SPECIAL PROVISIONS

City of Flagstaff
Coconino Estates Phase II
Improvements

Prepared By:

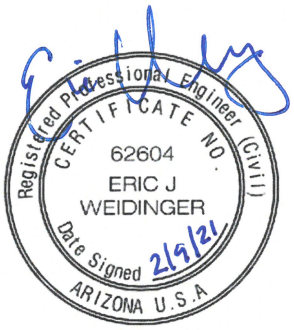
The WLB Group, Inc.

500 N. Beaver Street
Flagstaff, Arizona 86001
Phone 928-779-1500
Fax 928-779-1501
Eric Weidinger
e-mail eweidinger@wlbgroup.com

February 9, 2021

Final 2 Submittal

City of Flagstaff Project Number: 03-19015



INDEX TO THE SPECIAL PROVISIONS:

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION 2019 EDITION, CITY OF FLAGSTAFF GENERAL PROVISIONS, AND CITY OF FLAGSTAFF ENGINEERING STANDARDS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 100 – GENERAL CONDITIONS

SECTION 104 – SCOPE OF WORK

104.1 WORK TO BE DONE:

104.1.1 GENERAL:

(revise to include the following)

The City of Flagstaff Coconino Estates Improvements Phase II (CEIP2) project is located in the north end of the Coconino Estates Neighborhood within west Flagstaff. The utility and roadway improvements will be designed and constructed for several streets within the neighborhood as follows:

1. Crescent Drive: Meade Lane to Talkington Drive
2. Navajo Drive: Elizabeth Road to Talkington Drive
3. Talkington Drive: Meade Lane to Crescent Drive
4. Elizabeth Drive: Navajo Drive to Talkington Drive
5. Hazel Way, Thelma Way, Davis Way, and N and S Louise Way.
6. Meade Lane: Crescent to approximately the Rio De Flag.

In general, improvements within the above streets consist of:

- Water main replacements and extensions
- Water service and hydrant replacements
- New Air Release Valves
- Sanitary sewer main replacements
- Sanitary sewer service and manhole replacements
- Construct new sanitary sewer main
- Full depth pavement reconstruction
- Replacement of roll curb with vertical curb and gutter
- Driveway Reconstruction
- Stormwater drainage issue resolution within roadway

104.1.2 MAINTENANCE OF TRAFFIC:
(revise to include the following)

The contractor shall provide to the City a traffic control plan and corresponding schedule for the project that includes provisions for access to all adjacent private properties within the project area. The detailed traffic control plan and corresponding schedule shall be submitted to and approved by the City of Flagstaff prior to the start of work. The contractor may temporarily restrict vehicular traffic to properties through advance written notice, approval from the City and the property owners.

The Contractor shall be required to provide no less that one (1) week advanced written notice of all street closures and traffic restrictions to all affected property owners, and residents as well as to the City's Project Manager. The notice shall include the Contractor's name, contact person and local telephone number.

Existing pedestrian and bicycle facilities shall be continued through or around the construction zone. The Contractor is responsible for securing the construction site and maintaining safe passage for pedestrian and bicycle traffic.

Pedestrian access throughout the project limits shall be maintained. Should construction occur during the school year, any existing school bus stops will need to be temporarily relocated to another location acceptable to the Flagstaff Unified School District Transportation Director. The Contractor shall coordinate any school bus relocations through the Flagstaff Unified School District Transportation Director, Patrick Fleming at 928-527-2301.

Access to the community pool shall be maintained. Should construction occur during the pool season (May 31 - September 6), Existing pedestrian, vehicles and bicycle facilities shall be continued through or around the construction zone. The Contractor is responsible for securing and maintaining safe passage for pedestrian and bicycle traffic to the pool.

Special Access Requirements:
The Contractor shall maintain access to all side streets, access roads, driveways, and alleys at all times during their hours of operations. Access to all residential driveways shall be provided during all non-working hours. Where property has more than one driveway, no more than one access will be restricted or closed at one time. Should it be necessary to close access to private property, driveways or alley entrances, the closure must be for as short a time as feasible and be restored at the end of the work shift.

Traffic Control and Safety:
At the time of the Pre-construction Meeting, the Contractor shall designate an employee, other than the Project Superintendent, who is well qualified and experienced in construction traffic

control and safety, to be available on the project site during all periods of construction to coordinate and maintain safe barricading whenever construction restricts traffic. The contractor shall designate and provide the contact information of one person who shall be available during non-construction hours in case of any traffic control and/or safety items that need to be handled in an urgent manner. This representative must be within 20 minutes response time from the project area and must be able to operate equipment. Traffic control shall include pedestrian as well as vehicle traffic.

Public Involvement:
At the time of the Pre-construction Meeting, the Contractor shall designate an employee who is responsible for coordination with the public, including but not limited to property owners, business owners, and tenants. This person shall be qualified and experienced in public coordination during a construction project and shall be available during all periods of construction to address any issues.

The City has procured the services of a Professional Public Relations Firm to assist with the public outreach process during the construction of the Project. The Contractor shall coordinate with and provide all the necessary information required for public outreach efforts to the City's Public Relations Firm. No separate payment will be made for the coordination with and or information provided to the City's Public Relations Firm. It shall be incidental to the cost of the Project.

Sanitation Pickup:
Trash and recycle pickup in the project area is scheduled every Monday (trash) and Thursday (recycle). When construction activity interferes with pickup, the contractor shall provide for sanitation vehicle access to the affected properties or relocate the trash containers where access is acceptable. The Solid Waste Division of the Public Works Department contact is 213-2110.

104.2 ALTERATION OF THE WORK

104.2.3 DUE TO EXTRA WORK

See the City of Flagstaff Amendments to MAG Standard Specifications for Public Works Construction Section 104.2.3.

(Revise to include the following)

At the pre-construction meeting, the contractor will submit for review and approval, equipment and personnel rates that may be used to assist in determining compensation for extra work performed. These rates may be used when determining the cost of extra work if bid unit line items do not exist in the original proposal. Profit, taxes and markup for all extra work will be in accordance with the appropriate MAG sections if bid unit line item prices are not used.

SECTION 105 – CONTROL OF WORK

105.2.1 RECORD DRAWING (As-Built Plans):
(revise to include the following)

The Contractor shall be required to maintain an as-built "red-line" set of construction plans that fully describes work that deviated from the approved contract documents. The redline plan set will be reviewed at each weekly meeting with the City's PM and the engineer to assure that all deviations from the plans are being noted. The redline plan set needs to be legible and contain accurate information that will be used by the Engineer to prepare Record Drawings at the conclusion of the project. The redlines will include at least the following information:

Sewer
Stations for all cleanouts and services.
Station and length of pipe encasements.
Swing ties to manholes

Water
Stations of all water services including landscape and fire lines.
Stations of all fire hydrants.
Stations of all valve boxes, air release valves.
Stations/elevations for all horizontal and vertical bends and tees.
Profile views of all pipeline vertical alignments.
Stations and length of pipe encasements.
Swing ties to all valves and fire hydrants
Blow up sketched of fittings and realignments
All stations and elevations shall be documented with a sealed as-built survey which will be provided to the City at the conclusion of the project.
All roadway stations and elevations shall be documented with a sealed as-built survey which will be provided to the City at the conclusion of the project.

The contractor is responsible for preparing sealed Record Drawings at the conclusion of the project. The record drawings shall be completed per Section 13-06-002-0008 of the City Engineering Standards and the attached COF As-built checklist dated April 27, 2015. They shall be sealed by a registered Civil Engineer and registered Land Surveyor in the State of Arizona and approved by the City. The City of Flagstaff As-Built Plans/Record Drawings Checklist has been included in the contract documents for the convenience of the Contractor. The Contractor is responsible for verifying all items required per COF As-built checklist dated December 12, 2019.

105.5.1 WEEKLY CONSTRUCTION MEETING:
(revise to include new sub-section)

The Contractor's Superintendent shall attend weekly construction progress meetings. The Contractor representative shall be prepared to discuss construction schedule, construction activities projected for the next two weeks, problems, issues and any other pertinent project details as may be required by the City's representative.

The Contractor shall prepare meeting agendas and meeting minutes. Minutes shall be distributed within four (4) working days after the meeting.

105.5.2 PROTECTION OF WORK:
(revise to include new sub-section)

The Contractor is required to protect work during inclement weather. The contractor shall grade areas to drain and utilize pumps to remove ponding water immediately during all stages of construction during both working and non-working hours.

105.8 CONSTRUCTION STAKES, LINES, AND GRADES
(revise to include the following)

Unless noted otherwise in the contract documents, the Contractor shall layout the work from the lines, grades and dimensions shown on the drawings. The Contractor shall be responsible for all such work for the duration of the project. Any dimension or grade errors shall be immediately transmitted in writing to the Owner for clarification, before proceeding with the work.

SECTION 107 – LEGAL REGULATIONS AND RESPONISIBILITY TO THE PUBLIC

107.2 PERMITS:
(revise to include the following)

The Contractor shall be required to obtain all City required permits. The City of Flagstaff Capital Improvements Program will prepare Temporary Entry Permits for the work to be done on private property as needed. A copy of these permits will be provided to the contractor and shall be kept on site during construction.

ADOT Permits
The Contractor is responsible for obtaining an ADOT encroachment permit for work within the ADOT Right-of-Way and adhering to all the permit requirements. The cost to prepare and submit the Highway Encroachment Permit Application is incidental to construction; no additional

payment will be made. NO WORK SHALL TAKE PLACE INSIDE THE ADOT RIGHT-OF-WAY WITHOUT AN APPROVED PERMIT ON-SITE.

107.5 SAFETY, HEALTH AND SANITATION PROVISIONS

107.5.4 HANDLING, REMOVAL AND DISPOSAL OF SURPLUS MATERIAL AND ASBESTOS CONTAINING MATERIALS (ACM)

See the City of Flagstaff Amendments to MAG Standard Specifications for Public Works Construction.

(revise to include the following)

The Coconino Estates Improvements Phase II project includes work associated with disconnecting, removing, disposing, and abandoning existing AC waterlines in-place. The Contractor is responsible for all work associated with these activities to complete the project as shown on the construction documents. All work relating to the removal and disposal of the waterline materials as described above shall be incidental to the project and no separate payment shall be made for this work.

Work relating to the removal and disposal of sewer line that has asbestos containing materials shall be paid for as indicated in the City of Flagstaff Amendments to MAG Standard Specifications for Public Works Construction.

The Contractor shall strictly follow City of Flagstaff requirements regarding the handling, removal and disposal of asbestos containing materials. Detailed instructions are shown on the construction plans.

107.6 PUBLIC CONVENIENCES AND SAFETY

(revise to include the following)

Whereas on-street parking currently exists within the project limits, the Contractor shall give written notice, describing the proposed work and parking restrictions, to each adjacent business or residence. Written notice (with specific dates of anticipated construction work) shall be given at least one week in advance of the work. In the event that the work requires removal of parked vehicles, the Contractor shall coordinate removal of vehicle to the nearest convenient side street at the Contractor's expense. No separate payment will be made for this work.

107.9 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE:
(revise to include the following)

Survey monuments and property corners not specifically called out for removal and replacement shall be protected and not disturbed. If monuments or property corners are disturbed that are not specifically called out on the plans, all costs associated re-establishing disturbed survey monuments and property corners shall be borne solely by the Contractor. All survey monuments that are set as a part of the project shall be done by a registered land surveyor and recorded with Coconino County prior to final payment. See the City of Flagstaff Amendments to MAG Standard Specifications for Public Works Construction Section 430 and Section 430 of these special provisions.

Landscaping shall be restored to pre-construction condition per the Engineer's Design Report. In areas where the contractor is working near existing landscape walls it is the contractor's responsibility to document the existing condition of the walls and maintain that condition throughout construction. As part of the restore disturbed landscaping line item work, the Contractor shall replace and/or restore disturbed landscaping including but not limited to fences, gates, brick pavers, retaining walls, landscape rock walls or rock barriers, parking bumpers, driveway materials, private signage, surface materials, any other owner improvements impacted by the construction of the project, etc. as needed to construct the proposed improvements. Landscaping items that will not be included in the restore disturbed landscaping line item work, and that the Contractor shall not be responsible for, include flowers and bushes within the City's right-of-way. These items will be the responsibility of the property owner to salvage and or replant. It is the contractor's responsibility to coordinate with the City's PM to discuss areas where there may be more impact to existing landscaping than what is called out on the plans. The restoring disturbed landscaping line item of work shall also include the extension of the existing landscaping surface materials to the new back of curb location with new landscaping surface materials matching the existing adjacent materials including landscape rock, mulch, and topsoil where adjacent landscaped vegetation exists. Items that are not included in the extension of the existing landscaping surface materials, and that the Contractor shall not be responsible for are any vegetation and irrigation lines.

Protection of Existing Trees and Vegetation:
Protect existing trees and other vegetation indicated to remain in place against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.
1. Provide protection for roots over 1-1/2 inch in diameter that are cut during construction operations. Coat cut faces with an acceptable coating formulated to use on damaged plant

tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out, cover with earth as soon as possible.
2. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations in manner acceptable to the City's Project Manager. Employ a licensed arborist to repair damage to trees.
3. Replace trees that cannot be replaced and restored to full-growth status, as determined by the City Project Manager.

The Contractor is responsible for trimming trees/landscaping to construct the proposed improvements, provide sight clearance for signage, driveways, and other construction improvements.

The contractor shall record and provide the City with a pre-construction video and pictures (in readable format) of the full construction area prior to mobilization, paying special attention to the private property boundary and private improvements. This video will serve as a record of preexisting conditions and it is in the best interest of the contractor to record a thorough document for the record.

107.9.1 ERROSION AND SEDIMENT CONTROL:
(new section)

The size of this project is greater than one (1) acre. Erosion control shall be in accordance with Section 431 of the City of Flagstaff Amendments to MAG Standard Specifications for Public Works Construction. The Contractor is required to submit a Notice of Intent and a Notice of Termination to the Arizona Department of Environmental Quality. The Contractor shall use best management practices (BMP) in controlling stormwater runoff. A stormwater pollution prevention plan (SWPPP) has been included in the construction documents for the Contractor's use. The contractor shall develop and maintain a SWPPP inspection and maintenance binder that is to be kept on site during construction.

107.9.1.1 MEASUREMENT AND PAYMENT:

Measurement shall include all items required to comply with the requirements of the AZPDES permit program.

The cost for obtaining and complying with the AZPDES permit, inspection documentation, erosion control devices and all work associated with stormwater protection shall be included in the pay item for SWPPP.

107.11 CONTRACTOR'S RESPONSIBILTY FOR UTILITY PROPERTY AND SERVICES:
(revise to include the following)

The Contractor is responsible for providing written notification to each affected resident at least 96 hours prior to any disruption to water or sewer service in the construction area. The notice must include the exact time of the disruption of service and the expected duration of the loss of service. Contractor shall submit water service interruption notifications to the City's Project Manager for approval prior to distribution. Unless otherwise approved by the City's Project Manager, water service interruptions shall begin no earlier that 8:00 AM.

The Contractor shall protect existing water, sewer, gas, electric, fiber optic, telephone and cable service lines where the proposed work crosses individual service lines. Not all services lines are shown on the plans and it is the Contractor's responsibility to determine their location in the field. Protection or repair of existing service lines not in conflict with the work is considered incidental to the other work. In the event that there is a physical conflict between an existing service line and the proposed work, the Contractor shall immediately notify the City's Project Manager of the conflict. The City will make a determination as to how the conflict will be resolved. Any extra work required as a result of an unforeseen service conflict will be ordered and paid for in accordance with City of Flagstaff Amendments to MAG Standard Specifications Section 104.2.3.

Locations of underground utilities shown on the plans are to be regarded as approximate only. Utility company contacts are listed below:

Arizona Public Service	Ryan Weisner	(928) 773-6446
CenturyLink	Manuel Hernandez	(928) 779-4935
SuddenLink	Sanford Yazzie	(928) 266-0672
Unisource	Martin Conboy	(928) 226-2269
City of Flagstaff Sewer	Joe Almanderz	(928) 853-4876
City of Flagstaff Water	Jim Davis	(928) 213-2411

APS utility poles and down guys shall remain in place unless otherwise noted on the plans. The Contractor is responsible for maintaining the integrity of utility poles and down guys during construction. No separate payment shall be made for protecting, bracing, shoring or otherwise protecting utility poles.

SECTION 108 – COMMENCEMENT, PROSECUTION AND PROGRESS:

108.1 NOTICE TO PROCEED
(revise to include the following)

Prior to notice to proceed, the contractor may only work on non-destructive items such as materials submittals, franchise utility coordination, public coordination, securing a construction yard, field reconnaissance, etc. The contractor shall guarantee bid prices until the completion of the project.

108.4 CONTRACTOR'S CONSTRUCTION SCHEDULE
(revise to include the following)

Trench Rock Excavation, Unsuitable Materials, and Subgrade Stabilization are allowance items included in the contract bid schedule. Time to perform these established work items at their indicated quantities shall be included in the Contactor's original work schedule. The contract duration has been established to include time to perform the allowance work and the Contractor shall be prepared with appropriate labor and equipment to perform the work in the time allotted. Additional contract time may be requested if these allowance quantities over run the original quantities.

108.5 LIMITATIONS OF OPERATIONS:
(revise to include the following)

Due to the Project's funding restrictions, the Contractor shall be required to initiate and complete construction on Crescent Drive, Elizabeth Drive, Navajo Drive to the satisfaction of the City's Representative prior to any construction activities beginning on Talkington Drive and intersecting side streets. Contractor will be responsible for the temporary grading between the new improvements within Crescent Drive, Elizabeth Drive, and Navajo Drive to Talkington Drive until construction on Talkington Drive can begin. No separate payment for the work under this section will be made.

108.7 DETERMINATION AND EXTENSION OF CONTRACT TIME:
(revise to include the following)

The Contractor's schedule must include the above anticipated adverse weather delays on a month-by-month basis during the contractor's normal working schedule.

SECTION 110 – NOTIFICATION OF CHANGED CONDITIONS AND DISPUTE RESOLUTION

110.1 GENERAL
(revise to include the following)

There are several project allowances included. The allowances are available based on the City Project Managers approval and actual field conditions. It is the responsibility of the Contractor to document quantities and payment requested associated with each allowance. The allowances are as follows:

Trench Rock Excavation – There is rock in the area and it is anticipated that the Contractor will encounter rock. Refer to Section 601.2.1 of the City of Flagstaff Amendments to the MAG Specifications.

Unsuitable Material – Refer to the Geo-tech Report revised by Speedie and Associates, report number 192658F, dated 05-20-2020 and City of Flagstaff Amendments to the MAG Specifications Section 205.2.

Subgrade Stabilization **-** Refer to Section 301.1 of the Geo-tech Report revised by Speedie and Associates, report number 192658F, dated 05-20-2020.

PART 200 – EARTHWORK

SECTION 205 – ROADWAY EXCAVATION

A geotechnical investigation was completed and revised by Speedie and Associates, report number 192658SF, dated 05/20/2020. The report is attached for the contractor's information. The report, while representative, is not guaranteed to be indicative of all field conditions on site regarding asphalt thickness or location and type of subsurface soil and rock. It is the contractor's responsibility to investigate the field conditions fully prior to bidding. The bid item #100 Remove and Dispose of Existing Asphalt shall include removal and disposal of asphalt and any base materials needed to attain subgrade elevation.

205.2 Unsuitable Material:
(revise to include the following)

In the event that subgrade stabilization is required in addition to or in place of removing and replacing unsuitable material, the preferred subgrade stabilization is filter fabric and geogrid below an aggregate base layer per the recommendations in the geotechnical report provided by Speedie and Associates, report number 192856SF, dated May 20, 2020. The unit price for the subgrade stabilization line item shall be based on the preferred subgrade stabilization method as previously mentioned and shall include all equipment, labor and materials necessary to install the filter fabric and geogrid complete in place. The costs to remove the unsuitable material and replace with materials that conform to the project specifications shall be per the unsuitable material allowance. Other stabilization methods including: removal and replacement of additional subbase, cement treating, and lime stabilization that may be more beneficial for the Project. The contractor is responsible for coordinating proposed solutions that may be acceptable to the City of Flagstaff. If stabilization options other than the preferred stabilization option mentioned above are used, the unit price for subgrade stabilization shall be renegotiated and shall be paid out of the Subgrade Stabilization Allowance bid item.

205.6 SURPLUS MATERIAL:
(revise to include the following)

The cost of hauling off material to prepare the subgrade of the proposed asphalt is included in the bid price of the pavement removal and new asphalt. There may be areas within the project that have cinders in the subgrade. All cinders encountered shall be removed, which is included in the removal costs replaced with materials that conform to the project specifications, which is included in the new asphalt bid item.

Earthwork quantities have not been calculated and the cost of excavating and hauling material off to reach the proposed subgrade is included in the surface improvement bid items.

PART 300 – STREET AND RELATED WORK

SECTION 301 – SUBGRADE PREPARATION

301.1 DESCRIPTION:
The work under this section shall be in accordance with Section 306 of the MAG Standard Specifications and modified herein.

The recommended subgrade stabilization is a geogrid and aggregate base for the project based on the geotechnical report provided by Speedie and Associates, report number 192856SF, dated May 20, 2020. Stabilization options typically include: removal and replacement of additional subbase, cement treating, and lime stabilization. The contractor shall present preferred method to be approved by the City of Flagstaff Project Manager.

301.8 PAYMENT:
(revise to include the following)

No separate payment for the work under this section will be made. Subgrade preparation is included in the bid price of all surface improvements including Asphalt, Curb, sidewalk, sidewalk ramps, driveways, pavers, etc.

