

**STORM WATER POLLUTION PREVENTION PLAN**

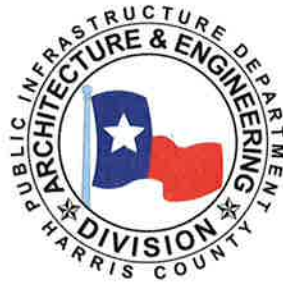
**FOR**

**East Aldine Town Center – Infrastructure Package  
Houston, Texas  
UPIN No.17035MF0M201**

**JANUARY 2017**

**Storm Water Pollution Prevention Plan  
Prepared for**

**Harris County Public Infrastructure Department  
Architecture & Engineering Division  
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## TABLE OF CONTENTS

<b>Section 1 – Site Evaluation, Assessment, and Planning.....</b>	<b>1</b>
1.1 Project/Site Information.....	1
1.2 Contact Information/Responsible Parties.....	1
1.3 Nature and Sequence of Construction Activity.....	2
1.4 Soil, Slopes, Vegetation and Current Drainage Patterns.....	2
1.5 Construction Site Estimates.....	3
1.6 Receiving Waters.....	4
1.7 Site Features and Sensitive Areas to be Protected.....	4
1.8 Potential Sources of Pollution.....	5
1.9 Endangered Species Certification.....	6
1.10 Cultural Resources (Historical & Archeological).....	6
1.11 Applicable Federal, Tribal, State or Local Programs.....	6
1.12 Maps.....	6
<b>Section 2 – Erosion and Sediment Control BMPs.....</b>	<b>6</b>
2.1 Minimize Disturbed Area and Protect Natural Features.....	7
2.2 Phased Construction Activity.....	8
2.3 Control Storm Water Flowing onto and through the Project.....	8
2.4 Stabilize Soil.....	9
2.5 Protect Slopes.....	10
2.6 Protect Storm Drain Inlets.....	10
2.7 Establish Perimeter Controls and Sediment Barriers, Retain Sediment on Site.....	11
2.8 Establish Stabilized Construction Exits (Access).....	11
2.9 Additional BMP's.....	12
<b>Section 3 – Good Housekeeping BMPs.....</b>	<b>12</b>
3.1 Material Handling and Waste Management.....	12
3.2 Establish Proper Building Material Staging Area.....	12
3.3 Designated Washout Areas.....	13
3.4 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices.....	13
3.5 Control Equipment/Vehicle Washing.....	13
3.6 Spill Prevention and Control Plan.....	14
3.7 Any Additional BMPs.....	14
3.8 Allowable Non-Storm Water Discharge Management.....	14
<b>Section 4 – Selection Post-Construction BMPs.....</b>	<b>15</b>
4.1 Post-Construction BMPs.....	15

<b>Section 5 – Inspections.....</b>	<b>16</b>
5.1 Inspections.....	16
5.2 Delegation of Authority.....	17
5.3 Corrective Action Log.....	17
<b>Section 6 – Recordkeeping and Training.....</b>	<b>17</b>
6.1 Recordkeeping.....	17
6.2 Log of Changes to SWPPP.....	18
6.3 Training.....	18
<b>Section 7 – Final Stabilization.....</b>	<b>18</b>
7.1 Final Stabilization.....	18

**SWPPP Appendices**

- Appendix A – Preparer’s Certification
- Appendix B – Delegation of Authority Form
- Appendix C – Storm Water Construction Site Inspection Report
- Appendix D – TPDES Forms (NOI, NOT, CSN)
- Appendix E – Jurisdictional Wetlands Determination Letter – Section 404 of Clean Water Act Documentation
- Appendix F – Corrective Action Log/Recordkeeping Log
- Appendix G – Training Log
- Appendix H – SWPPP Amendment Log
- Appendix I – TPDES General Permit No. TXR 150000 (dated 03/05/2008)
- Appendix J – Harris County Specifications for Structural Controls and Final Stabilization

Standard Specifications

- Item 162 Sodding for Erosion Control and Final Stabilization (Block Sodding)
- Item 165 Hydro-mulch Seeding For Erosion Control and Final Stabilization
- Item 166 Fertilizer
- Item 708 Filter Fabric Fence
- Item 719 Inlet Protection Barriers
- Item 724 Stabilized Construction Access (Type I-Rock)
- Item 741 Inlet Protection Barrier (for Stage II Inlets, Gravel Bags)
- Item 750 Rock Filter Dams
- SS 8812 Concrete Truck Washout Structures

- Appendix K – Vicinity Map
- Appendix L – Site Plan (SWPPP and Details included)

- Part B. SWPPP Construction Drawings
- Part C. SWPPP Cost Estimate
- Part D. Other Items

**1.0 Site Evaluation, Assessment, and Planning**

**1.1. Project/Site Information**

Name: East Aldine Town Center – Infrastructure Package  
Location: 3314 Aldine Mail Route Road, Houston, Harris County, Texas 77039  
(0.5 miles east of Aldine Westfield Road)  
Latitude: 29° 54' 8.352"N  
Longitude: 95° 20' 38.7168"W  
Method: EPA Web Site

This project is not located in Indian Country nor is it considered a federal facility.

TPDES project or permit tracker number: \_\_\_\_\_

**1.2. Contact Information/Responsible Parties**

Primary Operator: Harris County  
Harris County Public Infrastructure Department – Construction Programs Division  
(Name) David Goldberg (Title) Manager – Road and Bridge Construction  
Address 1310 Prairie St., Suite 1105  
Houston, Texas 77002  
Phone: (713) 274-1562  
Fax: (713) 755-2302

Primary Operator: Contractor (completed upon contract award)  
Company Name: \_\_\_\_\_  
Name and Title of Person signing or signed Notice of Intent (NOI):

\_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
Phone No.: \_\_\_\_\_  
Fax No.: \_\_\_\_\_  
Email: \_\_\_\_\_

Primary Emergency 24-Hour Contact: (complete prior to start of Construction)  
Company Name: \_\_\_\_\_  
Name: \_\_\_\_\_  
Telephone No.: \_\_\_\_\_

Secondary Emergency 24-Hour Contact: (complete prior to start of Construction)  
Company Name: \_\_\_\_\_  
Name: \_\_\_\_\_  
Telephone No.: \_\_\_\_\_

Preparers Information:

Company Name: PGAL

Name: Megan Houtchens, P.E.

Title: Senior Associate

Address: 3131 Briarpark Drive, Suite 200

City: Houston State: TX Zip Code: 77042

Phone No.: 713-622-1444

Fax No. or Email: mhoutchens@pgal.com

1.3. Nature and Sequence of Construction Activity

This project is the construction of underground utilities, roadways, a wet basin, channel reconstruction, and landscaping. The remaining parcels of land will be developed separately at a future date. A grass-lined swale currently located along the southern property line, which will be denoted as “EAMD channel” from herein, and HCFCD channel P118-37-00 will be reconstructed to convey existing storm water flow as well as the flow released from the East Aldine Town Center site. The entire site will be disturbed with the exception of the 1.56-acres the 100-year floodplain is located on.

*Sequence of Construction Activity:*

The first major phase of construction is expected to be completed in approximately 4 months, dependent upon the weather. Utility construction will occur which includes the storm sewers, sanitary sewers, water lines, gas lines, underground power distribution, and communication lines. This will require clearing and construction of all underground utilities located within the street rights-of-way and within their respective dedicated easements. The wet basin will be roughly graded to serve dually as a permanent detention pond and a temporary best management practice (BMP) during construction.

The second major phase of construction is expected to be completed in approximately 8 months, dependent upon the weather. The roadways will be formed and constructed, grading from the roadway rights-of-way up to the adjacent lots at a maximum 3:1 slope to elevation 72.0, the wet basin will be completed, the channel upgrades will be completed, and landscaping will be placed. Additional clearing is likely in order to comply with the landscaping plans. The roadway elevations will be established through the removal of additional earthwork.

1.4. Soils, Slopes, Vegetation, and Current Drainage Patterns

Per the Natural Resources Conservation Service (NRCS) Web Soil Survey, the soils currently existing onsite are Cd, Ge, and Gu and are defined as follows:

- Cd – Clodine fine sandy loam, 0 to 1 percent slopes
- Ge – Gessner fine sandy loam, 0 to 1 percent slopes, ponded
- Gu – Gessner – urban land complex

The site is relatively flat with the existence of six (6) drainage ditches constructed with the “Proposed Earthwork and Site Preparation of East Aldine Town Center” project, Harris County project number 1604190093. Prior to the construction of the drainage ditches, the site had an excess of soil stacked on it from a previous nearby project. The soil was spread out onsite to create a flat elevation of 72 with the exception of the drainage ditches which were needed to redirect storm water runoff around to the existing swale running along the southern property boundary (EAMD Channel) and eventually into HCFCD channel P118-37-00.

1.5. Construction Site Estimates

The total site area is 61.57-acres. The area of the site that will be disturbed is 60.01-acres with an additional 1.05-acres offsite to be disturbed for the HCFCD and EAMD channel reconstruction. The 1.56-acres of the site where the 100-year floodplain is located will remain undisturbed. No off-site borrow is expected for the construction of this site.

The acreage disturbed for the first major phase of construction will be 15.64 –acres and the acreage disturbed for the second major phase of construction will be 19.30-acres on site and 1.05 -acres for the channel reconstruction offsite.

The pre-construction runoff coefficient “C” for the site is 0.18 and is 100% pervious.

The runoff coefficient “C” for the entire project site post-construction is estimated at 0.23 with impervious cover being approximately 24.7%, including only the infrastructure presented in the accompanying plans.

The runoff coefficient “C” for the completed East Aldine Town Center site once all lots have been fully developed, including Lone Star College, Harris County 911 Operations, the Town Center Park, and retail, is estimated at 0.61 with impervious cover being approximately 56.7%.

Calculations:

Pre-construction Runoff Coefficient “C”:

<u>Area</u>	<u>“C”</u>
60.01-acres open area	0.18

Post-construction Runoff Coefficient “C” for Infrastructure Package:

<u>Area</u>	<u>“C”</u>
55.50-acres landscaping/open areas	0.18

4.51-acres roadways, concrete pavement            0.90  
60.01-acres total

$$((55.50*0.18)+(4.51*0.90))/60.01 = 0.23 = \text{“C” weighted}$$

Post-construction Runoff Coefficient “C” for Full Development:

<u>Area</u>	<u>“C”</u>
19.19-acres landscaping/open areas	0.18
4.51-acres roadways, concrete pavement	0.90
36.31-acres commercial	0.80
60.01-acres total	

$$((19.19*0.18)+(4.51*0.90)+(36.31*0.80))/60.01 = 0.61 = \text{“C” weighted}$$

Areas of the site that should be completed prior to construction by the Contractor include:

- Stock pile location and acreage: 0.06 AC (2,500 SF)
- Project Trailer acreage: 0.02 AC (1,000 SF)
- Material yard acreage: 0.06 AC (2,500 SF)
- Total acreage disturbed: 0.14 AC (6,000 SF)

1.6. Receiving Waters

Harris County Flood Control District (HCFCD) channel number P118-37-00 is located adjacent to the western edge of the property, flowing north to south towards HCFCD Unit P518-02-00 located in Keith Wiess Park. Unit P518-02-00 is a regional detention basin that has been previously sized to account for the storm runoff for the area including this project site. This channel currently carries flow picked up from the existing Aldine Mail Route and nearby subdivisions. As part of this project, this channel will be reconstructed but only from the limits laid out in the plans. The reconstructed channel will continue to carry the flow currently traveling through it, in addition to the flow released from the wet basin located on the East Aldine Town Center property. There are no existing wetlands or other aquatic sites near the project area.

1.7. Site Features and Sensitive Areas to be Protected

The 1.56-acre 100-year floodplain area will remain undisturbed during construction. Filter fabric fencing will be placed around the floodplain to protect it from any possible erosion and debris.

1.8. Potential Sources of Pollution

Potential sources of sediment contributing to storm water runoff is the soil erosion of upland areas from overland runoff sheet flow, offsite and onsite vehicle tracking, concrete washout areas, and channel mitigation including bank widening and flow line realignment.

Other types of potential pollutant sources contributing to storm water runoff from the construction site are:

- Discharges from firefighting activities
- Uncontaminated fire hydrant flushings (excluding discharges of hyper chlorinated water, unless the water is first dechlorinated and discharges are not expected to adversely affect aquatic life), which include flushings from systems that utilize potable water, surface water, or groundwater that does not contain additional pollutants (uncontaminated fire hydrant flushing do not include systems utilizing reclaimed wastewater as a source water).
- Water from the routine external washing of vehicles, the external portion of buildings or structures, and pavement, where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless spilled materials have been removed; and if local, state, or federal regulations are applicable, the materials are removed according to those regulations), and where the purpose is to remove mud, dirt, or dust.
- Uncontaminated water used to control dust.
- Potable water sources including waterline flushings (excluding discharges of hyper chlorinated water, unless the water is first dechlorinated and discharges are not expected to adversely affect aquatic life).
- Uncontaminated air conditioning condensate.
- Uncontaminated ground water or spring water, including foundation or footing drains where flows are not contaminated with industrial materials such as solvents.
- Lawn watering and similar irrigation drainage.

The following materials or substances may be present onsite during the construction period:

- Concrete and concrete products
- Asphalt and asphalt products
- Metal reinforcing materials – rebar, welded wire fabric
- Fertilizers
- Petroleum based products
- Wood
- Plastic (PVC) and metal pipe and fittings
- Rock, gravel, sand, and soil
- Paint



1.9. Endangered Species Certification

There are no endangered or threatened species located on or near the site nor are there any critical habitats on or near the site. A look through the database of the U.S. Fish and Wildlife Service for Harris County, Texas revealed that three species have been known to occur in the county, but all seem unlikely to exist on this specific site due to there not being any vegetation other than grass and brush on the property. The site has been cleared.

1.10. Cultural Resources (Historical & Archeological)

There are no historic or archeological sites on or near the construction site. The site did not appear on the list of historic sites per the Texas Historical Commission.

1.11. Applicable Federal, Tribal, State or Local Programs

There are no other applicable erosion control or storm water management requirements other than those laid out in this report and plan drawings.

1.12. Maps

A “Vicinity Map” is included in the *Appendix K* to illustrate the general location of the project site along with properties and landmarks adjacent to it for quick reference. A SWPPP site plan and applicable details are included in *Appendix L*.

**2.0 Erosion and Sediment Control BMPs**

Temporary Sediment Controls: stabilized construction entrances will be placed as shown on the SWPPP and silt fences will be constructed at the downstream edge of the disturbed areas. Silt fence will also be used at selected locations of significant fill, around material stockpile sites, and around any other areas that would be a pollutant source during storm events. Inlet protection barriers will be placed around all storm sewer inlets the entire duration of construction to prevent sediment from entering the storm sewer conveyance systems. The utility trenches will also be utilized as temporary sediment traps to the extent feasible during construction. Rock filter dams will be placed in appropriate locations to slow any channelized flow and prevent possible erosion.

Permanent Storm Water Controls: Once construction is completed, the site will be revegetated in accordance with the stabilization practices identified in this plan. A wet basin with a floatable collection screen will provide water quality control and treatment for storm water runoff from the developed areas being conveyed to the HCFCD channel P118-37-00.

1. Sediment will be retained on site to the maximum extent practicable.
2. All control measures will be properly selected, installed, and maintained in accordance

with the manufacturer's specifications and good engineering practice prior to the start of any construction. The contractor will be responsible for maintaining the erosion control measures and removing the controls once the revegetation is established. If damaged or rendered ineffective, the erosion and sediment controls will be repaired or replaced immediately.

3. When pumping (dewatering) standing storm water from the site, the operator shall use appropriate Best Management Practices (BMPs) from the Storm Water Management Handbook for Construction Activities that address dewatering activities. Untreated/Direct discharge into a storm sewer will not be allowed.
4. If sediment is found off-site, the contractor will be responsible for removing those accumulations to reduce adverse impacts off-site.
5. Litter, construction debris, and construction chemicals found on site will be contained and removed by the contractor immediately to prevent the storm water runoff and all downstream water sources from becoming polluted.
6. On site material storage areas, if used by the contractor, will be properly fenced and maintained as to prevent erosion or contamination, and will be addressed on the Storm Water Pollution Prevention Plan. There are currently no plans for any off-site material storage areas, however, if the contractor deems this is necessary, the SWPPP will be updated to address this requirement.

#### 2.1. Minimize Disturbed Area and Protect Natural Features and Soil

1. The first phase of construction will include the installation of all underground utilities. Filter fabric fencing will be placed at all downstream locations of the open trenches and inlet protection barriers will be placed around all inlet openings to prevent sediment, trash or other debris from entering the conveyance systems.
2. The construction of the roadways are expected to begin within 1 week after the utilities are completed. If the interim period between construction of utilities and street construction will be more than 21 days, the street rights-of-way will be mulched or otherwise stabilized within 14 days. During the construction of the roadways, filter fabric fencing will be placed along the right-of-ways and inlet protection barriers will be placed around all inlet openings to prevent sediment, trash or other debris from entering the conveyance system.
3. After the roadways are completed, the areas from back-of-curb to the landscape reserve limits shall be fully sodded and comply with the landscape plans in the East Aldine Town Center Infrastructure plan set.
4. Construction entrances that vehicles will use for access on and off the site as well as staging and parking areas, shall be stabilized using coarse aggregate.
5. After paving completion, newly graded areas and all exposed soils will be completely stabilized.
6. Rock filter dams will be placed in the EAMD and HCFC channels to slow channelized flow, and filter fabric fencing will also be placed around the channels during reconstruction. Once the channels have been completed, the side slopes will be hydro-mulch seeded and covered with blankets and matting to prevent erosion.

2.2. Phased Construction Activity

1. Filter fabric fencing will be placed along the street rights-of-ways in areas not actively under construction to prevent sediment from piling up on the newly constructed roadways. Fencing will also be used along the property line, around the wet basin, and around any temporary material stockpiles located on site.

Approved inlet protection barriers will be placed around all proposed curb inlets to trap sediment that escaped the filter fabric fence.

Rock filter dams will be placed inside the channels to slow channelized flow and prevent erosion of the channels until permanent stabilization can be achieved.

Protective fencing will be installed and maintained around the drip line of all existing and proposed trees and shrubs.

Phase 1:

Sediment traps, stabilized construction entrances, and staging or parking areas will be installed with filter fabric fencing added around them where applicable. The installation of all proposed utilities will take approximately 4 months. At this time, the wet basin should be rough graded to serve as a temporary BMP during construction for storm water runoff to discharge.

Phase 2:

The second phase is expected to be completed in approximately 8 months, depending upon the weather. The roadways will be constructed, final site grading will occur, completion of the wet basin, and HCFCD channel P118-37-00 and EAMD channel will be reconstructed. Inlet protection barriers should be placed around all storm inlets, filter fabric fencing should be adjusted to prevent the piling of sediment in the construction area, and rock filter dams should be placed in the channels to slow channelized storm water flow. All excess material not used on site must be hauled off and removed at time of project completion. When construction is complete, all temporary controls must be removed and the site must be stabilized by revegetation.

2. Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water on the site, unless they are using a properly designed and designated concrete washout area.

2.3. Control Storm Water Flowing onto and through the Project

The existing drainage ditches constructed with the “Proposed Earthwork and Site Preparation of East Aldine Town Center” project, Harris County project number 1604190093, will remain to divert storm water runoff around the site and towards EAMD channel. Ditches D, E, and F, as shown on the *Overall Existing Site* layout located in **Appendix L**, will eventually be removed once the construction of the proposed roadways is completed. At that time, the

newly constructed storm water inlets will capture the site sheet flow and direct it to the proposed wet basin.

The existing ditches will be properly maintained by installing filter fabric fencing where necessary to prevent sediments and other debris from building up and blocking storm water flow. These ditches should be inspected on a monthly basis or immediately following a rainfall event of 0.5 inches or greater in a 24-hour period. The inlet protection barriers and fencing should be inspected every fourteen (14) calendar days and within 24-hours of the end of a storm event of 0.5 inches or greater, OR every 7 calendar days.

Sediment will be removed from behind the filter fabric fence when it reaches 1/3 the height of the fence. Sediment will be removed around the inlet barriers when the storage capacity has been approximately 50% filled.

#### 2.4. Stabilize Soils

##### Temporary

##### 1. *Blankets and Matting*

These will be used to stabilize the soil in and around the EAMD and HCFC channels. They will be installed once the channel reconstruction ends for each channel and remain in place until the permanent sod is established. Blankets and matting should be inspected weekly and after each rain event to locate and repair any damage. New material must be applied if necessary to restore function.

##### 2. *Hydraulic Mulch*

If construction over an area between phases exceeds 21 days, hydraulic mulch will be placed. A possible location may include the area within the street right-of-ways and landscape easements after the utilities are installed but before roadway construction begins. Mulched areas should be inspected weekly and after each rain event to locate and repair any damage. Areas damaged by storms or normal construction activities should be regraded and hydraulic mulch reapplied as soon as possible.

##### Permanent

##### 1. *Landscaping and Vegetation*

Sod, trees, bushes, plants, and other forms of vegetation will be installed once all construction activities have been completed and in compliance with the landscaping plans in the East Aldine Town Center Infrastructure set. All vegetation should be properly maintained by watering and fertilization to promote growth and establishment. Any damaged forms of vegetation should be repaired or replaced as soon as practical.

### Dust Control - Temporary

There are several methods that can be taken to control dust during construction:

1. Vegetative Cover
2. Mulches – chemical mulch binders can be used to bind mulch material. Commercial mulch binders should be used according to manufacturer’s recommendations.
3. Commercially available dust suppressors if applied in accordance with the manufacturers’ directions.
4. Tillage – roughens the surface and brings clods to the surface. This is typically an emergency measure that should be used before soil blowing starts.
5. Irrigation – site is sprinkled with water until the surface is moist. This can be particularly effective for controlling dust during trenching operations.
6. Barriers – solid board fences, snow fences, burlap fences, crate walls, bales of hay and similar materials can be used to control air currents and soil blowing.

### Dust Control – Permanent

1. Permanent Vegetation
2. Topsoil
3. Stone – crushed stone or coarse gravel

## 2.5. Protect Slopes

As mentioned above in section 2.4, blankets and matting will be installed along the side slopes of the EAMD and HCFCD channels to prevent erosion after the reconstruction of each channel has been completed. Once the sod and seed have been installed, the protective matting can be laid over the areas. The matting should be uniformly in contact with the soil, all lap joints should be secure, all staples flush with the ground, and all disturbed areas have been revegetated.

Blankets and matting should be inspected weekly and after each rain event to locate and repair any damage. Apply new material if necessary to restore function.

## 2.6. Protect Storm Drain Inlets

Bagged gravel inlet filters will be used onsite to protect all inlets, both curb and grate. They will be placed entirely around the opening of each inlet as soon as the inlet has been installed. The gravel bags should be filled and stacked to form a continuous barrier about 1 foot high around the inlets. The bags should be tightly abutted against each other to prevent runoff from flowing between them.

The inlet protection barriers should be inspected weekly and after each rainfall. Repair or replacement should be made promptly as needed by the contractor. Sediment needs to be removed when buildup reaches a depth of 3-inches and should be deposited in an area suitable so it will not erode. The placement of the bags should be checked to prevent any gaps between the bags and the curb. If filter fabric is used, it should be inspected and

patched or replaced if torn or missing. The barriers should be removed and the area stabilized only after the remaining drainage area has been properly stabilized.

2.7. Establish Perimeter Controls and Sediment Barriers, Retain Sediment on Site

Filter fabric fence or silt fence, will be placed along the street right-of-ways, along the property line, around the wet basin, and around any temporary material stockpiles located on site prior to start of construction. Fabric fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric with a width of 36-inches and a minimum opening size of U.S. Sieve No. 30. Fence posts should be made of hot rolled steel, surface painted or galvanized, and at least 4 feet long. The woven wire backing to support the fabric should be galvanized 2"x4" welded wire, 12 gauge minimum.

The steel posts should be installed on a slight angle toward the anticipated runoff source, be embedded a minimum of 1 foot deep, and spaced not more than 8 feet apart on center unless water is concentrated in which case the maximum spacing should be 6 feet.

The filter fabric fence should be inspected weekly and after any rain event. The sediment will be removed and the fence must be replaced if sediment reaches 1/3 the height of the fence. Any torn fabric will be replaced or second line of fencing parallel to the torn section will be installed. Any crushed or collapsed fence due to construction activity will be immediately replaced or repaired.

2.8. Establish Stabilized Construction Exits (Access)

This project has two (2) construction entrances/exits proposed as shown on the SWPPP located in **Appendix L**. These pads provide a stable entrance/exit condition from the construction site and also keep mud and sediment off public roads.

The pad will consist of 4 to 8-inch washed stone over a stable foundation consisting of a base layer of geotextile fabric specifically for use as a soil filtration media.

The entrance/exit should be maintained in a manner that will prevent tracking or flowing of sediment onto public rights-of-ways. This may require periodic to dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public right-of-ways should be removed immediately by contractor. If washing is required, it should be done in an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin. All sediment should be prevented from entering any storm drain, ditch, or water feature by using approved methods.

2.9. Additional BMPs

Rock filter dams will be located within the EAMD and HCFC D P118-37-00 channels to reduce channelized flow and prevent the channels from eroding. The dam should be 18-inches tall and 2 feet wide with a side slope no greater than 2:1. The ends of the dams should be tied into existing upslope grade and buried in a trench approximately 3 to 4-inches deep to prevent failure.

The dams should be inspected weekly and after each rain event by the responsible individual. Sediment and other debris will be removed when buildup reaches 6-inches and dispose of the accumulated silt in an approved manner. The dam should be replaced when the structure does not function as intended due to silt accumulation among the rocks, washout, or construction traffic damage. The rock filter dam should be left in place until all upstream areas are stabilized and the accumulated silt is removed.

3.0 Good Housekeeping BMPs

3.1. Material Handling and Waste Management

- All litter, trash and floatable debris will be contained in proper trash receptacles for the duration of construction. The trash is to be removed from site and emptied at least once weekly.
- Portable sanitary units shall be provided onsite for the duration of construction and cleaned, treated, and pumped by a licensed waste management organization at least once weekly.
- Hazardous products should be kept in original containers unless they are not reseal able; original labels and material safety data will be retained, as they contain important product information; and if surplus product must be disposed of, manufacturers' and/or local and state recommended methods for proper disposal will be followed.

The contractor shall cease work in any area where any underground storage tanks may be discovered or any unusual odors or sheen are detected.

3.2. Establish Proper Building Material Staging Areas

The materials listed in Section 1.8, "Potential Sources of Pollution" will be stored in a neat, orderly manner in their appropriate containers. Products should be stored in their original containers if possible with the original manufacturers' labels, and the manufacturers' recommendations for proper use and disposal will be followed. They will also be stored in the temporary spoils, disposal area as shown on erosion/sedimentation control plan, or an area as may otherwise be approved. Whenever possible, all of a product will be used before disposing of the container. The contractor will inspect daily to ensure proper use and disposal of materials onsite.

The contractor shall cease work in any area where any underground storage tanks may be discovered or any unusual odors or sheen are detected.

### 3.3 Designated Washout Areas

There will be a designated concrete washout area on site the entire duration of construction. The purpose of this area is to prevent or reduce the discharge of pollutants to storm water flow by providing an area away from storm drains, ditches, streets, or channels where washing is allowed. The washout area will be located at least 50 feet from sensitive features, storm drains, ditches, or bodies of water. Runoff is not allow from this area and a temporary pit or bermed area large enough to contain liquid and solid waste should be constructed. After the concrete has set, it should be broken up and disposed of properly.

If any holes, depressions, or other ground disturbances caused by the removal of the temporary concrete washout facility are visible, the facility should be backfilled and repaired immediately.

### 3.4 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices

Fuels that will be used on site must be stored in sealed, clearly labeled containers on a stable, level, and impervious surface. This will prevent unnecessary spills by not easily being able to tip over. Secondary containment must be provided for all regulated containers and be in place during refueling activities involving transfers of fuel from delivery trucks, tank trucks or portable containers to field equipment. Secondary containment must be sized to contain the most likely volume of fuel to be spilled during a fuel transfer.

Drip pans or absorbent pads should be used during fueling unless the fueling is performed over an impermeable surface in a dedicated fueling area. Absorbent spill clean-up materials and spill kits should be available in fueling areas and on fueling trucks and should be disposed of properly after use.

Fueling areas should be inspected every 14 calendar days and within 24 hours of the end of a storm event of 0.5-inches or greater, OR every seven (7) calendar days, and should promptly repair the area if needed. Spills should be immediately cleaned up and contaminated soil and cleanup materials should be properly disposed. Inspectors should check for spills and overfills due to operator error, check for failure of any pipe systems, check for leaks or spills during pumping of liquids or gases from a truck to a storage facility or vice versa, and visually inspect new container installations for loose fittings, poor welds and improper or poorly fitted gaskets.

### 3.5 Control Equipment/Vehicle Washing

Vehicle washing area should be located where the wash water will spread out and evaporate or infiltrate directly into the ground, or in a location where the runoff can be collected in a temporary holding basin. The area should be designated only for washing vehicles and should have gravel or rock bases to minimize the generation of mud.

The washout area should be inspected every 14 calendar days and within 24 hours of the end of a storm event of 0.5-inches or greater, OR every seven (7) calendar days. In the case



the topography of the area has changed or the area is no longer an acceptable location, berms should be constructed or the washout location should be relocated to a more suitable area.

### 3.6 Spill Prevention and Control Plan

The following are good practices to maintain to reduce the risk of spills:

- Only enough product required to do the job will be stored.
- All materials stored on site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- If possible, all of a product will be used up before disposing of the container.
- Manufacturers' recommendations for proper use and disposal will be followed.
- The site superintendent will inspect daily to ensure proper use and disposal of materials on site.
- Site personnel will be made aware of the manufacturers' recommended methods for spill cleanup and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept on site in an accessible location known to the site personnel.

Specific product and spill prevention practices to be followed are listed in **Table 1**.

### 3.7 Any Additional BMPs

Hazardous products are likely to be found on site and the following practices are used to reduce the risks associated with hazardous materials (if applicable):

- Products will be kept in original containers unless they are not resealable.
- Original labels and material safety data will be retained, as they contain important product information.
- If surplus product must be disposed of, manufacturers' and/or local and state recommended methods for proper disposal will be followed.

Specific product and spill prevention practices to be followed are listed in **Table 1**.

### 3.8 Allowable Non-Storm Water Discharge Management

- Discharges from firefighting activities
- Uncontaminated fire hydrant flushings (excluding discharges of hyper chlorinated water, unless the water is first dechlorinated and discharges are not expected to adversely affect aquatic life), which include flushings from systems that utilize potable water, surface water, or groundwater that does not contain additional pollutants (uncontaminated fire hydrant flushing do not include systems utilizing reclaimed wastewater as a source water).

- Water from the routine external washing of vehicles, the external portion of buildings or structures, and pavement, where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless spilled materials have been removed; and if local, state, or federal regulations are applicable, the materials are removed according to those regulations), and where the purpose is to remove mud, dirt, or dust.
- Uncontaminated water used to control dust.
- Potable water sources including waterline flushings (excluding discharges of hyper chlorinated water, unless the water is first dechlorinated and discharges are not expected to adversely affect aquatic life).
- Uncontaminated air conditioning condensate.
- Uncontaminated ground water or spring water, including foundation or footing drains where flows are not contaminated with industrial materials such as solvents.
- Lawn watering and similar irrigation drainage.

The following materials or substances may be present onsite during the construction period:

- Concrete and concrete products
- Asphalt and asphalt products
- Metal reinforcing materials – rebar, welded wire fabric
- Fertilizers
- Petroleum based products
- Wood
- Plastic (PVC) and metal pipe and fittings
- Rock, gravel, sand, and soil
- Paint

BMPs that can reduce or eliminate these discharges from contaminating storm water are designated washing and washout areas, vegetation, mulches, and barriers. The installation and maintenance requirements for these can be found in Section 2 and 3 above.

#### **4.0 Selecting Post-Construction BMPs**

##### **4.1 Post Construction BMPs**

###### *Floatable Collection Screen*

The collection screen is designed per Harris County standards and is located at the 4'x3' RCB wet basin outfall structure. The screen is used to collect and contain floating trash and litter found in the wet basin to prevent clogging of downstream drainage structures and to protect the aquatic habitat and animal life. The collection screen will be cleaned monthly and after flood events.

###### *Wet Basin*

The basin will have a permanent water depth of 6 feet and is sized large enough to detain the 100-year storm event for the site and approximately 5.5-acres of adjacent Aldine Mail Route Road. All water above the permanent pool elevation exits the basin through a 4'x3' RCB to

EAMD channel located along the southern property boundary. In case there is a storm event greater than the 100 year storm, an emergency spillway is located above the outfall pipe to prevent the basin from overtopping. The wet basin's main pool area provides storm water quality treatment by gravitational settling, and the plants and other vegetation located along the edge of the basin remove pollutants and sediment from land sheet flow entering the basin.

The following routine maintenance tasks should take place:

- Mowing: the side-slopes, embankment, and emergency spillway of the basin should be mowed at least twice a year to prevent woody growth and control weeds.
- Debris and Litter Removal: As part of periodic mowing operations and inspections, debris and litter should be removed from the surface of the basin. The outlet should be checked for possible clogging.
- Erosion Control: The basin side slopes, emergency spillway, and embankment all may periodically suffer from slumping and erosion. Corrective measures such as regrading and revegetation may be necessary.
- Nuisance Control: Control of insects, weeds, odors, and algae may be needed. Nuisance control tends to be rare in wet basins except under extremely dry weather conditions. Twice a year, the facility should be evaluated in terms of nuisance control. Means other than chemical applications is preferable.

The design calculations for these BMPs are located in **Appendix L**.

#### *Landscaping and Vegetation*

After roadway construction and channel reconstruction, newly graded areas and all exposed soils will be completely stabilized by new vegetation. Sod will be planted on disturbed land between the roadway back-of-curb and landscape easement, as well as within the "Bethany Lane" designated right-of-way as soon as possible. Trees, plants and bushes will also be planted throughout the project. The landscaping will done per the landscaping plans in the East Aldine Town Center Sec 1 Infrastructure Package upon completion of roadways, sidewalks, and site grading.

## **5.0 Inspections**

### **5.1. Inspections**

Inspections of all BMPs will be conducted every fourteen (14) calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater; OR every 7 calendar days. In the event of flooding or other uncontrollable situations which prohibit access to the inspection sites, inspections must be conducted as soon as access is practicable. The contractor will designate a qualified person or team to be responsible for inspection of the controls and for required record keeping. Personnel shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, discharge locations, and structural controls for evidence of, or the potential for, pollutants entering the drainage system. Personnel conducting these inspections must be

knowledgeable of TPDES General Permit No. TXR150000, familiar with the construction site, and knowledgeable of this plan. Sediment and erosion control measures identified in this plan shall be inspected to ensure that they are operating correctly.

Detailed inspection information for particular BMPs are included in Sections 2 and 3 of this report.

If any BMPs are deemed ineffective, the SWPPP shall be modified as necessary to better control pollutants in runoff. Revisions to the plan must be completed within seven (7) calendar days following the inspection. If existing controls are modified or if additional controls are necessary, an implementation schedule must be described in this plan and/or in a maintenance report before the next storm event. If implementation before the next anticipated storm event is impracticable, these changes must be implemented as soon as practicable.

A copy of the Maintenance form can be found in **Appendix C**.

#### 5.2. Delegation of Authority

The construction site operator must fill out and sign the Delegation of Authority form in order to allow a person other than themselves to sign inspection reports, certifications, or any other information pertinent to the site construction.

The delegation of authority form that should be used is found in **Appendix B**.

#### 5.3. Corrective Action Log

Corrective action log is located in **Appendix F**.

### 6.0 Recordkeeping and Training

#### 6.1 Recordkeeping

The following is a list of records you should keep at your project site available for inspectors to review:

- Dates of grading, construction activity, and stabilization
- A copy of the general permit (TPDES General Permit TXR150000)
- The signed and certified NOI forms and permit application form (attached)
- Copy of the letter from TCEQ notifying you of their receipt of your complete NOI/application once received from TCEQ
- Inspection reports (attached)

Records will be retained for a minimum period of 3 years after the permit is terminated.

## 6.2 Log of Changes to SWPPP

Log of changes and updates to the SWPPP:  
SWPPP Amendment Log, **Appendix H**.

## 6.3 Training

Training log is located in **Appendix G**. The training conducted is:

- General storm water and BMP awareness training for staff and subcontractors.
- Detailed training for staff and subcontractors with specific storm water responsibilities.

## 7.0 Final Stabilization

### 7.1 Final Stabilization

Final stabilization practices can be found in Section 2.4, *Stabilize Soils*. Once construction has been completed, permanent vegetation will be placed in conformance with the East Aldine Town Center Sec 1 Infrastructure Package plans.

Site plans should be updated to indicate areas that have achieved final stabilization and the dates for those areas once they've achieved final stabilization should be included in Section 6, Part 6.1 of this SWPPP.

Once the site is complete, site cleanup of road project area along with maintenance yards, project trailer, spoils pile location, and all washing areas are to be removed and cleaned.

**Permit Notice of Termination (NOT) cannot be sent to TCEQ until site reached 70% aerial coverage.**

\*Inspections and permit cannot be terminated until at least 70% vegetation cover has been achieved as defined by the TPDES Permit.

TABLE 1	
Product Specific Practices	
The following product specific practices will be followed onsite:	
Petroleum Products:	All onsite vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be sorted in tightly sealed containers which are clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.
Fertilizers:	Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked in the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.
Paints:	All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system but will be properly disposed of according to manufacturer's instructions or state and local regulations.
Concrete Trucks:	Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water on the site.
Spill Prevention Practices	
In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:	
<ul style="list-style-type: none"> <li>• Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.</li> <li>• Materials and equipment necessary for spill cleanup will be kept in the material storage" are onsite. Equipment and materials will include but not be limited to brooms, dust" pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal" trash containers specifically for this purpose.</li> <li>• All spills will be cleaned up immediately after discovery.</li> <li>• The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with hazardous substance.</li> <li>• Spills of toxic or hazardous material will be reported to the appropriate state or local government agency, regardless of the size.</li> <li>• The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.</li> <li>• Mr. Doe, the site superintendent responsible for the day-to-day site operations, will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area and in the office trailer onsite.</li> </ul>	

## **Appendix A**

# **Preparer's Certification**

**PREPARER'S CERTIFICATION FOR THE  
STORM WATER POLLUTION PREVENTION PLAN**

Project Name and Location:

Project Name: East Aldine Town Center Sec 1 – Infrastructure Package  
Location: 3314 Aldine Mail Route Road, Houston, TX 77039

I certify under penalty of law that this document and all attachments were prepared under my direction of supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, 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.

Storm Water Pollution Prevention Plan prepared by:

PGAL  
Company

Megan E. Houtchens  
Name

Senior Associate  
Title

  
Signature

01/16/2017  
Date

Date Prepared: 10/07/2016

Latest Revision: 11/15/2016



## **SUBCONTRACTOR'S CERTIFICATION**

Project Name and Location:

Project Name:

Location:

I certify under penalty of law that I understand the terms and conditions of the Texas Pollutant Discharge Elimination System (TPDES) General Permit TXR150000 that authorizes the storm water discharges associated with the industrial activity from the construction site identified as part of this certification.

Subcontractor:

Responsible For:

\_\_\_\_\_

Company

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name

\_\_\_\_\_

\_\_\_\_\_

Title

Signature

Date

Subcontractor:

Responsible For:

\_\_\_\_\_

Company

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name

\_\_\_\_\_

\_\_\_\_\_

---

Title

---

Signature

---

Date

## **Appendix B**

# **Delegation of Authority Form**

## Delegation of Authority Form

I, \_\_\_\_\_ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the Construction General Permit, at the \_\_\_\_\_ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

\_\_\_\_\_ (name of person or  
position)  
\_\_\_\_\_ (company)  
\_\_\_\_\_ (address)  
\_\_\_\_\_ (city, state, zip)  
\_\_\_\_\_ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in \_\_\_\_\_ (Reference State Permit), and that the designee above meets the definition of a “duly authorized representative” as set forth in \_\_\_\_\_ (Reference State Permit).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, 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.

**Name:** \_\_\_\_\_

**Company:** \_\_\_\_\_

**Title:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

## **Appendix C**

# **Storm Water Construction Site Inspection Report**

## Storm Water Construction Site Inspection Report

General Information			
<b>Project Name</b>			
<b>TPDES Tracking No.</b>		<b>Location</b>	
<b>Date of Inspection</b>		<b>Start/End Time</b>	
<b>Inspector's Name(s)</b>			
<b>Inspector's Title(s)</b>			
<b>Inspector's Contact Information</b>			
<b>Inspector's Qualifications</b>			
<ul style="list-style-type: none"> <li>• <i>Insert qualifications or add reference to the SWPPP. (See Section 5 of the SWPPP Template)</i></li> </ul>			
<b>Describe present phase of construction</b>			
<b>Type of Inspection:</b>			
<input type="checkbox"/> Regular <input type="checkbox"/> Pre-storm event <input type="checkbox"/> During storm event <input type="checkbox"/> Post-storm event ( _____ inches received at site)			
<b>Waters of the U.S. (CWA &amp; RHA Compliance)</b> <b>U.S. Army Corps of Engineers Regulatory Compliance</b> <b>Completed under USACE Subject No. SWG- _____ - _____</b>			
<b>Does this project area contain jurisdictional waters of the U.S.?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If yes, are the jurisdictional waters impacted in any way by the proposed work?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, impact are permitted by <input type="checkbox"/> NWP(s) _____ or <input type="checkbox"/> Individual Permit Issued on the following Date: _____. If this is an Individual Permit is the Site Notice Posted with SWPPP notices? <input type="checkbox"/> Yes <input type="checkbox"/> No			
<b>Weather Information</b>			
<b>Has there been a storm event since the last inspection?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If yes, provide:</b> Storm Start Date & Time: _____ Storm Duration (hrs): _____ Approximate Amount of Precipitation (in): _____			
<b>Weather at time of this inspection?</b> <input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Fog <input type="checkbox"/> Snowing <input type="checkbox"/> High Winds <input type="checkbox"/> Other: _____ Temperature: _____			
<b>Have any discharges occurred since the last inspection?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If yes, describe:</b> _____			
<b>Are there any discharges at the time of inspection?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If yes, describe:</b> _____			

**Site-specific BMPs**

- *Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with*

*you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.*

- *Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.*

	<b>BMP</b>	<b>BMP Installed?</b>	<b>BMP Maintenance Required?</b>	<b>Corrective Action Needed and Notes</b>
1		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
13		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
14		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
15		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
16		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
17		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
18		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
19		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
20		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

**Overall Site Issues**

*Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.*

	<b>BMP/activity</b>	<b>Implemented?</b>	<b>Maintenance Required?</b>	<b>Corrective Action Needed and Notes</b>
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	<b>BMP/activity</b>	<b>Implemented?</b>	<b>Maintenance Required?</b>	<b>Corrective Action Needed and Notes</b>
4	Are discharge points and receiving waters free of any sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are storm drain inlets properly protected?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Is the construction exit preventing sediment from being tracked into the street?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	Are materials that are potential storm water contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	Are non-storm water discharges (e.g., wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12	(Other)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

**Non-Compliance**



Describe any incidents of non-compliance not described above:

**CERTIFICATION STATEMENT**

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, 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.”

**Print name and title:**

\_\_\_\_\_

**Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

# **Appendix D**

## **TPDES Forms**



# TCEQ Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

### IMPORTANT:

- Use the [INSTRUCTIONS](#) to fill out each question in this form.
- Use the [CHECKLIST](#) to make certain all you filled out all required information. Incomplete applications **WILL** delay approval or result in automatic denial.
- Once processed your permit can be viewed at:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm)

**ePERMITS:** Sign up now for online NOI: <https://www3.tceq.texas.gov/steers/index.cfm>  
Pay a \$225 reduced application fee by using ePermits.

### APPLICATION FEE:

- You must pay the **\$325** Application Fee to TCEQ for the paper application to be complete.
- Payment and NOI must be mailed to separate addresses.
- Did you know you can pay on line?
  - Go to <https://www3.tceq.texas.gov/epay/index.cfm>
  - Select Fee Type: GENERAL PERMIT CONSTRUCTION STORM WATER DISCHARGE NOI APPLICATION

• **Provide your payment information below, for verification of payment:**

Mailed	Check/Money Order No.:	_____
	Name Printed on Check:	_____
EPAY	Voucher No.:	_____
	Is the Payment Voucher copy attached?	Yes

**RENEWAL: Is this NOI a Renewal of an existing General Permit Authorization?**  
**(Note: A permit cannot be renewed after June 3, 2013.)**

Yes    The Permit number is: TXR15\_\_\_\_\_

**(If a permit number is not provided, a new number will be assigned.)**

No

### 1) OPERATOR (Applicant)

**a)** If the applicant is currently a customer with TCEQ, what is the Customer Number (CN) issued to this entity? You may search for your CN at:  
<http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=cust.CustSearch>

CN \_\_\_\_\_

**b)** What is the Legal Name of the entity (applicant) applying for this permit?

\_\_\_\_\_  
(The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal document forming the entity.)

**c)** What is the name and title of the person signing the application? The person must be an executive official meeting signatory requirements in TAC 305.44(a).

Prefix (Mr. Ms. Miss): \_\_\_\_\_

First/Last Name: \_\_\_\_\_ Suffix: \_\_\_\_\_

Title: \_\_\_\_\_ Credential: \_\_\_\_\_

**d)** What is the Operator Contact's (Responsible Authority) contact information and mailing address as recognized by the US Postal Service (USPS)? You may verify the address at:

<http://zip4.usps.com/zip4/welcome.jsp>

Phone #: \_\_\_\_\_ ext: \_\_\_\_\_ Fax #: \_\_\_\_\_

E-mail: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Internal Routing (Mail Code, Etc.): \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_

If outside USA: Territory: \_\_\_\_\_ Country Code: \_\_\_\_\_ Postal Code: \_\_\_\_\_

**e)** Indicate the type of Customer (The instructions will help determine your customer type):

Individual	Limited Partnership	Sole Proprietorship-DBA
Joint Venture	General Partnership	Corporation
Trust	Estate	Federal Government
State Government	County Government	City Government
Other Government		

**f)** Independent Operator? Yes          No  
(If governmental entity, subsidiary, or part of a larger corporation, check "No".)

**g)** Number of Employees: 0-20; 21-100; 101-250; 251-500; or 501 or higher

**h)** Customer Business Tax and Filing Numbers:  
(REQUIRED for Corporations and Limited Partnerships. Not Required for Individuals, Government, or Sole Proprietors)

State Franchise Tax ID Number: \_\_\_\_\_

Federal Tax ID: \_\_\_\_\_

Texas Secretary of State Charter (filing) Number: \_\_\_\_\_

DUNS Number (if known): \_\_\_\_\_

## 2) APPLICATION CONTACT

If TCEQ needs additional information regarding this application, who should be contacted?

Is the application contact the same as the applicant identified above?

Yes, go to Section 3).          No, complete section below.

