T.S.



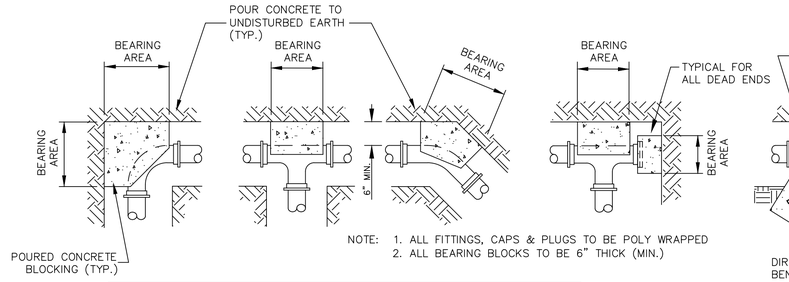
ELEVATION

FIELD INSTALLATION DETAIL

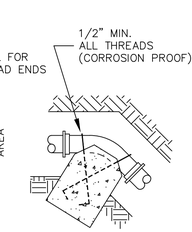
GENERAL NOTES

1. ALL OFFSITE TOWN OF LITTLE ELM MAINS WITH VALVES, AIR RELEASE VALVES, ETC. SHALL BE MARKED AS DETAILED ON THIS SHEET.
2. CONTRACTOR SHALL INSTALL ALL MARKERS.

OFFSITE WATER MAIN MARKER
N.T.S.



NOTE: 1. ALL FITTINGS, CAPS & PLUGS TO BE POLY WRAPPED
2. ALL BEARING BLOCKS TO BE 6" THICK (MIN.)

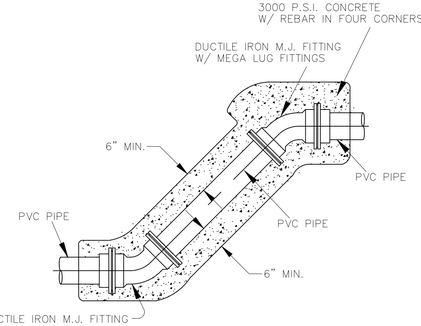


DIRECTIONAL CHANGE VERTICAL BEND ANCHOR

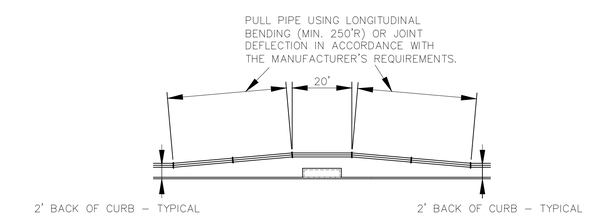
MIN. BEARING AREA OF BLOCK IN SQ. FT. (UNLESS OTHERWISE INDICATED ON THE PLANS)					
FITTING SIZES	TEE & END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
TO 6"	3.6	5.4	2.5	2.0	2.0
8"	6.3	8.9	4.8	2.5	2.0
10"	9.9	13.9	7.6	3.9	2.0
12"	14.2	20.0	10.9	5.6	2.8
16"	25.1	35.5	19.2	9.8	4.9

SOIL BEARING PRESSURE	MULTIPLIER
1000	2.0
1500	1.33
2000	1.0
3000	0.67

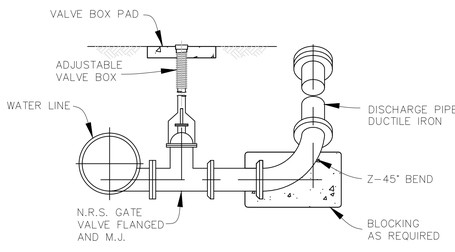
WATER MAIN THRUST BLOCKING
N.T.S.



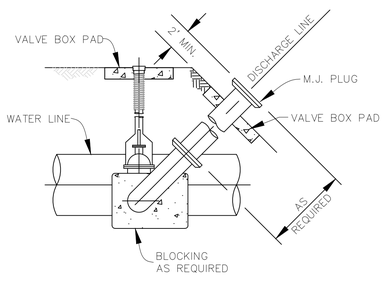
STANDARD HORIZONTAL AND/OR VERTICAL OFFSETS
N.T.S.



WATER LINE AT INLET DETAIL
N.T.S.



NOTE:
MUST BE DISCHARGED INTO STORM SEWER, BRIDGE OR CULVERT.



DRAIN VALVE AND BLOW OFF VALVE
N.T.S.

NO.	DATE	REVISION

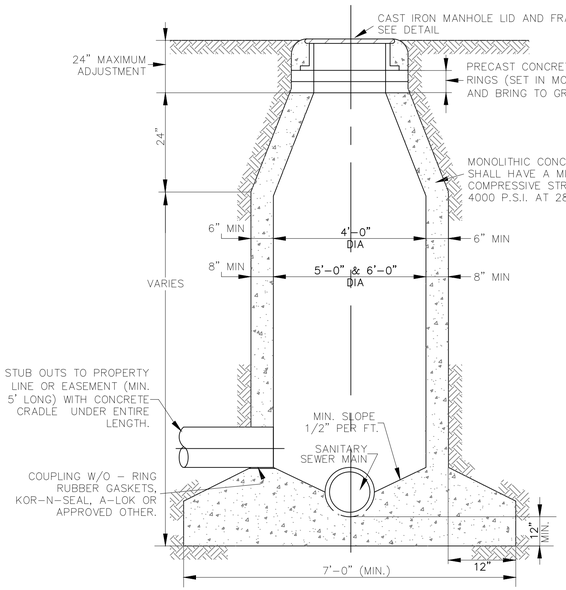
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
TYPICAL WATER SYSTEM DETAILS 4 OF 4

LITTLEELM

SHEET
18 OF 26

DECEMBER 2023



STANDARD CAST-IN-PLACE MANHOLE
N.T.S.

CAST-IN-PLACE MANHOLE NOTES:

1. THE DIAMETER OF A MANHOLE CONSTRUCTED OVER THE CENTER OF A SEWER SHOULD VARY WITH THE SIZE OF THE SEWER. FOR EIGHT-INCH (8"), TEN-INCH (10"), AND TWELVE-INCH (12"), THE MANHOLE SHALL BE FOUR-FOOT (4') MINIMUM DIAMETER, FOR FIFTEEN-INCH (15"), EIGHTEEN-INCH (18"), TWENTY-ONE-INCH (21"), TWENTY-FOUR-INCH (24") AND TWENTY-SEVEN-INCH (27") SHALL BE FIVE-FOOT (5') MINIMUM DIAMETER; THIRTY-INCH (30") AND THIRTY-SIX-INCH (36") SHALL BE SIX-FOOT (6') MINIMUM DIAMETER. MANHOLES DEEPER THAN TWELVE FEET (12') SHALL BE A MINIMUM OF FIVE-FOOT (5') DIAMETER.

2. DROP MANHOLES SHALL BE REQUIRED WHEN THE INFLOW ELEVATION IS MORE THAN TWENTY-FOUR INCHES (24") ABOVE THE OUTFALL ELEVATION.

3. WHERE PIPES ENTER A MANHOLE THERE SHALL BE A MINIMUM OF TWO-TENTHS OF A FOOT (0.2') DROP BETWEEN INVERTS.

4. WHERE UNEQUAL PIPES ENTER A MANHOLE, THE CROWN OF THE PIPES SHALL BE SET AT THE SAME ELEVATION.

5. CONCRETE SHALL BE A MONOLITHIC POUR.

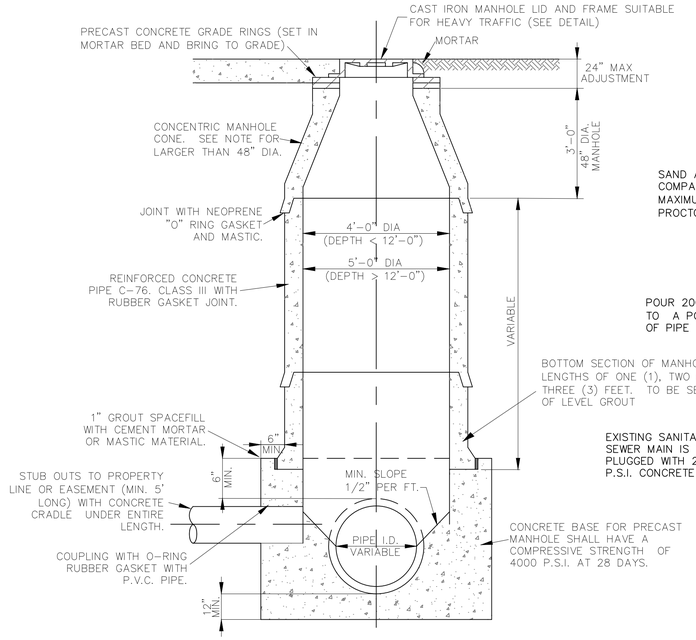
PRECAST MANHOLE NOTES:

1. THE DIAMETER OF A MANHOLE CONSTRUCTED OVER THE CENTER OF A SEWER SHOULD VARY WITH THE SIZE OF THE SEWER. FOR EIGHT-INCH (8"), TEN-INCH (10"), AND TWELVE-INCH (12"), THE MANHOLE SHALL BE FOUR-FOOT (4') MINIMUM DIAMETER, FOR FIFTEEN-INCH (15"), EIGHTEEN-INCH (18"), TWENTY-ONE-INCH (21"), TWENTY-FOUR-INCH (24") AND TWENTY-SEVEN-INCH (27") SHALL BE FIVE-FOOT (5') MINIMUM DIAMETER; THIRTY-INCH (30") AND THIRTY-SIX-INCH (36") SHALL BE SIX-FOOT (6') MINIMUM DIAMETER. MANHOLES DEEPER THAN TWELVE FEET (12') SHALL BE A MINIMUM OF FIVE-FOOT (5') DIAMETER.

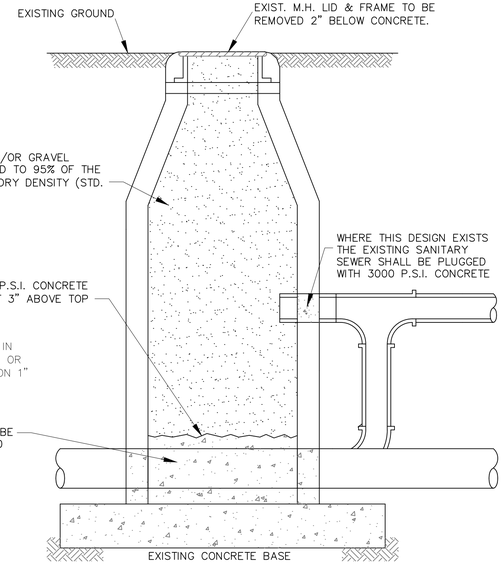
2. DROP MANHOLES SHALL BE REQUIRED WHEN THE INFLOW ELEVATION IS MORE THAN TWENTY-FOUR INCHES (24") ABOVE THE OUTFALL ELEVATION.