SECTION 310 – PLACEMENT AND CONSTRUCTION OF AGGREGATE BASE COURSE

310.5 PAYMENT:
(revise to include the following)

Payment for aggregate base course shall be included in the contract unit prices for items of work that include aggregate base course.

SECTION 321 – PLACEMENT AND CONSTRUCTION OF HOT ASPHALT CONCRETE PAVEMENT

321.1 DESCRIPTION:

The work under this section shall be in accordance with Section 321 of the MAG Standard Specifications, the City of Flagstaff addendum to MAG specifications, and as modified herein.

The recommended full depth pavement section of 4.5" over the 12" mechanically stabilized subgrade section with filter fabric and Tensar Geogrid BX1200 for the project based on the geotechnical report provided by Speedie and Associates, report number 192856SF, dated May 20, 2020.

The T-topped trenched shall have an asphalt thickness of 4.5” or match the existing asphalt section whichever is greater, T-topped trenching per COF Engineering Detail 9-01-030.

321.2 MATERIALS AND MANUFACTURE:

The asphalt concrete mix designation for this project shall be a ¾” mix. See Specification Section 710.2.1 for Asphalt Binder.

321.8 PLACEMENT:

(revise to include the following)

Sufficient trucks shall be available to enable paving to proceed continuously. Failure to provide a sufficient number of trucks may be considered a failure of the Contractor's responsibilities under Section 108.6 of the MAG Standard Specifications.

321.12 MEASUREMENT:

(revise to include the following)

Asphalt concrete will be measured by the square yard of material complete in place including tack coat as needed.

321.13 PAYMENT:

(revise to include the following)

Payment for asphalt construction will be paid for at the contract price per square yard for asphalt concrete pavement section. Tack coat is included in the square yard bid price for asphalt.

SECTION 340 – CONCRETE CURB, GUTTER, SIDEWALK, SIDEWALK RAMPS, DRIVEWAYS AND ALLEY ENTRANCE

340.1 DESCRIPTION:

(revise to include the following)

Limits of replacements are shown on the plans along with approximate quantities of removals and replacements. Actual limits of removal and replacement will be verified in the field and approved by the City. The sidewalk and curb limits should be adjusted to the nearest expansion joint. If the quantity varies from the plan, the contractor shall verify the limits with the City Project Manager.

340.2.1 DETECTABLE WARNINGS:

(revise to include the following)

All detectable warning devices used on the project shall be cast iron plates manufactured by East Jordan Iron Works and Neenah Foundry Co or approved equal. The cost of the detectable warnings is included in the cost of the ramp replacement.

340.3 CONSTRUCTION METHODS:

(revise to include the following)

Sidewalks, curb & gutters and ramps shall be constructed on three (3) inches of aggregate base course. No direct payment will be made for aggregate base course. All costs associated with this work are to be included in the amount bid for the items of work to which it is incidental or appurtenant.

All sidewalk ramps are quantified separately from the concrete sidewalk. The limit of the ramp replacement is per the details on the plans. If the removal limits expand beyond the center panel the additional concrete area shall be quantified and paid for at the concrete sidewalk bid price. All costs associated with the construction of the ramps are incidental to the bid price. This includes the additional form work and cast-iron detectable warning surface. Remove BOC along ramp.

The Contractor shall take extra precaution to protect all freshly poured concrete from vandalism. The Contractor shall coordinate placement of all new concrete with businesses and residences a minimum of forty-eight (48) hours in advance of the work. Night work, admixtures to accelerate hydration and setting of concrete and protective coverings should be considered by the Contractor to ensure that the finished concrete is free from any defects. Refer to MAG Spec. Sec. 107.10.

Unless otherwise noted for removal and replacement, the contractor shall protect all curb and gutter that is to remain in place. Removals outside the plan limits not approved by the owner shall be replaced at the Contractor's expense.

340.3.4 Joints:
(revise to include)

The Contractor is required to dowel new concrete into existing where driveway match-up connects to existing. Expansion joints shall be placed between all existing and new concrete, except for driveway match-up locations where concrete is to be doweled.

340.6 PAYMENT
(revise to include)

Doweling and expansion joints are incidental to the installation of concrete.

340.7 ACCEPTANCE
(revise to include new section)

In accordance with Section 107.10, the Contractor is responsible for protecting the finish surface of concrete by keeping footprints, names, etc., from becoming part of the finished product. This may require special scheduling of materials, delivery and/or manpower. All defaced concrete will be replaced by the Contractor at no extra cost to the City. Patching is not acceptable.

340.5 MEASUREMENT:
(revise to include the following)

If the removal limits expand beyond the center panel the additional concrete area shall be quantified and paid for at the concrete sidewalk bid price.

SECTION 350 – REMOVAL OF EXISTING IMPROVEMENTS

350.1 DESCRITPTION:
(revise to include the following)

Some of the removal limits may be at existing joints that are not uniform and clean. If this is the case the contractor shall shift the match line 6" past the joint and saw cut the curb to create a uniform edge. Contractor to document the adjusted stationing of the removal limits on the red-line as-built drawings so that quantities can be verified.

For paver driveway match-up, the pavers shall be removed to a neat edge. The Contractor is responsible for maintaining the edge during construction.

Existing fire hydrants to be removed shall be salvaged. Coordinate delivery location and schedule with City's Engineering Construction Inspector. Contractor shall salvage and deliver only the nozzle (yellow part) portion of the fire hydrant, from the traffic flange and above. All other fire hydrant materials shall be disposed.

Where called for on the plans, the Contractor shall remove and dispose valve box, cover, and concrete collar and abandon the valve in place.

Where called for on the plans, the Contractor shall remove and dispose manhole collar, ring, frame and cover, and cone. If there is no cone, remove and dispose upper 36" of brick, and fill manhole base with slurry and abandon in place.

350.2.1 UTILITIES:

(Revise to include the following)

The removal of existing improvements shall be conducted in such a manner as not to damage active utilities or any portion of the improvement that is to remain in place.

A utility may be abandoned in place below a new major structure that is part of the work only if approved by the Agency and solidly filled with grout using methods approved by the City. For manholes the manhole collar, ring, frame and cover, and cone shall be removed and disposed. If there is no cone, remove and dispose upper 36" of brick. Fill manhole base with slurry, plug inlet/outlet if necessary. All abandoned utilities to remain and the approved abandonment method shall be noted on the installation record drawings.

Removal of asbestos containing material shall be in accordance with the City of Flagstaff Amendments to MAG Standard Specifications for Public Works Construction Section 107.5.4.

All underground utility construction must be conducted via trench removal and the surrounding asphalt must be protected in place until full roadway removal and replacement is started.

The construction plans may or may or may NOT represent the location of the existing service lines correctly. Investigation will be required to understand which services are active and determine locations of the connection at the property line. The Contractor is required to verify that the service is active and the location of each sewer service at the property line during removal. This is included in the cost of removing and replacing the sewer services and no additional payment will be made for investigation. The unit price includes all investigation, locating and removal of the existing sewer service.

350.3 MISCELLANEOUS REMOVAL AND OTHER WORK:
(revise to include the following)

There are locations where fencing will need to be removed and replaced for meter or cleanout installation. The contractor is to avoid removal if possible. If removal is required the contractor shall preserve the fencing and reinstall to pre-construction condition or better. All fencing removal and reinstallation is incidental to the surrounding construction and additional payment will not be made.

(B) Remove and reset mailboxes shall be in accordance with Specification Section 450.

SECTION 405 SURVEY MONUMENTS

405.1 DESCRIPTION:
(revise to include the following)

The work under this section shall be in accordance with Section 405 of the MAG Standard Specifications and COF Revisions to MAG Uniform Standard Specifications and MAG Uniform Standard Details, including but not limited to Sections 13-03-002-0007 and 13-21-001-0405.2 and as modified herein.

All right-of-way centerline monuments shall be set as part of this project. Existing right-of-way monuments shall be reset in accordance with Section 13-03-005-0004 of the City Engineering Standards. In locations where right-of-way centerline monuments are missing, monument locations shall be calculated by a registered land surveyor in the State of Arizona and new monuments shall be set by the same.

405.3 CONSTRUCTION:
(revise to read)

Survey monuments shall be set by a licensed land surveyor registered in the State of Arizona. Survey monuments shall be installed accurately per City of Flagstaff Engineering Detail 3-02-070 Monument information shall be documented in accordance with section 13-03-002-0007 of the City Engineering Standards. Information on the as-built plans shall be furnished by a registered land surveyor and include all the information listed in the City engineering standards, Section 13-03-002-0007(I). including, but not limited to: City assigned point number, street location, monument type, and NAVD88 elevation. The surveyor shall prepare and record a Record of Survey map showing the monuments found and set. This map shall include the City's unique identifying number for each point. The Result of Survey shall be reviewed and accepted by the City prior to recordation.

Any survey monuments with boxes and covers shall be adjusted to grade by the Contractor without disturbing the survey monument.

405.4 MEASUREMENT

(revise as follows)

Survey monuments shall be measured by the number of units of each type of monument constructed and accepted.

SECTION 430 – LANDSCAPING AND PLANTINGS

430.1 DESCRIPTION:

(revise to include the following)

All disturbed landscape areas will be restored to original landscaping conditions per Engineer's Design Report. Plants and ground cover shall be replaced in kind to the satisfaction of the City Project Manager.

430.2 GENERAL

(revise to include the following)

The Contractor shall prepare shop drawings prepared by a landscape designer showing proposed landscaping for replacement of landscape materials to pre-existing conditions.

430.10 MEASUREMENT AND PAYMENT:

(revise to include the following)

Payment for replacing and/or restoring site, landscaping and owner's improvements to the pre-existing condition using in-kind materials, shall be lump sum per the contract bid and shall be full compensation for furnishing all shop drawings, labor, materials, tools, and equipment and for performing all work necessary to complete the landscaping operation to include planting of trees, shrubs, and ground cover.

SECTION 431 - EROSION CONTROL

(revise to include)

All disturbed areas not between the new back of curb and adjacent residence private property shall be hydroseeded in accordance with City of Flagstaff Engineering Standards Section 13-17. A revegetation plan will be required to be implemented and proved successful prior to project closeout. Contractor shall provide 70% successful regrowth per ADEQ permanent stabilization requirements for all areas disturbed during construction. Soil conditioners and watering are required in accordance with 13-17-002-004 and 13-17-002-0005.6, Contractor shall propose soil conditioners and watering schedule as part of the revegetation plan.

SECTION 440 – SPRINKLER IRRIGATION SYSTEM INSTALLATION

440.11 MEASUREMENT AND PAYMENT:

(revise to include the following)

Payment for replacing and/or restoring irrigation to the pre-existing condition using in-kind materials, shall be included in the lump sum Restore Landscaping to Existing Conditions line item per the contract bid and shall be full compensation for furnishing all shop drawings, labor, materials, tools, and equipment and for performing all work necessary to complete the irrigation restoration operation.

Sprinkler and irrigation restoration shall be considered incidental to construction and shall include all materials, labor, equipment, and all other items necessary or incidental for the complete restoration of the system.

SECTION 450 MAILBOX CONSTRUCTION (NEW SECTION)

450.1 DESCRIPTION

(revise to include new section)

The work under this section shall be in accordance with the Postmaster General's Mailbox Guidelines, https://www.usps.com/manage/mailboxes.htm, and as modified herein. The Contractor shall confirm with each property owner if they want to keep their existing mailbox and/or post and decorative facade if applicable, or if they want a new mailbox and/or post. The Contractor shall furnish a list, by address, to the City Project Manager of property owners who want to keep their existing mailbox, mailbox & post, or want a new mailbox and post. The Contractor shall make at least 2 attempts to contact the property owner. If the Contractor is unable to contact the property owner and receive direction, the City Project Manager shall be notified and make the determination. The Contractor shall maintain Postal Service Access and delivery at all times during construction in accordance with Specification Section 104.1.2.

The Contractor is responsible for removal of all mailboxes and posts within the project limits. The Contractor shall take care to remove all mailboxes and posts such that both mailbox and post can be restored if the property owner wants to have either or both of them reinstalled.

If the property owner wants to keep their existing mailbox and post:

The Contractor shall remove and salvage the existing mailbox and post, keep both in good working condition, and restore both on a new footing in accordance with the plans. If the existing mailbox and post is a custom element, the Contractor shall restore the custom element to the satisfaction of the property owner. If the mailbox installation includes a facade such as brick or rock work, the Contractor shall restore the facade to the satisfaction of the property owner.

If the property owner wants to keep EITHER their existing mailbox or post:

The Contractor shall remove and dispose of EITHER the mailbox OR post, as directed by the property owner, and salvage the element to be reused. The salvaged element (mailbox or post) shall be kept in good working condition. The Contractor shall supply a new mailbox OR post to provide a complete mailbox installation in accordance with the plans. If the existing mailbox or post to be reused is a custom element, the Contractor shall restore the custom element to the satisfaction of the property owner.

If the property owner wants a new mailbox and post:

The Contractor shall remove and dispose of the existing mailbox and post, subject to the requirements to maintain mail delivery service and US Postal Service Access. The Contractor shall supply a new mailbox, post, footing, and all required hardware for a complete installation in accordance with the plans.

450.2 PLACEMENT
(revise to include new section)

Guidelines to follow when installing new or replacing existing mailboxes:

- Position mailbox 41" to 45" from the adjacent surface to the bottom of the mailbox or point of mail entry. Height of mailboxes along the roadway shall be uniform.
- Place mailbox 6" to 8" back from the curb. Location of mailboxes behind the curb shall be uniform.
- Put house or apartment number on the mailbox.
- If mailbox is on a different street from house or apartment, put full street address on the box.

All mailboxes within the project limits shall be placed in accordance with the guidelines above.

450.3 MATERIALS

(revise to include new section)

Mailboxes shall include the Postmaster General's seal of approval. Provide material submittal for mailbox.

House or apartment number shall be uniform height, 3", and shall contrast with the color of the mailbox. Provide material submittal for approval.

Concrete shall be in accordance with Section 725 of the MAG Standard Specifications and the COF Revisions to MAG Uniform Standard Specifications.

450.4 INSTALLATION

(revise to include new section)

Mailbox shall include:

- House or apartment number on the mailbox.
- If mailbox is on a different street from house or apartment, put full street address on the box.

450.5 PAYMENT

(revise to include new section)

Payment for removal and salvaging of all mailboxes and posts (whether standard or custom) shall be at the contract unit price bid (1 lump sum) and shall constitute full payment for equipment, tools, labor, storage, maintenance and coordination with property owners necessary to complete work.

Payment for installation of all mailboxes within the project limits shall be at the contract unit price bid (1 lump sum) and shall constitute full payment for shop drawings, material submittal, coordination with property owners, hardware, equipment, tools, labor, mailboxes, and/or posts necessary to complete work. Broken or damaged mailboxes shall not be reinstalled. Landscape gravel and weed barrier are incidental to mailbox construction.

PART 600 – WATER, SEWER, STORM DRAIN AND IRRIGATION

SECTION 601 – TRENCH EXCAVATION, BACKFILLING AND COMPACTION

SECTION 601.6 – PAVEMENT REPLACEMENT AND SURFACE RESTORATION

601.6.4 Temporary Pavement:
(revise to read)

The Contractor shall be required to install temporary asphalt pavement in accordance with Section 336 at a minimum of every two weeks, or as otherwise approved by the City's representative, following backfilling and compaction of each completed linear foot of trench that is cut through the existing pavement. Prior to the temporary asphalt pavement installation the surface of the trench cut shall be finished flush to the adjacent pavement with 4-inches of compacted ABC. The Contractor shall maintain the ABC surface to a safe and reasonably

smooth condition to the satisfaction of the City's representative until the temporary asphalt pavement can be placed.

Except as otherwise provided in Section 336, this temporary asphalt pavement shall be maintained in a safe and reasonably smooth condition until required backfill compaction is obtained and final pavement replacement is ordered by the Engineer. Temporary paving removed shall be hauled from the job site and disposed of by the Contractor at no additional cost to the Contracting Agency.

Permanent pavement replacement shall replace temporary repairs within 5 working days after completion of temporary work, during the construction of the new roadway, or as otherwise approved by the City's representative.

SECTION 610 – WATER LINE CONSTRUCTION

(revise to include the following)

The Contractor shall notify residents 96 hours in advance of any scheduled water service interruption. Contractor shall submit water service interruption notifications to the City's Project Manager for approval prior to distribution. Unless otherwise approved by the City's Project Manager, water service interruptions shall begin no earlier that 8:00 AM. The contractor to install restraining joints per MAG specifications to restrain the waterline. Contractor to provide thrust blocks only where absolutely necessary. The method should be approved by the City prior to construction.

The contractor is responsible for maintaining individual water services during construction of the new improvements. If a water service(s) has to be shutdown for more than 8 hours to install the new waterline a temporary service will have to be provided until the new main is tested and inspected. The Contractor is responsible for all testing and materials required to install and maintain the temporary service line. The cost of the temporary service is incidental to the installation of the new main.

610.4 CONSTRUCTION METHODS

(revise to include new section)

The contractor is responsible for determining safe working and separation distances between existing live water mains and new utility mains during construction. In locations where maintaining a safe working distance is not possible the contractor shall identify the means for maintaining utility service during construction, in the Utility Phasing Plan, see Section 610.11.

If the Utility Phasing Plan includes cutting and capping an existing water main and leaving a portion of the dead-end water main in service, the cap shall be an MJ cap and include thrust restraint in accordance with MAG Standard Det. 380 or joint restraint per MAG Standard Det.

303 as needed to construct the proposed improvements and maintain water service to adjacent residents.

610.4.2 Laying Pipe:
(revise as follows)

To the extent feasible avoid joint deflection and bending the pipe on a radius except where explicitly called for on the plans.

Fittings shall be installed using joint restraints per MAG Standard Detail 303 instead of thrust blocks unless otherwise allowed by the City's Project Manager.

610.4.3 Blocking and Restraints
(revise as follows)

Joint restraints shall be used in lieu of thrust blocks except where there is insufficient distance to properly restrain the pipe. Joint restraints shall be Meg-A-Lug or approved equal. 11.25° fittings shall be restrained the same length as 22.5° fittings.

If allowed thrust blocks shall be per COF Engineering Standards table 13-21-002-0380.

610.9 Fire Hydrants
(revise as follows)

Fire hydrants to be installed 3' from face of hydrant to back of curb where there is no existing or proposed parkway and sidewalk.

Fire hydrants to be installed 2' from face of hydrant to back of curb when hydrant is within parkway.

610.13 METER SERVICE CONNECTIONS
(revise to include the following)

The Contractor shall salvage and reuse existing water meters. Salvaged water meters shall be labeled with the residential/commercial address associated with the meter and approximate station where the water meter was removed. Meters shall be protected in a manner approved by the City's Representative until reinstalled.

Water meters shall be installed at the original residential/commercial address per the City of Flagstaff Engineering Details at the locations shown on the waterline plans. The water service connection shall be installed as necessary to avoid utility conflicts.

The private side connection for the residential and commercial water services shall be performed by an appropriately licensed Contractor.

In locations where water services are being replaced and the existing curb and gutter, sidewalk, driveway, and or landscaping are required to be disturbed in order to replace the water service and are not being replaced as part of the roadway improvements, removal and replacement of disturbed curb and gutter, sidewalk, driveway, and landscaping is incidental to water service replacement.

610.16 MEASUREMENT AND PAYMENT:
(revise to include the following)

Payment for work under this section will be made in accordance with Subsection 610.16 of the MAG Standard Specifications at the contract unit prices complete and in place, which price shall be full compensation for the work, as described and specified herein and on the project plans, or as determined by the Owner's Representative.

Waterline pipe is measured horizontally in plan view in 2 dimensions.

No separate payment shall be made for horizontal or vertical bend fittings tees, crosses, transition couplings, reducers, bends, elbows, restrained joints, thrust blocks, and all parts that are included to make the installation complete. No separate payment shall be made for preparation and implementation of the Utility Phasing Plan, including but not limited to temporary water main caps and thrust restraints, temporary utility service, removal of existing water main required for installation of the new water main.

Removal and replacement of improvements not specifically called for on the plans, such as curb and gutter, required for construction of water mains is incidental to the waterline construction.

The ductile iron sections of the waterline may include vertical deflections to pass under the existing sewer line. The cost of all fittings including horizontal bends, vertical bends, tees, reducers, transition couplings, tapping sleeves, mechanical joints, and restrained joints or thrust blocking is included in the linear foot price for waterline construction. Where applicable, this bid item also includes existing asphalt sawcut removal, and disposal, temporary asphalt trench patching, T-Top trenching, ABC backfill and asphalt replacement.

No additional payment will be made for extra protection of water mains at water and sewer main crossings. All costs for extra protection shall be included in the cost of the water main construction for all required extra protection locations complete in place and complying with the appropriate governing agency.

Measurement and payment for new water services shall be at the contract unit prices and shall include all associated work, labor, and materials for a complete and operational service

installation per these standards. Measurement and payment for new water services shall also include curb, sidewalk, driveway, landscaping, and private improvements removal and replacement, in kind, not specifically identified on the plans, as required for water service construction. Curb and sidewalk removal and replacement shall be to the nearest joint to the satisfaction of the City's Representative. Measurement and payment for new water services shall also include adjustment of and connection to the customer side service, relocation and or adjustments to any existing customer side shut off valves, as well as adjustment of the meter box to finished grade.