Prefix (Mr. Ms. Miss): \_\_\_\_\_

First/Last Name: \_\_\_\_\_ Suffix: \_\_\_\_\_

Title: \_\_\_\_\_ Credential: \_\_\_\_\_

Organization Name: \_\_\_\_\_  
Phone No.: \_\_\_\_\_ ext: \_\_\_\_\_ Fax Number: \_\_\_\_\_  
E-mail: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
Internal Routing (Mail Code, Etc.): \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_  
Mailing Information if outside USA:  
Territory: \_\_\_\_\_ Country Code: \_\_\_\_\_ Postal Code: \_\_\_\_\_

**3) REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

If the site of your business is part of a larger business site or if other businesses were located at this site before yours, a Regulated Entity Number (RN) may already be assigned for the larger site. Use the RN assigned for the larger site. Search TCEQ's Central Registry to see if the larger site may already be registered as a regulated site at:

<http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=regent.RNSearch>.

If the site is found, provide the assigned Regulated Entity Reference Number and provide the information for the site to be authorized through this application below. The site information for this authorization may vary from the larger site information.

**a)** TCEQ issued RE Reference Number (RN): RN \_\_\_\_\_

**b)** Name of project or site (the name known by the community where located):  
\_\_\_\_\_

**c)** In your own words, briefly describe the primary business of the Regulated Entity: (Do not repeat the SIC and NAICS code):  
\_\_\_\_\_

**d)** County (or counties if > 1) \_\_\_\_\_

**e)** Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

**f)** Does the site have a physical address?  
Yes, complete Section A for a physical address.  
No, complete Section B for site location information.

**Section A:** Enter the physical address for the site.  
Verify the address with USPS. If the address is not recognized as a delivery address, provide the address as identified for overnight mail delivery, 911 emergency or other online map tools to confirm an address.

Physical Address of Project or Site:  
Street Number: \_\_\_\_\_ Street Name: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_

**Section B:** Enter the site location information.

If no physical address (Street Number & Street Name), provide a written location access description to the site. (Ex.: located 2 miles west from intersection of Hwy 290 & IH35 accessible on Hwy 290 South)

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City where the site is located or, if not in a city, what is the nearest city:

State: \_\_\_\_\_ ZIP Code where the site is located: \_\_\_\_\_

**4) GENERAL CHARACTERISTICS**

**a)** Is the project/site located on Indian Country Lands?

Yes - If the answer is Yes, you must obtain authorization through EPA, Region 6.

No

**b)** Is your construction activity associated with a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources?

Yes - If the answer is Yes, you may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization through EPA, Region 6.

No

**c)** What is the Primary Standard Industrial Classification (SIC) Code that best describes the construction activity being conducted at the site?

Primary SIC Code: \_\_\_\_\_

**d)** If applicable, what is the Secondary SIC Code(s): \_\_\_\_\_

**e)** What is the total number of acres disturbed? \_\_\_\_\_

**f)** Is the project site part of a larger common plan of development or sale?

Yes - If the answer is Yes, the total number of acres disturbed can be less than 5 acres.

No - If the answer is No, the total number of acres disturbed must be 5 or more. If the total number of acres disturbed is less than 5 then the project site does not qualify for coverage through this Notice of Intent. Coverage will be denied. See the requirements in the general permit for small construction sites.

**g)** What is the name of the first water body(s) to receive the stormwater runoff or potential runoff from the site?

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**h)** What is the segment number(s) of the classified water body(s) that the discharge will eventually reach?

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**i)** Is the discharge into an MS4?

Yes - If the answer is Yes, provide the name of the MS4 operator below.

No

If Yes, provide the name of the MS4 operator:

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Note: The general permit requires you to send a copy of the NOI to the MS4 operator.

**j)** Are any of the surface water bodies receiving discharges from the construction site on the latest EPA-approved CWA 303(d) List of impaired waters?

Yes - If the answer is Yes, provide the name(s) of the impaired water body(s) below.

No

If Yes, provide the name(s) of the impaired water body(s):

**k)** Is the discharge or potential discharge within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer as defined in 30 TAC Chapter 213?

Yes - If the answer is Yes, complete certification below by checking "Yes."

No

I certify that a copy of the TCEQ approved Plan required by the Edwards Aquifer Rule (30 TAC Chapter 213) is either included or referenced in the Stormwater Pollution Prevention Plan.

Yes

**5) CERTIFICATION**

Check Yes to the certifications below. Failure to indicate Yes to **ALL** items may result in denial of coverage under the general permit.

- a) I certify that I have obtained a copy and understand the terms and conditions of the Construction General Permit (TXR150000). Yes
- b) I certify that the full legal name of the entity applying for this permit has been provided and is legally authorized to do business in Texas. Yes
- c) I understand that a Notice of Termination (NOT) must be submitted when this authorization is no longer needed. Yes
- d) I certify that a Stormwater Pollution Prevention Plan has been developed, will be implemented prior to construction and to the best of my knowledge and belief is compliant with any applicable local sediment and erosion control plans, as required in the general permit TXR150000. Note: For multiple operators who prepare a shared SWP3, the confirmation of an operator may be limited to its obligations under the SWP3 provided all obligations are confirmed by at least one operator. Yes

**Operator Certification:**

I, \_\_\_\_\_  
Typed or printed name Title

certify under penalty of law that this document and all attachments were prepared under my direction 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 gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code 305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
*(Use blue ink)*



## NOTICE OF INTENT CHECKLIST (TXR150000)

- Did you complete everything? Use this checklist to be sure!
- Are you ready to mail your form to TCEQ? Go to the General Information Section of the Instructions for mailing addresses.

This checklist is for use by the operator to ensure a complete application. Missing information may result in denial of coverage under the general permit. (See NOI process description in the Instructions)

### Application Fee:

If paying by Check:

Check was mailed **separately** to the TCEQs Cashier's Office. (See Instructions for Cashier's address and Application address.)

Check number and name on check is provided in this application.

If using ePay:

The voucher number is provided in this application or a copy of the voucher is attached.

### PERMIT NUMBER:

Permit number provided – if this application is for renewal of an existing authorization.

### OPERATOR INFORMATION - Confirm each item is complete:

Customer Number (CN) issued by TCEQ Central Registry

Legal name as filed to do business in Texas (Call TX SOS 512/463-5555)

Name and title of responsible authority signing the application

Mailing address is complete & verifiable with USPS. [www.usps.com](http://www.usps.com)

Phone numbers/e-mail address

Type of operator (entity type)

Independent operator

Number of employees

For corporations or limited partnerships – Tax ID and SOS filing numbers

Application contact and address is complete & verifiable with USPS. <http://www.usps.com>

### REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE - Confirm each item is complete:

Regulated Entity Reference Number (RN) (if site is already regulated by TCEQ)

Site/project name/regulated entity

Latitude and longitude <http://www.tceq.texas.gov/gis/sqmaview.html>

County

Site/project physical address. Do not use a rural route or post office box.

Business description

### GENERAL CHARACTERISTICS - Confirm each item is complete:

Indian Country Lands –the facility is not on Indian Country Lands

Construction activity related to facility associated to oil, gas, or geothermal resources

Standard Industrial Classification (SIC) Code [www.osha.gov/oshstats/sicsr.html](http://www.osha.gov/oshstats/sicsr.html)

Acres disturbed is provided and qualifies for coverage through a NOI

Common plan of development or sale

Receiving water body(s)

Segment number(s)

Impaired water body(s)

MS4 operator

Edwards Aquifer rule

### CERTIFICATION

Certification statements have been checked indicating “Yes”

Signature meets 30 Texas Administrative Code (TAC) 305.44 and is original.

# Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

## General Information and Instructions

### GENERAL INFORMATION

#### Where to Send the Notice of Intent (NOI):

BY REGULAR U.S. MAIL

Texas Commission on  
Environmental Quality  
Stormwater Processing Center  
(MC228)  
P.O. Box 13087  
Austin, Texas 78711-3087

BY OVERNIGHT/EXPRESS MAIL

Texas Commission on  
Environmental Quality  
Stormwater Processing Center  
(MC228)  
12100 Park 35 Circle  
Austin, TX 78753

#### TCEQ Contact List:

Application – status and form questions:

*512/239-3700, [swpermit@tceq.texas.gov](mailto:swpermit@tceq.texas.gov)*

Technical questions:

*512/239-4671, [swgp@tceq.texas.gov](mailto:swgp@tceq.texas.gov)*

Environmental Law Division:

*512/239-0600*

Records Management - obtain copies of forms:

*512/239-0900*

Reports from databases (as available):

*512/239-DATA (3282)*

Cashier's office:

*512/239-0357 or 512/239-0187*

#### Notice of Intent Process:

When your NOI is received by the program, the form will be processed as follows:

- 1) **Administrative Review:** Each item on the form will be reviewed for a complete response. In addition, the operator's legal name must be verified with Texas Secretary of State as valid and active (if applicable). The address(s) on the form must be verified with the US Postal service as receiving regular mail delivery. Never give an overnight/express mailing address.
- 2) **Notice of Deficiency:** If an item is incomplete or not verifiable as indicated above, a notice of deficiency (NOD) will be mailed to the operator. The operator will have 30 days to respond to the NOD. The response will be reviewed for completeness.
- 3) **Acknowledgment of Coverage:** An Acknowledgment Certificate will be mailed to the operator. This certificate acknowledges coverage under the general permit.  
-OR-  
**Denial of Coverage:** If the operator fails to respond to the NOD or the response is inadequate, coverage under the general permit may be denied. If coverage is denied, the operator will be notified.

#### General Permit (Your Permit)

For NOIs submitted **electronically** through ePermits, provisional coverage under the general permit begins immediately following confirmation of receipt of the NOI form by the TCEQ.

For **paper** NOIs, provisional coverage under the general permit begins **7 days after a completed NOI is postmarked for delivery** to the TCEQ.

You should have a copy of your general permit when submitting your application. You may view and print your permit for which you are seeking coverage, on the TCEQ web site <http://www.tceq.texas.gov>. Search using key word TXR150000.

### **General Permit Forms**

The Notice of Intent (NOI), Notice of Termination (NOT), and Notice of Change (NOC) (including instructions) are available in Adobe Acrobat PDF format on the TCEQ web site <http://www.tceq.texas.gov>.

### **Change in Operator**

An authorization under the general permit is not transferable. If the operator of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be submitted no later than 10 days prior to the change in Operator status.

### **TCEQ Central Registry Core Data Form**

The Core Data Form has been incorporated into this form. Do not send a Core Data Form to TCEQ. After final acknowledgment of coverage under the general permit, the program will assign a Customer Number and Regulated Entity Number.

You can find the information on the Central Registry web site at <http://www12.tceq.texas.gov/crpub/index.cfm>. You can search by the Regulated Entity (RN), Customer Number (CN) or Name (Permittee), or by your permit number under the search field labeled "Additional ID". Capitalize all letters in the permit number.

The Customer (Permittee) is responsible for providing consistent information to the TCEQ, and for updating all CN and RN data for all authorizations as changes occur. For General Permits, a Notice of Change form must be submitted to the program area.

### **Fees associated with a General Permit**

Payment of the fee may be made by check or money order, payable to TCEQ, or through EPAY (electronic payment through the web).

**Application Fee:** This fee is required to be paid at the time the NOI is submitted. Failure to submit payment at the time the application is filed will cause delays in acknowledgment or denial of coverage under the general permit.

#### **Mailed Payments:**

Payment must be mailed under separate cover at one of the addresses below using the attached Application Fee submittal form. (DO NOT SEND A COPY OF THE NOI WITH THE APPLICATION FEE SUBMITTAL FORM)

#### **BY REGULAR U.S. MAIL**

Texas Commission on Environmental Quality  
Financial Administration Division  
Cashier's Office, MC-214  
P.O. Box 13088  
Austin, TX 78711-3088

#### **BY OVERNIGHT/EXPRESS MAIL**

Texas Commission on Environmental Quality  
Financial Administration Division  
Cashier's Office, MC-214  
12100 Park 35 Circle  
Austin, TX 78753

ePAY Electronic Payment: <http://www.tceq.texas.gov/epay>

When making the payment you must select Water Quality, and then select the fee category “General Permit Construction Storm Water Discharge NOI Application”. You must include a copy of the payment voucher with your NOI. Your NOI will not be considered complete without the payment voucher.

## INSTRUCTIONS FOR FILLING OUT THE NOI FORM

**Renewal of General Permit.** Dischargers holding active authorizations under the expired General Permit are required to submit a NOI to continue coverage. The existing permit number is required. If the permit number is not provided or has been terminated, expired, or denied a new permit number will be issued.

### 1. Operator (Applicant)

#### a) Enter assigned Customer Number (CN)

TCEQ’s Central Registry will assign each customer a number that begins with CN, followed by nine digits. **This is not a permit number, registration number, or license number.**

If this customer has not been assigned a CN, leave the space for the CN blank.

If this customer has already been assigned this number, enter the permittee’s CN.

#### b) Legal Name

Provide the current legal name of the permittee, as authorized to do business in Texas. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at 512/463-5555, for more information related to filing in Texas. If filed in the county where doing business, provide a copy of the legal documents showing the legal name.

#### c) Person Signing Application

Provide information about person signing section 5) Certification.

#### d) Operator Contact’s (Responsible Authority) Contact Information and Mailing Address

Provide a complete mailing address for receiving mail from the TCEQ. The address must be verifiable with the US Postal Service at <http://www.usps.com> for regular mail delivery (not overnight express mail). If you find that the address is not verifiable using the USPS web search, please indicate the address is used by the USPS for regular mail delivery.

The area code and phone number should provide contact to the operator. Leave Extension blank if not applicable.

The fax number and e-mail address are optional and should correspond to the operator.

#### e) Type of Customer (Entity Type)

Check only one box that identifies the type of entity. Use the descriptions below to identify the appropriate entity type. Note that the selected entity type also indicates the name that must be provided as an applicant for a permit, registration or authorization.

### **Sole Proprietorship – DBA**

A sole proprietorship is a customer that is owned by only one person and has not been incorporated. This business may:

- be under the person's name
- have its own name (doing business as or d.b.a.)
- have any number of employees

If the customer is a Sole Proprietorship or DBA, the 'legal name' of the individual business 'owner' must be provided. The DBA name is not recognized as the 'legal name' of the entity. The DBA name may be used for the site name (regulated entity).

### **Individual**

An individual is a customer who has not established a business, but conducts an activity that needs to be regulated by the TCEQ.

### **Partnership**

- A customer that is established as a partnership as defined by the Texas Secretary of State Office (TX SOS). A Limited Partnership or Limited Liability Partnership (Partnership) is required to file with the Texas Secretary of State. A General Partnership or Joint Venture is not required to register with the state.
- **Partnership (Limited Partnership or Limited Liability Partnership):** A limited partnership is defined in the Act as a partnership formed by two or more persons under the provisions of Section 3 of the Uniform Limited Partnership Act (Art. 6132a, Revised Civil Statutes of Texas) and having as members one or more general partners and one or more limited partners. The limited partners as such are not bound by the obligations of the partnership. Limited partners may not take part in the day-to-day operations of the business. A Limited Partnership must file with the Texas Secretary of State. A registered limited liability partnership is a general or limited partnership that is registered with the Texas Secretary of State. The partnership's name must contain the words "Registered Limited Liability Partnership" or the abbreviation "L.L.P." as the last words or letters of its name.
- **General Partnership:** A general partner may or may not invest, participates in running the partnership and is liable for all acts and debts of the partnership and any member of it. A General Partnership does not have limited partners. For a General Partnership, there is no registration with the state or even written agreement necessary for a general partnership to be formed. The legal definition of a partnership is generally stated as "an association of two or more persons to carry on as co-owners a business for profit" (Revised Uniform Partnership Act § 101 [1994]).
- **Joint Venture:** A joint venture is but another name for a special partnership. It might be distinguished from a general partnership in that the latter is formed for the transaction of a general business, while a joint venture is usually limited to a single transaction. That is, a joint venture is a special combination of persons in the nature of a partnership engaged in the joint prosecution of a particular transaction for mutual benefit or profit.

### **Corporation**

A customer meets all of these conditions:

- is a legally incorporated entity under the laws of any state or country
- is recognized as a corporation by the Texas Secretary of State

- has proper operating authority to operate in Texas.
- The corporation's 'legal name' as filed with the Texas Secretary of State must be provided as applicant. An 'assumed' name of a corporation is not recognized as the 'legal name' of the entity.

**Government**

Federal, state, county, or city government (as appropriate)

The customer is either an agency of one of these levels of government or the governmental body itself. The government agency's 'legal name' must be provided as the applicant. A department name or other description of the organization should not be included as a part of the 'legal name' as applicant.

**Trust or Estate**

A trust and an estate are fiduciary relationships governing the trustee/executor with respect to the trust/estate property.

**Other Government**

A utility district, water district, tribal government, college district, council of governments, or river authority. Write in the specific type of government.

**f) Independent Entity**

Check No if this customer is a subsidiary, part of a larger company, or is a governmental entity. Otherwise, check Yes.

**g) Number of Employees**

Check one box to show the number of employees for this customer's entire company, at all locations. This is not necessarily the number of employees at the site named in the application.

**h) Customer Business Tax and Filing Numbers**

These are required for Corporations and Limited Partnerships. These are not required for Individuals, Government, and Sole Proprietors.

**State Franchise Tax ID Number**

Corporations and limited liability companies that operate in Texas are issued a franchise tax identification number. If this customer is a corporation or limited liability company, enter this number here.

**Federal Tax ID**

All businesses, except for some small sole proprietors, individuals, or general partnerships should have a federal taxpayer identification number (TIN). Enter this number here. Use no prefixes, dashes, or hyphens. Sole proprietors, individuals, or general partnerships do not need to provide a federal tax ID.

**TX SOS Charter (filing) Number**

Corporations and Limited Partnerships required to register with the Texas Secretary of State are issued a charter or filing number. You may obtain further information by calling SOS at 512/463-5555.

**DUNS Number**

Most businesses have a DUNS (Data Universal Numbering System) number issued by Dun and Bradstreet Corp. If this customer has one, enter it here.

## **2. APPLICATION CONTACT**

Provide the name, title and communication information of the person that TCEQ can contact for additional information regarding this application.

## **3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

### **a) Regulated Entity Reference Number (RN)**

A number issued by TCEQ's Central Registry to sites (a location where a regulated activity occurs) regulated by TCEQ. This is not a permit number, registration number, or license number. If this regulated entity has not been assigned an RN, leave this space blank.

If the site of your business is part of a larger business site, a Regulated Entity Number (RN) may already be assigned for the larger site. Use the RN assigned for the larger site. Search TCEQ's Central Registry to see if the larger site may already be registered as a regulated site at: <http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=regent.RNSearch>

If the site is found, provide the assigned Regulated Entity Reference Number (RN) and provide the information for the site to be authorized through this application. The site information for this authorization may vary from the larger site information.

An example is a chemical plant where a unit is owned or operated by a separate corporation that is accessible by the same physical address of your unit or facility. Other examples include industrial parks identified by one common address but different corporations have control of defined areas within the site. In both cases, an RN would be assigned for the physical address location and the permitted sites would be identified separately under the same RN.

### **b) Site/Project Name/Regulated Entity**

Provide the name of the site as known by the public in the area where the site is located. The name you provide on this application will be used in the TCEQ Central Registry as the Regulated Entity name.

### **c) Description of Activity Regulated**

In your own words, briefly describe the primary business that you are doing that requires this authorization. Do not repeat the SIC Code description.

### **d) County**

Identify the county or counties in which the regulated entity is located.

### **e) Latitude and Longitude**

Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. For help obtaining the latitude and longitude, go to:

<http://www.tceq.texas.gov/gis/sqmapview.html> or <http://nationalmap.gov/ustopo>

### **f) Site/Project (RE) Physical Address/Location Information**

Enter the complete address for the site in Section A if the address can be validated through the US Postal Service. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate a site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

If a site does not have an address that includes a street (or house) number and street name, enter NO ADDRESS for the street name in Section A. In Section B provide a complete written location description. For example: "The site is located 2 miles west from intersection of Hwy 290 & IH35, located on the southwest corner of the Hwy 290 South bound lane."

Provide the city (or nearest city) and zip code of the facility location.

#### **4. GENERAL CHARACTERISTICS**

##### **a) Indian Country Lands**

If your site is located on Indian Country Lands, the TCEQ does not have authority to process your application. You must obtain authorization through EPA, Region 6, Dallas. Do not submit this form to TCEQ.

##### **b) Construction activity associated with facility associated with exploration, development, or production of oil, gas, or geothermal resources**

If your activity is associated with oil and gas exploration, development, or production, you may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization from EPA Region 6. For more information, see:

[http://info.sos.state.tx.us/pls/pub/readtac\\$ext.TacPage?sl=R&app=9&p\\_dir=&p\\_rloc=&p\\_tloc=&p\\_ploc=&pg=1&p\\_tac=&ti=16&pt=1&ch=3&rl=30](http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=30)

Construction activities associated with a facility related to oil, gas or geothermal resources may include the construction of a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel.

Where required by federal law, discharges of stormwater associated with construction activities under the Railroad Commission's jurisdiction must be authorized by the EPA and the Railroad Commission of Texas, as applicable. Activities under Railroad Commission of Texas jurisdiction include construction of a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources, such as a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility under the jurisdiction of the Railroad Commission of Texas; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel. The Railroad Commission of Texas also has jurisdiction over stormwater from land disturbance associated with a site survey that is conducted prior to construction of a facility that would be regulated by the Railroad Commission of Texas. Under 33 U.S.C. §1342(l)(2) and §1362(24), EPA cannot require a permit for discharges of stormwater from "field activities or operations associated with {oil and gas} exploration, production, processing, or treatment operations, or transmission facilities, including activities necessary to prepare a site for drilling and for the movement and placement of drilling equipment, whether or not such field activities or operations may be considered to be construction activities" unless the discharge is contaminated by contact with any overburden, raw material, intermediate product, finished product, byproduct, or waste product located on the site of the facility. Under §3.8 of this title (relating to Water Protection), the Railroad



Commission of Texas prohibits operators from causing or allowing pollution of surface or subsurface water. Operators are encouraged to implement and maintain best management practices (BMPs) to minimize discharges of pollutants, including sediment, in stormwater during construction activities to help ensure protection of surface water quality during storm events.

**c) Primary Standard Industrial Classification (SIC) Code**

Provide the SIC Code that best describes the construction activity being conducted at this site.

Common SIC Codes related to construction activities include:

- 1521 - Construction of Single Family Homes
- 1522 - Construction of Residential Bldgs. Other than Single Family Homes
- 1541 - Construction of Industrial Bldgs. and Warehouses
- 1542 - Construction of Non-residential Bldgs, other than Industrial Bldgs. and Warehouses
- 1611 - Highway and Street Construction, except Highway Construction
- 1622 - Bridge, Tunnel, and Elevated Highway Construction
- 1623 - Water, Sewer, Pipeline and Communications, and Power Line Construction

For help with SIC Codes, go to:

<http://www.osha.gov/pls/imis/sicsearch.html>

**d) Secondary SIC Code**

Secondary SIC Code(s) may be provided. Leave blank if not applicable. For help with SIC Codes, go to:

<http://www.osha.gov/pls/imis/sicsearch.html>

**e) Total Number of Acres Disturbed**

Provide the approximate number of acres that the construction site will disturb. Construction activities that disturb less than one acre, unless they are part of a larger common plan that disturbs more than one acre, do not require permit coverage. Construction activities that disturb between one and five acres, unless they are part of a common plan that disturbs more than five acres, do not require submission of an NOI. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

If you have any questions about this item, please contact the stormwater technical staff by phone at (512)239-4671 or by email at [swgp@tceq.texas.gov](mailto:swgp@tceq.texas.gov).

**f) Common Plan of Development**

Construction activities that disturb less than five acres do not require submission of an NOI unless they are part of a common plan of development or for sale where the area disturbed is five or more acres. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

For more information on "What is a common plan of development?" go to:

[www.tceq.texas.gov/permitting/stormwater/common\\_plan\\_of\\_development\\_steps.html](http://www.tceq.texas.gov/permitting/stormwater/common_plan_of_development_steps.html)

For further information, go to the TCEQ stormwater construction webpage at:

[www.tceq.texas.gov/goto/construction](http://www.tceq.texas.gov/goto/construction) and search for "Additional Guidance and Quick Links". If

you have any further questions about this item, please call the stormwater technical staff at (512)239-4671.

**g) Identify the water body(s) receiving stormwater runoff**

The stormwater may be discharged directly to a receiving stream or through a MS4 from your site. It eventually reaches a receiving water body such as a local stream or lake, possibly via a drainage ditch. You must provide the name of the water body that receives the discharge from the site (a local stream or lake).

If your site has more than one outfall you need to include the name of the first water body for each outfall, if they are different.

**h) Identify the segment number(s) of the classified water body(s)**

Identify the classified segment number(s) receiving a discharge directly or indirectly. Go to the following link to find the segment number of the classified water body where stormwater will flow from the site: [www.tceq.texas.gov/waterquality/monitoring/viewer.html](http://www.tceq.texas.gov/waterquality/monitoring/viewer.html)

You may also find the segment number in TCEQ publication GI-316:  
[www.tceq.texas.gov/publications/gi/gi-316](http://www.tceq.texas.gov/publications/gi/gi-316)

If the discharge is into an unclassified receiving water and then crosses state lines prior to entering a classified segment, select the appropriate watershed:

- 0100 (Canadian River Basin)
- 0200 (Red River Basin)
- 0300 (Sulfur River Basin)
- 0400 (Cypress Creek Basin)
- 0500 (Sabine River Basin)

Call the Water Quality Assessments section at (512)239-4671 for further assistance.

**i) Discharge into MS4 – Identify the MS4 Operator**

The discharge may initially be into a municipal separate storm sewer system (MS4). If the stormwater discharge is into an MS4, provide the name of the entity that operates the MS4 where the stormwater discharges. An MS4 operator is often a city, town, county, or utility district, but possibly can be another form of government. Please note that the Construction General Permit requires the Operator to supply the MS4 with a copy of the NOI submitted to TCEQ. For assistance, you may call the technical staff at (512)239-4671.

**j) Surface Water bodies on list of impaired waters – Identify the impaired water body(s)**

Indicate Yes or No if any surface water bodies receiving discharges from the construction site are on the latest EPA-approved CWA 303(d) List of impaired waters. Provide the name(s) of surface water bodies receiving discharges or potential discharges from the construction site that are on the latest EPA-approved CWA 303(d) List of impaired waters. The EPA-approved CWA 303(d) List of impaired waters in Texas can be found at:  
[www.tceq.texas.gov/waterquality/assessment/305\\_303.html](http://www.tceq.texas.gov/waterquality/assessment/305_303.html)

NOTE: Do not use any "draft" documents.

### **k) Discharges to the Edwards Aquifer Recharge Zone and Certification**

See maps on the TCEQ website to determine if the site is located within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer at: [www.tceq.texas.gov/field/eapp/viewer.html](http://www.tceq.texas.gov/field/eapp/viewer.html)

If the discharge or potential discharge is within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer, a site specific authorization approved by the Executive Director under the Edwards Aquifer Protection Program (30 TAC Chapter 213) is required before construction can begin. The certification must be answered "Yes" for coverage under the Construction General Permit. The TCEQ approved plan must be readily available for TCEQ staff to review at the time that the NOI is submitted.

The general permit requires the approved Contributing Zone Plan or Water Pollution Abatement Plan to be included or referenced as a part of the Stormwater Pollution Prevention Plan.

For questions regarding the Edwards Aquifer Protection Program, contact the appropriate TCEQ Regional Office. For projects in Hays, Travis and Williamson Counties: Austin Regional Office, 12100 Park 35 Circle, Austin, TX 78753, 512-339-2929. For Projects in Bexar, Comal, Kinney, Medina and Uvalde Counties: TCEQ San Antonio Regional Office, 14250 Judson Rd., San Antonio, TX 78233-4480, 210-490-3096.

## **5. CERTIFICATIONS**

Failure to indicate **Yes** to ALL of the certification items may result in denial of coverage under the general permit.

### **a) Certification of Understanding the Terms and Conditions of Construction General Permit (TXR150000)**

Provisional coverage under the Construction General Permit (TXR150000) begins 7 days after the completed paper NOI is postmarked for delivery to the TCEQ. (Electronic applications submitted through ePermits have immediate provisional coverage). You must obtain a copy and read the Construction General Permit before submitting your application. You may view and print the Construction General Permit for which you are seeking coverage at the TCEQ web site: [www.tceq.texas.gov/goto/construction](http://www.tceq.texas.gov/goto/construction)

### **b) Certification of Legal Name**

The full legal name of the applicant as authorized to do business in Texas is required. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at (512)463 5555, for more information related to filing in Texas.

### **c) Understanding of Notice of Termination**

A permittee shall terminate coverage under this Construction General Permit through the submittal of a NOT when the operator of the facility changes, final stabilization has been reached, the discharge becomes authorized under an individual permit, or the construction activity never began at this site.

### **d) Certification of Stormwater Pollution Prevention Plan**

The SWP3 identifies the areas and activities that could produce contaminated runoff at your site and then tells how you will ensure that this contamination is mitigated. For example, in describing your mitigation measures, your site's plan might identify the devices that collect and

filter stormwater, tell how those devices are to be maintained, and tell how frequently that maintenance is to be carried out. You must develop this plan in accordance with the TCEQ general permit requirements. This plan must be developed and implemented before you complete this NOI. The SWP3 must be available for a TCEQ investigator to review on request.

### **Operator Certification:**

The certification must bear an original signature of a person meeting the signatory requirements specified under 30 Texas Administrative Code (TAC) §305.44.

### **IF YOU ARE A CORPORATION:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(1) (see below). According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

### **IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(3) (see below). According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statute(s) under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a)(3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality's Environmental Law Division at (512)239-0600.

## **30 Texas Administrative Code**

### **§305.44. Signatories to Applications**

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

# Texas Commission on Environmental Quality General Permit Payment Submittal Form

**Use this form to submit your Application Fee only if you are mailing your payment.**

- Complete items 1 through 5 below:
- Staple your check in the space provided at the bottom of this document.
- Do not mail this form with your NOI form.
- Do not mail this form to the same address as your NOI.

**Mail this form and your check to:**

*BY REGULAR U.S. MAIL*

Texas Commission on Environmental  
Quality  
Financial Administration Division  
Cashier's Office, MC-214  
P.O. Box 13088  
Austin, TX 78711-3088

*BY OVERNIGHT/EXPRESS MAIL*

Texas Commission on Environmental  
Quality  
Financial Administration Division  
Cashier's Office, MC-214  
12100 Park 35 Circle  
Austin, TX 78753

Fee Code: GPA	General Permit:	TXR150000
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1. Check / Money Order No: \_\_\_\_\_
2. Amount of Check/Money Order: \_\_\_\_\_
3. Date of Check or Money Order: \_\_\_\_\_
4. Name on Check or Money Order: \_\_\_\_\_

5. NOI INFORMATION

If the check is for more than one NOI, list each Project/Site (RE) Name and Physical Address exactly as provided on the NOI. **DO NOT SUBMIT A COPY OF THE NOI WITH THIS FORM AS IT COULD CAUSE DUPLICATE PERMIT ENTRIES.**

See Attached List of Sites (If more space is needed, you may attach a list.)

Project/Site (RE) Name: \_\_\_\_\_

Project/Site (RE) Physical Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Staple Check in This Space**



# TCEQ Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

## IMPORTANT:

- Use the [INSTRUCTIONS](#) to fill out each question in this form.
- Use the [CHECKLIST](#) to make certain all you filled out all required information. Incomplete applications **WILL** delay approval or result in automatic denial.
- Once processed your permit can be viewed at:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm)

**ePERMITS:** Sign up now for online NOI: <https://www3.tceq.texas.gov/steers/index.cfm>  
Pay a \$225 reduced application fee by using ePermits.

## APPLICATION FEE:

- You must pay the **\$325** Application Fee to TCEQ for the paper application to be complete.
- Payment and NOI must be mailed to separate addresses.
- Did you know you can pay on line?
  - Go to <https://www3.tceq.texas.gov/epay/index.cfm>
  - Select Fee Type: GENERAL PERMIT CONSTRUCTION STORM WATER DISCHARGE NOI APPLICATION

**Provide your payment information below, for verification of payment:**

Mailed	Check/Money Order No.:	_____
	Name Printed on Check:	_____
EPAY	Voucher No.:	_____
	Is the Payment Voucher copy attached?	Yes

**RENEWAL: Is this NOI a Renewal of an existing General Permit Authorization?**  
**(Note: A permit cannot be renewed after June 3, 2013.)**

Yes    The Permit number is: TXR15\_\_\_\_\_

**(If a permit number is not provided, a new number will be assigned.)**

No

## 1) OPERATOR (Applicant)

**a)** If the applicant is currently a customer with TCEQ, what is the Customer Number (CN) issued to this entity? You may search for your CN at:  
<http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=cust.CustSearch>

CN \_\_\_\_\_

**b)** What is the Legal Name of the entity (applicant) applying for this permit?

\_\_\_\_\_  
(The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal document forming the entity.)

**c)** What is the name and title of the person signing the application? The person must be an executive official meeting signatory requirements in TAC 305.44(a).

Prefix (Mr. Ms. Miss): \_\_\_\_\_  
First/Last Name: \_\_\_\_\_ Suffix: \_\_\_\_\_  
Title: \_\_\_\_\_ Credential: \_\_\_\_\_

**d)** What is the Operator Contact's (Responsible Authority) contact information and mailing address as recognized by the US Postal Service (USPS)? You may verify the address at:

<http://zip4.usps.com/zip4/welcome.jsp>

Phone #: \_\_\_\_\_ ext: \_\_\_\_\_ Fax #: \_\_\_\_\_

E-mail: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Internal Routing (Mail Code, Etc.): \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_

If outside USA: Territory: \_\_\_\_\_ Country Code: \_\_\_\_\_ Postal Code: \_\_\_\_\_

**e)** Indicate the type of Customer (The instructions will help determine your customer type):

Individual	Limited Partnership	Sole Proprietorship-DBA
Joint Venture	General Partnership	Corporation
Trust	Estate	Federal Government
State Government	County Government	City Government
Other Government		

**f)** Independent Operator? Yes                  No  
(If governmental entity, subsidiary, or part of a larger corporation, check "No".)

**g)** Number of Employees: 0-20;                  21-100;                  101-250;                  251-500; or                  501 or higher

**h)** Customer Business Tax and Filing Numbers:  
(REQUIRED for Corporations and Limited Partnerships. Not Required for Individuals, Government, or Sole Proprietors)

State Franchise Tax ID Number: \_\_\_\_\_

Federal Tax ID: \_\_\_\_\_

Texas Secretary of State Charter (filing) Number: \_\_\_\_\_

DUNS Number (if known): \_\_\_\_\_

## **2) APPLICATION CONTACT**

If TCEQ needs additional information regarding this application, who should be contacted?

Is the application contact the same as the applicant identified above?

Yes, go to Section 3).          No, complete section below.

Prefix (Mr. Ms. Miss): \_\_\_\_\_  
First/Last Name: \_\_\_\_\_ Suffix: \_\_\_\_\_  
Title: \_\_\_\_\_ Credential: \_\_\_\_\_



Organization Name: \_\_\_\_\_  
Phone No.: \_\_\_\_\_ ext: \_\_\_\_\_ Fax Number: \_\_\_\_\_  
E-mail: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
Internal Routing (Mail Code, Etc.): \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_  
Mailing Information if outside USA:  
Territory: \_\_\_\_\_ Country Code: \_\_\_\_\_ Postal Code: \_\_\_\_\_

**3) REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

If the site of your business is part of a larger business site or if other businesses were located at this site before yours, a Regulated Entity Number (RN) may already be assigned for the larger site. Use the RN assigned for the larger site. Search TCEQ's Central Registry to see if the larger site may already be registered as a regulated site at:

<http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=regent.RNSearch>.

If the site is found, provide the assigned Regulated Entity Reference Number and provide the information for the site to be authorized through this application below. The site information for this authorization may vary from the larger site information.

**a)** TCEQ issued RE Reference Number (RN): RN \_\_\_\_\_

**b)** Name of project or site (the name known by the community where located):  
\_\_\_\_\_

**c)** In your own words, briefly describe the primary business of the Regulated Entity: (Do not repeat the SIC and NAICS code):  
\_\_\_\_\_

**d)** County (or counties if > 1) \_\_\_\_\_

**e)** Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

**f)** Does the site have a physical address?  
Yes, complete Section A for a physical address.  
No, complete Section B for site location information.

**Section A:** Enter the physical address for the site.  
Verify the address with USPS. If the address is not recognized as a delivery address, provide the address as identified for overnight mail delivery, 911 emergency or other online map tools to confirm an address.

Physical Address of Project or Site:  
Street Number: \_\_\_\_\_ Street Name: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_

**Section B:** Enter the site location information.

If no physical address (Street Number & Street Name), provide a written location access description to the site. (Ex.: located 2 miles west from intersection of Hwy 290 & IH35 accessible on Hwy 290 South)

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City where the site is located or, if not in a city, what is the nearest city:

State: \_\_\_\_\_ ZIP Code where the site is located: \_\_\_\_\_

**4) GENERAL CHARACTERISTICS**

**a)** Is the project/site located on Indian Country Lands?

Yes - If the answer is Yes, you must obtain authorization through EPA, Region 6.

No

**b)** Is your construction activity associated with a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources?

Yes - If the answer is Yes, you may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization through EPA, Region 6.

No

**c)** What is the Primary Standard Industrial Classification (SIC) Code that best describes the construction activity being conducted at the site?

Primary SIC Code: \_\_\_\_\_

**d)** If applicable, what is the Secondary SIC Code(s): \_\_\_\_\_

**e)** What is the total number of acres disturbed? \_\_\_\_\_

**f)** Is the project site part of a larger common plan of development or sale?

Yes - If the answer is Yes, the total number of acres disturbed can be less than 5 acres.

No - If the answer is No, the total number of acres disturbed must be 5 or more. If the total number of acres disturbed is less than 5 then the project site does not qualify for coverage through this Notice of Intent. Coverage will be denied. See the requirements in the general permit for small construction sites.

**g)** What is the name of the first water body(s) to receive the stormwater runoff or potential runoff from the site?

---

**h)** What is the segment number(s) of the classified water body(s) that the discharge will eventually reach?

---

**i)** Is the discharge into an MS4?

Yes - If the answer is Yes, provide the name of the MS4 operator below.

No

If Yes, provide the name of the MS4 operator:

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Note: The general permit requires you to send a copy of the NOI to the MS4 operator.

**j)** Are any of the surface water bodies receiving discharges from the construction site on the latest EPA-approved CWA 303(d) List of impaired waters?

Yes - If the answer is Yes, provide the name(s) of the impaired water body(s) below.

No

If Yes, provide the name(s) of the impaired water body(s):

**k)** Is the discharge or potential discharge within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer as defined in 30 TAC Chapter 213?

Yes - If the answer is Yes, complete certification below by checking "Yes."

No

I certify that a copy of the TCEQ approved Plan required by the Edwards Aquifer Rule (30 TAC Chapter 213) is either included or referenced in the Stormwater Pollution Prevention Plan.

Yes

**5) CERTIFICATION**

Check Yes to the certifications below. Failure to indicate Yes to **ALL** items may result in denial of coverage under the general permit.

- a) I certify that I have obtained a copy and understand the terms and conditions of the Construction General Permit (TXR150000). Yes
- b) I certify that the full legal name of the entity applying for this permit has been provided and is legally authorized to do business in Texas. Yes
- c) I understand that a Notice of Termination (NOT) must be submitted when this authorization is no longer needed. Yes
- d) I certify that a Stormwater Pollution Prevention Plan has been developed, will be implemented prior to construction and to the best of my knowledge and belief is compliant with any applicable local sediment and erosion control plans, as required in the general permit TXR150000. Note: For multiple operators who prepare a shared SWP3, the confirmation of an operator may be limited to its obligations under the SWP3 provided all obligations are confirmed by at least one operator. Yes

**Operator Certification:**

I, \_\_\_\_\_  
Typed or printed name Title

certify under penalty of law that this document and all attachments were prepared under my direction 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 gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code 305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
*(Use blue ink)*

## NOTICE OF INTENT CHECKLIST (TXR150000)

- Did you complete everything? Use this checklist to be sure!
- Are you ready to mail your form to TCEQ? Go to the General Information Section of the Instructions for mailing addresses.

This checklist is for use by the operator to ensure a complete application. Missing information may result in denial of coverage under the general permit. (See NOI process description in the Instructions)

### Application Fee:

If paying by Check:

Check was mailed **separately** to the TCEQs Cashier's Office. (See Instructions for Cashier's address and Application address.)

Check number and name on check is provided in this application.

If using ePay:

The voucher number is provided in this application or a copy of the voucher is attached.

### PERMIT NUMBER:

Permit number provided – if this application is for renewal of an existing authorization.

### OPERATOR INFORMATION - Confirm each item is complete:

Customer Number (CN) issued by TCEQ Central Registry

Legal name as filed to do business in Texas (Call TX SOS 512/463-5555)

Name and title of responsible authority signing the application

Mailing address is complete & verifiable with USPS. [www.usps.com](http://www.usps.com)

Phone numbers/e-mail address

Type of operator (entity type)

Independent operator

Number of employees

For corporations or limited partnerships – Tax ID and SOS filing numbers

Application contact and address is complete & verifiable with USPS. <http://www.usps.com>

### REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE - Confirm each item is complete:

Regulated Entity Reference Number (RN) (if site is already regulated by TCEQ)

Site/project name/regulated entity

Latitude and longitude <http://www.tceq.texas.gov/gis/sqmaview.html>

County

Site/project physical address. Do not use a rural route or post office box.

Business description

### GENERAL CHARACTERISTICS - Confirm each item is complete:

Indian Country Lands –the facility is not on Indian Country Lands

Construction activity related to facility associated to oil, gas, or geothermal resources

Standard Industrial Classification (SIC) Code [www.osha.gov/oshstats/sicsr.html](http://www.osha.gov/oshstats/sicsr.html)

Acres disturbed is provided and qualifies for coverage through a NOI

Common plan of development or sale

Receiving water body(s)

Segment number(s)

Impaired water body(s)

MS4 operator

Edwards Aquifer rule

### CERTIFICATION

Certification statements have been checked indicating “Yes”

Signature meets 30 Texas Administrative Code (TAC) 305.44 and is original.

# Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

## General Information and Instructions

### GENERAL INFORMATION

#### Where to Send the Notice of Intent (NOI):

BY REGULAR U.S. MAIL	BY OVERNIGHT/EXPRESS MAIL
Texas Commission on Environmental Quality	Texas Commission on Environmental Quality
Stormwater Processing Center (MC228)	Stormwater Processing Center (MC228)
P.O. Box 13087	12100 Park 35 Circle
Austin, Texas 78711-3087	Austin, TX 78753

#### TCEQ Contact List:

Application – status and form questions:	512/239-3700, <a href="mailto:swpermit@tceq.texas.gov">swpermit@tceq.texas.gov</a>
Technical questions:	512/239-4671, <a href="mailto:swgp@tceq.texas.gov">swgp@tceq.texas.gov</a>
Environmental Law Division:	512/239-0600
Records Management - obtain copies of forms:	512/239-0900
Reports from databases (as available):	512/239-DATA (3282)
Cashier's office:	512/239-0357 or 512/239-0187

#### Notice of Intent Process:

When your NOI is received by the program, the form will be processed as follows:

- 1) Administrative Review:** Each item on the form will be reviewed for a complete response. In addition, the operator's legal name must be verified with Texas Secretary of State as valid and active (if applicable). The address(s) on the form must be verified with the US Postal service as receiving regular mail delivery. Never give an overnight/express mailing address.
- 2) Notice of Deficiency:** If an item is incomplete or not verifiable as indicated above, a notice of deficiency (NOD) will be mailed to the operator. The operator will have 30 days to respond to the NOD. The response will be reviewed for completeness.
- 3) Acknowledgment of Coverage:** An Acknowledgment Certificate will be mailed to the operator. This certificate acknowledges coverage under the general permit.  
-OR-  
**Denial of Coverage:** If the operator fails to respond to the NOD or the response is inadequate, coverage under the general permit may be denied. If coverage is denied, the operator will be notified.

#### General Permit (Your Permit)

For NOIs submitted **electronically** through ePermits, provisional coverage under the general permit begins immediately following confirmation of receipt of the NOI form by the TCEQ.

For **paper** NOIs, provisional coverage under the general permit begins **7 days after a completed NOI is postmarked for delivery** to the TCEQ.

You should have a copy of your general permit when submitting your application. You may view and print your permit for which you are seeking coverage, on the TCEQ web site <http://www.tceq.texas.gov>. Search using key word TXR150000.

### **General Permit Forms**

The Notice of Intent (NOI), Notice of Termination (NOT), and Notice of Change (NOC) (including instructions) are available in Adobe Acrobat PDF format on the TCEQ web site <http://www.tceq.texas.gov>.

### **Change in Operator**

An authorization under the general permit is not transferable. If the operator of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be submitted no later than 10 days prior to the change in Operator status.

### **TCEQ Central Registry Core Data Form**

The Core Data Form has been incorporated into this form. Do not send a Core Data Form to TCEQ. After final acknowledgment of coverage under the general permit, the program will assign a Customer Number and Regulated Entity Number.

You can find the information on the Central Registry web site at <http://www12.tceq.texas.gov/crpub/index.cfm>. You can search by the Regulated Entity (RN), Customer Number (CN) or Name (Permittee), or by your permit number under the search field labeled "Additional ID". Capitalize all letters in the permit number.

The Customer (Permittee) is responsible for providing consistent information to the TCEQ, and for updating all CN and RN data for all authorizations as changes occur. For General Permits, a Notice of Change form must be submitted to the program area.

### **Fees associated with a General Permit**

Payment of the fee may be made by check or money order, payable to TCEQ, or through EPAY (electronic payment through the web).

**Application Fee:** This fee is required to be paid at the time the NOI is submitted. Failure to submit payment at the time the application is filed will cause delays in acknowledgment or denial of coverage under the general permit.

#### **Mailed Payments:**

Payment must be mailed under separate cover at one of the addresses below using the attached Application Fee submittal form. (DO NOT SEND A COPY OF THE NOI WITH THE APPLICATION FEE SUBMITTAL FORM)

#### **BY REGULAR U.S. MAIL**

Texas Commission on Environmental Quality  
Financial Administration Division  
Cashier's Office, MC-214  
P.O. Box 13088  
Austin, TX 78711-3088

#### **BY OVERNIGHT/EXPRESS MAIL**

Texas Commission on Environmental Quality  
Financial Administration Division  
Cashier's Office, MC-214  
12100 Park 35 Circle  
Austin, TX 78753

ePAY Electronic Payment: <http://www.tceq.texas.gov/epay>

When making the payment you must select Water Quality, and then select the fee category “General Permit Construction Storm Water Discharge NOI Application”. You must include a copy of the payment voucher with your NOI. Your NOI will not be considered complete without the payment voucher.

## INSTRUCTIONS FOR FILLING OUT THE NOI FORM

**Renewal of General Permit.** Dischargers holding active authorizations under the expired General Permit are required to submit a NOI to continue coverage. The existing permit number is required. If the permit number is not provided or has been terminated, expired, or denied a new permit number will be issued.

### 1. Operator (Applicant)

#### a) Enter assigned Customer Number (CN)

TCEQ’s Central Registry will assign each customer a number that begins with CN, followed by nine digits. **This is not a permit number, registration number, or license number.**

If this customer has not been assigned a CN, leave the space for the CN blank.

If this customer has already been assigned this number, enter the permittee’s CN.

#### b) Legal Name

Provide the current legal name of the permittee, as authorized to do business in Texas. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at 512/463-5555, for more information related to filing in Texas. If filed in the county where doing business, provide a copy of the legal documents showing the legal name.

