



LID REPORT

McDonald's 4-5205

13324 Inglewood Ave, Hawthorne, CA

August 2024

PREPARED FOR:

McDonalds USA, LLC
110 N Carpenter
Chicago, IL 60607

PREPARED BY:

Kimley»»Horn

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Project Owner's Certification

I certify under penalty of law that this document and all attachments were prepared under my jurisdiction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathered the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

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Preparer (Engineer) Certification

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<p>I hereby certify that this Low Impact Development Plan is in compliance with, and meets the requirements set forth in, Order WQ 2015-0075, of the Los Angeles Regional Water Quality Control Board.</p>			
Engineer's Signature		Date	
Place Stamp Here			

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1. PROJECT DESCRIPTION

1.1. PROJECT CATEGORY

Category	YES	NO
1. Development ^a of a new project equal to 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious area ^b	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Development ^a of a new industrial park with 10,000 square feet or more of surface area ^c	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Development ^a of a new commercial mall with 10,000 square feet or more surface area ^c	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Development ^a of a new retail gasoline outlet with 5,000 square feet or more of surface area ^c	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Development ^a of a new restaurant (SIC 5812) with 5,000 square feet or more of surface area ^c	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Development ^a of a new parking lot with either 5,000 ft ² or more of impervious area ^b or with 25 or more parking spaces	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Development ^a of a new automotive service facility (SIC 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) with 5,000 square feet or more of surface area ^c	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Area (SEA), ^d where the development will: a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and b. Create 2,500 square feet or more of impervious area ^b	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9. Redevelopment ^e of 5,000 square feet or more in one of the categories listed above If yes, list redevelopment category here: 6	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Redevelopment ^e of 10,000 square feet or more to a Single Family Home, without a change in landuse.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- a Development includes any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that results in land disturbance.
- b Surfaces that do not allow stormwater runoff to percolate into the ground. Typical impervious surfaces include: concrete, asphalt, roofing materials, etc.
- c The surface area is the total footprint of an area. Not to include the cumulative area above or below the ground surface.
- d An area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and would be disturbed or degraded by human activities and developments. Also, an area designated by the City as approved by the Regional Water Quality Control Board.
- e Land-disturbing activities that result in the creation, addition, or replacement of a certain amount of impervious surface area on an already developed site. Redevelopment does not include routine maintenance activities that are conducted to maintain the original line and grade, hydraulic capacity, or original purpose of facility, nor does it include modifications to existing single family structures, or emergency construction activities required to immediately protect public health and safety.

1.2. PROJECT DESCRIPTION

Total Project Area (ft²): 38,298

Total Project Area (Ac): 0.88

Total Disturbed Area (Ac): 0.88

EXISTING IMPERVIOUSNESS: 99 %

PROPOSED IMPERVIOUSNESS: 86%

NEW IMPERVIOUSNESS (AC): 0

REPLACED IMPERVIOUSNESS (AC): 0.76

SITE CHARACTERISTICS

<p>DRAINAGE PATTERNS/CONNECTIONS</p>	<p>Existing:</p> <p>The entirety of the existing 4.32 acres of the project site generally sheetflows to the north and east toward West 33rd Street and South Inglewood Avenue. Runoff eventually flows south along South Inglewood Avenue until it enters an existing City owned catch basin near the intersection at W 134th Street. The existing city connects to a Los Angeles County owned storm drain line which eventually discharges to the Dominguez Channel and eventually the Pacific Ocean. There are no existing BMP features along the project.</p> <p>The receiving waterbody and downstream waterbodies have the following impairments per the most recent California Clean Water Act Section 303(d) list:</p> <ul style="list-style-type: none"> • Dominguez Channel: Copper, Indicator Bacteria, Lead, Toxicity, Zing • Dominguez Channel Estuary: Benthic Community Effects, Benzo(a)anthracene, Benzo(a)pyrene, Chlordane (tissue), Chrysene, Copper, DDT, Indicator Bacteria, Lead, PCBs, Phenanthrene, Pyrene, Toxicity <p>Proposed:</p> <p>The project proposes to generally match drainage patterns and areas to that of existing conditions. Runoff will be collected in proposed catch basins in local low points throughout the site such that runoff can be routed to the proposed underground detention system (BMP 2). Runoff will then be treated in a proposed biofiltration system (BMP 1) before being pumped into the existing City owned catch basin near the intersection of Inglewood Avenue and W 134th Street.</p>
<p>NARRATIVE PROJECT DESCRIPTION:</p>	<p>The proposed development will be a new McDonalds restaurant and drive-thru. Other improvements include ADA paths, driveways,</p>

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	<p>entrances/exits, sidewalks, dry and wet utilities. The proposed project consists of 2 drainage areas. DMA A consists of 0.87 acres and makes up majority of the proposed project and will be routed to the proposed BMPs. DMA B consist of 0.01 ac and makes up a de-minimis area near the northwest corner of the site. This DMA cannot be reliably collected and routed to the proposed BMPs.</p>
<p>OFFSITE RUNON</p>	<p>There is no runon at the project site.</p>
<p>UTILITY AND INFRASTRUCTURE INFORMATION</p>	<p>There are no existing storm drain utilities within the project site.</p>
<p>SIGNIFICANT ECOLOGICAL AREAS (SEAs)</p>	<p>N/A</p>

1.3. HYDROMODIFICATION ANALYSIS

DOES THE PROPOSED PROJECT FALL INTO ONE OF THE FOLLOWING CATEGORIES? CHECK YES/NO.	YES	NO
1. <i>Project is a redevelopment that decreases the effective impervious area compared to the pre-project conditions.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Describe: The project is proposing to decrease the overall imperviousness from 99% to 86% by increasing landscaped areas throughout the project.		
2. <i>Project is a redevelopment that increases the infiltration capacity of pervious areas compared to the pre-project conditions.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Describe:		
3. <i>Project discharges directly or via a storm drain to a sump, lake, area under tidal influence, into a waterway that has a 100-year peak flow (Q_{100}) of 25,000 cfs or more.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Describe:		
4. <i>Project discharges directly or via a storm drain into concrete or otherwise engineered (not natural) channels (e.g., channelized or armored with rip rap, shotcrete, etc.), which, in turn, discharge into receiving water that is not susceptible to hydromodification impacts.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Describe:		

HYDROMODIFICATION ANALYSIS

No hydromodification analysis is required for this project.

1.4. PROPERTY OWNERSHIP/MANAGEMENT

	<p>The project site is owned by McDonalds USA, LLC. Proposed BMPs and storm drain infrastructure will be maintained, operated, and funded by McDonalds USA, LLC.</p>
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2. BEST MANAGEMENT PRACTICES (BMPs)

2.1. SITE DESIGN

85 TH PERCENTILE, 24-HOUR STORM DEPTH	The 85 th percentile is approximately 0.95 inch using Los Angeles County 85 th percentile precipitation isohyetal Hydrology Maps. See LA County Hydrology Map in Appendix E.
SITE DESIGN	All Designated Projects must retain 100 percent of the Stormwater Quality Design Volume (SWQDv) on-site through infiltration, evapotranspiration, stormwater runoff harvest and use, or a combination thereof unless it demonstrated that is technically infeasible to do so. Per the “Geotechnical Exploration Report” dated June 28, 2024 by Leighton, design infiltration rate at the facility is 0.01 in/hr. Therefore, infiltration BMPs are infeasible at the site. The project will implement biofiltration BMPs to treat stormwater quality volume.

BMP LIST

Table 2.1.1: DMA Designation, SWQDv and BMP Assessment

DMA DESIGNATION	SQUARE FOOTAGE (SF)	ACREAGE (Ac)	STORM WATER QUALITY DESIGN VOLUME (SWQDv, CF)	WATER QUALITY FLOW RATE (CFS)	BMP TYPE	BMP 2 VOLUME SIZE PROVIDED (CF)	BMP 1 BIOFILTRATION FLOW RATE PROVIDED (CFS)
A	37,689	0.87	2368	0.28	Biofiltration (BMP 1) with detention (BMP 2) upstream	3667	0.46
<i>Total</i>	<i>37,689</i>	<i>0.87</i>	<i>2368</i>	<i>0.28</i>		<i>3667</i>	<i>0.46</i>

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POTENTIAL STORMWATER POLLUTANTS

Potential pollutants of concern from Table 7-3 per the Los Angeles County Low Impact Development Standards Manual include the following for Commercial and Industrial land use:

- Suspended Solids
- Total Phosphorus
- Total Nitrogen
- Total Kjeldahl Nitrogen
- Total Copper
- Total Lead
- Total Zinc

POST DEVELOPMENT HYDROMODIFICATION ANALYSIS

No hydromodification analysis is required for this project.

2.2. BMP SELECTION

2.2.1. INFILTRATION BMPs

NAME	INCLUDED
Bioretention without underdrains	<input type="checkbox"/>
Infiltration Trench	<input type="checkbox"/>
Infiltration Basin	<input type="checkbox"/>
Drywell	<input type="checkbox"/>
Proprietary Subsurface Infiltration Gallery	<input type="checkbox"/>
Permeable Pavement (concrete, asphalt, pavers)	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>

DESCRIPTION	
	Per the project's Geotechnical Exploration Report, the project's soils are not suitable for infiltration. The design infiltration rate based on percolation testing and factors of safety is 0.01 in/hr which is less than the minimum 0.3 in/hr required for infiltration BMPs.

2.2.2. RAINWATER HARVEST AND USE BMPs (N/A)

Drywell infiltration is proposed for LID compliance. There are no Rainwater Harvest and Use BMPs planned for the Project.

NAME	INCLUDED
Above-ground cisterns and basins	<input type="checkbox"/>
Underground detention	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>

DESCRIPTION	
	Capture and Re-Use was deemed infeasible.

2.2.3. ALTERNATIVE COMPLIANCE BMPs

BIOFILTRATION BMPs

(If Infiltration BMPs and Rainwater Harvest and Use BMPs are Infeasible)

NAME	INCLUDED
Bioretention with underdrains (i.e. planter box, rain garden, etc.)	<input type="checkbox"/>
Constructed Wetland	<input type="checkbox"/>
Vegetated Swale	<input type="checkbox"/>
Vegetated Filter Strip	<input type="checkbox"/>
Tree-Well Filter	<input type="checkbox"/>
Other: Proprietary Biofiltration	<input checked="" type="checkbox"/>
Other:	<input type="checkbox"/>

DESCRIPTION	
	<p>The project is proposing to implement a Modular Wetland System (BMP 1) which is a proprietary biofiltration BMP. The MWS has been sized to treat 1.5 times the water quality flow rate for DMA A. Per the LA County MS4 permit, 1.5 times the SWQDv has been provided upstream of the MWS in an underground detention system (BMP 2). Runoff will enter the MWS unit to the inlet bay where the water quality flow will be pretreated in a filter and then treated in the biofiltration media. The MWS unit is on the State Water Board's approved list for full-trash capture devices. Treated flow and overflows bypassing via an internal weir will discharge via the outlet bay to a proposed sump. The proposed sump will discharge the project's flows to the existing catch basin.</p>

OFFSITE BMPs (N/A)

(If Infiltration BMPs, Rainwater Harvest and Use BMPs, and Biofiltration BMPs are Infeasible)

NAME	INCLUDED
Offsite Infiltration	<input type="checkbox"/>
Ground Water Replenishment Projects	<input type="checkbox"/>
Offsite Project - Retrofit Existing Development	<input type="checkbox"/>
Regional Storm Water Mitigation Program	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>

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DESCRIPTION	N/A
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2.2.4. TREATMENT CONTROL BMPs

NAME	INCLUDED
Media Filter	<input type="checkbox"/>
Filter Insert	<input type="checkbox"/>
CDS Unit	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>

DESCRIPTION	N/A

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Hydromodification Control BMPs

NAME	INCLUDED
Infiltration System	<input type="checkbox"/>
Above-ground Cistern	<input type="checkbox"/>
Above-ground Basin	<input type="checkbox"/>
Underground Detention	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>

DESCRIPTION	N/A
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2.2.5. NON-STRUCTURAL SOURCE CONTROL BMPs

NAME	CHECK ONE	
	Included	Not Applicable
Education for Property Owners, Tenants and Occupants	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Activity Restrictions	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Common Area Landscape Management	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Common Area Litter Control	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Housekeeping of Loading Docks	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Common Area Catch Basin Inspection	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Street Sweeping Private Streets and Parking Lots	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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2.2.6. STRUCTURAL SOURCE CONTROL BMPs

NAME	CHECK ONE	
	Included	Not Applicable
Provide storm drain system stenciling and signage	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Design and construct outdoor material storage areas to reduce pollution introduction	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Design and construct trash and waste storage areas to reduce pollution introduction	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Protect slopes and channels and provide energy dissipation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Loading docks	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Maintenance bays	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Vehicle wash areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Outdoor processing areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Equipment wash areas/racks	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Fueling areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Hillside landscaping	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Attachment A

Calculations

Peak Flow Hydrologic Analysis

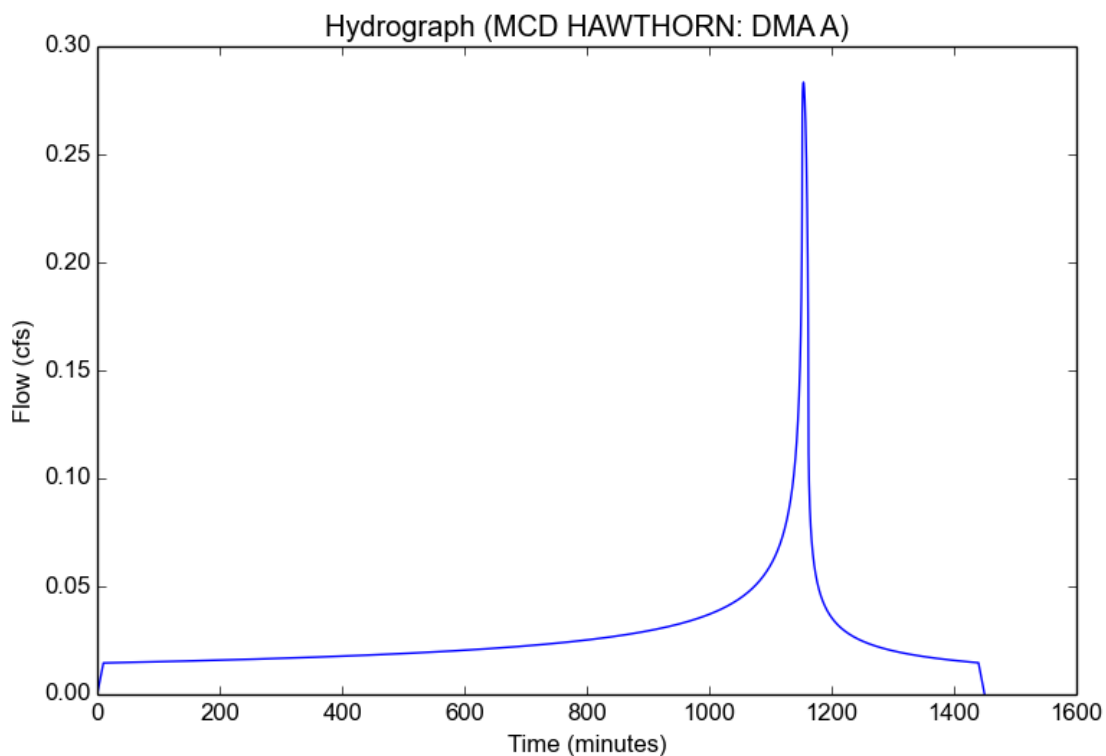
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Input Parameters

Project Name	MCD HAWTHORNE
Subarea ID	DMA A
Area (ac)	0.87
Flow Path Length (ft)	126.0
Flow Path Slope (vft/hft)	0.0214
85th Percentile Rainfall Depth (in)	0.95
Percent Impervious	0.87
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.95
Peak Intensity (in/hr)	0.4092
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.796
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	0.2834
Burned Peak Flow Rate (cfs)	0.2834
24-Hr Clear Runoff Volume (ac-ft)	0.0544
24-Hr Clear Runoff Volume (cu-ft)	2368.4214



Peak Flow Hydrologic Analysis

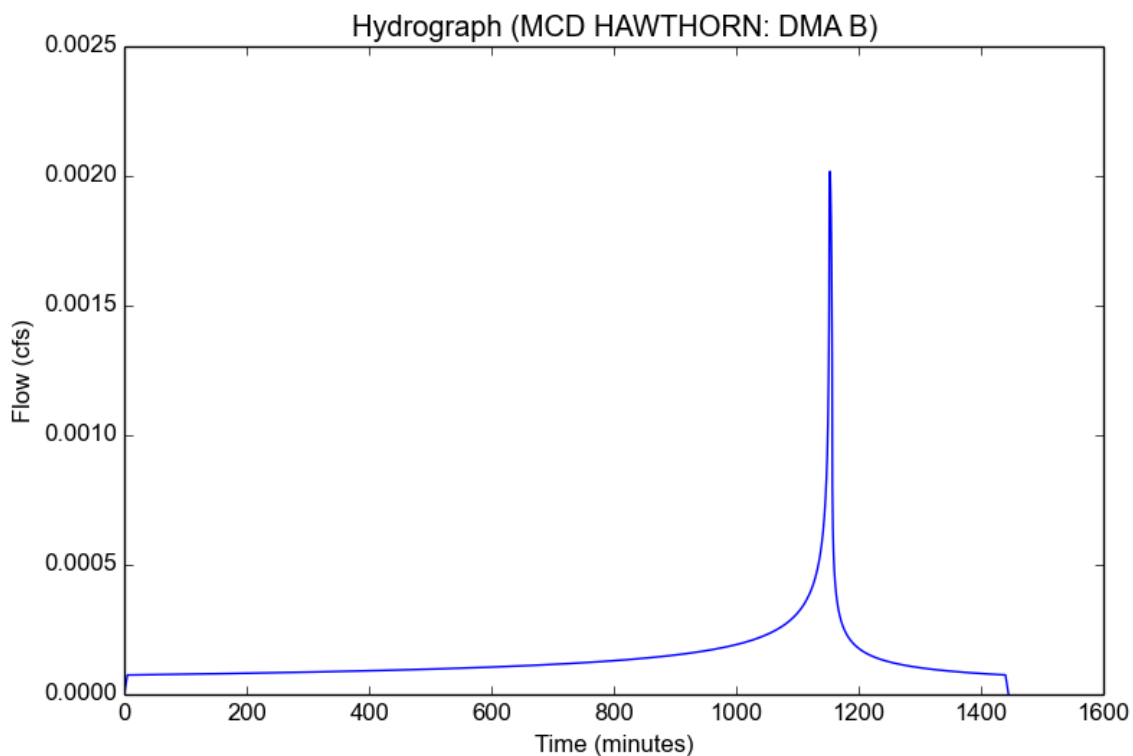
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Input Parameters