3. WHERE PIPES ENTER A MANHOLE THERE SHALL BE A MINIMUM OF TWO-TENTHS OF A FOOT (0.2') DROP BETWEEN INVERTS.

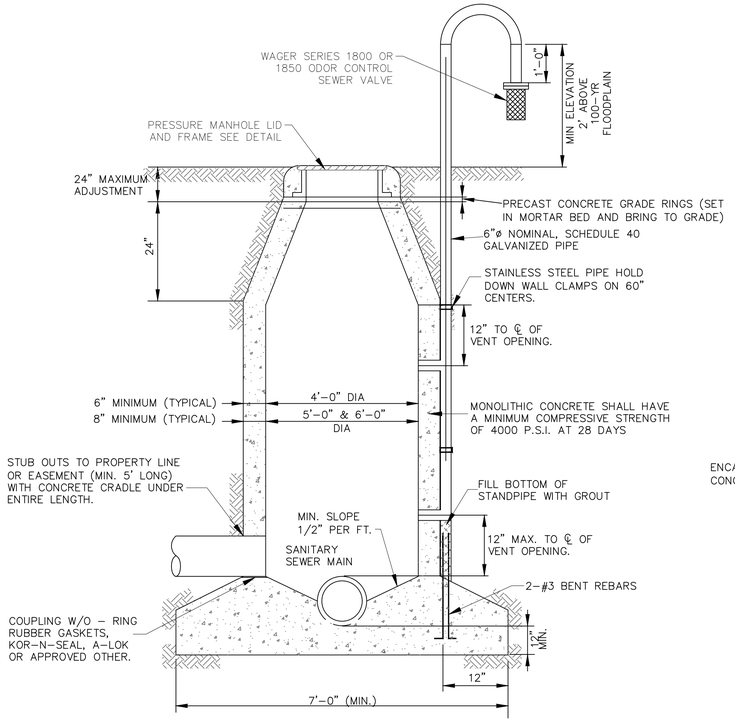
4. WHERE UNEQUAL PIPES ENTER A MANHOLE, THE CROWN OF THE PIPES SHALL BE SET AT THE SAME ELEVATION.



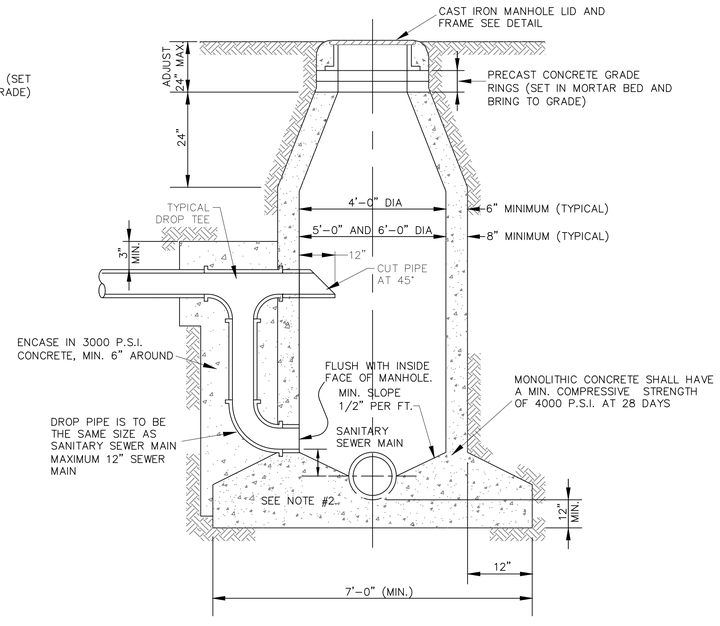
PRECAST CONCRETE PIPE MANHOLE
N.T.S.



MANHOLE ABANDONMENT
N.T.S.



VENTED TYPE S MANHOLE
N.T.S.



MANHOLE WITH OUTSIDE DROP CONNECTION
N.T.S.

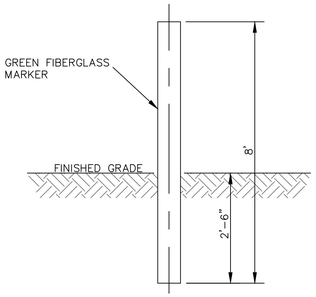
DATE				
REVISION				
NO.				
DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE: NONE	JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
SANITARY SEWER STANDARD DETAILS 1 OF 3

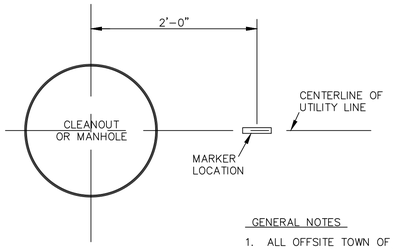
LITTLEELM

SHEET
19 OF 26

DECEMBER 2023



ELEVATION

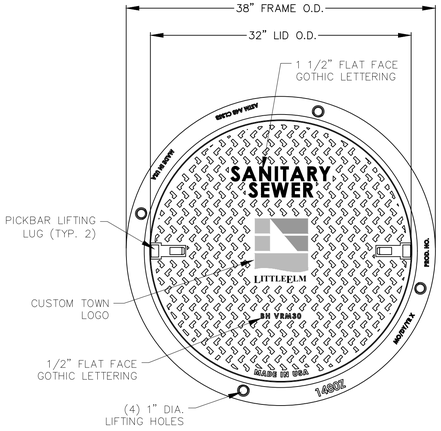


FIELD INSTALLATION DETAIL

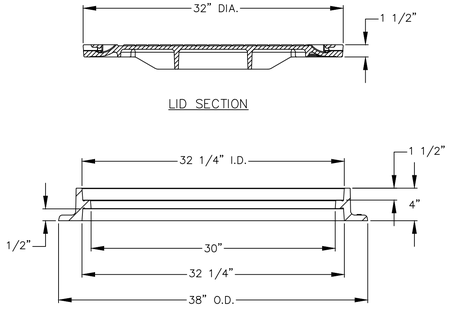
GENERAL NOTES

1. ALL OFFSITE TOWN OF LITTLE ELM MAINS WITH CLEANOUTS AND MANHOLES SHALL BE MARKED AS DETAILED ON THIS SHEET.
2. CONTRACTOR SHALL INSTALL ALL MARKERS.

OFFSITE SANITARY SEWER MARKER
N.T.S.



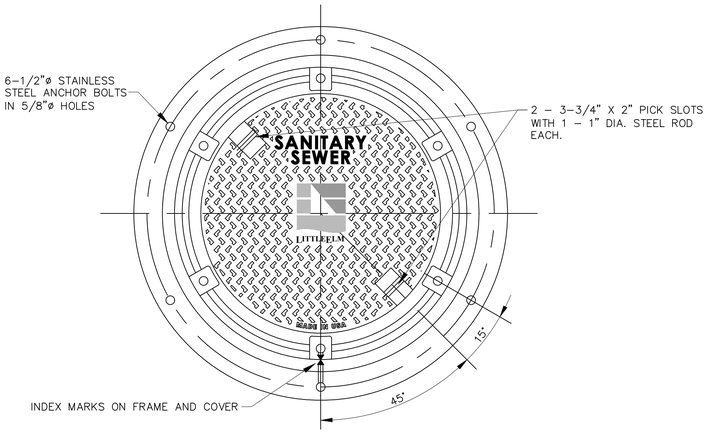
PLAN



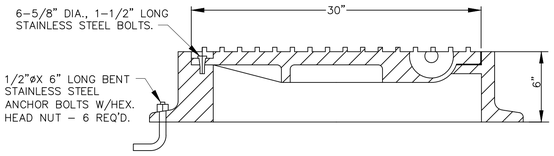
NOTES:

1. SANITARY SEWER FRAME AND COVER SHALL BE BASS & HAYS PATTERN NUMBER BH VRM-30. FRAME CONSTRUCTED OF ASTM A48 CLASS 35B GRAY CAST IRON. COVER CONSTRUCTED OF ASTM A536 DUCTILE IRON (70-50-05).
2. ASSEMBLY SHALL BE HEAVY DUTY TRAFFIC RATED FOR H-20 LOADING IN ACCORDANCE WITH AASHTO M306-10.
3. INFLOW PROTECTION INSERT, MINIMUM THICKNESS OF ONE-EIGHT INCH (1/8"), MADE OF HDPE MEETING ASTM D 1248 CLASS A, CATEGORY 5, TYPE 111. INSERT SHALL INCLUDE A LIFT STRAP AND VENT HOLE WITH VENT DISK AS MANUFACTURED BY KNUTSON MANHOLE INSERTS OR APPROVED OTHER.

SANITARY SEWER MANHOLE FRAME AND COVER
N.T.S.



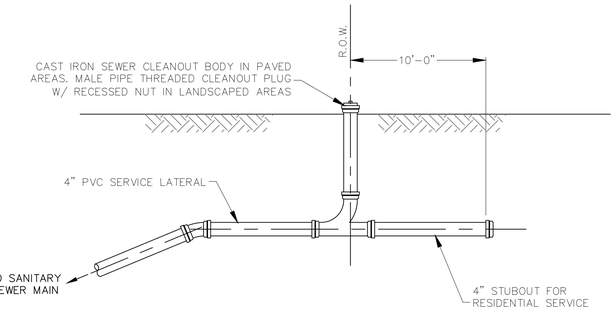
ASSEMBLY PLAN VIEW



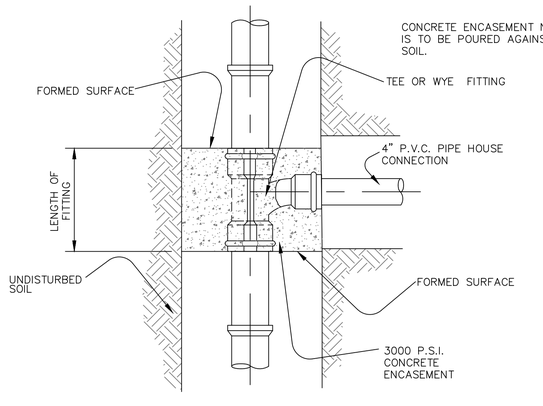
ASSEMBLY SECTION

GENERAL NOTES:
1. REQUIRED FOR ALL MANHOLES BELOW 100-YEAR FLOODPLAIN ELEVATION
2. THE HORIZONTAL BEARING SURFACES ARE TO BE MACHINE FINISHED.
3. FOR A SEAL BETWEEN THE RING FRAME AND COVER A 1/4" DIAMETER NEOPRENE "O-RING" GASKET SHALL BE AS INSTALLED BY THE MANUFACTURER. THE LOCATION SHALL BE AS PER THE MANUFACTURER'S STANDARDS BUT SHALL BE SUBJECT TO THE APPROVAL OF THE TOWN ENGINEER.
4. NOT ALLOWED IN TRAFFIC AREAS.