#### c) Person Signing Application

Provide information about person signing section 5) Certification.

#### d) Operator Contact’s (Responsible Authority) Contact Information and Mailing Address

Provide a complete mailing address for receiving mail from the TCEQ. The address must be verifiable with the US Postal Service at <http://www.usps.com> for regular mail delivery (not overnight express mail). If you find that the address is not verifiable using the USPS web search, please indicate the address is used by the USPS for regular mail delivery.

The area code and phone number should provide contact to the operator. Leave Extension blank if not applicable.

The fax number and e-mail address are optional and should correspond to the operator.

#### e) Type of Customer (Entity Type)

Check only one box that identifies the type of entity. Use the descriptions below to identify the appropriate entity type. Note that the selected entity type also indicates the name that must be provided as an applicant for a permit, registration or authorization.



### **Sole Proprietorship – DBA**

A sole proprietorship is a customer that is owned by only one person and has not been incorporated. This business may:

- be under the person's name
- have its own name (doing business as or d.b.a.)
- have any number of employees

If the customer is a Sole Proprietorship or DBA, the 'legal name' of the individual business 'owner' must be provided. The DBA name is not recognized as the 'legal name' of the entity. The DBA name may be used for the site name (regulated entity).

### **Individual**

An individual is a customer who has not established a business, but conducts an activity that needs to be regulated by the TCEQ.

### **Partnership**

- A customer that is established as a partnership as defined by the Texas Secretary of State Office (TX SOS). A Limited Partnership or Limited Liability Partnership (Partnership) is required to file with the Texas Secretary of State. A General Partnership or Joint Venture is not required to register with the state.
- **Partnership (Limited Partnership or Limited Liability Partnership):** A limited partnership is defined in the Act as a partnership formed by two or more persons under the provisions of Section 3 of the Uniform Limited Partnership Act (Art. 6132a, Revised Civil Statutes of Texas) and having as members one or more general partners and one or more limited partners. The limited partners as such are not bound by the obligations of the partnership. Limited partners may not take part in the day-to-day operations of the business. A Limited Partnership must file with the Texas Secretary of State. A registered limited liability partnership is a general or limited partnership that is registered with the Texas Secretary of State. The partnership's name must contain the words "Registered Limited Liability Partnership" or the abbreviation "L.L.P." as the last words or letters of its name.
- **General Partnership:** A general partner may or may not invest, participates in running the partnership and is liable for all acts and debts of the partnership and any member of it. A General Partnership does not have limited partners. For a General Partnership, there is no registration with the state or even written agreement necessary for a general partnership to be formed. The legal definition of a partnership is generally stated as "an association of two or more persons to carry on as co-owners a business for profit" (Revised Uniform Partnership Act § 101 [1994]).
- **Joint Venture:** A joint venture is but another name for a special partnership. It might be distinguished from a general partnership in that the latter is formed for the transaction of a general business, while a joint venture is usually limited to a single transaction. That is, a joint venture is a special combination of persons in the nature of a partnership engaged in the joint prosecution of a particular transaction for mutual benefit or profit.

### **Corporation**

A customer meets all of these conditions:

- is a legally incorporated entity under the laws of any state or country
- is recognized as a corporation by the Texas Secretary of State

- has proper operating authority to operate in Texas.
- The corporation's 'legal name' as filed with the Texas Secretary of State must be provided as applicant. An 'assumed' name of a corporation is not recognized as the 'legal name' of the entity.

**Government**

Federal, state, county, or city government (as appropriate)

The customer is either an agency of one of these levels of government or the governmental body itself. The government agency's 'legal name' must be provided as the applicant. A department name or other description of the organization should not be included as a part of the 'legal name' as applicant.

**Trust or Estate**

A trust and an estate are fiduciary relationships governing the trustee/executor with respect to the trust/estate property.

**Other Government**

A utility district, water district, tribal government, college district, council of governments, or river authority. Write in the specific type of government.

**f) Independent Entity**

Check No if this customer is a subsidiary, part of a larger company, or is a governmental entity. Otherwise, check Yes.

**g) Number of Employees**

Check one box to show the number of employees for this customer's entire company, at all locations. This is not necessarily the number of employees at the site named in the application.

**h) Customer Business Tax and Filing Numbers**

These are required for Corporations and Limited Partnerships. These are not required for Individuals, Government, and Sole Proprietors.

**State Franchise Tax ID Number**

Corporations and limited liability companies that operate in Texas are issued a franchise tax identification number. If this customer is a corporation or limited liability company, enter this number here.

**Federal Tax ID**

All businesses, except for some small sole proprietors, individuals, or general partnerships should have a federal taxpayer identification number (TIN). Enter this number here. Use no prefixes, dashes, or hyphens. Sole proprietors, individuals, or general partnerships do not need to provide a federal tax ID.

**TX SOS Charter (filing) Number**

Corporations and Limited Partnerships required to register with the Texas Secretary of State are issued a charter or filing number. You may obtain further information by calling SOS at 512/463-5555.

**DUNS Number**

Most businesses have a DUNS (Data Universal Numbering System) number issued by Dun and Bradstreet Corp. If this customer has one, enter it here.

## **2. APPLICATION CONTACT**

Provide the name, title and communication information of the person that TCEQ can contact for additional information regarding this application.

## **3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

### **a) Regulated Entity Reference Number (RN)**

A number issued by TCEQ's Central Registry to sites (a location where a regulated activity occurs) regulated by TCEQ. This is not a permit number, registration number, or license number. If this regulated entity has not been assigned an RN, leave this space blank.

If the site of your business is part of a larger business site, a Regulated Entity Number (RN) may already be assigned for the larger site. Use the RN assigned for the larger site. Search TCEQ's Central Registry to see if the larger site may already be registered as a regulated site at: <http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=regent.RNSearch>

If the site is found, provide the assigned Regulated Entity Reference Number (RN) and provide the information for the site to be authorized through this application. The site information for this authorization may vary from the larger site information.

An example is a chemical plant where a unit is owned or operated by a separate corporation that is accessible by the same physical address of your unit or facility. Other examples include industrial parks identified by one common address but different corporations have control of defined areas within the site. In both cases, an RN would be assigned for the physical address location and the permitted sites would be identified separately under the same RN.

### **b) Site/Project Name/Regulated Entity**

Provide the name of the site as known by the public in the area where the site is located. The name you provide on this application will be used in the TCEQ Central Registry as the Regulated Entity name.

### **c) Description of Activity Regulated**

In your own words, briefly describe the primary business that you are doing that requires this authorization. Do not repeat the SIC Code description.

### **d) County**

Identify the county or counties in which the regulated entity is located.

### **e) Latitude and Longitude**

Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. For help obtaining the latitude and longitude, go to:

<http://www.tceq.texas.gov/gis/sqmvview.html> or <http://nationalmap.gov/ustopo>

### **f) Site/Project (RE) Physical Address/Location Information**

Enter the complete address for the site in Section A if the address can be validated through the US Postal Service. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate a site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

If a site does not have an address that includes a street (or house) number and street name, enter NO ADDRESS for the street name in Section A. In Section B provide a complete written location description. For example: "The site is located 2 miles west from intersection of Hwy 290 & IH35, located on the southwest corner of the Hwy 290 South bound lane."

Provide the city (or nearest city) and zip code of the facility location.

#### **4. GENERAL CHARACTERISTICS**

##### **a) Indian Country Lands**

If your site is located on Indian Country Lands, the TCEQ does not have authority to process your application. You must obtain authorization through EPA, Region 6, Dallas. Do not submit this form to TCEQ.

##### **b) Construction activity associated with facility associated with exploration, development, or production of oil, gas, or geothermal resources**

If your activity is associated with oil and gas exploration, development, or production, you may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization from EPA Region 6. For more information, see:

[http://info.sos.state.tx.us/pls/pub/readtac\\$ext.TacPage?sl=R&app=9&p\\_dir=&p\\_rloc=&p\\_tloc=&p\\_ploc=&pg=1&p\\_tac=&ti=16&pt=1&ch=3&rl=30](http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=30)

Construction activities associated with a facility related to oil, gas or geothermal resources may include the construction of a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel.

Where required by federal law, discharges of stormwater associated with construction activities under the Railroad Commission's jurisdiction must be authorized by the EPA and the Railroad Commission of Texas, as applicable. Activities under Railroad Commission of Texas jurisdiction include construction of a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources, such as a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility under the jurisdiction of the Railroad Commission of Texas; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel. The Railroad Commission of Texas also has jurisdiction over stormwater from land disturbance associated with a site survey that is conducted prior to construction of a facility that would be regulated by the Railroad Commission of Texas. Under 33 U.S.C. §1342(l)(2) and §1362(24), EPA cannot require a permit for discharges of stormwater from "field activities or operations associated with {oil and gas} exploration, production, processing, or treatment operations, or transmission facilities, including activities necessary to prepare a site for drilling and for the movement and placement of drilling equipment, whether or not such field activities or operations may be considered to be construction activities" unless the discharge is contaminated by contact with any overburden, raw material, intermediate product, finished product, byproduct, or waste product located on the site of the facility. Under §3.8 of this title (relating to Water Protection), the Railroad

Commission of Texas prohibits operators from causing or allowing pollution of surface or subsurface water. Operators are encouraged to implement and maintain best management practices (BMPs) to minimize discharges of pollutants, including sediment, in stormwater during construction activities to help ensure protection of surface water quality during storm events.

**c) Primary Standard Industrial Classification (SIC) Code**

Provide the SIC Code that best describes the construction activity being conducted at this site.

Common SIC Codes related to construction activities include:

- 1521 - Construction of Single Family Homes
- 1522 - Construction of Residential Bldgs. Other than Single Family Homes
- 1541 - Construction of Industrial Bldgs. and Warehouses
- 1542 - Construction of Non-residential Bldgs, other than Industrial Bldgs. and Warehouses
- 1611 - Highway and Street Construction, except Highway Construction
- 1622 - Bridge, Tunnel, and Elevated Highway Construction
- 1623 - Water, Sewer, Pipeline and Communications, and Power Line Construction

For help with SIC Codes, go to:

<http://www.osha.gov/pls/imis/sicsearch.html>

**d) Secondary SIC Code**

Secondary SIC Code(s) may be provided. Leave blank if not applicable. For help with SIC Codes, go to:

<http://www.osha.gov/pls/imis/sicsearch.html>

**e) Total Number of Acres Disturbed**

Provide the approximate number of acres that the construction site will disturb. Construction activities that disturb less than one acre, unless they are part of a larger common plan that disturbs more than one acre, do not require permit coverage. Construction activities that disturb between one and five acres, unless they are part of a common plan that disturbs more than five acres, do not require submission of an NOI. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

If you have any questions about this item, please contact the stormwater technical staff by phone at (512)239-4671 or by email at [swgp@tceq.texas.gov](mailto:swgp@tceq.texas.gov).

**f) Common Plan of Development**

Construction activities that disturb less than five acres do not require submission of an NOI unless they are part of a common plan of development or for sale where the area disturbed is five or more acres. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

For more information on "What is a common plan of development?" go to:

[www.tceq.texas.gov/permitting/stormwater/common\\_plan\\_of\\_development\\_steps.html](http://www.tceq.texas.gov/permitting/stormwater/common_plan_of_development_steps.html)

For further information, go to the TCEQ stormwater construction webpage at:

[www.tceq.texas.gov/goto/construction](http://www.tceq.texas.gov/goto/construction) and search for "Additional Guidance and Quick Links". If

you have any further questions about this item, please call the stormwater technical staff at (512)239-4671.

**g) Identify the water body(s) receiving stormwater runoff**

The stormwater may be discharged directly to a receiving stream or through a MS4 from your site. It eventually reaches a receiving water body such as a local stream or lake, possibly via a drainage ditch. You must provide the name of the water body that receives the discharge from the site (a local stream or lake).

If your site has more than one outfall you need to include the name of the first water body for each outfall, if they are different.

**h) Identify the segment number(s) of the classified water body(s)**

Identify the classified segment number(s) receiving a discharge directly or indirectly. Go to the following link to find the segment number of the classified water body where stormwater will flow from the site: [www.tceq.texas.gov/waterquality/monitoring/viewer.html](http://www.tceq.texas.gov/waterquality/monitoring/viewer.html)

You may also find the segment number in TCEQ publication GI-316:  
[www.tceq.texas.gov/publications/gi/gi-316](http://www.tceq.texas.gov/publications/gi/gi-316)

If the discharge is into an unclassified receiving water and then crosses state lines prior to entering a classified segment, select the appropriate watershed:

- 0100 (Canadian River Basin)
- 0200 (Red River Basin)
- 0300 (Sulfur River Basin)
- 0400 (Cypress Creek Basin)
- 0500 (Sabine River Basin)

Call the Water Quality Assessments section at (512)239-4671 for further assistance.

**i) Discharge into MS4 – Identify the MS4 Operator**

The discharge may initially be into a municipal separate storm sewer system (MS4). If the stormwater discharge is into an MS4, provide the name of the entity that operates the MS4 where the stormwater discharges. An MS4 operator is often a city, town, county, or utility district, but possibly can be another form of government. Please note that the Construction General Permit requires the Operator to supply the MS4 with a copy of the NOI submitted to TCEQ. For assistance, you may call the technical staff at (512)239-4671.

**j) Surface Water bodies on list of impaired waters – Identify the impaired water body(s)**

Indicate Yes or No if any surface water bodies receiving discharges from the construction site are on the latest EPA-approved CWA 303(d) List of impaired waters. Provide the name(s) of surface water bodies receiving discharges or potential discharges from the construction site that are on the latest EPA-approved CWA 303(d) List of impaired waters. The EPA-approved CWA 303(d) List of impaired waters in Texas can be found at:  
[www.tceq.texas.gov/waterquality/assessment/305\\_303.html](http://www.tceq.texas.gov/waterquality/assessment/305_303.html)

NOTE: Do not use any "draft" documents.

### **k) Discharges to the Edwards Aquifer Recharge Zone and Certification**

See maps on the TCEQ website to determine if the site is located within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer at: [www.tceq.texas.gov/field/eapp/viewer.html](http://www.tceq.texas.gov/field/eapp/viewer.html)

If the discharge or potential discharge is within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer, a site specific authorization approved by the Executive Director under the Edwards Aquifer Protection Program (30 TAC Chapter 213) is required before construction can begin. The certification must be answered "Yes" for coverage under the Construction General Permit. The TCEQ approved plan must be readily available for TCEQ staff to review at the time that the NOI is submitted.

The general permit requires the approved Contributing Zone Plan or Water Pollution Abatement Plan to be included or referenced as a part of the Stormwater Pollution Prevention Plan.

For questions regarding the Edwards Aquifer Protection Program, contact the appropriate TCEQ Regional Office. For projects in Hays, Travis and Williamson Counties: Austin Regional Office, 12100 Park 35 Circle, Austin, TX 78753, 512-339-2929. For Projects in Bexar, Comal, Kinney, Medina and Uvalde Counties: TCEQ San Antonio Regional Office, 14250 Judson Rd., San Antonio, TX 78233-4480, 210-490-3096.

## **5. CERTIFICATIONS**

Failure to indicate **Yes** to ALL of the certification items may result in denial of coverage under the general permit.

### **a) Certification of Understanding the Terms and Conditions of Construction General Permit (TXR150000)**

Provisional coverage under the Construction General Permit (TXR150000) begins 7 days after the completed paper NOI is postmarked for delivery to the TCEQ. (Electronic applications submitted through ePermits have immediate provisional coverage). You must obtain a copy and read the Construction General Permit before submitting your application. You may view and print the Construction General Permit for which you are seeking coverage at the TCEQ web site: [www.tceq.texas.gov/goto/construction](http://www.tceq.texas.gov/goto/construction)

### **b) Certification of Legal Name**

The full legal name of the applicant as authorized to do business in Texas is required. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at (512)463 5555, for more information related to filing in Texas.

### **c) Understanding of Notice of Termination**

A permittee shall terminate coverage under this Construction General Permit through the submittal of a NOT when the operator of the facility changes, final stabilization has been reached, the discharge becomes authorized under an individual permit, or the construction activity never began at this site.

### **d) Certification of Stormwater Pollution Prevention Plan**

The SWP3 identifies the areas and activities that could produce contaminated runoff at your site and then tells how you will ensure that this contamination is mitigated. For example, in describing your mitigation measures, your site's plan might identify the devices that collect and

filter stormwater, tell how those devices are to be maintained, and tell how frequently that maintenance is to be carried out. You must develop this plan in accordance with the TCEQ general permit requirements. This plan must be developed and implemented before you complete this NOI. The SWP3 must be available for a TCEQ investigator to review on request.

### **Operator Certification:**

The certification must bear an original signature of a person meeting the signatory requirements specified under 30 Texas Administrative Code (TAC) §305.44.

### **IF YOU ARE A CORPORATION:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(1) (see below). According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

### **IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(3) (see below). According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statute(s) under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a)(3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality's Environmental Law Division at (512)239-0600.

## **30 Texas Administrative Code**

### **§305.44. Signatories to Applications**

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.



(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

# Texas Commission on Environmental Quality General Permit Payment Submittal Form

**Use this form to submit your Application Fee only if you are mailing your payment.**

- Complete items 1 through 5 below:
- Staple your check in the space provided at the bottom of this document.
- Do not mail this form with your NOI form.
- Do not mail this form to the same address as your NOI.

**Mail this form and your check to:**

*BY REGULAR U.S. MAIL*

Texas Commission on Environmental  
Quality  
Financial Administration Division  
Cashier's Office, MC-214  
P.O. Box 13088  
Austin, TX 78711-3088

*BY OVERNIGHT/EXPRESS MAIL*

Texas Commission on Environmental  
Quality  
Financial Administration Division  
Cashier's Office, MC-214  
12100 Park 35 Circle  
Austin, TX 78753

Fee Code: GPA	General Permit:	TXR150000
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1. Check / Money Order No: \_\_\_\_\_
2. Amount of Check/Money Order: \_\_\_\_\_
3. Date of Check or Money Order: \_\_\_\_\_
4. Name on Check or Money Order: \_\_\_\_\_

5. NOI INFORMATION

If the check is for more than one NOI, list each Project/Site (RE) Name and Physical Address exactly as provided on the NOI. **DO NOT SUBMIT A COPY OF THE NOI WITH THIS FORM AS IT COULD CAUSE DUPLICATE PERMIT ENTRIES.**

See Attached List of Sites (If more space is needed, you may attach a list.)

Project/Site (RE) Name: \_\_\_\_\_

Project/Site (RE) Physical Address:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Staple Check in This Space**



# TCEQ Notice of Termination (NOT) for Authorizations under TPDES General Permit (TXR150000)

**ePERMITS: Sign up now for online NOT:** <https://www3.tceq.texas.gov/steers/index.cfm>

**What is the permit number to be terminated?** Processing will be delayed without the permit number.

TXR15 \_\_\_\_\_ or TXRCW \_\_\_\_\_

## 1) OPERATOR (APPLICANT)

**a)** What is the Customer Number (CN) issued to this entity? You may search for your CN at: <http://www.tceq.texas.gov/goto/cr-customer>

CN \_\_\_\_\_

**b)** What is the Legal Name of the current permittee?

\_\_\_\_\_  
(This must be the current permittee of the permit to be terminated.)

**c)** What is the contact information for the Operator (Responsible Authority)? The mailing address must be recognized by the US Postal Service. You may verify the address at: <https://tools.usps.com/go/ZipLookupAction!input.action>

Prefix (Mr. Ms. Miss): \_\_\_\_\_

First/Last Name: \_\_\_\_\_ Suffix: \_\_\_\_\_

Title: \_\_\_\_\_ Credential: \_\_\_\_\_

Phone Number: \_\_\_\_\_ Ext: \_\_\_\_\_ Fax Number: \_\_\_\_\_

E-mail: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Internal Routing (Mail Code, Etc.): \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_

If outside USA:

Territory: \_\_\_\_\_ Country Code: \_\_\_\_\_ Postal Code: \_\_\_\_\_

## 2) APPLICATION CONTACT

If TCEQ needs additional information regarding this application, who should be contacted?

Is the application contact the same as the applicant identified above?

Yes, go to Section 3).

No, complete section below

Prefix (Mr. Ms. Miss): \_\_\_\_\_

First/Last Name: \_\_\_\_\_ Suffix: \_\_\_\_\_

Title: \_\_\_\_\_ Credential: \_\_\_\_\_  
Organization Name: \_\_\_\_\_  
Phone Number: \_\_\_\_\_ Ext: \_\_\_\_\_ Fax Number: \_\_\_\_\_  
E-mail Address: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
Internal Routing (Mail Code, Etc.): \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_  
Mailing Information if outside USA:  
Territory: \_\_\_\_\_ Country Code: \_\_\_\_\_ Postal Code: \_\_\_\_\_

**3) REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

**a)** TCEQ issued RE Reference Number (RN):

RN \_\_\_\_\_

**b)** Name of project or site (the name known by the community where located):

\_\_\_\_\_

**c)** County (or counties if > 1)

**d)** Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

**e)** Does the site have a physical address?

Yes, complete Section A for a physical address.

No, complete Section B for site location information.

**Section A: Enter the physical address for the site.**

Verify the address with USPS. If the address is not recognized as a delivery address, provide the address as identified for overnight mail delivery, 911 emergency or other online map tools to confirm an address.

Physical Address of Project or Site:

Street Number: \_\_\_\_\_ Street Name: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_

**Section B: Enter the site location information.**

If no physical address (Street Number & Street Name), provide a written location access description to the site. (Example: located 2 miles west from intersection of Hwy 290 & IH35 accessible on Hwy 290 South)

City where the site is located or, if not in a city, what is the nearest city:

State: \_\_\_\_\_ ZIP Code where the site is located: \_\_\_\_\_

**4) REASON FOR TERMINATION**

Check the reason for termination:

Final stabilization has been achieved on all portions of the site that are the responsibility of the Operator and all silt fences and other temporary erosion controls have either been removed, or scheduled for removal as defined in the SWP3.

Another permitted Operator has assumed control over all areas of the site that have not been finally stabilized, and temporary erosion controls that have been defined in the SWP3 have been transferred to the new Operator.

The activity is now authorized under an alternate TPDES permit.

The activity never began at this site that is regulated under the general permit.

**5) CERTIFICATION**

I, \_\_\_\_\_  
*Typed or printed name* *Title*

certify under penalty of law that this document and all attachments were prepared under my direction 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 gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code 305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
*(Use blue ink)*

# Notice of Termination (NOT) for Authorizations under TPDES General Permit (TXR150000) General Information and Instructions

## GENERAL INFORMATION

### Where to Send the Notice of Termination (NOT):

#### BY REGULAR U.S. MAIL

Texas Commission on Environmental Quality  
Storm Water Processing Center (MC-228)  
P.O. Box 13087  
Austin, Texas 78711-3087

#### BY OVERNIGHT/EXPRESS MAIL

Texas Commission on Environmental Quality  
Storm Water Processing Center (MC-228)  
12100 Park 35 Circle  
Austin, TX 78753

### TCEQ Contact list:

Application – status and form questions:	512/239-3700, <a href="mailto:swpermit@tceq.texas.gov">swpermit@tceq.texas.gov</a>
Technical questions:	512/239-4671, <a href="mailto:swgp@tceq.texas.gov">swgp@tceq.texas.gov</a>
Environmental Law Division:	512/239-0600
Records Management - obtain copies of forms:	512/239-0900
Reports from databases (as available):	512/239-DATA (3282)
Cashier's office:	512/239-0357 or 512/239-0187

### Notice of Termination Process:

When your NOT is received by the program, the form will be processed as follows:

**1) Administrative Review:** The form will be reviewed to confirm the following:

- the permit number is provided
- the permit is active and has been approved
- the entity terminating the permit is the current permittee
- the site information matches the original permit record
- the form has the required original signature with title and date

**2) Notice of Deficiency:** If an item is incomplete or not verifiable as indicated above, a phone call will be made to the applicant to clear the deficiency. A letter will not be sent to the permittee if unable to process the form.

**3) Confirmation of Termination:** A Notice of Termination Confirmation letter will be mailed to the operator.

### General Permit Forms

The Notice of Intent (NOI), Notice of Termination (NOT), Notice of Change (NOC), and Waiver forms (including instructions) are available in Adobe Acrobat PDF format on the TCEQ web site <http://www.tceq.texas.gov>.

### Change in Operator

An authorization under the general permit is not transferable. If the operator of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be submitted not later than 10 days prior to the change in Operator status.

## **TCEQ Central Registry Core Data Form**

The Core Data Form has been incorporated into this form. Do not send a Core Data Form to TCEQ. After final acknowledgment of coverage under the general permit, the program will assign a Customer Number and Regulated Entity Number.

You can find the information on the Central Registry web site at <http://www15.tceq.texas.gov/crpub/>. You can search by the Regulated Entity (RN), Customer Number (CN) or Name (Permittee), or by your permit number under the search field labeled "Additional ID". Capitalize all letters in the permit number.

The Customer (Permittee) is responsible for providing consistent information to the TCEQ, and for updating all CN and RN data for all authorizations as changes occur. For General Permits, a Notice of Change form must be submitted to the program area.

## **INSTRUCTIONS FOR FILLING OUT THE NOT FORM**

### **1. OPERATOR (CURRENT PERMITTEE)**

#### **a) Enter assigned Customer Number (CN)**

TCEQ's Central Registry assigns each customer a number that begins with CN, followed by nine digits. **This is not a permit number, registration number, or license number.**

#### **b) Legal Name of Operator**

The operator must be the same entity as previously submitted on the original Notice of Intent for the permit number provided.

#### **c) Contact Information for the Operator (Responsible Authority)**

Provide information for person signing the NOT application in Certification section. This person is also referred to as the Responsible Authority.

Provide a complete mailing address for receiving mail from the TCEQ. Update the address if different than previously submitted for the Notice of Intent or Notice of Change.

The area code and phone number should provide contact to the operator. Leave Extension blank if not applicable.

The fax number and e-mail address are optional and should correspond to the operator.

### **2. APPLICATION CONTACT**

Provide the name, title and contact information of the person that TCEQ can contact for additional information regarding this application.

### **3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

#### **a) Regulated Entity Reference Number (RN)**

A number issued by TCEQ's Central Registry to sites (a location where a regulated activity occurs) regulated by TCEQ. This is not a permit number, registration number, or license number. If this regulated entity has not been assigned an RN, leave this space blank.

#### **b) Site/Project Name/Regulated Entity**

Provide the name of the site as known by the public in the area where the site is located.

#### **c) County**

Identify the county or counties in which the regulated entity is located.

**d) Latitude and Longitude**

Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. For help obtaining the latitude and longitude, go to: <http://www.tceq.texas.gov/gis/sqmapview.html> or <http://nationalmap.gov/ustopo/>

**e) Site/Project (RE) Physical Address/Location Information**

Enter the complete address for the site in Section A if the address can be validated through the US Postal Service. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate a site. Please confirm this to be a complete and valid address. Please do not use a rural route or post office box for a site location.

If a site does not have an address that includes a street (or house) number and street name, enter NO ADDRESS for the street name in Section A. In Section B provide a complete written location description. For example: “The site is located 2 miles west from intersection of Hwy 290 & IH35, located on the southwest corner of the Hwy 290 South bound lane.” Provide the city (or nearest city) and zip code of the facility location.

**4. REASON FOR TERMINATION**

The Notice of Termination form is only for use to terminate the authorization (permit). The Operator must indicate the specific reason for terminating by checking one of the options. If the reason is not listed then provide an attachment that explains the reason for termination.

Please read your general permit carefully to determine when to terminate your permit. Permits will not be reactivated after submitting a termination form. The termination is effective on the date postmarked for delivery to TCEQ.

**5. CERTIFICATION**

The certification must bear an original signature of a person meeting the signatory requirements specified under 30 Texas Administrative Code (TAC) §305.44.

**IF YOU ARE A CORPORATION:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(see below). According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

**IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(see below). According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statute(s) under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a) (3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are



either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality's Environmental Law Division at 512/239-0600.

### **30 Texas Administrative Code**

#### **§305.44. Signatories to Applications**

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

TCEQ Office Use Only  
Permit No:  
CN:  
RN:  
Region:



# Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR150000

ePermits: This form is available on our online permitting system.  
Sign up for online permitting at: <https://www3.tceq.texas.gov/steers/>

What is the permit number to be terminated?

TXR15 [redacted] TXRCW [redacted]

## Section 1. OPERATOR (Permittee)

a) What is the Customer Number (CN) issued to this entity?

CN [redacted]

b) What is the Legal Name of the current permittee?

[redacted]

c) Provide the contact information for the Operator (Responsible Authority).

Prefix (Mr. Ms. or Miss): [redacted]

First and Last Name: [redacted] Suffix: [redacted]

Title: [redacted] Credentials: [redacted]

Phone Number: [redacted] Fax Number: [redacted]

Email: [redacted]

Mailing Address: [redacted]

City, State, and Zip Code: [redacted]

Country Mailing Information, if outside USA: [redacted]

## Section 2. APPLICATION CONTACT

This is the person TCEQ will contact if additional information is needed regarding this application.

Is the application contact the same as the permittee identified above? Yes  No

If Yes, go to Section 3.

If No, complete section below

Prefix (Mr. Ms. or Miss): [redacted]  
First and Last Name: [redacted] Suffix: [redacted]  
Title: [redacted] Credentials: [redacted]  
Phone Number: [redacted] Fax Number: [redacted]  
Email: [redacted]  
Mailing Address: [redacted]  
City, State, and Zip Code: [redacted]  
Country Mailing Information, if outside USA: [redacted]

**Section 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

- a) TCEQ issued RE Reference Number (RN): RN [redacted]
- b) Name of project or site as known by the local community: East Aldine Town Center
- c) County, or counties if more than 1: Harris County
- d) Latitude: 29° 54' 8.352"N Longitude: 95° 20' 38.7168"W
- e) Site Address/Location:

If the site has a physical address such as 12100 Park 35 Circle, Austin, TX 78753, complete Section 3A.

If the site does not have a physical address, provide a location description in Section 3B. Example: located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1.

**Section 3A: Physical Address of Project or Site:**

Street Number and Name: 3314 Aldine Mail Route Road  
City, State, and Zip Code: Houston, TX 77039

**Section 3B: Site Location Description:**

Location description: [redacted]  
[redacted]

City where the site is located or, if not in a city, what is the nearest city: [redacted]  
[redacted]

Zip Code where the site is located: [redacted]

## **Section 4. REASON FOR TERMINATION**

Check the reason for termination:

- Final stabilization has been achieved on all portions of the site that are the responsibility of the Operator and all silt fences and other temporary erosion controls have been removed, or scheduled for removal as defined in the SWP3.
- Another permitted Operator has assumed control over all areas of the site that have not been finally stabilized, and temporary erosion controls that have been identified in the SWP3 have been transferred to the new Operator.
- The discharge is now authorized under an alternate TPDES permit.
- The activity never began at this site that is regulated under the general permit.

## **Section 5. CERTIFICATION**

Signatory Name: \_\_\_\_\_

Signatory Title: \_\_\_\_\_

I certify under penalty of law that this document and all attachments were prepared under my direction 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 gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature (use blue ink): \_\_\_\_\_ Date: \_\_\_\_\_

# Instructions for Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR150000

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## GENERAL INFORMATION

### Where to Send the Notice of Termination (NOT):

#### BY REGULAR U.S. MAIL:

Texas Commission on Environmental Quality  
Stormwater Processing Center (MC-228)  
P.O. Box 13087  
Austin, Texas 78711-3087

#### BY OVERNIGHT/EXPRESS MAIL:

Texas Commission on Environmental Quality  
Stormwater Processing Center (MC-228)  
12100 Park 35 Circle  
Austin, TX 78753

### TCEQ Contact List:

Application status and form questions:	512-239-3700, <a href="mailto:swpermit@tceq.texas.gov">swpermit@tceq.texas.gov</a>
Technical questions:	512-239-4671, <a href="mailto:swgp@tceq.texas.gov">swgp@tceq.texas.gov</a>
Environmental Law Division:	512-239-0600
Records Management - obtain copies of forms:	512-239-0900
Reports from databases (as available):	512-239-DATA (3282)
Cashier's office:	512-239-0357 or 512-239-0187

### Notice of Termination Process:

A Notice of Termination is effective on the date postmarked for delivery to TCEQ.

When your NOT is received by the program, the form will be processed as follows:

- 1) Administrative Review: The form will be reviewed to confirm the following:
  - the permit number is provided;
  - the permit is active and has been approved;
  - the entity terminating the permit is the current permittee;
  - the site information matches the original permit record; and
  - the form has the required original signature with title and date.
- 2) Notice of Deficiency: If an item is incomplete or not verifiable as indicated above, a phone call will be made to the applicant to clear the deficiency. A letter will not be sent to the permittee if unable to process the form.
- 3) Confirmation of Termination: A Notice of Termination Confirmation letter will be mailed to the operator.

### Change in Operator:

An authorization under the general permit is not transferable. If the operator of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be

submitted not later than 10 days prior to the change in Operator status.

### **Annual Water Quality Fee:**

This fee is assessed to permittees with an active authorization under the general permit on September 1 of each year. The designated billing contact will receive an invoice for payment of the annual fee in November of each year. The payment will be due 30 days from the invoice date. A 5% penalty will be assessed if the payment is not received by TCEQ by the due date. Annual fee assessments cannot be waived as long as the authorization under the general permit is active on September 1.

It is important for the permittees to submit a NOT when coverage under the general permit is no longer required. A NOT is effective on the postmarked date of mailing the form to TCEQ. It is recommended that the NOT be mailed using a method that documents the date mailed and received by TCEQ.

### **INSTRUCTIONS FOR FILLING OUT THE FORM**

The majority of permit information related to the current operator and regulated entity are available at the following website: [http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).

#### **Section 1. Operator (Current Permittee):**

- a) Customer Number (CN)  
TCEQ's Central Registry assigns each customer a number that begins with CN, followed by nine digits. This is not a permit number, registration number, or license number. The Customer Number, for the current permittee, is available at the following website: [http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- b) Legal Name of Operator  
The operator must be the same entity as previously submitted on the original Notice of Intent for the permit number provided. The current operator name, as provided on the current authorization, is available at the following website: [http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- c) Contact Information for the Operator (Responsible Authority)  
Provide information for person signing the NOT application in the Certification section. This person is also referred to as the Responsible Authority.

Provide a complete mailing address for receiving mail from the TCEQ. Update the address if different than previously submitted for the Notice of Intent or Notice of Change. The mailing address must be recognized by the US Postal Service. You may verify the address on the following website: <https://tools.usps.com/go/ZipLookupAction!input.action>.

The phone number should provide contact to the operator.

The fax number and e-mail address are optional and should correspond to the operator.

#### **Section 2. Application Contact:**

Provide the name, title and contact information of the person that TCEQ can contact for additional information regarding this application.

### **Section 3. Regulated Entity (RE) Information on Project or Site:**

- a) Regulated Entity Reference Number (RN)  
A number issued by TCEQ's Central Registry to sites where an activity regulated by TCEQ. This is not a permit number, registration number, or license number. The Regulated Entity Reference Number is available at the following website:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- b) Name of the Project or Site  
Provide the name of the site as known by the public in the area where the site is located.
- c) County  
Identify the county or counties in which the regulated entity is located.
- d) Latitude and Longitude  
Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. The latitude and longitude as provided on the current authorization is available at the following website:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- e) Site/Project (RE) Physical Address/Location Information  
The physical address/location information, as provided on the current authorization, is available at the following website:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).

Section 3A. If a site has an address that includes a street number and street name, enter the complete address for the site. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate the site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

Section 3B. If a site does not have an address that includes a street number and street name, provide a complete written location description. For example: "The site is located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1."

Provide the city (or nearest city) and Zip Code of the facility location.

### **Section 4. Reason for Termination:**

The Notice of Termination form is only for use to terminate the authorization (permit). The Permittee must indicate the specific reason for terminating by checking one of the options. If the reason is not listed then provide an attachment that explains the reason for termination.

Please read your general permit carefully to determine when to terminate your permit. Permits will not be reactivated after submitting a termination form. The termination is effective on the date postmarked for delivery to TCEQ.

### **Section 5. Certification:**

The certification must bear an original signature of a person meeting the signatory

requirements specified under 30 Texas Administrative Code §305.44.

**IF YOU ARE A CORPORATION:**

The regulation that controls who may sign an application form is 30 Texas Administrative

Code §305.44(a), which is provided below. According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

**IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a), which is provided below. According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statutes under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a) (3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality's Environmental Law Division at 512-239-0600.

**30 TEXAS ADMINISTRATIVE CODE §305.44. SIGNATORIES TO APPLICATIONS**

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.



(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

TCEQ Office Use Only  
Permit No:  
CN:  
RN:  
Region:



# Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR150000

ePermits: This form is available on our online permitting system.  
Sign up for online permitting at: <https://www3.tceq.texas.gov/steers/>

What is the permit number to be terminated?

TXR15 [redacted] TXRCW [redacted]

## Section 1. OPERATOR (Permittee)

a) What is the Customer Number (CN) issued to this entity?

CN 602680423

b) What is the Legal Name of the current permittee?

Harris County

c) Provide the contact information for the Operator (Responsible Authority).

Prefix (Mr. Ms. or Miss): Mr.

First and Last Name: David Goldberg Suffix: [redacted]

Title: Manager - Road & Bridge Const. Credentials: [redacted]

Phone Number: (713) 274-1562 Fax Number: (713) 755-2302

Email: david.goldberg@hcpid.org

Mailing Address: 1310 Prairie St., Suite 1105

City, State, and Zip Code: Houston, TX 77002

Country Mailing Information, if outside USA: [redacted]

## Section 2. APPLICATION CONTACT

This is the person TCEQ will contact if additional information is needed regarding this application.

Is the application contact the same as the permittee identified above? Yes  No

If Yes, go to Section 3.

If No, complete section below

Prefix (Mr. Ms. or Miss): Ms.

First and Last Name: Megan Houtchens

Suffix: [REDACTED]

Title: Senior Associate Credentials: P.E.

Phone Number: (713) 622-1444 Fax Number: (713) 968-9333

Email: mhoutchens@pgal.com

Mailing Address: 3131 Briarpark Dr., Suite 200

City, State, and Zip Code: Houston, TX 77042

Country Mailing Information, if outside USA: [REDACTED]

**Section 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

- a) TCEQ issued RE Reference Number (RN): RN [REDACTED]
- b) Name of project or site as known by the local community: East Aldine Town Center
- c) County, or counties if more than 1: Harris County
- d) Latitude: 29° 54' 8.352"N Longitude: 95° 20' 38.7168"W
- e) Site Address/Location:

If the site has a physical address such as 12100 Park 35 Circle, Austin, TX 78753, complete Section 3A.

If the site does not have a physical address, provide a location description in Section 3B. Example: located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1.

**Section 3A: Physical Address of Project or Site:**

Street Number and Name: 3314 Aldine Mail Route Road

City, State, and Zip Code: Houston, TX 77039

**Section 3B: Site Location Description:**

Location description: [REDACTED]

[REDACTED]

City where the site is located or, if not in a city, what is the nearest city: [REDACTED]

[REDACTED]

Zip Code where the site is located: [REDACTED]

## **Section 4. REASON FOR TERMINATION**

Check the reason for termination:

- Final stabilization has been achieved on all portions of the site that are the responsibility of the Operator and all silt fences and other temporary erosion controls have been removed, or scheduled for removal as defined in the SWP3.
- Another permitted Operator has assumed control over all areas of the site that have not been finally stabilized, and temporary erosion controls that have been identified in the SWP3 have been transferred to the new Operator.
- The discharge is now authorized under an alternate TPDES permit.
- The activity never began at this site that is regulated under the general permit.

## **Section 5. CERTIFICATION**

Signatory Name: \_\_\_\_\_

Signatory Title: \_\_\_\_\_

I certify under penalty of law that this document and all attachments were prepared under my direction 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 gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature (use blue ink): \_\_\_\_\_ Date: \_\_\_\_\_

# Instructions for Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR150000

---

## GENERAL INFORMATION

### Where to Send the Notice of Termination (NOT):

#### BY REGULAR U.S. MAIL:

Texas Commission on Environmental Quality  
Stormwater Processing Center (MC-228)  
P.O. Box 13087  
Austin, Texas 78711-3087

#### BY OVERNIGHT/EXPRESS MAIL:

Texas Commission on Environmental Quality  
Stormwater Processing Center (MC-228)  
12100 Park 35 Circle  
Austin, TX 78753

### TCEQ Contact List:

Application status and form questions:	512-239-3700, <a href="mailto:swpermit@tceq.texas.gov">swpermit@tceq.texas.gov</a>
Technical questions:	512-239-4671, <a href="mailto:swgp@tceq.texas.gov">swgp@tceq.texas.gov</a>
Environmental Law Division:	512-239-0600
Records Management - obtain copies of forms:	512-239-0900
Reports from databases (as available):	512-239-DATA (3282)
Cashier's office:	512-239-0357 or 512-239-0187

### Notice of Termination Process:

A Notice of Termination is effective on the date postmarked for delivery to TCEQ.

When your NOT is received by the program, the form will be processed as follows:

- 1) Administrative Review: The form will be reviewed to confirm the following:
  - the permit number is provided;
  - the permit is active and has been approved;
  - the entity terminating the permit is the current permittee;
  - the site information matches the original permit record; and
  - the form has the required original signature with title and date.
- 2) Notice of Deficiency: If an item is incomplete or not verifiable as indicated above, a phone call will be made to the applicant to clear the deficiency. A letter will not be sent to the permittee if unable to process the form.
- 3) Confirmation of Termination: A Notice of Termination Confirmation letter will be mailed to the operator.

### Change in Operator:

An authorization under the general permit is not transferable. If the operator of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be

submitted not later than 10 days prior to the change in Operator status.

### **Annual Water Quality Fee:**

This fee is assessed to permittees with an active authorization under the general permit on September 1 of each year. The designated billing contact will receive an invoice for payment of the annual fee in November of each year. The payment will be due 30 days from the invoice date. A 5% penalty will be assessed if the payment is not received by TCEQ by the due date. Annual fee assessments cannot be waived as long as the authorization under the general permit is active on September 1.

It is important for the permittees to submit a NOT when coverage under the general permit is no longer required. A NOT is effective on the postmarked date of mailing the form to TCEQ. It is recommended that the NOT be mailed using a method that documents the date mailed and received by TCEQ.

### **INSTRUCTIONS FOR FILLING OUT THE FORM**

The majority of permit information related to the current operator and regulated entity are available at the following website: [http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).

#### **Section 1. Operator (Current Permittee):**

- a) Customer Number (CN)  
TCEQ's Central Registry assigns each customer a number that begins with CN, followed by nine digits. This is not a permit number, registration number, or license number. The Customer Number, for the current permittee, is available at the following website: [http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- b) Legal Name of Operator  
The operator must be the same entity as previously submitted on the original Notice of Intent for the permit number provided. The current operator name, as provided on the current authorization, is available at the following website: [http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- c) Contact Information for the Operator (Responsible Authority)  
Provide information for person signing the NOT application in the Certification section. This person is also referred to as the Responsible Authority.

Provide a complete mailing address for receiving mail from the TCEQ. Update the address if different than previously submitted for the Notice of Intent or Notice of Change. The mailing address must be recognized by the US Postal Service. You may verify the address on the following website: <https://tools.usps.com/go/ZipLookupAction!input.action>.

The phone number should provide contact to the operator.

The fax number and e-mail address are optional and should correspond to the operator.

#### **Section 2. Application Contact:**

Provide the name, title and contact information of the person that TCEQ can contact for additional information regarding this application.

### **Section 3. Regulated Entity (RE) Information on Project or Site:**

- a) Regulated Entity Reference Number (RN)  
A number issued by TCEQ's Central Registry to sites where an activity regulated by TCEQ. This is not a permit number, registration number, or license number. The Regulated Entity Reference Number is available at the following website:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- b) Name of the Project or Site  
Provide the name of the site as known by the public in the area where the site is located.
- c) County  
Identify the county or counties in which the regulated entity is located.
- d) Latitude and Longitude  
Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. The latitude and longitude as provided on the current authorization is available at the following website:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- e) Site/Project (RE) Physical Address/Location Information  
The physical address/location information, as provided on the current authorization, is available at the following website:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).

Section 3A. If a site has an address that includes a street number and street name, enter the complete address for the site. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate the site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

Section 3B. If a site does not have an address that includes a street number and street name, provide a complete written location description. For example: "The site is located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1."

Provide the city (or nearest city) and Zip Code of the facility location.

### **Section 4. Reason for Termination:**

The Notice of Termination form is only for use to terminate the authorization (permit). The Permittee must indicate the specific reason for terminating by checking one of the options. If the reason is not listed then provide an attachment that explains the reason for termination.

Please read your general permit carefully to determine when to terminate your permit. Permits will not be reactivated after submitting a termination form. The termination is effective on the date postmarked for delivery to TCEQ.

### **Section 5. Certification:**

The certification must bear an original signature of a person meeting the signatory

requirements specified under 30 Texas Administrative Code §305.44.

**IF YOU ARE A CORPORATION:**

The regulation that controls who may sign an application form is 30 Texas Administrative

Code §305.44(a), which is provided below. According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

**IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a), which is provided below. According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statutes under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a) (3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality's Environmental Law Division at 512-239-0600.

**30 TEXAS ADMINISTRATIVE CODE §305.44. SIGNATORIES TO APPLICATIONS**

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.



(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

TCEQ Office Use Only  
Permit No:  
CN:  
RN:  
Region:



# Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR150000

ePermits: This form is available on our online permitting system.  
Sign up for online permitting at: <https://www3.tceq.texas.gov/steers/>

What is the permit number to be terminated?

TXR15 [redacted] TXRCW [redacted]

## Section 1. OPERATOR (Permittee)

a) What is the Customer Number (CN) issued to this entity?

CN [redacted]

b) What is the Legal Name of the current permittee?

[redacted]

c) Provide the contact information for the Operator (Responsible Authority).

Prefix (Mr. Ms. or Miss): [redacted]

First and Last Name: [redacted] Suffix: [redacted]

Title: [redacted] Credentials: [redacted]

Phone Number: [redacted] Fax Number: [redacted]

Email: [redacted]

Mailing Address: [redacted]

City, State, and Zip Code: [redacted]

Country Mailing Information, if outside USA: [redacted]

## Section 2. APPLICATION CONTACT

This is the person TCEQ will contact if additional information is needed regarding this application.

Is the application contact the same as the permittee identified above? Yes  No

If Yes, go to Section 3.

If No, complete section below

Prefix (Mr. Ms. or Miss): [redacted]  
First and Last Name: [redacted] Suffix: [redacted]  
Title: [redacted] Credentials: [redacted]  
Phone Number: [redacted] Fax Number: [redacted]  
Email: [redacted]  
Mailing Address: [redacted]  
City, State, and Zip Code: [redacted]  
Country Mailing Information, if outside USA: [redacted]

**Section 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

- a) TCEQ issued RE Reference Number (RN): RN [redacted]
- b) Name of project or site as known by the local community: East Aldine Town Center
- c) County, or counties if more than 1: Harris County
- d) Latitude: 29° 54' 8.352"N Longitude: 95° 20' 38.7168"W
- e) Site Address/Location:

If the site has a physical address such as 12100 Park 35 Circle, Austin, TX 78753, complete Section 3A.

If the site does not have a physical address, provide a location description in Section 3B. Example: located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1.