Project Name	MCD HAWTHORNE
Subarea ID	DMA B
Area (ac)	0.01
Flow Path Length (ft)	10.0
Flow Path Slope (vft/hft)	0.1
85th Percentile Rainfall Depth (in)	0.95
Percent Impervious	0.32
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

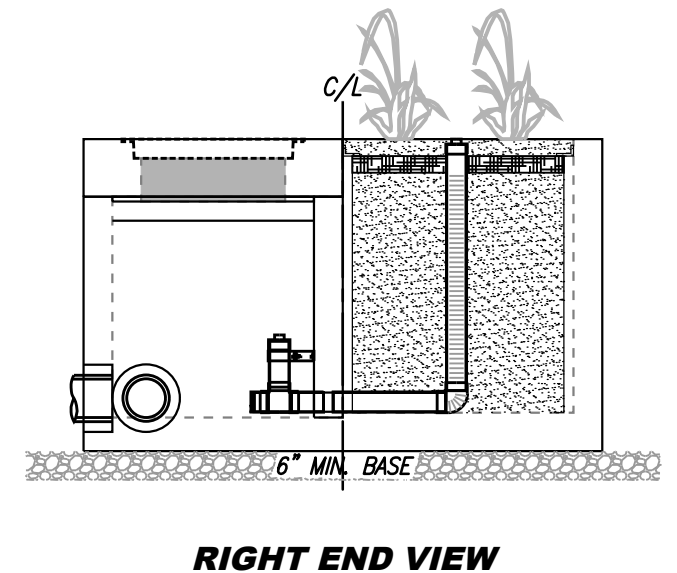
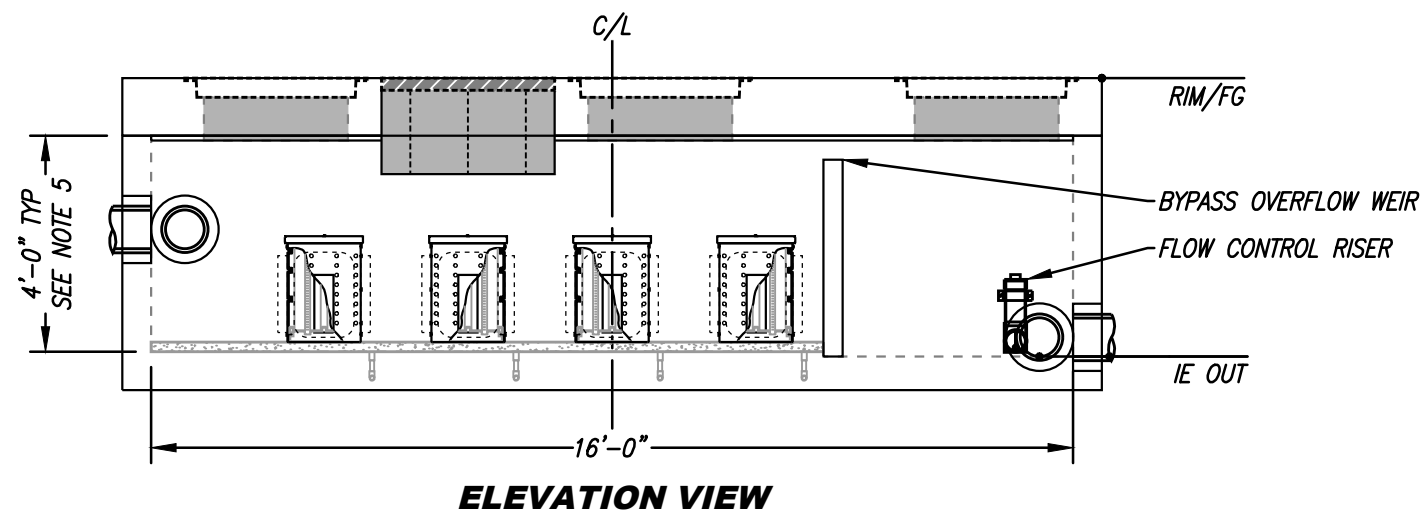
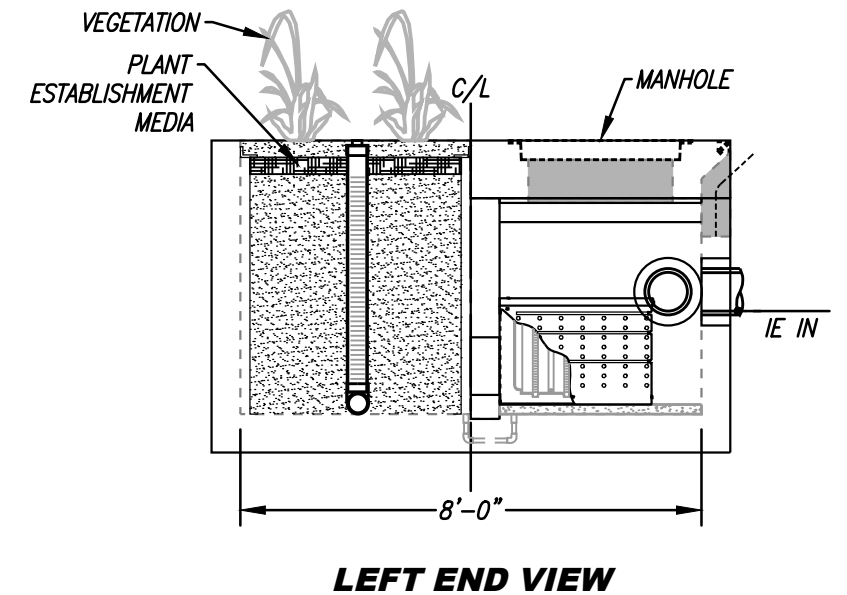
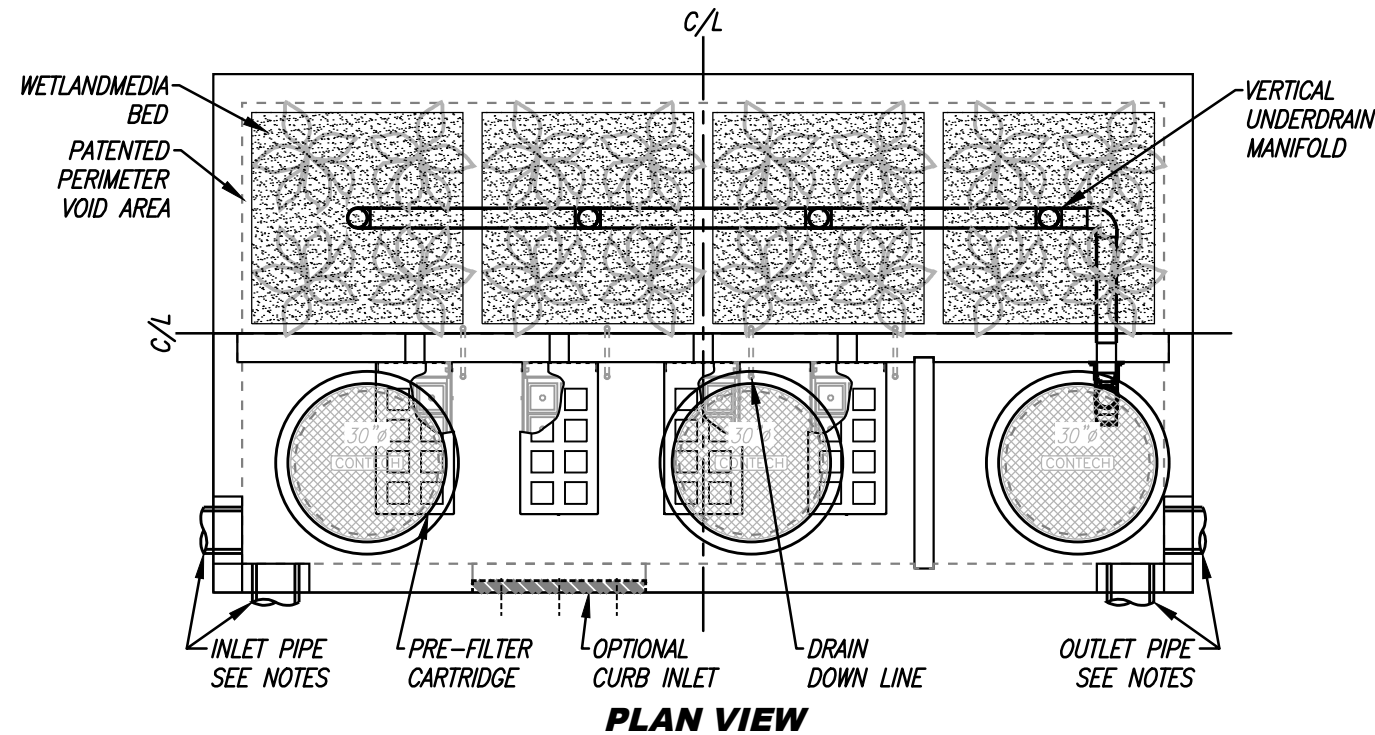
Modeled (85th percentile storm) Rainfall Depth (in)	0.95
Peak Intensity (in/hr)	0.5668
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.356
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.002
Burned Peak Flow Rate (cfs)	0.002
24-Hr Clear Runoff Volume (ac-ft)	0.0003
24-Hr Clear Runoff Volume (cu-ft)	12.1752



SITE SPECIFIC DATA

PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			
PRETREATMENT LOADING RATE (GPM/SF)		2.1 GPM/SF	
WETLAND MEDIA LOADING RATE (GPM/SF)		1.0	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE		___ (CFS)	
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

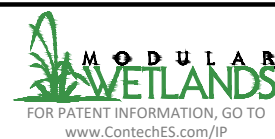
* PRELIMINARY ONLY - NOT FOR CONSTRUCTION



INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
4. CONTRACTOR RESPONSIBLE FOR CONTACTING CONTECH FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A CONTECH REPRESENTATIVE.
5. VERTICAL HEIGHT VARIES BASED ON SITE SPECIFIC REQUIREMENTS.

8/14/23 SCOTT SERICH



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MWS-L-8-16-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	



MCD HAWTHORNE

HAWTHORNE, CA, USA

SC-310 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-310.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE OR POLYETHYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 400 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2922 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-310 SYSTEM

1. STORMTECH SC-310 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOOTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

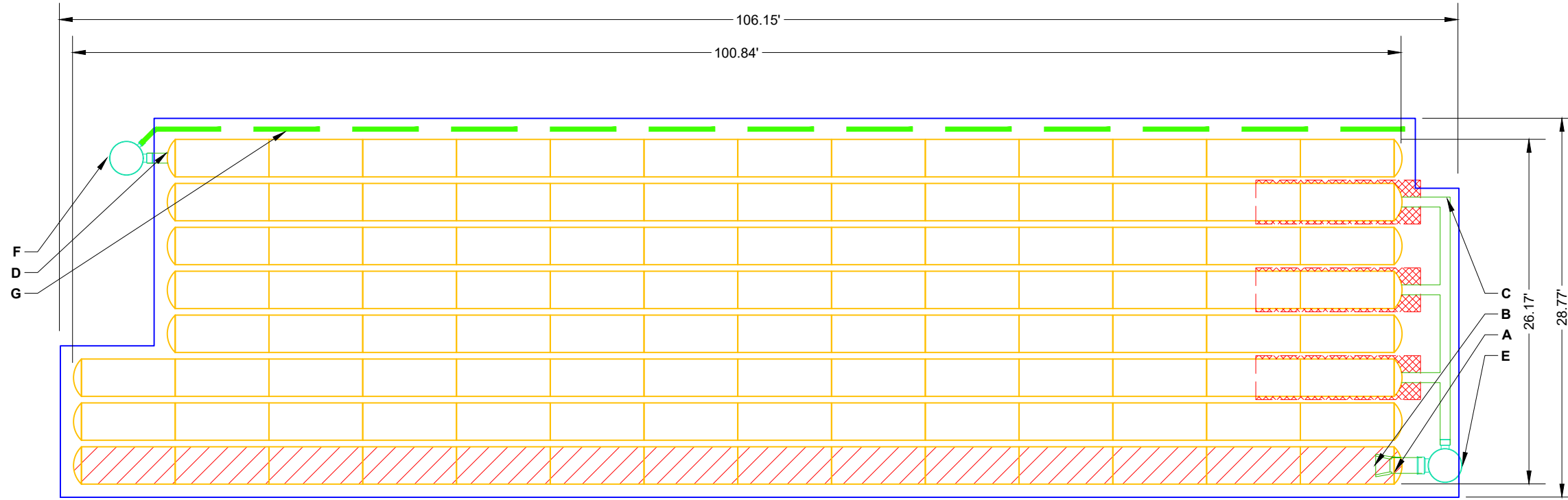
NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER Tired LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

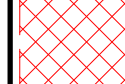
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.


CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS:		*INVERT ABOVE BASE OF CHAMBER				
				PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
107	STORMTECH SC-310 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	9.83					
16	STORMTECH SC-310 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	3.83					
6	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	3.33	PREFABRICATED EZ END CAP	A	12" BOTTOM PREFABRICATED EZ END CAP, PART#: SC310ECEZ / TYP OF ALL 12" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	0.90"	
6	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	3.33	FLAMP	B	INSTALL FLAMP ON 12" ACCESS PIPE / PART#: SC31012RAMP		
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	3.33	MANIFOLD	C	8" x 8" TOP MANIFOLD, MOLDED FITTINGS	3.50"	
3667	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	2.33	PIPE CONNECTION	D	8" BOTTOM CONNECTION	0.60"	
		TOP OF SC-310 CHAMBER:	1.83	NYLOPLAST (INLET W/ ISO PLUS ROW)	E	30" DIAMETER (24.00" SUMP MIN)		2.3 CFS IN
2913	SYSTEM AREA (SF)	8" BOTTOM CONNECTION INVERT:	0.55	NYLOPLAST (OUTLET)	F	30" DIAMETER (DESIGN BY ENGINEER)		0.7 CFS OUT
269.8	SYSTEM PERIMETER (ft)	BOTTOM OF SC-310 CHAMBER:	0.50	UNDERDRAIN	G	4" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		
473	THERMOPLASTIC LINER (SY) (20% OVERAGE)	UNDERDRAIN INVERT:	0.00					
		BOTTOM OF STONE:	0.00					



 ISOLATOR ROW PLUS (SEE DETAIL)

 PLACE MINIMUM 12.50' OF ADSPLUS625 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

 THERMOPLASTIC LINER (SEE TECH NOTE #6.50 PROVIDED BY OTHERS / DESIGN BY OTHERS)

NOTES

- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

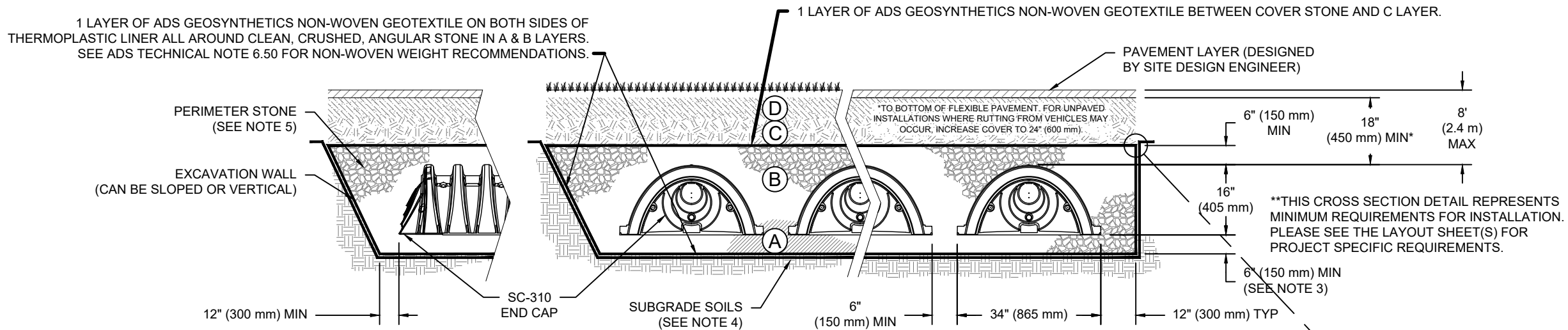
MCD HAWTHORNE HAWTHORNE, CA, USA DATE: 08/19/2024 DRAWN: GC		PROJECT #: CHECKED: N/A	
		DESCRIPTION DATE DRW CHK	
StormTech® Chamber System 1-800-821-6710 WWW.STORMTECH.COM		THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS/STORMTECH UNDER THE DIRECTION OF THE PROJECT'S ENGINEER OF RECORD (EOR) OR OTHER PROJECT REPRESENTATIVE. THIS DRAWING IS NOT INTENDED FOR USE IN BIDDING OR CONSTRUCTION WITHOUT THE EOR'S PRIOR APPROVAL. EOR SHALL REVIEW THIS DRAWING FOR THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.	
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ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	AASHTO M145 ¹ A-1, A-2-4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

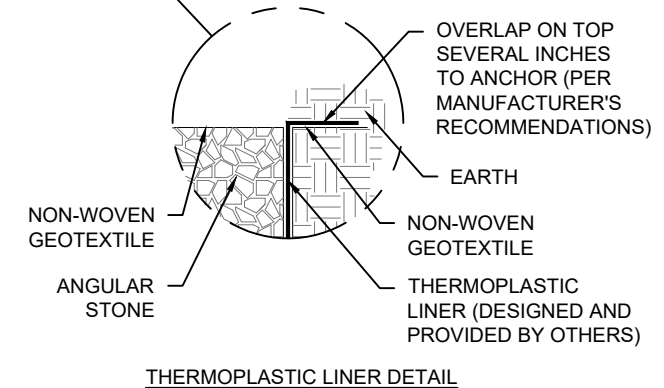
PLEASE NOTE:

1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 400 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.