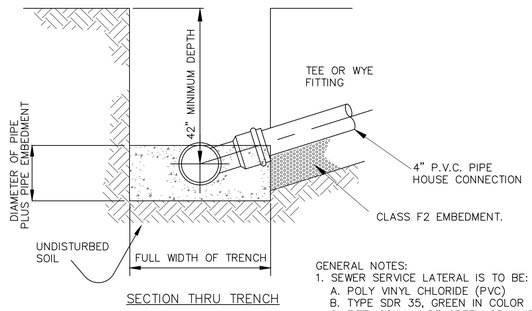
PRESSURE MANHOLE FRAME & COVER
N.T.S.



RESIDENTIAL SANITARY SEWER CLEANOUT & STUBOUT DETAIL
N.T.S.



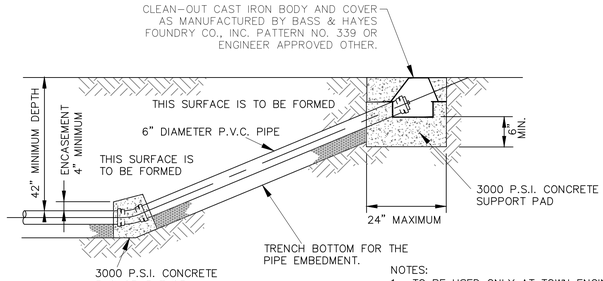
PLAN VIEW



SECTION THRU TRENCH

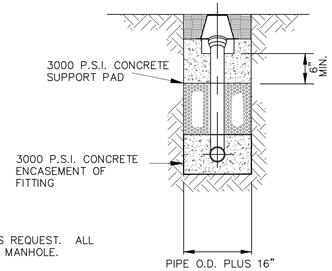
GENERAL NOTES:
1. SEWER SERVICE LATERAL IS TO BE:
   A. POLY VINYL CHLORIDE (PVC)
   B. TYPE SDR 35, GREEN IN COLOR
   C. FITTINGS MAY BE GREEN OR WHITE IN COLOR.

RESIDENTIAL SANITARY SEWER SERVICE CONNECTION
N.T.S.



SECTIONAL ELEVATION

NOTES:
1. TO BE USED ONLY AT TOWN ENGINEER'S REQUEST. ALL OTHER SEWER MAINS TO TERMINATE AT MANHOLE.
2. INSTALL A 22 1/2° BEND IF THE SEWER MAIN IS GREATER THAN 6" IN DIAMETER THEN INSTALL A REDUCER FITTING AFTER THE 22 1/2° BEND, REDUCING THE CLEANOUT TO 6" IN DIAMETER.
3. CLEAN-OUT CASTING AS MANUFACTURED BY THE BASS & HAYES FOUNDRY CO., INC. PATTERN NO. 339 OR APPROVED OTHER.
4. CONCRETE PAD 24" SQUARE SHALL BE POURED AROUND ALL CLEANOUTS NOT PLACED WITHIN CONCRETE PAVEMENT. 3000 P.S.I. CONCRETE, 6" THICK, FOUR NO. 3 BARS.



SECTION

SANITARY SEWER MAIN CLEANOUT
N.T.S.

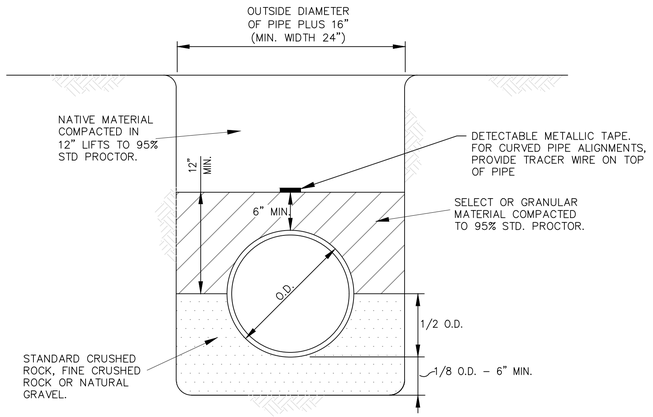
DATE				
REVISION				
NO.				
DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE: NONE	JOB NUMBER: 1

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
SANITARY SEWER STANDARD DETAILS 2 OF 3

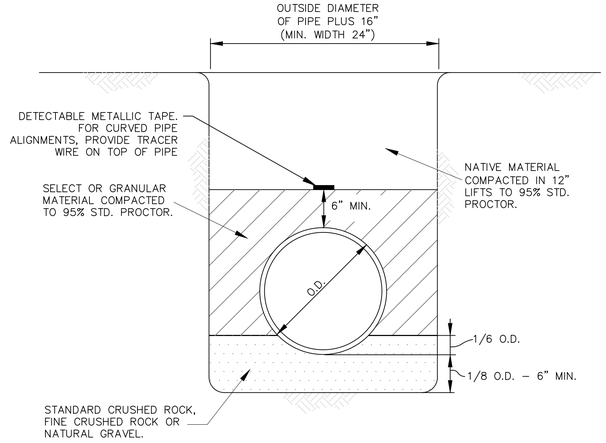
LITTLEELM

SHEET
20 OF 26

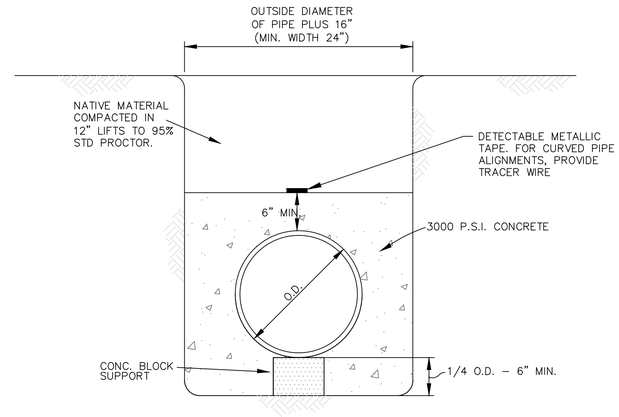
DECEMBER 2023



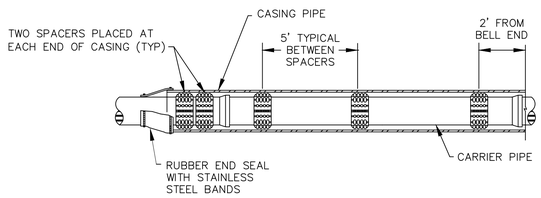
MIN. STD. P.V.C. SEWER
CLASS LE2 EMBEDMENT
N.T.S.



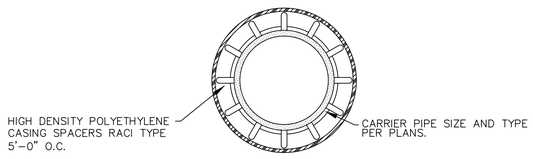
MIN. STD. DUCTILE IRON SEWER
CLASS LE3 EMBEDMENT
N.T.S.



CONCRETE ENCASEMENT
CLASS LE4 EMBEDMENT
N.T.S.



PIPE CASING SPACER
SPACING DETAILS

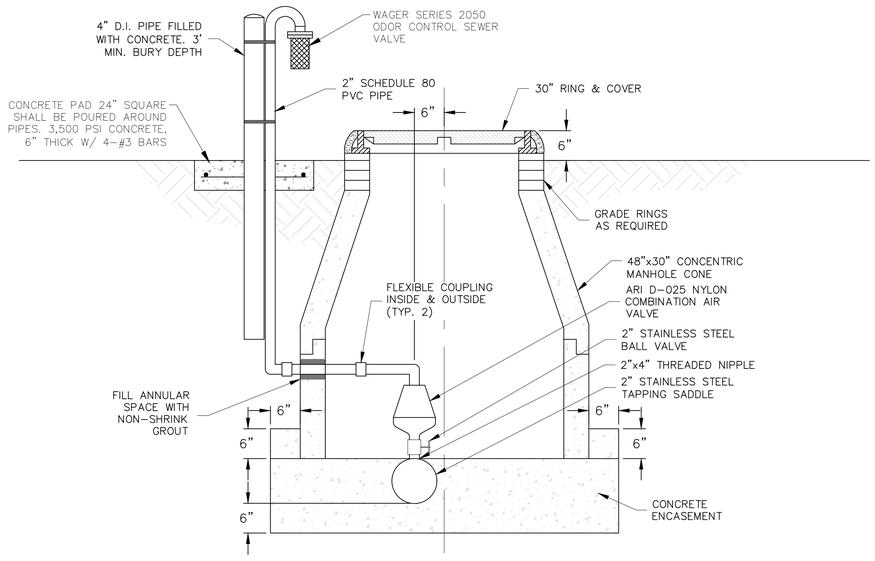


NOTES:

CASING SPACERS SHALL BE USED TO INSTALL CARRIER PIPE INSIDE THE ENCASEMENT PIPE. TO PROVIDE SUPPORT AROUND THE PERIPHERY OF THE PIPE SHOULD THE PIPE TWIST AS IT IS PUSHED THROUGH THE CASING, THE SPACERS SHALL BE OF A PROJECTION TYPE THAT HAS A MINIMUM NUMBER OF PROJECTIONS AROUND THE CIRCUMFERENCE TOTALLING THE NUMBER OF DIAMETER INCHES. FOR EXAMPLE, 8" PIPE SHALL HAVE A MINIMUM OF 8 PROJECTIONS AND 18" PIPE SHALL HAVE A MINIMUM NUMBER OF 18 PROJECTIONS.

CASING SPACERS SHALL HAVE A MAXIMUM SPACING SPAN OF 5 FEET. THE SPAN BETWEEN SPACERS SHOULD RESULT IN CONSERVATIVE LONG TERM SAFETY FACTOR PROVIDED TOTAL LOAD PER SPACER DOES NOT EXCEED THE MAXIMUM LOAD FOR PIPE FULL OF LIQUID PER SPACER LISTED IN THE LITERATURE FOR CLASS SPACER USED. SPACERS SHALL HAVE A MINIMUM HEIGHT THAT CLEARS THE PIPE BELL OR AS OTHERWISE INDICATED ON PLANS. CASING SPACERS SHALL USE DOUBLE BACKED TAPE PROVIDED WITH THE SPACERS, TO FASTEN TIGHTLY ONTO THE CARRIER PIPE, SO THAT THE SPACERS DO NOT MOVE DURING INSTALLATION.

PIPE CASING SPACER DETAIL
N.T.S.



2" AIR RELEASE VALVE
FOR FORCE MAIN
N.T.S.