**Section 3A: Physical Address of Project or Site:**

Street Number and Name: 3314 Aldine Mail Route Road  
City, State, and Zip Code: Houston, TX 77039

**Section 3B: Site Location Description:**

Location description: [redacted]  
[redacted]

City where the site is located or, if not in a city, what is the nearest city: [redacted]  
[redacted]

Zip Code where the site is located: [redacted]

## **Section 4. REASON FOR TERMINATION**

Check the reason for termination:

- Final stabilization has been achieved on all portions of the site that are the responsibility of the Operator and all silt fences and other temporary erosion controls have been removed, or scheduled for removal as defined in the SWP3.
- Another permitted Operator has assumed control over all areas of the site that have not been finally stabilized, and temporary erosion controls that have been identified in the SWP3 have been transferred to the new Operator.
- The discharge is now authorized under an alternate TPDES permit.
- The activity never began at this site that is regulated under the general permit.

## **Section 5. CERTIFICATION**

Signatory Name: \_\_\_\_\_

Signatory Title: \_\_\_\_\_

I certify under penalty of law that this document and all attachments were prepared under my direction 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 gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature (use blue ink): \_\_\_\_\_ Date: \_\_\_\_\_

# Instructions for Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR150000

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## GENERAL INFORMATION

### Where to Send the Notice of Termination (NOT):

#### BY REGULAR U.S. MAIL:

Texas Commission on Environmental Quality  
Stormwater Processing Center (MC-228)  
P.O. Box 13087  
Austin, Texas 78711-3087

#### BY OVERNIGHT/EXPRESS MAIL:

Texas Commission on Environmental Quality  
Stormwater Processing Center (MC-228)  
12100 Park 35 Circle  
Austin, TX 78753

### TCEQ Contact List:

Application status and form questions:	512-239-3700, <a href="mailto:swpermit@tceq.texas.gov">swpermit@tceq.texas.gov</a>
Technical questions:	512-239-4671, <a href="mailto:swgp@tceq.texas.gov">swgp@tceq.texas.gov</a>
Environmental Law Division:	512-239-0600
Records Management - obtain copies of forms:	512-239-0900
Reports from databases (as available):	512-239-DATA (3282)
Cashier's office:	512-239-0357 or 512-239-0187

### Notice of Termination Process:

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When your NOT is received by the program, the form will be processed as follows:

- 1) Administrative Review: The form will be reviewed to confirm the following:
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It is important for the permittees to submit a NOT when coverage under the general permit is no longer required. A NOT is effective on the postmarked date of mailing the form to TCEQ. It is recommended that the NOT be mailed using a method that documents the date mailed and received by TCEQ.

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The majority of permit information related to the current operator and regulated entity are available at the following website: [http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).

#### **Section 1. Operator (Current Permittee):**

- a) Customer Number (CN)  
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- b) Name of the Project or Site  
Provide the name of the site as known by the public in the area where the site is located.
- c) County  
Identify the county or counties in which the regulated entity is located.
- d) Latitude and Longitude  
Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. The latitude and longitude as provided on the current authorization is available at the following website:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- e) Site/Project (RE) Physical Address/Location Information  
The physical address/location information, as provided on the current authorization, is available at the following website:  
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(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.



(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).



# LARGE CONSTRUCTION SITE NOTICE

FOR THE  
Texas Commission on Environmental Quality (TCEQ)  
Storm Water Program  
**TPDES GENERAL PERMIT TXR150000**

## ***“PRIMARY OPERATOR” NOTICE***

This notice applies to construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of storm water runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.D.2. of the general permit. This notice shall be posted along with a copy of the signed Notice of Intent (NOI), as applicable. Additional information regarding the TCEQ storm water permit program may be found on the internet at:

[http://www.tceq.state.tx.us/nav/permits/sw\\_permits.html](http://www.tceq.state.tx.us/nav/permits/sw_permits.html)

Site-Specific TPDES Authorization Number:	
Operator Name:	
Contact Name and Phone Number:	
Project Description: <i>Physical address or description of the site's location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.</i>	
Location of Storm Water Pollution Prevention Plan:	

CONTRACTOR



# LARGE CONSTRUCTION SITE NOTICE

FOR THE  
Texas Commission on Environmental Quality (TCEQ)  
Storm Water Program  
**TPDES GENERAL PERMIT TXR150000**

## ***“PRIMARY OPERATOR” NOTICE***

This notice applies to construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of storm water runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.D.2. of the general permit. This notice shall be posted along with a copy of the signed Notice of Intent (NOI), as applicable. Additional information regarding the TCEQ storm water permit program may be found on the internet at:

[http://www.tceq.state.tx.us/nav/permits/sw\\_permits.html](http://www.tceq.state.tx.us/nav/permits/sw_permits.html)

Site-Specific TPDES Authorization Number:	
Operator Name:	
Contact Name and Phone Number:	
Project Description: <i>Physical address or description of the site's location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.</i>	
Location of Storm Water Pollution Prevention Plan:	

## **Appendix E**

### **Jurisdictional Wetlands Determination**

#### **Letter**

**(NOT APPLICABLE)**

## **Appendix F**

# **Corrective Action Log/Recordkeeping Log**



**Appendix G**  
**TRAINING LOG**

## Stormwater Pollution Prevention Training Log

Project Name: \_\_\_\_\_

Project Location: \_\_\_\_\_

Instructor's Name(s): \_\_\_\_\_

Instructor's Title(s): \_\_\_\_\_

Course Location: \_\_\_\_\_ Date: \_\_\_\_\_

Course Length (hours): \_\_\_\_\_

Stormwater Training Topic: *(check as appropriate)*

- Erosion Control BMPs       Emergency Procedures  
 Sediment Control BMPs       Good Housekeeping BMPs  
 Non-Stormwater BMPs

Specific Training Objective: \_\_\_\_\_  
\_\_\_\_\_

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Company
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		



## **Appendix H**

### **SWPPP AMENDMENT LOG**



## **Appendix I**

**TPDES General Permit No. TXR 150000**

# Texas Commission on Environmental Quality

P.O. Box 13087, Austin, Texas 78711-3087



## GENERAL PERMIT TO DISCHARGE UNDER THE TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM

under provisions of  
Section 402 of the Clean Water Act  
and Chapter 26 of the Texas Water Code

This permit supersedes and replaces  
TPDES General Permit No. TXR150000, issued March 5, 2008

Construction sites that discharge stormwater associated with construction activity  
located in the state of Texas  
may discharge to surface water in the state

only according to monitoring requirements and other conditions set forth in this general permit, as well as the rules of the Texas Commission on Environmental Quality (TCEQ or Commission), the laws of the State of Texas, and other orders of the Commission of the TCEQ. The issuance of this general permit does not grant to the permittee the right to use private or public property for conveyance of stormwater and certain non-stormwater discharges along the discharge route. This includes property belonging to but not limited to any individual, partnership, corporation or other entity. Neither does this general permit authorize any invasion of personal rights nor any violation of federal, state, or local laws or regulations. It is the responsibility of the permittee to acquire property rights as may be necessary to use the discharge route.

This general permit and the authorization contained herein shall expire at midnight, five years from the permit effective date.

EFFECTIVE DATE: March 5, 2013

ISSUED DATE: FEB 19 2013

  
For the Commission

**TPDES GENERAL PERMIT NUMBER TXR150000 RELATING TO  
STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION  
ACTIVITIES**

**Table of Contents**

Part I. Flow Chart and Definitions .....5

Section A. Flow Chart to Determine Whether Coverage is Required .....5

Section B. Definitions .....6

Part II. Permit Applicability and Coverage ..... 12

Section A. Discharges Eligible for Authorization ..... 12

1. Stormwater Associated with Construction Activity ..... 12

2. Discharges of Stormwater Associated with Construction Support Activities ..... 12

3. Non-Stormwater Discharges ..... 12

4. Other Permitted Discharges ..... 13

Section B. Concrete Truck Wash Out ..... 13

Section C. Limitations on Permit Coverage ..... 13

1. Post Construction Discharges ..... 13

2. Prohibition of Non-Stormwater Discharges ..... 13

3. Compliance With Water Quality Standards ..... 13

4. Impaired Receiving Waters and Total Maximum Daily Load (TMDL) Requirements ..... 14

5. Discharges to the Edwards Aquifer Recharge or Contributing Zone ..... 14

6. Discharges to Specific Watersheds and Water Quality Areas ..... 14

7. Protection of Streams and Watersheds by Other Governmental Entities ..... 14

8. Indian Country Lands ..... 14

9. Oil and Gas Production ..... 15

10. Stormwater Discharges from Agricultural Activities ..... 15

11. Endangered Species Act ..... 15

12. Other ..... 15

Section D. Deadlines for Obtaining Authorization to Discharge ..... 15

1. Large Construction Activities ..... 15

2. Small Construction Activities ..... 15

Section E. Obtaining Authorization to Discharge ..... 16

1. Automatic Authorization for Small Construction Activities With Low Potential for Erosion: ..... 16

2. Automatic Authorization For All Other Small Construction Activities: ..... 17

3. Authorization for Large Construction Activities: ..... 17

4.	Waivers for Small Construction Activities:.....	18
5.	Effective Date of Coverage .....	18
6.	Notice of Change (NOC) .....	18
7.	Signatory Requirement for NOI Forms, Notice of Termination (NOT) Forms, NOC Letters, and Construction Site Notices .....	19
8.	Contents of the NOI.....	19
Section F. Terminating Coverage.....		20
1.	Notice of Termination (NOT) Required .....	20
2.	Minimum Contents of the NOT .....	20
3.	Termination of Coverage for Small Construction Sites and for Secondary Operators at Large Construction Sites.....	20
4.	Transfer of Operational Control .....	21
Section G. Waivers from Coverage .....		21
1.	Waiver Applicability and Coverage.....	22
2.	Steps to Obtaining a Waiver .....	22
3.	Effective Date of Waiver .....	22
4.	Activities Extending Beyond the Waiver Period.....	22
Section H. Alternative TPDES Permit Coverage.....		23
1.	Individual Permit Alternative.....	23
2.	Individual Permit Required.....	23
3.	Alternative Discharge Authorization .....	23
Section I. Permit Expiration.....		23
Part III. Stormwater Pollution Prevention Plans (SWP <sub>3</sub> ) .....		24
Section A. Shared SWP <sub>3</sub> Development .....		24
Section B. Responsibilities of Operators.....		25
1.	Secondary Operators and Primary Operators with Control Over Construction Plans and Specifications .....	25
2.	Primary Operators with Day-to-Day Operational Control.....	25
Section C. Deadlines for SWP <sub>3</sub> Preparation, Implementation, and Compliance.....		25
Section D. Plan Review and Making Plans Available .....		26
Section E. Revisions and Updates to SWP <sub>3</sub> s .....		26
Section F. Contents of SWP <sub>3</sub> .....		26
Section G. Erosion and Sediment Control Requirements Applicable to All Sites.....		34
Part IV. Stormwater Runoff from Concrete Batch Plants .....		35
Section A. Benchmark Sampling Requirements .....		35
Section B. Best Management Practices (BMPs) and SWP <sub>3</sub> Requirements .....		37
Section C. Prohibition of Wastewater Discharges.....		39

Part V. Concrete Truck Wash Out Requirements ..... 40

Part VI. Retention of Records..... 40

Part VII. Standard Permit Conditions ..... 40

Part VIII. Fees ..... 41

Appendix A: Automatic Authorization .....43

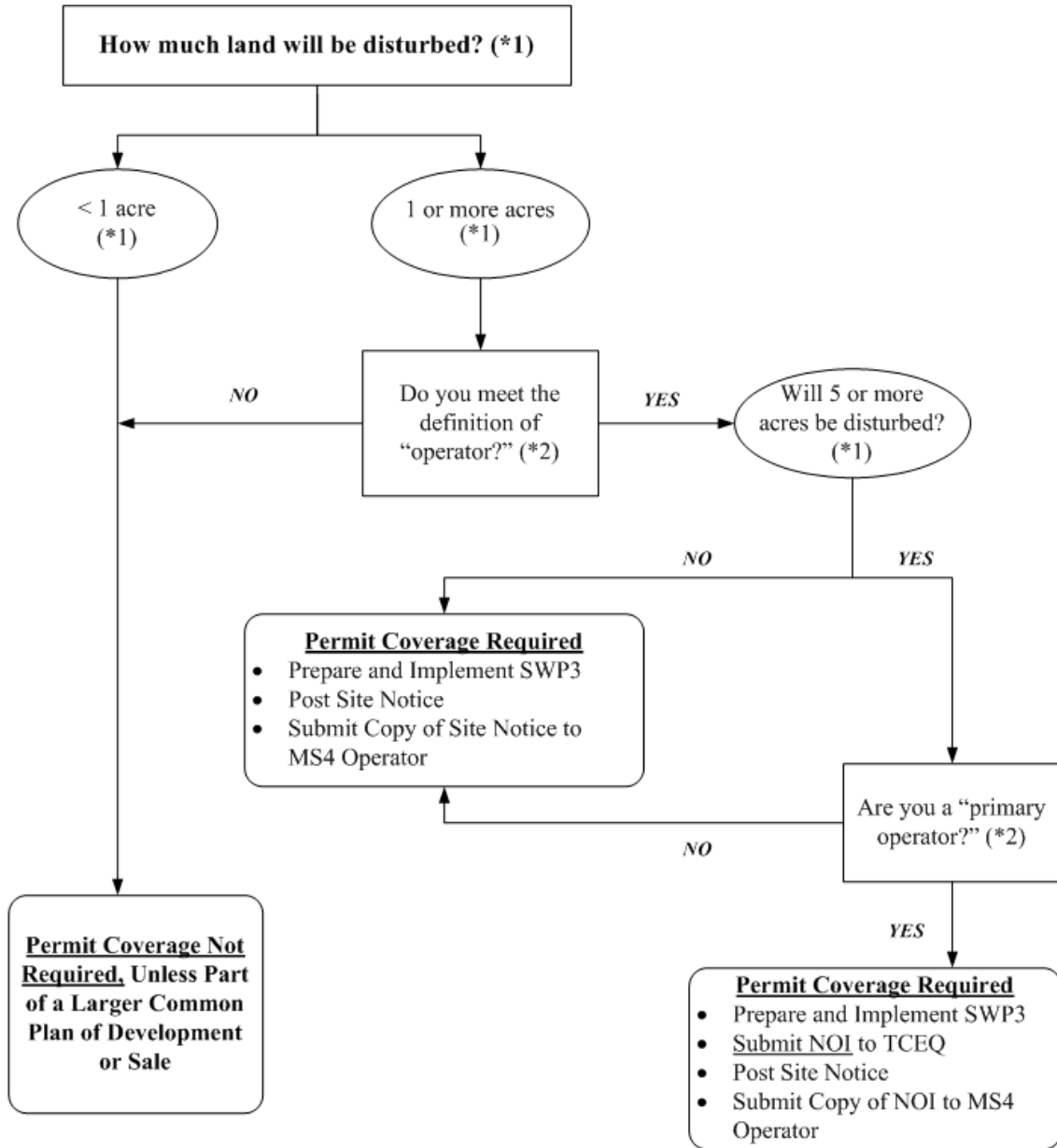
Appendix B: Erosivity Index (EI) Zones in Texas .....45

Appendix C: Isoerodent Map .....46

Appendix D: Erosivity Indices for EI Zones in Texas .....47

**Part I. Flow Chart and Definitions**

**Section A. Flow Chart to Determine Whether Coverage is Required**



(\*1) To determine the size of the construction project, use the size of the entire area to be disturbed, and include the size of the larger common plan of development or sale, if the project is part of a larger project (refer to Part I.B., "Definitions," for an explanation of "common plan of development or sale").

(\*2) Refer to the definitions for "operator," "primary operator," and "secondary operator" in Part I., Section B. of this permit.



## Section B. Definitions

**Arid Areas** - Areas with an average annual rainfall of 0 to 10 inches.

**Best Management Practices (BMPs)** - Schedules of activities, prohibitions of practices, maintenance procedures, structural controls, local ordinances, and other management practices to prevent or reduce the discharge of pollutants. BMPs also include treatment requirements, operating procedures, and practices to control construction site runoff, spills or leaks, waste disposal, or drainage from raw material storage areas.

**Commencement of Construction** - The initial disturbance of soils associated with clearing, grading, or excavation activities, as well as other construction-related activities (e.g., stockpiling of fill material, demolition).

**Common Plan of Development** - A construction activity that is completed in separate stages, separate phases, or in combination with other construction activities. A common plan of development (also known as a “common plan of development or sale”) is identified by the documentation for the construction project that identifies the scope of the project, and may include plats, blueprints, marketing plans, contracts, building permits, a public notice or hearing, zoning requests, or other similar documentation and activities. A common plan of development does not necessarily include all construction projects within the jurisdiction of a public entity (e.g., a city or university). Construction of roads or buildings in different parts of the jurisdiction would be considered separate “common plans,” with only the interconnected parts of a project being considered part of a “common plan” (e.g., a building and its associated parking lot and driveways, airport runway and associated taxiways, a building complex, etc.). Where discrete construction projects occur within a larger common plan of development or sale but are located ¼ mile or more apart, and the area between the projects is not being disturbed, each individual project can be treated as a separate plan of development or sale, provided that any interconnecting road, pipeline or utility project that is part of the same “common plan” is not included in the area to be disturbed.

**Construction Activity** - Includes soil disturbance activities, including clearing, grading, and excavating; and does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site (e.g., the routine grading of existing dirt roads, asphalt overlays of existing roads, the routine clearing of existing right-of-ways, and similar maintenance activities). Regulated construction activity is defined in terms of small and large construction activity.

**Dewatering** – The act of draining rainwater or groundwater from building foundations, vaults, and trenches.

**Discharge** – For the purposes of this permit, the drainage, release, or disposal of pollutants in stormwater and certain non-stormwater from areas where soil disturbing activities (e.g., clearing, grading, excavation, stockpiling of fill material, and demolition), construction materials or equipment storage or maintenance (e.g., fill piles, borrow area, concrete truck wash out, fueling), or other industrial stormwater directly related to the construction process (e.g., concrete or asphalt batch plants) are located.

**Drought-Stricken Area** – For the purposes of this permit, an area in which the National Oceanic and Atmospheric Administration’s U.S. Seasonal Drought Outlook indicates for the period during which the construction will occur that any of the following conditions are likely: (1) “Drought to persist or intensify”, (2) “Drought ongoing, some improvement”, (3) “Drought likely to improve, impacts ease”, or (4) “Drought development likely”. See [http://www.cpc.ncep.noaa.gov/products/expert\\_assessment/seasonal\\_drought.html](http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html).

**Edwards Aquifer** - As defined under Texas Administrative Code (TAC) § 213.3 of this title (relating to the Edwards Aquifer), that portion of an arcuate belt of porous, water-bearing, predominantly carbonate rocks known as the Edwards and Associated Limestones in the Balcones Fault Zone trending from west to east to northeast in Kinney, Uvalde, Medina, Bexar, Comal, Hays, Travis, and Williamson Counties; and composed of the Salmon Peak

Limestone, McKnight Formation, West Nueces Formation, Devil's River Limestone, Person Formation, Kainer Formation, Edwards Formation, and Georgetown Formation. The permeable aquifer units generally overlie the less-permeable Glen Rose Formation to the south, overlie the less-permeable Comanche Peak and Walnut Formations north of the Colorado River, and underlie the less-permeable Del Rio Clay regionally.

**Edwards Aquifer Recharge Zone** - Generally, that area where the stratigraphic units constituting the Edwards Aquifer crop out, including the outcrops of other geologic formations in proximity to the Edwards Aquifer, where caves, sinkholes, faults, fractures, or other permeable features would create a potential for recharge of surface waters into the Edwards Aquifer. The recharge zone is identified as that area designated as such on official maps located in the offices of the Texas Commission on Environmental Quality (TCEQ) and the appropriate regional office. The Edwards Aquifer Map Viewer, located at [http://www.tceq.texas.gov/compliance/field\\_ops/eapp/mapdisclaimer.html](http://www.tceq.texas.gov/compliance/field_ops/eapp/mapdisclaimer.html), can be used to determine where the recharge zone is located.

**Edwards Aquifer Contributing Zone** - The area or watershed where runoff from precipitation flows downgradient to the recharge zone of the Edwards Aquifer. The contributing zone is located upstream (upgradient) and generally north and northwest of the recharge zone for the following counties: all areas within Kinney County, except the area within the watershed draining to Segment No. 2304 of the Rio Grande Basin; all areas within Uvalde, Medina, Bexar, and Comal Counties; all areas within Hays and Travis Counties, except the area within the watersheds draining to the Colorado River above a point 1.3 miles upstream from Tom Miller Dam, Lake Austin at the confluence of Barrow Brook Cove, Segment No. 1403 of the Colorado River Basin; and all areas within Williamson County, except the area within the watersheds draining to the Lampasas River above the dam at Stillhouse Hollow reservoir, Segment No. 1216 of the Brazos River Basin. The contributing zone is illustrated on the Edwards Aquifer map viewer at [http://www.tceq.texas.gov/compliance/field\\_ops/eapp/mapdisclaimer.html](http://www.tceq.texas.gov/compliance/field_ops/eapp/mapdisclaimer.html).

**Effluent Limitations Guideline (ELG)** – Defined in 40 Code of Federal Regulations (CFR) § 122.2 as a regulation published by the Administrator under § 304(b) of the Clean Water Act (CWA) to adopt or revise effluent limitations.

**Facility or Activity** – For the purpose of this permit, a construction site or construction support activity that is regulated under this general permit, including all contiguous land and fixtures (for example, ponds and materials stockpiles), structures, or appurtenances used at a construction site or industrial site described by this general permit.

**Final Stabilization** - A construction site status where any of the following conditions are met:

- A. All soil disturbing activities at the site have been completed and a uniform (that is, evenly distributed, without large bare areas) perennial vegetative cover with a density of at least 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.
- B. For individual lots in a residential construction site by either:
  - (1) the homebuilder completing final stabilization as specified in condition (a) above; or
  - (2) the homebuilder establishing temporary stabilization for an individual lot prior to the time of transfer of the ownership of the home to the buyer and after informing the homeowner of the need for, and benefits of, final stabilization. If temporary stabilization is not feasible, then the homebuilder may fulfill this requirement by retaining perimeter controls or BMPs, and informing the homeowner of the need for removal of temporary controls and the establishment of final stabilization.

Fullfillment of this requirement must be documented in the homebuilder's stormwater pollution prevention plan (SWP3).

- C. For construction activities on land used for agricultural purposes (such as pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to surface water and areas that are not being returned to their preconstruction agricultural use must meet the final stabilization conditions of condition (a) above.
- D. In arid, semi-arid, and drought-stricken areas only, all soil disturbing activities at the site have been completed and both of the following criteria have been met:
- (1) Temporary erosion control measures (for example, degradable rolled erosion control product) are selected, designed, and installed along with an appropriate seed base to provide erosion control for at least three years without active maintenance by the operator, and
  - (2) The temporary erosion control measures are selected, designed, and installed to achieve 70% of the native background vegetative coverage within three years.

**Hyperchlorination of Waterlines** – Treatment of potable water lines or tanks with chlorine for disinfection purposes, typically following repair or partial replacement of the waterline or tank, and subsequently flushing the contents.

**Impaired Water** - A surface water body that is identified on the latest approved CWA §303(d) List as not meeting applicable state water quality standards. Impaired waters include waters with approved or established total maximum daily loads (TMDLs), and those where a TMDL has been proposed by TCEQ but has not yet been approved or established.

**Indian Country Land** – (from 40 CFR §122.2) (1) all land within the limits of any Indian reservation under the jurisdiction of the United States government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation; (2) all dependent Indian communities with the borders of the United States whether within the originally or subsequently acquired territory thereof, and whether within or without the limits of a state; and (3) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.

**Indian Tribe** - (from 40 CFR §122.2) any Indian Tribe, band, group, or community recognized by the Secretary of the Interior and exercising governmental authority over a Federal Indian Reservation.

**Large Construction Activity** - Construction activities including clearing, grading, and excavating that result in land disturbance of equal to or greater than five (5) acres of land. Large construction activity also includes the disturbance of less than five (5) acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than five (5) acres of land. Large construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site (for example, the routine grading of existing dirt roads, asphalt overlays of existing roads, the routine clearing of existing right-of-ways, and similar maintenance activities.)

**Linear Project** – Includes the construction of roads, bridges, conduits, substructures, pipelines, sewer lines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities in a long, narrow area.

**Minimize** - To reduce or eliminate to the extent achievable using stormwater controls that are technologically available and economically practicable and achievable in light of best industry practices.

**Municipal Separate Storm Sewer System (MS4)** - A separate storm sewer system owned or operated by the United States, a state, city, town, county, district, association, or other public body (created by or pursuant to state law) having jurisdiction over the disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under state law such as a sewer district, flood control or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, that discharges to surface water in the state.

**Notice of Change (NOC)** – Written notification to the executive director from a discharger authorized under this permit, providing changes to information that was previously provided to the agency in a notice of intent form.

**Notice of Intent (NOI)** - A written submission to the executive director from an applicant requesting coverage under this general permit.

**Notice of Termination (NOT)** - A written submission to the executive director from a discharger authorized under a general permit requesting termination of coverage.

**Operator** - The person or persons associated with a large or small construction activity that is either a primary or secondary operator as defined below:

**Primary Operator** – the person or persons associated with a large or small construction activity that meets either of the following two criteria:

- (a) the person or persons have on-site operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
- (b) the person or persons have day-to-day operational control of those activities at a construction site that are necessary to ensure compliance with a Storm Water Pollution Prevention Plan (SWP3) for the site or other permit conditions (for example, they are authorized to direct workers at a site to carry out activities required by the SWP3 or comply with other permit conditions).

**Secondary Operator** – The person or entity, often the property owner, whose operational control is limited to:

- (a) the employment of other operators, such as a general contractor, to perform or supervise construction activities; or
- (b) the ability to approve or disapprove changes to construction plans and specifications, but who does not have day-to-day on-site operational control over construction activities at the site.

Secondary operators must either prepare their own SWP3 or participate in a shared SWP3 that covers the areas of the construction site where they have control over the plans and specifications.

If there is not a primary operator at the construction site, then the secondary operator is defined as the primary operator and must comply with the requirements for primary operators.

**Outfall** - For the purpose of this permit, a point source at the point where stormwater runoff associated with construction activity discharges to surface water in the state and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels, or other conveyances that connect segments of the same stream or other water of the U.S. and are used to convey waters of the U.S.

**Permittee** - An operator authorized under this general permit. The authorization may be gained through submission of a notice of intent, by waiver, or by meeting the requirements for automatic coverage to discharge stormwater runoff and certain non-stormwater discharges.

**Point Source** – (from 40 CFR §122.2) Any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are, or may be, discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

**Pollutant** - Dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, filter backwash, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into any surface water in the state. The term "pollutant" does not include tail water or runoff water from irrigation or rainwater runoff from cultivated or uncultivated rangeland, pastureland, and farmland. For the purpose of this permit, the term "pollutant" includes sediment.

**Pollution** - (from Texas Water Code (TWC) §26.001(14)) The alteration of the physical, thermal, chemical, or biological quality of, or the contamination of, any surface water in the state that renders the water harmful, detrimental, or injurious to humans, animal life, vegetation, or property or to public health, safety, or welfare, or impairs the usefulness or the public enjoyment of the water for any lawful or reasonable purpose.

**Rainfall Erosivity Factor (R factor)** - the total annual erosive potential that is due to climatic effects, and is part of the Revised Universal Soil Loss Equation (RUSLE).

**Receiving Water** - A "Water of the United States" as defined in 40 CFR §122.2 into which the regulated stormwater discharges.

**Semiarid Areas** - areas with an average annual rainfall of 10 to 20 inches

**Separate Storm Sewer System** - A conveyance or system of conveyances (including roads with drainage systems, streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains), designed or used for collecting or conveying stormwater; that is not a combined sewer, and that is not part of a publicly owned treatment works (POTW).

**Small Construction Activity** - Construction activities including clearing, grading, and excavating that result in land disturbance of equal to or greater than one (1) acre and less than five (5) acres of land. Small construction activity also includes the disturbance of less than one (1) acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one (1) and less than five (5) acres of land. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site (for example, the routine grading of existing dirt roads, asphalt overlays of existing roads, the routine clearing of existing right-of-ways, and similar maintenance activities.)

**Steep Slopes** – Where a state, Tribe, local government, or industry technical manual (e.g. stormwater BMP manual) has defined what is to be considered a "steep slope", this permit's definition automatically adopts that definition. Where no such definition exists, steep slopes are automatically defined as those that are 15 percent or greater in grade.

**Stormwater (or Stormwater Runoff)** - Rainfall runoff, snow melt runoff, and surface runoff and drainage.

**Stormwater Associated with Construction Activity** - Stormwater runoff from a construction activity where soil disturbing activities (including clearing, grading, excavating) result in the disturbance of one (1) or more acres of total land area, or are part of a larger common plan of development or sale that will result in disturbance of one (1) or more acres of total land area.

**Structural Control (or Practice)** - A pollution prevention practice that requires the construction of a device, or the use of a device, to reduce or prevent pollution in stormwater

runoff. Structural controls and practices may include but are not limited to: silt fences, earthen dikes, drainage swales, sediment traps, check dams, subsurface drains, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins.

**Surface Water in the State** - Lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, wetlands, marshes, inlets, canals, the Gulf of Mexico inside the territorial limits of the state (from the mean high water mark (MHW) out 10.36 miles into the Gulf), and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, navigable or nonnavigable, and including the beds and banks of all water-courses and bodies of surface water, that are wholly or partially inside or bordering the state or subject to the jurisdiction of the state; except that waters in treatment systems which are authorized by state or federal law, regulation, or permit, and which are created for the purpose of waste treatment are not considered to be water in the state.

**Temporary Stabilization** - A condition where exposed soils or disturbed areas are provided a protective cover or other structural control to prevent the migration of pollutants. Temporary stabilization may include temporary seeding, geotextiles, mulches, and other techniques to reduce or eliminate erosion until either permanent stabilization can be achieved or until further construction activities take place.

**Total Maximum Daily Load (TMDL)** - The total amount of a pollutant that a water body can assimilate and still meet the Texas Surface Water Quality Standards.

**Turbidity** – A condition of water quality characterized by the presence of suspended solids and/or organic material.

**Waters of the United States** - (from 40 CFR §122.2) Waters of the United States or waters of the U.S. means:

- (a) all waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- (b) all interstate waters, including interstate wetlands;
- (c) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds that the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:
  - (1) which are or could be used by interstate or foreign travelers for recreational or other purposes;
  - (2) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
  - (3) which are used or could be used for industrial purposes by industries in interstate commerce;
- (d) all impoundments of waters otherwise defined as waters of the United States under this definition;
- (e) tributaries of waters identified in paragraphs (a) through (d) of this definition;
- (f) the territorial sea; and
- (g) wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR §423.11(m) which also meet the criteria of this definition) are not waters of the U.S. This exclusion applies only to manmade bodies of water which neither were originally created in waters of the U.S. (such as

disposal area in wetlands) nor resulted from the impoundment of waters of the U.S. Waters of the U.S. do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with EPA.

## **Part II. Permit Applicability and Coverage**

### **Section A. Discharges Eligible for Authorization**

#### 1. Stormwater Associated with Construction Activity

Discharges of stormwater runoff from small and large construction activities may be authorized under this general permit.

#### 2. Discharges of Stormwater Associated with Construction Support Activities

Examples of construction support activities include, but are not limited to, concrete batch plants, rock crushers, asphalt batch plants, equipment staging areas, material storage yards, material borrow areas, and excavated material disposal areas.

Construction support activities authorized under this general permit are not commercial operations, and do not serve multiple unrelated construction projects. Discharges of stormwater runoff from construction support activities may be authorized under this general permit, provided that the following conditions are met:

- (a) the activities are located within one (1) mile from the boundary of the permitted construction site and directly support the construction activity;
- (b) an SWP3 is developed for the permitted construction site according to the provisions of this general permit, and includes appropriate controls and measures to reduce erosion and discharge of pollutants in stormwater runoff from the construction support activities; and
- (c) the construction support activities either do not operate beyond the completion date of the construction activity or, at the time that they do, are authorized under separate Texas Pollutant Discharge Elimination System (TPDES) authorization. Separate TPDES authorization may include the TPDES Multi Sector General Permit (MSGP), TXR050000 (related to stormwater discharges associated with industrial activity), separate authorization under this general permit if applicable, coverage under an alternative general permit if available, or authorization under an individual water quality permit.

#### 3. Non-Stormwater Discharges

The following non-stormwater discharges from sites authorized under this general permit are also eligible for authorization under this general permit:

- (a) discharges from fire fighting activities (fire fighting activities do not include washing of trucks, run-off water from training activities, test water from fire suppression systems, or similar activities);
- (b) uncontaminated fire hydrant flushings (excluding discharges of hyperchlorinated water, unless the water is first dechlorinated and discharges are not expected to adversely affect aquatic life), which include flushings from systems that utilize potable water, surface water, or groundwater that does not contain additional pollutants (uncontaminated fire hydrant flushings do not include systems utilizing reclaimed wastewater as a source water);
- (c) water from the routine external washing of vehicles, the external portion of buildings or structures, and pavement, where detergents and soaps are not used, where spills or leaks of toxic or hazardous materials have not occurred (unless spilled materials

have been removed; and if local state, or federal regulations are applicable, the materials are removed according to those regulations), and where the purpose is to remove mud, dirt, or dust;

- (d) uncontaminated water used to control dust;
- (e) potable water sources, including waterline flushings, but excluding discharges of hyperchlorinated water, unless the water is first dechlorinated and discharges are not expected to adversely affect aquatic life;
- (f) uncontaminated air conditioning condensate;
- (g) uncontaminated ground water or spring water, including foundation or footing drains where flows are not contaminated with industrial materials such as solvents; and
- (h) lawn watering and similar irrigation drainage.

#### 4. Other Permitted Discharges

Any discharge authorized under a separate National Pollutant Discharge Elimination System (NPDES), TPDES, or TCEQ permit may be combined with discharges authorized by this general permit, provided those discharges comply with the associated permit.

### **Section B. Concrete Truck Wash Out**

The wash out of concrete trucks at regulated construction sites must be performed in accordance with the requirements of Part V of this general permit.

### **Section C. Limitations on Permit Coverage**

#### 1. Post Construction Discharges

Discharges that occur after construction activities have been completed, and after the construction site and any supporting activity site have undergone final stabilization, are not eligible for coverage under this general permit. Discharges originating from the sites are not authorized under this general permit following the submission of the notice of termination (NOT) or removal of the appropriate site notice, as applicable, for the regulated construction activity.

#### 2. Prohibition of Non-Stormwater Discharges

Except as otherwise provided in Part II.A. of this general permit, only discharges that are composed entirely of stormwater associated with construction activity may be authorized under this general permit.

#### 3. Compliance With Water Quality Standards

Discharges to surface water in the state that would cause, have the reasonable potential to cause, or contribute to a violation of water quality standards or that would fail to protect and maintain existing designated uses are not eligible for coverage under this general permit. The executive director may require an application for an individual permit or alternative general permit (see Parts II.H.2. and 3.) to authorize discharges to surface water in the state if the executive director determines that any activity will cause, has the reasonable potential to cause, or contribute to a violation of water quality standards or is found to cause, has the reasonable potential to cause, or contribute to, the impairment of a designated use. The executive director may also require an application for an individual permit considering factors described in Part II.H.2. of this general permit.



#### 4. Impaired Receiving Waters and Total Maximum Daily Load (TMDL) Requirements

New sources or new discharges of the pollutants of concern to impaired waters are not authorized by this permit unless otherwise allowable under 30 TAC Chapter 305 and applicable state law. Impaired waters are those that do not meet applicable water quality standards and are listed on the EPA approved CWA §303(d) List. Pollutants of concern are those for which the water body is listed as impaired.

Discharges of the pollutants of concern to impaired water bodies for which there is a TMDL are not eligible for this general permit unless they are consistent with the approved TMDL. Permittees must incorporate the conditions and requirements applicable to their discharges into their SWP3, in order to be eligible for coverage under this general permit. For consistency with the construction stormwater-related items in an approved TMDL, the SWP3 must be consistent with any applicable condition, goal, or requirement in the TMDL, TMDL Implementation Plan (I-Plan), or as otherwise directed by the executive director.

#### 5. Discharges to the Edwards Aquifer Recharge or Contributing Zone

Discharges cannot be authorized by this general permit where prohibited by 30 TAC Chapter 213 (relating to Edwards Aquifer). In addition, commencement of construction (i.e., the initial disturbance of soils associated with clearing, grading, or excavating activities, as well as other construction-related activities such as stockpiling of fill material and demolition) at a site regulated under 30 TAC Chapter 213, may not begin until the appropriate Edwards Aquifer Protection Plan (EAPP) has been approved by the TCEQ's Edwards Aquifer Protection Program.

- (a) For new discharges located within the Edwards Aquifer Recharge Zone, or within that area upstream from the recharge zone and defined as the Contributing Zone (CZ), operators must meet all applicable requirements of, and operate according to, 30 TAC Chapter 213 (Edwards Aquifer Rule) in addition to the provisions and requirements of this general permit.
- (b) For existing discharges located within the Edwards Aquifer Recharge Zone, the requirements of the agency-approved Water Pollution Abatement Plan (WPAP) under the Edwards Aquifer Rule is in addition to the requirements of this general permit. BMPs and maintenance schedules for structural stormwater controls, for example, may be required as a provision of the rule. All applicable requirements of the Edwards Aquifer Rule for reductions of suspended solids in stormwater runoff are in addition to the requirements in this general permit for this pollutant.

#### 6. Discharges to Specific Watersheds and Water Quality Areas

Discharges otherwise eligible for coverage cannot be authorized by this general permit where prohibited by 30 TAC Chapter 311 (relating to Watershed Protection) for water quality areas and watersheds.

#### 7. Protection of Streams and Watersheds by Other Governmental Entities

This general permit does not limit the authority or ability of federal, other state, or local governmental entities from placing additional or more stringent requirements on construction activities or discharges from construction activities. For example, this permit does not limit the authority of a home-rule municipality provided by Texas Local Government Code §401.002.

#### 8. Indian Country Lands

Stormwater runoff from construction activities occurring on Indian Country lands are not under the authority of the TCEQ and are not eligible for coverage under this general permit. If discharges of stormwater require authorization under federal NPDES

regulations, authority for these discharges must be obtained from the U.S. Environmental Protection Agency (EPA).

#### 9. Oil and Gas Production

Stormwater runoff from construction activities associated with the exploration, development, or production of oil or gas or geothermal resources, including transportation of crude oil or natural gas by pipeline, are not under the authority of the TCEQ and are not eligible for coverage under this general permit. If discharges of stormwater require authorization under federal NPDES regulations, authority for these discharges must be obtained from the EPA.

#### 10. Stormwater Discharges from Agricultural Activities

Stormwater discharges from agricultural activities that are not point source discharges of stormwater are not subject to TPDES permit requirements. These activities may include clearing and cultivating ground for crops, construction of fences to contain livestock, construction of stock ponds, and other similar agricultural activities. Discharges of stormwater runoff associated with the construction of facilities that are subject to TPDES regulations, such as the construction of concentrated animal feeding operations, would be point sources regulated under this general permit.

#### 11. Endangered Species Act

Discharges that would adversely affect a listed endangered or threatened aquatic or aquatic-dependent species or its critical habitat are not authorized by this permit, unless the requirements of the Endangered Species Act are satisfied. Federal requirements related to endangered species apply to all TPDES permitted discharges and site-specific controls may be required to ensure that protection of endangered or threatened species is achieved. If a permittee has concerns over potential impacts to listed species, the permittee may contact TCEQ for additional information.

#### 12. Other

Nothing in Part II of the general permit is intended to negate any person's ability to assert the force majeure (act of God, war, strike, riot, or other catastrophe) defenses found in 30 TAC §70.7.

### **Section D. Deadlines for Obtaining Authorization to Discharge**

#### 1. Large Construction Activities

- (a) New Construction - Discharges from sites where the commencement of construction occurs on or after the effective date of this general permit must be authorized, either under this general permit or a separate TPDES permit, prior to the commencement of those construction activities.
- (b) Ongoing Construction - Operators of large construction activities continuing to operate after the effective date of this permit, and authorized under TPDES general permit TXR150000 (effective on March 5, 2008), must submit an NOI to renew authorization or a NOT to terminate coverage under this general permit within 90 days of the effective date of this general permit. During this interim period, as a requirement of this TPDES permit, the operator must continue to meet the conditions and requirements of the previous TPDES permit.

#### 2. Small Construction Activities

- (a) New Construction - Discharges from sites where the commencement of construction occurs on or after the effective date of this general permit must be authorized, either

under this general permit or a separate TPDES permit, prior to the commencement of those construction activities.

- (b) Ongoing Construction - Discharges from ongoing small construction activities that commenced prior to the effective date of this general permit, and that would not meet the conditions to qualify for termination of this permit as described in Part II.E. of this general permit, must meet the requirements to be authorized, either under this general permit or a separate TPDES permit, within 90 days of the effective date of this general permit. During this interim period, as a requirement of this TPDES permit, the operator must continue to meet the conditions and requirements of the previous TPDES permit.

### **Section E. Obtaining Authorization to Discharge**

1. Automatic Authorization for Small Construction Activities With Low Potential for Erosion:

If all of the following conditions are met, then a small construction activity is determined to occur during periods of low potential for erosion, and a site operator may be automatically authorized under this general permit without being required to develop an SWP3 or submit an NOI:

- (a) the construction activity occurs in a county listed in Appendix A;
- (b) the construction activity is initiated and completed, including either final or temporary stabilization of all disturbed areas, within the time frame identified in Appendix A for the location of the construction site;
- (c) all temporary stabilization is adequately maintained to effectively reduce or prohibit erosion, permanent stabilization activities have been initiated, and a condition of final stabilization is completed no later than 30 days following the end date of the time frame identified in Appendix A for the location of the construction site;
- (d) the permittee signs a completed TCEQ construction site notice, including the certification statement;
- (e) a signed copy of the construction site notice is posted at the construction site in a location where it is readily available for viewing by the general public, local, state, and federal authorities prior to commencing construction activities, and maintained in that location until completion of the construction activity;
- (f) a copy of the signed and certified construction site notice is provided to the operator of any MS4 receiving the discharge at least two days prior to commencement of construction activities;
- (g) any supporting concrete batch plant or asphalt batch plant is separately authorized for discharges of stormwater runoff or other non-stormwater discharges under an individual TPDES permit, another TPDES general permit, or under an individual TCEQ permit where stormwater and non-stormwater is disposed of by evaporation or irrigation (discharges are adjacent to water in the state); and
- (h) any non-stormwater discharges are either authorized under a separate permit or authorization, or are not considered to be a wastewater.

Part II.G. of this general permit describes how an operator may apply for and obtain a waiver from permitting, for certain small construction activities that occur during a period with a low potential for erosion, where automatic authorization under this section is not available.

## 2. Automatic Authorization For All Other Small Construction Activities:

Operators of small construction activities not described in Part II.E.1. above may be automatically authorized under this general permit, and operators of these sites shall not be required to submit an NOI, provided that they meet all of the following conditions:

- (a) develop a SWP3 according to the provisions of this general permit, that covers either the entire site or all portions of the site for which the applicant is the operator, and implement that plan prior to commencing construction activities;
- (b) sign and certify a completed TCEQ small construction site notice, post the notice at the construction site in a location where it is safely and readily available for viewing by the general public, local, state, and federal authorities, prior to commencing construction, and maintain the notice in that location until completion of the construction activity (for linear construction activities, e.g. pipeline or highway, the site notice must be placed in a publicly accessible location near where construction is actively underway; notice for these linear sites may be relocated, as necessary, along the length of the project, and the notice must be safely and readily available for viewing by the general public; local, state, and federal authorities); and
- (c) provide a copy of the signed and certified construction site notice to the operator of any municipal separate storm sewer system receiving the discharge prior to commencement of construction activities.

Operators of small construction activities as defined in Part I.B of this general permit shall not submit an NOI for coverage unless otherwise required by the executive director.

As described in Part I (Definitions) of this general permit, large construction activities include those that will disturb less than five (5) acres of land, but that are part of a larger common plan of development or sale that will ultimately disturb five (5) or more acres of land, and must meet the requirements of Part II.E.3. below.

## 3. Authorization for Large Construction Activities:

Operators of large construction activities that qualify for coverage under this general permit must meet all of the following conditions:

- (a) develop a SWP3 according to the provisions of this general permit that covers either the entire site or all portions of the site for which the applicant is the operator, and implement that plan prior to commencing construction activities;
- (b) primary operators must submit an NOI, using a form provided by the executive director, at least seven (7) days prior to commencing construction activities, or if utilizing electronic submittal, prior to commencing construction activities. If an additional primary operator is added after the initial NOI is submitted, the new primary operator must submit an NOI at least seven (7) days before assuming operational control, or if utilizing electronic NOI submittal, prior to assuming operational control. If the primary operator changes after the initial NOI is submitted, the new primary operator must submit a paper NOI or an electronic NOI at least ten (10) days before assuming operational control;
- (c) all operators of large construction activities must post a site notice in accordance with Part III.D.2. of this permit. The site notice must be located where it is safely and readily available for viewing by the general public, local, state, and federal authorities prior to commencing construction, and must be maintained in that location until completion of the construction activity (for linear construction activities, e.g. pipeline or highway, the site notice must be placed in a publicly accessible location near where construction is actively underway; notice for these linear sites may be relocated, as necessary, along the length of the project, and the notice must be safely and readily available for viewing by the general public; local, state, and federal authorities);

- (d) prior to commencing construction activities, all primary operators must (1) provide a copy of the signed NOI to the operator of any MS4 receiving the discharge and to any secondary construction operator, and (2) list in the SWP3 the names and addresses of all MS4 operators receiving a copy;
- (e) all persons meeting the definition of “secondary operator” in Part I of this permit are hereby notified that they are regulated under this general permit, but are not required to submit an NOI, provided that a primary operator at the site has submitted an NOI, or is required to submit an NOI, and the secondary operator has provided notification to the operator(s) of the need to obtain coverage (with records of notification available upon request). Any secondary operator notified under this provision may alternatively submit an NOI under this general permit, may seek coverage under an alternative TPDES individual permit, or may seek coverage under an alternative TPDES general permit if available; and
- (f) all secondary operators must provide a copy of the signed and certified Secondary Operator construction site notice to the operator of any MS4 receiving the discharge prior to commencement of construction activities.

#### 4. Waivers for Small Construction Activities:

Part II.G. describes how operators of certain small construction activities may obtain a waiver from coverage.

#### 5. Effective Date of Coverage

- (a) Operators of small construction activities as described in either Part II.E.1. or II.E.2. above are authorized immediately following compliance with the applicable conditions of Part II.E.1. or II.E.2. Secondary operators of large construction activities as described in Part II.E.3. above are authorized immediately following compliance with the applicable conditions in Part II.E.3. For activities located in areas regulated by 30 TAC Chapter 213, related to the Edwards Aquifer, this authorization to discharge is separate from the requirements of the operator’s responsibilities under that rule. Construction may not commence for sites regulated under 30 TAC Chapter 213 until all applicable requirements of that rule are met.
- (b) Primary operators of large construction activities as described in Part II.E.3. above are provisionally authorized seven (7) days from the date that a completed NOI is postmarked for delivery to the TCEQ, unless otherwise notified by the executive director. If electronic submission of the NOI is provided, and unless otherwise notified by the executive director, primary operators are authorized immediately following confirmation of receipt of the NOI by the TCEQ. Authorization is non-provisional when the executive director finds the NOI is administratively complete and an authorization number is issued for the activity. For activities located in areas regulated by 30 TAC Chapter 213, related to the Edwards Aquifer, this authorization to discharge is separate from the requirements of the operator’s responsibilities under that rule. Construction may not commence for sites regulated under 30 TAC Chapter 213 until all applicable requirements of that rule are met.
- (c) Operators are not prohibited from submitting late NOIs or posting late notices to obtain authorization under this general permit. The TCEQ reserves the right to take appropriate enforcement actions for any unpermitted activities that may have occurred between the time construction commenced and authorization was obtained.