MCD HAWTHORNE

HAWTHORNE, CA, USA

DRAWN: GC

CHECKED: N/A

DATE: 08/19/2024

PROJECT #:

DESCRIPTION

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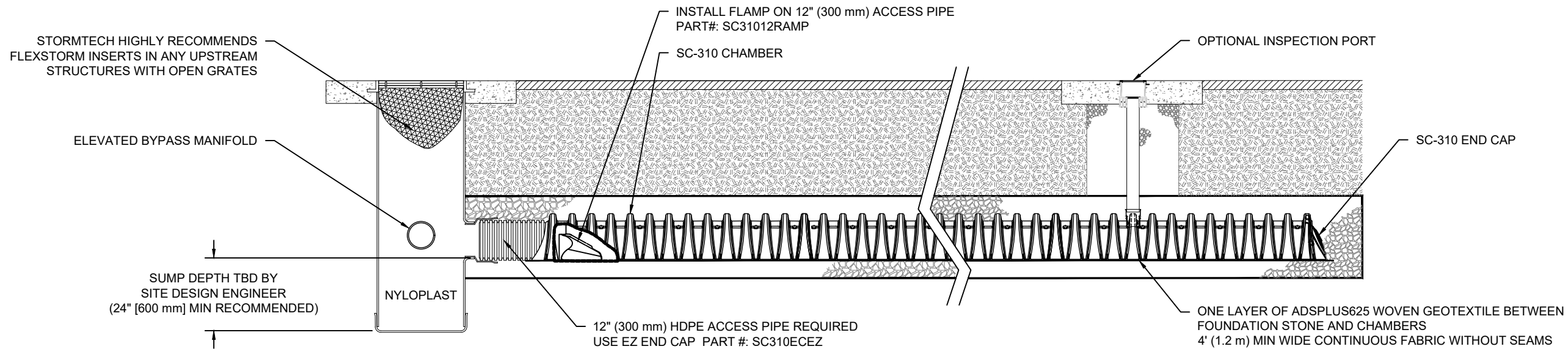
Chamber System

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SC-310 ISOLATOR ROW PLUS DETAIL

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INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
 - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
 - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
 - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
 - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
 - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
 - B. ALL ISOLATOR PLUS ROWS
 - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
 - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
 - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
 - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
 - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
 - B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
 - C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

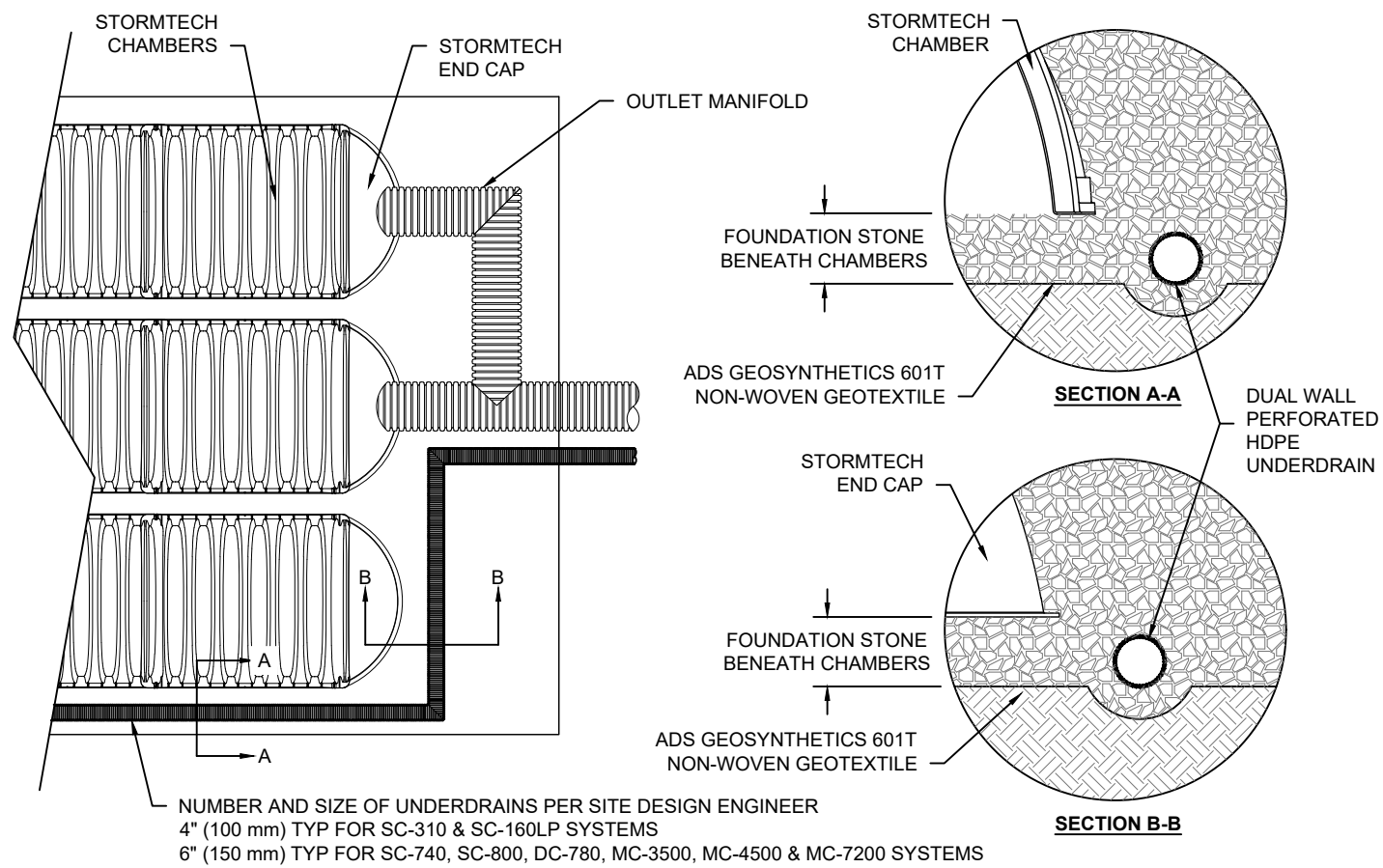
NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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<p>StormTech® Chamber System</p>			
<p>1-800-821-6710 WWW.STORMTECH.COM</p>			
<p>4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473</p>			
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<p>SHEET 4 OF 6</p>			

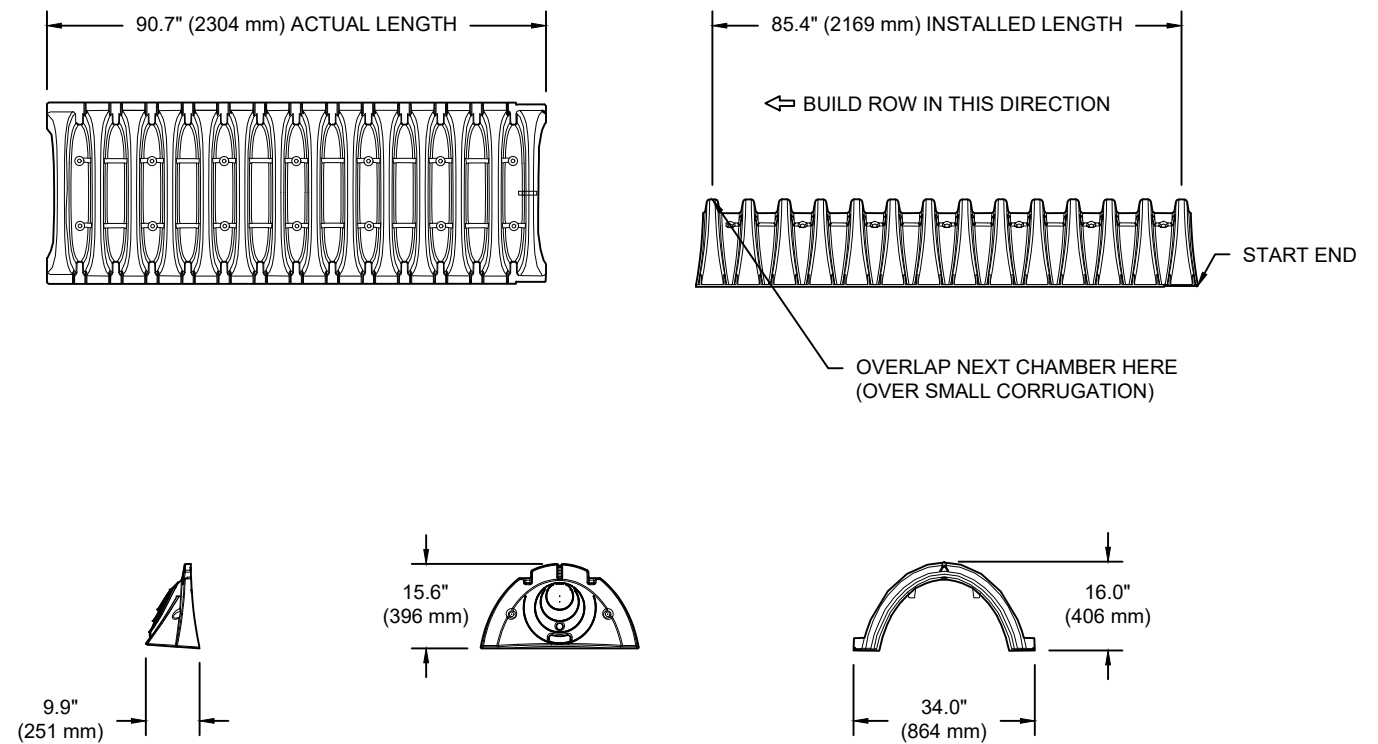
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SC-310 TECHNICAL SPECIFICATION

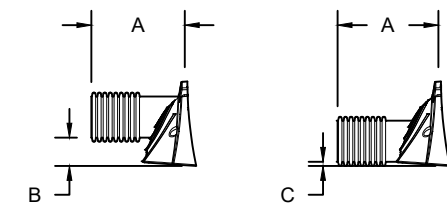
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NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	34.0" X 16.0" X 85.4"	(864 mm X 406 mm X 2169 mm)
CHAMBER STORAGE	14.7 CUBIC FEET	(0.42 m ³)
MINIMUM INSTALLED STORAGE*	31.0 CUBIC FEET	(0.88 m ³)
WEIGHT	35.0 lbs.	(16.8 kg)

*ASSUMES 6" (152 mm) ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUB AT BOTTOM OF END CAP WITH FLANGE END WITH "BR"
 PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
 PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
 PRE-CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC310EPE06T / SC310EPE06TPC	6" (150 mm)	9.6" (244 mm)	5.8" (147 mm)	---
SC310EPE06B / SC310EPE06BPC			---	0.5" (13 mm)
SC310EPE08T / SC310EPE08TPC	8" (200 mm)	11.9" (302 mm)	3.5" (89 mm)	---
SC310EPE08B / SC310EPE08BPC			---	0.6" (15 mm)
SC310EPE10T / SC310EPE10TPC	10" (250 mm)	12.7" (323 mm)	1.4" (36 mm)	---
SC310EPE10B / SC310EPE10BPC			---	0.7" (18 mm)
SC310ECEZ*	12" (300 mm)	13.5" (343 mm)	---	0.9" (23 mm)

ALL STUBS, EXCEPT FOR THE SC310ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-800-821-6710.

* FOR THE SC310ECEZ THE 12" (300 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 0.25" (6 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

MCD HAWTHORNE

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Chamber System

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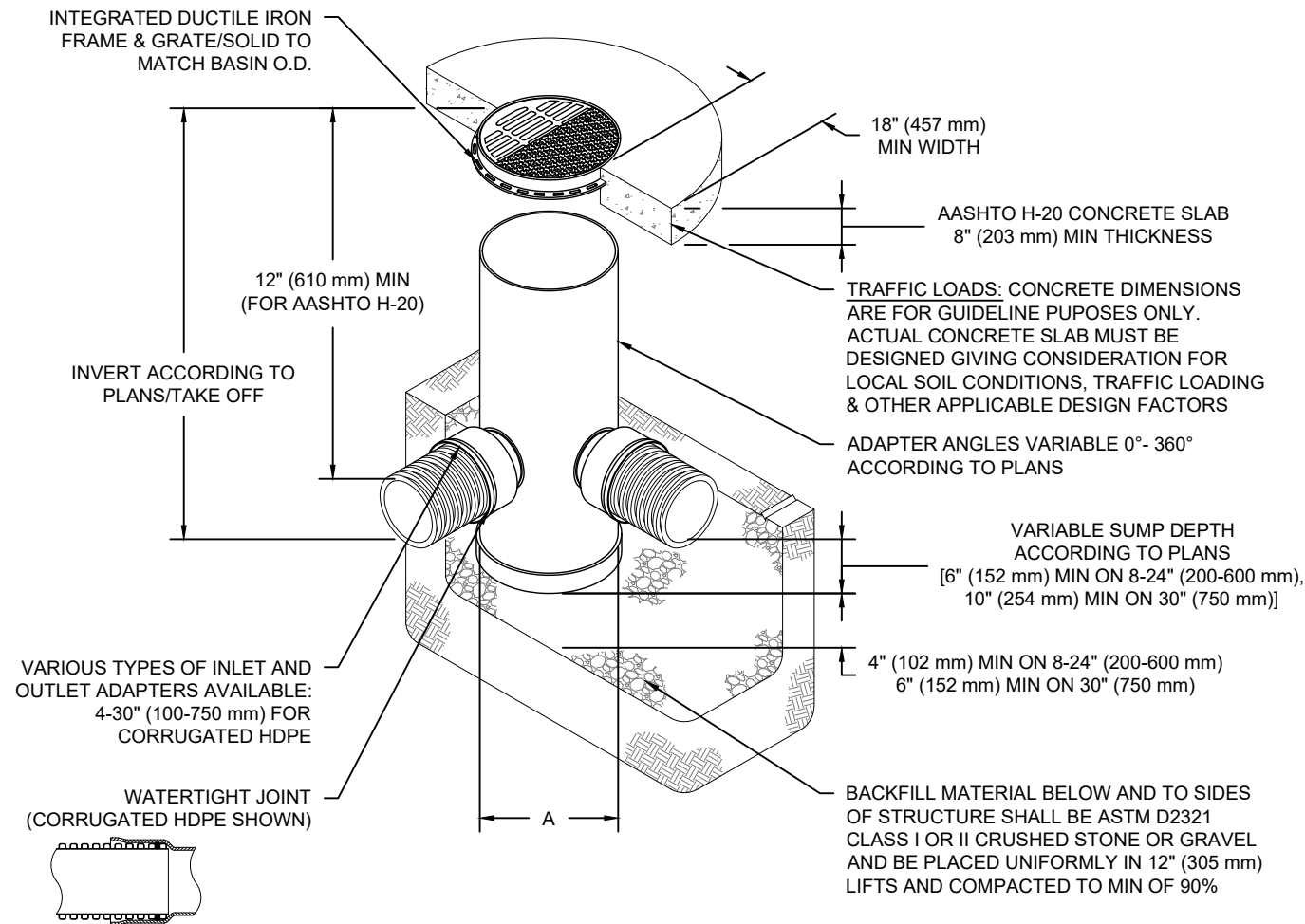
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NYLOPLAST DRAIN BASIN

NTS



NOTES

- 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
- 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
- DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
- DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
- FOR COMPLETE DESIGN AND PRODUCT INFORMATION: WWW.NYLOPLAST-US.COM
- TO ORDER CALL: 800-821-6710

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

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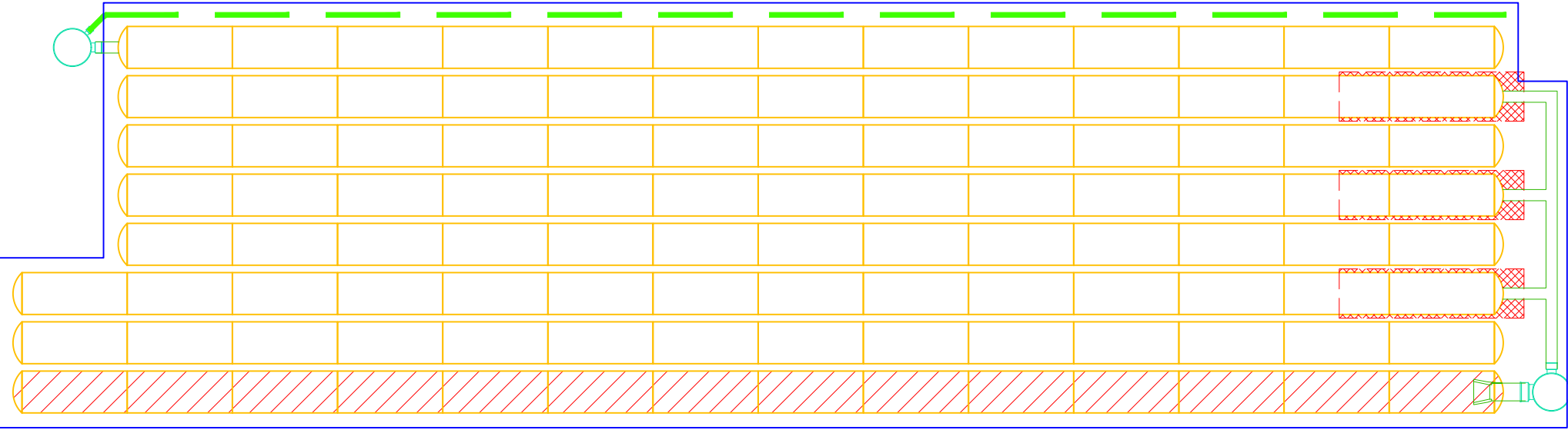
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SHEET

6 OF 6



Attachment B

Geotechnical Investigation



**GEOTECHNICAL EXPLORATION REPORT
MCDONALD'S SITE ID NO. 0045205
13324 INGLEWOOD AVENUE AND
13324 WEST 133RD STREET
HAWTHORNE, CALIFORNIA**

Prepared For **MCDONALD'S USA**
18565 JAMBOREE ROAD, SUITE 850
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Project Number 036.0000022167

June 28, 2024

June 28, 2024

Project No. 036.0000022167

MCDONALD'S USA
18565 Jamboree Road, Suite 850
Irvine, California 92612

Attention: Mr. Scott Wilkeson

**Subject: Geotechnical Exploration Report
McDonald's Site ID No. 0045205
13324 S. Inglewood Avenue And 13324 West 133rd Street
Hawthorne, California**

In accordance with your request, we are pleased to provide this report summarizing our geotechnical findings, conclusions and recommendations regarding the design and construction of the proposed project (McDonalds's Hawthorne 45205). Based on the results of our evaluation, it is our opinion that the site is suitable for the intended use provided the recommendations included in herein are implemented during design and construction phases of development.

If you have any questions regarding this report, please do not hesitate to contact the undersigned. We appreciate this opportunity to be of service on this project.

Respectfully submitted,

LEIGHTON CONSULTING, INC.