The Fire Hydrant bid item includes the tee and valve, water main to the hydrant, and hydrant assembly as well as all thrust blocking, testing and all other items in COF detail 13-03-011 for a complete in place fire hydrant. The fire hydrants must be adjusted in the field and approved by the City Inspector. Measurement and payment for new fire hydrants also includes curb removal and replacement, sidewalk removal and replacement, and removal and replacement of private improvements such as driveways and/or landscaping, in kind, not specifically identified on the plans, as required for fire hydrant construction. Where applicable, this bid item also includes existing asphalt sawcut removal, and disposal, T-Top trenching, temporary asphalt trench patching, ABC backfill and asphalt replacement.

611.2.13 Fire Flow Testing:
(revise to include the following)

The Contractor shall be responsible for hiring a certified tester, coordinating the fire flow tests, and providing the City with the results. No additional payment shall be made for costs associated with fire flow testing and all costs shall be included in the unit price for the Fire Hydrant bid item.

SECTION 615 – SEWER LINE CONSTRUCTION

615.1 GENERAL:
(revise to include the following)

All Sewerlines shall be either SDR35 PVC, ASTM D3034, or Class 150 lined with protecto 401 ceramic epoxy coated ductile iron pipe per COF Specification Section 13-09-006-0001 as specified on the plans. If used, all buried metal pipe, valves, and fittings shall be wrapped in polywrap to protect them from corrosion in accordance with MAG Specifications Section 610.5.

Contractor shall maintain full sewer service to the adjacent community, with the exception of minimal shutdown as required to install replacement sewer line and new connections. Contractor shall ensure that full sewer service is restored to all customers at the close of business each day. Sewer construction phasing, bypass pumping, and shutdowns shall be included in the Utility Phasing Plan where the Contractor deems necessary, see Section 615.

Bypass pumping shall be included in the cost of replacing the sewer mains where neccessary.

615.5 PIPE INSTALLATION
(revise to include the following)

When a shutdown of an existing sewer is necessary in order to construct replacement lines, the Contractor shall schedule a pre-shutdown conference with the Contractor's representative, City Inspector, and City Project Manager. This conference shall establish the timeline and procedures to ensure that the shutdown will be the shortest possible time (8-hours maximum). Contractor may temporarily need to bypass pump sewage flow around the immediate construction site. After the procedures and time for a shutdown are agreed upon, it shall be the Contractor's responsibility to notify all affected customers in advance, that sewer service will be interrupted. Customers shall be notified no less than seventy-two (72) hours in advance, except for emergency situations. Notification shall be in writing giving the reason for the shutdown, and the time and duration that sewer service will be shut off. All shutdown notifications to the customers must be approved by the City Project Manager.

615.5.1 SEWAGE BYPASS
(revise to include new subsection)

If needed for the construction of the new sewer main, the Contractor may choose to maintain sewer service during the construction period by means of a sewage bypass system. The temporary sewer system shall be installed and tested prior to the removal of existing sewer main. The Contractor shall design and provide all labor, materials, and equipment to install and operate a sewage bypass system that bypasses sewage flows around each sewer rehabilitation work area. Each bypass system shall extend the entire length of the section of pipeline rehabilitation and shall remain in operation until the sewer rehabilitation work is complete and accepted by the City. All bypass flows shall be discharged into a downstream sanitary sewer manhole. Bypass flows shall not be directed to ground surface receiving waters, storm drains, or wherever groundwater contamination is possible. The bypass system shall maintain flow to prevent wastewater backup into customer fixtures or discharge to the environment.

The design of the bypass system is the responsibility of the Contractor and shall be prepared and submitted to the City for review and approval. The Contractor shall have each bypass system in place and tested before bypassing any sewage. The Contractor shall notify the City 48 hours prior to shutting down or bypassing the pipeline to be rehabilitated. Equipment shall be equipped with a specially designed, acoustically-silenced enclosure intended for use in any application where pumping is required, and engine and other noise must be kept to a minimum. The sound levels shall be within the limits specified in the City of Flagstaff codes or 69dBA at 30 feet. The bypass pumping system shall be of adequate capacity and size to handle the required flows with redundancy to bypass if the largest temporary pump is out of service.

The Contractor shall consider the existing conditions and ground features when designing and installing the aboveground discharge pipe system. Access to driveways shall be maintained.

615.5.1.3 SYSTEM MONITORING
(revise to include the following)

The wastewater levels in the upstream and discharge manholes shall be continuously monitored for the first 24-hours of operation by an on-site representative of the Contractor. After the first 24-hours of monitoring, the City may allow the Contractor to perform monitoring only during daytime hours so long as the site is secured. The representative shall be Contractor staff and/or a subcontractor that has been directly responsible for the bypass pumping of sewage flows during completion of a similar pipeline rehabilitation project. The qualifications of the staff or subcontractor shall be submitted to the City for approval 10 business days prior to any bypass pumping work.

The City may also allow for the bypass pumping system to be removed at the end of construction each day and or week, provided the new sewer main in the sewer rehabilitation work area has been connected to the existing sewer main and sewage flow has been confirmed.

615.5.1.4 SYSTEM MAINTENANCE
(revise to include the following)

The Contractor shall provide qualified personnel on-site to maintain the bypass system for the entire time the bypass system is in operation, up to 24 hours per day 7 day per week. The Contractor shall maintain sufficient on-site equipment and materials to ensure continuous and successful operation of the bypass system. This includes a sufficient number of valves, tees, elbows, connections, tools, sewer plugs, piping, fuel, and other parts or system hardware to ensure immediate repair or modification of any part of the system as necessary.

All equipment shall be placed on a new plastic tarp, adequately sized and bermed to protect against fuel, oil, and hydraulic fluid spills. The Contractor is responsible to notify the City for immediate and proper cleanup should any spill occur, regardless of amount. The Contractor shall repair, without cost to the Owner, any damage that may result from its negligence, inadequate or improper mechanical or electrical failures.

615.5.1.5 MEASUREMENT AND PAYMENT
(revise to include the following)

Bypass pumping required to install the sewer system as shown on the plans while keeping the mains in service is considered incidental to the sewer items on the bid form with no additional compensation.

615.7 SANITARY SEWER SERVICE TAPS:
(revise to include the following)

The project includes replacement of all sewer services from the main to just past the property line where possible. This includes connection to the existing service just past the property line, unless in conflict with an existing tree or other private improvements, with a 2-way cleanout.

The service lines are shown perpendicular to the main unless a sewer cleanout was found with the field investigation. This may or may or may NOT represent the lines correctly.

The project area includes many inactive sewer connections to the existing mains. It is the contractors resposibility to verify that the existing services are active before making connections. Any active connections not shown on plans will be paid at the new sewer service bid price.

Quantities shown on the plans are the number of service connections. The size of the sewer service shall be per the table on the plans and the Contractor shall verify the size prior to construction.

Measurement and payment for new sewer service shall be per the contract unit prices and shall include all work, materials and labor for a complete and operational service installation per these standards. Measurement and payment for new sewer services also includes curb removal and replacement, sidewalk removal and replacement, and removal and replacement of private improvements such as driveways and/or landscaping, in kind, not specifically identified on the plans, as required for each sewer service construction. Curb removal and replacement shall be to the nearest joint. Sidewalk removal and replacement shall be to the nearest joint to the satisfaction of the City's Representative. Measurement and payment for new sewer services shall also include connection to the customer side service, and adjustment of the clean-out to finished grade.

615.16 MEASUREMENT AND PAYMENT
(revise to include the following)

(B) Sanitary Sewer Service Lines and Taps:
Payment shall be for the number of removals and improvements as indicated on the construction plans and shall be per the contract unit prices.
(C) Sanitary Sewer Cleanouts: No separate measurement and payment will be made for sewer cleanouts. Sewer cleanouts shall be included in the cost of the new sewer service.
(D) Sanitary Sewer services include removal and replacement of curb and gutter, sidewalk, driveway, private improvements, and landscaping where required for sewer service replacement.

SECTION 631 - WATER TAPS AND METER SERVICE CONNECTIONS

631.3.1 GENERAL:

(revise to include the following)

Water service lines shall be installed to replace the existing water service lines. Construction includes replacement of all water services to COF Engineering Standards, including the service saddle at the main, corporation stop, pipe, and curb stop to the meter and adjust the customer's service to the new outlet meter coupling elevation as needed. The lines shall be extended to the existing or proposed meter box location and a new meter box shall be installed and shall connect to the existing meter. If the existing meter is not at the City's standard depth, the contractor shall adjust the elevation of the meter. In cases where the meter box moves, the contractor shall salvage the existing meter and shift it to the proposed location. At each of these locations the contractor is required to connect to the existing water service on the private side of the meter. This shall also include adjusting, lowering and or relocating any existing customer side shut off valves. Contractor shall coordinate with each homeowner where private construction is required to verify the waterline routing and to restore landscaping to its original condition.

The service lines are shown perpendicular to the main this may or may NOT represent the lines correctly. The size of the tap, water service and meter shall be per the table on the plans.

Quantities shown on the plans are for the total number of service connections. The unit price includes everything to make a complete and functioning service connection per COF standards.

Measurement and payment for new water services includes water service taps, meter placement, and service connections and shall be per the contract unit prices and shall include all work materials and labor for a complete and operational service installation per these standards. Measurement and payment for new water services also includes curb removal and replacement, sidewalk removal and replacement, and removal and replacement of private improvements such as driveways or landscaping, in kind, not specifically identified on the plans, as required for water service construction. Measurement and payment for new water services also includes adjustment of meter boxes to finished grade. There will be no additional payment for work on the private side of the meter. Curb removal and replacement shall be to the nearest joint. Sidewalk removal and replacement shall be to the nearest joint. Where applicable, this bid item also includes existing asphalt sawcut removal, and disposal, T-Top trenching, temporary asphalt trench patching, ABC backfill and asphalt replacement.

PART 700 – MATERIALS

SECTION 710 - ASPHALT CONCRETE

710.2.1 Asphalt Binder:
(Revise as follows)

The asphalt binder specified by the City of Flagstaff for use on this project shall be PG 58-28.

AS-BUILT PLANS/RECORD DRAWINGS CHECKLIST

for

City of Flagstaff Public Improvements

December 12, 2019

General (applies to entire plan set)

_____ As-Builts/Record Drawings plan set shall contain all sheets from the approved design/construction plan set (cover sheet to last sheet including details). This includes Landscape Plan, Retaining Wall sheets and Resource Protection Plan (if applicable)

_____ As-Built survey data shall tie into the same horizontal and vertical control as that used for the approved construction plans

_____ All plan sheets shall have an Engineer seal per B.T.R. rules.

_____ Certification. All as-built plans shall contain a statement by a licensed professional engineer who is currently registered in the State of Arizona certifying the drawings to be as-built. All plans must also contain the seal and signature of said registered professional.

_____ All survey data given by the as-built plans shall be performed by a registered land surveyor who is currently registered in the State. Plans must show seal and signature of registrant

_____ Any easements or ROW recorded must include the instrument number

_____ If the As-Built Engineer is different from the Design Engineer, provide the As-Built Engineer contact info on cover sheet.

_____ Place "As-Built" or "Record Drawing" lettering and date in lower right hand corner of all sheets.

_____ Improvements deleted in the field shall be crossed out with an "x" and labeled "not built".

_____ Improvements changed from the approved design plans shall be reflected and clearly called out by "clouding".

_____ Plan sheets that represent improvements that were not changed from the approved design plans shall have "Per Plan" placed in the lower right hand corner.

Sanitary Sewer Plans

_____ Improvements built exactly per design plan shall have the elevations/stations noted within parenthesis and marked "AB".

_____ Stations for all manholes, cleanouts, services and lateral stub-outs.

____ Manhole pipe invert elevations (in and out) and manhole rim elevations shall be determined by field surveying.

_____ Pipe lengths indicated on both plan and profile.

_____ Recalculate longitudinal pipe slopes for all pipe segments. (All measurements to MH Centers)

_____ Stations and length of pipe encasements/extra protection.

_____ Anode locations, valves and tracer wire connection stations and cross ties to two permanent structures at least 30" high

Water Plans

_____ Stations of all water services including landscape and fire lines. At least two (2) horizontal cross-ties

_____ Stations of all fire hydrants.

_____ Stations of all valve boxes, blow-offs, and air release valves.

_____ Stations of all bends, tees, and bell restraints.

_____ Profile view of all pipeline vertical alignments, including stations of all fittings, depth to finish grade, and pipe separation dimensions.

_____ Stations and length of pipe encasements/extra protection.

_____ Horizontal cross ties to two permanent structures (fire hydrants, light poles & ID #, power poles & ID #, etc.) for all valve boxes.

_____ Anode locations, valves and tracer wire connection stations and cross ties to two permanent structures at least 30" high

Drainage Plans

_____ Inverts for storm sewer pipes at inlets and manholes shall be determined by field surveying.

_____ Recalculate longitudinal pipe slopes for all pipe segments.

Street/Trail Plans

_____ Stations of all survey monuments – existing and new

_____ Sleeve/conduit/casing types, sizes, locations and stations.

_____ Provide spot elevations at intersections as well as pavement and curb every 500 ft.

Street Lights and Traffic Signal Plans

_____ Stations for all street illumination lights.

_____ Locations of all traffic signal poles, cabinets, J-boxes and related conduits.

_____ Abandonment of existing conduits and facilities.

_____ Location of signage related to traffic signal.

Miscellaneous

_____ Major unexpected dry utility crossings of water and sewer mains

_____ Unforeseen underground structures exposed during water and sewer main construction such as vaults

_____ Major constructed dry utilities

____ ADA compliance within the ROW, spot elevations, cross and longitudinal slopes

SPEEDIE AND ASSOCIATES
Geotechnical • Environmental • Materials Engineers

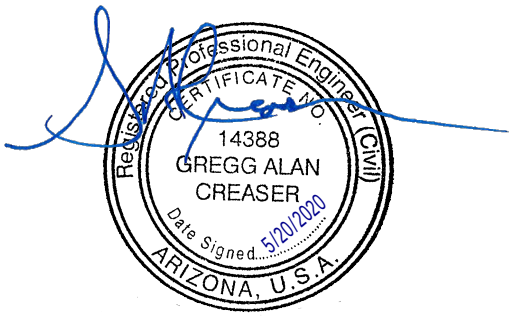
www.speedie.net

Report on Geotechnical Investigation

Designation:	**Coconino Estates Phase II**
Location:	**Coconino Estates**
Client:	**The WLB Group, Inc.**
Project Number:	**192658SF**
Revised Date:	**May 20, 2020**

3331 East Wood Street ■ Phoenix, AZ 85040 ■ Phone (602) 997-6391 ■ Fax (602) 943-5508
2026 North 3rd Street ■ Flagstaff, AZ 86004 ■ Phone (928) 526-6681 ■ Fax (928) 526-6685
3125 East 47th Street ■ Tucson, AZ 85713 ■ Phone (520) 514-9411 ■ Fax (520) 514-9474

TABLE OF CONTENTS



1.0 INTRODUCTION

1.1 PROJECT INFORMATION

This report presents the results of a subsoil investigation carried out within the Coconino Estates subdivision located in Flagstaff, Arizona.

At this time, it is our understanding that construction will consist improvements made to utilities and pavement on Crescent Drive, Navajo Drive, Elizabeth Lane, Talkington Drive, Louise Way, Thelma Way, and Hazel Way. The purpose of this investigation is to evaluate the suitability of existing pavements and subsoils located throughout the site for use in roadway and utility improvements. Information was obtained regarding these items, in addition to recommendations for pavement improvement and maintenance. No traffic data was provided at the time of this report.

1.2 FIELD AND LABORATORY INVESTIGATION

On February 25, 2020, 13 pavement soil borings were drilled at the approximate locations shown on the attached Soil Boring Location Plan. All exploration work was carried out under the full-time supervision of our staff engineer who recorded subsurface conditions and obtained samples for laboratory testing. The borings were excavated with a CME-75 truck mounted drill rig utilizing 7-inch diameter hollow stem augers. Detailed information regarding the soil borings and samples obtained can be found on an individual Log of Test Boring prepared for each location.

Laboratory testing consisted of grain-size distribution and plasticity (Atterberg Limits)> tests for classification and pavement design parameters. Sulfate, pH, resistivity and chloride testing was also performed to determine the corrosive properties of the soil with regards to attack on buried metal and concrete structures. All field and laboratory data are presented in this appendix.

2.0 SITE CONDITIONS

2.1 PROPERTY DESCRIPTION

The proposed improvement area includes Crescent Drive, Navajo Drive, Elizabeth Lane, Talkington Drive, Louise Way, Thelma Way, and Hazel Way. These roadways primarily serve as access to residences located throughout the Coconino Estates subdivision. Traffic typically consists of residential vehicle traffic, however the roadway is also subject to occasional commercial construction traffic, delivery traffic, and bus traffic. Numerous underground utilities were present including gas, sewer, water, and coaxial. Drainage within the neighborhood is generally to the south.

2.2 SUBSURFACE CONDITIONS

2.2.1 Field Results

Subsurface conditions are variable with silty clayey sand, sandy silt, sandy silty clay, and sandy lean clay being present in the upper soils. Bedrock was not encountered to the depths investigated of 11.5 feet. In-situ moisture contents varied from moist to wet states, typically being above the plastic limit. Standard Penetration Resistance Tests (SPT) values of the upper soils range from 2 to 12 blows per foot (bpf). Higher blow counts on the order of 4-19 bpf were encountered in deeper soils. No groundwater was encountered at the time of our investigation, however soft, wet soils were encountered at all boring locations and shallow perched water is not uncommon in Coconino Estates. Due to the proximity of this area to the Rio de Flag drainage and the high saturation of subsurface soils, shallow perched water may be encountered in deeper excavations. Laboratory testing indicates liquid limits in the range of 22 to 30 percent with plasticity indices ranging from 2 to 10 percent.

2.2.2 Pavement Conditions

Existing asphalt sections varied but typically ranged from 3.75-6.0 inches of asphalt on top of 3.5-18.0 inches of aggregate base. The majority of aggregate base encountered was cinder based. No records were available regarding maintenance that has been performed on the pavement following initial construction. With the exception of North Talkington Drive, pavement throughout the site is generally in poor condition. The pavement within North Talkington Drive, West Hazel Way, and West Davis Way look to have had maintenance performed more recently than other neighborhood roadways, however it should be noted that these roadways are experiencing reflective alligator and block cracking of varying severity. North Navajo Drive as well as North Crescent Drive are in poor condition, with severe alligator cracking (subgrade failure), and block cracking throughout the roadways. Block cracks up to ¾ inch in width were visible on Crescent and Navajo Drive. Detailed information regarding existing asphalt thickness, aggregate base thickness, and pavement conditions can be found in the Appendix.

2.2.2.1 Existing Pavement Thicknesses

Area	Boring	Asphalt Thickness	Aggregate Base Thickness
N. Crescent Dr.	B-1	4.5”	8.0”
N. Louise Dr.	B-2	4.9”	7.0”
N. Talkington Dr.	B-3	5.5”	7.0”
W. Davis Way	B-4	6.0”	6.5”
N. Talkington Dr.	B-5	4.5”	8.0”
W. Hazel Way	B-6	6.5”	5.0”
N. Navajo Dr.	B-7	5.4”	7.0”
N. Navajo Dr.	B-8	5.5”	18.0”
N. Talkington Dr.	B-9	4.0”	6.5”
N. Crescent Dr.	B-10	6.0”	5.0”
N. Crescent Dr.	B-11	4.5”	7.0”
N. Crescent Dr.	B-12	4.0”	7.0”
N. Crescent Dr.	B-13	3.8”	3.5”

Notes:
1. Aggregate base encountered as a part of this investigation at borings B-1 through B-13 consist of cinder based aggregate.

3.0 ANALYSIS

Analysis of the field and laboratory data indicate that pavement and subgrade conditions require full depth reconstruction of the roadways. While the asphalt encountered is generally thick enough to allow for a mill and overlay, the age and overall condition of the asphalt present difficulties. Pavement maintenance records were unknown at the time of this report, however asphalt cores indicate that several overlays have been performed throughout the life of the pavement. In addition to this, cinder based aggregate base was encountered at the majority of boring locations. Cinder based materials are no longer accepted by the City of Flagstaff beneath roadways due to low durability and resistance to abrasion. In light of this and the age of the pavement, which is assumed to be greater than 40 years, full reconstruction of the roadways is recommended.

The subgrade soils in this area are very soft and highly saturated, which will make constructability of a new roadway surface a challenge. **Successful performance of the new pavement will be dependent on a stable subgrade prior to placing a new roadway section.** Anytime existing subgrade that has been covered with asphalt is opened up, it is not uncommon to find soft or loose, wet subgrade that will not stabilize or achieve the compaction required. Laboratory and field testing indicate that the majority of the upper soils are moist to wet and soft/loosely consolidated. As noted, blow counts as low

as **2** blows per foot (bpf) were encountered in the native soils just below the existing aggregate base. Based on the field and laboratory data, subgrade stabilization **will be required**. It is possible that stabilization may be required for the entire length of the project.

Subgrade stabilization is often a "trial and error" process. Stabilization options typically used include; allowing time to dry out, removal and replacement with additional subbase (usually 2 to 3 feet of stockpiled asphalt millings is sufficient), cement treating (MAG Section 311), lime stabilization (MAG Section 309) or the use of one or more layers of geogrid such as Tensar BX1200 or equivalent Type 2 polypropylene welded grid meeting MAG Section 796.2.4 with additional layers of aggregate base, just to mention a few. Due to the number of means and methods available, and associated costs, there is typically no specific method that may work best for any given project. It is recommended to include a (time and materials) budget line for the additional geogrid and aggregate base. Other stabilization methods should be presented by the contractor as a VE option, and should be approved by the city engineer. It is our opinion that stabilization with geogrid and aggregate base is the preferred stabilization method for this project given the soil conditions, anticipated time constraints, traffic sequencing and other items related to this project. It is recommended that a test section be performed for any stabilization methods used to demonstrate that the method chosen will stabilize the subgrade to the satisfaction of the city engineer.