#### 6. Notice of Change (NOC)

If relevant information provided in the NOI changes, an NOC must be submitted at least 14 days before the change occurs, if possible. Where 14-day advance notice is not possible, the operator must submit an NOC within 14 days of discovery of the change. If

the operator becomes aware that it failed to submit any relevant facts or submitted incorrect information in an NOI, the correct information must be provided to the executive director in an NOC within 14 days after discovery. The NOC shall be submitted on a form provided by the executive director, or by letter if an NOC form is not available. A copy of the NOC must also be provided to the operator of any MS4 receiving the discharge, and a list must be included in the SWP3 that includes the names and addresses of all MS4 operators receiving a copy.

Information that may be included on an NOC includes, but is not limited to, the following: the description of the construction project, an increase in the number of acres disturbed (for increases of one or more acres), or the operator name. A transfer of operational control from one operator to another, including a transfer of the ownership of a company, may not be included in an NOC.

A transfer of ownership of a company includes changes to the structure of a company, such as changing from a partnership to a corporation or changing corporation types, so that the filing number (or charter number) that is on record with the Texas Secretary of State must be changed.

An NOC is not required for notifying TCEQ of a decrease in the number of acres disturbed. This information must be included in the SWP3 and retained on site.

#### 7. Signatory Requirement for NOI Forms, Notice of Termination (NOT) Forms, NOC Letters, and Construction Site Notices

NOI forms, NOT forms, NOC letters, and Construction Site Notices that require a signature must be signed according to 30 TAC § 305.44 (relating to Signatories for Applications).

#### 8. Contents of the NOI

The NOI form shall require, at a minimum, the following information:

- (a) the TPDES CGP authorization number for existing authorizations under this general permit, where the operator submits an NOI to renew coverage within 90 days of the effective date of this general permit;
- (b) the name, address, and telephone number of the operator filing the NOI for permit coverage;
- (c) the name (or other identifier), address, county, and latitude/longitude of the construction project or site;
- (d) the number of acres that will be disturbed by the applicant;
- (e) confirmation that the project or site will not be located on Indian Country lands;
- (f) confirmation that a SWP3 has been developed in accordance with this general permit, that it will be implemented prior to construction, and that it is compliant with any applicable local sediment and erosion control plans; for multiple operators who prepare a shared SWP3, the confirmation for an operator may be limited to its obligations under the SWP3 provided all obligations are confirmed by at least one operator;
- (g) name of the receiving water(s);
- (h) the classified segment number for each classified segment that receives discharges from the regulated construction activity (if the discharge is not directly to a classified segment, then the classified segment number of the first classified segment that those discharges reach); and
- (i) the name of all surface waters receiving discharges from the regulated construction activity that are on the latest EPA-approved CWA § 303(d) List of impaired waters.

## **Section F. Terminating Coverage**

### **1. Notice of Termination (NOT) Required**

Each operator that has submitted an NOI for authorization under this general permit must apply to terminate that authorization following the conditions described in this section of the general permit. Authorization must be terminated by submitting an NOT on a form supplied by the executive director. Authorization to discharge under this general permit terminates at midnight on the day the NOT is postmarked for delivery to the TCEQ. If electronic submission of the NOT is provided, authorization to discharge under this permit terminates immediately following confirmation of receipt of the NOT by the TCEQ. Compliance with the conditions and requirements of this permit is required until an NOT is submitted.

The NOT must be submitted to TCEQ, and a copy of the NOT provided to the operator of any MS4 receiving the discharge (with a list in the SWP3 of the names and addresses of all MS4 operators receiving a copy), within 30 days after any of the following conditions are met:

- (a) final stabilization has been achieved on all portions of the site that are the responsibility of the permittee;
- (b) a transfer of operational control has occurred (See Section II.F.4. below); or
- (c) the operator has obtained alternative authorization under an individual TPDES permit or alternative TPDES general permit.

### **2. Minimum Contents of the NOT**

The NOT form shall require, at a minimum, the following information:

- (a) if authorization was granted following submission of an NOI, the permittee's site-specific TPDES authorization number for the construction site;
- (b) an indication of whether the construction activity is completed or if the permittee is simply no longer an operator at the site;
- (c) the name, address, and telephone number of the permittee submitting the NOT;
- (d) the name (or other identifier), address, county, and location (latitude/longitude) of the construction project or site; and
- (e) a signed certification that either all stormwater discharges requiring authorization under this general permit will no longer occur, or that the applicant is no longer the operator of the facility or construction site, and that all temporary structural erosion controls have either been removed, will be removed on a schedule defined in the SWP3, or have been transferred to a new operator if the new operator has applied for permit coverage. Erosion controls that are designed to remain in place for an indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal.

### **3. Termination of Coverage for Small Construction Sites and for Secondary Operators at Large Construction Sites**

Each operator that has obtained automatic authorization and has not been required to submit an NOI must remove the site notice upon meeting any of the conditions listed below, complete the applicable portion of the site notice related to removal of the site notice, and submit a copy of the completed site notice to the operator of any MS4 receiving the discharge (or provide alternative notification as allowed by the MS4 operator, with documentation of such notification included in the SWP3), within 30 days of meeting any of the following conditions:

- (a) final stabilization has been achieved on all portions of the site that are the responsibility of the permittee;
- (b) a transfer of operational control has occurred (See Section II.F.4. below); or
- (c) the operator has obtained alternative authorization under an individual or general TPDES permit.

Authorization to discharge under this general permit terminates immediately upon removal of the applicable site notice. Compliance with the conditions and requirements of this permit is required until the site notice is removed.

#### 4. Transfer of Operational Control

Coverage under this general permit is not transferable. A transfer of operational control includes changes to the structure of a company, such as changing from a partnership to a corporation, or changing to a different corporation type such that a different filing (or charter) number is established with the Texas Secretary of State.

When the primary operator of a large construction activity changes or operational control is transferred, the original operator must submit an NOT within ten (10) days prior to the date that responsibility for operations terminates, and the new operator must submit an NOI at least ten (10) days prior to the transfer of operational control, in accordance with condition (a) or (b) below. A copy of the NOT must be provided to the operator of any MS4 receiving the discharge in accordance with Section II.F.1. above.

Operators of regulated construction activities who are not required to submit an NOI must remove the original site notice, and the new operator must post the required site notice prior to the transfer of operational control, in accordance with condition (a) or (b) below. A copy of the completed site notice must be provided to the operator of any MS4 receiving the discharge, in accordance with Section II.F.3. above.

A transfer of operational control occurs when either of the following criteria is met:

- (a) Another operator has assumed control over all areas of the site that have not been finally stabilized; and all silt fences and other temporary erosion controls have either been removed, scheduled for removal as defined in the SWP3, or transferred to a new operator, provided that the permitted operator has attempted to notify the new operator in writing of the requirement to obtain permit coverage. Record of this notification (or attempt at notification) shall be retained by the operator in accordance with Part VI of this permit. Erosion controls that are designed to remain in place for an indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal.
- (b) A homebuilder has purchased one or more lots from an operator who obtained coverage under this general permit for a common plan of development or sale. The homebuilder is considered a new operator and shall comply with the requirements listed above, including the development of a SWP3 if necessary. Under these circumstances, the homebuilder is only responsible for compliance with the general permit requirements as they apply to lot(s) it has operational control over, and the original operator remains responsible for common controls or discharges, and must amend its SWP3 to remove the lot(s) transferred to the homebuilder.

### **Section G. Waivers from Coverage**

The executive director may waive the otherwise applicable requirements of this general permit for stormwater discharges from small construction activities under the terms and conditions described in this section.



### 1. Waiver Applicability and Coverage

Operators of small construction activities may apply for and receive a waiver from the requirements to obtain authorization under this general permit, where all of the following conditions are met. This waiver from coverage does not apply to non-stormwater discharges. The operator must insure that any non-stormwater discharges are either authorized under a separate permit or authorization, or are not considered to be a wastewater.

- (a) the calculated rainfall erosivity (R) factor for the entire period of the construction project is less than five (5);
- (b) the operator submits to the TCEQ a signed waiver certification form, supplied by the executive director, certifying that the construction activity will commence and be completed within a period when the value of the calculated R factor is less than five (5); and
- (c) the waiver certification form is postmarked for delivery to the TCEQ at least seven (7) days before construction activity begins or, if electronic filing is available, then any time following the receipt of written confirmation from TCEQ that a complete electronic application was submitted and acknowledged.

### 2. Steps to Obtaining a Waiver

The construction site operator may calculate the R factor to request a waiver using the following steps:

- (a) Estimate the construction start date and the construction end date. The construction end date is the date that final stabilization will be achieved.
- (b) Find the appropriate Erosivity Index (EI) zone in Appendix B of this permit.
- (c) Find the EI percentage for the project period by adding the results for each period of the project using the table provided in Appendix D of this permit, in EPA Fact Sheet 2.1, or in USDA Handbook 703, by subtracting the start value from the end value to find the percent EI for the site.
- (d) Refer to the Isoerodent Map (Appendix C of this permit) and interpolate the annual isoerodent value for the proposed construction location.
- (e) Multiply the percent value obtained in Step (c) above by the annual isoerodent value obtained in Step (d). This is the R factor for the proposed project. If the value is less than 5, then a waiver may be obtained. If the value is five (5) or more, then a waiver may not be obtained, and the operator must obtain coverage under Part II.E.2. of this permit.

Alternatively, the operator may calculate a site-specific R factor utilizing the following online calculator: <http://ei.tamu.edu/index.html>, or using another available resource.

The waiver certification form is not required to be posted at the small construction site.

### 3. Effective Date of Waiver

Operators of small construction activities are provisionally waived from the otherwise applicable requirements of this general permit seven (7) days from the date that a completed waiver certification form is postmarked for delivery to TCEQ, or immediately upon receiving confirmation of approval of an electronic submittal, if electronic form submittals are available.

### 4. Activities Extending Beyond the Waiver Period

If a construction activity extends beyond the approved waiver period due to circumstances beyond the control of the operator, the operator must either:

- (a) recalculate the R factor using the original start date and a new projected ending date, and if the R factor is still under five (5), submit a new waiver certification form at least two (2) days before the end of the original waiver period; or
- (b) obtain authorization under this general permit according to the requirements delineated in either Part II.E.2. or Part II.E.3. before the end of the approved waiver period.

## **Section H. Alternative TPDES Permit Coverage**

### **1. Individual Permit Alternative**

Any discharge eligible for coverage under this general permit may alternatively be authorized under an individual TPDES permit according to 30 TAC §305 (relating to Consolidated Permits). Applications for individual permit coverage should be submitted at least three hundred and thirty (330) days prior to commencement of construction activities to ensure timely authorization.

### **2. Individual Permit Required**

The executive director may suspend an authorization or deny an NOI in accordance with the procedures set forth in 30 TAC §205 (relating to General Permits for Waste Discharges), including the requirement that the executive director provide written notice to the permittee. The executive director may require an operator of a construction site, otherwise eligible for authorization under this general permit, to apply for an individual TPDES permit in the following circumstances:

- (a) the conditions of an approved TMDL or TMDL I-Plan on the receiving water;
- (b) the activity being determined to cause a violation of water quality standards or being found to cause, or contribute to, the loss of a designated use of surface water in the state; and
- (c) any other consideration defined in 30 TAC Chapter 205 (relating to General Permits for Waste Discharges) including 30 TAC Chapter 205.4(c)(3)(D), which allows the commission to deny authorization under the general permit and require an individual permit if a discharger “has been determined by the executive director to have been out of compliance with any rule, order, or permit of the commission, including non-payment of fees assessed by the executive director.”

Additionally, the executive director may cancel, revoke, or suspend authorization to discharge under this general permit based on a finding of historical and significant noncompliance with the provisions of this general permit, relating to 30 TAC §60.3 (Use of Compliance History). Denial of authorization to discharge under this general permit or suspension of a permittee’s authorization under this general permit shall be done according to commission rules in 30 TAC Chapter 205 (relating to General Permits for Waste Discharges).

### **3. Alternative Discharge Authorization**

Any discharge eligible for authorization under this general permit may alternatively be authorized under a separate general permit according to 30 TAC Chapter 205 (relating to General Permits for Waste Discharges), if applicable.

## **Section I. Permit Expiration**

1. This general permit is effective for a term not to exceed five (5) years. All active discharge authorizations expire on the date provided on page one (1) of this permit. Following public notice and comment, as provided by 30 TAC §205.3 (relating to

Public Notice, Public Meetings, and Public Comment), the commission may amend, revoke, cancel, or renew this general permit.

2. If the executive director publishes a notice of the intent to renew or amend this general permit before the expiration date, the permit will remain in effect for existing, authorized discharges until the commission takes final action on the permit. Upon issuance of a renewed or amended permit, permittees may be required to submit an NOI within 90 days following the effective date of the renewed or amended permit, unless that permit provides for an alternative method for obtaining authorization.
3. If the commission does not propose to reissue this general permit within 90 days before the expiration date, permittees shall apply for authorization under an individual permit or an alternative general permit. If the application for an individual permit is submitted before the expiration date, authorization under this expiring general permit remains in effect until the issuance or denial of an individual permit. No new NOIs will be accepted nor new authorizations honored under the general permit after the expiration date.

### **Part III. Stormwater Pollution Prevention Plans (SWP3)**

All regulated construction site operators shall prepare an SWP3, prior to submittal of an NOI, to address discharges authorized under Parts II.E.2. and II.E.3. of this general permit that will reach Waters of the U.S., including discharges to MS4s and privately owned separate storm sewer systems that drain to Waters of the U.S., to identify and address potential sources of pollution that are reasonably expected to affect the quality of discharges from the construction site, including off-site material storage areas, overburden and stockpiles of dirt, borrow areas, equipment staging areas, vehicle repair areas, fueling areas, etc., used solely by the permitted project. The SWP3 must describe the implementation of practices that will be used to minimize to the extent practicable the discharge of pollutants in stormwater associated with construction activity and non-stormwater discharges described in Part II.A.3., in compliance with the terms and conditions of this permit.

Individual operators at a site may develop separate SWP3s that cover only their portion of the project, provided reference is made to the other operators at the site. Where there is more than one SWP3 for a site, permittees must coordinate to ensure that BMPs and controls are consistent and do not negate or impair the effectiveness of each other. Regardless of whether a single comprehensive SWP3 is developed or separate SWP3s are developed for each operator, it is the responsibility of each operator to ensure compliance with the terms and conditions of this general permit in the areas of the construction site where that operator has control over construction plans and specifications or day-to-day operations.

#### **Section A. Shared SWP3 Development**

For more effective coordination of BMPs and opportunities for cost sharing, a cooperative effort by the different operators at a site is encouraged. Operators must independently obtain authorization, but may work together to prepare and implement a single, comprehensive SWP3 for the entire construction site.

1. The SWP3 must clearly list the name and, for large construction activities, the general permit authorization numbers, for each operator that participates in the shared SWP3. Until the TCEQ responds to receipt of the NOI with a general permit authorization number, the SWP3 must specify the date that the NOI was submitted to TCEQ by each operator. Each operator participating in the shared plan must also sign the SWP3.

2. The SWP3 must clearly indicate which operator is responsible for satisfying each shared requirement of the SWP3. If the responsibility for satisfying a requirement is not described in the plan, then each permittee is entirely responsible for meeting the requirement within the boundaries of the construction site where they perform construction activities. The SWP3 must clearly describe responsibilities for meeting each requirement in shared or common areas.
3. The SWP3 may provide that one operator is responsible for preparation of a SWP3 in compliance with the CGP, and another operator is responsible for implementation of the SWP3 at the project site.

### **Section B. Responsibilities of Operators**

1. Secondary Operators and Primary Operators with Control Over Construction Plans and Specifications

All secondary operators and primary operators with control over construction plans and specifications shall:

- (a) ensure the project specifications allow or provide that adequate BMPs are developed to meet the requirements of Part III of this general permit;
- (b) ensure that the SWP3 indicates the areas of the project where they have control over project specifications, including the ability to make modifications in specifications;
- (c) ensure that all other operators affected by modifications in project specifications are notified in a timely manner so that those operators may modify their BMPs as necessary to remain compliant with the conditions of this general permit; and
- (d) ensure that the SWP3 for portions of the project where they are operators indicates the name and site-specific TPDES authorization number(s) for operators with the day-to-day operational control over those activities necessary to ensure compliance with the SWP3 and other permit conditions. If the party with day-to-day operational control has not been authorized or has abandoned the site, the person with control over project specifications is considered to be the responsible party until the authority is transferred to another party and the SWP3 is updated.

2. Primary Operators with Day-to-Day Operational Control

Primary operators with day-to-day operational control of those activities at a project that are necessary to ensure compliance with an SWP3 and other permit conditions must ensure that the SWP3 accomplishes the following requirements:

- (a) meets the requirements of this general permit for those portions of the project where they are operators;
- (b) identifies the parties responsible for implementation of BMPs described in the SWP3;
- (c) indicates areas of the project where they have operational control over day-to-day activities; and
- (d) includes, for areas where they have operational control over day-to-day activities, the name and site-specific TPDES authorization number of the parties with control over project specifications, including the ability to make modifications in specifications.

### **Section C. Deadlines for SWP3 Preparation, Implementation, and Compliance**

The SWP3 must be prepared prior to obtaining authorization under this general permit, and implemented prior to commencing construction activities that result in soil

disturbance. The SWP3 must be prepared so that it provides for compliance with the terms and conditions of this general permit.

#### **Section D. Plan Review and Making Plans Available**

1. The SWP3 must be retained on-site at the construction site or, if the site is inactive or does not have an on-site location to store the plan, a notice must be posted describing the location of the SWP3. The SWP3 must be made readily available at the time of an on-site inspection to: the executive director; a federal, state, or local agency approving sediment and erosion plans, grading plans, or stormwater management plans; local government officials; and the operator of a municipal separate storm sewer receiving discharges from the site. If the SWP3 is retained off-site, then it shall be made available as soon as reasonably possible. In most instances, it is reasonable that the SWP3 shall be made available within 24 hours of the request.
2. A primary operator of a large construction activity must post the TCEQ site notice near the main entrance of the construction site. An operator of a small construction activity seeking authorization under this general permit and a secondary operator of a large construction activity must post the TCEQ site notice required in Part II.E.1., 2., or 3. of this general permit in order to obtain authorization. If the construction project is a linear construction project, such as a pipeline or highway, the notices must be placed in a publicly accessible location near where construction is actively underway. Notices for these linear sites may be relocated, as necessary, along the length of the project. The notices must be readily available for viewing by the general public; local, state, and federal authorities; and contain the following information:
  - (a) the site-specific TPDES authorization number for the project if assigned;
  - (b) the operator name, contact name, and contact phone number;
  - (c) a brief description of the project; and
  - (d) the location of the SWP3.
3. This permit does not provide the general public with any right to trespass on a construction site for any reason, including inspection of a site; nor does this permit require that permittees allow members of the general public access to a construction site.

#### **Section E. Revisions and Updates to SWP3s**

The permittee must revise or update the SWP3 whenever the following occurs:

1. a change in design, construction, operation, or maintenance that has a significant effect on the discharge of pollutants and that has not been previously addressed in the SWP3;
2. changing site conditions based on updated plans and specifications, new operators, new areas of responsibility, and changes in BMPs; or
3. results of inspections or investigations by site operators, operators of a municipal separate storm sewer system receiving the discharge, authorized TCEQ personnel, or a federal, state or local agency approving sediment and erosion plans indicate the SWP3 is proving ineffective in eliminating or significantly minimizing pollutants in discharges authorized under this general permit.

#### **Section F. Contents of SWP3**

The SWP3 must include, at a minimum, the information described in this section and must comply with the construction and development effluent guidelines in Part III, Section G of the general permit.

1. A site or project description, which includes the following information:
  - (a) a description of the nature of the construction activity;
  - (b) a list of potential pollutants and their sources;
  - (c) a description of the intended schedule or sequence of activities that will disturb soils for major portions of the site, including estimated start dates and duration of activities;
  - (d) the total number of acres of the entire property and the total number of acres where construction activities will occur, including off-site material storage areas, overburden and stockpiles of dirt, and borrow areas that are authorized under the permittee's NOI;
  - (e) data describing the soil or the quality of any discharge from the site;
  - (f) a map showing the general location of the site (e.g. a portion of a city or county map);
  - (g) a detailed site map (or maps) indicating the following:
    - (i) drainage patterns and approximate slopes anticipated after major grading activities;
    - (ii) areas where soil disturbance will occur;
    - (iii) locations of all controls and buffers, either planned or in place;
    - (iv) locations where temporary or permanent stabilization practices are expected to be used;
    - (v) locations of construction support activities, including off-site activities, that are authorized under the permittee's NOI, including material, waste, borrow, fill, or equipment or chemical storage areas;
    - (vi) surface waters (including wetlands) either at, adjacent, or in close proximity to the site, and also indicating those that are impaired waters;
    - (vii) locations where stormwater discharges from the site directly to a surface water body or a municipal separate storm sewer system;
    - (viii) vehicle wash areas; and
    - (ix) designated points on the site where vehicles will exit onto paved roads (for instance, this applies to construction transition from unstable dirt areas to exterior paved roads).

Where the amount of information required to be included on the map would result in a single map being difficult to read and interpret, the operator shall develop a series of maps that collectively include the required information.

- (h) the location and description of support activities authorized under the permittee's NOI, including asphalt plants, concrete plants, and other activities providing support to the construction site that is authorized under this general permit;
- (i) the name of receiving waters at or near the site that may be disturbed or that may receive discharges from disturbed areas of the project;
- (j) a copy of this TPDES general permit;
- (k) the NOI and acknowledgement certificate for primary operators of large construction sites, and the site notice for small construction sites and for secondary operators of large construction sites;
- (l) stormwater and allowable non-stormwater discharge locations, including storm drain inlets on site and in the immediate vicinity of the construction site; and

- (m) locations of all pollutant-generating activities, such as paving operations; concrete, paint and stucco washout and water disposal; solid waste storage and disposal; and dewatering operations.
2. A description of the BMPs that will be used to minimize pollution in runoff.
- The description must identify the general timing or sequence for implementation. At a minimum, the description must include the following components:
- (a) General Requirements
    - (i) Erosion and sediment controls must be designed to retain sediment on-site to the extent practicable with consideration for local topography, soil type, and rainfall.
    - (ii) Control measures must be properly selected, installed, and maintained according to the manufacturer's or designer's specifications.
    - (iii) Controls must be developed to minimize the offsite transport of litter, construction debris, and construction materials.

(b) Erosion Control and Stabilization Practices

The SWP3 must include a description of temporary and permanent erosion control and stabilization practices for the site, compliant with the requirements of Part III.G.1 and G.2 of this general permit, including a schedule of when the practices will be implemented. Site plans should ensure that existing vegetation is preserved where it is possible.

- (i) Erosion control and stabilization practices may include but are not limited to: establishment of temporary or permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of existing trees and vegetation, slope texturing, temporary velocity dissipation devices, flow diversion mechanisms, and other similar measures.
- (ii) The following records must be maintained and either attached to or referenced in the SWP3, and made readily available upon request to the parties listed in Part III.D.1 of this general permit:
  - (A) the dates when major grading activities occur;
  - (B) the dates when construction activities temporarily or permanently cease on a portion of the site; and
  - (C) the dates when stabilization measures are initiated.
- (iii) Erosion control and stabilization measures must be initiated immediately in portions of the site where construction activities have temporarily ceased and will not resume for a period exceeding 14 calendar days. Stabilization measures that provide a protective cover must be initiated immediately in portions of the site where construction activities have permanently ceased. The term "immediately" is used to define the deadline for initiating stabilization measures. In the context of this requirement, "immediately" means as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased. Except as provided in (A) through (D) below, these measures must be completed as soon as practicable, but no more than 14 calendar days after the initiation of soil stabilization measures:
  - (A) Where the immediate initiation of stabilization measures after construction activity temporarily or permanently ceased is precluded

by snow cover or frozen ground conditions, stabilization measures must be initiated as soon as practicable.

- (B) In arid areas, semi-arid areas, or drought-stricken areas where the immediate initiation of stabilization measures after construction activity has temporarily or permanently ceased or is precluded by arid conditions, erosion control and stabilization measures must be initiated as soon as practicable. Where vegetative controls are not feasible due to arid conditions, the operator shall immediately install, and within 14 calendar days of a temporary or permanent cessation of work in any portion of the site complete, non-vegetative erosion controls. If non-vegetative controls are not feasible, the operator shall install temporary sediment controls as required in Paragraph (C) below.
  - (C) In areas where temporary stabilization measures are infeasible, the operator may alternatively utilize temporary perimeter controls. The operator must document in the SWP3 the reason why stabilization measures are not feasible, and must demonstrate that the perimeter controls will retain sediment on site to the extent practicable. The operator must continue to inspect the BMPs at the frequency established in Section III.F.7.(a) for unstabilized sites.
  - (D) If the initiation or completion of vegetative stabilization is affected by circumstances beyond the control of the permittee, vegetative stabilization must be initiated or completed as soon as conditions or circumstances allow it on the site. The requirement to initiate stabilization is triggered as soon as it is known with reasonable certainty that work will be stopped for 14 or more additional calendar days.
- (iv) Final stabilization must be achieved prior to termination of permit coverage.
  - (v) TCEQ does not expect that temporary or permanent stabilization measures to be applied to areas that are intended to be left un-vegetated or unstabilized following construction (e.g., dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, or materials).
- (c) Sediment Control Practices

The SWP3 must include a description of any sediment control practices used to remove eroded soils from stormwater runoff, including the general timing or sequence for implementation of controls.

- (i) Sites With Drainage Areas of Ten or More Acres

- (A) Sedimentation Basin(s)

- (1) A sedimentation basin is required, where feasible, for a common drainage location that serves an area with ten (10) or more acres disturbed at one time. A sedimentation basin may be temporary or permanent, and must provide sufficient storage to contain a calculated volume of runoff from a 2-year, 24-hour storm from each disturbed acre drained. When calculating the volume of runoff from a 2-year, 24-hour storm event, it is not required to include the flows from offsite areas and flow from onsite areas that are either undisturbed or have already undergone permanent stabilization, if these flows are diverted around both the disturbed areas of the site and the sediment basin. Capacity calculations shall be included in the SWP3.



- (2) Where rainfall data is not available or a calculation cannot be performed, the sedimentation basin must provide at least 3,600 cubic feet of storage per acre drained until final stabilization of the site.
        - (3) If a sedimentation basin is not feasible, then the permittee shall provide equivalent control measures until final stabilization of the site. In determining whether installing a sediment basin is feasible, the permittee may consider factors such as site soils, slope, available area, public safety, precipitation patterns, site geometry, site vegetation, infiltration capacity, geotechnical factors, depth to groundwater, and other similar considerations. The permittee shall document the reason that the sediment basins are not feasible, and shall utilize equivalent control measures, which may include a series of smaller sediment basins.
        - (4) Unless infeasible, when discharging from sedimentation basins and impoundments, the permittee shall utilize outlet structures that withdraw water from the surface.
      - (B) Perimeter Controls: At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries of the construction area, and for those side slope boundaries deemed appropriate as dictated by individual site conditions.
    - (ii) Controls for Sites With Drainage Areas Less than Ten Acres:
      - (A) Sediment traps and sediment basins may be used to control solids in stormwater runoff for drainage locations serving less than ten (10) acres. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries of the construction area, and for those side slope boundaries deemed appropriate as dictated by individual site conditions.
      - (B) Alternatively, a sediment basin that provides storage for a calculated volume of runoff from a 2-year, 24-hour storm from each disturbed acre drained may be utilized. Where rainfall data is not available or a calculation cannot be performed, a temporary or permanent sediment basin providing 3,600 cubic feet of storage per acre drained may be provided. If a calculation is performed, then the calculation shall be included in the SWP<sub>3</sub>.
      - (C) If sedimentation basins or impoundments are used, the permittee shall comply with the requirements in Part III.G.6 of this general permit.
3. Description of Permanent Stormwater Controls

A description of any measures that will be installed during the construction process to control pollutants in stormwater discharges that may occur after construction operations have been completed must be included in the SWP<sub>3</sub>. Permittees are only responsible for the installation and maintenance of stormwater management measures prior to final stabilization of the site or prior to submission of an NOT.
4. Other Required Controls and BMPs
  - (a) Permittees shall minimize, to the extent practicable, the off-site vehicle tracking of sediments and the generation of dust. The SWP<sub>3</sub> shall include a description of controls utilized to accomplish this requirement.

- (b) The SWP3 must include a description of construction and waste materials expected to be stored on-site and a description of controls to minimize pollutants from these materials.
  - (c) The SWP3 must include a description of potential pollutant sources from areas other than construction (such as stormwater discharges from dedicated asphalt plants and dedicated concrete batch plants), and a description of controls and measures that will be implemented at those sites to minimize pollutant discharges.
  - (d) Permittees shall place velocity dissipation devices at discharge locations and along the length of any outfall channel (i.e., runoff conveyance) to provide a non-erosive flow velocity from the structure to a water course, so that the natural physical and biological characteristics and functions are maintained and protected.
  - (e) Permittees shall design and utilize appropriate controls to minimize the offsite transport of suspended sediments and other pollutants if it is necessary to pump or channel standing water from the site.
  - (f) Permittees shall ensure that all other required controls and BMPs comply with all of the requirements of Part III.G of this general permit.
5. Documentation of Compliance with Approved State and Local Plans
- (a) Permittees must ensure that the SWP3 is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or stormwater management site plans or site permits approved by federal, state, or local officials.
  - (b) SWP3s must be updated as necessary to remain consistent with any changes applicable to protecting surface water resources in sediment erosion site plans or site permits, or stormwater management site plans or site permits approved by state or local official for which the permittee receives written notice.
  - (c) If the permittee is required to prepare a separate management plan, including but not limited to a WPAP or Contributing Zone Plan in accordance with 30 TAC Chapter 213 (related to the Edwards Aquifer), then a copy of that plan must be either included in the SWP3 or made readily available upon request to authorized personnel of the TCEQ. The permittee shall maintain a copy of the approval letter for the plan in its SWP3.
6. Maintenance Requirements
- (a) All protective measures identified in the SWP3 must be maintained in effective operating condition. If, through inspections or other means, the permittee determines that BMPs are not operating effectively, then the permittee shall perform maintenance as necessary to maintain the continued effectiveness of stormwater controls, and prior to the next rain event if feasible. If maintenance prior to the next anticipated storm event is impracticable, the reason shall be documented in the SWP3 and maintenance must be scheduled and accomplished as soon as practicable. Erosion and sediment controls that have been intentionally disabled, run-over, removed, or otherwise rendered ineffective must be replaced or corrected immediately upon discovery.
  - (b) If periodic inspections or other information indicates a control has been used incorrectly, is performing inadequately, or is damaged, then the operator shall replace or modify the control as soon as practicable after making the discovery.
  - (c) Sediment must be removed from sediment traps and sedimentation ponds no later than the time that design capacity has been reduced by 50%. For perimeter

controls such as silt fences, berms, etc., the trapped sediment must be removed before it reaches 50% of the above-ground height.

- (d) If sediment escapes the site, accumulations must be removed at a frequency that minimizes off-site impacts, and prior to the next rain event, if feasible. If the permittee does not own or operate the off-site conveyance, then the permittee shall work with the owner or operator of the property to remove the sediment.

#### 7. Inspections of Controls

- (a) Personnel provided by the permittee must inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, discharge locations, and structural controls for evidence of, or the potential for, pollutants entering the drainage system. Personnel conducting these inspections must be knowledgeable of this general permit, familiar with the construction site, and knowledgeable of the SWP3 for the site. Sediment and erosion control measures identified in the SWP3 must be inspected to ensure that they are operating correctly. Locations where vehicles enter or exit the site must be inspected for evidence of off-site sediment tracking. Inspections must be conducted at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

Where sites have been finally or temporarily stabilized or where runoff is unlikely due to winter conditions (e.g. site is covered with snow, ice, or frozen ground exists), inspections must be conducted at least once every month. In arid, semi-arid, or drought-stricken areas, inspections must be conducted at least once every month and within 24 hours after the end of a storm event of 0.5 inches or greater. The SWP3 must also contain a record of the total rainfall measured, as well as the approximate beginning and ending dates of winter or drought conditions resulting in monthly frequency of inspections.

As an alternative to the above-described inspection schedule of once every 14 calendar days and within 24 hours of a storm event of 0.5 inches or greater, the SWP3 may be developed to require that these inspections will occur at least once every seven (7) calendar days. If this alternative schedule is developed, then the inspection must occur regardless of whether or not there has been a rainfall event since the previous inspection.

The inspections may occur on either schedule provided that the SWP3 reflects the current schedule and that any changes to the schedule are conducted in accordance with the following provisions: the schedule may be changed a maximum of one time each month, the schedule change must be implemented at the beginning of a calendar month, and the reason for the schedule change must be documented in the SWP3 (e.g., end of "dry" season and beginning of "wet" season).

- (b) Utility line installation, pipeline construction, and other examples of long, narrow, linear construction activities may provide inspection personnel with limited access to the areas described in Part III.F.7.(a) above. Inspection of these areas could require that vehicles compromise temporarily or even permanently stabilized areas, cause additional disturbance of soils, and increase the potential for erosion. In these circumstances, controls must be inspected at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater, but representative inspections may be performed. For representative inspections, personnel must inspect controls along the construction site for 0.25 mile above and below each access point where a roadway, undisturbed right-of-way, or other similar feature intersects the construction site and allows access to the areas described in Part III.F.7.(a)

above. The conditions of the controls along each inspected 0.25 mile portion may be considered as representative of the condition of controls along that reach extending from the end of the 0.25 mile portion to either the end of the next 0.25 mile inspected portion, or to the end of the project, whichever occurs first.

As an alternative to the above-described inspection schedule of once every 14 calendar days and within 24 hours of a storm event of 0.5 inches or greater, the SWP3 may be developed to require that these inspections will occur at least once every seven (7) calendar days. If this alternative schedule is developed, the inspection must occur regardless of whether or not there has been a rainfall event since the previous inspection. The inspections may occur on either schedule provided that the SWP3 reflects the current schedule and that any changes to the schedule are conducted in accordance with the following provisions: the schedule may be changed a maximum of one time each month, the schedule change must be implemented at the beginning of a calendar month, and the reason for the schedule change must be documented in the SWP3 (e.g., end of “dry” season and beginning of “wet” season).

- (c) In the event of flooding or other uncontrollable situations which prohibit access to the inspection sites, inspections must be conducted as soon as access is practicable.
- (d) The SWP3 must be modified based on the results of inspections, as necessary, to better control pollutants in runoff. Revisions to the SWP3 must be completed within seven (7) calendar days following the inspection. If existing BMPs are modified or if additional BMPs are necessary, an implementation schedule must be described in the SWP3 and wherever possible those changes implemented before the next storm event. If implementation before the next anticipated storm event is impracticable, these changes must be implemented as soon as practicable.
- (e) A report summarizing the scope of the inspection, the date(s) of the inspection, and major observations relating to the implementation of the SWP3 must be made and retained as part of the SWP3. Major observations should include: The locations of discharges of sediment or other pollutants from the site; locations of BMPs that need to be maintained; locations of BMPs that failed to operate as designed or proved inadequate for a particular location; and locations where additional BMPs are needed.

Actions taken as a result of inspections must be described within, and retained as a part of, the SWP3. Reports must identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report must contain a certification that the facility or site is in compliance with the SWP3 and this permit. The report must be signed by the person and in the manner required by 30 TAC §305.128 (relating to Signatories to Reports).

The names and qualifications of personnel making the inspections for the permittee may be documented once in the SWP3 rather than being included in each report.

- 8. The SWP3 must identify and ensure the implementation of appropriate pollution prevention measures for all eligible non-stormwater components of the discharge, as listed in Part II.A.3. of this permit.
- 9. The SWP3 must include the information required in Part III.B. of this general permit.
- 10. The SWP3 must include pollution prevention procedures that comply with Part III.G.4 of this general permit.

**Section G. Erosion and Sediment Control Requirements Applicable to All Sites**

Except as provided in 40 CFR §§125.30-125.32, any discharge regulated under this general permit, with the exception of sites that obtained waivers based on low rainfall erosivity, must achieve, at a minimum, the following effluent limitations representing the degree of effluent reduction attainable by application of the best practicable control technology currently available (BPT).

1. *Erosion and sediment controls.* Design, install, and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, such controls must be designed, installed, and maintained to:
  - (a) Control stormwater volume and velocity within the site to minimize soil erosion;
  - (b) If any stormwater flow will be channelized at the site, stormwater controls must be designed to control both peak flowrates and total stormwater volume to minimize erosion at outlets and to minimize downstream channel and streambank erosion;
  - (c) Minimize the amount of soil exposed during construction activity;
  - (d) Minimize the disturbance of steep slopes;
  - (e) Minimize sediment discharges from the site. The design, installation, and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site;
  - (f) If earth disturbance activities are located in close proximity to a surface water, provide and maintain appropriate natural buffers if feasible and as necessary, around surface waters, depending on site-specific topography, sensitivity, and proximity to water bodies. Direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration. If providing buffers is infeasible, the permittee shall document the reason that natural buffers are not feasible, and shall implement additional erosion and sediment controls to reduce sediment load;
  - (g) Preserve native topsoil at the site, unless infeasible; and
  - (h) Minimize soil compaction in post-construction pervious areas. In areas of the construction site where final vegetative stabilization will occur or where infiltration practices will be installed, either:
    - (1) restrict vehicle and equipment use to avoid soil compaction; or
    - (2) prior to seeding or planting areas of exposed soil that have been compacted, use techniques that condition the soils to support vegetative growth, if necessary and feasible;
  - (i) TCEQ does not consider stormwater control features (e.g., stormwater conveyance channels, storm drain inlets, sediment basins) to constitute “surface waters” for the purposes of triggering the buffer requirement in Part III.G.(f) above.
2. *Soil stabilization.* Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating, or other earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. In the context of this requirement, “immediately” means as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased. Temporary

stabilization must be completed no more than 14 calendar days after initiation of soil stabilization measures, and final stabilization must be achieved prior to termination of permit coverage. In arid, semi-arid, and drought-stricken areas where initiating vegetative stabilization measures immediately is infeasible, alternative non-vegetative stabilization measures must be employed as soon as practicable. Refer to Part III.F.2.(b) for complete erosion control and stabilization practice requirements.

3. *Dewatering*. Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited, unless managed by appropriate controls.
4. *Pollution prevention measures*. Design, install, implement, and maintain effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, such measures must be designed, installed, implemented, and maintained to:
  - (a) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
  - (b) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater; and
  - (c) Minimize the discharge of pollutants from spills and leaks, and implement chemical spill and leak prevention and response procedures.
5. *Prohibited discharges*. The following discharges are prohibited:
  - (a) Wastewater from wash out of concrete trucks, unless managed by an appropriate control (see Part V of the general permit);
  - (b) Wastewater from wash out and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
  - (c) Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and
  - (d) Soaps or solvents used in vehicle and equipment washing.
6. *Surface outlets*. When discharging from basins and impoundments, utilize outlet structures that withdraw water from the surface, unless infeasible.

#### **Part IV. Stormwater Runoff from Concrete Batch Plants**

Discharges of stormwater runoff from concrete batch plants at regulated construction sites may be authorized under the provisions of this general permit provided that the following requirements are met for concrete batch plant(s) authorized under this permit. If discharges of stormwater runoff from concrete batch plants are not covered under this general permit, then discharges must be authorized under an alternative general permit or individual permit. This permit does not authorize the discharge or land disposal of any wastewater from concrete batch plants at regulated construction sites. Authorization for these wastes must be obtained under an individual permit or an alternative general permit.

##### **Section A. Benchmark Sampling Requirements**

1. Operators of concrete batch plants authorized under this general permit shall sample the stormwater runoff from the concrete batch plants according to the requirements

of this section of this general permit, and must conduct evaluations on the effectiveness of the SWP3 based on the following benchmark monitoring values:

**Table 1. Benchmark Parameters**

<b>Benchmark Parameter</b>	<b>Benchmark Value</b>	<b>Sampling Frequency</b>	<b>Sample Type</b>
Oil and Grease	15 mg/L	1/quarter (*1) (*2)	Grab (*3)
Total Suspended Solids	100 mg/L	1/quarter (*1) (*2)	Grab (*3)
pH	6.0 – 9.0 Standard Units	1/quarter (*1) (*2)	Grab (*3)
Total Iron	1.3 mg/L	1/quarter (*1) (*2)	Grab (*3)

(\*1) When discharge occurs. Sampling is required within the first 30 minutes of discharge. If it is not practicable to take the sample, or to complete the sampling, within the first 30 minutes, sampling must be completed within the first hour of discharge. If sampling is not completed within the first 30 minutes of discharge, the reason must be documented and attached to all required reports and records of the sampling activity.

(\*2) Sampling must be conducted at least once during each of the following periods. The first sample must be collected during the first full quarter that a stormwater discharge occurs from a concrete batch plant authorized under this general permit.

January through March

April through June

July through September

October through December

For projects lasting less than one full quarter, a minimum of one sample shall be collected, provided that a stormwater discharge occurred at least once following submission of the NOI or following the date that automatic authorization was obtained under Section II.E.2., and prior to terminating coverage.

(\*3) A grab sample shall be collected from the stormwater discharge resulting from a storm event that is at least 0.1 inches of measured precipitation that occurs at least 72 hours from the previously measurable storm event. The sample shall be collected downstream of the concrete batch plant, and where the discharge exits any BMPs utilized to handle the runoff from the batch plant, prior to commingling with any other water authorized under this general permit.

2. The permittee must compare the results of sample analyses to the benchmark values above, and must include this comparison in the overall assessment of the SWP3’s effectiveness. Analytical results that exceed a benchmark value are not a violation of this permit, as these values are not numeric effluent limitations. Results of analyses are indicators that modifications of the SWP3 should be assessed and may be necessary to protect water quality. The operator must investigate the cause for each exceedance and must document the results of this investigation in the SWP3 by the end of the quarter following the sampling event.

The operator's investigation must identify the following:

- (a) any additional potential sources of pollution, such as spills that might have occurred,
- (b) necessary revisions to good housekeeping measures that are part of the SWP3,
- (c) additional BMPs, including a schedule to install or implement the BMPs, and
- (d) other parts of the SWP3 that may require revisions in order to meet the goal of the benchmark values.

Background concentrations of specific pollutants may also be considered during the investigation. If the operator is able to relate the cause of the exceedance to background concentrations, then subsequent exceedances of benchmark values for that pollutant may be resolved by referencing earlier findings in the SWP3.

Background concentrations may be identified by laboratory analyses of samples of stormwater runoff to the permitted facility, by laboratory analyses of samples of stormwater runoff from adjacent non-industrial areas, or by identifying the pollutant is a naturally occurring material in soils at the site.

### **Section B. Best Management Practices (BMPs) and SWP3 Requirements**

Minimum SWP3 Requirements – The following are required in addition to other SWP3 requirements listed in this general permit (including, but not limited to Part III.F.7. of this permit):

1. Description of Potential Pollutant Sources - The SWP3 must provide a description of potential sources (activities and materials) that may reasonably be expected to affect the quality of stormwater discharges associated with concrete batch plants authorized under this permit. The SWP3 must describe practices that that will be used to reduce the pollutants in these discharges to assure compliance with this general permit, including the protection of water quality, and must ensure the implementation of these practices.

The following must be developed, at a minimum, in support of developing this description:

- (a) Drainage – The site map must include the following information:
  - (1) the location of all outfalls for stormwater discharges associated with concrete batch plants that are authorized under this permit;
  - (2) a depiction of the drainage area and the direction of flow to the outfall(s);
  - (3) structural controls used within the drainage area(s);
  - (4) the locations of the following areas associated with concrete batch plants that are exposed to precipitation: vehicle and equipment maintenance activities (including fueling, repair, and storage areas for vehicles and equipment scheduled for maintenance); areas used for the treatment, storage, or disposal of wastes; liquid storage tanks; material processing and storage areas; and loading and unloading areas; and
  - (5) the locations of the following: any bag house or other dust control device(s); recycle/sedimentation pond, clarifier or other device used for the treatment of facility wastewater (including the areas that drain to the treatment device); areas with significant materials; and areas where major spills or leaks have occurred.
- (b) Inventory of Exposed Materials – A list of materials handled at the concrete batch plant that may be exposed to stormwater and that have a potential to



affect the quality of stormwater discharges associated with concrete batch plants that are authorized under this general permit.

- (c) Spills and Leaks - A list of significant spills and leaks of toxic or hazardous pollutants that occurred in areas exposed to stormwater and that drain to stormwater outfalls associated with concrete batch plants authorized under this general permit must be developed, maintained, and updated as needed.
  - (d) Sampling Data - A summary of existing stormwater discharge sampling data must be maintained, if available.
2. Measures and Controls - The SWP3 must include a description of management controls to regulate pollutants identified in the SWP3's "Description of Potential Pollutant Sources" from Part IV.B.1.(a) of this permit, and a schedule for implementation of the measures and controls. This must include, at a minimum:
- (a) Good Housekeeping - Good housekeeping measures must be developed and implemented in the area(s) associated with concrete batch plants.
    - (1) Operators must prevent or minimize the discharge of spilled cement, aggregate (including sand or gravel), settled dust, or other significant materials from paved portions of the site that are exposed to stormwater. Measures used to minimize the presence of these materials may include regular sweeping or other equivalent practices. These practices must be conducted at a frequency that is determined based on consideration of the amount of industrial activity occurring in the area and frequency of precipitation, and shall occur at least once per week when cement or aggregate is being handled or otherwise processed in the area.
    - (2) Operators must prevent the exposure of fine granular solids, such as cement, to stormwater. Where practicable, these materials must be stored in enclosed silos, hoppers or buildings, in covered areas, or under covering.
  - (b) Spill Prevention and Response Procedures - Areas where potential spills that can contribute pollutants to stormwater runoff, and the drainage areas from these locations, must be identified in the SWP3. Where appropriate, the SWP3 must specify material handling procedures, storage requirements, and use of equipment. Procedures for cleaning up spills must be identified in the SWP3 and made available to the appropriate personnel.
  - (c) Inspections - Qualified facility personnel (i.e., a person or persons with knowledge of this general permit, the concrete batch plant, and the SWP3 related to the concrete batch plant(s) for the site) must be identified to inspect designated equipment and areas of the facility specified in the SWP3. The inspection frequency must be specified in the SWP3 based upon a consideration of the level of concrete production at the facility, but must be a minimum of once per month while the facility is in operation. The inspection must take place while the facility is in operation and must, at a minimum, include all areas that are exposed to stormwater at the site, including material handling areas, above ground storage tanks, hoppers or silos, dust collection/containment systems, truck wash down and equipment cleaning areas. Follow-up procedures must be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections must be maintained and be made readily available for inspection upon request.
  - (d) Employee Training - An employee training program must be developed to educate personnel responsible for implementing any component of the SWP3, or personnel otherwise responsible for stormwater pollution prevention, with the provisions of the SWP3. The frequency of training must be documented in

the SWP3, and at a minimum, must consist of one training prior to the initiation of operation of the concrete batch plant.