Christian Delgadillo, GE 3144
Associate Engineer
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Distribution: (1) Addressee (PDF copy via email)

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1.0 INTRODUCTION

1.1 Purpose and Scope

This geotechnical exploration is for the proposed Hawthorne 45205 store, located on the southeast corner of South Inglewood Avenue and West 133rd Street in Hawthorne, California. Our scope of services for this exploration included the following:

- Review of available site-specific geologic information and provided site plan.
- A site reconnaissance and excavation, logging, and sampling of four (4) exploratory borings. Approximate locations of these geotechnical borings are depicted on Figure 2, Exploration Location Map. The logs of exploratory borings are presented in Appendix A.
- Percolation testing within the proposed infiltration areas to provide preliminary infiltration rates for the onsite soil. The one (1) percolation test extended to a depth of approximately 5 feet below existing ground surface (bgs). The test data is presented in Appendix A.
- Geotechnical laboratory testing of selected soil samples collected during this evaluation. Test results are presented in Appendix B.
- Geotechnical engineering analyses performed or as directed by a California registered Geotechnical Engineer (GE) and reviewed by a California Certified Engineering Geologist (CEG).
- Preparation of this report, which presents our geotechnical conclusions and recommendations regarding the proposed structures.

This report is not intended to be used as an environmental assessment (Phase I or other), or foundation plan review.

1.2 Site and Project Description

The site is located on the southeast corner of South Inglewood Avenue and West 133rd Street in Hawthorne, California (see Figure 1, Site Location Map). The Los Angeles County Assessor's office has designated the Site as Assessor Parcel Numbers (APN) 4042-011-024 and 4042-011-026. Topographically, the site is relatively flat and bordered by 133rd Street to the north, South Inglewood Avenue to the west, West 134th Street to the south, and commercial/residential buildings to the

east. The Site was formerly occupied by a trailer park; however, there are currently no onsite structures and the property is vacant at this time. There are 17 concrete pads for trailers and one concrete pad for a former structure that appears to have been a rental office and/or managers residence. There are two asphalt-paved driveways and an asphalt-paved parking lot located in the southeast portion of the Site.

We understand that the proposed site development (see Figure 2) includes an approximately 3,694 square-foot building (new McDonald's restaurant) along with a trash enclosure, associated sidewalks, parking and driveways. The proposed building is anticipated to consist of one-story wood-frame structure supported by isolated spread and continuous wall footings founded near existing grades (within upper 3 feet bgs). Based on the preliminary site plan provided to us, we anticipate cut and fill grading of less than 2 feet to create finish site grades. If site development plans significantly differ from those described herein, the report should be subject to further review and evaluation.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration

Our field exploration consisted of the excavation of four (4) hollow stem auger borings to depths ranging from 11½ to 26½ feet below ground surface (bgs) in areas of planned buildings and parking areas and one (1) percolation test within a designated area of the site, at a depth of 5 feet bgs. During exploration, disturbed/bulk and relatively undisturbed samples were collected for further laboratory testing and evaluation. Approximate locations of these borings are depicted on the Exploration Location Map (see Figure 2). Sampling and logging were conducted by a technical member from our firm. After logging and sampling, the excavations were backfilled with spoils generated during excavation and the surface was patched to match the existing grade using quick set concrete and black dye. The exploration logs are provided in Appendix A.

2.2 Laboratory Testing

Laboratory tests were performed on representative bulk samples to provide a basis for development of earthwork control and foundation design. The laboratory testing program included maximum density and moisture content relationship, corrosion suite, R-value, Direct Shear, consolidation, Atterberg limits, and sieve analysis. The results of our laboratory testing are presented in Appendix B.

3.0 GEOTECHNICAL AND GEOLOGIC FINDINGS

3.1 Subsurface Conditions

Our field exploration, observations, and review of the pertinent literature indicate that the site is underlain by artificial fill (Af) overlying Quaternary old alluvial sediments (Qoa). A more detailed description of each unit is provided on the logs of borings in Appendix A.

- **Artificial fill:** Fill materials were encountered in our borings up to a depth of 5 feet deep. The fill consisted mainly of medium stiff clay and sandy clay. The fill was presumably placed during construction of the former trailer park that occupied the property.
- **Alluvium:** Alluvial materials were encountered in our borings below the artificial fill to the maximum depth explored of 26½ feet. As encountered, the alluvial deposits generally consisted of medium dense to very dense clayey sand and sand, and very stiff to hard sandy clay and clay.

3.2 Groundwater and Surface Water

Groundwater was not encountered during this exploration to a maximum depth explored of approximately 26½ feet below existing ground surface. Based on historic high groundwater from the *Seismic Hazard Zone Report for the Inglewood Quadrangle* (CGS, 1998), the groundwater levels reached approximately 47 feet bgs near the site. However, depth to groundwater can fluctuate depending on rainfall and seasonal variation.

3.3 Landslides/Debris Flow and Rockfall

No evidence of on-site landslides/debris flow or rock fall was observed during our field investigation. Due to lack of exposed rock and relatively low topographic relief of surrounding properties, the potential for rock fall due to either erosion or seismic ground shaking is considered negligible.

3.4 Regional Faulting and Fault Activity

The subject site, like the rest of Southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity is

movement along the northwest-trending regional fault systems such as the San Andreas Fault Zone. Based on published geologic hazard maps, this site is not located within a currently designated Alquist-Priolo (AP) Earthquake Fault Zone, or a County Fault Zone. The nearest zoned faults are the Newport-Inglewood Fault and the Palos Verdes fault. The Newport- Inglewood Fault is located approximately 2.9 miles northeast away from the site and the Palos Verdes is approximately 5.6 miles southwest of the site.

3.5 **Seismicity**

As is common for virtually all of Southern California, strong ground shaking can be expected at the site during moderate to severe earthquakes in this general region. Intensity of ground shaking at a given location depends primarily upon earthquake magnitude, site distance from the source, and site response (soil type) characteristics. The seismic coefficients were calculated utilizing an interactive program on current OSHPD website using ASCE 7-16 procedures, as well as USGS Unified Hazard Maps. Based on our exploration and review, the site will be underlain by relatively dense alluvial materials. As such, the site is classified as a Class D site, and the site-specific seismic coefficients are as listed in the following table:

Table 1. 2022 CBC Seismic Coefficients per USGS General Procedure

Site Seismic Coefficients / Coordinates		Value
Latitude		33.9113
Longitude		-118.3610
Mapped Spectra (OSHDP)	Spectral Response – Class D (short), S_s	1.833g
	Spectral Response – Class D (1 sec), S_1	0.645g
	Site Modified Peak Ground Acceleration, PGA_M	0.87g
	Max. Considered Earthquake Spectral Response Acceleration (short), S_{MS}	1.83g
	Max. Considered Earthquake Spectral Response Acceleration – (1 sec), S_{M1}	1.105g ⁽¹⁾
	5% Damped Design Spectral Response Acceleration (short), S_{DS}	1.22g
	5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.737g ⁽¹⁾
	Peak Ground Acceleration, PGA	0.79g
g = Gravity acceleration ⁽¹⁾ Per Supplement 3 to ASCE 7-16, the seismic parameters S_{M1} and S_{D1} in Table 1 above should be increased by 50% (Site Class D). Alternatively, a site-specific ground motion hazard analysis in accordance with Section 21.2 of ASCE 7-16 is required for this site.		

3.6 Secondary Seismic Hazards

Ground shaking can induce “secondary” seismic hazards such as liquefaction, dynamic densification, lateral spreading, flooding, seiche/tsunami, collapsible soils, and ground rupture, as discussed in the following subsections:

3.6.1 Dynamic Settlement (Liquefaction and/or Dry Settlement)

Due to the lack of shallow groundwater and dense nature of underlying older alluvial soils, dynamic settlement (Liquefaction and/or Dry Settlement) is not considered a geologic hazard on this site.

3.6.2 Lateral Spreading

Due to the lack of shallow groundwater and dense nature of underlying materials, lateral spreading is not considered a geologic hazard on this site.

3.6.3 Seiche and Tsunami

Due to the site location and lack of nearby open bodies of water, the possibility of the affects due to seiches or tsunami is considered nil.

3.6.4 Collapsible Soils

Due to the dense nature and relatively high dry densities of the near-surface materials, collapse potential is considered to be low on this site.

3.6.5 Expansive Soils

Expansive soils contain significant amounts of clay particles that swell considerably when wetted and which shrink when dried. Foundations constructed on these swells are subject to uplifting forces caused by swelling. Without proper mitigation measures heaving and cracking of both building foundations and slabs-on-grade could result.

One (1) near-surface (upper 5 feet) bulk sample of clay obtained during our subsurface exploration was tested for expansion potential. The test results indicate that the onsite soils have a "high" expansion potential (Expansion Index of 85). The Expansion Index laboratory test result is included in Appendix B of this report.

3.6.6 Ground Rupture

Since this site is not located within a mapped Fault Zone and there are no known faults within or trending into the property, the possibility of ground surface-fault-rupture is considered very low at this site.

3.7 Percolation/Infiltration Testing

One (1) preliminary percolation test was performed in a proposed infiltration area (see Figure 2) in general accordance with the procedures of the Los Angeles County Public Works Standards (Los Angeles County, 2021). The percolation test was performed at a depth of approximately 5 feet bgs. The percolation test results/data sheets are included in Appendix A.

Per the guidelines by County of Los Angeles Department of Public Works (2021), reduction factors should be applied to measured infiltration rates to determine design values that will represent long-term performance of the proposed infiltration system. A reduction factor of 3 was selected to account for the test method, site variability, and long-term siltation. Results of the percolation testing are summarized in Table 2.

Table 2. Field Percolation Testing Summary

Percolation Test Boring/Well Designation	Percolation Test Method	Approximate Depth of Test Zone Below Ground Surface (feet)	Design Infiltration Rate (in/hr)
LB-4	Falling Head	5	<u>0.01</u>

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 General

Based on the results of this exploration, it is our opinion that the site is suitable for the proposed development from a geotechnical viewpoint. Grading of the site should be in accordance with our recommendations included in this report and future recommendations and evaluations made during construction by the geotechnical consultant.

4.2 Earthwork

Earthwork should be performed in accordance with the General Earthwork and Grading Specifications in Appendix C as well as the following recommendations. The recommendations contained in Appendix C, are general grading specifications provided for typical grading projects and some of the recommendations may not be strictly applicable to this project. The specific recommendations contained in the text of this report supersede the general recommendations in Appendix C.

The contract between the developer and earthwork contractor should be worded such that it is the responsibility of the contractor to place fill properly in accordance with the recommendations of this report, the specifications in Appendix C, applicable Grading Ordinances, notwithstanding the testing and observation of the geotechnical consultant during construction.

4.2.1 Site Preparation and Remedial Grading

Prior to grading, the proposed structural improvement areas (i.e. all-structural fill areas, pavement areas, buildings, etc.) should be cleared of stockpiled soils, debris, vegetation, surface and subsurface pipelines and obstructions. Heavy vegetation, roots and debris should be disposed of offsite. Voids created by removal of buried/unsuitable materials should be backfilled with properly compacted soil in general accordance with the recommendations of this report.

- **Building Areas:** Foundation for the proposed building should be underlain by compacted fill reinforced with geogrid to provide a uniform support and reduce potential for differential settlement. The compacted fill should extend a minimum of 3 feet below bottom of the foundation and a minimum 3 feet beyond outside edges of the foundation. Localized

deeper over-excavation (ox) may be required depending on actual field conditions encountered during excavation.

- **Vehicular Pavements/Flatwork:** Pavement areas, driveway, and concrete flatwork should be underlain by a minimum of 1 foot of compacted fill. Local conditions may be encountered that could require additional overexcavation beyond the above noted minimum to obtain an acceptable subgrade.

The actual depths and lateral extents of remedial grading will be determined by Leighton, based on subsurface conditions encountered during grading. Prior to placing fill materials, the pavement subgrade soils should be scarified to a minimum depth of 6 inches, moisture conditioned, and proofrolled. Any soft and/or unsuitable materials encountered at the bottom of the excavations should be removed and replaced with fill material.

4.2.2 Structural Fills

The onsite soils are generally suitable for re-use as compacted fill, provided they are free of debris and organic matter. Areas to receive structural fill and/or other surface improvements should be scarified to a minimum depth of 8 inches, conditioned to at least optimum moisture content, and recompacted. Fill soils should be placed at a minimum of 90 percent relative compaction (based on ASTM D1557) at least 2 to 4 percentage points above optimum moisture content. Placement and compaction of fill should be performed in accordance with local grading ordinances under the observation and testing of the geotechnical consultant. The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts not exceeding 8 inches in thickness.

4.2.3 Import Soils

Import soils and/or borrow sites, if needed, should be evaluated by us prior to import. Import soils should be uncontaminated, granular in nature, free of organic material (loss on ignition less-than 2 percent), have very low expansion potential ($E < 21$) and have a low corrosion impact to the proposed improvements.

4.2.4 Utility Trenches

Utility trenches should be backfilled with compacted fill in accordance with the *Standard Specifications for Public Works Construction*, (“Greenbook”), 2021 Edition. Fill material above the pipe zone should be placed in lifts not exceeding 8 inches in uncompacted thickness and should be compacted to at least 90 percent relative compaction (ASTM D 1557) by mechanical means only. Site soils may generally be suitable as trench backfill provided these soils are screened of rocks over 1½ inches in diameter and organic matter. If imported sand is used as backfill, the upper 3 feet in building and pavement areas should be compacted to 95 percent. The upper 6 inches of backfill in all pavement areas should be compacted to at least 95 percent relative compaction.

Where granular backfill is used in utility trenches adjacent to moisture sensitive subgrades and foundation soils, we recommend that a cut-off “plug” of impermeable material be placed in these trenches at the perimeter of buildings, and at pavement edges adjacent to irrigated landscaped areas. A “plug” can consist of a 5-foot long section of clayey soils with more than 35-percent passing the No. 200 sieve, or a Controlled Low Strength Material (CLSM) consisting of one sack of Portland-cement plus one sack of bentonite per cubic-yard of sand. CLSM should generally conform to requirements of the “Greenbook”. This is intended to reduce the likelihood of water permeating trenches from landscaped areas, then seeping along permeable trench backfill into the building and pavement subgrades, resulting in wetting of moisture sensitive subgrade soils under buildings and pavements.

Excavation of utility trenches should be performed in accordance with the project plans, specifications and the *California Construction Safety Orders* (latest Edition). The contractor should be responsible for providing a "competent person" as defined in Article 6 of the *California Construction Safety Orders*. Contractors should be advised that sandy soils (such as fills generated from the onsite alluvium) could make excavations particularly unsafe if all safety precautions are not properly implemented. In addition, excavations at or near the toe of slopes and/or parallel to slopes may be highly unstable due to the increased driving force and load on the trench wall. Spoil piles from the excavation(s) and construction equipment should

be kept away from the sides of the trenches. Leighton Consulting, Inc. does not consult in the area of safety engineering.

4.2.5 Shrinkage

The volume change of excavated onsite soils upon recompaction is expected to vary with materials, density, insitu moisture content, and location and compaction effort. The in-place and compacted densities of soil materials vary and accurate overall determination of shrinkage and bulking cannot be made. Therefore, we recommend site grading include, if possible, a balance area or ability to adjust grades slightly to accommodate some variation. Based on our geotechnical laboratory results, we expect recompaction shrinkage (when recompacted to an average 92 percent of ASTM D1557) to vary between 5% and 15%, where the shrinkage decreases with depth.

4.2.6 Drainage

All drainage should be directed away from structures and pavements by means of approved permanent/temporary drainage devices. Adequate storm drainage of any proposed pad should be provided to avoid wetting of foundation soils. Irrigation adjacent to buildings should be avoided when possible. As an option, sealed-bottom planter boxes and/or drought resistant vegetation should be used within 5-feet of buildings.

4.3 Foundation Design

4.3.1 Design Parameters – Spread/Continuous Shallow Footings

Footings should be embedded at least 18-inches below lowest adjacent grade for the proposed structure. Footing embedment should be measured from lowest adjacent finished grade, considered as the top of interior slabs-on-grade or the finished exterior grade, excluding landscape topsoil, whichever is lower. Footings located adjacent to utility trenches or vaults should be embedded below an imaginary 1:1 (horizontal:vertical) plane projected upward and outward from the bottom edge of the trench or vault, up towards the footing.

-
- **Bearing Capacity**: For footings on newly placed, properly compacted fill soil, an allowable vertical bearing capacity of 2,000 pounds-per-square-foot (psf) should be used. These footings should have a minimum base width of 12 inches for continuous wall footings and a minimum bearing area of 3 square feet (1.75-ft by 1.75-ft) for pad foundations. The bearing pressure value may be increased by 250 psf for each additional foot of embedment or each additional foot of width to a maximum vertical bearing value of 3,000 psf. Additionally, these bearing values may be increased by one-third when considering short-term seismic or wind loads. A modulus of subgrade reaction, K of 60 pounds per cubic inch (pci) may be used for design.
 - **Lateral loads**: Lateral loads may be resisted by friction between the footings and the supporting subgrade. A maximum allowable frictional resistance of 0.35 may be used for design. In addition, lateral resistance may be provided by passive pressures acting against foundations poured neat against properly compacted granular fill. We recommend that an allowable passive pressure based on an equivalent fluid pressure of 390 pounds-per-cubic-foot (pcf) be used in design. These friction and passive values have already been reduced by a factor-of-safety of 1.5.

4.3.2 **Settlement Estimates**

Based on structural loads and foundation conditions described in Section 1.2, proposed buildings should be designed in anticipation of 1-inch of total settlement and 0.5-inch differential settlement within a 40-foot horizontal distance. If greater column/wall loads or deeper footings are required, we should re-evaluate our foundation recommendations, and re-calculate settlement estimates.

4.4 **Slab-On-Grade**

From a geotechnical standpoint, we recommend slab-on-grade floor slab be a minimum 5 inches thick with No. 3 rebar placed at the center of the slab at 18 inches on center in each direction. The structural engineer should design the actual thickness and reinforcement based on anticipated loading conditions. Where moisture-sensitive floor coverings or equipment is planned, the slabs should be protected by a minimum 10-mil thick vapor barrier between the slab and subgrade.

Exterior concrete slabs that are not subject to vehicular loading, such as patio slabs and sidewalks, should be at least 4 inches thick. We suggest that the exterior concrete slabs be reinforced using No. 3 rebar, 18 inches on center in both directions, placed at mid-thickness. Prior to placement of rebar and concrete, we recommend subgrade for the concrete flatwork be pre-saturated to 1.3 times the optimum moisture content to a minimum depth of 18 inches.

Minor cracking of concrete after curing due to drying and shrinkage is normal and should be expected; however, concrete is often aggravated by a high water/cement ration, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. The use of low-slump concrete or low water/cement ratios can reduce the potential for shrinkage cracking. Additionally, our experience indicates that the use of reinforcement in slabs and foundations can generally reduce the potential for concrete cracking.

To reduce the potential for excessive cracking, concrete slabs-on-grade should be provided with construction or weakened plane joints at frequent intervals. Joints should be laid out to form approximately square panels.