NO.	REVISION	DATE

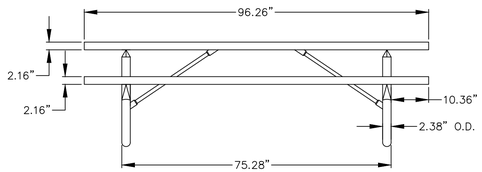
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

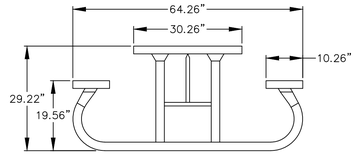
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
SANITARY SEWER STANDARD DETAILS 3 OF 3

LITTLEELM

SHEET
21 OF 26

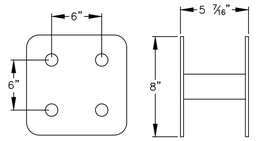
DECEMBER 2023



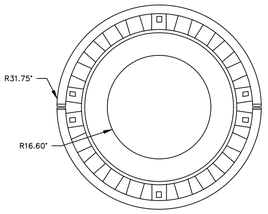


NOTES
1. PICNIC TABLE FRAME SHALL BE BLACK IN COLOR, TABLE TOP AND BENCH SEATS SHALL BE BRONZE IN COLOR, WITH 10'x10' REINFORCED CONCRETE PAD.
2. ACCEPTABLE MANUFACTURERS:
   - ANOVA MODEL D2014, 8' PERFORATED STEEL PICNIC TABLE, TRADITIONAL EDGE, FLAT BENCH SEATS, PORTABLE MOUNT.
   - BELSON MODEL PTH-8PS, 8' PERFORATED STEEL PICNIC TABLE, PERFORATED STEEL BENCH SEATS, PORTABLE FRAME MOUNT.

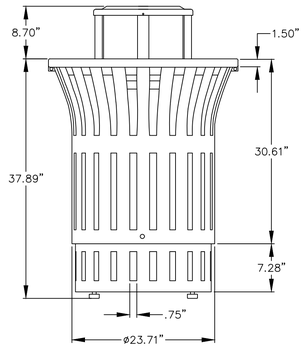
PICNIC TABLE DETAIL
N.T.S.



SURFACE MOUNT PLATE FOR RECEPTACLES
F1098 – SURFACE MOUNT PLATE FOR RECEPTACLES OR APPROVED EQUAL



TOP VIEW

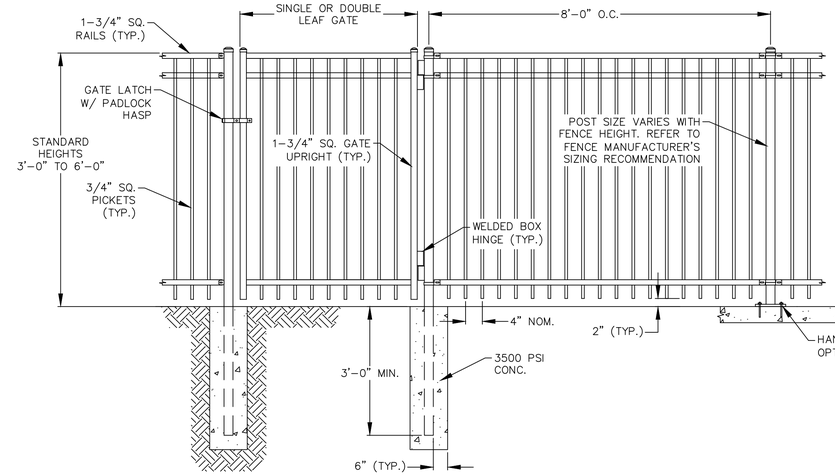


FRONT ELEVATION

FINISH: HEAT INFUSED PLASTISOL
RUST PROOF BARRIER MATERIAL: 12-GAUGE SLOTTED STEEL WITH .75" GAP SLOTTED PATTERN. BLACK IN COLOR.

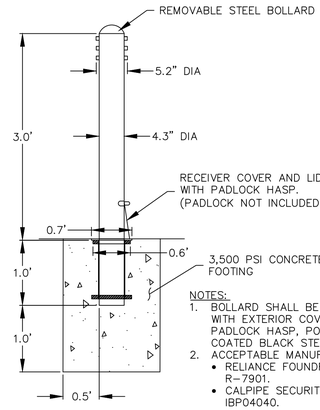
NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. ALL DIMENSIONS ARE CONSIDERED TRUE AND REFLECT MANUFACTURER'S SPECIFICATIONS.
3. ACCEPTABLE MANUFACTURERS:
   - ANOVA MODEL L1380BT – 55 GALLON RENDEZVOUS SLOTTED STEEL RECEPTACLE WITH BONNET TOP, RUBBER FEET, PLASTIC LINER, TRADITIONAL SURFACE MOUNT (F1098)
   - BELSON OUTDOORS MODEL M5001-RC – 50 GALLON OAKLEY COLLECTION SLATTED STEEL RECEPTACLE WITH RAIN CAP LID, SURFACE MOUNT LEVELING/ANCHOR KIT, RIGID PLASTIC LINER.

TRASH RECEPTACLE DETAIL
N.T.S.



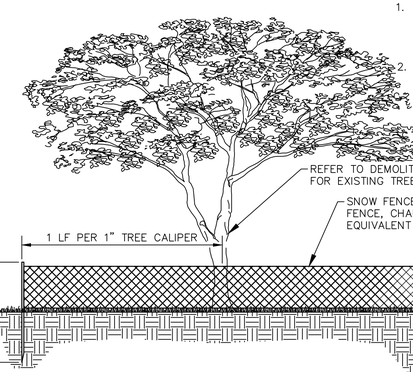
FENCE/HANDRAIL NOTES:
1. INSTALLATION SHALL BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. FENCE AND HARDWARE SHALL BE BLACK IN COLOR.
3. PROVIDE STEEL KEEPER ROD AND LATCH W/ PADLOCK HASP FOR DOUBLE LEAF GATES.
4. PROVIDE WELDED STEEL POST MOUNTING PLATES W/ 4 BOLTS IN LIEU OF CONCRETE FOUNDATIONS WHEN INSTALLED AS A HANDRAIL ON A CONCRETE SURFACE.
5. ACCEPTABLE FENCE MANUFACTURERS:
   - MONTAGE PLUS MAJESTIC BY AMERISTAR FENCE
   - VERSAI V2 BY FORTRESS FENCE PRODUCTS

STEEL FENCE/HANDRAIL DETAIL
N.T.S.



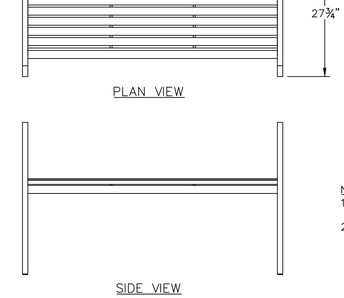
NOTES:
1. BOLLARD SHALL BE REMOVABLE WITH EXTERIOR COVER & PADLOCK HASP, POWDER COATED BLACK STEEL.
2. ACCEPTABLE MANUFACTURERS:
   - RELIANCE FOUNDRY MODEL R-7901.
   - CALPIPE SECURITY MODEL IBP04040.

REMOVABLE BOLLARD DETAIL
N.T.S.



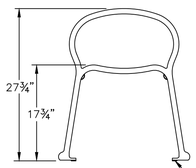
TREE PROTECTION NOTES:
1. ALL TREES WITHIN 15' OF CONSTRUCTION AREA SHALL BE PROTECTED DURING CONSTRUCTION WITH TEMPORARY FENCING UNLESS OTHERWISE DIRECTED BY OWNERS REPRESENTATIVE.
2. TREE PROTECTION FENCES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITE PREPARATION WORK (CLEARING, GRUBBING, OR GRADING).

TREE PROTECTION FENCING DETAIL
N.T.S.



PLAN VIEW

SIDE VIEW

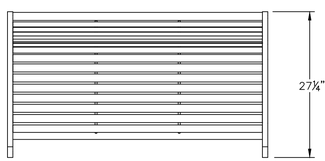


END VIEW

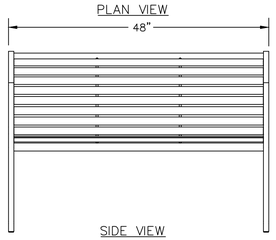
GLIDE FOR FREESTANDING UNIT. REMOVE TO SURFACE MOUNT. (4) 3/8"ø NON-CORROSIVE ANCHOR BOLTS.

NOTES
1. BENCH SHALL BE BLACK IN COLOR, MOUNTED ON A 10'x10' REINFORCED CONCRETE PAD.
2. ACCEPTABLE MANUFACTURERS:
   - LANDSCAPE FORMS MODEL SCARBOROUGH, 48" WIDE WITH HORIZONTAL STRAP SEAT.
   - BELSON OUTDOORS MODEL CB4NB-S – BACKLESS COURTYARD PARK BENCH, 48" WIDE WITH HORIZONTAL SLATS AND END ARMS.

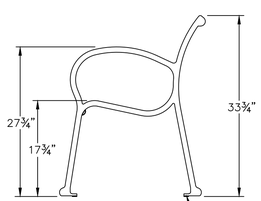
BACKLESS BENCH DETAIL
N.T.S.



PLAN VIEW



SIDE VIEW

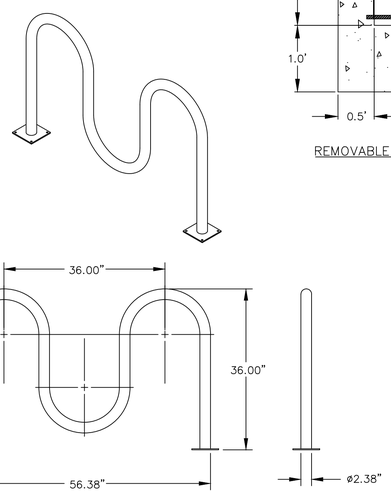


END VIEW

GLIDE FOR FREESTANDING UNIT. REMOVE TO SURFACE MOUNT. (4) 3/8"ø NON-CORROSIVE ANCHOR BOLTS.

NOTES
1. BENCH SHALL BE BLACK IN COLOR, MOUNTED ON A 10'x10' REINFORCED CONCRETE PAD.
2. ACCEPTABLE MANUFACTURERS:
   - LANDSCAPE FORMS MODEL SCARBOROUGH, 48" BACKED WITH HORIZONTAL STRAP SEAT.
   - BELSON OUTDOORS MODEL CB4WBE-S – COURTYARD PARK BENCH, 48" WIDE BACKED WITH END ARMS AND HORIZONTAL SLATS.

PARK BENCH DETAIL
N.T.S.