- (e) Record Keeping and Internal Reporting Procedures - A description of spills and similar incidents, plus additional information that is obtained regarding the quality and quantity of stormwater discharges, must be included in the SWP3. Inspection and maintenance activities must be documented and records of those inspection and maintenance activities must be incorporated in the SWP3.
  - (f) Management of Runoff - The SWP3 shall contain a narrative consideration for reducing the volume of runoff from concrete batch plants by diverting runoff or otherwise managing runoff, including use of infiltration, detention ponds, retention ponds, or reusing of runoff.
3. Comprehensive Compliance Evaluation – At least once per year, one or more qualified personnel (i.e., a person or persons with knowledge of this general permit, the concrete batch plant, and the SWP3 related to the concrete batch plant(s) for the site) shall conduct a compliance evaluation of the plant. The evaluation must include the following.
- (a) Visual examination of all areas draining stormwater associated with regulated concrete batch plants for evidence of, or the potential for, pollutants entering the drainage system. These include but are not limited to: cleaning areas, material handling areas, above ground storage tanks, hoppers or silos, dust collection/containment systems, and truck wash down and equipment cleaning areas. Measures implemented to reduce pollutants in runoff (including structural controls and implementation of management practices) must be evaluated to determine if they are effective and if they are implemented in accordance with the terms of this permit and with the permittee's SWP3. The operator shall conduct a visual inspection of equipment needed to implement the SWP3, such as spill response equipment.
  - (b) Based on the results of the evaluation, the following must be revised as appropriate within two weeks of the evaluation: the description of potential pollutant sources identified in the SWP3 (as required in Part IV.B.1., "Description of Potential Pollutant Sources"); and pollution prevention measures and controls identified in the SWP3 (as required in Part IV.B.2., "Measures and Controls"). The revisions may include a schedule for implementing the necessary changes.
  - (c) The permittee shall prepare and include in the SWP3 a report summarizing the scope of the evaluation, the personnel making the evaluation, the date(s) of the evaluation, major observations relating to the implementation of the SWP3, and actions taken in response to the findings of the evaluation. The report must identify any incidents of noncompliance. Where the report does not identify incidences of noncompliance, the report must contain a statement that the evaluation did not identify any incidence(s), and the report must be signed according to 30 TAC §305.128, relating to Signatories to Reports.
  - (d) The Comprehensive Compliance Evaluation may substitute for one of the required inspections delineated in Part IV.B.2.(c) of this general permit.

### **Section C. Prohibition of Wastewater Discharges**

Wastewater discharges associated with concrete production including wastewater disposal by land application are not authorized under this general permit. These wastewater discharges must be authorized under an alternative TCEQ water quality permit or otherwise disposed of in an authorized manner. Discharges of concrete truck wash out at construction sites may be authorized if conducted in accordance with the requirements of Part V of this general permit.

**Part V. Concrete Truck Wash Out Requirements**

This general permit authorizes the wash out of concrete trucks at construction sites regulated under Sections II.E.1., 2., and 3. of this general permit, provided the following requirements are met. Authorization is limited to the land disposal of wash out water from concrete trucks. Any other direct discharge of concrete production waste water must be authorized under a separate TCEQ general permit or individual permit.

1. Direct discharge of concrete truck wash out water to surface water in the state, including discharge to storm sewers, is prohibited by this general permit.
2. Concrete truck wash out water shall be discharged to areas at the construction site where structural controls have been established to prevent direct discharge to surface waters, or to areas that have a minimal slope that allow infiltration and filtering of wash out water to prevent direct discharge to surface waters. Structural controls may consist of temporary berms, temporary shallow pits, temporary storage tanks with slow rate release, or other reasonable measures to prevent runoff from the construction site.
3. Wash out of concrete trucks during rainfall events shall be minimized. The direct discharge of concrete truck wash out water is prohibited at all times, and the operator shall insure that its BMPs are sufficient to prevent the discharge of concrete truck wash out as the result of rainfall or stormwater runoff.
4. The discharge of wash out water must not cause or contribute to groundwater contamination.
5. If a SWP3 is required to be implemented, the SWP3 shall include concrete wash out areas on the associated site map.

**Part VI. Retention of Records**

The permittee must retain the following records for a minimum period of three (3) years from the date that a NOT is submitted as required by Part II.E.3. For activities in which an NOT is not required, records shall be retained for a minimum period of three (3) years from the date that the operator terminates coverage under Section II.F.3. of this permit. Records include:

1. A copy of the SWP3;
2. All reports and actions required by this permit, including a copy of the construction site notice;
3. All data used to complete the NOI, if an NOI is required for coverage under this general permit; and
4. All records of submittal of forms submitted to the operator of any MS4 receiving the discharge and to the secondary operator of a large construction site, if applicable.

**Part VII. Standard Permit Conditions**

1. The permittee has a duty to comply with all permit conditions. Failure to comply with any permit condition is a violation of the permit and statutes under which it was issued, and is grounds for enforcement action, for terminating, revoking, or denying coverage under this general permit, or for requiring a discharger to apply for and obtain an individual TPDES permit.
2. Authorization under this general permit may be suspended or revoked for cause. Filing a notice of planned changes or anticipated non-compliance by the permittee does not stay any permit condition. The permittee must furnish to the executive director, upon request and within a reasonable time, any information necessary for the executive director to determine whether cause exists for revoking, suspending, or

terminating authorization under this permit. Additionally, the permittee must provide to the executive director, upon request, copies of all records that the permittee is required to maintain as a condition of this general permit.

3. It is not a defense for a discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the permit conditions.
4. Inspection and entry shall be allowed under TWC Chapters 26-28, Texas Health and Safety Code §§361.032-361.033 and 361.037, and 40 CFR §122.41(i). The statement in TWC §26.014 that commission entry of a facility shall occur according to an establishment's rules and regulations concerning safety, internal security, and fire protection is not grounds for denial or restriction of entry to any part of the facility or site, but merely describes the commission's duty to observe appropriate rules and regulations during an inspection.
5. The discharger is subject to administrative, civil, and criminal penalties, as applicable, under TWC Chapter 7 for violations including but not limited to the following:
  - (a) negligently or knowingly violating the federal CWA §§301, 302, 306, 307, 308, 318, or 405, or any condition or limitation implementing any sections in a permit issued under CWA §402, or any requirement imposed in a pretreatment program approved under CWA §§402(a)(3) or 402(b)(8);
  - (b) knowingly making any false statement, representation, or certification in any record or other document submitted or required to be maintained under a permit, including monitoring reports or reports of compliance or noncompliance; and
  - (c) knowingly violating §303 of the federal CWA, and placing another person in imminent danger of death or serious bodily injury.
6. All reports and other information requested by the executive director must be signed by the person and in the manner required by 30 TAC §305.128 (relating to Signatories to Reports).
7. Authorization under this general permit does not convey property or water rights of any sort and does not grant any exclusive privilege.
8. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.
9. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.
10. The permittee shall comply with the reporting requirements in 40 CFR §122.41(l), as applicable.

#### **Part VIII. Fees**

1. A fee of must be submitted along with the NOI:
  - (a) \$325 if submitting a paper NOI, or
  - (b) \$225 if submitting an NOI electronically.

2. Fees are due upon submission of the NOI. An NOI will not be declared administratively complete unless the associated fee has been paid in full.
3. No separate annual fees will be assessed for this general permit. The Water Quality Annual Fee has been incorporated into the NOI fees as described above.

**Appendix A: Automatic Authorization**

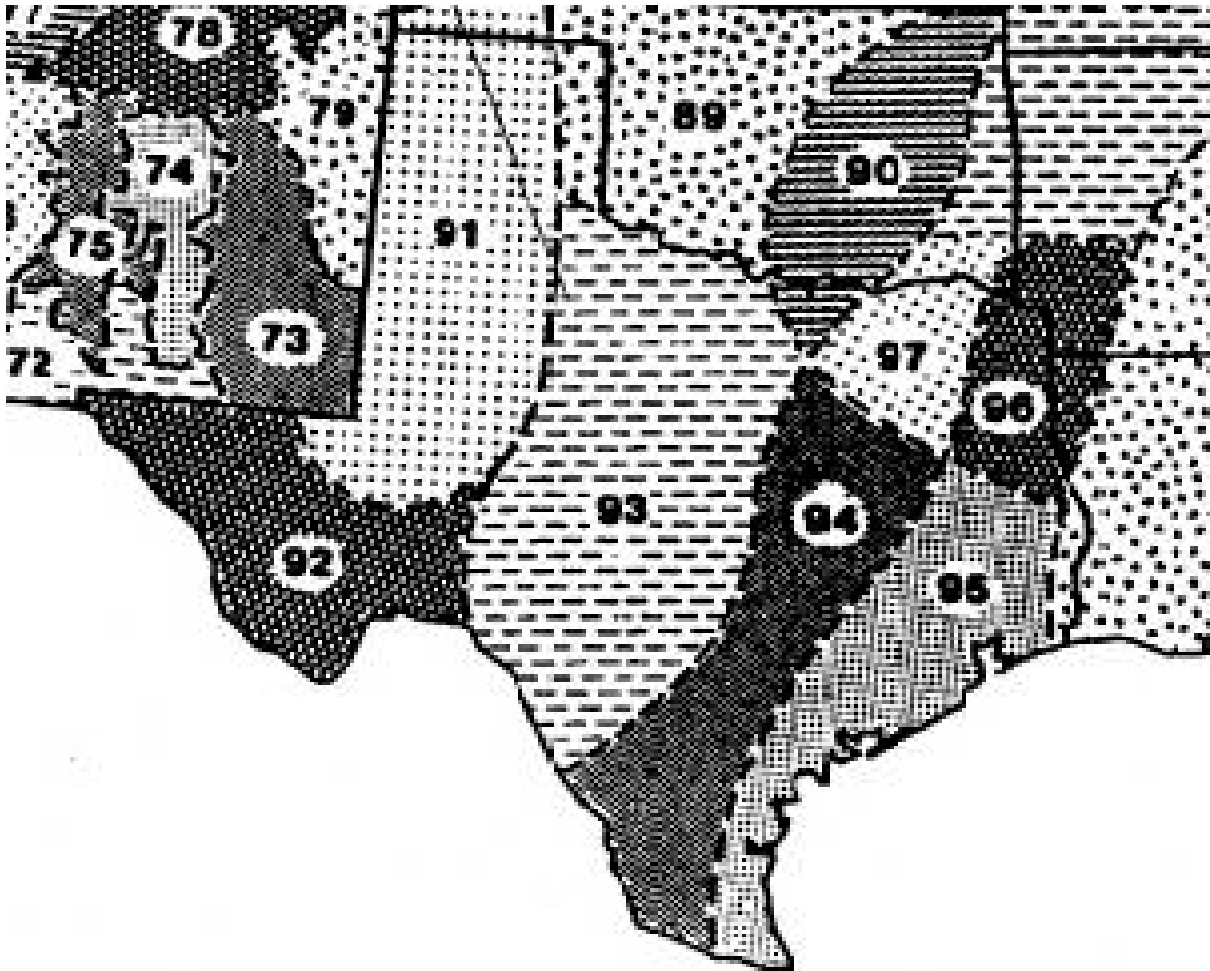
## Periods of Low Erosion Potential by County – Eligible Date Ranges

Andrews: Nov. 15 - Apr. 30	Ector: Nov. 15 - Apr. 30
Archer: Dec. 15 - Feb. 14	Edwards: Dec. 15 - Feb. 14
Armstrong: Nov. 15 - Apr. 30	El Paso: Jan. 1 - Jul. 14, or May 15 - Jul. 31, or Jun. 1 - Aug. 14, or Jun. 15 - Sept. 14, or Jul. 1 - Oct. 14, or Jul. 15 - Oct. 31, or Aug. 1 - Apr. 30, or Aug. 15 - May 14, or Sept. 1 - May 30, or Oct. 1 - Jun. 14, or Nov. 1 - Jun. 30, or Nov. 15 - Jul. 14
Bailey: Nov. 1 - Apr. 30, or Nov. 15 - May 14	Fisher: Dec. 15 - Feb. 14
Baylor: Dec. 15 - Feb. 14	Floyd: Nov. 15 - Apr. 30
Borden: Nov. 15 - Apr. 30	Foard: Dec. 15 - Feb. 14
Brewster: Nov. 15 - Apr. 30	Gaines: Nov. 15 - Apr. 30
Briscoe: Nov. 15 - Apr. 30	Garza: Nov. 15 - Apr. 30
Brown: Dec. 15 - Feb. 14	Glasscock: Nov. 15 - Apr. 30
Callahan: Dec. 15 - Feb. 14	Hale: Nov. 15 - Apr. 30
Carson: Nov. 15 - Apr. 30	Hall: Feb. 1 - Mar. 30
Castro: Nov. 15 - Apr. 30	Hansford: Nov. 15 - Apr. 30
Childress: Dec. 15 - Feb. 14	Hardeman: Dec. 15 - Feb. 14
Cochran: Nov. 1 - Apr. 30, or Nov. 15 - May 14	Hartley: Nov. 15 - Apr. 30
Coke: Dec. 15 - Feb. 14	Haskell: Dec. 15 - Feb. 14
Coleman: Dec. 15 - Feb. 14	Hockley: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30
Collingsworth: Jan. 1 - Mar. 30, or Dec. 1 - Feb. 28	Howard: Nov. 15 - Apr. 30
Concho: Dec. 15 - Feb. 14	Hudspeth: Nov. 1 - May 14
Cottle: Dec. 15 - Feb. 14	Hutchinson: Nov. 15 - Apr. 30
Crane: Nov. 15 - Apr. 30	Irion: Dec. 15 - Feb. 14
Crockett: Nov. 15 - Jan. 14, or Feb. 1 - Mar. 30	Jeff Davis: Nov. 1 - Apr. 30 or Nov. 15 - May 14
Crosby: Nov. 15 - Apr. 30	Jones: Dec. 15 - Feb. 14
Culberson: Nov. 1 - May 14	Kent: Nov. 15 - Jan. 14 or Feb. 1 - Mar. 30
Dallam: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30	Kerr: Dec. 15 - Feb. 14
Dawson: Nov. 15 - Apr. 30	Kimble: Dec. 15 - Feb. 14
Deaf Smith: Nov. 15 - Apr. 30	King: Dec. 15 - Feb. 14
Dickens: Nov. 15 - Jan. 14, or Feb. 1 - Mar. 30	Kinney: Dec. 15 - Feb. 14
Dimmit: Dec. 15 - Feb. 14	Knox: Dec. 15 - Feb. 14
Donley: Jan. 1 - Mar. 30, or Dec. 1 - Feb. 28	Lamb: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30
Eastland: Dec. 15 - Feb. 14	

Loving: Nov. 1 - Apr. 30, or Nov. 15 - May 14  
Lubbock: Nov. 15 - Apr. 30  
Lynn: Nov. 15 - Apr. 30  
Martin: Nov. 15 - Apr. 30  
Mason: Dec. 15 - Feb. 14  
Maverick: Dec. 15 - Feb. 14  
McCulloch: Dec. 15 - Feb. 14  
Menard: Dec. 15 - Feb. 14  
Midland: Nov. 15 - Apr. 30  
Mitchell: Nov. 15 - Apr. 30  
Moore: Nov. 15 - Apr. 30  
Motley: Nov. 15 - Jan. 14, or Feb. 1 - Mar. 30  
Nolan: Dec. 15 - Feb. 14  
Oldham: Nov. 15 - Apr. 30  
Parmer: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30  
Pecos: Nov. 15 - Apr. 30  
Potter: Nov. 15 - Apr. 30  
Presidio: Nov. 1 - Apr. 30, or Nov. 15 - May 14  
Randall: Nov. 15 - Apr. 30  
Reagan: Nov. 15 - Apr. 30  
Real: Dec. 15 - Feb. 14  
Reeves: Nov. 1 - Apr. 30, or Nov. 15 - May 14  
Runnels: Dec. 15 - Feb. 14  
Schleicher: Dec. 15 - Feb. 14

Scurry: Nov. 15 - Apr. 30  
Shackelford: Dec. 15 - Feb. 14  
Sherman: Nov. 15 - Apr. 30  
Stephens: Dec. 15 - Feb. 14  
Sterling: Nov. 15 - Apr. 30  
Stonewall: Dec. 15 - Feb. 14  
Sutton: Dec. 15 - Feb. 14  
Swisher: Nov. 15 - Apr. 30  
Taylor: Dec. 15 - Feb. 14  
Terrell: Nov. 15 - Apr. 30  
Terry: Nov. 15 - Apr. 30  
Throckmorton: Dec. 15 - Feb. 14  
Tom Green: Dec. 15 - Feb. 14  
Upton: Nov. 15 - Apr. 30  
Uvalde: Dec. 15 - Feb. 14  
Val Verde: Nov. 15 - Jan. 14, or Feb. 1 - Mar. 30  
Ward: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30  
Wichita: Dec. 15 - Feb. 14  
Wilbarger: Dec. 15 - Feb. 14  
Winkler: Nov. 1 - Apr. 30, or Nov. 15 - May 14  
Yoakum: Nov. 1 - Apr. 30, or Nov. 15 - May 14  
Young: Dec. 15 - Feb. 14  
Wheeler: Jan. 1 - Mar. 30, or Dec. 1 - Feb. 28  
Zavala: Dec. 15 - Feb. 14

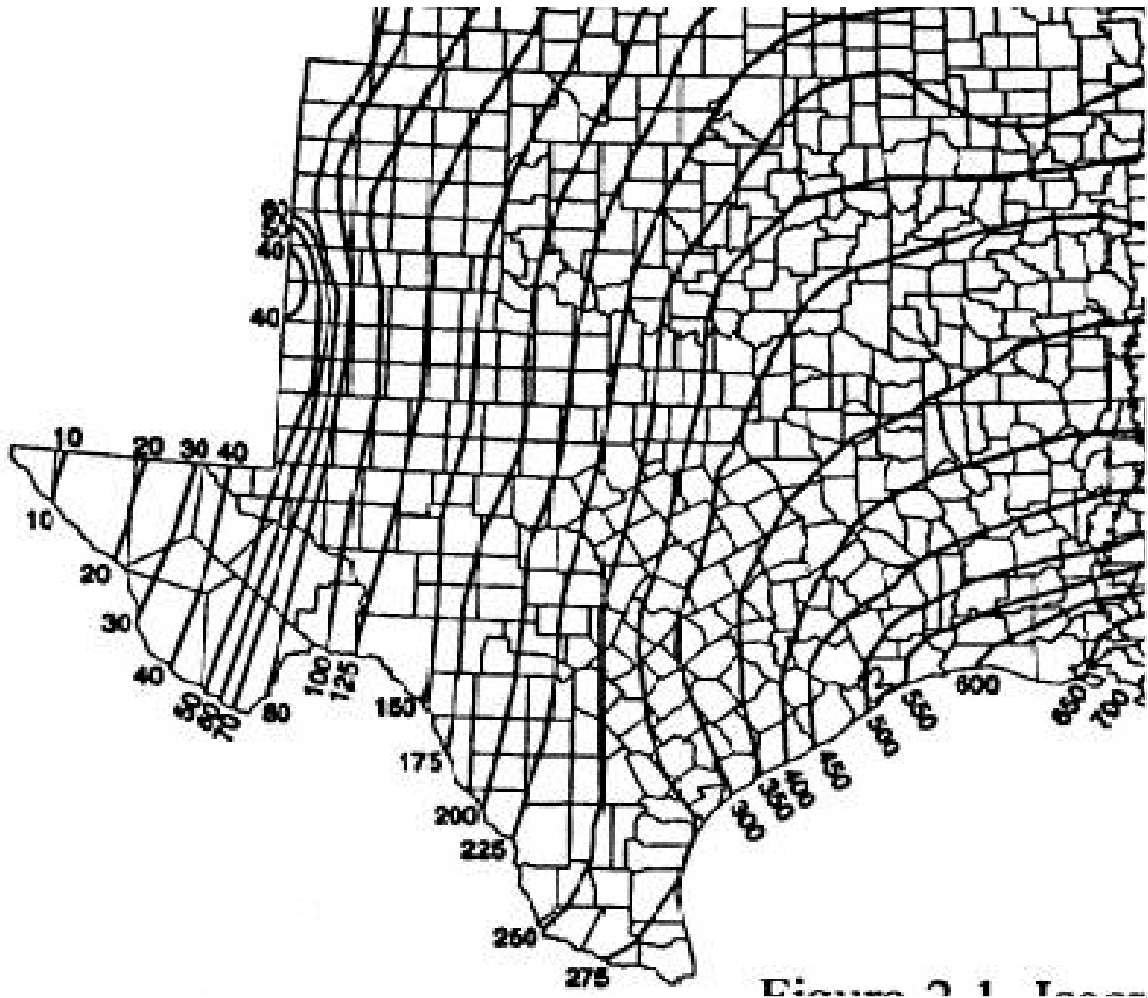
**Appendix B: Erosivity Index (EI) Zones in Texas**



*Adapted from Chapter 2 of USDA Agriculture Handbook 703: "Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)," U.S. Department of Agriculture, Agricultural Research Service*



**Appendix C: Isoerodent Map**



*Adapted from Chapter 2 of USDA Agriculture Handbook 703: "Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)," U.S. Department of Agriculture, Agricultural Research Service*

**Appendix D: Erosivity Indices for EI Zones in Texas**

**Periods:**

<b>EI #</b>	1/1	1/16	1/31	2/15	3/1	3/16	3/31	4/15	4/30	5/15	5/30	6/14	6/29	7/14	7/29	8/13	8/28	9/12	9/27	10/12	10/27	11/11	11/26	12/11	12/31
<b>89</b>	0	1	1	2	3	4	7	2	8	27	38	48	55	62	69	76	83	90	94	97	98	99	100	100	100
<b>90</b>	0	1	2	3	4	6	8	13	21	29	37	46	54	60	65	69	74	81	87	92	95	97	98	99	100
<b>91</b>	0	0	0	0	1	1	1	2	6	16	29	39	46	53	60	67	74	81	88	95	99	99	100	100	100
<b>92</b>	0	0	0	0	1	1	1	2	6	16	29	39	46	53	60	67	74	81	88	95	99	99	100	100	100
<b>93</b>	0	1	1	2	3	4	6	8	13	25	40	49	56	62	67	72	76	80	85	91	97	98	99	99	100
<b>94</b>	0	1	2	4	6	8	10	15	21	29	38	47	53	57	61	65	70	76	83	88	91	94	96	98	100
<b>95</b>	0	1	3	5	7	9	11	14	18	27	35	41	46	51	57	62	68	73	79	84	89	93	96	98	100
<b>96</b>	0	2	4	6	9	12	17	23	30	37	43	49	54	58	62	66	70	74	78	82	86	90	94	97	100
<b>97</b>	0	1	3	5	7	10	14	20	28	37	48	56	61	64	68	72	77	81	86	89	92	95	98	99	100
<b>106</b>	0	3	6	9	13	17	21	27	33	38	44	49	55	61	67	71	75	78	81	84	86	90	94	97	100

\* Each period begins on the date listed in the table above and lasts until the day before the following period. The final period begins on December 11 and ends on December 31.

*Table adapted from Chapter 2 of USDA Agriculture Handbook 703: "Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)," U.S. Department of Agriculture, Agricultural Research Service*

**Appendix J**  
**Harris County Specifications**  
**For**  
**Structural Controls and Final**  
**Stabilization**

ITEM 162

SODDING FOR EROSION CONTROL AND STABILIZATION

162.1 Description. This Item shall govern for providing and planting Bermuda grass, St. Augustine grass, or other acceptable sod along or across such areas as are designated on the drawings and in accordance with the specification requirements herein outlined.

162.2 Materials. The sod shall consist of living, growing Bermuda grass, St. Augustine grass, or other acceptable sod, (ninety-five percent pure), secured from sources where the soil is fertile and has been fumigated. The sod shall have a healthy virile root system of dense, thickly matted roots throughout. The sod shall be cut from the field so that there is a minimum of 1/2 inch of soil on the roots of the sod, and so that no roots show on the bottom of the soil. Sod shall be dense, with the grass having been mowed to 1 inch height before lifting from field. Sod shall be in a vigorous condition, dark green in color, free of disease and harmful insects. The Contractor shall not use sod from areas where the grass is thinned out, nor where the grass roots have been dried out by exposure to the air and sun to such an extent as to damage its ability to grow when transplanted. The sod shall be free from obnoxious weeds or other grasses and shall not contain any matter deleterious to its growth or which might affect its subsistence or hardiness when transplanted. Unless the area has been closely pastured, it shall be closely mowed and raked to remove all weeds and long-standing stems.

Care shall be taken at all times to retain the native soil on the roots of the sod during the process of excavation, hauling and planting. Sod material shall be kept moist from the time it is dug, until planted. When so directed by the Engineer, the sod existing at the source shall be watered to the extent required, prior to excavating. Do not stack sod for more than 36 hours between the time of cutting and the time of installation. The Engineer reserves the right to reject any sod deemed unacceptable for installation.

All planting shall be done between the average date of the last freeze in the spring and six weeks prior to the average date for the first freeze in the fall, according to the U.S. Weather Bureau.

Fertilizer shall conform to the requirements of the Item 166 "Fertilizer" and shall be applied at the rate of 480 pounds per acre.

162.3 Construction Methods. Immediately after the finished grade has been approved, begin sodding operations to reduce excessive weed growth. If the sod bed is dry, immediately prior to sod installation, dampen the surface with a fine mist of water.

Grass shall be turf sod, cut into 16 inch strip widths for those areas behind a curb. All other areas can receive various cut widths and lengths.

All areas to be sodded shall be raked to true lines, free from all unsightly variations, bumps, ridges or depressions. All sticks, stones, roots or other objectionable material which might interfere with the formation of a finely pulverized sod bed, shall be removed from the soil.

Lay sod so that adjacent strips butt tightly, with no spaces between strips. Lay sod on mounds and slopes, with strips parallel to contours. Stagger joints. Sodded areas shall be flush with adjoining seeded areas. All sod shall, of course, be laid green side up. Tamp and roll the sod thoroughly to make contact with the sod bed, or as directed by the Engineer.

Peg sod on slopes three-to-one or steeper with pegs driven through sod into soil, until pegs are flush with the turf. Space pegs 18 inches on center. Pegs to be 1 inch square, 6 inches long or, 6 inch lengths of lath.

Commercial fertilizer as outlined in the Item 166 "Fertilizer" shall be applied to the entire sodded area at the prescribed rates, immediately following laying the sod. Immediately after fertilizing, water the entire area until a saturated depth of 2 inches has been reached. If rain is imminent, then the application of fertilizer shall be postponed until weather conditions exist such that the potential for the runoff of fertilizer from the site is minimized.

Immediately after installation of the sod, remove sod clumps, soil, and any plant material from roadways and pavements. Edges along curbs and drives, walkways, etc., shall be carefully trimmed and maintained until accepted.

In areas where sod is dead, satisfactory growth may be accomplished with application of seeding or hydromulch seeding in lieu of replacing the dead sod, only as approved by the Engineer. Costs for labor, materials, tools and equipment for the application of seeding or hydromulch seeding over dead sod shall be incidental to this pay item.

162.4

Contractor's Maintenance & Guarantee Period. It shall be the responsibility of the Contractor to maintain all sodded areas until satisfactory growth has occurred as determined by the Engineer and for a period of 60 days after the successful completion of all punch list items. Maintenance shall consist of watering, weeding, repairing of all erosion, and resodding as necessary to establish a uniform growth of the specified grass. A minimum of 95 percent of the area planted shall be covered with the specified grass with no bare or dead spots greater than 10 square feet.

The Contractor shall be responsible for 1 mowing per month between the months of April to October. The Contractor shall also be responsible for 1 mowing every 6 weeks between the months of November to March.

In addition, the Contractor shall water all sodded areas as often as necessary to establish satisfactory growth and to maintain its growth throughout the duration of the project; including in the 60 day period described above.

Contractor shall make as many repeat plantings as necessary to achieve a minimum of 95 percent of the area planted covered with the specified grass with no bare or dead spots greater than 10 square feet. Such replanting is to be performed within 14 calendar days of notification by the Engineer.

- 162.5 Submittal Required. The Contractor shall submit a statement from the supplier attesting that the sod meets the requirements stated herein.
- 162.6 Measurement. Work and acceptable material for Sodding for Erosion Control and Stabilization shall be measured by linear feet (with standard width of 16 inches behind curb), or by the square yard (for various widths), complete in place.
- 162.7 Payment. Work performed and material furnished under "Measurement" shall be paid for at the unit price bid for "Sodding for Erosion Control and Stabilization", which price shall be full compensation for furnishing materials, preparation of ground for planting, planting of sod, pegging of sod, raking, fertilizing, watering, sprinkling, maintenance, mowing, and for labor, tools, equipment and incidentals necessary to complete the work. Additional payment shall not be made for those areas that are replanted.

There are line code(s), description(s), and unit(s) for this Item.

NOTE: This Item requires other Standard Specifications.

Item 166 "Fertilizer"  
Item 725 "General Source Controls"

END OF ITEM 162

ITEM 164

SEEDING AND EROSION CONTROL BLANKET

164.1 Description. This Item shall govern for preparing the ground, sowing of seeds, applying a fertilizer, and stabilizing with a mulch, mat, or mesh consisting of straw, hay, wood, coir, paper, or other biodegradable fibers along and across such areas as are designated on the plans and in accordance with these Standard Specifications.

164.2 Material. Seed shall comply with the Texas Seed and Plant Certification Act and Standards, Sections 21.0, 31.10, 21.11 and the U. S. Department of Agriculture Rules and Regulations – Federal Seed Act. Seed bags shall have tags affixed for inspection in the field. Bags without tags will be rejected. Seed shall be tested and certified by a commercial or state laboratory not more than nine (9) months prior to the date of planting. Tags on seed bags shall show the name of the seed, locality and year of harvest, percentage purity, germination and dormant seed, Johnson grass content and noxious weed content. Seed shall be provided in clean, unopened and undamaged bags. Seed shall be provided with no objectionable material, such as sticks, stems and unthreshed seed heads, which will hinder proper distribution. Seed that is wet, moldy, starting to germinate or otherwise damaged, will not be accepted by Harris County.

Standard seed plan, planting dates, plant species and seeding rates shall be as indicated in Table 1:

TABLE 1

<u>Seed Plan</u>	<u>Planting Dates</u>	<u>Species</u>	<u>Planting Rate Per Acre</u>
<u>1</u>	<u>Oct. 1- March 31 When soil temperatures fall below 75°F, or as directed.</u>	<u>Unhulled Bermuda Grass Tall Fescue and Durana Clover Crimson Clover</u>	<u>50 lbs. 25 lbs.  5 lbs. 5 lbs.</u>
<u>2</u>	<u>April 1-Sept. 30 When soil temperatures rise above 65°F, or as directed</u>	<u>Certified Bermuda Grass* Or Common Bermuda Grass, minimum purity/germination of 95/85 Millet</u>	<u>50 lbs. or 50 lbs. PLS  10 lbs.</u>
<u>3</u>	<u>As directed</u>	<u>Certified Bermuda Grass Or Hulled Bermuda Grass minimum purity/germination 95/85 and Pensacola Bahia Grass Brown Top or Fox Tail Millet</u>	<u>50 lbs. or 50 lbs. PLS and 20 lbs. 20 lbs.</u>
<u>5</u>	<u>As directed</u>	<u>Annual Ryegrass and Fescue Or Millet</u>	<u>25 lbs. each 25 lbs.</u>
<u>6</u>	<u>As directed</u>	<u>Improved Bermuda Grass Cultivars</u>	<u>50 lbs.</u>
<u>7</u>	<u>As directed</u>	<u>Legume or Grain</u>	<u>20 lbs.</u>

Seeding shall be applied in accordance with the following:

- Planting dates are approximate, Harris County will determine which seed to use prior to start of seeding.
- Seeding rate for "Pure Live Seed". Is used to determine the actual application rate of bulk material to obtain.
- PLS= (%germination X %purity) .95x.85= .807 (80.7%) PLS
- Rate/PLS= LBS of seed needed for application  
1/.807= 1.24 lbs of seed needed/1000 SF
- Certified Bermuda must have a Blue Tag and tested by an accredited seed testing lab

164.3 Fertilizer. Commercial fertilizer as outlined in the Item 166 "Fertilizer", shall be applied to the entire seeded area at the prescribed rates. The fertilizer shall be delivered to the site in bags or other convenient containers, each fully labeled, conforming to the applicable State Fertilizer Laws and bearing the name and warranty of the producer.

164.4 Straw Mulch. Straw mulch shall be oat, wheat, or rice straw. Hay mulch shall be prairie grass, Bermuda grass, oat, wheat or rice stems or other hay as approved by the Engineer. Do not use straw containing Johnson grass or other noxious weeds and foreign materials. The mulch shall be kept in a dry condition and shall not be molded or rotted.

164.5 Fiber Mat. Fiber mat shall consist of machine produced woven mat of wood, coir, straw, or a combination of various biodegradable fibers as approved by the Engineer, with consistent thickness throughout the blanket. The fiber mat shall have a mesh or netting for support. The mesh or netting shall be biodegradable or photo-degradable and have a high wet strength. The mat shall not contain any weed seeds. Use blanket with a weight from 0.7 pounds per square yard to 1.0 pound per square yard. The mat shall be free of defects, rips, holes, flaws, deterioration, mold, rot, or damage.

Material type, size, shape, and spacing of wire staples, or fasteners, shall be in accordance with the recommendations of the manufacturer of the fiber mat erosion control blanket.

164.6 Paper Mesh. Use paper mesh consisting of knitted construction of yarn with uniform openings interwoven with strips of biodegradable paper, furnished in rolls which have suitable protection for outdoor storage. Use paper mesh of weight from 0.2 pounds per square yard to approximately 0.5 pounds per square yard. The mesh shall be free of defects, rips, holes, flaws, deterioration, mold, rot, or damage.

Material type, size, shape, and spacing of wire staples, or fasteners, shall be in accordance with the recommendations of the manufacturer of the paper mesh erosion control blanket.



164.7 Construction Methods.

A. General

Fertilizing & Seeding. After areas to receive fertilizing and seeding have been completed to the lines, grades and sections shown on the plans, apply fertilizer at the prescribed rates as outlined in the Item 166 "Fertilizer". Thoroughly mix upper 3 inches of top soil with fertilizer until a uniform mixture of fertilizer and top soil is obtained. Sprinkle areas to be seeded with water, using fine spray to avoid washing or erosion of soil. Broadcast seed with sowing equipment at the rate specified above, using care to obtain uniform distribution. After broadcasting, lightly rake seeds into soil to a depth not to exceed 1/2 inch. Complete seeding by rolling with roller developing 15 to 25 pounds per inch of tread.

After applying seed and fertilizer, apply straw mulch, fiber mat, or paper mesh as described in the following sections. Keep seeded areas moist for a period of 10 days immediately following placement and as necessary to meet Contractor's maintenance and guarantee period. When watering seeded areas, use fine spray to prevent erosion of seeds or soil. Reseed any areas damaged by erosion and as necessary to obtain a satisfactory growth as determined by the Engineer.

If rain is imminent, then seeding and fertilization shall be postponed until weather conditions exist such that the potential for the runoff of fertilizer from the site is minimized. If high wind conditions exist then the subsequent application of the straw mulch, fiber mat, or paper mesh erosion control blanket shall be postponed until weather conditions exist such that the blanket can be installed properly.

B. Straw Mulch Erosion Control Blanket

1. Fertilizing & Seeding: After ditch or slope has been completed to lines, grades and cross-sections shown on the plans, apply fertilizer and seed in accordance with the above. When seed and fertilizer are to be distributed as water slurry, mixture is to be applied within 30 minutes after all components are placed in the equipment.
2. Mulch Application: Immediately upon completion of planting of seed and fertilizing, spray straw mulch uniformly over the area at the rate of 1-1/2 to 2 tons of hay or 2-1/2 tons of straw per acre. Mulching machine shall inject tacking agent into straw uniformly as it leaves the equipment at the rate of 0.05 to 0.10 gallons of tacking agent per square yard of mulched area. When watering seeded areas, use fine spray to prevent erosion of seeds or soil. Reseed any areas damaged by erosion for any reason. The mulching

operation shall immediately follow seeding and fertilizing as a continuous operation.

C. Fiber Mat or Paper Mesh Erosion Control Blanket

1. Fertilizing and seeding shall be in accordance with the above.
2. Fiber Mat or Paper Mesh Installation: Place fiber mat or paper mesh within 24 hours after seeding operations have been completed. Prior to placing, clear the area to be covered of all rocks or clods over 1-1/2 inches in diameter and all sticks or other foreign material which will prevent close contact of the blanket with the soil. Area shall be smooth and free of ruts or other depressions.

If as a result of a rain, prepared seed bed becomes crusted or eroded, or if eroded places, ruts or depressions exist for any reason, rework soil until smooth and reseed such areas. After area has been properly prepared, lay fiber mat or paper mesh flat, smooth and loosely without stretching or crimping material. Lay mat according to manufacturer's recommendations, generally with the mesh or netting on the top side.

Apply materials with lengths running parallel to the flow of water, or as shown on the plans or as directed by the Engineer. When more than one width is required, butt or overlap edges as required by the manufacturer. In general, for overlaps, the top edge shall overlap the bottom edge to match the direction of the flow of water, not against it.

Hold the material in place by means of a wire staple driven into the soil at an angle to the surface. Staple material along each edge and in a grid pattern with a minimum of 3 feet on center each way. In ditches and on slopes, provide additional stapling as recommended by the manufacturer.

The placement of the fiber mat or paper mesh erosion control blanket shall immediately follow the preparation of the ground.

164.8

Contractor Maintenance & Guarantee Period. It shall be the responsibility of the Contractor to maintain all seeded and erosion control blanket areas until satisfactory growth has occurred as determined by the Engineer, and for a period of 60 days after the successful completion of all punch list items. Maintenance shall consist of watering and weeding, repair of all erosion and any reseeding as necessary to establish a uniform stand of the specified grasses. A minimum of 95 percent of the area seeded shall be covered with the specified grass with no bare or dead spots greater than 10 square feet.

The Contractor shall be responsible for 1 mowing per month between the months of April to October. The Contractor shall also be responsible for 1 mowing every 6 weeks between the months of November to March. In addition, the Contractor shall water all grassed areas as often as necessary to establish satisfactory growth and to maintain its growth throughout the duration of the project.

The Contractor shall make as many repeat seedings as necessary to achieve a minimum of 95 percent of the area planted covered with the specified grass with no bare or dead spots greater than 10 square feet. Such replanting is to be performed within 14 calendar days of notification by the Engineer.

164.9 Submittal Required. The Contractor shall submit copy of seed tag(s) and letter from the supplier attesting that the seed meets the requirements as stated herein. Certification shall include common name; botanical name, percent by weight of each plant species; year of harvest; percent purity, germination and dormant seed; percent noxious weed content; and date of certification.

164.10 Measurement & Payment:

Measurement shall be by the acre or square yard of prepared area underlying the erosion control blanket. Payment for work under this Item to be made at the contract price for "Seeding and Erosion Control Blanket", with price to be full compensation for the materials, tools, equipment, and labor necessary for preparing the area (including fine grading and rolling), seeding, fertilizing, placing and securing the fiber mat, and watering. Additional payment shall not be made for those areas that are repaired or reseeded.

There are line code(s), description(s), and unit(s) for this Item.

NOTE: This Item requires other Standard Specifications.

Item 166 "Fertilizer"

Item 725 "General Source Controls"

END OF ITEM 164

ITEM 165

HYDRO-MULCH SEEDING  
 (FOR EROSION CONTROL AND STABILIZATION)

165.1 Description. This Item shall govern for furnishing all labor, materials, equipment, supplies, supervision and tools and performing all work necessary to:

- seed,
- fertilize,
- water,
- maintain, and
- cleanup of side slopes and finished grades,

in accordance with these Standard Specifications, for the purpose of temporary erosion control or final stabilization.

The hydro-mulch seeding operations, together with all necessary related work, shall conform to the requirements specified in this section. The area(s) to be hydro-mulch seeded shall be as shown on the construction drawings.

165.2 Materials. Seed shall comply with the U. S. Department of Agriculture Rules and Regulations – Federal Seed Act. Seed bags shall have tags affixed for inspection in the field. Bags without tags will be rejected. Seed shall be tested and certified by a commercial or state laboratory not more than nine (9) months prior to the date of planting. Tags on seed bags shall show the name of the seed, locality and year of harvest, percentage purity, germination and dormant seed, Johnson grass content and noxious weed content. Seed shall be provided in clean, unopened and undamaged bags. Seed(s) shall be provided with no objectionable material, such as sticks, stems and unthreshed seed heads, which will hinder proper distribution. Seed that is wet, moldy, starting to germinate or otherwise damaged, will not be accepted by Harris County.

Standard seed plan, planting Dates, plant species and seeding rate are as shown on Table 1:

TABLE 1

<u>Seed Plan</u>	<u>Planting Dates</u>	<u>Species</u>	<u>Planting Rate Per Acre</u>
<u>1</u>	<u>Oct. 1- March 31</u> <u>When soil</u> <u>temperatures fall</u> <u>below 75°F, or as</u> <u>directed.</u>	<u>Unhulled Bermuda Grass Tall</u> <u>Fescue</u> <u>and</u> <u>Durana Clover</u> <u>Crimson Clover</u>	<u>50 lbs.</u> <u>25 lbs.</u>  <u>5 lbs.</u> <u>5 lbs.</u>
<u>2</u>	<u>April 1-Sept. 30</u> <u>When soil</u> <u>temperatures rise</u>	<u>Certified Bermuda Grass*</u> <u>Or</u> <u>Common Bermuda Grass,</u>	<u>50 lbs.</u> <u>or</u> <u>50 lbs. PLS</u>

	<u>above 65°F, or as directed</u>	<u>minimum purity/germination of 95/85 Millet</u>	<u>10 lbs.</u>
<u>3</u>	<u>As directed</u>	<u>Certified Bermuda Grass Or Hulled Bermuda Grass minimum purity/germination 95/85 and Pensacola Bahia Grass Brown Top or Fox Tail Millet</u>	<u>50 lbs. or 50 lbs. PLS and 20 lbs. 20 lbs.</u>
<u>5</u>	<u>As directed</u>	<u>Annual Ryegrass and Fescue Or Millet</u>	<u>25 lbs. each 25 lbs.</u>
<u>6</u>	<u>As directed</u>	<u>Improved Bermuda Grass Cultivars</u>	<u>50 lbs.</u>
<u>7</u>	<u>As directed</u>	<u>Legume or Grain</u>	<u>20 lbs.</u>

Seeding shall be applied in accordance with the following:

- Planting dates are approximate, Harris County will determine which seed to use prior to start of seeding
- Seeding rate for "PureLive Seed". Is used to determine the actual application rate of bulk material to obtain.
- PLS= (%germination X %purity) 95x85 = 80.7%PLS
- Rate/PLS= LBS of seed needed for application 1/.807= 1.24 lbs of seed needed/1000 SF
- Certified Bermuda must have a Blue Tag and tested by an accredited seed testing lab

Commercial fertilizer as outlined in the Item 166 "Fertilizer", shall be applied to the entire seeded area at the prescribed rates. The fertilizer shall be delivered to the site in bags or other convenient containers, each fully labeled, conforming to the applicable State Fertilizer Laws and bearing the name and warranty of the producer.

Mulch shall be virgin wood cellulose fiber made from whole wood chips. Rate of application shall be 2000 pounds per acre. Soil stabilizers shall be applied at a rate of 40 pounds per acre. On side slopes Terra Type III (or approved equal) shall be used. On all other areas Terra Tack I (or approved equal) shall be used. Alternatively, Ultra Bond 2002 (or approved equal) shall be applied at a rate of one gallon per square yard in three applications. First application shall be at a rate of 1/2 gallon per square yard followed by another application in about two weeks at a rate of 1/4 gallon per square yard. The third application shall follow in about two months at a rate of 1/4 gallon per square yard. The concentrate shall be diluted in 1:5 ratio with water or as recommended by the manufacturer.

Wood cellulose fiber mulch, for use in the grass seed and fertilizer, shall be processed in such a manner that it will not contain any germination or growth inhibiting factors. It shall be dyed an appropriate color to allow visual metering of its application. The wood cellulose fibers shall have the

property of becoming evenly dispersed and suspended when agitated in water. When sprayed uniformly on the surface of the soil, the fibers shall form a blotter-like ground cover which readily absorbs water and allows infiltration to the underlying soil. Weight specifications from suppliers, shall refer only to the air dry weight of the fiber. The mulch material shall be supplied in packages having a gross weight not greater than 100 pounds and must be marked by the manufacturer to show the dry weight content. Suppliers shall be prepared to certify that laboratory and field testing of their product has been accomplished and that it meets all of the preceding requirements.

Water shall be free from oil, acid, alkali, salt and other substances harmful to the growth of grass. The water source shall be subject to approval, prior to use.

165.3 Execution. Immediately after the finished grade has been approved, begin hydro-mulching operations to reduce erosion and excessive weed growth.

Hydraulic equipment used for the application of fertilizer, seed and slurry of prepared wood fiber mulch shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend and homogeneously mix a slurry containing up to 40 pounds of fiber plus a combined total of 70 pounds of fertilizer solids for each 100 gallons of water. The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with a set of hydraulic spray nozzles which provide even distribution of the slurry on the area to be seeded. The slurry tank shall have a minimum capacity of 800 gallons and shall be mounted on a traveling unit, which may either be self-propelled or drawn with a separate unit which will place the slurry tank and spray nozzles within sufficient proximity to the areas to be seeded, so as to provide uniform distribution without waste. The Engineer may authorize equipment with a smaller tank capacity, provided the equipment has the necessary agitation system and sufficient pump capacity to spray the slurry in a uniform coat.

Slurry preparation shall take place on the worksite. The slurry preparation should begin by adding water to the tank when the engine is at half throttle. When the water level has reached the height of the agitator shaft, good re-circulation shall be established and seed shall be added. Fertilizer shall then be added, followed by wood pulp mulch. The wood pulp mulch shall only be added to the mixture after the seed and when the tank is at least one-third filled with water. The engine throttle shall be opened to full speed when the tank is half filled with water. All the wood pulp mulch shall be added by the time the tank is two-thirds to three-fourths full. Spraying shall commence immediately when the tank is full. The operator shall spray the area with a uniform visible coat, by using the green color of the wood pulp as a guide.

165.4 Application. The Contractor shall obtain approval of hydro-mulch area preparation from the Engineer prior to application. If rain is imminent,

then the application of hydromulch seeding and fertilizer shall be postponed until weather conditions exist such that the potential for the runoff of the slurry and fertilizer from the site is minimized.

Operators of hydro-mulching equipment shall be thoroughly experienced in this type of application. Apply the specified slurry mix to form a uniform mat at the specified rate. The Contractor shall avoid getting the hydromulch on paved areas. Keep paved and planting areas clean during maintenance operations. Contractor shall confine hydro-mulching within the areas designated on the plans and keep it from contact with other plant material. Immediately after application, thoroughly wash off any plants, planting areas or paved areas not intended to receive slurry mix.

If the Engineer notes any unmulched areas after hydro-mulching, the Contractor shall be required to seed the unmulched areas with the grasses that were to have been planted at no additional cost to Harris County.