With clayey/silty soils as subgrade beneath pavements, there is potential for the underlying finer grained soils to migrate into the aggregate base over time. This potential is increased in areas of wet unstable subgrade and decreases the strength and stability of the aggregate base. If geogrid is used for subgrade stabilization purposes, consideration should also be given to utilizing a geotextile non-woven filter fabric at the interface of the aggregate base and the subgrade to attempt to limit this migration. If utilized, the filter fabric should be placed below the geogrid (not above) so that it does not interfere with the interlock of the aggregate with the geogrid.

Section 4.3 presents various structural sections with associated capacities for consideration depending on anticipated traffic volumes. Pavement sections are provided for new asphalt and aggregate base assuming that the subgrade is stable. It may be more feasible to stabilize the entire roadway rather than piecemealing multiple areas. For entire roadway sections utilizing geogrid as the stabilization method, pavement sections are provided based on full depth asphalt on a mechanically stabilized layer (MSL) consisting of 12 inches aggregate base placed on Type 2 geogrid indicated above. If stabilization of the entire roadway is not necessary, stabilization with geogrid can still be performed in isolated areas, but will require the 12 inch MSL indicated above in addition to the aggregate base used as part of the pavement structural section. Full depth asphalt sections can be placed directly on the 12" MSL. **ALL** stabilized subgrade and the MSL should be proof-rolled to demonstrate that the subgrade is acceptable for placement of either aggregate base or asphalt. It is assumed the project will involve reconstruction of various concrete elements adjacent to the roadway including curbs, gutters, and sidewalks. These items and their elevations should be considered during the redesign of the new roadway.

4.0 RECOMMENDATIONS

4.1 EARTHWORK

4.1.1 Site Preparation

The area for new pavement reconstruction will require the complete removal of the existing asphalt surface to be replaced with a new structural section of asphalt surface. Replacement of underground utilities should be performed prior to removal of the existing asphalt pavement. Following removal of the asphalt, subgrade soils should be removed to allow for the new structural section of asphalt and aggregate base. Site preparation will be somewhat dependent upon stabilization methods. Scarification and re-compaction of the subgrade should be performed when possible. Site preparation performed for other stabilization methods should be presented by the contractor following locally accepted engineering practices and approved by the geotechnical and/or city engineer.

Traditional scarification and re-compaction of the subgrade soil is not necessary with the use of geogrid. However, there are some fine points of installation that can be critical to a successful result. While there are many geotextile products available, it is our experience that some provide better results than others when stabilization of soft subgrade soils are concerned. If a geogrid stabilization option is selected, the use of Tensar Geogrid BX1200, or equivalent polypropylene welded grid meeting 2014 MAG Section 796 Type 2 or ADOT 2008 Standard Specification 1014-3 is recommended. The use of geogrid for subgrade stabilization is not meant to increase the allowable ESAL's for pavement design for this project. The geogrid should be placed according to manufacturer's recommendations, with appropriate overlaps along their sides and ends. With the installation of geogrid for stabilization, a minimum of 12.0 inches of aggregate subbase course is recommended on top of the geogrid. Depending upon the severity of the instability, additional geogrid and thickness of ABC may be required. A small test section will help determine if additional geogrid and aggregate base will be necessary. As noted above, with clayey/silty soils as subgrade beneath pavements, there is potential for migration of the underlying finer grained soils to migrate into the aggregate base over time. This potential is increased in areas of wet unstable subgrade and decreases the strength and stability of the aggregate base. With the use of geogrid for subgrade stabilization purposes, consideration should also be given to utilizing a geotextile non-woven filter fabric at the interface of the aggregate base and the subgrade to attempt to limit this migration. If utilized, the filter fabric should be placed below the geogrid (not above) so that it does not interfere with the interlock of the aggregate with the geogrid.

The ABC should be moisture conditioned to optimum moisture content, ±2 percent prior to its placement on the geogrid**. It is critical that the ABC is <u>not</u> moisture-conditioned in place, as any excess moisture may contribute to the instability of the underlying subgrade and further decrease the stability of the clayey subgrade soils.** The aggregate base course material should be placed in a single 12 inch lift and compacted to 95 percent of its maximum dry density, as determined by ASTM D698. Note that this is less than the 100 percent required by MAG Standard Specifications. The extra

energy needed to reach 100 percent will increase the potential for pumping subgrade. **The first 12-inch lift should be placed full thickness prior to operating equipment over the geogrid.** Native soil should not be used as fill above the geogrid. **It is critical to provide and maintain positive drainage within the ABC material in order to minimize the potential for moisture infiltration and subsequent saturation of the underlying subgrade soils.** Milled asphaltic concrete may be used as the stabilizing aggregate base provided it meets pavement base course requirements per M.A.G. Section 702. Selective stockpiling of asphalt millings may be necessary for material to meet aggregate base specifications.

If other stabilization methods are performed as a VE option, prior to placement of aggregate base, the subgrade should be proof rolled with a heavy rubber tired vehicle such as a loaded water truck to locate unstable areas per MAG 301. Unstable areas identified during proof rolling will need to be re-stabilized prior to placement fill or aggregate base.

4.1.2 Fill and Backfill

Native soils, and milled asphalt are suitable for use in roadway subgrade and utility trench backfill, above the bedding zone. It should be noted that although the native soils may be suitable for reuse as fill material, it may not be suitable at the moisture contents present at the time of excavation. Native soils used for fill will be highly sensitive to changes in moisture content. Accordingly, care should be taken to ensure stability of subgrades once fill has been placed. Oversized material (> 3 inches) should be removed or reduced in size. Imported fill, if required, should be the same or better quality as the existing subgrade. In general, it shall meet the following requirements:

4.1.2.1 Fill Specification

Specification	Below Concrete Slabs	Below Roadways
Passing 3”/75mm	100%	100%
Passing #200/0.075mm	≤60%	≤60%
Liquid Limit	<30%	<30%
Plasticity Index	<10%	<10%
Swell[1]	<1.5	N/A

Notes:
1. Swell potential when compacted to 95 percent of maximum dry density (ASTM D-698) at a moisture content of 2 percent below optimum, confined under a 100 psf surcharge, and inundated.

Although “clean” cinders often times meet our fill specifications for placement of common fill, they may pose difficulties during construction. Due to their granular nature and lack of sufficient fines, “clean” cinders are a free draining material. As a result, they may be difficult to properly moisture condition and water may infiltrate the cinders and saturate the underlying soils. This could result in an unstable support for pavement. Excess water, as a result of moisture conditioning, is often observed at the interface between the fill and underlying less permeable material. Free water and loose

saturated soils would need to be removed prior to placement of concrete or asphalt paving. "Clean" cinders also pose difficulties in trenching operations due to the inability to excavate neat trenches. With the lack of fines and cohesive soils, the clean cinders generally slough and vertical walls are hard to maintain. If a cinder based product is used for import fill above foundation bottom elevation, consideration should be given to a "dirty" cinder product that meets the fill criteria for placement beneath foundations.

Imported common fill for use in site grading should be examined by a Soils Engineer to ensure that it is of low swell potential and free of organic or otherwise deleterious material. Fill should be placed on subgrade which has been properly prepared and approved by a Soils Engineer. Fill must be wetted and thoroughly mixed to achieve optimum moisture content, ±2 percent. Granular fill (ASTM Classification GW, GP, SW, SP) can be placed on the dry side of optimum at the discretion of the geotechnical engineer on record. Due to the clayey and silty nature of the native soils, there is potential for the native material to become unstable at the recommended moisture contents. Accordingly, it may be necessary to compact native fill soils on the dry side of optimum. The reduced moisture content under pavements should only be used upon approval of the engineer in the field.

Fill should be placed in horizontal lifts of 8-inch thickness (or as dictated by compaction equipment) and compacted to the percent of maximum dry density per ASTM D-698 as set forth below. Frozen material shall not be placed, nor shall fill be placed upon frozen grade.

4.1.2.2 Compaction Specifications	
Pavement Subgrade/Fill	
Native/Import Fill	95%
Utility Trench Backfill	
> 2.0' Below Finish Subgrade	95%
Within 2.0' of Finish Subgrade (non-granular)	95%
Within 2.0' of Finish Subgrade (granular)	100%
Aggregate Base Course	
Placed Directly Above Geogrid	95%
Below Asphalt Paving	100%
Landscaped Areas	
Miscellaneous fill	90%
Utility Trench - > 1.0' Below Finished Grade	85%
Utility Trench - < 1.0' Below Finished Grade	90%

4.2 UTILITY INSTALLATION

In general, trench excavations for utilities can be accomplished by conventional trenching equipment. While shallow bedrock was not encountered during this investigation, it should be noted that shallow basalt has been encountered at depths of 3 and 9 feet in southern portions of the neighborhood as a part of previous investigations. It is possible to encounter shallow basalt boulders and cobbles in

isolated areas throughout the site that may impede deeper excavations if encountered. Due to the clayey/silty nature of the soils encountered it is anticipated that trench walls will not stand vertically for the short period of time required to install utilities. Trench walls may experience some premature sloughing due to the relatively low density and moist to wet condition. If trenches are greater than shoulder-height, precautions must be taken to protect workmen. All trenches should be in accordance with OSHA Excavation Standard 1926 Subpart P.

Pipe bedding and shading should be per M.A.G. Specification Section 601.4 (and any City of Flagstaff/Coconino County modifications). Backfill of trenches above bedding zones may be carried out with native excavated material provided material greater than 8 inches is broken down or removed. Material used for backfill of trenches should be moisture-conditioned, placed in 8 inch lifts and mechanically compacted. Water settling is not recommended. Compaction requirements are summarized in Section 4.1.3 Fill and Backfill of this report.

4.3 PAVEMENT

It must be noted that all new asphalt pavements will eventually crack. Cracking in asphalt pavement is typical and should be expected over the life of the pavement. In fact, it has been our experience of late that the new asphalt binders that are available, we are seeing the onset or earlier aging and block shrinkage cracking. These require routine maintenance to prevent accelerated deterioration. Accordingly, it is highly recommended to establish a maintenance program where the cracks are routinely filled as they appear beginning at about the second year of life. It is also recommended that surface fog seal coats be considered beginning at about year 5 and every 5 years after. This will help preserve the pavements, extending the service life.

If earthwork in paved areas is carried out to finish subgrade elevation as set forth herein (including subgrade stabilization), the subgrade will provide adequate support for pavements. The section capacity is reported as daily ESALs, Equivalent 18 kip Single Axle Loads. Typical heavy trucks impart 1.0 to 2.5 ESALs per truck depending on load. It takes approximately 1200 passenger cars to impart 1 ESAL. Multiple structural sections are presented based on subgrade stabilization with geogrid or stabilization of native soils. Option E, F, G and H provide full depth asphalt sections if the entire roadway is stabilized with geogrid. The designer/owner should choose the appropriate sections to meet the anticipated traffic volume and life expectancy.

4.3.1 Pavement Sections

Option	AC Pavement (Flexible) Thickness			
	AC	AB	Mechanically Stabilized Layer	Daily/Total 18-kip ESALs
A[2]	3.0"	6.0"	NA	11/79,200
B[3]	4.0”	6.0”	NA	46/338,650
C	3.0”	8.0”	NA	22/162,500
D	4.0”	8.0”	NA	84/614,500
E[5]	4.5”	0.0”	12” MSL	11/79,180
F[4,5]	6.0”	0.0”	12” MSL	63/459,000
G[5]	6.5”	0.0”	12” MSL	104/759,050
H[5]	7.0”	0.0”	12” MSL	166/1,214,000

Notes:

1. Designs are based on AASHTO design equations and ADOT correlated R-Values.

2. Represents minimum City of Flagstaff structural section for local residential street classification.

3. Represents minimum City of Flagstaff structural section for minor collector street classification.

4. This option provides equivalent structural capacities to City of Flagstaff minimum requirements for minor collector street classification.

5. For all options requiring MSL, subgrade stabilization must consist of a **minimum** of 12” aggregate base on Tensar Geogrid BX1200, or equivalent Type 2 polypropylene welded grid meeting MAG Section 796.2.4. Note that subgrade stabilization may require additional grid and aggregate base as necessary to provide a stabilized subgrade. Aggregate base used for stabilization may consist of 100% asphalt millings of similar gradation requirements for City of Flagstaff aggregate base. For structural sections requiring aggregate base, subgrade stabilization method is to be determined by the contractor and approved by the engineer of record. Aggregate base (AB) course for the proposed pavement structural section may include milled asphaltic concrete (AC) provided ≤50% milled AC by weight is blended with ≥50% or more new crushed AB by weight.

Pavement Design Parameters:

Assume:	One 18 kip Equivalent Single Axle Load (ESAL)/Truck
Life:	20 years

Subgrade Soil Profile:

Average % Passing #200 sieve:	53%
Plasticity Index:	6%
R value:	39.1 (per ADOT tables)
M_R:	11,200 (per AASHTO design)

These pavement sections assume that all subgrades are prepared in accordance with the recommendations contained in the "Site Preparation" and "Fill and Backfill" sections of this report, and paving operations carried out in a proper manner. If pavement subgrade preparation is not carried out immediately prior to paving, the entire area should be proof-rolled at that time with a heavy pneumatic-tired roller to identify locally unstable areas for repair. Site drainage should be designed to ensure positive drainage of the base and sub base materials. Improper grading of sub base materials will drastically reduce the overall life of the pavement.

Pavement base course material should be aggregate base per M.A.G. Section 702 Specifications. Asphalt concrete materials and mix design should conform to M.A.G. 710 (and any City of Flagstaff/Coconino County modifications) using the Marshall mix design criteria and PG 58-28 for the asphalt grade. Reducing the air void content to 3 percent will aid in reducing thermal cracking typical in the area. It is recommended that a 12.5mm or 19.0mm mix designation be used for the pavements. While a 19.0mm mix may have a somewhat rougher texture, it offers more stability and resistance to scuffing, particularly in truck turning areas. Pavement installation should be carried out under applicable portions of M.A.G. Section 321 and municipality standards. The asphalt supplier should be informed of the pavement use and required to provide a mix that will provide stability and be aesthetically acceptable. Some of the newer M.A.G. mixes are very coarse and could cause placing and finish problems. A mix design should be submitted for review to determine if it will be acceptable for the intended use.

For sidewalks and driveways that experience light vehicle traffic, a minimum section of 5.0 inches of PCCP should be used. Heavy duty areas should use at least 9 inches of PCCP. Portland Cement Concrete Pavement must have a minimum 28-day flexural strength 550 psi (compressive strength of approximately 3,700 psi). It may be cast directly on the prepared subgrade with proper compaction (reduced) and the elevated moisture content as recommended in the report. Lacking an aggregate base course, attention must be paid to using low slump concrete and proper curing, especially on the thinner sections. No reinforcing is necessary. Joint design and spacing should be in accordance with ACI recommendations. Construction joints should contain dowels or be tongue and grooved to provide load transfer. Tie bars are recommended on the joints adjacent to unsupported edges. Maximum joint spacing in feet should not exceed 2 to 3 times the thickness in inches. Joint sealing with a quality silicone sealer is recommended to prevent water from entering the subgrade allowing pumping and loss of support.

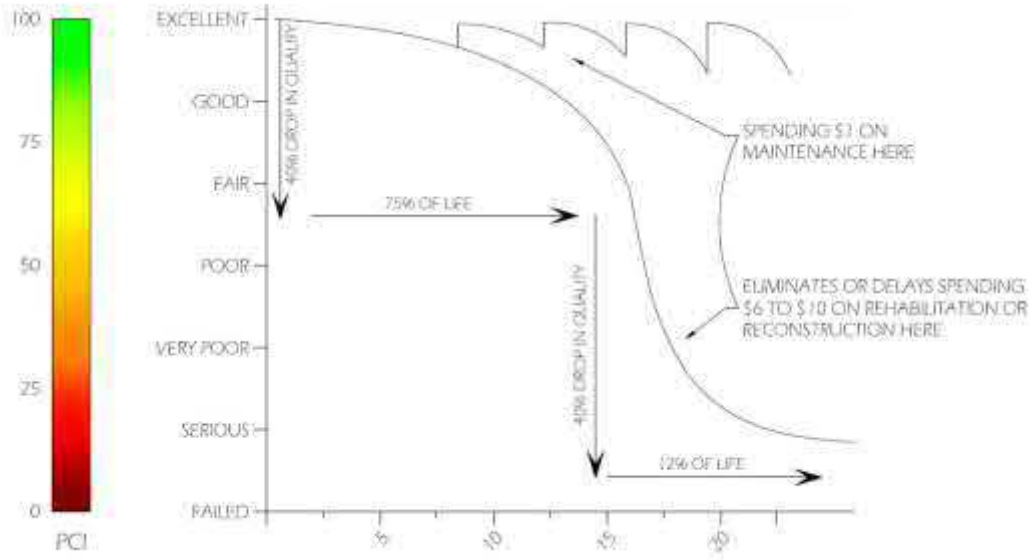
Proper subgrade preparation and joint sealing will reduce (but not eliminate) the potential for slab movements (thus cracking) on the expansive native soils. Frequent jointing will reduce uncontrolled cracking and increase the efficiency of aggregate interlock joint transfer.

4.4 PAVEMENT MAINTENANCE

In order to achieve an extended life in the pavement it is highly recommended that a maintenance plan be constructed to address the aging process of the pavement. It has been well documented that proper pavement maintenance will prolong the life of the pavement at a lower cost than letting the pavement age with no maintenance. Figure 3.6.1 shows through the Pavement Condition Index (PCI), a typical visual condition scale ranging from 0 (failed) to 100 (new), how spending money on pavement preservation at the correct time will be a significantly more cost effective means for extending the life of the pavement. As long as the pavement remains in a fair to excellent state, the cost of pavement preservation is relatively small. However, as the pavement deteriorates, the pavement life becomes significantly shorter and there is a change from preservation to rehabilitation, and reconstruction.

A well-formed maintenance plan should include budgeting for crack sealing on an annual basis beginning the 2nd or 3rd year, and resealing every 4 to 5 years after. Budget estimates should assume that approximately 25 percent of the pavement areas will need isolated crack sealing every year. It is also recommended that surface fog seal coats be considered about year 5 and every 5 years after. This will help preserve the pavement surface as well as minimize the effects from moisture infiltration. Depending on the progression of the aging, more costly surface treatments such as thin overlays or slurry seals should be anticipated at the 15 to 20 year point of the pavements life.

Figure 4.4.1 - Life Cycle Cost Analysis



It is recommended that an initial PCI (Pavement Condition Index) survey be completed on all new pavements at around 4 years old, at which time the pavement should start showing signs of aging. The pavement condition survey will allow for better prediction modeling, permit planning of maintenance and operations, and maximize the life of the roadway. PCI surveys should be conducted every 3 to 5 years to determine progression of aging. A 10 year maintenance plan can be created with each one of these surveys to help for budgeting over a 10 year period.

4.5 CORROSION PROTECTION

Laboratory testing of the native soil indicated a pH of 5.94 and minimum resistivity values of 2618 Ohm-Centimeters. Chloride concentrations are on the order of 88 ppm, and sulfate concentrations on the order of 6 ppm. These results indicate moderate corrosive conditions for buried metal in direct contact with native soils, and negligible corrosive conditions for buried concrete structures. Subsurface concrete should use Type I or II cement, which is readily available and used in the area.

5.0 CONCLUSION

The scope of this investigation and report includes only regional published considerations for seismic activity and ground fissures resulting from subsidence due to groundwater withdrawal, not any site specific studies. The scope does not include any considerations of hazardous releases or toxic contamination of any type.

Our analysis of data and the recommendations presented herein are based on the assumption that soil conditions do not vary significantly from those found at specific sample locations. Our work has been performed in accordance with generally accepted engineering principles and practice; this warranty is in lieu of all other warranties expressed or implied.

We recommend that a representative of the Geotechnical Engineer observe and test the earthwork portions of this project to ensure compliance to project specifications and the field applicability of subsurface conditions which are the basis of the recommendations presented in this report. If any significant changes are made in the scope of work or type of construction that was assumed in this report, we must review such revised conditions to confirm our findings if the conclusions and recommendations presented herein are to apply.

Respectfully submitted,

SPEEDIE & ASSOCIATES, INC.

Garrett J. Chott, E.I.T.

Registered Geologist
CERTIFICATE NO
50535
CLAY WARD
SPENCER
Date Signed 5/20/2020
ARIZONA U.S.A.

Clay W. Spencer, R.G.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
14388
GREGG ALAN
CREASER
Date Signed 5/20/2020
ARIZONA, U.S.A.

Gregg A. Creaser, P.E.