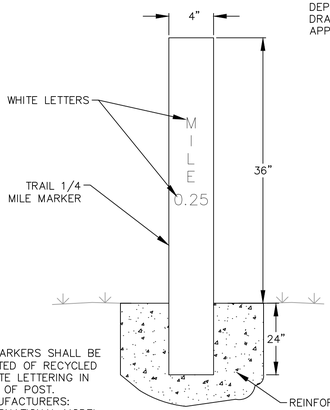


2x 6" x 6" x 0.25" SQUARE FLANGE MOUNTING PLATE WITH (4) 5/8"ø MOUNTING HOLES

SECTION A-A

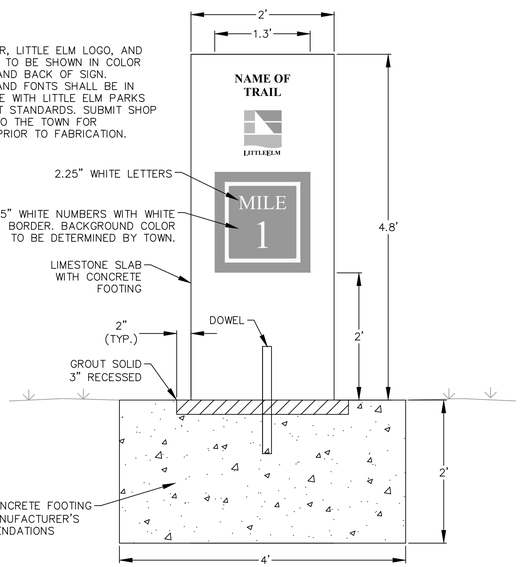
NOTES:
1. INSTALLATION SHALL BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. BIKE RACK AND MOUNTING PLATES SHALL BE POWDER COATED BLACK IN COLOR. MOUNTED ON A 10'x10' REINFORCED CONCRETE PAD.
3. ACCEPTABLE MANUFACTURERS:
   - SARIS MODEL 2103 5-BIKE FM WAVE RACK.
   - BELSON OUTDOORS MODEL CBBR05UR-BKB – 3 LOOP 5-BIKE WAVE RACK.

BIKE RACK DETAIL
N.T.S.



TRAIL MAKER NOTES:
1. TRAIL 1/4 MILE MARKERS SHALL BE POSTS CONSTRUCTED OF RECYCLED PLASTIC WITH WHITE LETTERING IN FRONT AND BACK OF POST.
2. ACCEPTABLE MANUFACTURERS:
   - BERNTSEN INTERNATIONAL MODEL MMKR8 – COLOR WEATHERED.
   - BALDWIN DESIGN WORKS TRAIL/MILE MARKER POSTS – COLOR WEATHERWOOD.

1/4 MILE MARKER



NOTES:
1. MILE MARKER, LITTLE ELM LOGO, AND TRAIL NAME TO BE SHOWN IN COLOR ON FRONT AND BACK OF SIGN.
2. LETTERING AND FONTS SHALL BE IN ACCORDANCE WITH LITTLE ELM PARKS DEPARTMENT STANDARDS. SUBMIT SHOP DRAWINGS TO THE TOWN FOR APPROVAL PRIOR TO FABRICATION.

MILE MARKER

TRAIL MARKER DETAILS
N.T.S.

NO.	REVISION	DATE

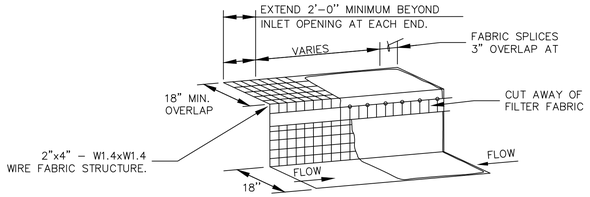
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: 1

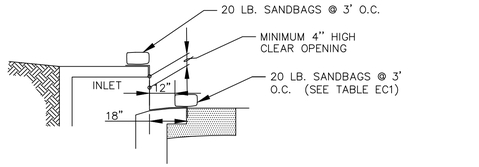
TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
PARKS DETAILS

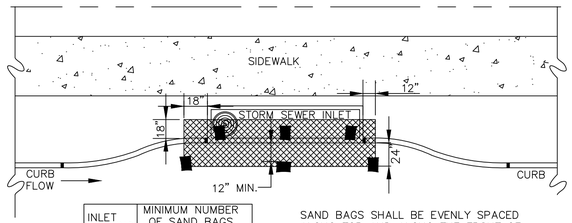
LITTLEELM

SHEET
22 OF 26

DECEMBER 2023



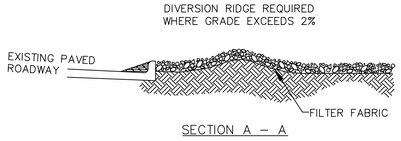




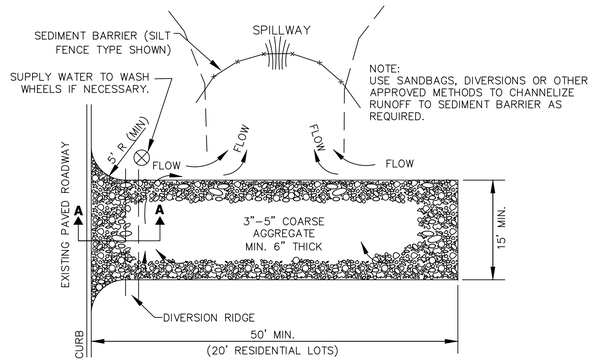
INLET OPENING	MINIMUM NUMBER OF SAND BAGS	
	TOP	FRONT
5'	2	3
10'	3	3
15'	3	4
20'	4	4

SAND BAGS SHALL BE EVENLY SPACED ALONG TOP AND ALONG THE FRONT OF INLET.

CURB INLET ON GRADE PROTECTION DETAIL
N.T.S.

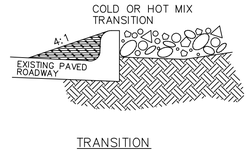


SECTION A – A



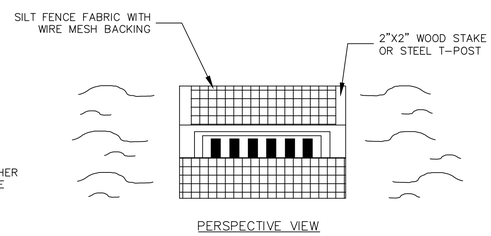
PLAN

WHEN SEDIMENT HAS SUBSTANTIALLY CLOGGED THE VOID AREA BETWEEN THE ROCKS, THE AGGREGATE MAT MUST BE WASHED DOWN OR REPLACED. PERIODIC RE-GRADING AND TOP DRESSING WITH ADDITIONAL STONE MUST BE DONE TO KEEP THE EFFICIENCY OF THE ENTRANCE FROM DIMINISHING.

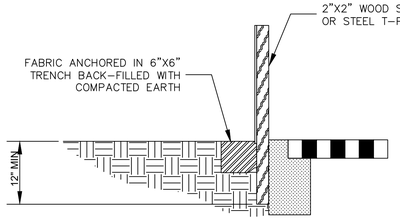


TRANSITION

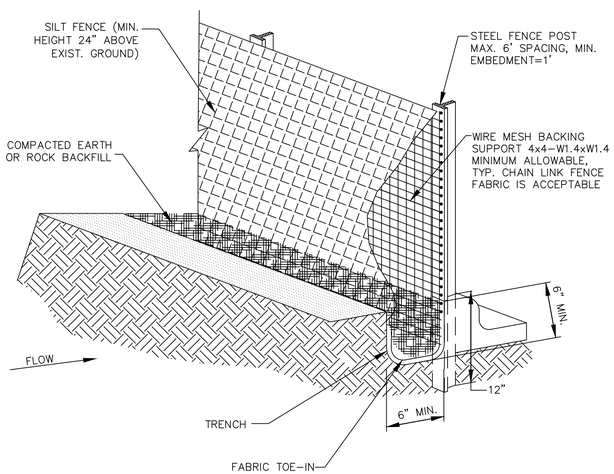
TEMPORARY STONE CONSTRUCTION
ENTRANCE/EXIST
N.T.S.



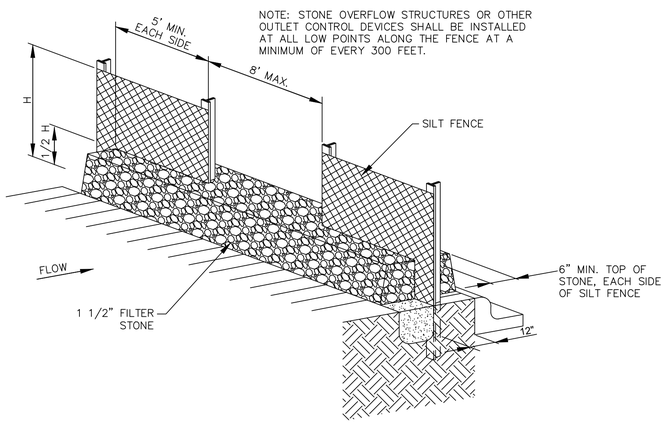
PERSPECTIVE VIEW



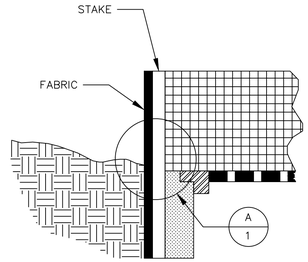
I. STANDARD FILTER BARRIER INSTALLATION
N.T.S.



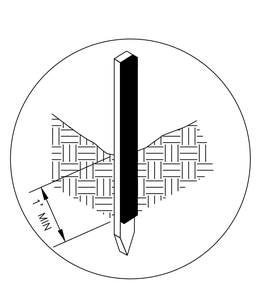
SILT FENCE ISOMETRIC PLAN VIEW
N.T.S.



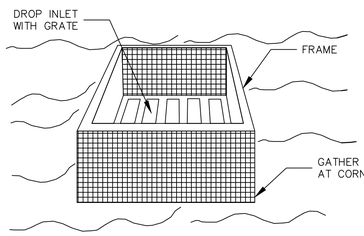
SILT FENCE STONE OVERFLOW STRUCTURE
N.T.S.