- 165.5 Contractor's Maintenance & Guarantee Period. It shall be the responsibility of the Contractor to maintain all hydromulch seeded areas until satisfactory growth has occurred as determined by the Engineer and for 60 days after the successful completion of all punch list items. Maintenance shall consist of watering, weeding, repairing of all erosion, and reseeding, as necessary to establish a uniform stand of the specified grasses. A minimum of 95 percent of the area seeded shall be covered with the specified grass with no bare or dead spots greater than 10 square feet. The Contractor shall make as many repeat seedings as necessary to achieve the required level of coverage. Such reseeding is to be performed within 14 calendar days of notification by the Engineer.

The Contractor shall be responsible for 1 mowing per month in the months of April through October. The Contractor shall also be responsible for 1 mowing every 6 weeks in the months of November through March. In addition, the Contractor shall water all grassed areas as often as necessary to establish satisfactory growth and to maintain its growth throughout the duration of the project; including the 60 day period after the punch list is completed as described above.

- 165.6 Submittal Required. The Contractor shall submit copy of seed tag(s) and letter from the supplier attesting that the seed meets the requirements as stated herein. Certification shall include common name; botanical name, percent by weight of each plant species; year of harvest; percent purity, germination and dormant seed; percent noxious weed content; and date of certification. The Contractor shall certify on the application of the project.

- 165.7 Measurement. The unit of measurement for all work performed and materials furnished, as described herein, shall be by the acre or per station as indicated in the bid documents. Measurement shall be done upon completion of the work performed within the limits shown on the

drawings and as described herein. The area measured for payment will be computed to the nearest 1/10 acre or station.

- 165.8 Payment. Payment for hydro-mulch seeding will be made at the contract unit price per acre or per station and includes final grading, mulch, seed, fertilizer, watering, maintenance and clean-up. Additional payment shall not be made for those areas that are reseeded as provided in Section 165.5 above.

There are line code(s), description(s), and unit(s) for this Item.

NOTE: This Item requires other Standard Specifications.

Item 166 "Fertilizer"  
Item 725 "General Source Controls"

END OF ITEM 165



ITEM 166

FERTILIZER

- 166.1 Description. This Item shall govern for providing and distributing fertilizer over such areas as are designated for sodding for erosion control and stabilization, hydro-mulch seeding, or seeding and erosion control blanket and in accordance with these Standard Specifications.
- 166.2 Materials. All fertilizer used shall be delivered in bags or containers clearly labeled showing analysis. A pelleted or granulated fertilizer shall be used with an analysis of 10-10-5 (nitrogen – phosphoric acid – potash), unless otherwise approved by the Engineer. The figures in the analysis represent the nitrogen, phosphoric acid and potash nutrients respectively as determined by the methods of the Association of Official Agricultural Chemists. The sources of nitrogen in the fertilizer shall be roughly balanced between ammonical (quick release) and nitrate nitrogen (slow release). Fertilizer shall be readily water-soluble.
- Fertilizer of a different analysis may be substituted as approved by the Engineer. It shall be pelleted or granulated fertilizer with a lower concentration. The total amounts of nutrients furnished and applied per acre shall equal or exceed that specified for each nutrient.
- 166.3 Construction Methods. When fertilizer is included in the specifications, pelleted or granulated fertilizer shall be applied uniformly over the area specified to be fertilized and in the manner directed for the particular item of work. Fertilizer shall be dry and in good physical condition. Fertilizer that is powdered or caked will be rejected. Distribution of fertilizer for the particular item of work shall meet the approval of the Engineer.
- Unless otherwise indicated on the plans, fertilizer shall be applied uniformly at the average rate of 480 pounds per acre for the Item 162 "Sodding for Erosion Control and Stabilization", 400 pounds per acre for the Item 164 "Seeding and Erosion Control Blanket" and for the Item 165 "Hydro-Mulch Seeding for Erosion Control and Stabilization".
- 166.4 Delivery, Storage and Handling. Deliver fertilizer in bags or containers clearly labeled with name and address of the manufacturer, weight and guaranteed analysis. Bulk fertilizer, if approved by the Engineer, must be accompanied by either an invoice or label showing the name and address of the manufacturer, guaranteed analysis, and appropriate means to accurately measure and record weight of fertilizer used.
- Deliver fertilizer in clean, unopened and undamaged bags.
- 166.5 Measurement. Acceptable material for "Fertilizer" will be measured by pounds of guaranteed weight of sacks shown by manufacturer.

166.6 Payment. If the fertilizer is being utilized as part of construction project, no separate payment shall be made for materials furnished or work performed under this Item. Include the cost of the same in the contract price bid for work of which this is a component part.

If this Item is being utilized for material procurement, in which fertilizer is not already a requirement of another bid item, payment shall be made by the pound of guaranteed sack weight shown by manufacturer.

There are line code(s), description(s), and unit(s) for this Item.

NOTE: This Item requires other Standard Specifications.

Item 162 "Sodding for Erosion Control and Stabilization"

Item 164 "Seeding and Erosion Control Blanket"

Item 165 "Hydro-Mulch Seeding for Erosion Control and Stabilization"

Item 725 "General Source Controls"

END OF ITEM 166

ITEM 713

REINFORCED FILTER FABRIC BARRIER

713.1 Description. This Item shall govern for furnishing, installing, and removing temporary erosion protection and sediment control reinforced filter fabric barrier in accordance with these Standard Specifications and construction drawings, and as directed by the Engineer. The reinforced filter fabric barrier consists of geotextile fabric supported by a net reinforced fence stretched across and attached to supporting posts or frame and entrenched. This work shall be performed during construction operations and prior to final stabilization to control erosion and sedimentation.

713.2 Materials. Geotextile fabric (filter fabric) shall consist of long-chain synthetic polymers composed of at least 95 percent by weight of polyolefins in a woven fabric. The geotextile fabric shall meet or exceed the following specifications:

TABLE 1

Silt Fence Geotextile Fabric Properties			Requirements Unsupported Silt Fence	
	Units	Supported Silt Fence	Geotextile Elongation ≥50%	Geotextile Elongation <50%
Grab Strength				
Machine Direction	Lbs.	90	123	123
X-Machine Direction	Lbs.	90	100	100
Permittivity	Sec <sup>-1</sup>	0.05	0.05	0.05
Apparent Opening Size (maximum average roll value)	Mm/sieve	0.6/30	0.6/30	0.6/30
Ultraviolet Stability (Retained Tensile Strength)	%	70 after 500 hrs exposure	70 after 500 hrs exposure	70 after 500 hrs exposure
NOTES:				
1. Table 1 adapted from AASHTO M 288 <i>Geotextile Specification for Highway Applications</i> Table 6. Temporary Silt Fence Property Requirements.				
2. All numeric values in Table 1 except Apparent Opening Size (AOS) represent minimum average roll values (MARV). Values for AOS represent maximum average roll values.				

Geotextile fabric shall contain stabilizers and/or inhibitors to make the fabric resistant to deterioration resulting from exposure to sunlight or heat. Geotextile fabric shall be resistant to commonly encountered soil chemicals, mildew, rot, and insects. Geotextile fabric shall be free of defects or flaws that affect its physical and/or filtering properties. Geotextile fabric shall provide an expected useable life comparable to the anticipated construction period.

Fence posts shall be either steel or hardwood, essentially straight, with a minimum length of 4 feet. Hardwood posts shall be 2 inch x 2 inch minimum, or equivalent. Metal posts shall be either studded T or U steel type with a minimum weight of 1.28 lbs. per linear foot. Fin anchors shall be used to resist post movement as directed by the Engineer.

Net reinforced fence shall be 2 inch wide by 4 inch high welded wire fabric mesh, 14 gauge minimum. The mesh support height shall be the equivalent height, or greater, of the geotextile fabric to be attached. Plastic grid mesh or other support mesh may be substituted for welded wire mesh as approved by the Engineer.

Attachment of net reinforced fence and geotextile fabric shall be with wire ties, staples, or rings. Wire ties shall be 14 gauge minimum, staples shall be no. 9 wire minimum with a 1/2 inch minimum crown length, and rings shall be galvanized, or as approved by the Engineer.

A prefabricated unit with geotextile fabric, posts, and wire mesh meeting the minimum specifications in this Item may be used in lieu of a constructed filter fabric barrier.

713.3

Construction Methods. No clearing and grubbing or rough cutting, other than as specifically directed by the Engineer to allow for soil testing, surveying and installation of erosion protection and sediment control measures, shall be permitted until sediment control and erosion protection systems are in place.

Reinforced filter fabric barriers shall be so installed that the surface runoff will percolate through the system and allow sediment to be retained and accumulated, and may be used in conjunction with a rock filter dam (Item 750) at the outfall of a detention pond. Reinforced filter fabric barrier shall not be used as the sole best management practice at the outfall of a detention pond. Reinforced filter fabric barriers shall be installed at the locations shown on the construction drawings and in accordance with the Standard Civil Drawing or as directed by the Engineer. Reinforced filter fabric barriers shall be constructed in accordance with an approved schedule that clearly describes the timing during the construction process that the various erosion control measures will be implemented. Reinforced filter fabric barriers shall be installed so as surface runoff will percolate through the system and allow sediment to be retained and accumulated.

Posts shall be driven to a minimum depth of 1 foot into the ground. Posts shall be a minimum of 18" above the ground. Posts shall be placed with a maximum spacing of 6 feet and be installed on a slight angle toward the anticipated runoff.

Trenches shall be dug along the uphill side of the fence to anchor at least 8 inches of the filter fabric to prevent underflow. The trench shall be a 6 inch x 6 inch square, or a 4 inch deep V-trench.

Net reinforced fence shall be attached to the posts. Attachment shall be at the top and mid-section. Additional ties or staples shall be added to secure the net reinforced fence to the posts as directed by the Engineer.

Geotextile fabric shall be placed against the side of the trench with approximately 2 inches across the bottom in the upstream direction. Using

wire ties or rings, the geotextile fabric shall be attached to the net reinforced fence. The fabric shall be attached at the top and mid-section. The horizontal spacing of the attachment shall be every 24 inches, or less. Additional ties, rings, or staples shall be added to secure fabric to the net reinforced fence or posts as directed by the Engineer.

Geotextile fabric shall be provided in continuous rolls and cut to the length of the barrier, so as to minimize joints. When joints of two sections of fabric are necessary, the fabric shall be spliced together only at a support post. The fabric shall be overlapped a minimum of 6 inches at a post, folded, and secured at six or more places. Splices in concentrated flow areas will not be permitted.

Geotextile fabric shall be attached at the end posts at a minimum of four locations. Geotextile fabric shall be entrenched and attached to the posts so as a minimum of 18 inches of the fabric is above the ground. The trench then shall be backfilled and hand tamped as approved by the Engineer.

Contractor shall inspect the reinforced filter fabric barriers at least once every week or as directed by the Engineer. The Contractor shall remove irregularities which will impede normal flow. Erosion protection and sediment control systems shall be maintained by the Contractor until final stabilization. Damage caused to erosion protection and sediment control systems shall be repaired immediately. (Note: Maintenance for Item 713 is paid for under Item 751 "SWPPP Inspection and Maintenance")

The Contractor is responsible for removal and proper disposal of sediment and debris from the reinforced filter fabric barrier system and as directed by the Engineer. Sediment and debris shall not be allowed to flush into the storm sewer system, waterways, and jurisdictional wetlands, or onto adjacent properties. Sediment deposits shall be removed before they reach one-third of the height of the reinforced filter fabric barrier.

Uncontaminated sediment can be placed at the project spoil site protected by a reinforced filter fabric barrier or, if properly handled, spread out to supplement fill requirements. The Engineer will designate how the sediment deposits are to be handled. Uncontaminated sediment shall not be placed in waterways or jurisdictional wetlands, unless as approved by the Engineer. If sediment has been contaminated, then it shall be disposed of in compliance with current local, State and Federal Regulations. Offsite disposal shall be the responsibility of the Contractor.

After final stabilization and at the direction of the Engineer, the Contractor, when required, shall be responsible for removing all erosion protection and sediment control systems that are not permanent, from the project.

713.4

Quality Assurance. The Contractor is responsible for the control of the quality of materials incorporated into the construction and the quality of completed construction. The County will engage materials engineering

services to provide quality assurance testing and inspection to assist the Engineer in determining the acceptability of materials and completed construction. Quality assurance services provided by the County do not relieve the Contractor of his responsibility for quality control. The Materials Engineer shall not have control of the means, methods, techniques, sequences or procedures of construction selected by the Contractor.

713.5 Measurement. When paid for separately as a pay item, measurement for reinforced filter fabric barrier shall be by the linear foot, complete in place, measurement being made along the centerline of the top of the barrier.

713.6 Payment. Payment for reinforced filter fabric barrier shall include and be full compensation for all labor, equipment, materials, supervision and all incidental expenses for the construction of this Item, complete in place, where 60 percent of the total unit cost shall be for furnishing and installing all materials. Thus, 40 percent of the total unit cost shall be for the removal and disposal of erosion protection and sediment control systems: reinforced filter fabric barrier, after final stabilization, at the end of the project.

There are line code(s), description(s), and unit(s) for this Item.

NOTE: This Item requires a Standard Civil Drawing that shall be incorporated into the contract documents.

NOTE: This Item requires other Standard Specifications.

Item 751 "SWPPP Inspection and Maintenance"

END OF ITEM 713

ITEM 719

INLET PROTECTION BARRIERS

719.1 Description. This Item shall govern for furnishing, installing, and removing temporary erosion protection and sediment control inlet protection barriers in accordance with these Standard Specifications and construction drawings, and as directed by the Engineer. The inlet protection barrier consists of a geotextile fabric (filter fabric) supported by a net reinforced fence structure and constructed around a storm drain inlet, catch basin, or culvert. An alternative design of the inlet protection barrier, as approved by the Engineer, consists of fiber rolls placed around a frame, staked in place (or weighted down with clean gravel bags), and constructed around a storm drain inlet, catch basin or culvert. This work shall be performed during construction operations and prior to final stabilization to control erosion and sedimentation.

719.2 Materials. Geotextile fabric (filter fabric) shall consist of long-chain synthetic polymers composed of at least 95 percent by weight of polyolefins in a woven fabric. The geotextile fabric shall meet or exceed the following specifications shown in Table 1:

TABLE 1

Silt Fence Geotextile Fabric Properties			Requirements Unsupported Silt Fence	
	Units	Supported Silt Fence	Geotextile Elongation ≥50%	Geotextile Elongation <50%
Grab Strength				
Machine Direction	Lbs.	90	123	123
X-Machine Direction	Lbs.	90	100	100
Permittivity	Sec <sup>-1</sup>	0.05	0.05	0.05
Apparent Opening Size (maximum average roll value)	Mm/sieve	0.6/30	0.6/30	0.6/30
Ultraviolet Stability (Retained Tensile Strength)	%	70 after 500 hrs exposure	70 after 500 hrs exposure	70 after 500 hrs exposure

NOTES:

1. Table 1 adapted from AASHTO M 288 *Geotextile Specification for Highway Applications* Table 6. Temporary Silt Fence Property Requirements.
2. All numeric values in Table 1 except Apparent Opening Size (AOS) represent minimum average roll values (MARV). Values for AOS represent maximum average roll values.

Geotextile fabric shall contain stabilizers and/or inhibitors to make the fabric resistant to deterioration resulting from exposure to sunlight or heat. Geotextile fabric shall be resistant to commonly encountered soil chemicals, mildew, rot, and insects. Geotextile fabric shall be free of defects or flaws that affect its physical and/or filtering properties. Geotextile fabric shall provide an expected useable life comparable to the anticipated construction period.

Posts shall be either steel or hardwood, essentially straight, with a minimum length of 4 feet. Hardwood posts shall be 2 inch x 2 inch minimum, or equivalent. Metal posts shall be either studded T or U steel type with a minimum weight of 1.28 lbs. per linear foot. Fin anchors shall be used to resist post movement as directed by the Engineer.

Support beams shall be either steel or hardwood essentially straight. Hardwood support beams shall be 2 inch x 2 inch minimum, or equivalent. Metal support beams shall be either studded T or U steel type with or minimum weight of 1.28 lbs per linear foot, or as approved by the Engineer.

Net reinforced fence shall be 2 inch wide by 4 inch high welded wire fabric mesh, 14 gauge minimum. The mesh support height shall be the equivalent height, or greater, of the geotextile fabric to be attached. Plastic grid mesh or other support mesh may be substituted for welded wire mesh as approved by the Engineer.

Attachment of net reinforced fence and geotextile fabric shall be with wire ties, staples, or rings. Wire ties shall be 14 gauge minimum, staples shall be no. 9 wire minimum with a 1/2 inch minimum crown length, and rings shall be galvanized, or as approved by the Engineer.

A prefabricated unit with geotextile fabric, posts, supports, and wire mesh meeting the minimum specifications in this Item may be used in lieu of a constructed inlet protection barrier.

Fiber roll material for inlet protection barrier alternative design shall be as approved by the Engineer.

719.3 Construction Methods. No clearing and grubbing or rough cutting, other than as specifically directed by the Engineer to allow for soil testing, surveying and installation of erosion protection and sediment control measures, shall be permitted until sediment control and erosion protection systems are in place.

Inlet protection barriers shall be installed at the locations shown on the construction drawings and in accordance with the Standard Civil Drawing or as directed by the Engineer. Inlet protection barriers shall be constructed in accordance with an approved schedule that clearly describes the timing during the construction process that the various erosion control measures will be implemented. Inlet protection barriers shall be installed so as surface runoff will percolate through the system and allow sediment to be retained and accumulated.

Posts shall be driven to a minimum depth of 1 foot into the ground. Posts shall be a minimum of 18" above the ground. Posts shall be placed with a maximum spacing of 4 feet. Horizontal support beams shall be securely attached from post to post and no higher than the top of the filtering material.



Trenches shall be dug along the upstream side of the barrier to anchor at least 8 inches of the geotextile fabric to prevent underflow. The trench shall be a 6 inch x 6 inch square, or a 4 inch deep V-trench.

Net reinforced fence shall be attached to the posts. Attachment shall be at the top and mid-section. Additional ties or staples shall be added to secure the net reinforced fence to the posts as directed by the Engineer.

Geotextile fabric shall be placed against the side of the trench with approximately 2 inches across the bottom in the upstream direction. Using wire ties or rings, the geotextile fabric shall be attached to the net reinforced fence. The fabric shall be attached at the top and mid-section. The horizontal spacing of the attachment shall be every 24 inches, or less. Additional ties, rings, or staples shall be added to secure fabric to the net reinforced fence or posts as directed by the Engineer. Geotextile fabric shall be entrenched and attached to the posts so as a minimum of 18 inches of the fabric is above the ground.

Geotextile fabric shall be provided in continuous rolls and cut to the length of the barrier, so as to minimize joints. When joints of two sections of fabric are necessary, the fabric shall be spliced together only at a support post. The fabric shall be overlapped a minimum of 6 inches at a post, folded, and secured at six or more places.

After the geotextile fabric has been securely attached, the trench shall be backfilled and hand tamped as approved by the Engineer.

For inlet protection barriers with reinforced filter fabric, if the immediately adjacent surface is a hard packed surface, the geotextile fabric shall extend outward away from the inlet protection barrier and upstream along the hard packed surface for at least 12 inches and be weighed down continuously along the perimeter of the structure with at least 4 inches of clean gravel or nylon gravel filled bags

The Contractor shall inspect the inlet protection barriers at least once every week or as directed by the Engineer. The Contractor shall remove irregularities which will impede normal flow. Erosion protection and sediment control systems shall be maintained by the Contractor until final stabilization. Damage caused to erosion protection and sediment control systems shall be repaired immediately. (Note: Maintenance for Item 719 is paid for under Item 751 "SWPPP Inspection and Maintenance")

The Contractor is responsible for removal and proper disposal of sediment and debris from the inlet protection barrier system and as directed by the Engineer. Sediment and debris shall not be allowed to flush into the storm sewer system, waterways, and jurisdictional wetlands, or onto adjacent properties. Sediment deposits shall be removed before they reach one-third of the height of the inlet protection barrier.

Uncontaminated sediment can be placed at the project spoil site or, if properly handled, spread out to supplement fill requirements. The

Engineer will designate how the sediment deposits are to be handled. Uncontaminated sediment shall not be placed in waterways or jurisdictional wetlands, unless as approved by the Engineer. If sediment has been contaminated, then it shall be disposed of in compliance with current local, State and Federal Regulations. Offsite disposal shall be the responsibility of the Contractor.

After final stabilization and at the direction of the Engineer, the Contractor, when required, shall be responsible for removing all erosion protection and sediment control systems that are not permanent, from the project.

719.4 Quality Assurance. The Contractor is responsible for the control of the quality of materials incorporated into the construction and the quality of completed construction. The County will engage materials engineering services to provide quality assurance testing and inspection to assist the Engineer in determining the acceptability of materials and completed construction. Quality assurance services provided by the County do not relieve the Contractor of his responsibility for quality control. The Materials Engineer shall not have control of the means, methods, techniques, sequences or procedures of construction selected by the Contractor.

719.5 Measurement. When paid for separately as a pay item, measurement shall be by the unit, for each inlet protection barrier, complete in place.

719.6 Payment. Payment for each unit of an inlet protection barrier shall include and be full compensation for all labor, equipment, materials, supervision and for all incidental expenses for the construction of these items, complete in place, where 60 percent of the total unit cost shall be for the furnishing and installing all material. Thus, 40 percent of the total unit cost shall be for the removal of erosion protection and sediment control systems: inlet protection barriers, after final stabilization, at the end of the project.

There are line code(s), description(s), and unit(s) for this Item.

NOTE: This Item requires a Standard Civil Drawing that shall be incorporated into the contract documents.

NOTE: This Item requires other Standard Specifications

Item 751 "SWPPP Inspection And Maintenance"

END OF ITEM 719

ITEM 730

CONCRETE TRUCK WASHOUT STRUCTURES

- 730.1 Description. This Item shall govern for furnishing, installing and removing concrete washout structures. The description for maintenance is included in this Item, but payment for maintenance is part of Item 751 "SWPPP Inspection and Maintenance".
- 730.2 Submittals. Concrete truck washout structure shall be used per Standard Civil Drawing.
- Submit site plan showing location(s) of concrete truck washout structure(s) for approval.
- Submit plan for disposal of both concrete truck washout water and solid concrete wastes for approval.
- 730.3 Concrete Truck Washout Structure. Refer to the Standard Civil Drawing detail for "Concrete Truck Washout Structure", with sandbags.
- 730.4 Placement. Do not locate concrete washout structures within 50 feet of storm drain inlets, open drainage facilities or watercourses.
- Locate away from construction traffic or access areas to prevent disturbance or tracking.
- 730.5 Construction. Install a sign adjacent to each temporary concrete washout structure to inform concrete equipment operators to utilize the proper facilities. See Detail sheets for sign dimensions.
- Detail – "Below Grade Concrete Truck Washout Structure with Sandbags".
- Construct temporary concrete truck washout structures below grade with a minimum length and width of 10 feet. Construct and maintain concrete truck washout structures in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.
  - Remove rocks and other debris in soil base of structure that might tear or puncture the plastic lining.
  - Provide plastic lining material which is a minimum of 10 mil thick polyethylene sheeting. Sheeting shall be free of holes, tears or other defects that compromise the impermeability of the lining. Install lining seams in accordance with manufacturers' recommendations.
  - Provide sandbags to hold plastic lining in place.
  - Install 15 feet by 35 feet by 8 inches thick granular fill truck parking pad underlain with geotextile per Item 724 "Stabilized Construction Access".
  - Install orange safety fence around three sides of the structure as shown on the drawing detail.

- 730.6 Maintenance. Once concrete wastes are washed into the designated structure and allowed to harden, break up the concrete, remove and dispose in accordance with approved submittal.
- Inspect lining integrity and level in concrete washout structure before each rainfall to prevent overtopping due to rainfall and daily during periods of daily rainfall and, at a minimum, once every week.
- Repair or replace damaged lining or other damaged or missing parts of the washout structure immediately.
- Maintain level in washout structure(s) to provide adequate holding capacity with a minimum freeboard of 12 inches.
- Existing washout structure(s) must be cleaned, or new washout structure(s) constructed and ready for use once the washout structure is 75 percent full. Contractor is responsible for any concrete washed out in other location. (Note: Maintenance for Item 730 is paid for under Item 751 "SWPPP Inspection and Maintenance")
- 730.7 Removal of Concrete Washout Structures. Once concrete washout structures are no longer required, as determined by the Engineer, remove and dispose the hardened concrete and concrete washout water per the approved submittal.
- 730.8 Material Disposal. Dispose materials used to construct truck washout structure(s) and granular fill parking pad(s) in compliance with current local, State and Federal Regulations.
- Remove unusable, objectionable or excess material from the construction work area. Dispose of such material in compliance with current local, State and Federal Regulations.
- Disposal of material in the 100-year flood plain without permits is prohibited.
- Disposal of material in wetlands or other environmentally sensitive areas without permits is prohibited.
- Material disposed of without permits shall be removed and properly disposed of at no cost to the County. Restore the site at no cost to the County.
- 730.9 Site Restoration. Compact clean fill in pit up to surrounding grade.
- Backfill and repair all holes, depressions or other ground disturbances caused by the construction and removal of the concrete washout structure(s).
- Restore concrete washout structure area to match surrounding grade and vegetation.

730.10 Measurement. Measurement is as noted as lump sum. No separate measurement will be made for maintenance or removal of accumulated washout structure wastes.

730.11 Payment. Payment is lump sum, for the duration of the project. Payment shall include and be full compensation for all labor, equipment, materials, supervision and for all incidental expenses for the installation of concrete washout structures, complete in place, where 60% of the total cost shall be for the furnishing and installation with embankment and excavation. Thus, 40% of the total cost shall be for the removal of concrete truck washout structures, after final stabilization, at the end of the project.

No separate payment will be made for maintenance or removal of accumulated washout structure wastes, per this Item. Removal of the concrete washout structure and site restoration is a part of the cost bid for the concrete washout structure. For the Below Grade Concrete Washout Structure shown on the Standard Civil Drawing detail, the sandbags and geotextile are incidental to the cost of the concrete truck washout structure.

There are line code(s), description(s), and unit(s) for this Item.

NOTE: This Item requires a Standard Civil Drawing that shall be incorporated into the contract documents.

NOTE: This Item requires other Standard Specifications.

Item 724 "Stabilized Construction Access"  
Item 751 "SWPPP Inspection and Maintenance".

END OF ITEM 730

ITEM 741

INLET PROTECTION BARRIER  
 (FOR STAGE II INLETS, GRAVEL BAGS)

741.1 Description: This Item shall govern for furnishing, installing, and removing temporary erosion protection and sediment control gravel bag inlet protection barrier for a stage II inlet in accordance with these Standard Specifications and construction drawings, and as directed by the Engineer. Gravel bag inlet protection barriers for stage II inlets are geotextile fabric bags filled with clean gravel and placed around a stage II inlet, such as a curb inlet. This work shall be performed during construction operations and prior to final stabilization to control erosion and sedimentation.

741.2 Materials: Bags shall consist of geotextile fabric (filter fabric) made of long-chain synthetic polymers composed of at least 95 percent by weight of polyolefins in a woven fabric. The geotextile fabric shall meet or exceed the following specifications shown in Table 1:

TABLE 1

Silt Fence Geotextile Fabric Properties			Requirements Unsupported Silt Fence	
	Units	Supported Silt Fence	Geotextile Elongation ≥50%	Geotextile Elongation <50%
Grab Strength				
Machine Direction	lbs.	90	123	123
X-Machine Direction	lbs.	90	100	100
Permittivity	sec <sup>-1</sup>	0.05	0.05	0.05
Apparent Opening Size (maximum average roll value)	mm/sieve	0.6/30	0.6/30	0.6/30
Ultraviolet Stability (Retained Tensile Strength)	%	70 after 500 hrs exposure	70 after 500 hrs exposure	70 after 500 hrs exposure

NOTES:

1. Table 1 adapted from AASHTO M 288 *Geotextile Specification for Highway Applications* Table 6. Temporary Silt Fence Property Requirements.
2. All numeric values in Table 1 except Apparent Opening Size (AOS) represent minimum average roll values (MARV). Values for AOS represent maximum average roll values.

Geotextile fabric shall contain stabilizers and/or inhibitors to make the fabric resistant to deterioration resulting from exposure to sunlight or heat. Geotextile fabric shall be resistant to commonly encountered soil chemicals, mildew, rot, and insects. Geotextile fabric shall be free of defects or flaws that affect its physical and/or filtering properties.

Geotextile fabric shall provide an expected useable life comparable to the anticipated construction period.

The bag size shall be as follows:

Length:	18 to 24 inches
Width:	12 to 18 inches
Thickness	6 to 8 inches

The bag shall be filled with open-graded gravel and weigh 50 to 75 pounds. The gravel shall be free from adherent coatings, salt, alkali, dirt, clay, or organic and injurious matter.

Nylon rope shall be used to secure the closure of the gravel filled bag.

741.3

Construction Methods: Gravel bag inlet protection barrier for a stage II inlet shall be installed at the locations shown on the construction drawings and in accordance with the Standard Civil Drawing or as directed by the Engineer. Inlet protection barrier for a stage II inlet shall be constructed in accordance with an approved schedule that clearly describes the timing during the construction process that the various erosion control measures will be implemented. Inlet protection barrier for a stage II inlet shall be installed so as surface runoff will percolate through the system and allow sediment to be retained and accumulated.

Gravel bags for the inlet protection barrier shall be placed so as the gravel bags are placed on each side of the curb inlet along the gutter line and continuously along the back of the curb inlet. Gravel bags shall not be placed so as the throat of the inlet is blocked. Gravel bags shall be placed in a row with ends tightly abutting the adjacent bag.

The Contractor shall inspect the gravel bag inlet protection barrier at least once every week or as directed by the Engineer. The Contractor shall remove irregularities which will impede normal flow. Erosion protection and sediment control systems shall be maintained by the Contractor until final stabilization. Damage caused to erosion protection and sediment control systems shall be repaired immediately. (Note: Maintenance for Item 741 is paid for under Item 751 "SWPPP Inspection and Maintenance")

The Contractor is responsible for removal and proper disposal of sediment and debris from the inlet protection barrier system and as directed by the Engineer. Sediment and debris shall not be allowed to flush into the storm sewer system, waterways, jurisdictional wetlands, or onto adjacent properties. Sediment deposits shall be removed before they reach one-third of the height of the gravel bags.

Uncontaminated sediment can be placed at the project spoil site or, if properly handled, spread out to supplement fill requirements. The Engineer will designate how the sediment deposits are to be handled. Uncontaminated sediment shall not be placed in waterways or jurisdictional wetlands, unless as approved by the Engineer. If sediment

has been contaminated, then it shall be disposed of in compliance with current local, State, and Federal Regulations. Offsite disposal shall be the responsibility of the Contractor.

After final stabilization and at the direction of the Engineer, the Contractor, when required, shall be responsible for removing all erosion protection and sediment control systems that are not permanent, from the project.

- 741.4 Quality Assurance. The Contractor is responsible for the control of the quality of materials incorporated into the construction and the quality of completed construction. The County will engage materials engineering services to provide quality assurance testing and inspection to assist the Engineer in determining the acceptability of materials and completed construction. Quality assurance services provided by the County do not relieve the Contractor of his responsibility for quality control. The Materials Engineer shall not have control of the means, methods, techniques, sequences or procedures of construction selected by the Contractor.
- 741.5 Measurement. Inlet protection barrier for a stage II inlet shall be measured as "each", complete in place all necessary gravel bags to protect against erosion and control sediment.
- 741.6 Payment. Payment for a gravel bag inlet protection barrier for a stage II inlet shall include and be full compensation for all labor, equipment, materials, supervision, and all incidental expenses for construction of this Item, where 60 percent of the total unit cost shall be for the furnishing and installing all materials. Thus, 40 percent of the total unit cost shall be for the removal and disposal of erosion protection and sediment control systems: inlet protection barrier, after final stabilization, at the end of the project.

There are line code(s), description(s), and unit(s) for this Item.

NOTE: This Item requires a Standard Civil Drawing that shall be incorporated into the contract documents.

NOTE: This Item requires other Standard Specifications.

Item 751 "SWPPP Inspection and Maintenance"

END OF ITEM 741



ITEM 750

ROCK FILTER DAMS

750.1 Description. This Item shall govern for furnishing and installing temporary erosion protection and sediment control rock filter dams utilized during construction operations and prior to final stabilization in accordance with these Standard Specifications and construction drawings, and as directed by the Engineer. Rock filter dams are temporary berms constructed of stone to intercept and slow storm water runoff to retain sediment on the construction site. Depending upon the type of rock filter dam specified in the construction plans as Type 1, 2, 3, 4, or 5, the aggregate fill may be unwrapped, wrapped in twisted hexagonal wire mesh, or confined in a gabion wire basket.

Applications of RockFilter Dams:

- A. Type 1 dams may be used at toe of slopes, around inlets, in small ditches, and at dike or swale outlets. Type 1 dams are recommended for erosion and sediment control from a drainage area of 5 acres or less.
- B. Type 2 dams may be used in ditches and at dike or swale outlets.
- C. Type 3 dams may be used in stream flow.
- D. Type 4 sack gabions may be used in ditches and smaller channels to form an erosion and sediment control dam.
- E. Type 5: As shown in plans.

750.2 Materials. Geotextile fabric shall consist of a woven monofilament or spunbond nonwoven fibers consisting of long chain synthetic polymers composed of at least 95 percent by weight of polyolefins. Geotextile fabric shall equal or exceed the following average roll values or as directed by the Engineer:

- A. Minimum average roll value.
  - (1) Elongation  $\geq$  50%.
  - (2) Grab Strength – 200 pounds.
  - (3) Puncture Strength – 75 pounds.
  - (4) UV Stability (retained strength) – 50% after 500 hours of exposure.

B. Maximum average roll value.

- (1) Apparent Opening Size (AOS) – 0.6 mm/#30 US sieve.

Geotextile fabric shall be resistant to commonly encountered soil chemicals, mildew, rot, insects, and deterioration resulting from exposure to sunlight or heat. Geotextile fabric shall provide an expected useable life comparable to the anticipated construction period.

Aggregate for the rock filter dams shall consist of crushed stone. Aggregate particles shall be composed of clean, hard, durable materials free from adherent coatings, salt, alkali, dirt, clay, loam, shale, soft or flaky materials or organic and injurious matter. Aggregate shall be cubic or

rounded form, not elongated, flat, shapes. Spalls, fragments, and chips shall not exceed 5 percent by weight. Crushed concrete shall not be substituted for the crushed stone unless as approved by the Engineer. Aggregate size shall depend upon the type of rock filter dam specified in the construction plans. Aggregate size based on type of rock filter dam is as follows:

- A. Type 1: 3 inches to 5 inches, open graded.
- B. Type 2: 3 inches to 5 inches, open graded.
- C. Type 3: 4 inches to 8 inches, open graded.
- D. Type 4: 3 inches to 5 inches, open graded.
- E. Type 5: As shown on the plans.

Mesh is required for reinforced type rock filter dams. Mesh shall be 20 gauge galvanized double twisted hexagonal wire mesh with 1 inch diameter hexagonal openings. Mesh wire shall be zinc coated prior to being double twisted. Reinforcing spiral binders, lacing wire, and stiffeners shall be made of wire having the same coating material and same wire size as the wire mesh. Gabion wire baskets shall equal or exceed the requirements of the wire mesh.

750.3

Construction Methods. No clearing and grubbing or rough cutting, other than as specifically directed by the Engineer to allow for soil testing, surveying and installation of erosion protection and sediment control measures, shall be permitted until sediment control and erosion protection systems are in place.

Rock filter dams shall be installed at the locations shown on the construction plans and in accordance with the Standard Civil Drawing or as directed by the Engineer. Rock filter dams shall be the types specified in the construction plans. Rock filter dams shall be constructed in accordance with an approved schedule that clearly describes the timing during the construction process that the various erosion control measures will be implemented. Rock filter dams shall be installed so as to prevent downstream deposition of sediment and debris from the construction site.

The separation geotextile fabric and wire mesh shall be sized and placed in accordance with the rock filter dam detail and as specified by the type of rock filter dam shown in the construction plans. The separation geotextile fabric may be omitted only as approved by the Engineer. The separation geotextile fabric and wire mesh shall be securely staked with wooden or metal stakes to the bottom and side slopes of the ditch or channel prior to aggregate placement. Sack gabions for Type 4 rock filter dams shall be securely staked with wooden or metal stakes to the bottom and side slopes of the ditch or channel, as well.

Aggregate fill shall be placed to the width, length, height and slopes in accordance with this Item and the rock filter dam detail and as specified by the type of rock filter dam shown in the construction plans. The height of the dam shall be measured vertically from the existing ground to the top of the filter dam. The length of the dam shall be measured across the top

centerline of the dam from embankment to embankment and includes the additional length embedded into the embankment. Width of the dam shall be measured along the top face of the dam.

Wire mesh shall be folded upstream side over the aggregate fill and tightly secured to itself on the downstream side using wire ties. Rings may be substituted for wire ties.

Additional aggregate fill or gravel bags shall be placed and secured at the embedded section to prevent low flows from short circuiting the dam at the adjacent dirt embankment area. Gravel bags shall meet the specifications of Item 741 "Inlet Protection Barrier (for Stage II Inlets, Gravel Bags)".

The Contractor shall be responsible for periodic reshaping, repairing, and maintaining of rock filter dams as directed by the Engineer.

The Contractor shall inspect the rock filter dam at least once every week or as directed by the Engineer. Damage caused to rock filter dams shall be repaired immediately. Rock filter dams shall be maintained by the Contractor until construction staging requires removal or upon final stabilization of the construction site. Upon removal of the rock filter dam, the area shall be stabilized with vegetation, or other. (Note: Maintenance for Item 750 is paid for under Item 751 "SWPPP Inspection and Maintenance")

The Contractor is responsible for removal and proper disposal of sediment and debris from the rock filter dam. Removed sediment and debris shall not be allowed to flush into the storm sewer system, waterways, jurisdictional wetlands, or onto adjacent properties. Sediment deposits shall be removed before they reach 1/3 of the height of the dam.

Uncontaminated sediment can be placed at the project spoil site or, if properly handled, spread out to supplement fill requirements. The Engineer will designate how the sediment deposits are to be handled. Uncontaminated sediment shall not be placed in waterways or jurisdictional wetlands, unless as approved by the Engineer. If sediment has been contaminated, then it shall be disposed of in compliance with current local, State and Federal Regulations. Offsite disposal shall be the responsibility of the Contractor.

After final stabilization and at the direction of the Engineer, the Contractor, when required, shall be responsible for removing all erosion protection and sediment control systems that are not permanent, from the project.

Pursuant to Section 404 of the Clean Water Act, a permit may be required for placement of fill, rock filter dams, into Waters of the United States, Waters of the State, and their associated jurisdictional wetlands. The Contractor shall not proceed with the construction of the rock filter dams in Waters of the United States, Waters of the State, and their associated jurisdictional wetlands until the permits are obtained.

- 750.4 Quality Assurance. The Contractor is responsible for the control of the quality of materials incorporated into the construction and quality of completed construction. The County will engage materials engineering services to provide quality assurance testing and inspection to assist the Engineer in determining the acceptability of materials and completed construction. Quality assurance services provided by the County do not relieve the Contractor of his responsibility for quality control. The Materials Engineer shall not have control of the means, methods, techniques, sequences or procedures of construction selected by the Contractor.
- 750.5 Measurement. When paid for separately as a pay item, measurement for rock filter dams, Types 1,2,3,4, or 5 shall be by the linear foot, as shown on the plans, complete in place. Measurement shall be along the centerline of the top of the dam from embankment to embankment and includes the additional length which is embedded into the embankment.
- 750.6 Payment. Payment for rock filter dams shall include and be full compensation for all labor, equipment, materials, supervision and for all incidental expenses for the construction of these items, complete in place, where 60 percent of the total unit cost shall be for furnishing and installation with embankment and excavation. Thus, 40 percent of the total unit cost shall be for the removal of erosion protection and sediment control systems: rock filter dams, after final stabilization, at the end of the project. Geotextile fabric, reinforcement, aggregate fill, and gravel bags shall be considered incidental expenses to this Item. Disposal of sediment and debris are considered incidental expenses to this Item.

There are line code(s), description(s), and unit(s) for this Item.

NOTE: This Item requires drawing details that shall be incorporated into the contract documents.

NOTE: This Item requires other Standard Specifications.

Item 741 "Inlet Protection Barrier (for Stage II Inlets, Gravel Bags)"  
Item 751 "SWPPP Inspection and Maintenance"

END OF ITEM 750

ITEM 751

SWPPP INSPECTION AND MAINTENANCE

751.1 Description. This Item shall govern for inspecting, maintaining, cleaning, and replacing as necessary, all SWPPP items, in conformance with the drawings and/or as directed by the Engineer. Included in the maintenance of the SWPPP will be once per week inspections and reports, or as directed by the Engineer. The day of the week established for the inspections, shall be mutually agreed to, by Harris County and the Contractor, prior to the Contract start date.

A Storm Water Pollution Prevention Plan (SWPPP) has been established for this project in accordance with the EPA and TCEQ regulations, and as defined by the TPDES General Permit.

751.2 Construction Methods. All SWPPP items shall conform to details shown on the drawings and the Storm Water Pollution Prevention Plan in the Project Manual.

Prior to beginning work, the Contractor shall designate in writing an authorized representative who will be responsible and available on the project site or in the immediate area to insure compliance with the SWPPP.

The Contractor is solely responsible for inspecting and maintaining all the SWPPP items. The Contractor's responsibility in this regard extends for the entire duration of the project, from the start of construction until acceptance by the County.

All SWPPP items such as Sodding, Hydro-Mulch Seeding, Reinforced Filter Fabric Barrier, Inlet Protection Barrier (Stage I and/or Stage II), Stabilized Construction Access, Concrete Truck Washout, Rock Filter Dam, etc. shall be maintained at all times by cleaning, replacing or a combination thereof such that after rain or other inclement weather the SWPPP items shall be equal to or exceed their like new installed condition.

The Contractor shall receive compensation for inspecting and maintaining the necessary SWPPP items, and any incidentals necessary to achieve turf establishment and an approved final inspection and acceptance by the County.

The above does not preclude the requirements of the "Harris County General Conditions".

751.3 Submittal. The Contractor shall be required to submit and fill out the SWPPP Inspection Report at least once per week, or as directed by the Engineer. The inspection and the Report shall be completed in conformance with the Storm Water Pollution Prevention Plan, and

maintained at the project site. The Contractor shall maintain a corrective action log, and the SWPPP amendment log.

751.4 Measurement & Payment. Inspecting, maintaining, cleaning, and replacing any or all SWPPP items, shall be paid for by the month, provided the SWPPP is properly maintained, as approved by the Engineer. Included in the maintenance of the SWPPP will be the issues described in Item 725 "General Source Controls (SWPPP)" and required weekly inspections and Reports. All items noted in each weekly SWPPP Inspection Report shall be corrected within 72 hours, or prior to the next rain event, whichever come first, and/or as approved by the Engineer.

The SWPPP Monthly Maintenance Fee will be designated by a minimum bid amount.

If in the opinion of the Engineer, the Contractor does not comply with the above requirements of the work, a prorated portion of the SWPPP Monthly Maintenance Fee will be withheld from any money due or to become due to the Contractor.

There are line code(s), description(s) and unit(s) for this Item.

NOTE: This Item requires other Standard Specifications as designated in the Project Manual.

NOTE: This Item requires other Standard Specifications

Item 162 "Sodding For Erosion Control and Stabilization"  
Item 165 "Hydro-Mulch Seeding (For Erosion Control and Stabilization)"

Item 713 "Reinforced Filter Fabric Barrier"

Item 719 "Inlet Protection Barriers"

Item 724 "Stabilized Construction Access"

Item 725 "General Source Controls (SWPPP)"

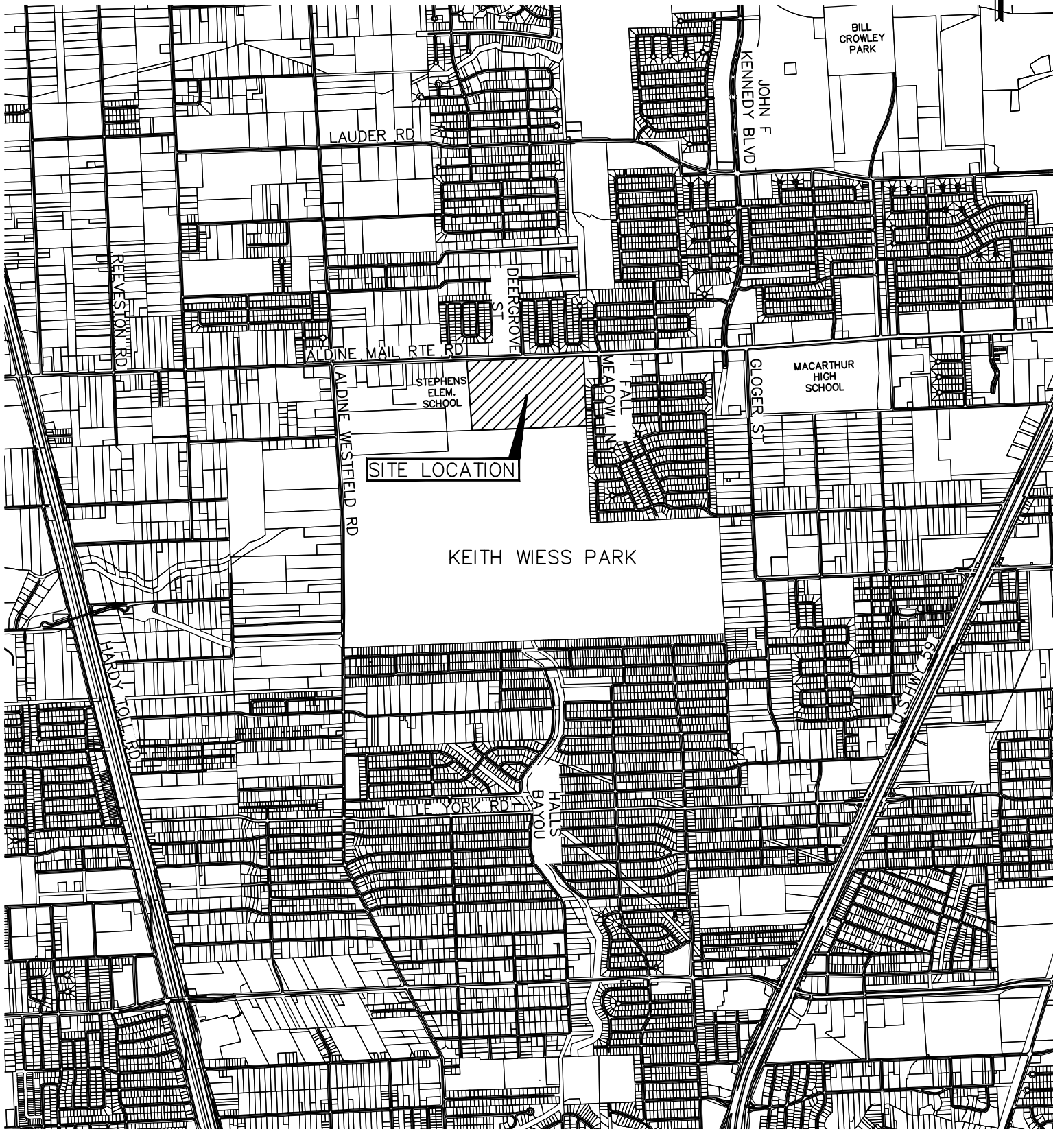
Item 730 "Concrete Truck Washout Structures"

Item 741 "Inlet Protection Barrier" (For Stage II Inlets, Gravel Bags)

END OF ITEM 751

# **Appendix K**

## **Vicinity Map**



SITE LOCATION

KEITH WIESS PARK

BILL CROWLEY PARK

JOHN F. KENNEDY BLVD

LAUDER RD

REEVES ST

DEERGROVE ST

ALDINE MAIL RTE RD

STEPHENS ELEM. SCHOOL

ALDINE WESTFIELD RD

MACARTHUR HIGH SCHOOL

GLOGER ST

FALL MEADOW LN

HARRY TOLSON RD

LITTLE YORK RD

BAYOU HALLS

U.S. HWY 59

Site located on Key Map page 414E & J

VICINITY MAP

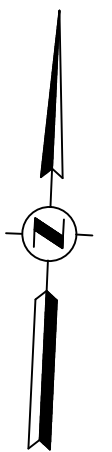
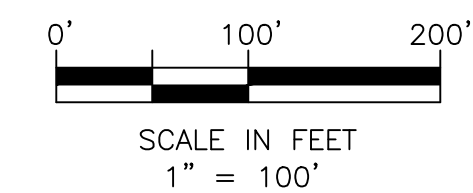


## **Appendix L**

### **Site Plan (SWPPP and Details Included)**

- EXIST DITCHES A-F WERE CONSTRUCTED IN THE "PROPOSED EARTHWORK & SITE PREPARATION OF EAST ALDINE TOWN CENTER" PLANS, HARRIS COUNTY PROJECT #1604190093. REFER TO THOSE PLANS FOR ADDITIONAL INFORMATION.
- REFER TO "TOPOGRAPHIC SURVEY" SHEETS (C1.50-C1.80) FOR BENCHMARK INFORMATION. CONSTRUCTION CONTRACTOR TO LOCATE AND IF NECESSARY RE-ESTABLISH TBM'S BEFORE CONSTRUCTION STARTS.