4.5 Retaining Walls

Retaining wall earth pressures are a function of the amount of wall yielding horizontally under load. If the wall can yield enough to mobilize full shear strength of backfill soils, then the wall can be designed for "active" pressure. If the wall cannot yield under the applied load, the shear strength of the soil cannot be mobilized and the earth pressure will be higher. Such walls should be designed for "at rest" conditions. If a structure moves toward the soils, the resulting resistance developed by the soil is the "passive" resistance. Retaining walls backfilled with non-expansive soils can be designed using the following equivalent fluid pressures:

Table 3. Retaining Wall Design Earth Pressures (Static, Drained)

Loading Conditions	Equivalent Fluid Density (pcf)
	Level Backfill
Active	40
At-Rest	60
Passive*	300

* This assumes level condition in front of the wall will remain for the duration of the project, not to exceed 3,000 psf at depth.

Retaining walls retaining more than 6 feet of soil should consider a seismic earth pressure increment with an inverted triangular distribution of 30 psf/foot in addition to the active earth pressure provided above. The above values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design.

Unrestrained (yielding) cantilever walls should be designed for the active equivalent-fluid weight value provided above for very low expansive soils that are free draining. In the design of walls restrained from movement at the top (non-yielding) such as basement or elevator pit/utility vaults, the at-rest equivalent fluid weight value should be used. Total depth of retained earth for design of cantilever walls should be measured as the vertical distance below the ground surface measured at the wall face for stem design, or measured at the heel of the footing for overturning and sliding calculations. Should a sloping backfill other than a 2:1 (horizontal: vertical) be constructed above the wall (or a backfill is loaded by an adjacent surcharge load), the equivalent fluid weight values provided above should be re-evaluated on an individual case basis by us. Non-standard wall designs should also be reviewed by us prior to construction to check that the proper soil parameters have been incorporated into the wall design.

All retaining walls should be provided with appropriate drainage. The outlet pipe should be sloped to drain to a suitable outlet. Wall backfill should be non-expansive ($EI \leq 21$) sands compacted by mechanical methods to a minimum of 90 percent relative compaction (ASTM D 1557). Clayey site soils should not be used as wall backfill. Walls should not be backfilled until wall concrete attains the 28-day compressive strength and/or as determined by the Structural Engineer that the wall is structurally capable of supporting backfill. Lightweight compaction equipment should be used, unless otherwise approved by the Structural Engineer.

4.6 **Soil Corrosivity**

One representative soil sample was evaluated for corrosivity to concrete and steel. The test results are presented in Appendix B, Laboratory Test Results, and design Recommendations pertaining to soil corrosivity are presented below.

We anticipate that concrete structures will be exposed to moisture from precipitation and irrigation. Based on the site location and the results of chloride testing of the site soils, we do not anticipate that concrete structures will be exposed to external sources of chlorides, such as deicing chemicals, salt, brackish water, or seawater.

American Concrete Institute (ACI) specifies exposure category C1 where concrete is exposed to moisture, but not to external sources of chlorides based on Table 19.3.1.1 of ACI 318 (2014). ACI provides concrete design recommendations in Table 19.3.2.1, including a minimum compressive strength of 2,500 psi and a maximum chloride content of 0.3 percent for non-prestressed concrete and 0.06 percent for prestressed concrete.

Based on laboratory testing, the onsite soils are expected to possess negligible sulfate content (<1,000 ppm). ACI 318 (2014) specifies exposure category S0 based on Table 19.3.1.1. There is no cement type specified for exposure category S0 based on Table 19.3.2.1; however, a minimum compressive strength of 2,500 psi should be used. Type II cement or equivalent may be used. Further testing should be performed at the completion of site grading to confirm such conditions.

The measured value of the minimum electrical resistivity of the sample when saturated was 750 ohm-cm for the tested soil sample. This indicates that the soils tested at the site are “very severely corrosive” to ferrous metals based on findings of studies presented in the American Society for Testing and Materials (ASTM) STP 1013 titled “Effects of Soil Characteristics on Corrosion” (February 1989). A qualified corrosion consultant should provide appropriate corrosion mitigation for ferrous metals in contact with the onsite soils.

This is a conservative assessment based on limited sampling; therefore, additional corrosion testing should be performed at the completion of grading or as recommended by a qualified corrosion consultant.

4.7 **Preliminary Pavement Design**

Our preliminary pavement design is based on a design R-value of at least 5, and the Caltrans Highway Design Manual. For planning and estimating purposes, the pavement sections are calculated for a range of Traffic Indexes (TI) as listed in table below.

Table 4. Asphalt Pavement Sections

Traffic Index (TI)	Asphalt Concrete (inches)	Aggregate Base (inches)
5	4	9
6	4½	13
7	5½	14

Appropriate Traffic Index (TI) should be selected or verified by the project civil engineer and actual R-value of the subgrade soils will need to be verified after completion of site grading. Pavement design and construction should also conform to applicable local City, County and industry standards. The Caltrans pavement section design calculations were based on a pavement life of approximately 20 years with periodic flexible pavement maintenance.

Where applicable, we recommend that a minimum of 6 inches of PCC pavement be used in high impact load areas or if to be subjected to truck traffic. The PCC pavement should be placed on a minimum 6-inch aggregate base. The PCC pavement should have a minimum of 28-day compressive strength of 3250 psi. Other requirements of Caltrans Standard Specifications regarding mixing and placing of concrete should be followed.

The upper 6 inches of the subgrade soils should be moisture-conditioned to near optimum moisture content, compacted to at least 95 percent relative compaction (ASTM D1557) and kept in this condition until the pavement section is constructed. Minimum relative compaction requirements for aggregate base should be 95 percent of the maximum laboratory density as determined by ASTM D1557. If applicable, aggregate base should conform to the “Standard Specifications for Public Works Construction” (green book) current edition or Caltrans Class 2 aggregate base.

If pavement areas are adjacent to heavily watered landscape areas, some deterioration of the subgrade load bearing capacity and pavement failure may result. Moisture control measures such as deepened curbs or other moisture

barrier materials may be used to prevent the subgrade soils from becoming saturated. The use of concrete cutoff or edge barriers should be considered when pavement is planned adjacent to either open (unfinished) or irrigated landscaped areas.

5.0 GEOTECHNICAL CONSTRUCTION SERVICES

Geotechnical review is of paramount importance in engineering practice. Poor performances of many foundation and earthwork projects have been attributed to inadequate construction review. We recommend that Leighton Consulting, Inc. be provided the opportunity to review the grading plan and foundation plan(s) prior to bid.

Reasonably-continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction. Geotechnical conclusions and preliminary recommendations should be reviewed and verified by Leighton Consulting, Inc. during construction, and revised accordingly if geotechnical conditions encountered vary from our findings and interpretations. Geotechnical observation and testing should be provided:

- After completion of site demolition and clearing,
- During over-excavation of compressible soil,
- During compaction of all fill materials,
- After excavation of all footings and prior to placement of concrete,
- During utility trench backfilling and compaction, and
- When any unusual conditions are encountered.

Additional geotechnical exploration and analysis may be required based on final development plans, for reasons such as significant changes in proposed structure locations/footprints. We should review grading (civil) and foundation (structural) plans, and comment further on geotechnical aspects of this project.

6.0 LIMITATIONS

This report was based in part on data obtained from a limited number of observations, site visits, soil excavations, samples and tests. Such information is, by necessity, incomplete. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, our findings, conclusions and recommendations presented in this report are based on the assumption that we (Leighton Consulting, Inc.) will provide geotechnical observation and testing during construction as the Geotechnical Engineer of Record for this project. Please refer to Appendix D, GBA's *Important Information About This Geotechnical-Engineering Report*, prepared by the Geoprofessional Business Association (GBA) presenting additional information and limitations regarding geotechnical engineering studies and reports.

This report was prepared for the sole use of Client and their design team, for application to design of the proposed maintenance building, in accordance with generally accepted geotechnical engineering practices at this time in California. Any unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton Consulting, Inc. from and against any liability, which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton Consulting, Inc.

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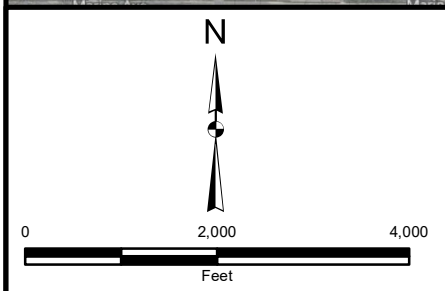
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Approximate Site Boundary





Project: 22167	Eng/Geol: CD
Scale: 1" = 2,000'	Date: April 2024
Base Map: ESRI ArcGIS Online 2024	
Author: (btran)	

SITE LOCATION MAP
 McDonalds 45205
 13324 West 133rd Street
 Hawthorne, California 90250

FIGURE 1


Legend

- LB-4**  Approximate location of boring showing total depth (T.D.)
-  Approximate Site Boundary



Project: 22167	Eng/Geol: CD
Scale: 1" = 30'	Date: May 2024
Reference: Delivery Truck Plan - Option 2 Sheet CP1.20 by Sevan Engineering, P.C.	

EXPLORATION LOCATION MAP
McDonalds 45205
13324 West 133rd Street
Hawthorne, California

FIGURE 2





APPENDIX A

**LOGS OF EXPLORATORY BORINGS AND
PERCOLATION TEST RESULTS**

APPENDIX A

LOGS OF EXPLORATORY BORINGS AND PERCOLATION TEST RESULTS

Encountered earth materials were logged and sampled in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D 2488). Representative soil samples were transported to our in-house Irvine laboratory for geotechnical testing. After logging and sampling, our borings were backfilled with spoils generated during drilling and capped with quickset concrete and black dye.

One shallow boring LB-4 was drilled to a depth of 5 and converted to a temporary percolation test well. The boring was pre-soaked upon completion of drilling in preparation for in-situ percolation testing. The testing was performed in general accordance with County of Los Angeles Department of Public Works (LADPW) Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, dated June 30, 2021 (LADPW, 2021). After the conclusion of percolation testing, the PVC pipe was removed from the test well and the test well was backfilled with soil cuttings and capped with quickset concrete and black dye.

GEOTECHNICAL BORING LOG LB-1

Project No. 036.0000022167
Project McDonald's Hawthorne 45205
Drilling Co. BC2
Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
Location See Figure 2 - Exploration Location Map

Date Drilled 3-15-24
Logged By RM
Hole Diameter 8"
Ground Elevation 82'
Sampled By RM

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.										
0		N S		B-1	Bulk Driven			CH	@Surface: 2-inches of Asphalt Concrete Artificial Fill (Af) @2": Fat CLAY, medium stiff, very dark brown, moist, high plasticity.	AL, EI, CR
80				R-1	9 12 14		111	CL	Quaternary-aged old alluvium deposits (Qoa) @5": Lean CLAY, very stiff, olive brown, slightly moist, oxidation.	DS
5				R-2	9 20 31		118	SP	@10": Poorly-graded SAND, dense, light yellow brown mottled with oxidation, slightly moist, very fine sands, trace fines.	
75				R-3	7 14 19		108	CL	@15": SANDY CLAY, hard, light gray mottled with brown, slightly moist, fine to medium coarse sand, trace calcium carbonate, medium plasticity.	
10				R-4	10 13 25		98	CL		
70				R-5	4 36 50		105	SP	@25": Poorly-graded SAND, very dense, light brown mottled with orange and mica, slightly moist, very fine sand, trace fines.	
15									TOTAL DEPTH = 26.5 FEET GROUNDWATER NOT ENCOUNTERED BACKFILL WITH SOIL CUTTINGS SURFACE PATCHED TO MATCH EXISTING SURFACE	
65										
20										
60										
25										
55										
30										

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- 200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL

- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE

- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-2

Project No. 036.0000022167
Project McDonald's Hawthone 45205
Drilling Co. BC2
Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
Location See Figure 2 - Exploration Location Map

Date Drilled 3-15-24
Logged By RM
Hole Diameter 8"
Ground Elevation 83'
Sampled By RM

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S			Bulk Driven				This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
0				B-1				CL	@Surface: 2-inches of Asphalt Concrete Artificial Fill (Af) @2": SANDY CLAY, medium stiff, dark brown, moist, very fine sand, medium plasticity.	
80										
5				R-1	6 18 30	105	17	SC	Quaternary-aged old alluvium deposits (Qos) @5": CLAYEY SAND, dense, light gray brown, mottled with oxidation, slightly moist, very fine sand, medium plasticity.	
75										
10				R-2	7 19 34	111	19	SP	@10": Poorly-graded SAND w/ CLAY, dense, light gray brown, mottled with oxidation, slightly moist to moist, fine to medium coarse sand, medium plasticity.	
70										
15				R-3	8 15 22	91	31	CL	@15": SANDY CLAY, hard, light gray brown, mottled with oxidation, slightly moist to moist, very fine sand, medium plasticity.	
65									TOTAL DEPTH = 16.5 FEET GROUNDWATER NOT ENCOUNTERED BACKFILL WITH SOIL CUTTINGS SURFACE PATCHED TO MATCH EXISTING SURFACE	
20										
60										
25										
55										
30										

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- 200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL

- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE

- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-3

Project No. 036.0000022167
 Project McDonald's Hawthorne 45205
 Drilling Co. BC2
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 2 - Exploration Location Map

Date Drilled 3-15-24
 Logged By RM
 Hole Diameter 8"
 Ground Elevation 83'
 Sampled By RM

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.										
0	0	N S		B-1	Bulk Driven			CL	@Surface: 2-inches of Asphalt Concrete Artificial Fill (Af) @2": SANDY CLAY, stiff, dark brown, moist, very fine sand, medium to high plasticity.	
80	5	[Hatched Pattern]		R-1	6 8 9	98	26	CL	Quaternary-aged old alluvium deposits (Qoa) @5": Lean CLAY, very stiff, brown, moist, very fine sand, low plasticity, oxidation.	CN
75	10	[Dotted Pattern]		R-2	5 9 11	106	20	SP	@10": Poorly-graded SAND, medium dense, light gray brown with mica, moist, very fine sand, trace fines.	
70	TOTAL DEPTH = 11.5 FEET GROUNDWATER NOT ENCOUNTERED BACKFILL WITH SOIL CUTTINGS SURFACE PATCHED TO MATCH EXISTING SURFACE									
15										
65										
20										
60										
25										
55										
30										
SAMPLE TYPES:		TYPE OF TESTS:								
B	BULK SAMPLE	-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS			
C	CORE SAMPLE	AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT			
G	GRAB SAMPLE	CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY			
R	RING SAMPLE	CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH			
S	SPLIT SPOON SAMPLE	CR	CORROSION	PP	POCKET PENETROMETER					
T	TUBE SAMPLE	CU	UNDRAINED TRIAXIAL	RV	R VALUE					



GEOTECHNICAL BORING LOG LB-4

Project No.	036.0000022167	Date Drilled	3-15-24
Project	McDonald's Hawthorne 45205	Logged By	RM
Drilling Co.	BC2	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	82'
Location	See Figure 2 - Exploration Location Map	Sampled By	RM

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
0	0			B-1				CH	@Surface: Vegetation. Artificial Fill (Af) @0": Fat CLAY, very stiff, very dark brown, moist, trace fine sand, high plasticity.	RV
80										
	5			R-1	4 14 16			CL	Quaternary-aged old alluvium deposits (Qoa) @5": Lean CLAY, very stiff, dark brown, slightly moist, low plasticity.	-200
75									TOTAL DEPTH = 6.5 FEET GROUNDWATER NOT ENCOUNTERED BACKFILL WITH SOIL CUTTINGS CONVERTED TO PERCOLATION TEST	
10										
70										
15										
65										
20										
60										
25										
55										
30										

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- 200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL

- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE

- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



Boring Percolation Test Data Sheet

Project Number: 036.000022167
 Project Name: MCD Hawthorne
 Earth Description: Clay
 Liquid Description: Tap Water
 Tested By: RM
Time Interval Standard
 Time for Pre-Soak: 4.0 hrs
 Start Time for Standard: 10:00 AM
 Standard Time Interval Between Readings, mins: 30

Test Hole Number: LB-4
 Date Excavated: 3/15/2024
 Date Tested: 3/15/2024
 Depth of boring (ft): 5.00
 Radius of boring (in): 4
 Radius of casing (in): 1
 Length of slotted of casing (ft): 5.00
 Depth to Initial Water Depth (ft): 4.00
 Porosity of Annulus Material, n : 0.37

Percolation Data

Reading	Time	Time Interval, Δt (min.)	Initial/Final Depth to Water (ft.)	Initial/Final Water Height, H ₀ /H _t (in.)	Total Water Drop, Δd (in.)	Percolation Rate (min./in.)	Infiltration Rate (in./hr.)	Notes
1	10:00 AM	30	4.00	12.00	0.12	250.00	0.02	
	10:30 AM		4.01	11.88				
2	10:30 AM	30	4.01	11.88	0.12	250.00	0.02	
	11:00 AM		4.02	11.76				
3	11:30 AM	30	4.00	12.00	0.12	250.00	0.02	
	12:00 PM		4.01	11.88				
4	12:00 PM	30	4.00	12.00	0.12	250.00	0.02	
	12:30 PM		4.01	11.88				
5	12:30 PM	30	4.00	12.00	0.12	250.00	0.02	
	1:00 PM		4.01	11.88				
6	1:30 PM	30	4.00	12.00	0.12	250.00	0.02	
	2:00 PM		4.01	11.88				
7	2:00 PM	30	4.00	12.00	0.12	250.00	0.02	
	2:30 PM		4.01	11.88				
8	2:30 PM	30	4.00	12.00	0.12	250.00	0.02	
	3:00 PM		4.01	11.88				

Infiltration Rate (I) = Flow Volume/Flow Area/Δt


Measured Infiltration Rate, I (Average of Last 3 readings) = 0.02 in./hr.

Design Infiltration Rate

Reduction Factor from Test Procedure, RF_t = 1
 Reduction Factor for Site Variability, # of Tests and I 0 1
 Reduction factor for Long Term Siltation, Plugging and Maintenance, RF_s = 1
 Total Reduction Factor, RF = RF_t + RF_v + RF_s = 3
Design Infiltration Rate = Measured Infiltration Rate / Reduction Factor (RF) = 0.01 in./hr.