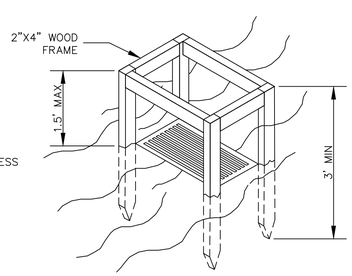
ELEVATION OF STAKE AND
FABRIC ORIENTATION



DETAIL A



PERSPECTIVE VIEW



PERSPECTIVE VIEW

SPECIFIC APPLICATION
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5%) WHERE THE INLET SHEET OR OVER-LAND FLOWS (NOT TO EXCEED 1 C.F.S.) ARE TYPICAL. THIS METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS SUCH AS IN STREETS OR HIGHWAY MEDIANS

II. ALTERNATE FILTER BARRIER INSTALLATION
N.T.S.

NO.	REVISION	DATE

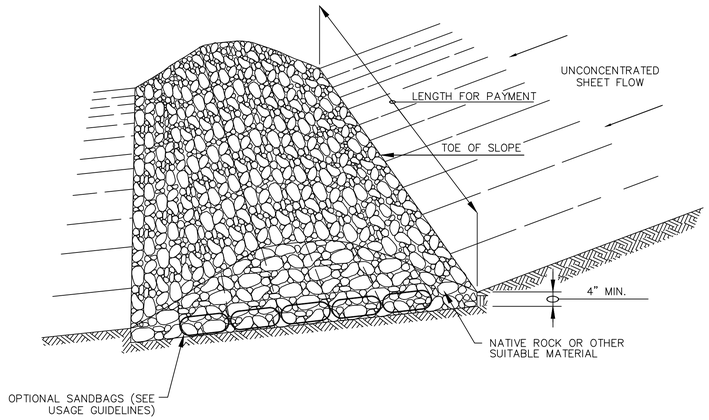
DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: NONE
JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
EROSION CONTROL DETAILS 1 OF 2

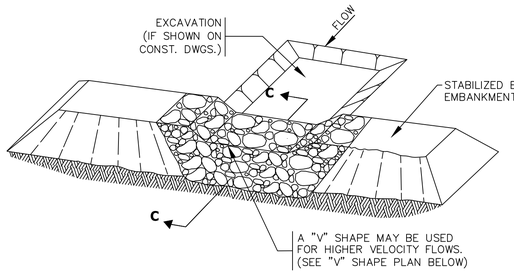
LITTLEELM

SHEET
23 OF 26

DECEMBER 2023



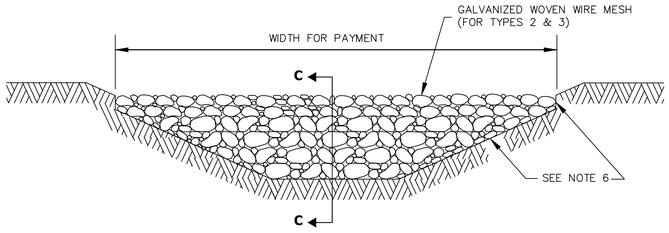
FILTER DAM AT TOE OF SLOPE
N.T.S.



FILTER DAM AT SEDIMENT TRAP
N.T.S.

RFD1 — OR — RFD2

TYPE 1 OR TYPE 2



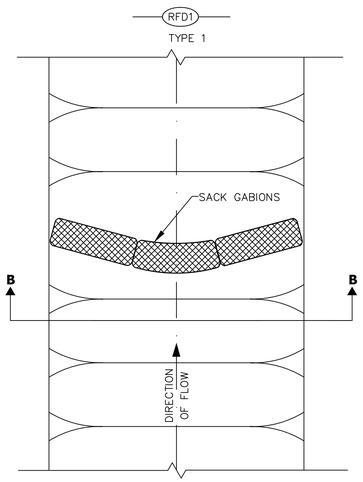
FILTER DAM AT CHANNEL SECTIONS
N.T.S.

RFD1 — OR — RFD2 — OR — RFD3

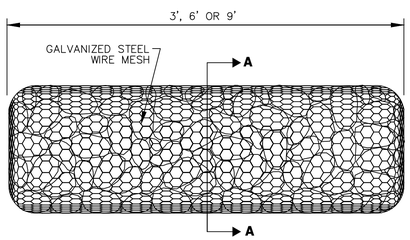
TYPE 1 OR TYPE 2

PLANS SHEET LEGEND

TYPE 1 ROCK FILTER DAM	RFD1
TYPE 2 ROCK FILTER DAM	RFD2
TYPE 3 ROCK FILTER DAM	RFD3

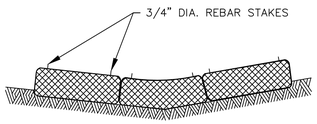


PLAN VIEW

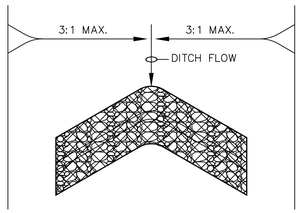


TYPE 4 (SACK GABIONS)

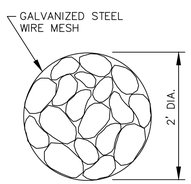
SACK GABIONS
N.T.S.



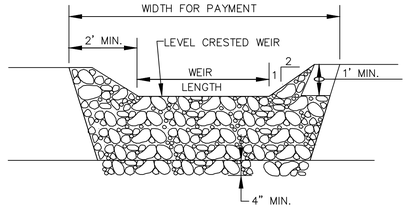
SECTION B–B



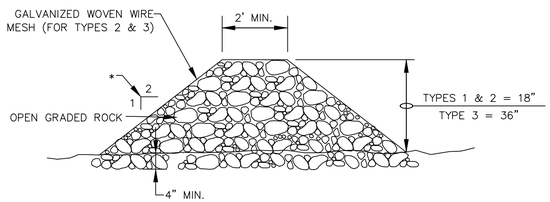
"V" SHAPE
(PLAN VIEW)



SECTION A–A



PROFILE



* STONE SIDE SLOPES SHOULD BE 2:1 OR FLATTER. DAMS WITHIN THE SAFETY ZONE SHALL HAVE SIDE SLOPES OF 6:1 OR FLATTER.

SECTION C–C

ROCK FILTER DAM
N.T.S.

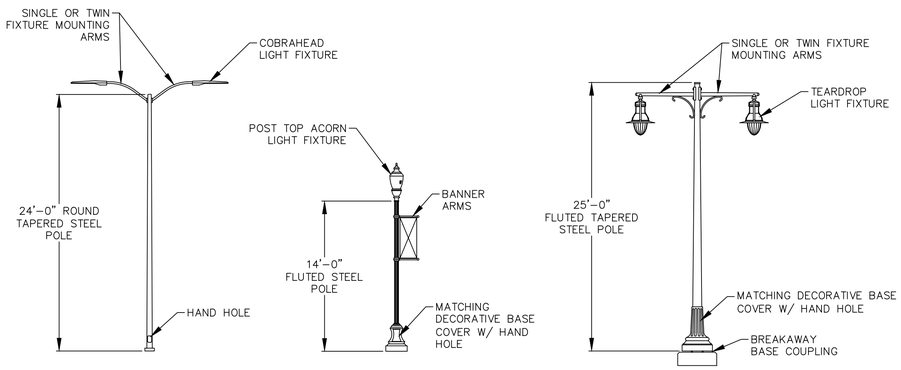
DATE				
REVISION				
NO.				
DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE: NONE	JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
EROSION CONTROL DETAILS 2 OF 2

LITTLEELM

SHEET
24 OF 26

DECEMBER 2023



TYPE SA TYPE SB TYPE SC

FIXTURE TYPE	DESCRIPTION	TYPICAL LOCATIONS	ACCEPTABLE MANUFACTURER/MODEL NO.
SA	SINGLE OR TWIN COBRAHEAD FIXTURE	PARKING AREAS, STREET MEDIANS	HADCO ROADFOCUS RFL AMERICAN ELECTRIC LIGHTING MODEL AUTOBAHN ATB2 LED
SB	ACORN FIXTURE	TRAILS, SIDEWALKS, PARKS/EVENT AREAS	HADCO LUMILOCK LED MODEL RL32/RL52 HOLOPHANE WASHINGTON POSTLITE II LED
SC	SINGLE OR TWIN LUMINAIRE AREA FIXTURE	STREET MEDIANS, PARKS/EVENT AREAS	HADCO TEARDROP LED TXF9 HOLOPHANE TEARDROP MPL2 SKIRT LED

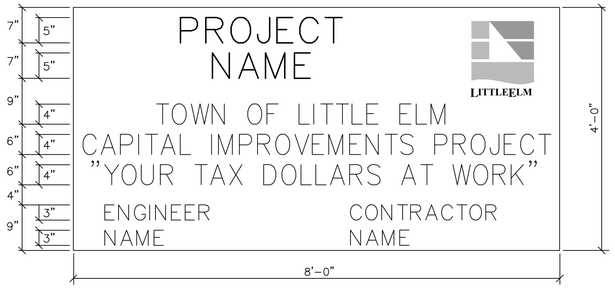
NOTES:

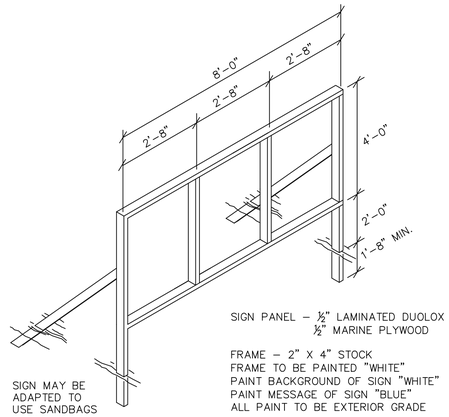
1. ALL LIGHTING LUMINAIRES SHALL USE LED LAMPS.
2. FIXTURES, POLES, BASES AND APPURTENANCES SHALL BE BLACK IN COLOR.
3. MATCHING POLE–MOUNTED BANNER ARMS MAY BE REQUIRED ON ANY FIXTURE DEPENDING ON LOCATION.
4. ALTERNATE MANUFACTURERS MAY BE ACCEPTED UPON APPROVAL BY THE TOWN ENGINEER.

LIGHTING DETAILS
N.T.S.

1. LOCATION
   – NINE INCH (9") EXTRUDED BLADES SHALL BE USED AT ALL INTERSECTIONS.
2. BLADE REQUIREMENTS
   – NINE INCH (9") EXTRUDED BLADE SHALL BE ALUMINUM.
3. LETTERING ALIGNMENT
   – STREET NAME SHALL BE LEFT JUSTIFIED.
   – BLOCK NUMBERS SHALL BE LOCATED IN UPPER RIGHT HAND CORNER.
   – ABBREVIATED STREET DESIGNATIONS SHALL BE LOCATED IN THE LOWER RIGHT HAND CORNER.
4. LETTERING FOR NINE INCH (9") EXTRUDED BLADES
   – LETTERS SHALL BE UPPER & LOWERCASE.
   – FONT SHALL BE FEDERAL HIGHWAY SERIES "B" OR SERIES "C". (MANUFACTURER WILL DETERMINE BEST SERIES TO USE BASED UPON LENGTH OF BLADE AND LENGTH OF NAME)
   – LETTERS AND NUMBERS IN STREET NAME SHALL BE SIX INCHES (6") TALL.
   – LETTERS IN ABBREVIATED STREET DESIGNATIONS AND BLOCK NUMBERS SHALL BE THREE INCHES (3") TALL. (I.E, LN, PKWY, DR, CT, ETC.)
5. SIGN SHEETING AND COLORS
   – SHEETING SHALL BE HIGH INTENSITY.
   – BACKGROUND COLOR SHALL BE GREEN.
   – LEGEND SHALL BE WHITE.
   – TOWN OF LITTLE ELM LOGO SHALL BE LEFT JUSTIFIED. FOR SIGNS LOCATED OUTSIDE OF TOWN LIMITS, OMIT TOWN OF LITTLE ELM LOGO.
6. NO OUTLET STREETS
   – FOR A STREET WITH ONLY ONE CUL–DE–SAC END (TYPICAL) A STANDARD W 14–2a "NO OUTLET" SHALL BE MOUNTED AT THE END OF STREET NAME BLADE.
   – PARKING LOT STRIP SHALL BE WHITE
   – IN THE CASE OF A STREET WITH TWO CUL–DE–SAC ENDS, TWO (2) STANDARD W 14–2a "NO OUTLET" SIGNS SHALL BE MOUNTED AT THE ENDS OF THE STREET NAME BLADE WITH ARROWS PLACED IN THE APPROPRIATE DIRECTIONS.
7. BLOCK NUMBER
   – BLOCK NUMBERS ARE REQUIRED ON ALL STREET NAME BLADES, EVEN IF NO HOUSES OR BUILDINGS FRONT ONTO THE STREET
8. MANUFACTURER CONTACT
   – BRANDON INDUSTRIES, INC. 1601 W. WILMETH ROAD, MCKINNEY, TEXAS 75069. (972) 542–3000, OR APPROVED EQUAL.
   – DEVELOPERS AND CONTRACTORS ORDERING SIGNS SHOULD CONTACT PUBLIC WORKS AT (214) 975–0470.