APPENDIX

SOIL BORING LOCATION PLAN

SOIL LEGEND

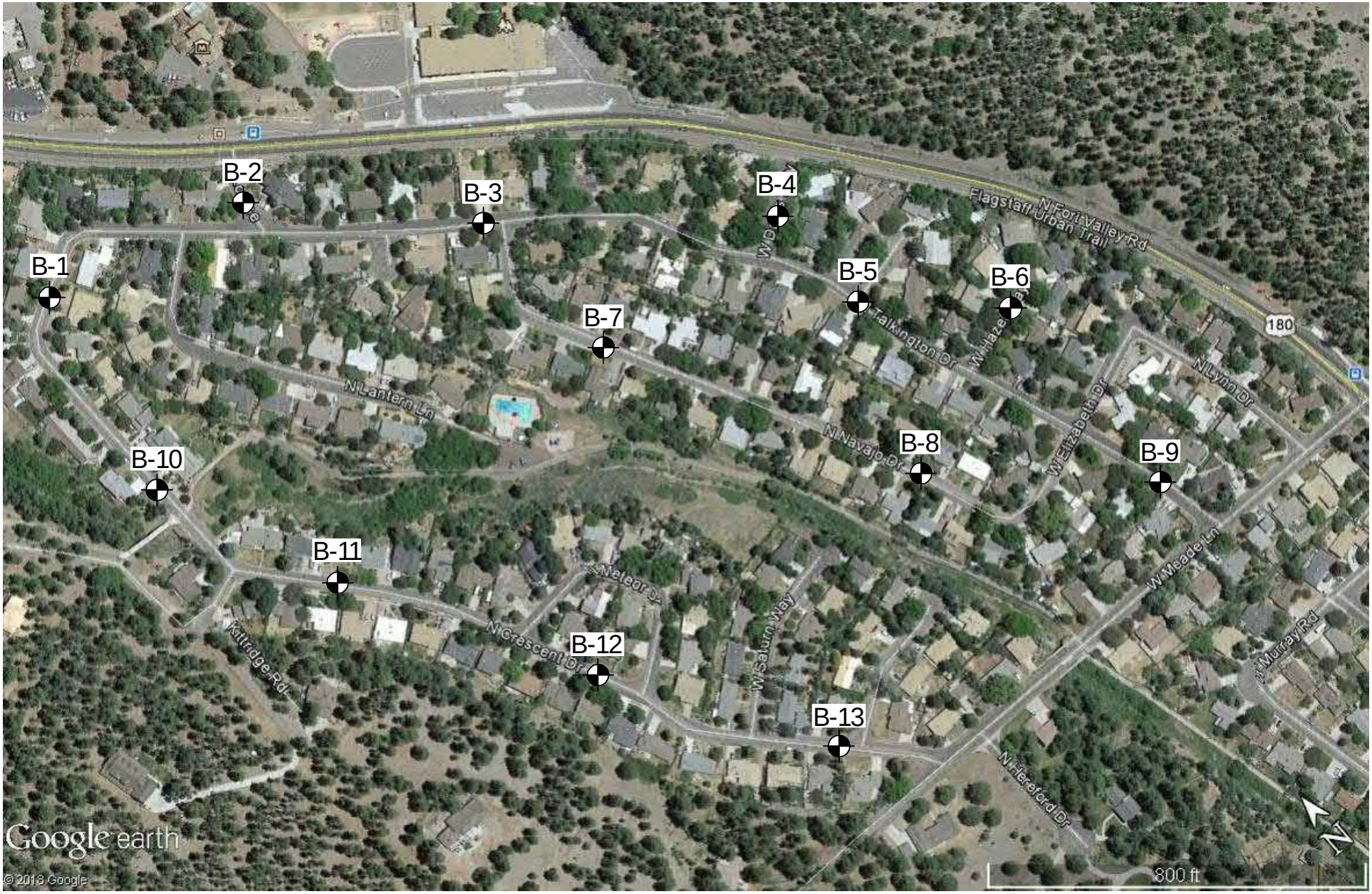
LOG OF TEST BORINGS

TABULATION OF TEST DATA

CORROSIVE TEST DATA

CORE PHOTOGRAPHS

SITE PHOTOGRAPHS



- APPROXIMATE SOIL BORING LOCATIONS

Satellite Imagery Courtesy of Google Earth

SOIL BORING LOCATION PLAN

DR:RMT	CHK:CWS	REV:	DATE: 12-4-19	PROJECT NO. 192658SF

Coconino Estates Phase II
Crescent Drive, N. Navajo Drive, Talkington Drive, Louise Way, Davis Way, Thelma Way, and Hazel Way
Flagstaff, Arizona

SPEEDIE AND ASSOCIATES
GEOTECHNICAL/ENVIRONMENTAL/MATERIALS ENGINEERS
2026 N. THIRD STREET FLAGSTAFF, ARIZONA 86004

TMPLT_2000.CAD 10/23/00

SOIL LEGEND

SAMPLE DESIGNATION		DESCRIPTION	
	AS	**Auger Sample**	A grab sample taken directly from auger flights.
	BS	**Large Bulk Sample**	A grab sample taken from auger spoils or from bucket of backhoe.
	S	**Spoon Sample**	Standard Penetration Test (ASTM D-1586) Driving a 2.0 inch outside diameter split spoon sampler into undisturbed soil for three successive 6-inch increments by means of a 140 lb. weight free falling through a distance of 30 inches. The cumulative number of blows for the final 12 inches of penetration is the Standard Penetration Resistance.
	RS	**Ring Sample**	Driving a 3.0 inch outside diameter spoon equipped with a series of 2.42-inch inside diameter, 1-inch long brass rings, into undisturbed soil for one 12-inch increment by the same means of the Spoon Sample. The blows required for the 12 inches of penetration are recorded.
	LS	**Liner Sample**	Standard Penetration Test driving a 2.0-inch outside diameter split spoon equipped with two 3-inch long, 3/8-inch inside diameter brass liners, separated by a 1-inch long spacer, into undisturbed soil by the same means of the Spoon Sample.
	ST	**Shelby Tube**	A 3.0-inch outside diameter thin-walled tube continuously pushed into the undisturbed soil by a rapid motion, without impact or twisting (ASTM D-1587).
	--	**Continuous Penetration Resistance**	Driving a 2.0-inch outside diameter "Bullnose Penetrometer" continuously into undisturbed soil by the same means of the spoon sample. The blows for each successive 12-inch increment are recorded.

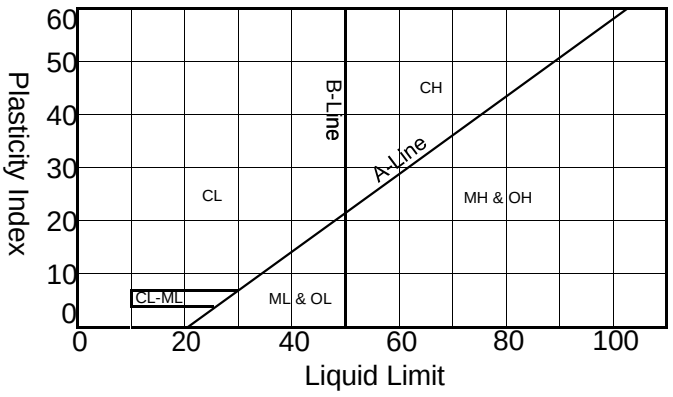
CONSISTENCY			RELATIVE DENSITY	
Clays & Silts	Blows/Foot	Strength (tons/sq ft)	Sands & Gravels	Blows/Foot
Very Soft	0 - 2	0 - 0.25	Very Loose	0 - 4
Soft	2 - 4	0.25 - 0.5	Loose	5 - 10
Firm	5 - 8	0.5 - 1.0	Medium Dense	11 - 30
Stiff	9 - 15	1 - 2	Dense	31 - 50
Very Stiff	16 - 30	2 - 4	Very Dense	> 50
Hard	> 30	> 4		

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL OR MODIFIED SYMBOLS MAY BE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS OR TO PROVIDE A BETTER GRAPHICAL PRESENTATION OF THE SOIL

MATERIAL SIZE	PARTICLE SIZE			
	Lower Limit		Upper Limit	
	mm	Sieve Size ◆	mm	Sieve Size ◆
SANDS				
Fine	0.075	#200	0.42	#40
Medium	0.420	#40	2.00	#10
Coarse	2.000	#10	4.75	#4
GRAVELS				
Fine	4.75	#4	19	0.75" ×
Coarse	19	0.75" ×	75	3" ×
COBBLES	75	3" ×	300	12" ×
BOULDERS	300	12" ×	900	36" ×

◆U.S. Standard ×Clear Square Openings



Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	4.5 INCHES ASPHALT ON 8 INCHES AGGREGATE BASE					
1.0	Loose Dark Brown SILTY CLAYEY SAND (SC/SM-Moist) with Little Gravel	S-1	4.0	NT	NT	
5		AS-2	5.0	NT	NT	
6.0	Soft Dark Brown SANDY SILTY CLAY (CL-Moist) with Trace Gravel	S-3	6.5	NT	NT	
10	Very Stiff from 10.0'-11.5'					
11.5	End of Boring	S-4	11.5	NT	NT	

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B- 1**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	4.9 INCHES ASPHALT ON 7 INCHES AGGREGATE BASE					
1.0	Soft Dark Brown SANDY SILTY CLAY (CL-Moist to Wet) with Trace Gracel	S-2	4.0	NT	NT	
5	Wet from 6.0'-11.5'	S-3	6.5	NT	NT	
		BS-1	7.0	NT	NT	
10	Firm from 10.0'-11.5'					
11.5	End of Boring	S-4	11.5	NT	NT	

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B- 2**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	5.5 INCHES ASPHALT ON 7 INCHES AGGREGATE BASE					
1.0	Soft Dark Brown SANDY SILTY CLAY (CL-Moist) with Trace Gravel	S-2	4.0	NT	NT	
		AS-1	5.0	NT	NT	
5		S-3	6.5	NT	NT	
	Wet from 7.0'-11.5'					
10	Firm from 10.0'-11.5'					
11.5	End of Boring	S-4	11.5	NT	NT	

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B- 3**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	6.0 INCHES ASPHALT ON 6.5 INCHES AGGREGATE BASE					
1.0	Soft Dark Brown SANDY SILTY CLAY (CL-Moist to Wet) with Trace Gravel	S-2	4.0	NT	NT	
		AS-1	5.0	NT	NT	
5		S-3	6.5	NT	NT	
10	Firm from 10.0'-11.5'					
11.5	End of Boring	S-4	11.5	NT	NT	

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B- 4**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	4.5 INCHES ASPHALT ON 8 INCHES AGGREGATE BASE					
1.0	Loose Dark Brown SILTY CLAYEY SAND (SC/SM-Moist) with Little Gravel	S-2	4.0	NT	NT	
5	Very Loose from 5.0'-6.5'	AS-1	5.0	NT	NT	
5.0		S-3	6.5	NT	NT	
	End of Boring					
10						

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B- 5**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	6.5 INCHES ASPHALT ON 5 INCHES AGGREGATE BASE					
1.0	Medium Dense Dark Brown SILTY CLAYEY SAND (SC/SM-Moist) with Little Gravel	S-1	4.0	NT	NT	
		AS-2	5.0	NT	NT	
5	Loose from 5.0'-10.0'	S-3	6.5	NT	NT	
10						
11.5	End of Boring	S-4	11.5	NT	NT	

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B- 6**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	5.4 INCHES ASPHALT ON 7 INCHES AGGREGATE BASE					
1.0	Soft Dark Brown SANDY SILT (ML-Moist to Wet) with Trace Gravel	S-2	4.0	NT	NT	
5		AS-1	5.0	NT	NT	
		S-3	6.5	NT	NT	
10	Firm from 10.0'-11.5'					
11.5	End of Boring	S-4	11.5	NT	NT	

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B- 7**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	5.5 INCHES ASPHALT ON 18 INCHES AGGREGATE BASE					
2.0	Soft Dark Brown SANDY SILTY CLAY (CL-Moist to Wet) with Trace Gravel	S-2	4.0	NT	NT	
		AS-1	5.0	NT	NT	
5	Firm from 5.0'-11.5'					
		S-3	6.5	NT	NT	
	Moist from 7.0'-11.5'					
10						
11.5		S-4	11.5	NT	NT	
	End of Boring					

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B- 8**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 / 25 / 50)
0	4 INCHES ASPHALT ON 6.5 INCHES AGGREGATE BASE					
0.9	Soft Dark Brown SANDY LEAN CLAY (CL-Moist) with Trace Gravel	S-2	4.0	NT	NT	
5		S-3	6.5	NT	NT	
		AS-1	8.0	NT	NT	
10	Firm from 10.0'-11.5'					
11.5	End of Boring	S-4	11.5	NT	NT	

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B- 9**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	6 INCHES ASPHALT ON 5 INCHES AGGREGATE BASE					
0.9	Loose Dark Brown SILTY SAND (SM-Moist to Wet) with Trace Gravel	AS-1	3.0	NT	NT	
		S-2	4.0	NT	NT	
5		S-3	6.5	NT	NT	
10						
11.5	End of Boring	S-4	11.5	NT	NT	

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-10**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	4.5 INCHES ASPHALT ON 7 INCHES AGGREGATE BASE					
0.9	Very Loose Dark Brown SILTY CLAYEY SAND (SC/SM-Moist) with Little Gravel					
		S-2	4.0	NT	NT	
5		AS-1	5.0	NT	NT	
		S-3	6.5	NT	NT	
10						
11.5	End of Boring	S-4	11.5	NT	NT	

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-11**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	4 INCHES ASPHALT ON 7 INCHES AGGREGATE BASE					
0.9	Soft Dark Brown LEAN CLAY (CL-Moist) with Trace Gravel and Little Sand	AS-1	3.0	NT	NT	
		S-2	4.0	NT	NT	
5	Firm from 5.0'-11.5'	S-3	6.5	NT	NT	
10						
11.5	End of Boring	S-4	11.5	NT	NT	

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-12**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	3.8 INCHES ASPHALT ON 3.5 INCHES AGGREGATE BASE					
0.6	Firm Dark Brown LEAN CLAY (CL-Wet) with Trace Gravel and Little Sand	S-1	2.5	NT	NT	
		AS-2	5.0	NT	NT	
5		S-3	6.5	NT	NT	
		AS-4	7.0	NT	NT	
	Hard Drilling from 7.0'-10.0'					
	Increased Gravel from 8.0'-11.5'					
10	Very Stiff from 10.0'-11.5'					
11.5	End of Boring	S-5	11.5	NT	NT	

Boring Date: **2-25-20**
Field Engineer/Technician: **G. Chott**
Driller: **T. Crain**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-13**

Coconino Estates Phase II

Coconino Estates Subdivision

Flagstaff, Arizona

Project No.: **192658SF**

_SPEEDIE 192658SF.GPJ GENGEO.GDT 5/6/20

TABULATION OF TEST DATA

SOIL BORING or TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE INTERVAL (ft)	NATURAL WATER CONTENT (Percent of Dry Weight)	IN-PLACE DRY DENSITY (Pounds Per Cubic Foot)	PARTICLE SIZE DISTRIBUTION (Percent Finer)					ATTERBERG LIMITS			UNIFIED SOIL CLASSIFICATION	SPECIMEN DESCRIPTION
						#200 SIEVE	#40 SIEVE	#10 SIEVE	#4 SIEVE	3" SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX		
B- 1	AS-2	AUGER	3.0 - 5.0	NT	NT	40.2	56	70	80	100	22	18	4	SC-SM	SILTY, CLAYEY SAND with GRAVEL
B- 3	AS-1	AUGER	1.0 - 5.0	NT	NT	51.3	70	87	94	100	25	21	4	CL-ML	SANDY SILTY CLAY
B- 4	AS-1	AUGER	1.0 - 5.0	NT	NT	60.2	78	90	96	100	28	21	7	CL-ML	SANDY SILTY CLAY
B- 5	AS-1	AUGER	1.0 - 5.0	NT	NT	41.8	60	76	85	100	24	20	4	SC-SM	SILTY, CLAYEY SAND
B- 6	AS-2	AUGER	3.0 - 5.0	NT	NT	47.3	65	79	89	100	26	21	5	SC-SM	SILTY, CLAYEY SAND
B- 7	AS-1	AUGER	1.0 - 5.0	NT	NT	50.6	70	85	93	100	28	23	5	ML	SANDY SILT
B- 8	AS-1	AUGER	1.0 - 5.0	NT	NT	58.8	74	87	93	100	28	21	7	CL-ML	SANDY SILTY CLAY
B- 9	AS-1	AUGER	1.0 - 8.0	NT	NT	60.3	74	85	91	100	30	20	10	CL	SANDY LEAN CLAY
B-10	AS-1	AUGER	1.0 - 3.0	NT	NT	44.6	67	82	91	100	22	20	2	SM	SILTY SAND
B-11	AS-1	AUGER	1.0 - 5.0	NT	NT	49.3	64	79	88	100	27	21	6	SC-SM	SILTY, CLAYEY SAND
B-13	AS-2	AUGER	3.0 - 5.0	NT	NT	60.7	74	83	91	100	27	22	5	ML	SANDY SILT
B-13	AS-4	AUGER	5.0 - 27.0	NT	NT	72.9	83	89	92	100	30	20	10	CL	LEAN CLAY with SAND

Sieve analysis results do not include material greater than 3". Refer to the actual boring logs for the possibility of cobble and boulder sized materials.

NT=Not Tested

Coconino Estates Phase II
Coconino Estates Subdivision
Flagstaff, Arizona
Project No. 192658SF

SPEEDIE AND ASSOCIATES

CORROSIVE TEST DATA

SOIL BORING or TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE INTERVAL (ft)	PERCENT FINER #200 SIEVE	pH	RESISTIVITY (Ohm-Centimeters)	SULFATE (SO4) (ppm)	CHLORIDE (CL) (ppm)	SULFIDE (+ or -)	REDOX (millivolts)	UNIFIED SOIL CLASSIFICATION	SPECIMEN DESCRIPTION
B- 2	BS-1	BULK	1.0 - 7.0	52.5	5.94	2618	6	88	NT	NT		

Coconino Estates Phase II
Coconino Estates Subdivision
Flagstaff, Arizona
Project No. 192658SF

SPEEDIE AND ASSOCIATES

Core Photographs

Photo No. 1: Asphalt core from boring location B-1

Photo No. 2: Asphalt core from boring location B-2

Photo No. 3: Asphalt core from boring location B-3

Photo No. 4: Asphalt core from boring location B-4

Core Photographs

Photo No. 1: Asphalt core from boring location B-6

Photo No. 2: Asphalt core from boring location B-7

Photo No. 3: Asphalt core from boring location B-8

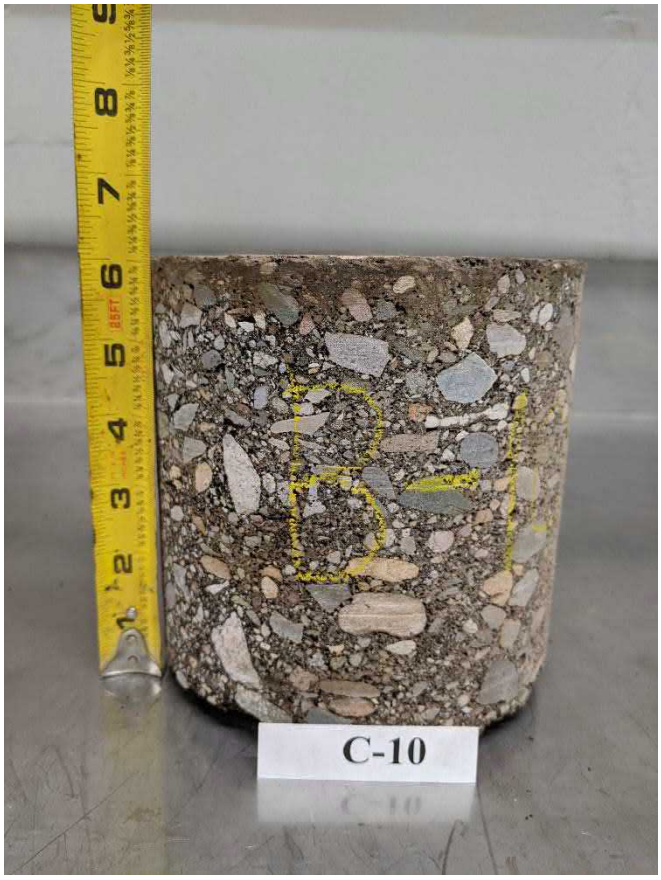


Photo No. 4: Asphalt core from boring location B-10

Core Photographs

Photo No. 1: Asphalt core from boring location B-11

Photo No. 2: Asphalt core from boring location B-12

Photo No. 3: Asphalt core from boring location B-13

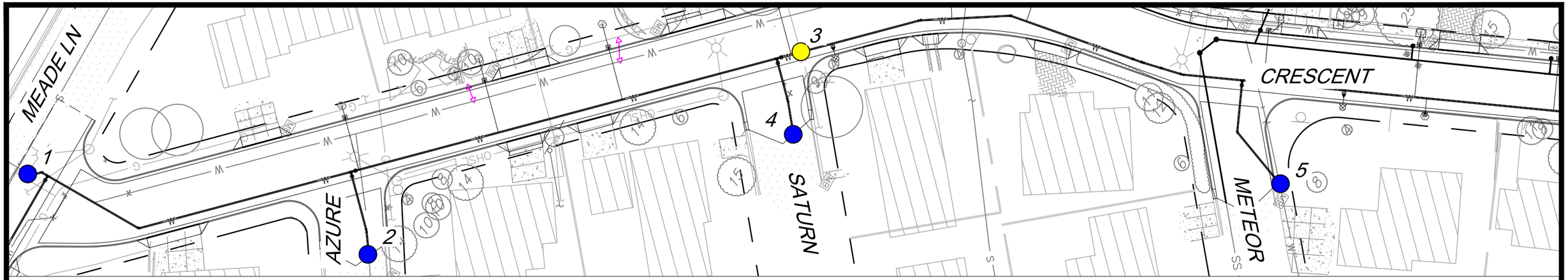
Cores from boring locations B-5 and B-9 were unable to be recovered.