APPENDIX B

RESULTS OF GEOTECHNICAL LABORATORY TESTING

Boring No.	LB-4							
Sample No.	R-1							
Depth (ft.)	5.0							
Sample Type	Ring							
Soil Identification	Dark brown lean clay (CL)							
Moisture Correction								
Wet Weight of Soil + Container (g)	0.0							
Dry Weight of Soil + Container (g)	0.0							
Weight of Container (g)	1.0							
Moisture Content (%)	0.0							
Sample Dry Weight Determination								
Weight of Sample + Container (g)	534.4							
Weight of Container (g)	110.7							
Weight of Dry Sample (g)	423.7							
Container No.:								
After Wash								
Method (A or B)	B							
Dry Weight of Sample + Cont. (g)	165.4							
Weight of Container (g)	110.7							
Dry Weight of Sample (g)	54.7							
% Passing No. 200 Sieve	87.1							
% Retained No. 200 Sieve	12.9							
	PERCENT PASSING No. 200 SIEVE ASTM D 1140				Project Name: <u>McDonald's Hawthorne</u>			
					Project No.: <u>036.0000022167</u>			
					Tested By: <u>K. Jumig</u>		Date: <u>03/22/24</u>	



ATTERBERG LIMITS ASTM D 4318

Project Name: McDonald's Hawthorne Tested By: J. Domingo Date: 03/28/24
 Project No. : 036.0000022167 Input By: G. Bathala Date: 03/29/24
 Boring No.: LB-1 Checked By: J. Ward
 Sample No.: B-1 Depth (ft.) 0.0
 Soil Identification: Very dark brown fat clay (CH)

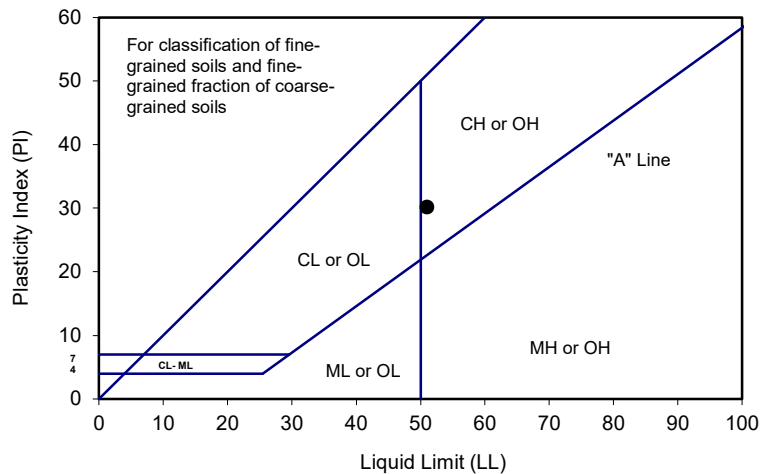
TEST NO.	PLASTIC LIMIT		LIQUID LIMIT			
	1	2	1	2	3	4
Number of Blows [N]			33	24	17	
Wet Wt. of Soil + Cont. (g)	10.04	10.03	20.72	19.40	21.40	
Dry Wt. of Soil + Cont. (g)	8.47	8.49	14.20	13.12	14.26	
Wt. of Container (g)	0.99	1.03	1.07	1.00	1.01	
Moisture Content (%) [Wn]	20.99	20.64	49.66	51.82	53.89	

Liquid Limit	51
Plastic Limit	21
Plasticity Index	30
Classification	CH

PI at "A" - Line = $0.73(LL-20)$ 22.63

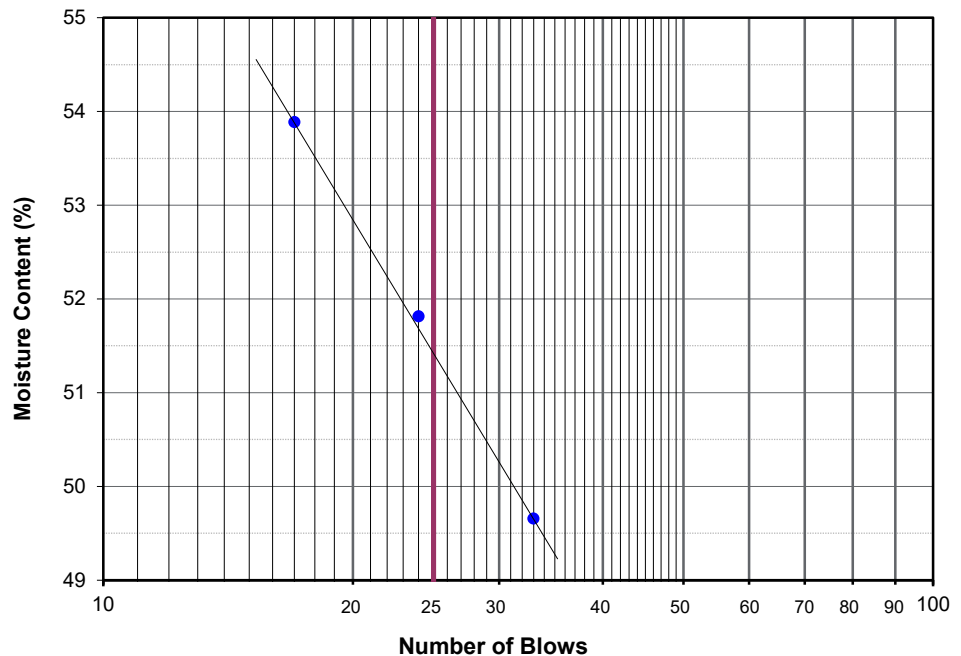
One - Point Liquid Limit Calculation

$$LL = Wn(N/25)^{0.121}$$



PROCEDURES USED

- Wet Preparation
Multipoint - Wet
- Dry Preparation
Multipoint - Dry
- Procedure A
Multipoint Test
- Procedure B
One-point Test





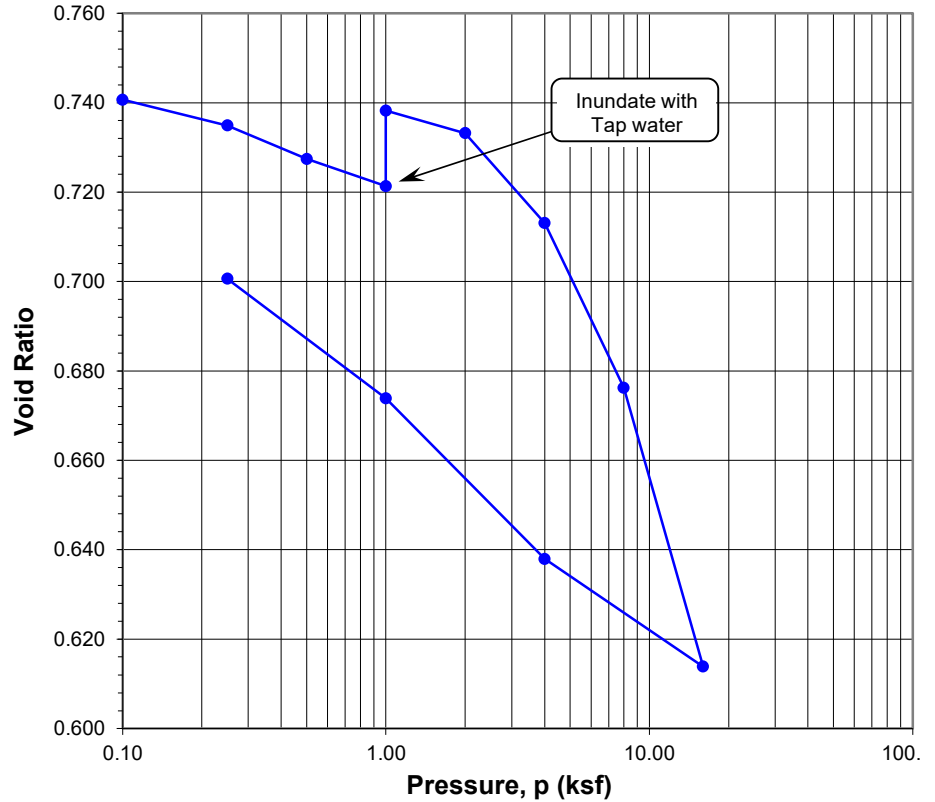
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name: McDonald's Hawthorne
 Project No.: 036.0000022167
 Boring No.: LB-3
 Sample No.: R-1
 Soil Identification: Brown lean clay (CL)

Tested By: G. Bathala Date: 03/21/24
 Checked By: J. Ward Date: 04/22/24
 Depth (ft.): 5.0
 Sample Type: Ring

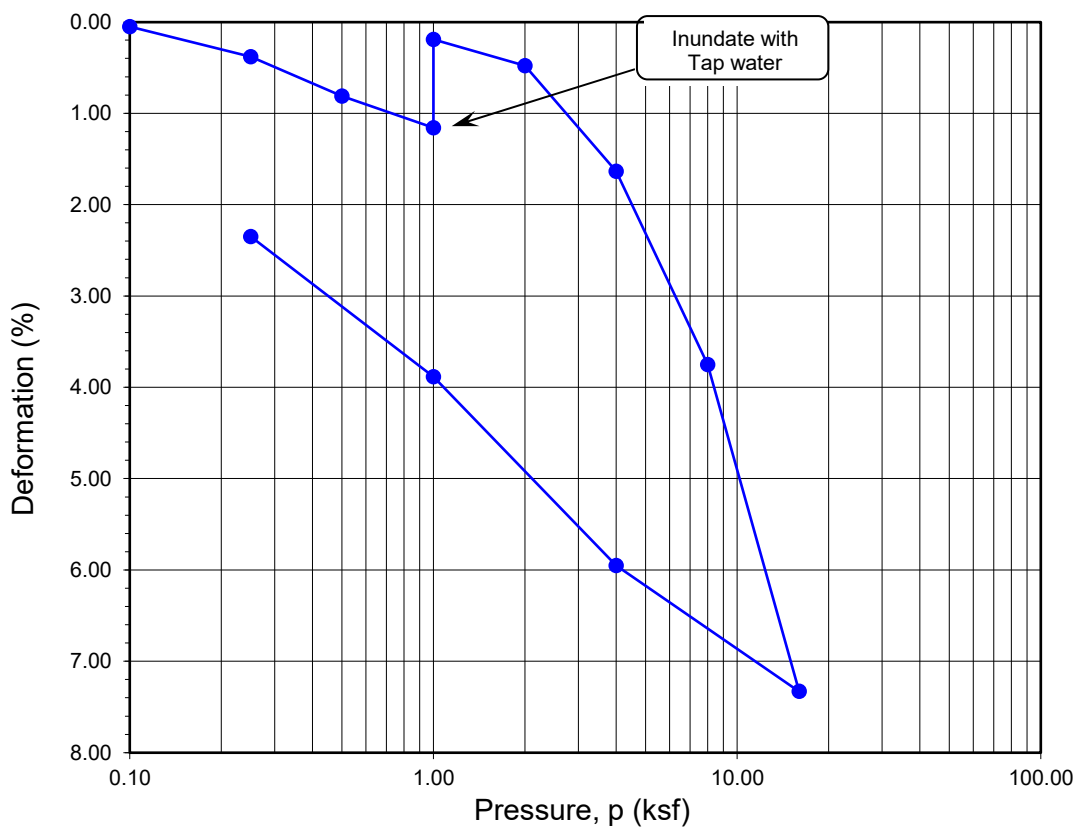
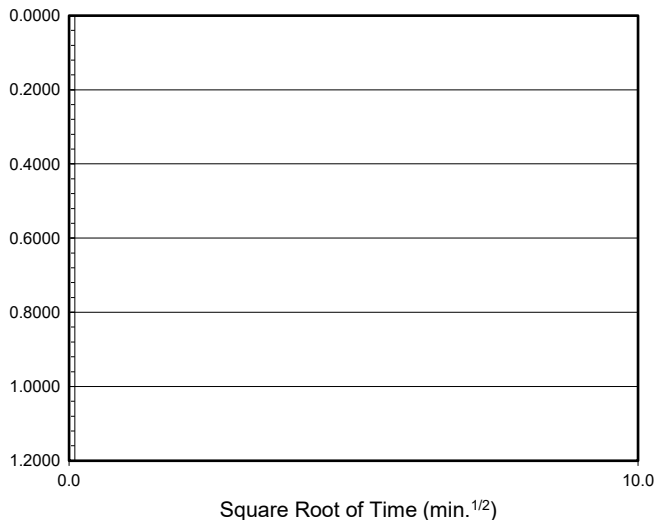
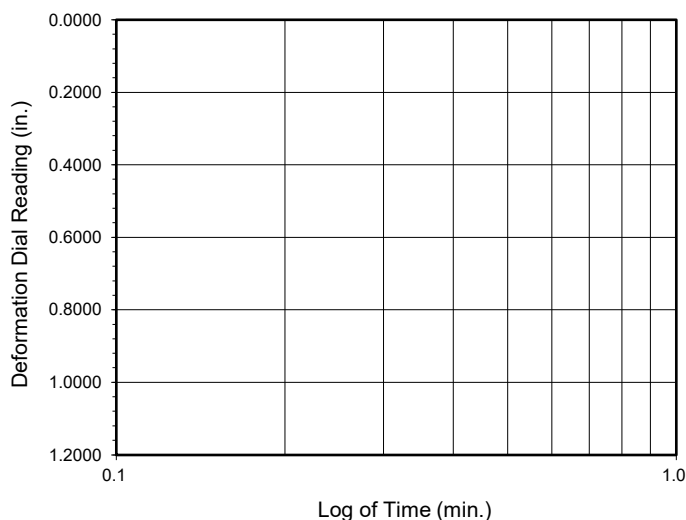
Sample Diameter (in.):	2.415
Sample Thickness (in.):	1.000
Weight of Sample + ring (g):	192.82
Weight of Ring (g):	45.12
Height after consol. (in.):	0.9765
Before Test	
Wt. of Wet Sample+Cont. (g):	185.76
Wt. of Dry Sample+Cont. (g):	156.11
Weight of Container (g):	39.91
Initial Moisture Content (%)	25.5
Initial Dry Density (pcf)	97.9
Initial Saturation (%):	94
Initial Vertical Reading (in.)	0.1118
After Test	
Wt. of Wet Sample+Cont. (g):	252.36
Wt. of Dry Sample+Cont. (g):	222.47
Weight of Container (g):	58.54
Final Moisture Content (%)	25.16
Final Dry Density (pcf):	101.2
Final Saturation (%):	100
Final Vertical Reading (in.)	0.1432
Specific Gravity (assumed):	2.73
Water Density (pcf):	62.43



Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.10	0.1123	0.9995	0.00	0.05	0.741	0.05
0.25	0.1170	0.9948	0.14	0.52	0.735	0.38
0.50	0.1229	0.9889	0.30	1.11	0.727	0.81
1.00	0.1283	0.9835	0.49	1.65	0.721	1.16
1.00	0.1186	0.9932	0.49	0.68	0.738	0.19
2.00	0.1231	0.9887	0.65	1.13	0.733	0.48
4.00	0.1363	0.9756	0.81	2.45	0.713	1.64
8.00	0.1588	0.9530	0.95	4.70	0.676	3.75
16.00	0.1960	0.9158	1.09	8.42	0.614	7.33
4.00	0.1812	0.9306	0.99	6.94	0.638	5.95
1.00	0.1596	0.9523	0.89	4.78	0.674	3.89
0.25	0.1432	0.9686	0.79	3.14	0.701	2.35

Time Readings				
Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)

Time Readings



Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
LB-3	R-1	5	25.5	25.2	97.9	101.2	0.742	0.701	94	100

Soil Identification: Brown lean clay (CL)



**ONE-DIMENSIONAL CONSOLIDATION
PROPERTIES of SOILS
ASTM D 2435**

Project No.: 036.0000022167

McDonald's Hawthorne



DIRECT SHEAR TEST
Consolidated Drained - ASTM D 3080

Project Name: [McDonald's Hawthorne](#) Tested By: [G. Bathala](#) Date: [03/25/24](#)
Project No.: [036.0000022167](#) Checked By: [J. Ward](#) Date: [04/22/24](#)
Boring No.: [LB-1](#) Sample Type: [Ring](#)
Sample No.: [R-1](#) Depth (ft.): [5.0](#)
Soil Identification: [Olive brown lean clay \(CL\)](#)

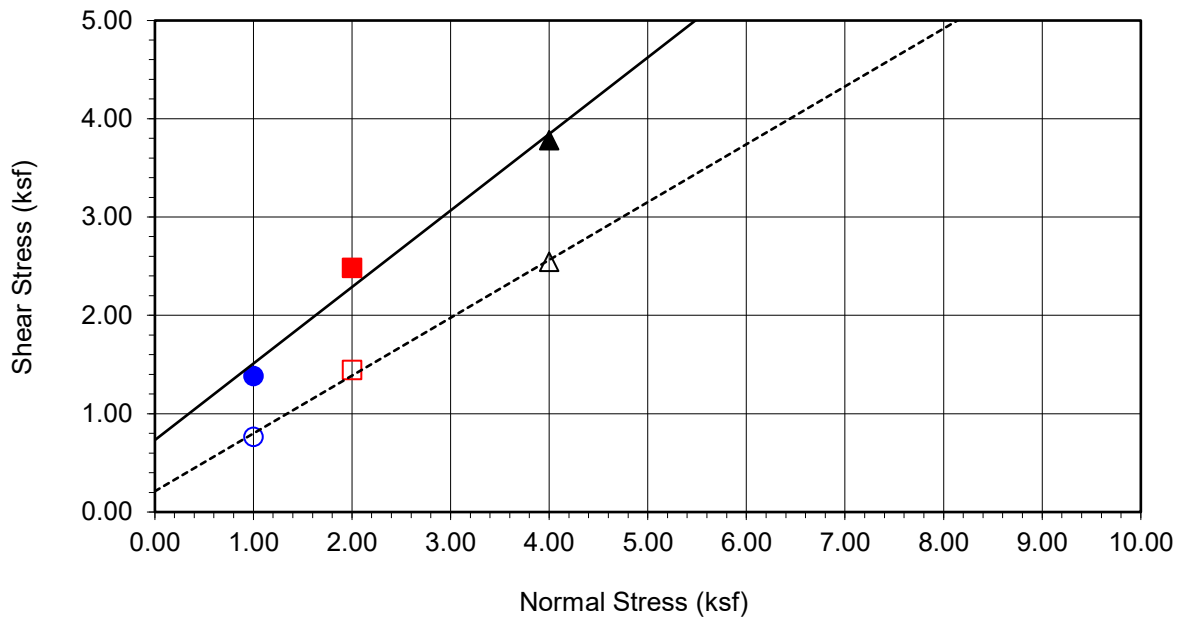
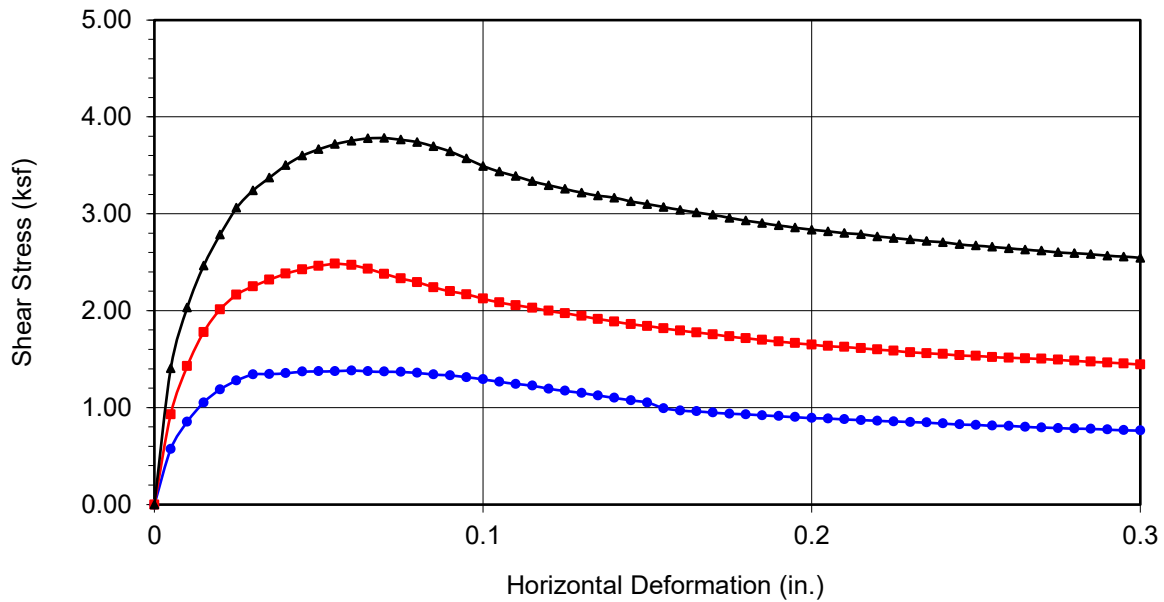
Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	188.94	199.31	200.34
Weight of Ring(gm):	38.44	45.28	41.70