STREET BLADE DETAIL
N.T.S.





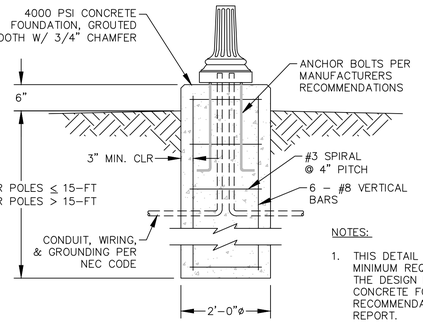
SIGN MAY BE ADAPTED TO USE SANDBAGS IF NECESSARY.

SIGN PANEL – ½" LAMINATED DUOLOX MASONITE OR ½" MARINE PLYWOOD

FRAME – 2" X 4" STOCK
FRAME TO BE PAINTED "WHITE"
PAINT BACKGROUND OF SIGN "WHITE"
PAINT MESSAGE OF SIGN "BLUE"
ALL PAINT TO BE EXTERIOR GRADE

CONTRACTOR SHALL PLACE SIGN(S) AS DIRECTED BY THE OWNER AND WILL PROPERLY MAINTAIN THE SIGN(S) DURING CONSTRUCTION

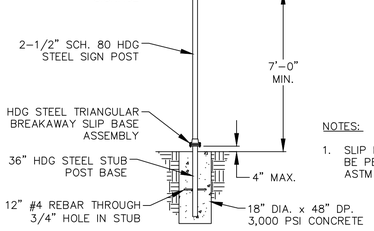
PROJECT SIGN DETAIL
N.T.S.



NOTES:

1. THIS DETAIL IS A REPRESENTATION OF THE MINIMUM REQUIREMENTS FOR CONSTRUCTION. THE DESIGN ENGINEER IS RESPONSIBLE FOR CONCRETE FOUNDATION DESIGN, INCORPORATING RECOMMENDATIONS OF THE GEOTECHNICAL REPORT.
2. CONCRETE AND REINFORCING STEEL TO BE PLACED IN ACCORDANCE WITH ACI CODE.

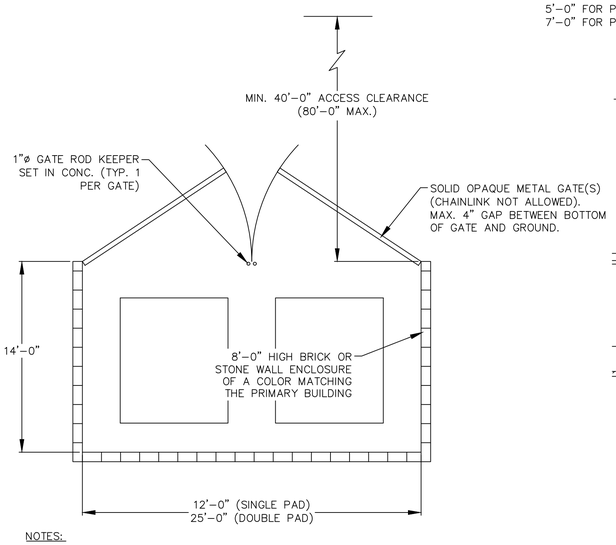
LIGHT POLE BASE DETAIL
N.T.S.



NOTES:

1. SLIP BASE BOLTS, NUTS AND WASHERS SHALL BE PER ASTM A325 OR A449, GALVANIZED PER ASTM A454.

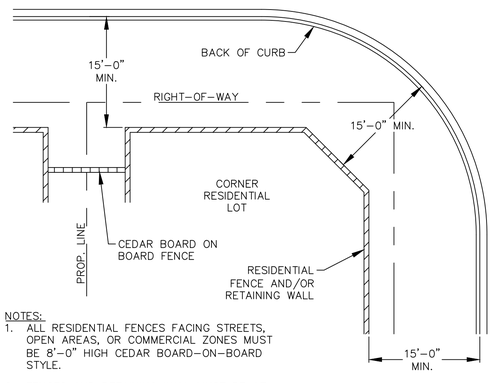
STREET SIGN POST DETAIL
N.T.S.



NOTES:

1. ENGINEERED CONCRETE FOUNDATIONS WITH PIERS ARE REQUIRED, PER REVIEW AND APPROVAL BY TOWN ENGINEER.
2. NEW COMMERCIAL DEVELOPMENT SHALL PROVIDE SPACE FOR A MINIMUM OF TWO DUMPSTER PADS.

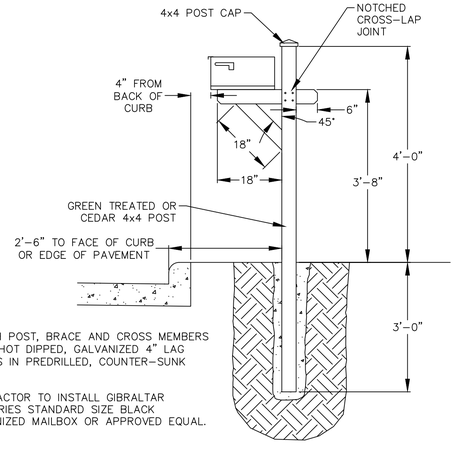
COMMERCIAL DUMPSTER SCREENING ENCLOSURE DETAIL
N.T.S.



NOTES:

1. ALL RESIDENTIAL FENCES FACING STREETS, OPEN AREAS, OR COMMERCIAL ZONES MUST BE 8'–0" HIGH CEDAR BOARD–ON–BOARD STYLE.
2. FENCES AND RETAINING WALL MUST BE AT LEAST 15 FEET FROM EDGE OF PAVEMENT.

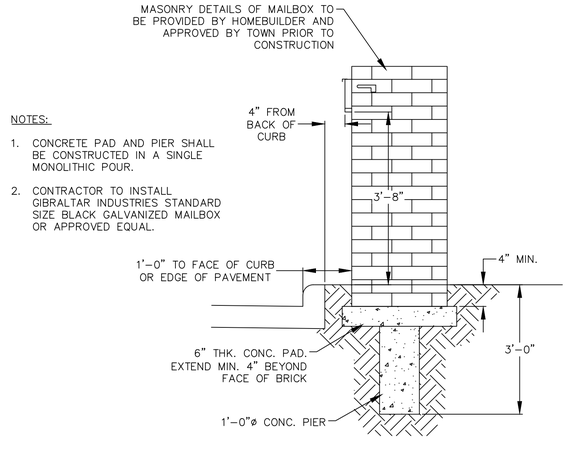
FENCE/RETAINING WALL LAYOUT DETAIL
N.T.S.



NOTES:

1. ATTACH POST, BRACE AND CROSS MEMBERS USING HOT DIPPED, GALVANIZED 4" LAG SCREWS IN PREDRILLED, COUNTER–SUNK HOLES.
2. CONTRACTOR TO INSTALL GIBRALTAR INDUSTRIES STANDARD SIZE BLACK GALVANIZED MAILBOX OR APPROVED EQUAL.

TYPICAL POST MAILBOX CONSTRUCTION
N.T.S.



NOTES:

1. CONCRETE PAD AND PIER SHALL BE CONSTRUCTED IN A SINGLE MONOLITHIC POUR.
2. CONTRACTOR TO INSTALL GIBRALTAR INDUSTRIES STANDARD SIZE BLACK GALVANIZED MAILBOX OR APPROVED EQUAL.

TYPICAL BRICK PAD MAILBOX CONSTRUCTION
N.T.S.

DATE					
REVISION					
NO.					
DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE:	NONE	JOB NUMBER: -

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
MISCELLANEOUS DETAILS 1 OF 2