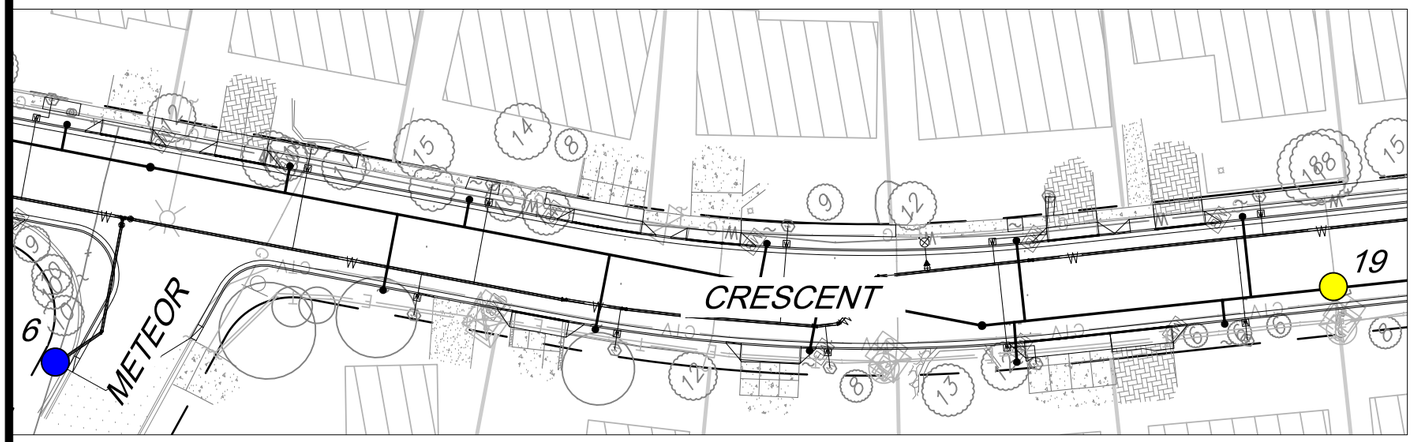
Site Photographs

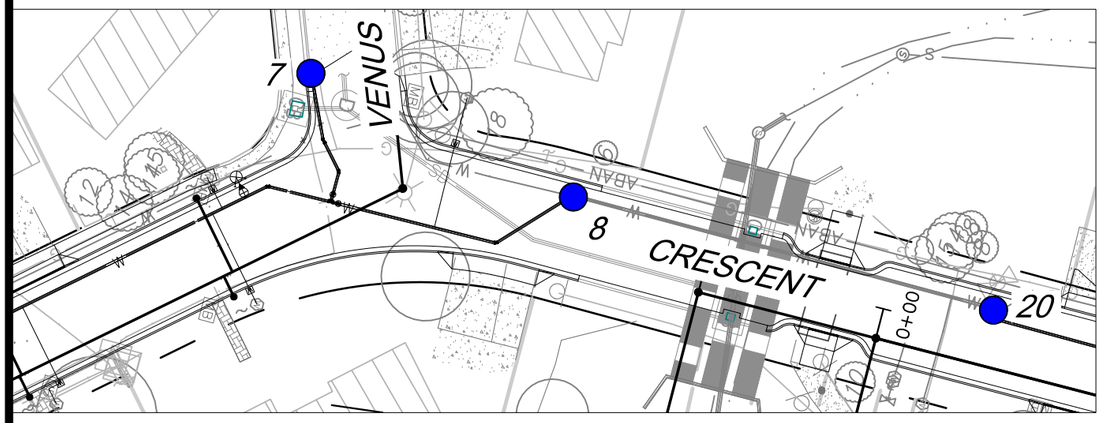
Photo No. 1: Alligator cracking, corner erosion and Asphalt spalling on N. Navajo Drive

Photo No. 2: Block cracking on N. Talkington Dr.

Photo No. 3: Severe alligator cracking on N. Navajo Dr.







SCALE: 1"=50'

POTHOLE TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
1	60236.04	29734.24	WL
2	60409.40	29682.59	WL
3	60551.02	29479.76	GAS
4	60568.80	29518.91	WL
5	60799.54	29414.96	WL
6	61000.26	29324.05	WL
7	61486.79	28863.70	WL
8	61580.87	28880.64	WL
9	62061.13	29262.02	WL
10	62093.86	29425.59	WL
11	61309.23	30149.58	WL
12	61098.91	30264.75	WL
13	60825.96	30344.84	WL
14	60826.97	30367.38	WL
15	60534.30	30199.53	WL
16	60563.10	30391.78	WL
17	60572.57	30430.22	UNK
18	60252.67	30522.35	COMM
19	61331.38	29061.65	GAS
20	61724.15	28880.55	WL
21	60534.85	30443.70	WL

COMMUNICATIONS POTHOLE

GAS POTHOLE

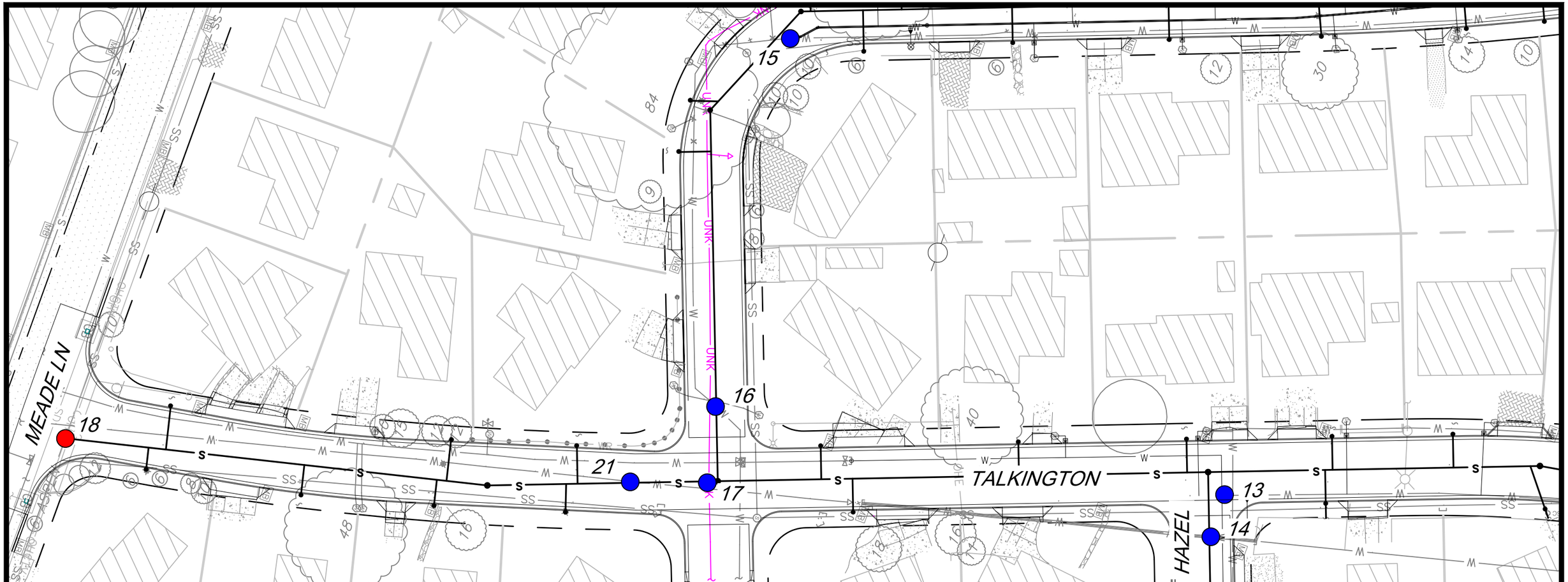
WATERLINE POTHOLE

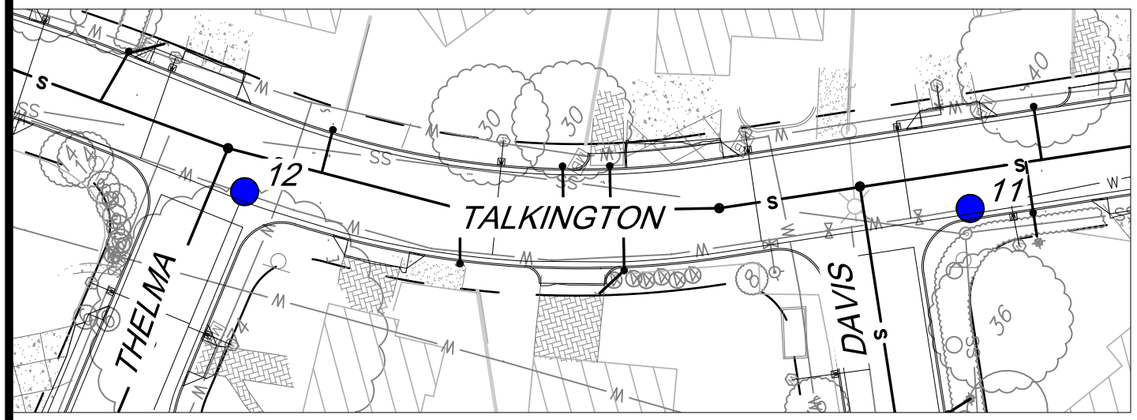
The WLB Group INC. **WLB**

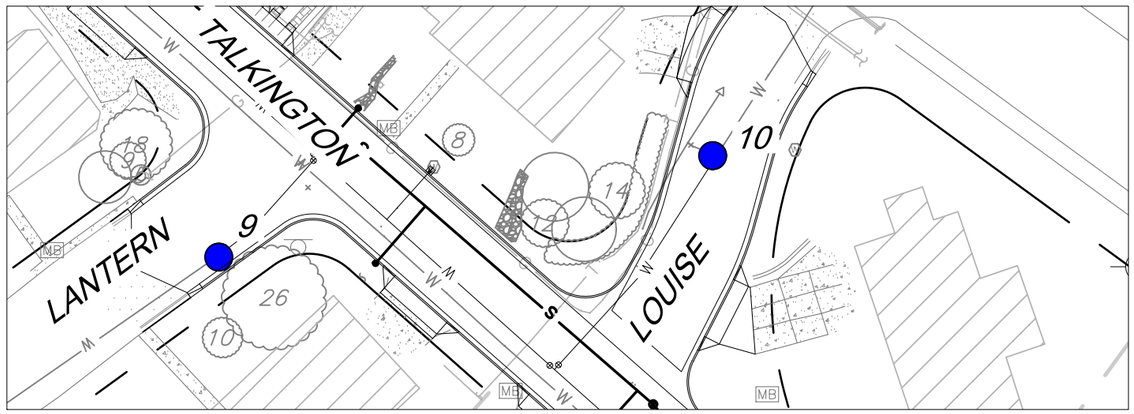
Engineering • Planning • Surveying
Landscape Architecture • Urban Design
Offices located in Tucson , Phoenix
Flagstaff and Las Vegas, NV.
500 N. Beaver Street
Flagstaff, Arizona 86001 (928) 779-1500

COCONINO ESTATES PHASE II
UTILITY POTHOLE LOCATIONS

SHT 1 OF 2
4.28.20







The WLB Group INC. **WLB**

Engineering • Planning • Surveying
Landscape Architecture • Urban Design
Offices located in Tucson , Phoenix
Flagstaff and Las Vegas, NV.
500 N. Beaver Street
Flagstaff, Arizona 86001 (928) 779-1500

SCALE: 1"=50'

COCONINO ESTATES PHASE II
UTILITY POTHOLE LOCATIONS

SHT 2 OF 2
4.28.20

N:\319012A001_Coconino Estates PII\dwg\Cut-Shts\Exhibits\20.4.27_Pothole Exhibit.dwg, 4/28/2020 7:57:54 AM

TEST HOLE DATA SUMMARY

PROJECT NO: AZ40900100
CLIENT:
PROJECT: AZ40900100 - COCONINO ESTATES PH 2
SUE CREW/TRUCK NO: DS, AF, JA, RF/550581, 550550, 540581
CITY,COUNTY: FLAGSTAFF/COCONINO
LOCATION/INTERSECTION:

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

SURFACE TYPE				REFERENCE MARKER (RM)				UTILITY TYPE											
ASPHALT	A	OTHER	O	CUT X	X	ROD & CAP	RC	BURIED ELECTRIC	BE	EXPLORATORY	EXP	GAS SERVICE	GS	STREET LIGHT	SL	WATERMAIN	WM
CONCRETE	C	ASPHALT/CONCRETE	AC	LATHE	L	SLEEVE	S	BURIED TELECOM	BT	FIBER OPTIC CABLE	FOC	OTHER	O	TRAFFIC SIGNAL	TS	RECLAIMED WATER	RW
INTERLOCK BRICK	I			NAIL & DISK	ND	WOODEN STAKE	W	CABLE TV	CATV	FORCE MAIN	FM	SANITARY SEWER	SAN	UNKNOWN	UNK	FUEL LINE	FL
NATURAL GROUND	NG			OTHER	O	PK NAIL	PK	COMBINED SEWER	COMB	GAS MAIN/PIPELINE	GM	STORM SEWER	STM	WATER SERVICE	WS	PIPELINE	PL

UTILITY MATERIAL

ASBESTOS	AC	CORRUGATED METAL PIPE	CMP	PLASTIC (PVC, PE, HDPE)	PL	CONCRETE	CONC	OTHER	O	WOOD	WD
CLAY	CL	DIRECT BURIED CABLE	DBC	METALLIC (IRON,STEEL,COATED	MET	COPPER	CU	UNKNOWN	UNK	FIBERGLASS	FIBG

TH NO	CLIENT TH NO	TH DATE	UTILITY TYPE	UTILITY MATERIAL	UTILITY DIRECTION	UTILITY WIDTH (FIELD)	APPARENT UTILITY OWNER	RM ELEVATION	DEPTH RM TO TOP OF UTILITY	DEPTH RM TO BTTM OF UTILITY	ELEV. TOP OF UTILITY	ELEV. BOTTOM OF UTILITY	SURFACE TYPE	REMARKS
1	1	5/13/2020	WM	CONC	NORTH - SOUTH	9.00"	-	6970.06'	4.32'	-	6965.74'	-	A	
2	2	5/13/2020	WM	CONC	NORTHEAST - SOUTHWEST	9.00"	-	6970.30'	4.47'	-	6965.83'	-	A	
3	3	5/13/2020	GM	MET	NORTHEAST - SOUTHWEST	2.50"	-	6972.52'	2.57'	-	6969.95'	-	A	
4	4	5/14/2020	WS	MET	NORTHEAST - SOUTHWEST	4.00"	-	6972.52'	3.18'	-	6969.34'	-	A	
5	5	5/14/2020	WM	PL	NORTHEAST - SOUTHWEST	8.00"	-	6974.51'	3.50'	-	6971.01'	-	NG	
6	6	5/15/2020	WM	PL	EAST - WEST	8.00"	-	6978.20'	4.35'	-	6973.85'	-	NG	
7	7	5/14/2020	WM	PL	EAST - WEST	8.00"	-	6984.67'	4.01'	-	6980.66'	-	A	DUG ON SURVEY FOUND AND EXPOSED UTILITIES, FOUND A WATER PIPE AND ALONG WITH A GAS LINE. SEE 7A FOR GAS INFORMATION
7A	7A	5/14/2020	GS	MET	EAST - WEST	2.50"	-	6984.74'	2.81'	-	6981.93'	-	A	
8	8	5/14/2020	WM	MET	NORTH - SOUTH	9.00"	-	6981.75'	4.66'	-	6977.09'	-	A	
9	9	5/14/2020	WM	-	NORTHEAST - SOUTHWEST	7.00"	-	6985.71'	3.43'	-	6982.28'	-	A	
10	10	5/14/2020	WM	MET	NE& NW	8.00"	-	6986.93'	3.55'	-	6983.38'	-	A	TOP MEASUREMENT IS TOP OF PIPE GOING TOWARDS NE. 3.43' IS TOP OF CONCRETE. DUG DOWN FOUND LINE AS IT GOES INTO CONCRETE STRUCTURE AT BEND. VERIFIED THAT IT 90'S INTO VALVE TO THE NW AS SHOWN BY B/S.
11	11	5/14/2020	-	MET	SE& SW	-	-	6975.32'	2.20'	-	6973.12'	-	A	DUG DOWN FOUND (2) PIPES DEAD ENDING AT SAME POINT. PIN SET WHERE PIPES END. TOP MEASUREMENT IS TOP OF HIGHEST POINT OF THE 10" UNKNOWN LINE. PIPE REDUCES TO 8". RUNNING TOWARDS SW. DEPTH MEASUREMENT TO TOP OF 4.50" LINE (BROKEN) RUNNING TOWARDS SOUTH EAST, IS 2.66'.
12	12	5/15/2020	WM	MET	NORTH - SOUTH	8.50"	-	6973.44'	3.81'	-	6969.63'	-	A	
13	13	5/15/2020	WM	MET	SOUTHEAST - NORTHWEST	8.50"	-	6971.19'	3.07'	-	6968.12'	-	A	
14	14	5/15/2020	WM	MET	SOUTHEAST - NORTHWEST	12.00"	-	6971.28'	2.83'	-	6968.45'	-	A	
15	15	5/15/2020	WM	MET	SOUTHEAST - NORTHWEST	10.50"	-	6970.46'	3.70'	-	6966.76'	-	A	ADJUSTED HOLE TO THE NORTH OF WATER VALVE. DUG DOWN FOUND PIPE 8.50" METALLIC. ALSO EXPOSED A 3/4" UNKNOWN UTILITY ON THE SW SIDE OF THE WATERLINE.
16	16	5/13/2020	WM	PL	NORTH - SOUTH	9.00"	-	6969.43'	8.43'	-	6961.00'	-	A	
17	17	5/13/2020	UNK	MET	EAST - WEST	3.00"	-	6969.13'	4.02'	-	6965.11'	-	A	DUG ON SURVEY, FOUND AND EXPOSED UTILITY. UTILITY TYPE IS UNKNOWN - POSSIBLE OLD GAS PIPE.
18	18	5/15/2020	SAN	CL	EAST - WEST	8.50"	-	6966.46'	4.96'	-	6961.50'	-	A	
19	19	5/13/2020	GM	MET	NORTHEAST - SOUTHWEST	1.50"	-	6982.65'	3.07'	-	6979.58'	-	A	
20	20	5/15/2020	WM	MET	NORTHEAST - SOUTHWEST	10.00"	-	6981.74'	4.40'	-	6977.34'	-	A	EXPOSED WATERLINE ALONG WITH TRACER WIRE AT PIPE ELBOW. UNABLE TO EXPOSE ENTIRE PIPE DUE TO CONCRETE
21	21	5/13/2020	WM	CONC	NORTH - SOUTH	14.00"	-	6969.21'	2.68'	-	6966.53'	-	A	

REMARKS:

REVISION NOTES:

Note: This is a summary only and is to be used in conjunction with the Individual Test Hole Data Reports

TEST HOLE DATA REPORT

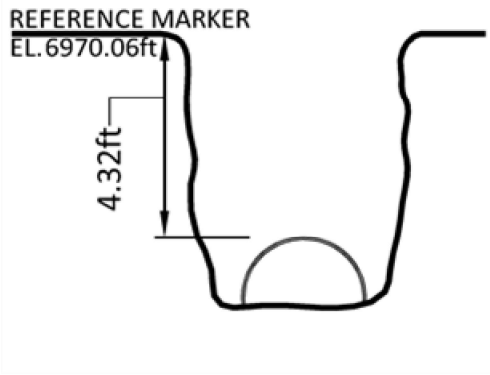
TEST HOLE NO:	1	CLIENT TEST HOLE NO:	1
TEST HOLE DATE:	5/13/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		MEADE LN & CRESCENT DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NORTH

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		**REFERENCE MARKER**	
UTILITY TYPE	WATERMAIN	NORTHING	60236.31'
UTILITY MATERIAL	CONCRETE	EASTING	29734.45'
UTILITY DIRECTION	NORTH - SOUTH	ELEVATION	6970.06'
UTILITY WIDTH (FIELD)	9.00"	LOCATION	
UTILITY WIDTH (RECORD)		MARKED BY	
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	4.32'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6965.74'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	4.00"

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:		CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:		CHECKED BY:	JM	

TEST HOLE DATA REPORT

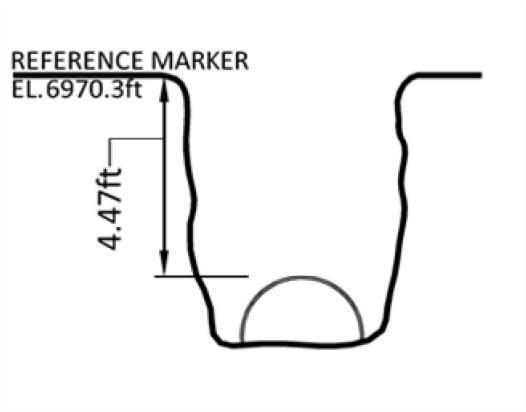
TEST HOLE NO:	2	CLIENT TEST HOLE NO:	2
TEST HOLE DATE:	5/13/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		AZURE DR & CRESCENT DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

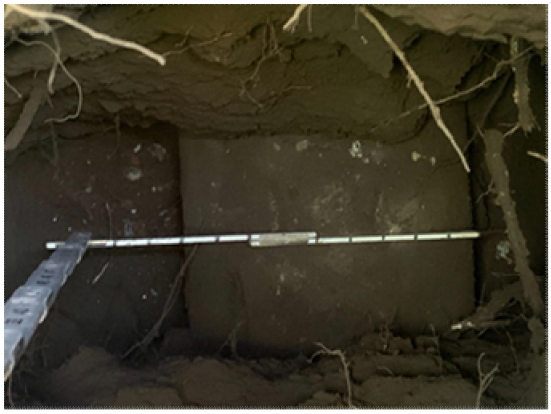
MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NE



DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		REFERENCE MARKER	
UTILITY TYPE	WATERMAIN	NORTHING	60409.47'
UTILITY MATERIAL	CONCRETE	EASTING	29682.72'
UTILITY DIRECTION	NORTHEAST - SOUTHWEST	ELEVATION	6970.30'
UTILITY WIDTH (FIELD)	9.00"	LOCATION	
UTILITY WIDTH (RECORD)		MARKED BY	
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	4.47'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6965.83'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	4.00"

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:		CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:		CHECKED BY:	JM	

TEST HOLE DATA REPORT

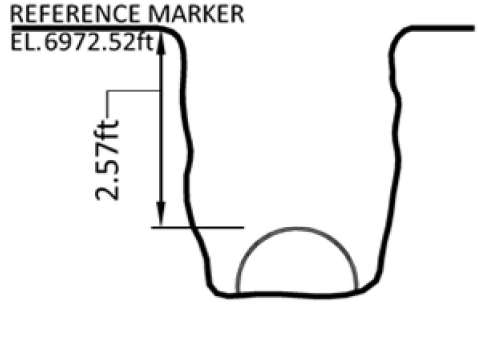
TEST HOLE NO:	3	CLIENT TEST HOLE NO:	3
TEST HOLE DATE:	5/13/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		SATURN WAY & CRESCENT DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

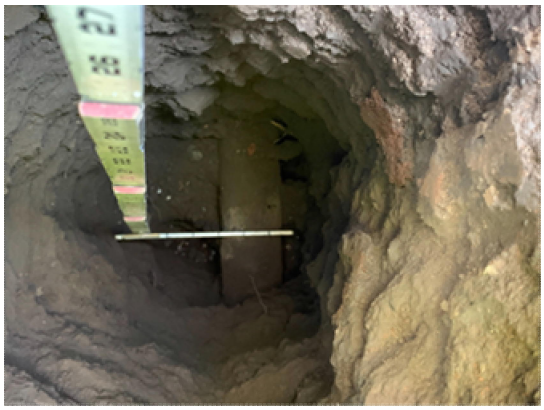
MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NE



DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		**REFERENCE MARKER**	
UTILITY TYPE	GAS MAIN/PIPELINE	NORTHING	60550.73'
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)	EASTING	29479.99'
UTILITY DIRECTION	NORTHEAST - SOUTHWEST	ELEVATION	6972.52'
UTILITY WIDTH (FIELD)	2.50"	LOCATION	CENTER OF UTILITY
UTILITY WIDTH (RECORD)		MARKED BY	NAIL & DISK
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	2.57'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6969.95'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	5.00"

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

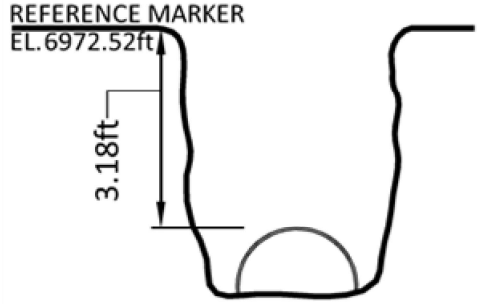
TEST HOLE NO:	4	CLIENT TEST HOLE NO:	4
TEST HOLE DATE:	5/14/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		SATURN WAY & CRESCENT DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NE

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION

UTILITY TYPE	WATER SERVICE
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)
UTILITY DIRECTION	NORTHEAST - SOUTHWEST
UTILITY WIDTH (FIELD)	4.00"
UTILITY WIDTH (RECORD)	
APPARENT UTILITY OWNER	

DEPTH FROM REFERENCE MARKER

TOP OF UTILITY	3.18'
BOTTOM OF UTILITY	-

ELEVATION OF UTILITY

TOP OF UTILITY	6969.34'
APPARENT BOTTOM OF UTILITY	-

REFERENCE MARKER

NORTHING	60569.39'
EASTING	29518.88'
ELEVATION	6972.52'
LOCATION	CENTER OF UTILITY
MARKED BY	NAIL & DISK
STATION	
OFFSET	-
OFFSET FROM	

SURFACE

TYPE	ASPHALT
THICKNESS	5.50"

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

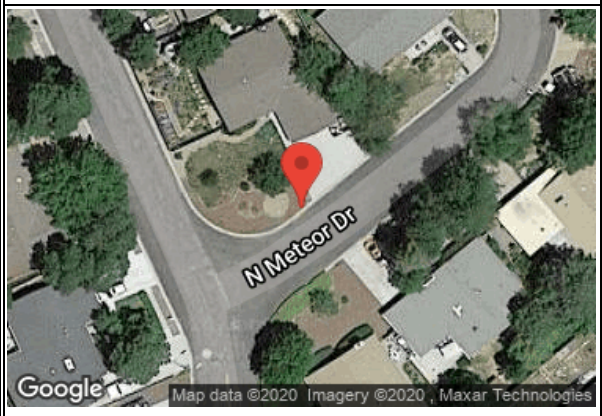
REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

TEST HOLE NO:	5	CLIENT TEST HOLE NO:	5
TEST HOLE DATE:	5/14/2020	SUE CREW/TRUCK NO:	DS, AF/550581
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		METEOR DR AND CREASENT DR

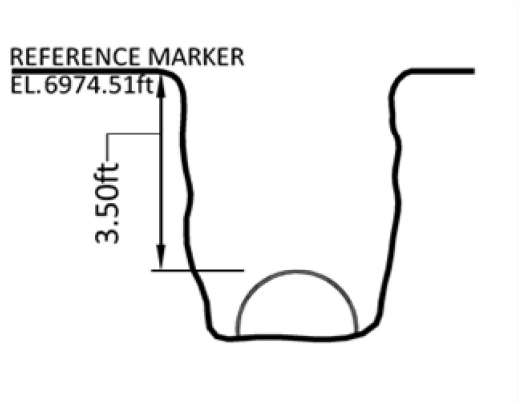
T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP



SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NORTH

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		REFERENCE MARKER	
UTILITY TYPE	WATERMAIN	NORTHING	60799.62'
UTILITY MATERIAL	PLASTIC (PVC, PE, HDPE)	EASTING	29414.98'
UTILITY DIRECTION	NORTHEAST - SOUTHWEST	ELEVATION	6974.51'
UTILITY WIDTH (FIELD)	8.00"	LOCATION	CENTER OF UTILITY
UTILITY WIDTH (RECORD)		MARKED BY	ROD & CAP
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	3.50'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6971.01'	TYPE	NATURAL GROUND
APPARENT BOTTOM OF UTILITY	-	THICKNESS	-

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

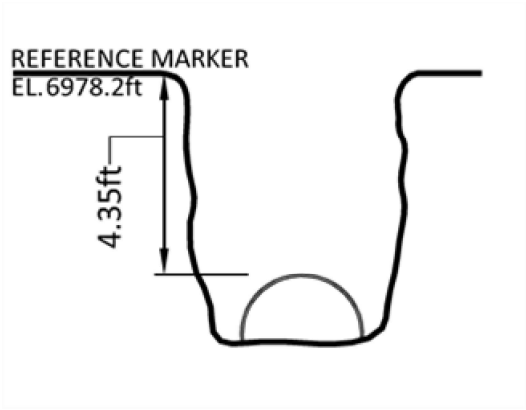
TEST HOLE NO:	6	CLIENT TEST HOLE NO:	6
TEST HOLE DATE:	5/15/2020	SUE CREW/TRUCK NO:	DS, AF/550581
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		METEOR DR AND N CRESCENT DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

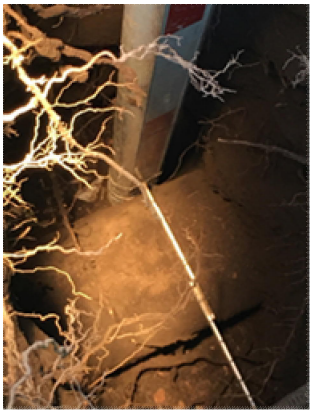
MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NORTH



DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		REFERENCE MARKER	
UTILITY TYPE	WATERMAIN	NORTHING	61001.60'
UTILITY MATERIAL	PLASTIC (PVC, PE, HDPE)	EASTING	29323.81'
UTILITY DIRECTION	EAST - WEST	ELEVATION	6978.20'
UTILITY WIDTH (FIELD)	8.00"	LOCATION	CENTER OF UTILITY
UTILITY WIDTH (RECORD)		MARKED BY	ROD & CAP
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	4.35'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6973.85'	TYPE	NATURAL GROUND
APPARENT BOTTOM OF UTILITY	-	THICKNESS	-

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

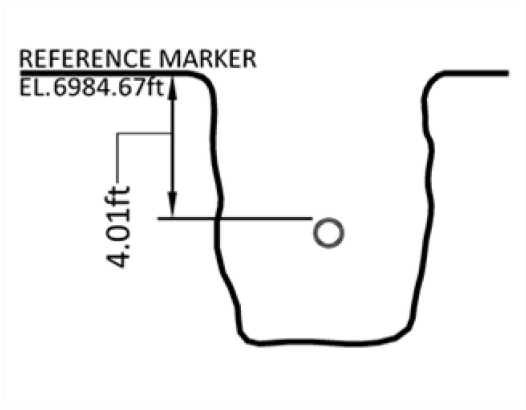
TEST HOLE NO:	7	CLIENT TEST HOLE NO:	7
TEST HOLE DATE:	5/14/2020	SUE CREW/TRUCK NO:	DS, AF/540581
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		W VENUS DR AND N CRESCENT DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING EAST

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		REFERENCE MARKER	
UTILITY TYPE	WATERMAIN	NORTHING	61488.19'
UTILITY MATERIAL	PLASTIC (PVC, PE, HDPE)	EASTING	28863.74'
UTILITY DIRECTION	EAST - WEST	ELEVATION	6984.67'
UTILITY WIDTH (FIELD)	8.00"	LOCATION	CENTER OF UTILITY
UTILITY WIDTH (RECORD)		MARKED BY	NAIL & DISK
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	4.01'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6980.66'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	5.00"

REMARKS:
DUG ON SURVEY FOUND AND EXPOSED UTILITIES, FOUND A WATER PIPE AND ALONG WITH A GAS LINE. SEE 7A FOR GAS INFORMATION

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

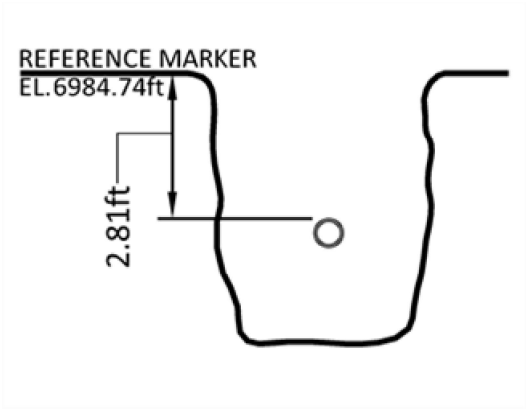
TEST HOLE NO:	7A	CLIENT TEST HOLE NO:	7A
TEST HOLE DATE:	5/14/2020	SUE CREW/TRUCK NO:	DS,AF/550581
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		W VENUS DR AND N CRESCENT DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING EAST

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION

UTILITY TYPE	GAS SERVICE
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)
UTILITY DIRECTION	EAST - WEST
UTILITY WIDTH (FIELD)	2.50"
UTILITY WIDTH (RECORD)	
APPARENT UTILITY OWNER	

DEPTH FROM REFERENCE MARKER

TOP OF UTILITY	2.81'
BOTTOM OF UTILITY	-

ELEVATION OF UTILITY

TOP OF UTILITY	6981.93'
APPARENT BOTTOM OF UTILITY	-

REFERENCE MARKER

NORTHING	61489.55'
EASTING	28863.34'
ELEVATION	6984.74'
LOCATION	CENTER OF UTILITY
MARKED BY	NAIL & DISK
STATION	
OFFSET	-
OFFSET FROM	

SURFACE

TYPE	ASPHALT
THICKNESS	5.00"

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

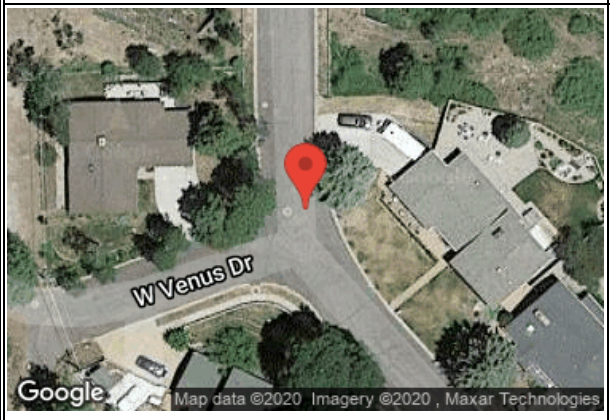
REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

TEST HOLE NO:	8	CLIENT TEST HOLE NO:	8
TEST HOLE DATE:	5/14/2020	SUE CREW/TRUCK NO:	DS,AF/550581
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		W VENUS DR AND N CRESCENT DR

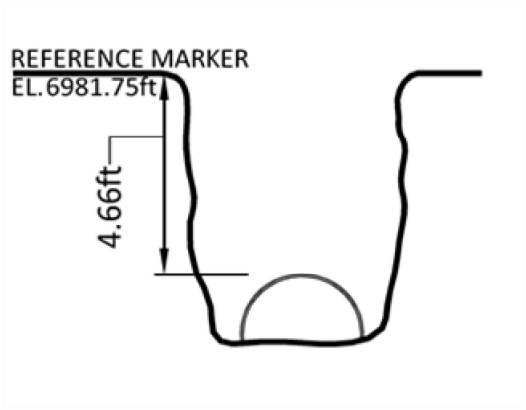
T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP



SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NORTH

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		**REFERENCE MARKER**	
UTILITY TYPE	WATERMAIN	NORTHING	61577.23'
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)	EASTING	28880.42'
UTILITY DIRECTION	NORTH - SOUTH	ELEVATION	6981.75'
UTILITY WIDTH (FIELD)	9.00"	LOCATION	CENTER OF UTILITY
UTILITY WIDTH (RECORD)		MARKED BY	NAIL & DISK
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	4.66'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6977.09'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	6.00"

REMARKS: EXPOSED WATER PIPE ALONG WITH TRACER WIRE JUST ABOVE IT.
.

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

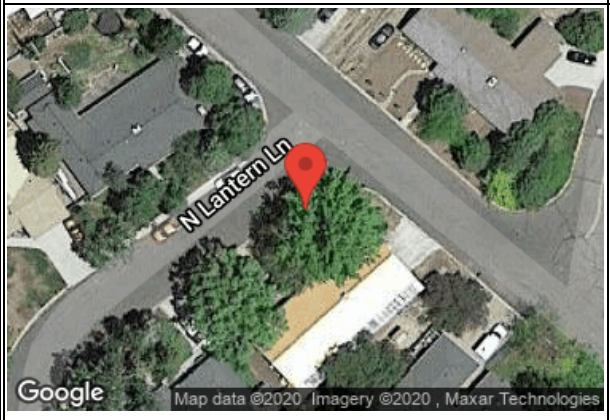
REVIEWED DATE:		CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:		CHECKED BY:	JM	

TEST HOLE DATA REPORT

TEST HOLE NO:	9	CLIENT TEST HOLE NO:	9
TEST HOLE DATE:	5/14/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		LANTERN LN & TALKINGTON DR

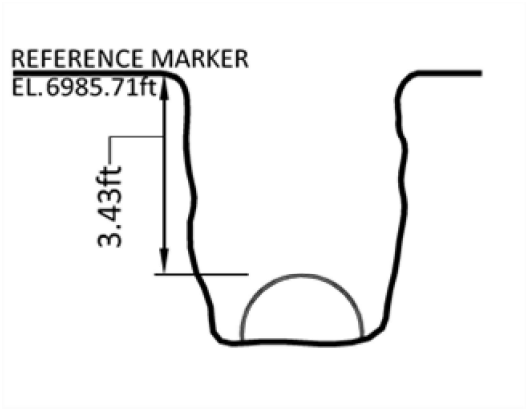
T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP



SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NE

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION

UTILITY TYPE	WATERMAIN
UTILITY MATERIAL	ACP
UTILITY DIRECTION	NORTHEAST - SOUTHWEST
UTILITY WIDTH (FIELD)	7.00"
UTILITY WIDTH (RECORD)	
APPARENT UTILITY OWNER	

DEPTH FROM REFERENCE MARKER

TOP OF UTILITY	3.43'
BOTTOM OF UTILITY	-

ELEVATION OF UTILITY

TOP OF UTILITY	6982.28'
APPARENT BOTTOM OF UTILITY	-

REFERENCE MARKER

NORTHING	62062.16'
EASTING	29261.40'
ELEVATION	6985.71'
LOCATION	CENTER OF UTILITY
MARKED BY	NAIL & DISK
STATION	
OFFSET	-
OFFSET FROM	

SURFACE

TYPE	ASPHALT
THICKNESS	5.00"

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

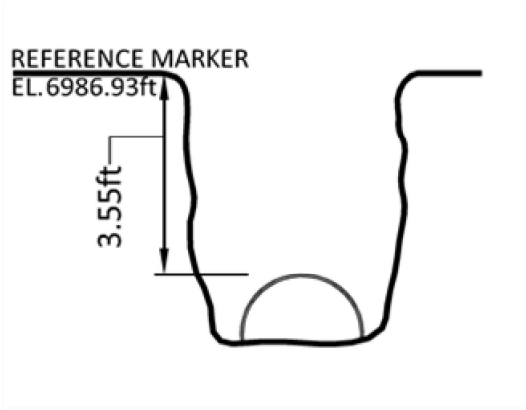
TEST HOLE NO:	10	CLIENT TEST HOLE NO:	10
TEST HOLE DATE:	5/14/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		LOUISE AND TALKINGTON

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NE

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		REFERENCE MARKER	
UTILITY TYPE	WATERMAIN	NORTHING	62093.73'
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)	EASTING	29425.86'
UTILITY DIRECTION	NE& NW	ELEVATION	6986.93'
UTILITY WIDTH (FIELD)	8.00"	LOCATION	
UTILITY WIDTH (RECORD)		MARKED BY	
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	3.55'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6983.38'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	8.00"

REMARKS:
TOP MEASUREMENT IS TOP OF PIPE GOING TOWARDS NE. 3.43' IS TOP OF CONCRETE. DUG DOWN FOUND LINE AS IT GOES INTO CONCRETE STRUCTURE AT BEND. VERIFIED THAT IT 90'S INTO VALVE TO THE NW AS SHOWN BY B/S.

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

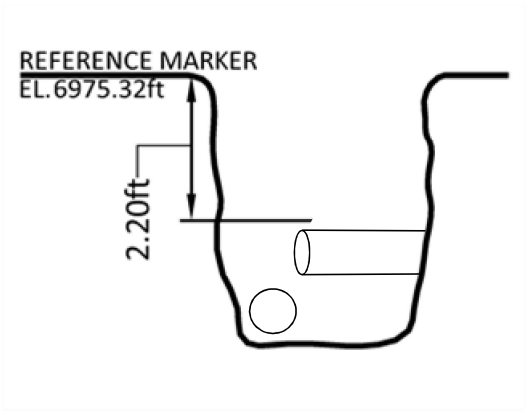
TEST HOLE NO:	11	CLIENT TEST HOLE NO:	11
TEST HOLE DATE:	5/14/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		DAVIS & TALKINGTON DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

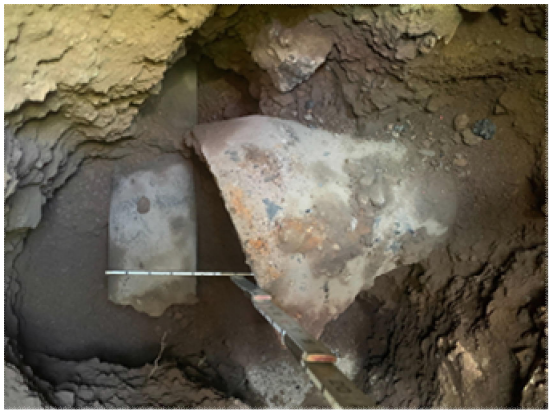
MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING SOUTH



DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		**REFERENCE MARKER**	
UTILITY TYPE	WATER & UNKNOWN	NORTHING	61310.25'
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)	EASTING	30149.49'
UTILITY DIRECTION	SE& SW	ELEVATION	6975.32'
UTILITY WIDTH (FIELD)	-	LOCATION	PIN SET AT END OF BOTH PIPES
UTILITY WIDTH (RECORD)		MARKED BY	NAIL & DISK
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	2.20'	OFFSET FROM	
BOTTOM OF UTILITY			
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6973.12'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY		THICKNESS	5.00"

REMARKS:
DUG DOWN FOUND (2) PIPES DEAD ENDING AT SAME POINT. PIN SET WHERE PIPES END. TOP MEASUREMENT IS TOP OF HIGHEST POINT OF THE 10" UNKNOWN LINE. PIPE REDUCES TO 8". RUNNING TOWARDS SW. DEPTH MEASUREMENT TO TOP OF 4.50" LINE (BROKEN) RUNNING TOWARDS SOUTH EAST, IS 2.66'.