Before Shearing

Weight of Wet Sample+Cont.(gm):	220.46	220.46	220.46
Weight of Dry Sample+Cont.(gm):	198.07	198.07	198.07
Weight of Container(gm):	56.75	56.75	56.75
Vertical Rdg.(in): Initial	0.0000	0.2777	0.2628
Vertical Rdg.(in): Final	0.0122	0.2650	0.2700

After Shearing

Weight of Wet Sample+Cont.(gm):	213.17	224.96	214.56
Weight of Dry Sample+Cont.(gm):	180.65	194.67	186.72
Weight of Container(gm):	57.09	68.90	55.12
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43



Boring No.	LB-1	
Sample No.	R-1	
Depth (ft)	5	
Sample Type:	Ring	
Soil Identification: Olive brown lean clay (CL)		
Strength Parameters		
	C (psf)	ϕ (°)
Peak	734	38
Ultimate	214	30

Normal Stress (kip/ft ²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft ²)	● 1.383	■ 2.484	▲ 3.782
Shear Stress @ End of Test (ksf)	○ 0.764	□ 1.446	△ 2.546
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	15.84	15.84	15.84
Dry Density (pcf)	108.0	110.6	113.9
Saturation (%)	76.4	81.6	89.1
Soil Height Before Shearing (in.)	1.0122	1.0127	0.9928
Final Moisture Content (%)	26.3	24.1	21.2



DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 036.0000022167

McDonald's Hawthorne



**TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS**

Project Name: McDonald's Hawthorne Tested By : K. Jumig Date: 03/27/24
Project No. : 036.0000022167 Checked By: J. Ward Date: 04/22/24

Boring No.	LB-1			
Sample No.	B-1			
Sample Depth (ft)	0.0			
Soil Identification:	Very dark brown CH			
Wet Weight of Soil + Container (g)	0.00			
Dry Weight of Soil + Container (g)	0.00			
Weight of Container (g)	1.00			
Moisture Content (%)	0.00			
Weight of Soaked Soil (g)	100.39			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	10			
Crucible No.	300			
Furnace Temperature (°C)	860			
Time In / Time Out	9:10/9:55			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	58.5128			
Wt. of Crucible (g)	58.5072			
Wt. of Residue (g) (A)	0.0056			
PPM of Sulfate (A) x 41150	230.44			
PPM of Sulfate, Dry Weight Basis	230			

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	15			
ml of AgNO ₃ Soln. Used in Titration (C)	0.4			
PPM of Chloride (C -0.2) * 100 * 30 / B	40			
PPM of Chloride, Dry Wt. Basis	40			

pH TEST, DOT California Test 643

pH Value	8.14			
Temperature °C	20.5			



SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name: McDonald's Hawthorne
 Project No. : 036.0000022167
 Boring No.: LB-1
 Sample No. : B-1

Tested By : K. Jumig Date: 03/29/24
 Checked By: J. Ward Date: 04/22/24
 Depth (ft.) : 0.0

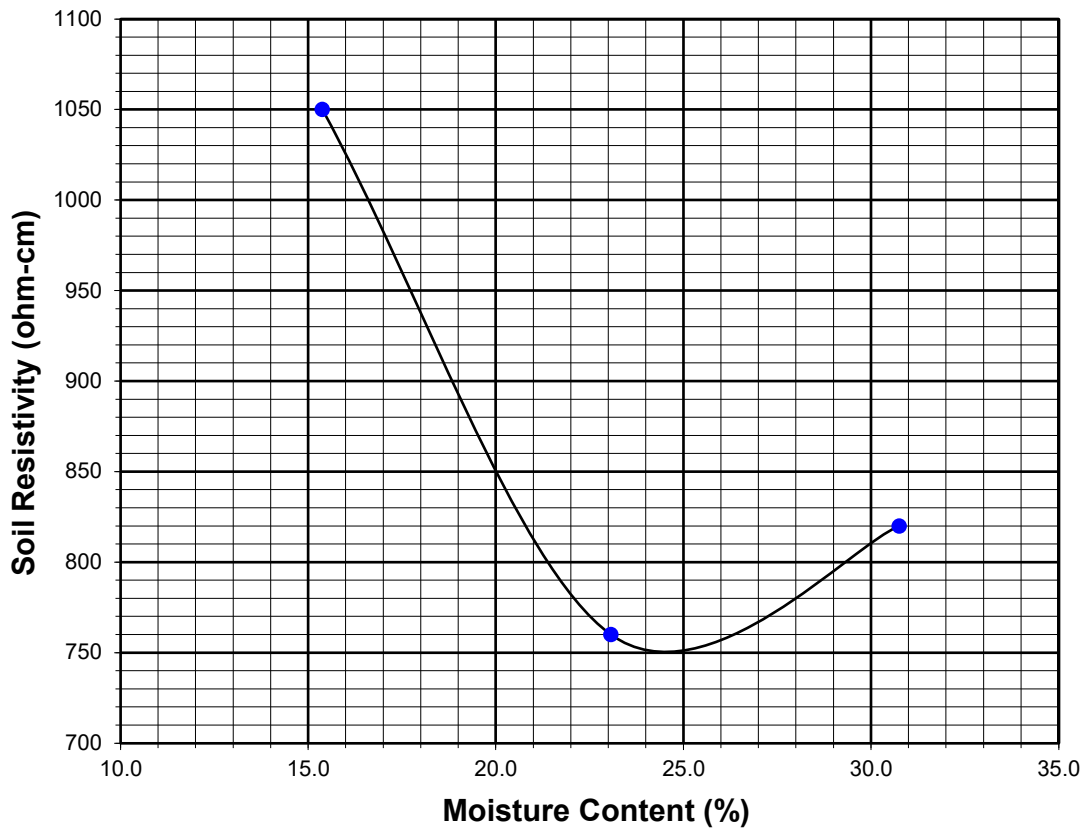
Soil Identification:* Very dark brown CH

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	15.38	1050	1050
2	30	23.07	760	760
3	40	30.76	820	820
4				
5				

Moisture Content (%) (Mci)	0.00
Wet Wt. of Soil + Cont. (g)	0.00
Dry Wt. of Soil + Cont. (g)	0.00
Wt. of Container (g)	1.00
Container No.	
Initial Soil Wt. (g) (Wt)	130.06
Box Constant	1.000
$MC = (((1 + Mci / 100) \times (Wa / Wt + 1)) - 1) \times 100$	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II		DOT CA Test 643	
750	24.5	230	40	8.14	20.5





EXPANSION INDEX of SOILS
ASTM D 4829

Project Name: McDonald's Hawthorne Tested By: J. Domingo Date: 03/27/24
 Project No.: 036.000022167 Checked By: J. Ward Date: 04/22/24
 Boring No.: LB-1 Depth (ft.): 0.0
 Sample No.: B-1
 Soil Identification: Very dark brown fat clay (CH)

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0830
Wt. Comp. Soil + Mold (g)	603.00	445.43
Wt. of Mold (g)	203.01	0.00
Specific Gravity (Assumed)	2.70	2.70
Container No.	0	0
Wet Wt. of Soil + Cont. (g)	808.60	648.44
Dry Wt. of Soil + Cont. (g)	738.50	568.45
Wt. of Container (g)	0.00	203.01
Moisture Content (%)	9.49	21.89
Wet Density (pcf)	120.7	124.1
Dry Density (pcf)	110.2	101.8
Void Ratio	0.530	0.656
Total Porosity	0.346	0.396
Pore Volume (cc)	71.7	88.8
Degree of Saturation (%) [S _{meas}]	48.4	90.1

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
03/27/24	14:00	1.0	0	0.5350
03/27/24	14:10	1.0	10	0.5330
Add Distilled Water to the Specimen				
03/27/24	15:50	1.0	100	0.5905
03/28/24	7:58	1.0	1068	0.6175
03/28/24	9:24	1.0	1154	0.6180

Expansion Index (EI _{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	85
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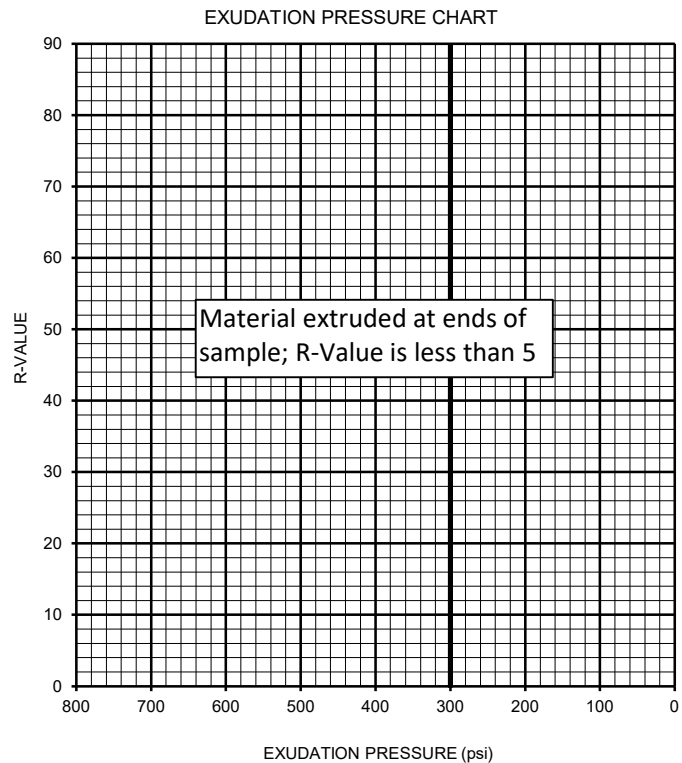
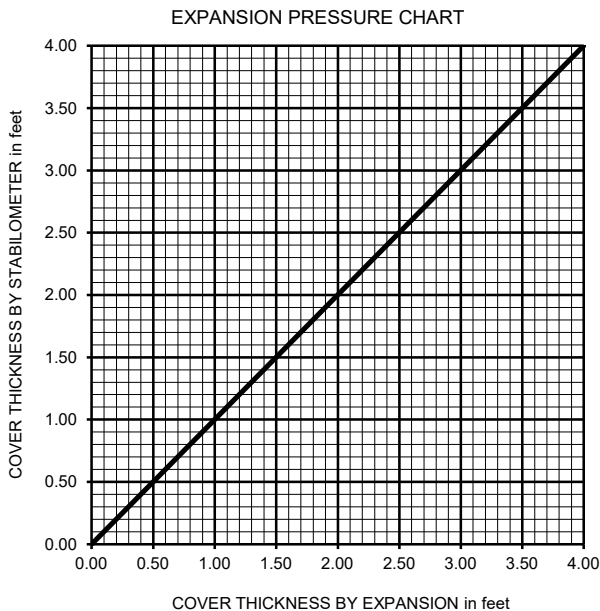


R-VALUE TEST RESULTS DOT CA Test 301

PROJECT NAME:	McDonald's Hawthorne	PROJECT NUMBER:	036.0000022167
BORING NUMBER:	LB-4	DEPTH (FT.):	0.0
SAMPLE NUMBER:	B-1	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Very dark brown fat clay (CH)	DATE COMPLETED:	3/28/2024

TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %			
HEIGHT OF SAMPLE, Inches			
DRY DENSITY, pcf			
COMPACTOR PRESSURE, psi			
EXUDATION PRESSURE, psi			
EXPANSION, Inches x 10exp-4			
STABILITY Ph 2,000 lbs (160 psi)			
TURNS DISPLACEMENT			
R-VALUE UNCORRECTED	N/A	N/A	N/A
R-VALUE CORRECTED	N/A	N/A	N/A

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	N/A	N/A	N/A
EXPANSION PRESSURE THICKNESS, ft.	N/A	N/A	N/A



R-VALUE BY EXPANSION:	N/A
R-VALUE BY EXUDATION:	N/A
EQUILIBRIUM R-VALUE:	< 5

APPENDIX C
EARTHWORK AND GRADING SPECIFICATIONS

APPENDIX C

LEIGHTON CONSULTING, INC.
EARTHWORK AND GRADING GUIDE SPECIFICATIONS

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C - 1 . 0 G E N E R A L

C-1.1 Intent

These Earthwork and Grading Guide Specifications are for grading and earthwork shown on the current, approved grading plan(s) and/or indicated in the Leighton Consulting, Inc. geotechnical report(s). These Guide Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the project-specific recommendations in the geotechnical report shall supersede these Guide Specifications. Leighton Consulting, Inc. shall provide geotechnical observation and testing during earthwork and grading. Based on these observations and tests, Leighton Consulting, Inc. may provide new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

C-1.2 Role of Leighton Consulting, Inc.

Prior to commencement of earthwork and grading, Leighton Consulting, Inc. shall meet with the earthwork contractor to review the earthwork contractor's work plan, to schedule sufficient personnel to perform the appropriate level of observation, mapping and compaction testing. During earthwork and grading, Leighton Consulting, Inc. shall observe, map, and document subsurface exposures to verify geotechnical design assumptions. If observed conditions are found to be significantly different than the interpreted assumptions during the design phase, Leighton Consulting, Inc. shall inform the owner, recommend appropriate changes in design to accommodate these observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include (1) natural ground after clearing to receiving fill but before fill is placed, (2) bottoms of all "remedial removal" areas, (3) all key bottoms, and (4) benches made on sloping ground to receive fill.

Leighton Consulting, Inc. shall observe moisture-conditioning and processing of the subgrade and fill materials, and perform relative compaction testing of fill to determine the attained relative compaction. Leighton Consulting, Inc. shall provide *Daily Field Reports* to the owner and the Contractor on a routine and frequent basis.

C-1.3 The Earthwork Contractor

The earthwork contractor (Contractor) shall be qualified, experienced and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Guide Specifications prior to commencement of grading. The Contractor shall be solely

responsible for performing grading and backfilling in accordance with the current, approved plans and specifications.

The Contractor shall inform the owner and Leighton Consulting, Inc. of changes in work schedules at least one working day in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that Leighton Consulting, Inc. is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish earthwork and grading in accordance with the applicable grading codes and agency ordinances, these Guide Specifications, and recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of Leighton Consulting, Inc., unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, Leighton Consulting, Inc. shall reject the work and may recommend to the owner that earthwork and grading be stopped until unsatisfactory condition(s) are rectified.

C - 2 . 0 P R E P A R A T I O N O F A R E A S T O B E F I L L E D

C-2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies and Leighton Consulting, Inc.. Care should be taken not to encroach upon or otherwise damage native and/or historic trees designated by the Owner or appropriate agencies to remain. Pavements, flatwork or other construction should not extend under the “drip line” of designated trees to remain.

Leighton Consulting, Inc. shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 3 percent of organic materials (by dry weight: ASTM D 2974). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area. As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage

of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

C-2.2 Processing

Existing ground that has been declared satisfactory for support of fill, by Leighton Consulting, Inc., shall be scarified to a minimum depth of 6 inches (15 cm). Existing ground that is not satisfactory shall be over-excavated as specified in the following Section C-2.3. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

C-2.3 Overexcavation

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by Leighton Consulting, Inc. during grading. All undocumented fill soils under proposed structure footprints should be excavated

C-2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), (>20 percent grade) the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet (4.5 m) wide and at least 2 feet (0.6 m) deep, into competent material as evaluated by Leighton Consulting, Inc.. Other benches shall be excavated a minimum height of 4 feet (1.2 m) into competent material or as otherwise recommended by Leighton Consulting, Inc.. Fill placed on ground sloping flatter than 5:1 (horizontal to vertical units), (<20 percent grade) shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

C-2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by Leighton Consulting, Inc. as suitable to receive fill. The Contractor shall obtain a written acceptance (*Daily Field Report*) from Leighton Consulting, Inc. prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys and benches.

C - 3 . 0 F I L L M A T E R I A L

C-3.1 Fill Quality

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by Leighton Consulting, Inc. prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to Leighton Consulting, Inc. or mixed with other soils to achieve satisfactory fill material.

C-3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 6 inches (15 cm), shall not be buried or placed in fill unless location, materials and placement methods are specifically accepted by Leighton Consulting, Inc.. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet (3 m) measured vertically from finish grade, or within 2 feet (0.61 m) of future utilities or underground construction.

C-3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section C-3.1, and be free of hazardous materials (“contaminants”) and rock larger than 3-inches (8 cm) in largest dimension. All import soils shall have an Expansion Index (EI) of 20 or less and a sulfate content no greater than (\leq) 500 parts-per-million (ppm). A representative sample of a potential import source shall be given to Leighton Consulting, Inc. at least four full working days before importing begins, so that suitability of this import material can be determined and appropriate tests performed.