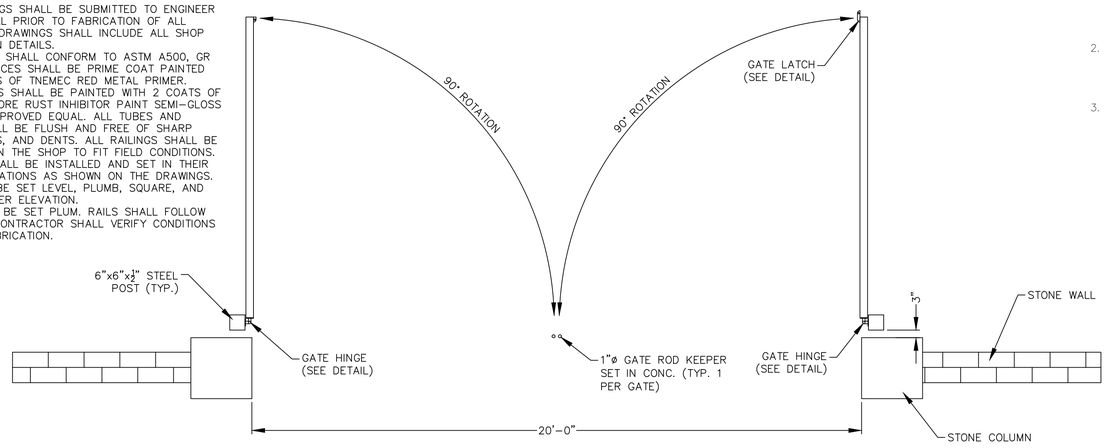
LITTLEELM

SHEET
25 OF 26

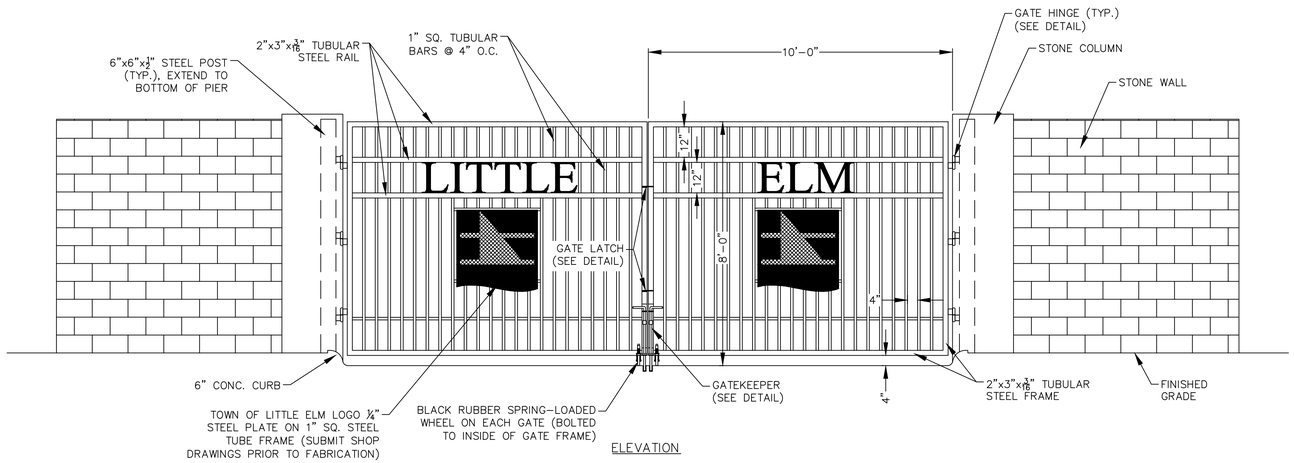
DECEMBER 2023

NOTES:

1. SHOP DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION OF ALL ITEMS. SHOP DRAWINGS SHALL INCLUDE ALL SHOP AND ERECTION DETAILS.
2. STEEL TUBING SHALL CONFORM TO ASTM A500, GR B. ALL SURFACES SHALL BE PRIME COAT PAINTED WITH 2 COATS OF TNEMEC RED METAL PRIMER.
3. ALL SURFACES SHALL BE PAINTED WITH 2 COATS OF BENJAMIN MOORE RUST INHIBITOR PAINT SEMI-GLOSS BLACK OR APPROVED EQUAL. ALL TUBES AND FITTINGS SHALL BE FLUSH AND FREE OF SHARP EDGES, SPURS, AND DENTS. ALL RAILINGS SHALL BE FABRICATED IN THE SHOP TO FIT FIELD CONDITIONS.
4. ALL ITEMS SHALL BE INSTALLED AND SET IN THEIR CORRECT LOCATIONS AS SHOWN ON THE DRAWINGS. THEY SHALL BE SET LEVEL, PLUMB, SQUARE, AND AT THE PROPER ELEVATION.
5. POSTS SHALL BE SET PLUM. RAILS SHALL FOLLOW THE SLOPE. CONTRACTOR SHALL VERIFY CONDITIONS PRIOR TO FABRICATION.



PLAN VIEW

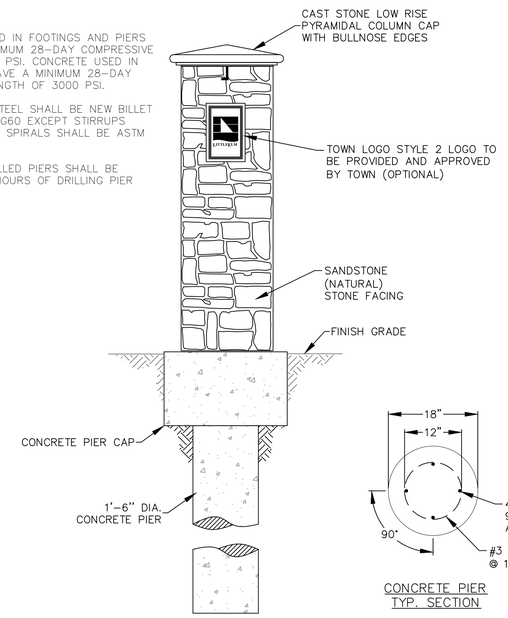


ELEVATION

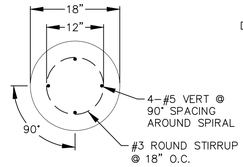
20'-0" DOUBLE SWING GATE
N.T.S.

COLUMN NOTES:

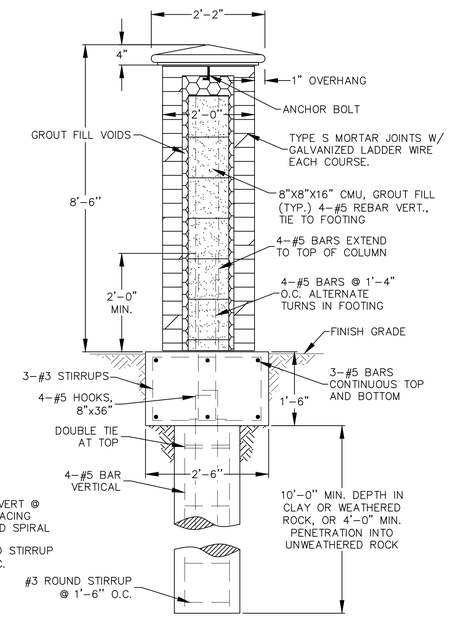
1. ALL CONCRETE USED IN FOOTINGS AND PIERS SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3500 PSI. CONCRETE USED IN COLUMNS SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI.
2. ALL REINFORCING STEEL SHALL BE NEW BILLET STEEL, ASTM A615 G60 EXCEPT STIRRUPS SHALL BE G40 AND SPIRALS SHALL BE ASTM A82 G60.
3. CONCRETE FOR DRILLED PIERS SHALL BE POURED WITHIN 8 HOURS OF DRILLING PIER HOLES.



ELEVATION WITH TOWN LOGO

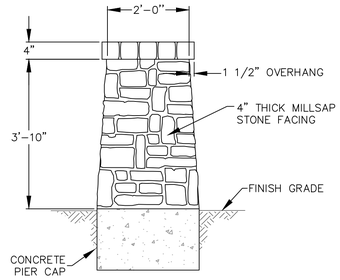


CONCRETE PIER TYP. SECTION

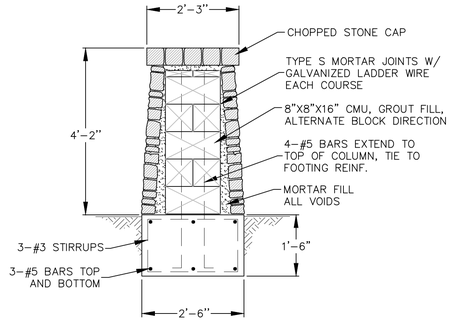


REINFORCEMENT

STONE COLUMN DETAIL
N.T.S.

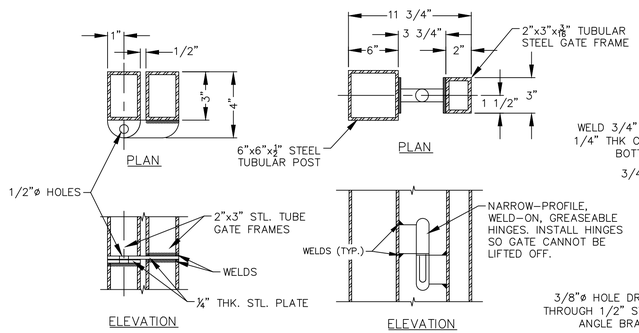


ELEVATION



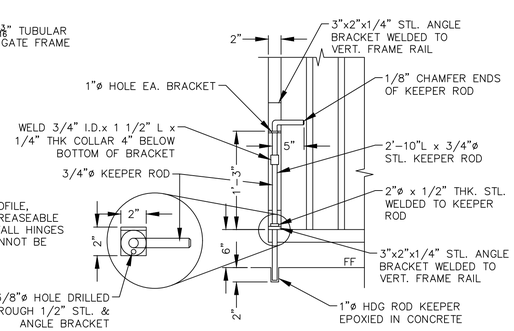
REINFORCEMENT

SMALL STONE COLUMN DETAIL
N.T.S.

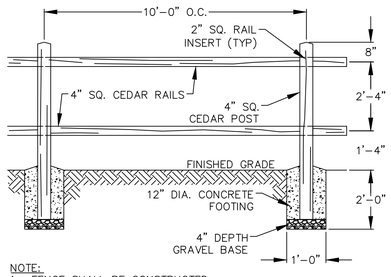


GATE LATCH DETAIL
N.T.S.

GATE HINGE DETAIL
N.T.S.

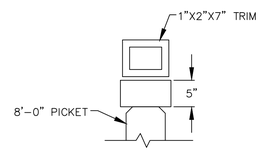


GATE KEEPER ROD DETAIL
N.T.S.



NOTE:
1. FENCE SHALL BE CONSTRUCTED OF WESTERN RED CEDAR.

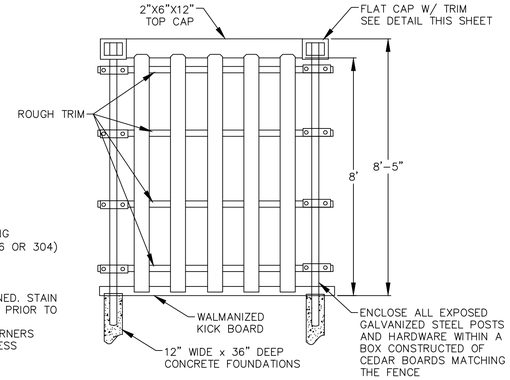
SPLIT RAIL FENCE DETAIL
N.T.S.



CAP DETAIL
N.T.S.

BOARD ON BOARD FENCE NOTES:

1. PICKETS TO BE ⅝"X6"X8" NO-1 CEDAR
2. BOARD ON BOARD WITH MAX 4" SPACING
3. ALL NAILS TO BE STAINLESS STEEL (316 OR 304)
4. GALVANIZED POST TO BE 2⅜" MINIMUM
5. LAGS TO BE ¼"X1½"
6. ROUGH TRIM TO BE EQUALLY SPACED
7. ALL CEDAR MATERIAL TO BE PRE-STAINED. STAIN SAMPLE SHALL BE APPROVED BY TOWN PRIOR TO INSTALLATION.
8. STONE COLUMNS TO BE INSTALL AT CORNERS AND MIDPOINT OF FENCE SECTION, UNLESS OTHERWISE INDICATED ON PLANS.



BOARD ON BOARD CEDAR FENCE
N.T.S.

DATE				
REVISION				
NO.				
DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE: NONE	JOB NUMBER: 1

TOWN OF LITTLE ELM, TEXAS
STANDARD DETAILS
MISCELLANEOUS DETAILS 2 OF 2

LITTLE ELM

SHEET
26 OF 26

DECEMBER 2023