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:		CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:		CHECKED BY:	JM	

TEST HOLE DATA REPORT

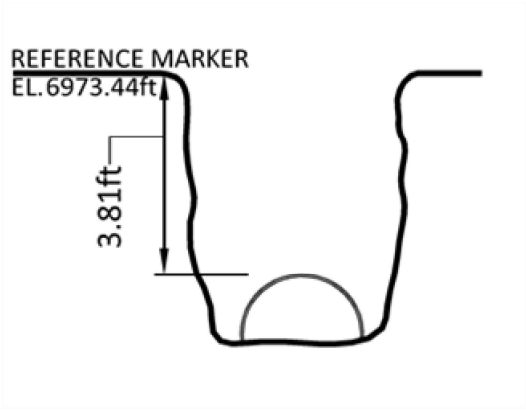
TEST HOLE NO:	12	CLIENT TEST HOLE NO:	12
TEST HOLE DATE:	5/15/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		THELMA WAY & TALKINGTON DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NORTH

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		REFERENCE MARKER	
UTILITY TYPE	WATERMAIN	NORTHING	61098.92'
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)	EASTING	30265.70'
UTILITY DIRECTION	NORTH - SOUTH	ELEVATION	6973.44'
UTILITY WIDTH (FIELD)	8.50"	LOCATION	CENTER OF UTILITY
UTILITY WIDTH (RECORD)		MARKED BY	NAIL & DISK
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	3.81'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6969.63'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	5.00"

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:		CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:		CHECKED BY:	JM	

TEST HOLE DATA REPORT

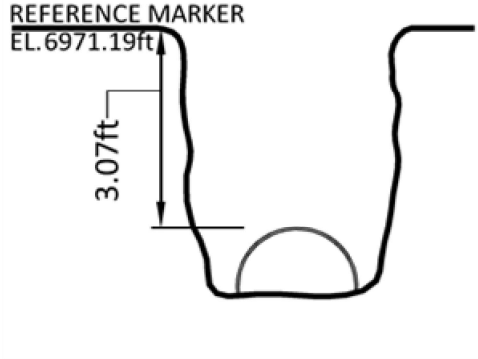
TEST HOLE NO:	13	CLIENT TEST HOLE NO:	13
TEST HOLE DATE:	5/15/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		HAZEL WAY & TALKINGTON DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NW

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION

UTILITY TYPE	WATERMAIN
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)
UTILITY DIRECTION	SOUTHEAST - NORTHWEST
UTILITY WIDTH (FIELD)	8.50"
UTILITY WIDTH (RECORD)	
APPARENT UTILITY OWNER	

DEPTH FROM REFERENCE MARKER

TOP OF UTILITY	3.07'
BOTTOM OF UTILITY	-

ELEVATION OF UTILITY

TOP OF UTILITY	6968.12'
APPARENT BOTTOM OF UTILITY	-

REFERENCE MARKER

NORTHING	60826.01'
EASTING	30344.99'
ELEVATION	6971.19'
LOCATION	CENTER OF UTILITY
MARKED BY	NAIL & DISK
STATION	
OFFSET	-
OFFSET FROM	

SURFACE

TYPE	ASPHALT
THICKNESS	5.50"

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

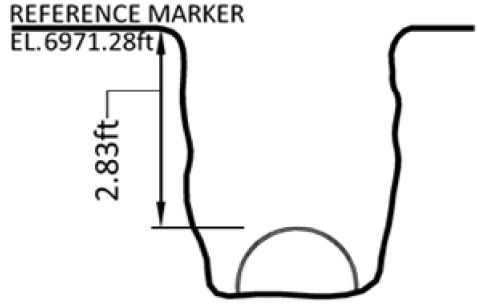
TEST HOLE NO:	14	CLIENT TEST HOLE NO:	14
TEST HOLE DATE:	5/15/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		HAZEL WAY & TALKINGTON DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NW

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		**REFERENCE MARKER**	
UTILITY TYPE	WATERMAIN	NORTHING	60827.01'
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)	EASTING	30367.43'
UTILITY DIRECTION	SOUTHEAST - NORTHWEST	ELEVATION	6971.28'
UTILITY WIDTH (FIELD)	12.00"	LOCATION	CENTER OF UTILITY
UTILITY WIDTH (RECORD)		MARKED BY	
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	2.83'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6968.45'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	5.00"

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

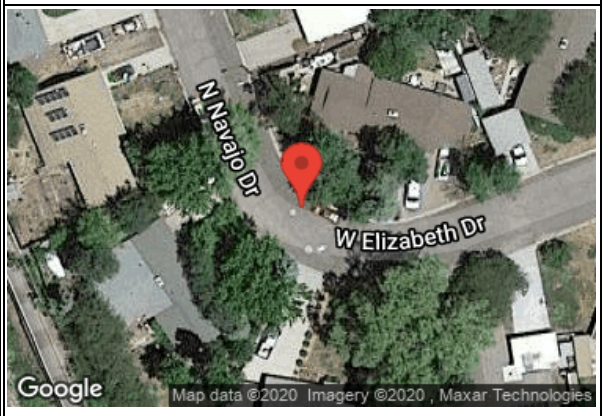
REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

TEST HOLE NO:	15	CLIENT TEST HOLE NO:	15
TEST HOLE DATE:	5/15/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		ELIZABETH DR & NAVAJO DR

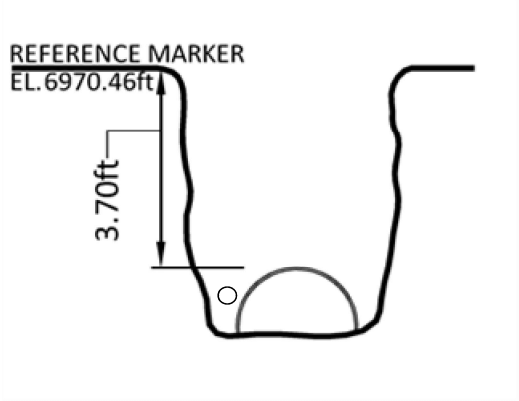
T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP



SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NW

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION

UTILITY TYPE	WATERMAIN
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)
UTILITY DIRECTION	SOUTHEAST - NORTHWEST
UTILITY WIDTH (FIELD)	10.50"
UTILITY WIDTH (RECORD)	
APPARENT UTILITY OWNER	

DEPTH FROM REFERENCE MARKER

TOP OF UTILITY	3.70'
BOTTOM OF UTILITY	-

ELEVATION OF UTILITY

TOP OF UTILITY	6966.76'
APPARENT BOTTOM OF UTILITY	-

REFERENCE MARKER

NORTHING	60536.09'
EASTING	30198.91'
ELEVATION	6970.46'
LOCATION	CENTER OF UTILITY
MARKED BY	NAIL & DISK
STATION	
OFFSET	-
OFFSET FROM	

SURFACE

TYPE	ASPHALT
THICKNESS	5.00"

REMARKS:
ADJUSTED HOLE TO THE NORTH OF WATER VALVE. DUG DOWN FOUND PIPE 8.50" METALLIC. ALSO EXPOSED A 3/4" UNKNOWN UTILITY ON THE SW SIDE OF THE WATERLINE.

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

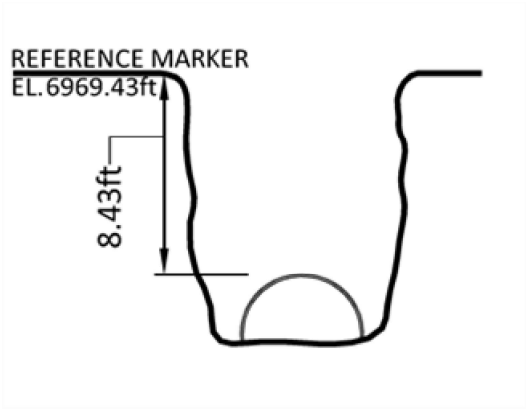
TEST HOLE NO:	16	CLIENT TEST HOLE NO:	16
TEST HOLE DATE:	5/13/2020	SUE CREW/TRUCK NO:	DS, AF/550581
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		W ELIZABETH DR AND N TALKINGTON DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NW

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		REFERENCE MARKER	
UTILITY TYPE	WATERMAIN	NORTHING	60562.83'
UTILITY MATERIAL	PLASTIC (PVC, PE, HDPE)	EASTING	30392.77'
UTILITY DIRECTION	NORTH - SOUTH	ELEVATION	6969.43'
UTILITY WIDTH (FIELD)	9.00"	LOCATION	CENTER OF UTILITY
UTILITY WIDTH (RECORD)		MARKED BY	NAIL & DISK
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	8.43'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6961.00'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	4.00"

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

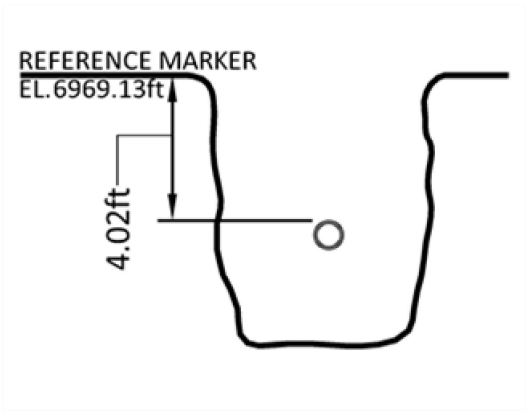
TEST HOLE NO:	17	CLIENT TEST HOLE NO:	17
TEST HOLE DATE:	5/13/2020	SUE CREW/TRUCK NO:	DS, AF/550581
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		W ELIZABETH DR AND N TALKINGTON DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NORTH

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		REFERENCE MARKER	
UTILITY TYPE	UNKNOWN	NORTHING	60573.52'
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)	EASTING	30429.89'
UTILITY DIRECTION	EAST - WEST	ELEVATION	6969.13'
UTILITY WIDTH (FIELD)	3.00"	LOCATION	CENTER OF UTILITY
UTILITY WIDTH (RECORD)		MARKED BY	NAIL & DISK
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	4.02'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6965.11'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	5.00"

REMARKS:
DUG ON SURVEY, FOUND AND EXPOSED UTILITY. UTILITY TYPE IS UNKNOWN - POSSIBLE OLD GAS PIPE.

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:		CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:		CHECKED BY:	JM	

TEST HOLE DATA REPORT

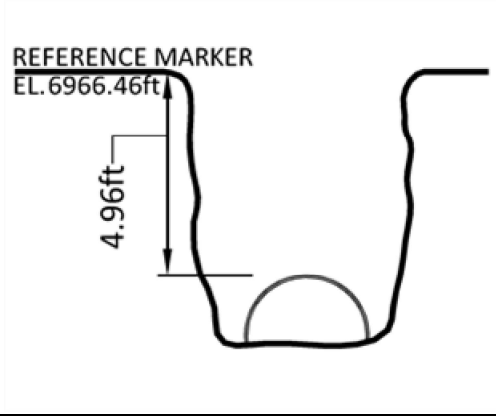
TEST HOLE NO:	18	CLIENT TEST HOLE NO:	18
TEST HOLE DATE:	5/15/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		TALKINGTON DR & MEADE DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING EAST

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		**REFERENCE MARKER**	
UTILITY TYPE	SANITARY SEWER	NORTHING	60252.64'
UTILITY MATERIAL	CLAY	EASTING	30522.35'
UTILITY DIRECTION	EAST - WEST	ELEVATION	6966.46'
UTILITY WIDTH (FIELD)	8.50"	LOCATION	
UTILITY WIDTH (RECORD)		MARKED BY	
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	4.96'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6961.50'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	5.00"

REMARKS:

REVISION NOTES:

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

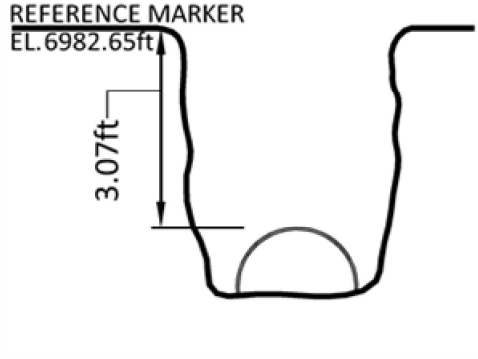
TEST HOLE NO:	19	CLIENT TEST HOLE NO:	19
TEST HOLE DATE:	5/13/2020	SUE CREW/TRUCK NO:	JA RF/550550
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		ON CRESCENT DR SOUTH OF VENUS DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

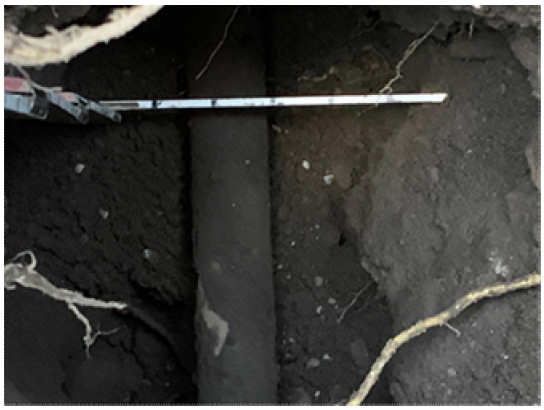
MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NE



DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		**REFERENCE MARKER**	
UTILITY TYPE	GAS MAIN/PIPELINE	NORTHING	61332.28'
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)	EASTING	29061.58'
UTILITY DIRECTION	NORTHEAST - SOUTHWEST	ELEVATION	6982.65'
UTILITY WIDTH (FIELD)	1.50"	LOCATION	CENTER OF UTILITY
UTILITY WIDTH (RECORD)		MARKED BY	NAIL & DISK
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	3.07'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		**SURFACE**	
TOP OF UTILITY	6979.58'	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	4.00"

REMARKS:

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

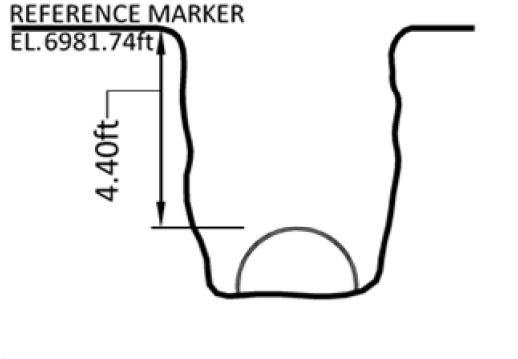
TEST HOLE NO:	20	CLIENT TEST HOLE NO:	20
TEST HOLE DATE:	5/15/2020	SUE CREW/TRUCK NO:	DS,AF/550581
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:		LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		W VENUS AND N CRESCENT

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NORTH

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION

UTILITY TYPE	WATERMAIN
UTILITY MATERIAL	METALLIC (IRON, STEEL, COATED)
UTILITY DIRECTION	NORTHEAST - SOUTHWEST
UTILITY WIDTH (FIELD)	10.00"
UTILITY WIDTH (RECORD)	
APPARENT UTILITY OWNER	

DEPTH FROM REFERENCE MARKER

TOP OF UTILITY	4.40'
BOTTOM OF UTILITY	-

ELEVATION OF UTILITY

TOP OF UTILITY	6977.34'
APPARENT BOTTOM OF UTILITY	-

REFERENCE MARKER

NORTHING	61726.39'
EASTING	28880.36'
ELEVATION	6981.74'
LOCATION	CENTER OF UTILITY
MARKED BY	NAIL & DISK
STATION	
OFFSET	-
OFFSET FROM	

SURFACE

TYPE	ASPHALT
THICKNESS	5.00"

REMARKS:
EXPOSED WATERLINE ALONG WITH TRACER WIRE AT PIPE ELBOW. UNABLE TO EXPOSE ENTIRE PIPE DUE TO CONCRETE AROUND PIPE.

REVISION NOTES:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64432
JAMES
MUELLER
Date Signed 05/28/2020
ARIZONA, U.S.A.

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

TEST HOLE NO:	21
TEST HOLE DATE:	5/13/2020
PROJECT NO:	AZ40900100
CLIENT:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2

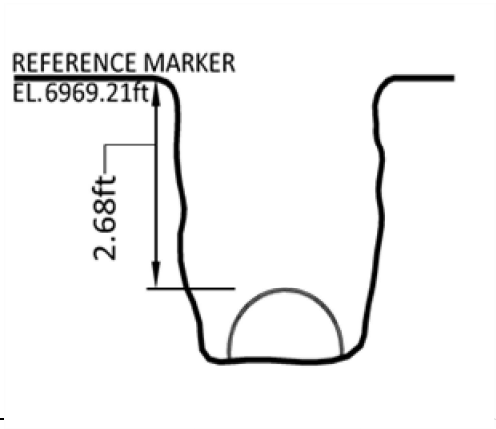
T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

CLIENT TEST HOLE NO:	21
SUE CREW/TRUCK NO:	DS,AF/550581
CITY,COUNTY:	FLAGSTAFF/COCONINO
LOCATION/INTERSECTION:	W ELIZABETH DR AND N TALKINGTON DR

MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING NORTH

DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION

UTILITY TYPE	WATERMAIN
UTILITY MATERIAL	CONCRETE
UTILITY DIRECTION	NORTH - SOUTH
UTILITY WIDTH (FIELD)	14.00"
UTILITY WIDTH (RECORD)	
APPARENT UTILITY OWNER	

DEPTH FROM REFERENCE MARKER

TOP OF UTILITY	2.68'
BOTTOM OF UTILITY	-

ELEVATION OF UTILITY

TOP OF UTILITY	6966.53'
APPARENT BOTTOM OF UTILITY	-

REFERENCE MARKER

NORTHING	60534.51'
EASTING	30443.25'
ELEVATION	6969.21'
LOCATION	CENTER OF UTILITY
MARKED BY	NAIL & DISK
STATION	
OFFSET	-
OFFSET FROM	

SURFACE

TYPE	ASPHALT
THICKNESS	4.00"

REMARKS:

REVISION NOTES:

REVIEWED DATE:	CHECKED DATE:	5/28/2020	REVISION DATE:
REVIEWED BY:	CHECKED BY:	JM	

TEST HOLE DATA REPORT

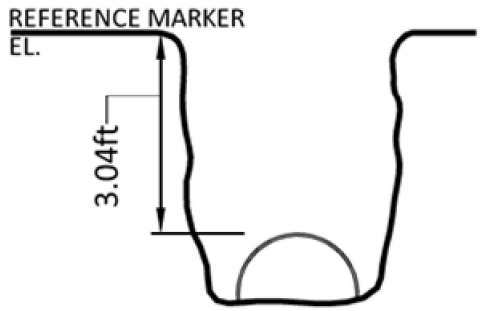
TEST HOLE NO:	22	CLIENT TEST HOLE NO:	22
TEST HOLE DATE:	8/4/2020	SUE CREW/TRUCK NO:	JA JB/550606
PROJECT NO:	AZ40900100	CITY,COUNTY:	FLAGSTAFF/COCONINO
CLIENT:	WLB GROUP	LOCATION/INTERSECTION:	
PROJECT:	AZ40900100 - COCONINO ESTATES PH 2		MEADE LN & CRESCENT DR

T2 utility engineers
19621 N. 23rd Drive Suite 150
Phoenix, Arizona 85027
TEL:(602) 977-8000
www.T2ue.com

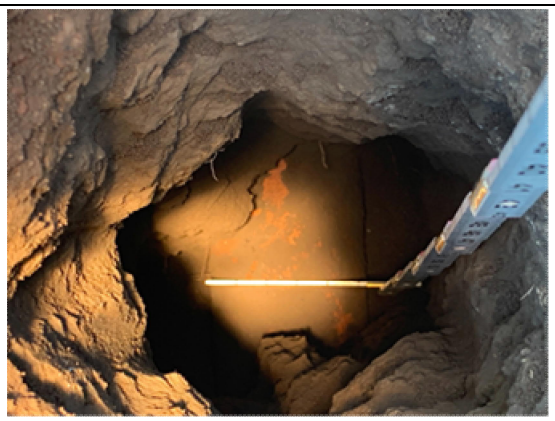
MAP

SITE PHOTO - FACING NORTH

CROSS SECTION - NOT TO SCALE



TEST HOLE - UTILITY - FACING EAST



DISCLAIMER: ADDITIONAL MATERIAL AND/OR UTILITIES MAY EXIST BELOW APPARENT BOTTOM

UTILITY DESCRIPTION		REFERENCE MARKER	
UTILITY TYPE	SANITARY SEWER	NORTHING	60310.4(
UTILITY MATERIAL	CLAY	EASTING	29720.6:
UTILITY DIRECTION	EAST - WEST	ELEVATION	6969.3:
UTILITY WIDTH (FIELD)	5.50"	LOCATION	CENTER OF UTILITY
UTILITY WIDTH (RECORD)		MARKED BY	NAIL & DISK
APPARENT UTILITY OWNER		STATION	
DEPTH FROM REFERENCE MARKER		OFFSET	-
TOP OF UTILITY	3.04'	OFFSET FROM	
BOTTOM OF UTILITY	-		
ELEVATION OF UTILITY		SURFACE	
TOP OF UTILITY	6966.33	TYPE	ASPHALT
APPARENT BOTTOM OF UTILITY	-	THICKNESS	5.00"

REMARKS:
SNAKED LINE FROM MANHOLE TO THE EAST UNTIL REFUSAL AND OBTAINED AN APPROXIMATE ALIGNMENT WITH ANGLE POINT AND THE INACCESSIBLE SEWER CLEANOUT OF 1910. EXCAVATED HOLE 5.5' DEEP BY 6' LONG AND ENCOUNTERED SEWER CLEAN OUT AT THE NORTH END OF THE HOLE. EXCAVATED A SECOND HOLE DIRECTLY OVER PIPE IN ORDER TO OBTAIN ACCURATE DEPTH MEASUREMENT.

REVIEWED DATE:		CHECKED DATE:	8/7/2020	REVISION DATE:	
REVIEWED BY:		CHECKED BY:	JM		