C - 4 . 0 F I L L P L A C E M E N T A N D C O M P A C T I O N

C-4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill, as described in Section C-2.0, above, in near-horizontal layers not exceeding 8 inches (20 cm) in loose thickness. Leighton Consulting, Inc. may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers, and only if the building officials with the appropriate jurisdiction approve. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

C-4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM) Test Method D 1557.

C-4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, each layer shall be uniformly compacted to not-less-than (\geq) 90 percent of the maximum dry density as determined by ASTM Test Method D 1557. In some cases, structural fill may be specified (see project-specific geotechnical report) to be uniformly compacted to at least (\geq) 95 percent of the ASTM D 1557 modified Proctor laboratory maximum dry density. For fills thicker than ($>$) 15 feet (4.5 m), the portion of fill deeper than 15 feet below proposed finish grade shall be compacted to 95 percent of the ASTM D 1557 laboratory maximum density. Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

C-4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by back rolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet (1 to 1.2 m) in fill elevation, or by other methods producing satisfactory results acceptable to Leighton Consulting, Inc.. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of the ASTM D 1557 laboratory maximum density.

C-4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by Leighton Consulting, Inc.. Location and frequency of tests shall be at our field representative(s) discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

C-4.6 Compaction Test Locations

Leighton Consulting, Inc. shall document the approximate elevation and horizontal coordinates of each density test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that Leighton

Consulting, Inc. can determine the test locations with sufficient accuracy. Adequate grade stakes shall be provided.

C - 5 . 0 EXCAVATION

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by Leighton Consulting, Inc. during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by Leighton Consulting, Inc. based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, then observed and reviewed by Leighton Consulting, Inc. prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by Leighton Consulting, Inc..

C - 6 . 0 TRENCH BACKFILLS

C-6.1 **Safety**

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations. Work should be performed in accordance with Article 6 of the *California Construction Safety Orders*, 2009 Edition or more current (see also: <http://www.dir.ca.gov/title8/sb4a6.html>).

C-6.2 **Bedding and Backfill**

All utility trench bedding and backfill shall be performed in accordance with applicable provisions of the 2018 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Bedding material shall have a Sand Equivalent greater than 30 (SE>30). Bedding shall be placed to 1-foot (0.3 m) over the top of the conduit, and densified by jetting in areas of granular soils, if allowed by the permitting agency. Otherwise, the pipe-bedding zone should be backfilled with Controlled Low Strength Material (CLSM) consisting of at least one sack of Portland cement per cubic-yard of sand, and conforming to Section 201-6 of the 2018 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Backfill over the bedding zone shall be placed and densified mechanically to a minimum of 90 percent of relative compaction (ASTM D 1557) from 1 foot (0.3 m) above the top of the conduit to the surface. Backfill above the pipe zone shall **not** be jetted. Jetting of the bedding around the conduits shall be observed by Leighton Consulting, Inc. and backfill above the pipe zone (bedding) shall be observed and tested by Leighton Consulting, Inc..

C-6.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to Leighton Consulting, Inc. that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method, and only if the building officials with the appropriate jurisdiction approve.

APPENDIX D

GBA - IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL-ENGINEERING REPORT

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer

will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the “Findings” Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site’s subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report’s Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals’ misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals’ plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note*

conspicuously that you’ve included the material for information purposes only. To avoid misunderstanding, you may also want to note that “informational purposes” means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled “limitations,” many of these provisions indicate where geotechnical engineers’ responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a “phase-one” or “phase-two” environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer’s services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer’s recommendations will not of itself be sufficient to prevent moisture infiltration.* **Confront the risk of moisture infiltration** by including building-envelope or mold specialists on the design team. **Geotechnical engineers are not building-envelope or mold specialists.**



Telephone: 301/565-2733

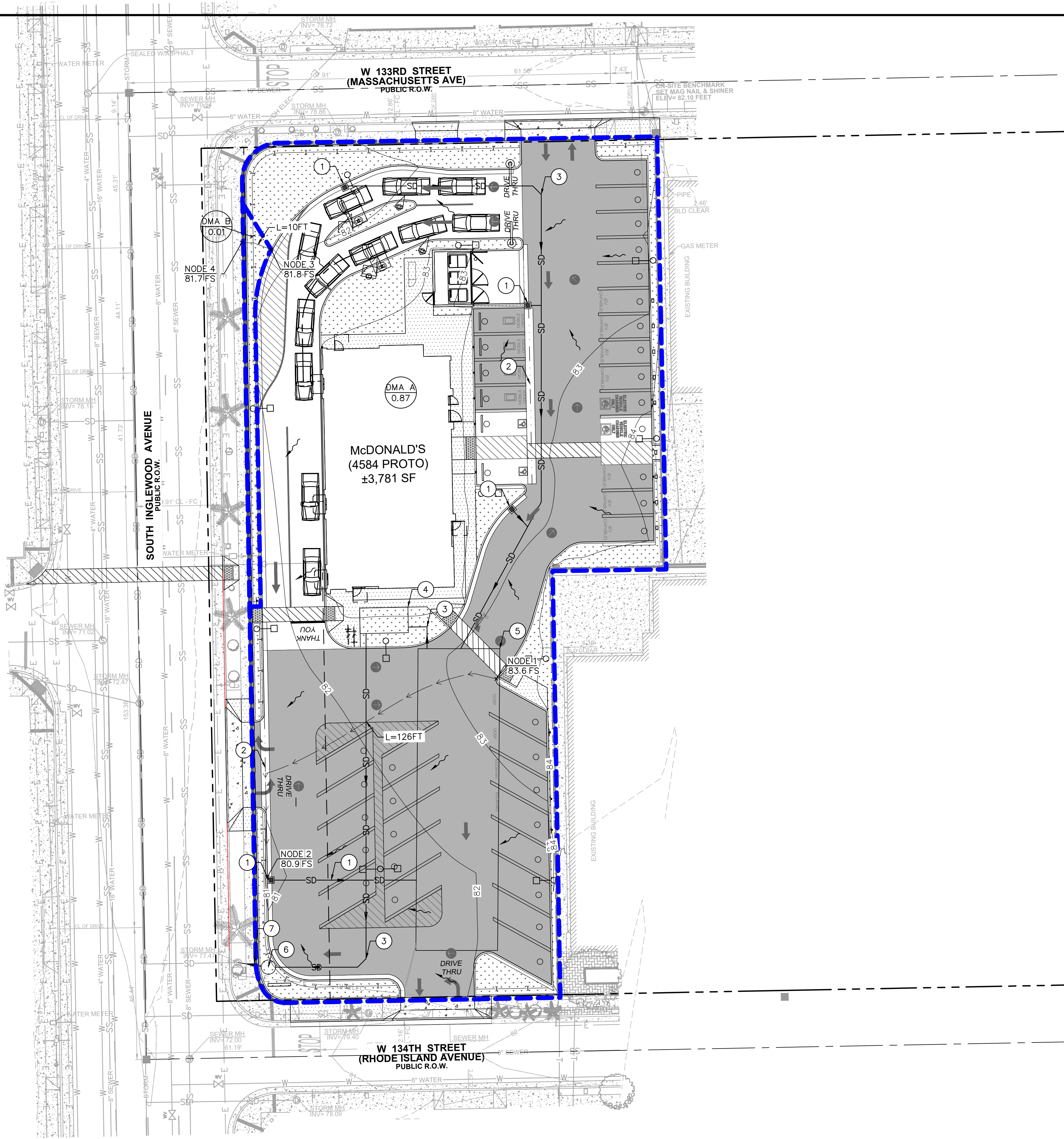
e-mail: info@geoprofessional.org www.geoprofessional.org

Attachment C
Operations and Maintenance (O&M) Plan
(To be provided during final design)

Attachment D

Plans

K:\ORA_LDEV\McDonalds\194015042 - Hawthorne (4-5205)\CADD\Exhibits\Reports\WQMP\Preliminary WQMP Plan.dwg 1 - Preliminary WQMP Plan Aug 19, 2024 12:35pm by: lupita.astorga



LID SUMMARY

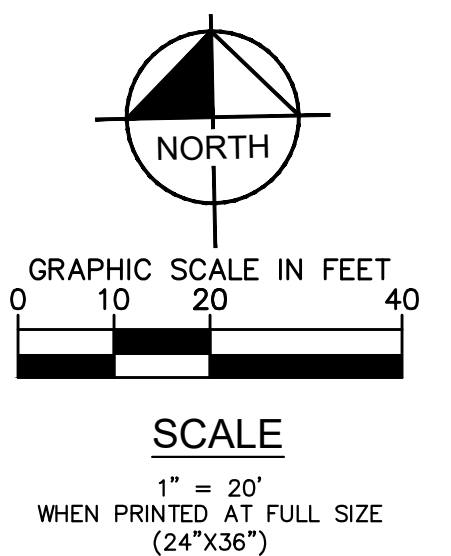
DMA #	TOTAL DRAINAGE AREA (SF)	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)	DESIGN CAPTURE VOLUME (CF)	STRUCTURAL BMP ID#	BMP CLASSIFICATION	WATER QUALITY FLOW RATE (CFS)	BIOFILTRATION FLOW RATE (CFS)	BMP DESCRIPTION	BMP CAPACITY (CFS)
A	37689	32873	4816	2368	1	BIOFILTRATION	0.28	0.43	MWS 8X16	0.46
B	609	193	416	12	-	DE-MINIMIS	-	-	-	-
TOTAL	38298	33066	4378	-	-	-	-	-	-	-

LEGEND

- CENTER LINE
- PROPERTY LINE
- EASEMENT LINE
- APPROXIMATE LIMITS OF DISTURBANCE
- DMA LIMITS
- PROPOSED RIDGE LINE
- PROPOSED GRADE BREAK LINE
- PROPOSED FLOW LINE
- PROPOSED STORM DRAIN LINE
- EXISTING STORM DRAIN LINE
- FLOW DIRECTION
- PROPOSED PERVIOUS AREAS

DRAINAGE KEYNOTES

- ① PROPOSED INLET
- ② PROPOSED VALLEY GUTTER
- ③ PROPOSED STORM DRAIN PIPE
- ④ PROPOSED 8'X16' MODULAR WETLAND SYSTEM
- ⑤ PROPOSED ADS SC-310 CHAMBERS (3600 CF)
- ⑥ PROPOSED SUMP PUMP
- ⑦ PROPOSED OVERFLOW TO EXISTING CATCH BASIN



Kimley»Horn
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 PHONE: (714) 939-1030 | www.kimley-horn.com

TITLE:
PRELIMINARY LID PLAN

INGENIERS SEAL

PROJECT:
MCDONALD'S 4-5205

LOCATION:
**13324 INGLEWOOD AVE,
 HAWTHORNE, CA**

JOB NUMBER: 094797XXX
 SCALE: 1" = 20'
 DATE: 8/19/2024
 SHEET: 1 OF 1

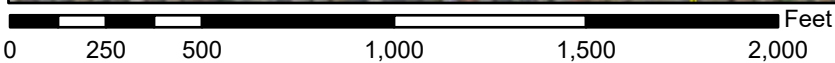
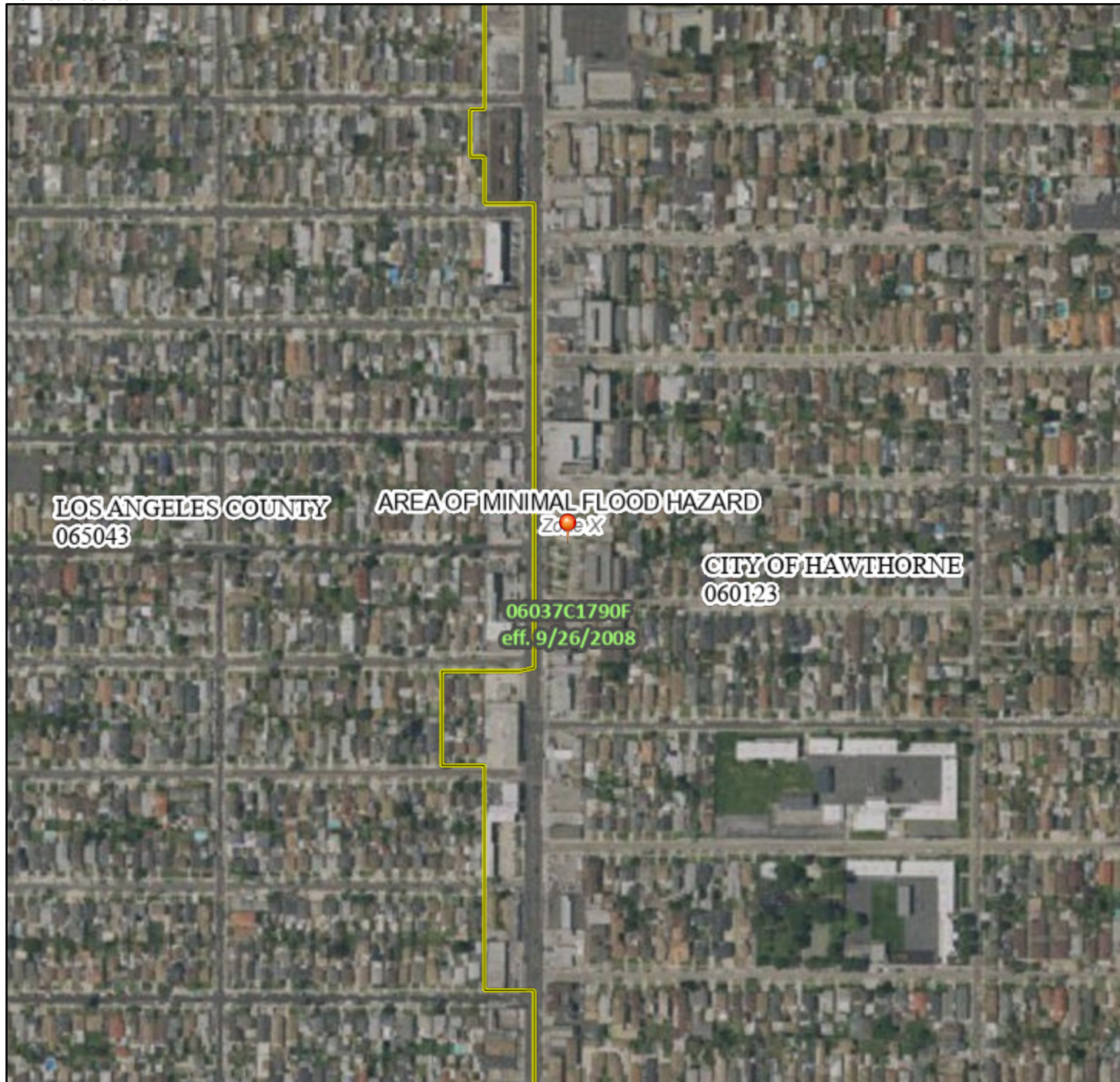
Attachment E

Supporting Documents

National Flood Hazard Layer FIRMMette



118°21'58"W 33°54'55"N



1:6,000

118°21'21"W 33°54'26"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>
		Area with Flood Risk due to Levee <i>Zone D</i>
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard <i>Zone D</i>
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance
		17.5 Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped
		The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.



This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **8/19/2024 at 4:25 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



About



Legend



Layers

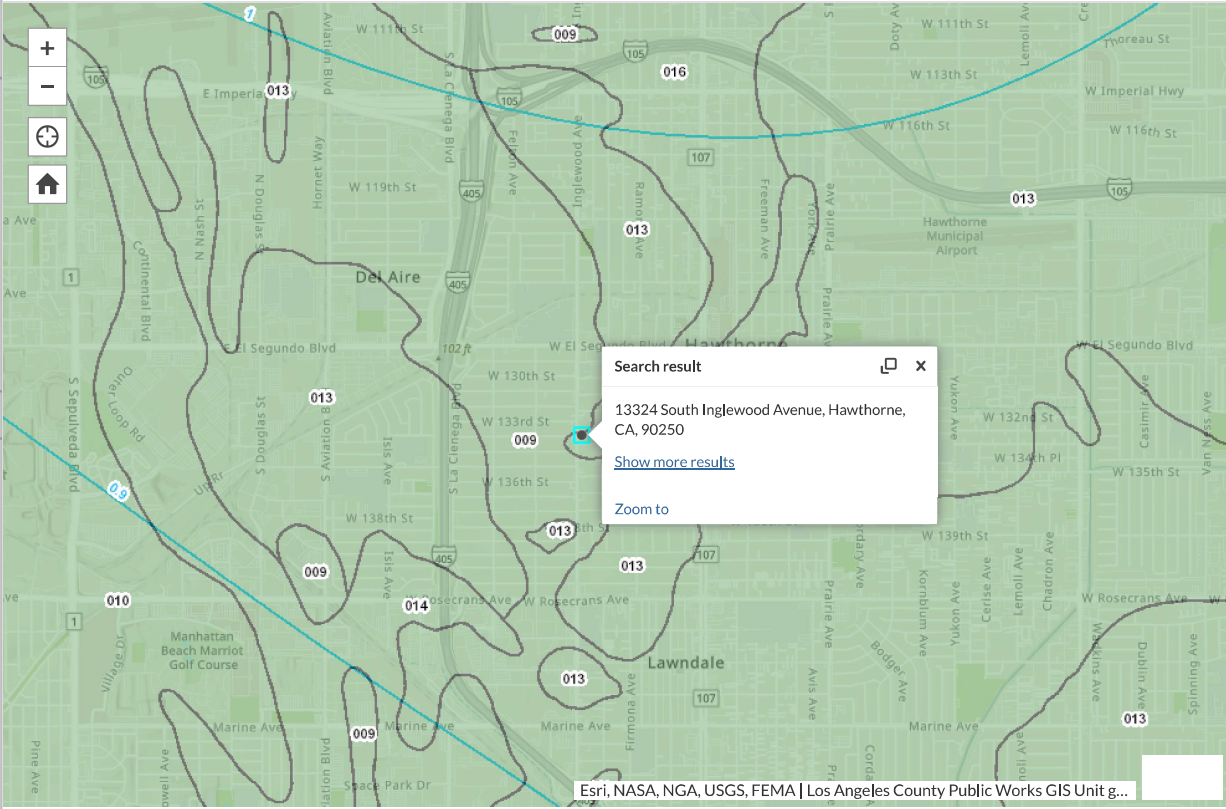
LA County Hydrology Map

13324 Inglewood Ave, H X



Layers

- Hydrology GIS
 - 50yr Two Tenths (Rainfall)
 - DPA Zones
 - Soils 2004
 - Final 85th Percentile, 24-hr Rainfall
 - 1-year, 1-hour Rainfall Intensity
 - Final 95th Percentile, 24-hr Rainfall
- LA County Parcels



Imagery with Labels