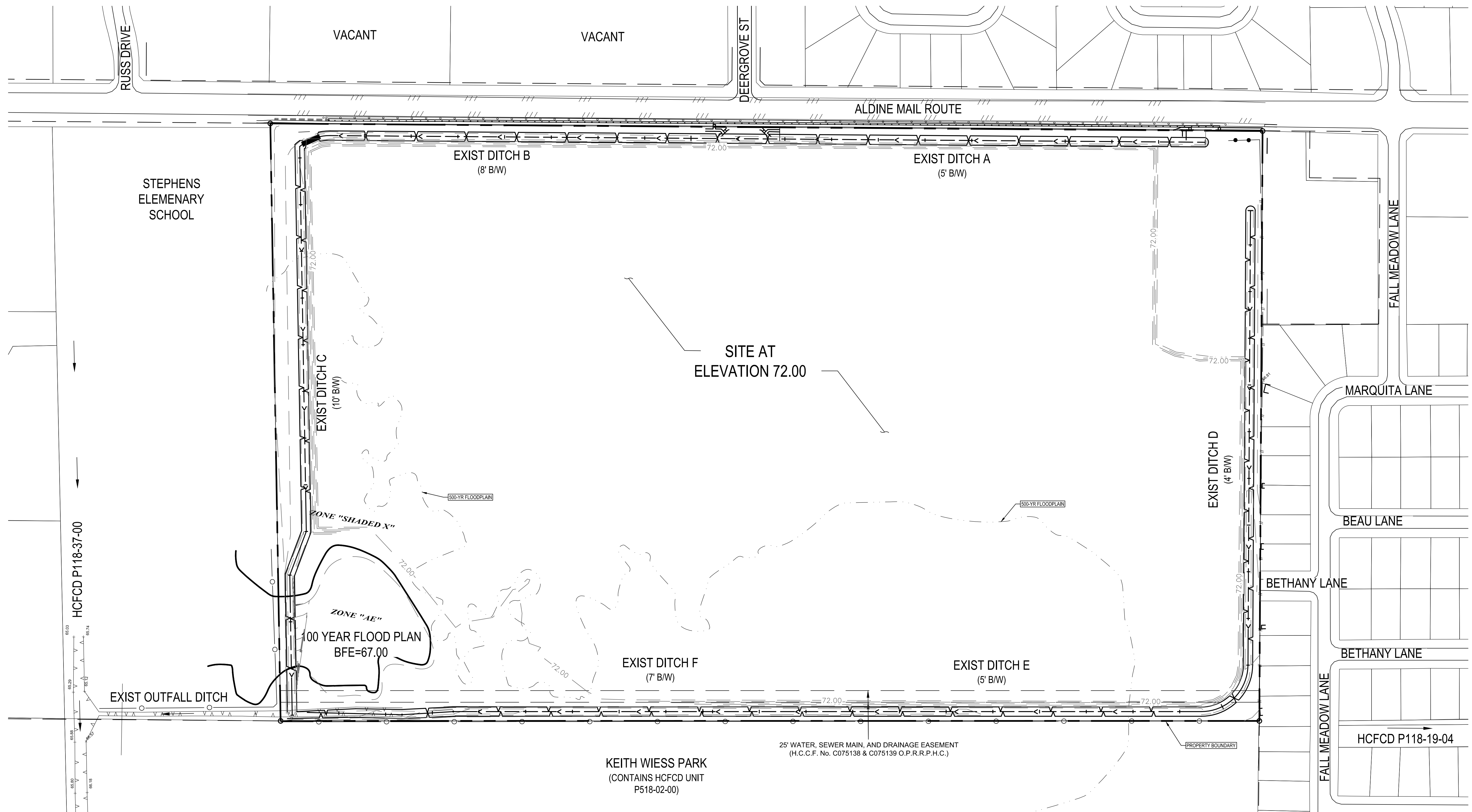
- 70.00 — EXISTING CONTOUR  
 A A A A A A A A EXIST DITCH TOP OF BANK  
 - - - - - 500-YR FLOODPLAIN  
 - - - - - PROPERTY BOUNDARY



NOTES

1

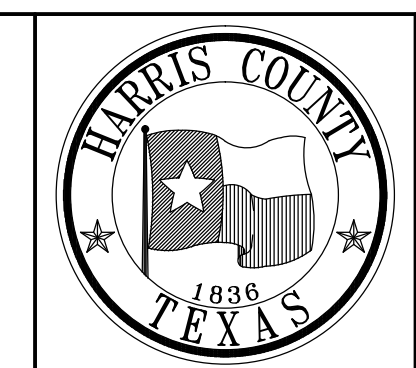
2



R:\100945\100945-00\100945-00\CAD FILES\SHEETS\CAD\100945 - C1.00 - OVERALL EXISTING SITE.DWG

NO.	REVISIONS	DATE	NAME

HARRIS COUNTY  
ENGINEERING DEPARTMENT



**PGAL**  
 3131 BRIARPARK DRIVE  
 SUITE 200  
 HOUSTON, TX 77042  
 (T) 713 622 1444  
 (F) 713 968 9333  
 www.pgal.com  
 PGAL TBPE REG. NO:  
 F-2742

11/15/2016  
  
 MEGAN E. HOUTCHENS  
 114293  
 LICENSED PROFESSIONAL ENGINEER  
 STATE OF TEXAS

PROJECT TITLE: EAST ALDINE TOWN CENTER	
DRAWN BY: MH	HCED STANDARD
CR'D BY: MH	SHEET DESCRIPTION: OVERALL EXISTING SITE
SCALE: 1"=100'	SHEET NO: C2.00
DATE: 11/11/2016	APPROVED BY:

RUSS DRIVE

DEERGROVE ST.

ALDINE MAIL ROUTE  
UPIN #16102MFOG801

STEPHENS  
ELEMENTARY  
SCHOOL

LONE STAR COLLEGE SITE  
(BY OTHERS)

NEIGHBORHOOD CENTER SITE  
(BY OTHERS)

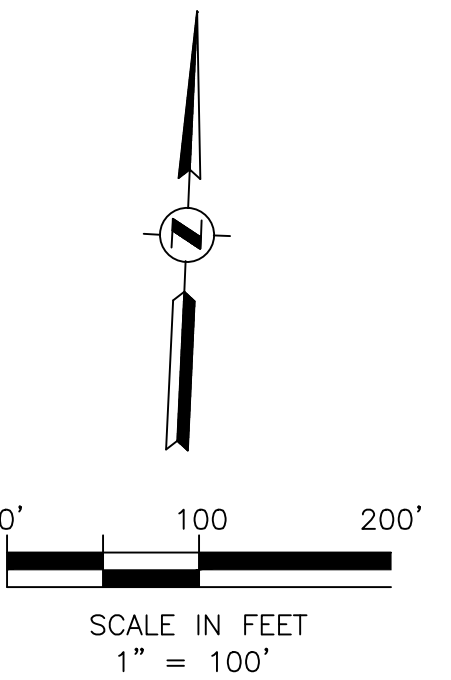
EAST ALDINE MANAGEMENT  
DISTRICT SITE  
(BY OTHERS)

TOWN CENTER PARK  
(BY OTHERS)

HARRIS COUNTY SITE  
UPIN #15035MF0DP01  
(BY OTHERS)

DRILL SITE  
(BY OTHERS)

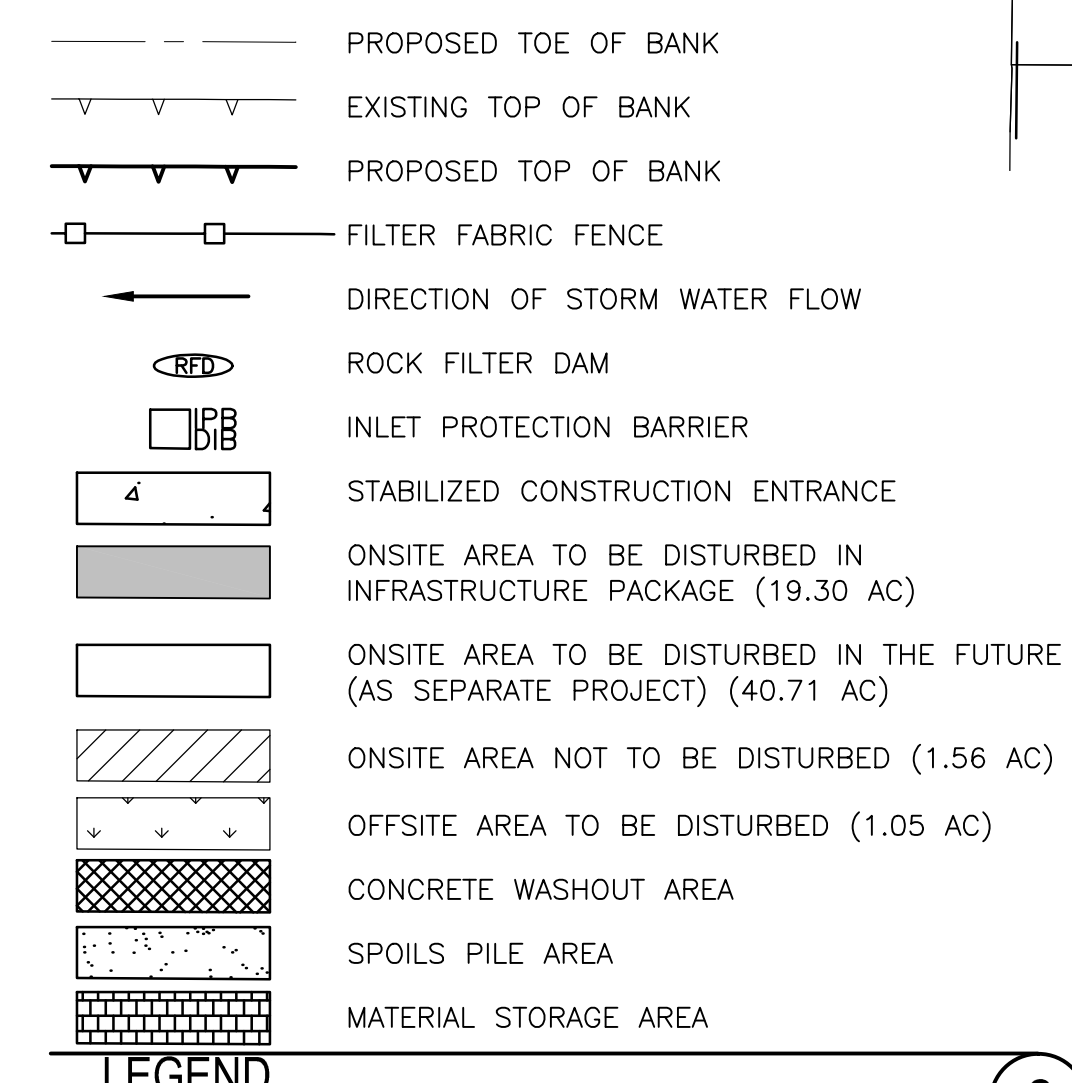
HCFCU UNIT  
P118-19-04



- CONTRACTOR SHALL IMPLEMENT INLET PROTECTION DEVICES, FILTER FABRIC BARRIERS, AND ROCK FILTER DAMS AT LOCATIONS SHOWN ON THE STORM WATER POLLUTION PREVENTION PLANS (SWPPP) TO KEEP SILT AND/OR EXCAVATED MATERIALS FROM ENTERING INTO THE STORM SEWER SYSTEM AND OUTFALL CHANNEL EVENTUALLY POLLUTING THE RECEIVING WATER SYSTEMS.
- CONTRACTOR SHALL CLEAN UP THE EXISTING STREET INTERSECTIONS DAILY, AS NECESSARY, TO REMOVE ANY EXCESS MUD, SILT, OR ROCK TRACKED FROM THE EXCAVATED AREA.
- CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT AND LOOSE MATERIAL AS CONSTRUCTION PROGRESSES.
- CONTRACTOR TO INSPECT AND MAINTAIN THE AREAS LISTED BELOW AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER.
  - DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED.
  - AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION.
  - STRUCTURAL CONTROL MEASURES.
  - LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE.
- RESTORE AND STABILIZE ALL DISTURBED SOIL AREAS AS SOON AS POSSIBLE BY INSTALLATION OF PAVING, HYDRO-MULCH SEEDING AND SODDING. MAINTAIN ALL SWPPP CONTROLS UNTIL ALL DRAINAGE AREAS ARE STABILIZED.
- THE LOCATION OF CONSTRUCTION SUPPORT ACTIVITIES INCLUDING MATERIALS, WASTE, BORROW, FILL, AND EQUIPMENT STORAGE AREA WILL BE SHOWN AND UPDATED ON THE PLAN SHEETS ONCE ESTABLISHED BY CONTRACTOR. THESE SITES WILL BE INCLUDED IN THE INSPECTION REPORT.
- THE LOCATION OF VEHICLE WASH AREA INCLUDING CONCRETE WASHOUTS WILL BE SHOWN AND UPDATED ON THE PLANS ONCE ESTABLISHED BY CONTRACTOR. THESE SITES WILL BE INCLUDED IN THE INSPECTION REPORT.
- THE FOLLOWING RECORDS WILL BE MAINTAINED BY THE CONTRACTOR AND WILL BE MADE READILY AVAILABLE UPON REQUEST TO PARTIES LISTED IN PART III.D.1 OF THE TPDES GENERAL PERMIT TXR150000:
  - DATES WHEN MAJOR GRADING ACTIVITIES OCCUR;
  - ALL DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND
  - THE DATES WHEN STABILIZATION (BOTH TEMPORARY AND/OR PERMANENT) MEASURES ARE INITIATED.
- SOD SHALL BE PLACED BEHIND CURB ALONG ALL ROADWAYS TO LANDSCAPE RIGHT-OF-WAY AS WELL AS AREAS WITHIN THE CHANNELS EXCEPT THE CHANNEL BOTTOMS PER HARRIS COUNTY REQUIREMENTS. ALL OTHER AREAS WILL BE HYDRO-MULCH SEEDED.
- REFER TO THE STORM WATER POLLUTION PREVENTION PLAN REPORT FOR ADDITIONAL DETAILED INFORMATION.
- THE ENTIRE 61.57-ACRE SITE, EXCLUDING THE 1.56-ACRES COVERING THE 100-YEAR FLOODPLAIN, IS TO BE GRADED TO AN EVEN ELEVATION OF 72.0 UP AT A 3:1 MAXIMUM SLOPE FROM THE PROPOSED ROADWAYS. EACH INDIVIDUAL TRACT WITHIN THIS SITE (LONE STAR COLLEGE, NEIGHBORHOOD CENTER, HARRIS COUNTY, TOWN CENTER PARK, DRILL SITE, AND EAST ALDINE MANAGEMENT DISTRICT SITE) ARE TO BE DEVELOPED IN THE FUTURE AS SEPARATE PROJECTS. AT THAT TIME, SWPPPS FOR EACH SITE WILL BE DETAILED AND SUBMITTED FOR APPROVAL INDEPENDENT OF THIS PROJECT.

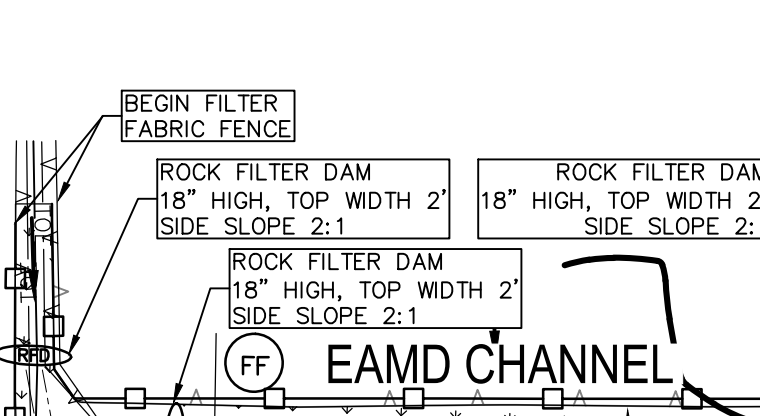
NOTES

KEITH WIESS PARK



THIS SITE REQUIRES A SWPPP AND A CONSTRUCTION SITE NOTICE TO BE POSTED ONSITE AND A NOI AND NOT MUST BE FILED WITH THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY.

HCFCU P118-37-00 CHANNEL

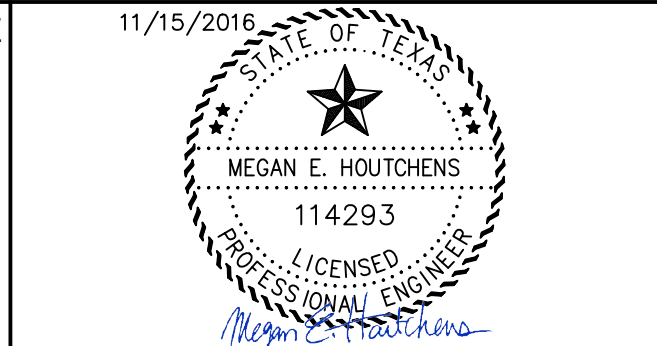


100-YEAR FLOODPLAIN

WET BASIN  
(RE:C5.00)

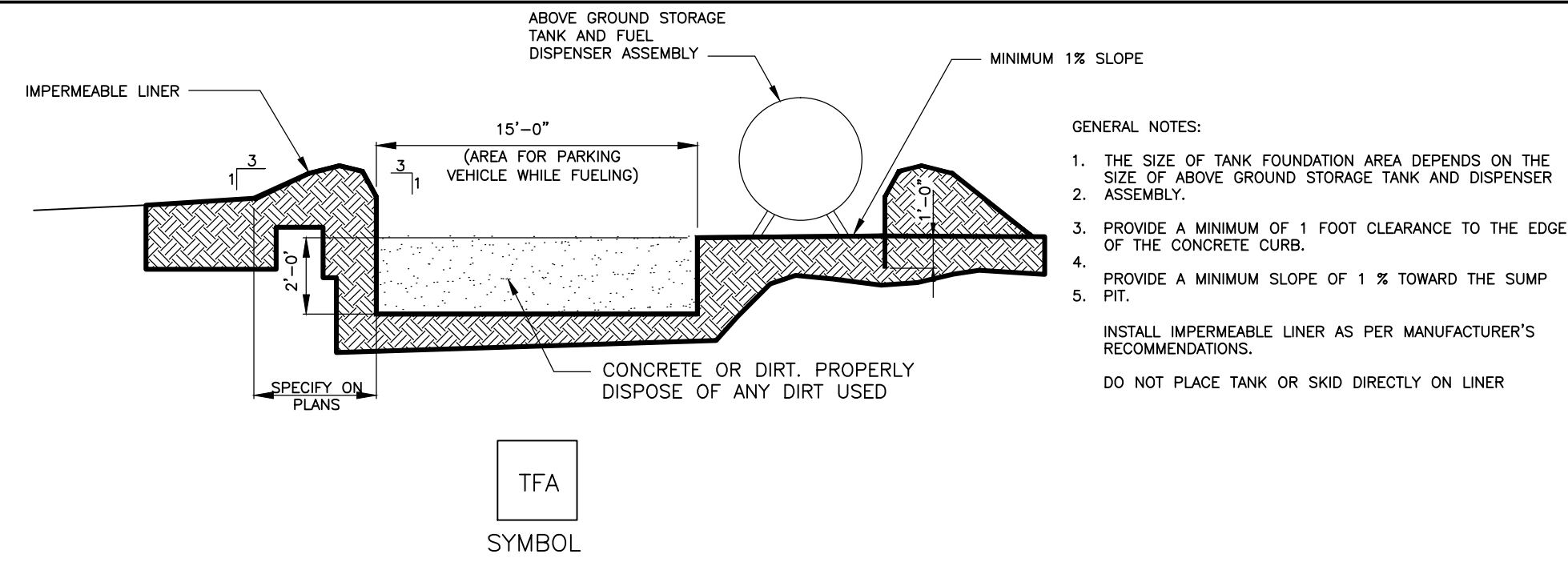
NO.	REVISIONS	DATE	NAME

HARRIS COUNTY  
ENGINEERING DEPARTMENT

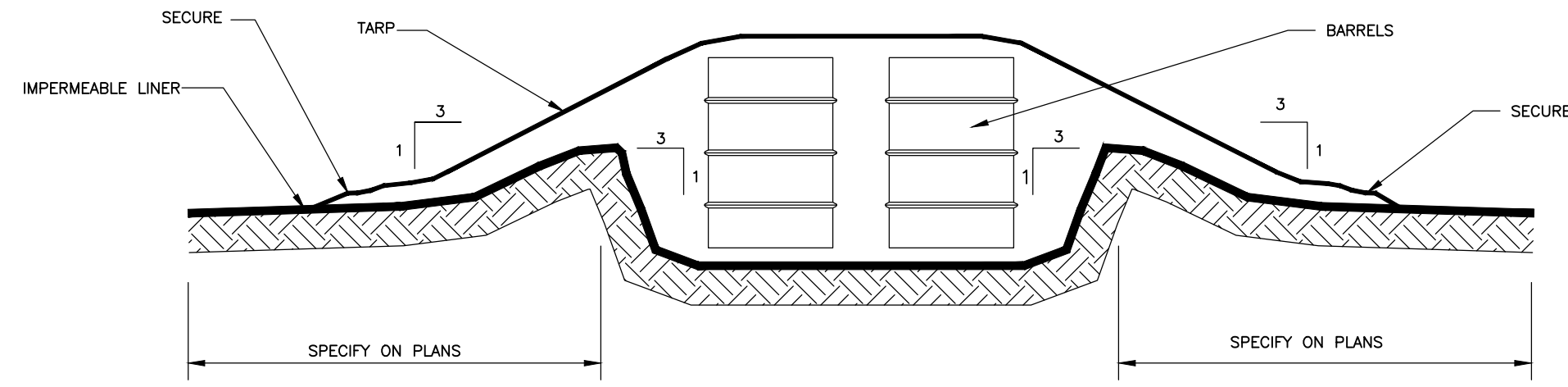


PROJECT TITLE: <b>EAST ALDINE TOWN CENTER</b>		HCED STANDARD
DRAWN BY: MH	SHEET DESCRIPTION: STORM WATER POLLUTION PREVENTION PLAN	SHEET NO: C7.00
CR'D BY: MH		
SCALE: 1"=100'	APPROVED BY:	
DATE: 11/11/2016		

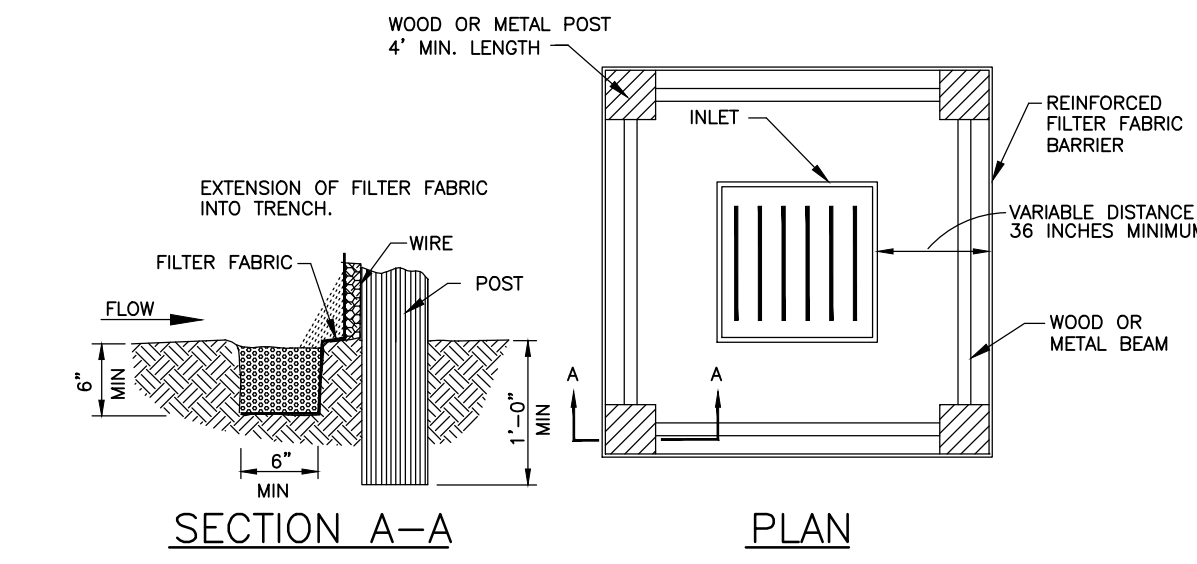
R:\1000945-CAD\10010 CAD FILES\SHEETS\DWG\1000945 - C1.DWG - SWPPP.DWG



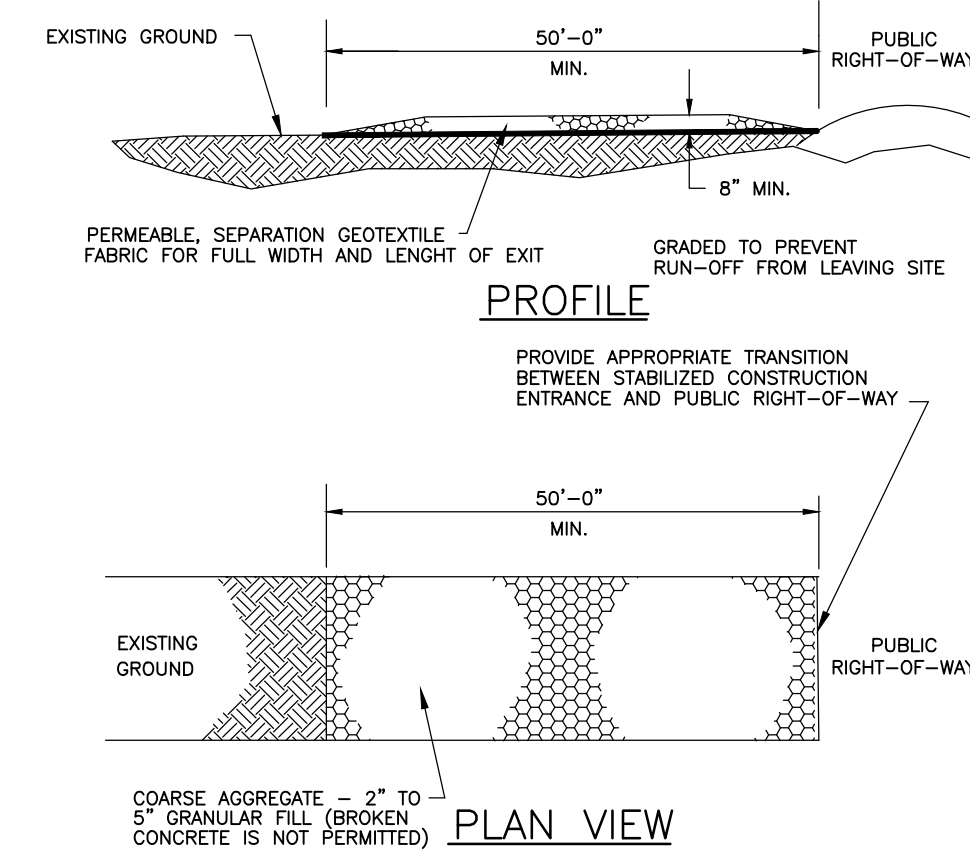
**ABOVE GROUND TEMP. VEHICLE & EQUIPMENT FUELING AREA WITH TANK**



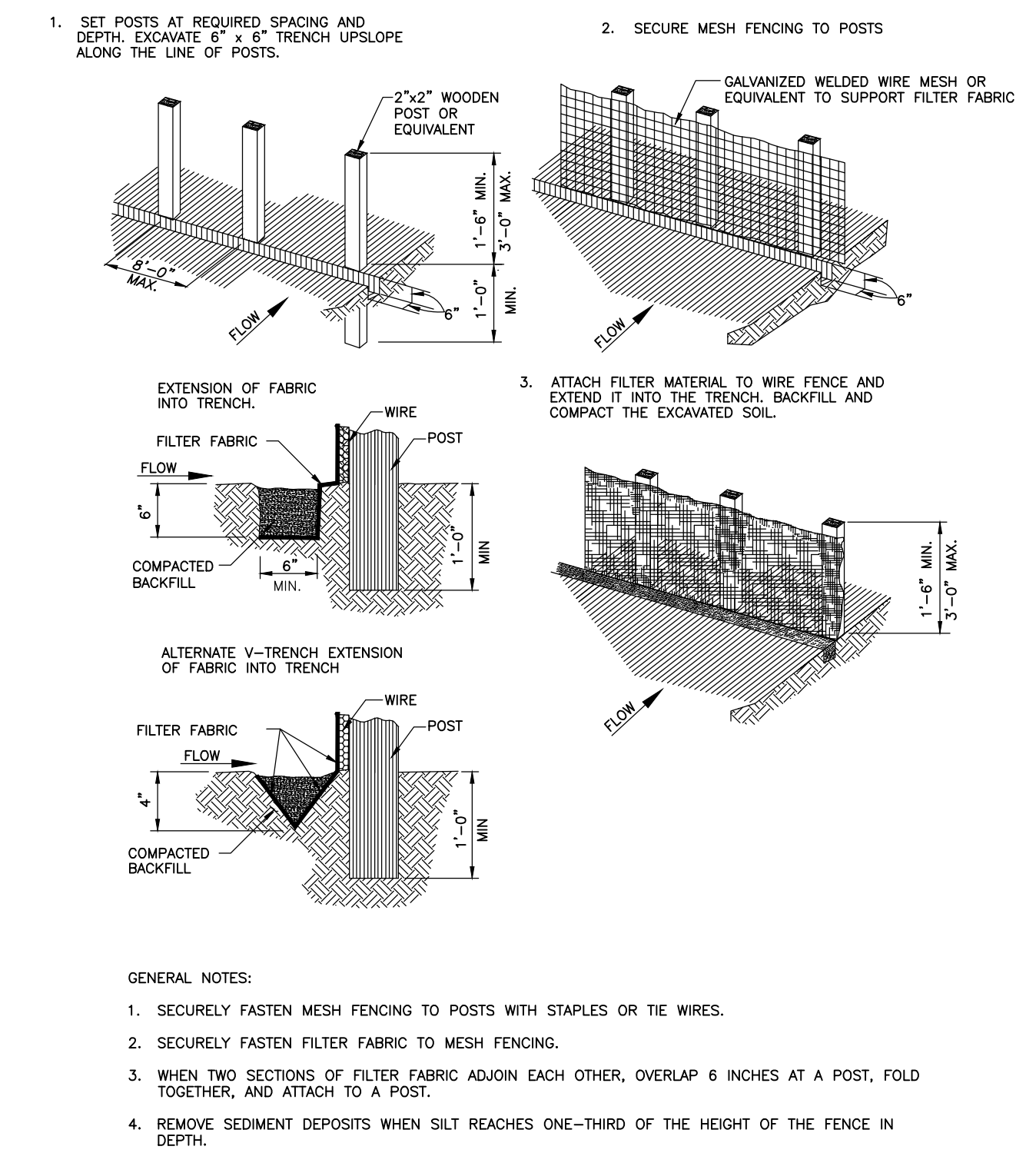
**BARREL STORAGE AREA**



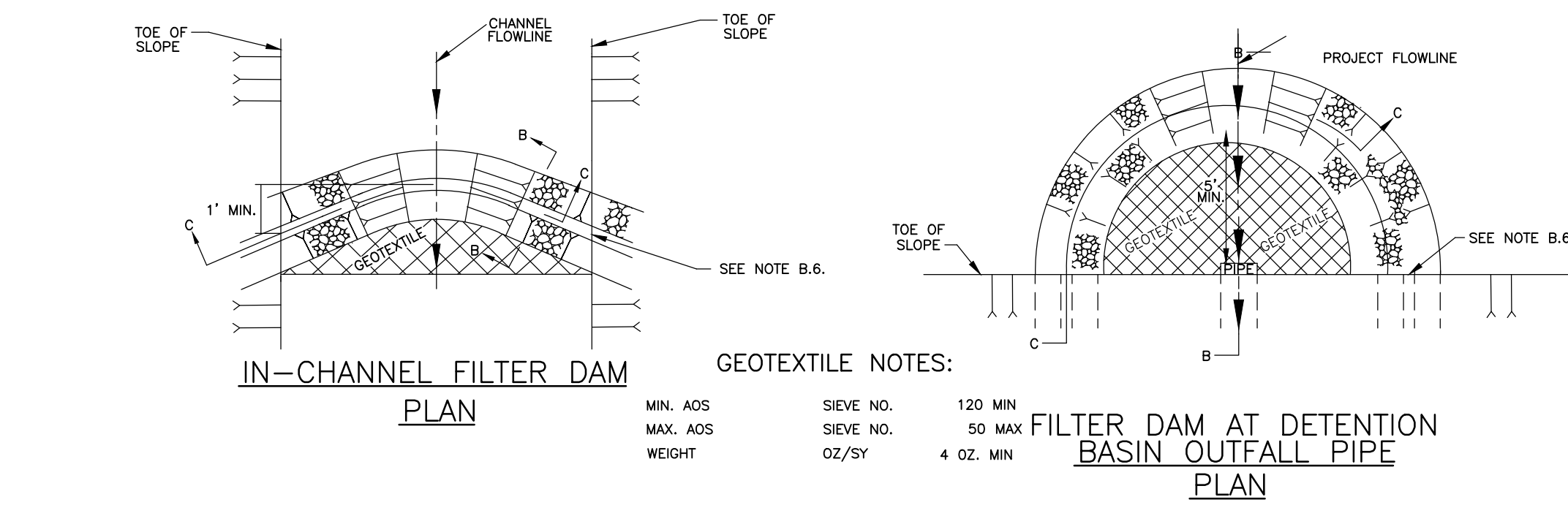
**INLET PROTECTION BARRIERS FOR STAGE I INLETS**



**STABILIZED CONSTRUCTION ACCESS**

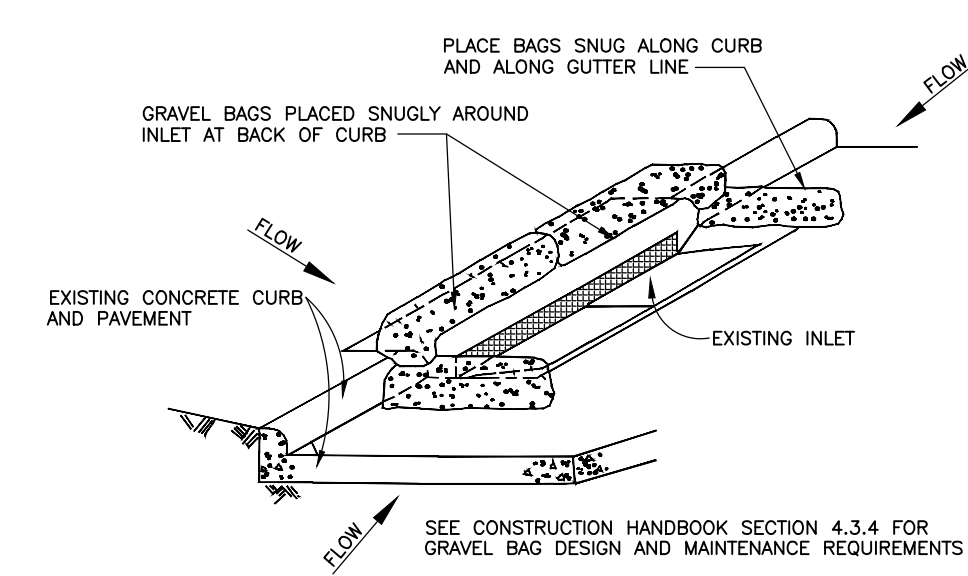


**REINFORCED FILTER FABRIC BARRIER**

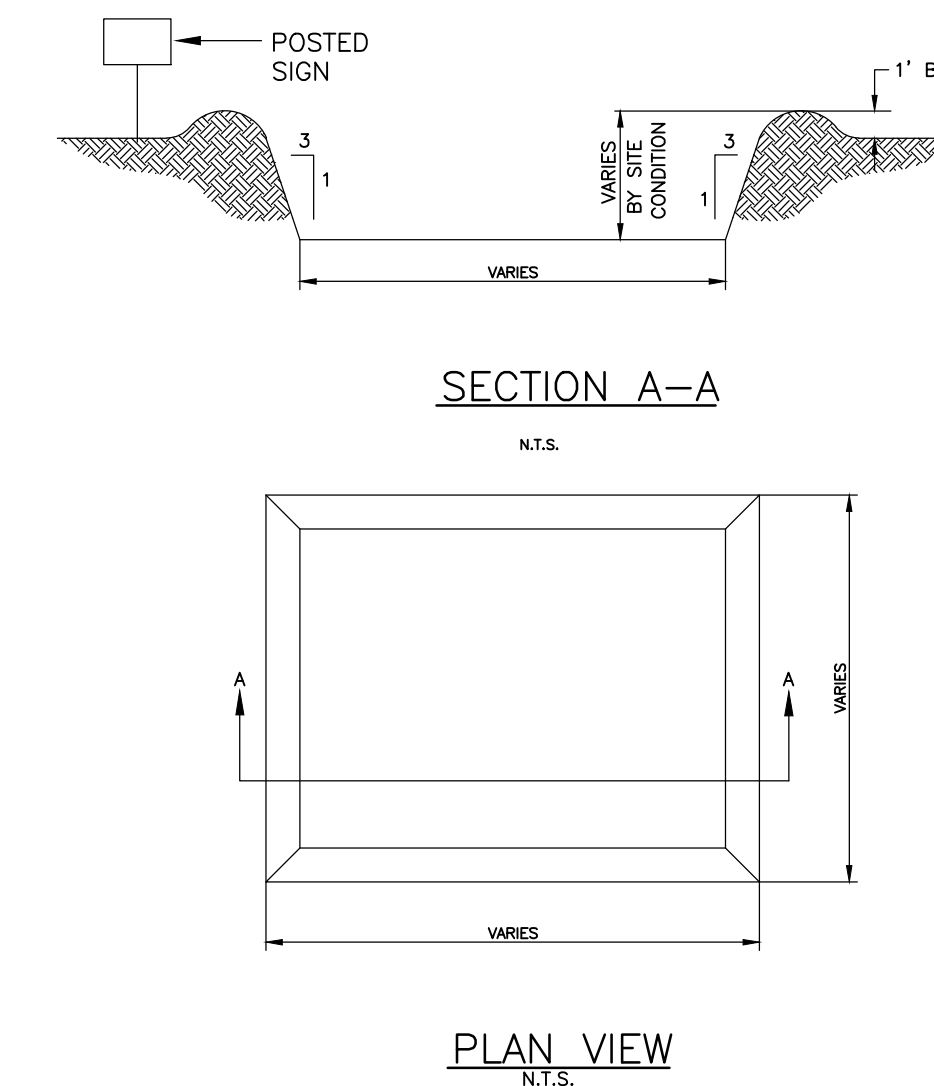


**IN-CHANNEL FILTER DAM**

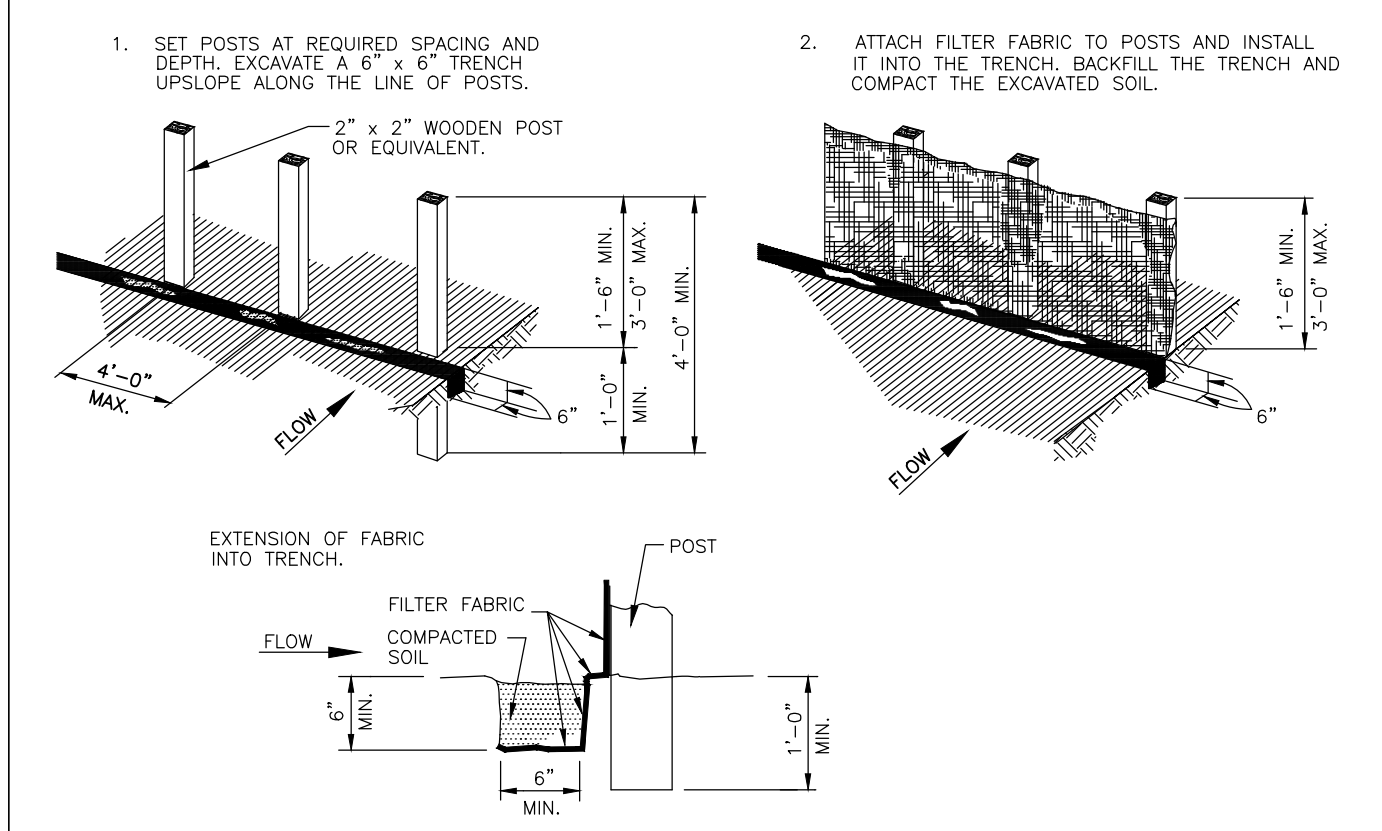
**FILTER DAM AT DETENTION BASIN OUTFALL PIPE**



**INLET PROTECTION BARRIERS FOR STAGE II INLETS**



**CONCRETE TRUCK WASHOUT AREA**

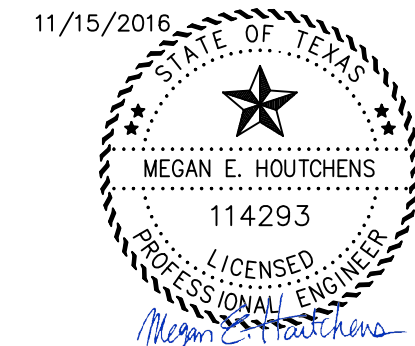
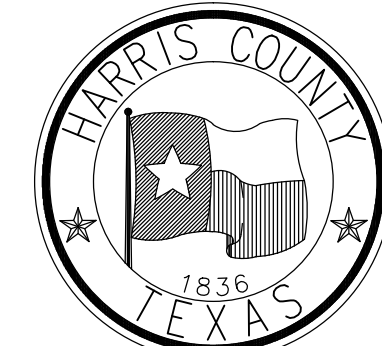


**FILTER FABRIC FENCE**

- A. TYPES OF FILTER DAMS**
1. TYPE 1 (NON-REINFORCED)
    - a. HEIGHT - 18-24 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
    - b. TOP WIDTH - 2 FEET (MINIMUM).
    - c. SLOPES - 2:1 (MAXIMUM).
  2. TYPE 2 (REINFORCED)
    - a. HEIGHT - 18-36 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
    - b. TOP WIDTH - 2 FEET (MINIMUM).
    - c. SLOPES - 2:1 (MAXIMUM).
  3. TYPE 3 (REINFORCED)
    - a. HEIGHT - 36-48 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
    - b. TOP WIDTH - 2 FEET (MINIMUM).
    - c. SLOPES - 3:1 (MAXIMUM).
  4. TYPE 4 (GABION)
    - a. HEIGHT - 30 INCHES (MINIMUM). MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
    - b. TOP WIDTH - 2 FEET (MINIMUM).
  5. TYPE 5. AS SHOWN ON THE PLANS.
- FILTER DAM**  
**RFD - TYPE**  
SYMBOL
- B. CONSTRUCT FILTER DAMS ACCORDING TO THE FOLLOWING CRITERIA UNLESS SHOWN OTHERWISE ON THE PLANS.**
1. TYPE 2 AND 3 FILTER DAMS: SECURE WITH 20 GAUGE GALVANIZED WOVEN WIRE MESH WITH 1 INCH DIAMETER HEXAGONAL OPENINGS.
  2. GRANULAR FILL:
    - a. PLACE ON MESH TO HEIGHT AND SLOPES SHOWN ON PLANS OR AS SPECIFIED BY THE ENGINEER.
    - b. 3-5 INCHES FOR ROCK FILTER DAM TYPES 1,2, AND 4 AND 4-8 INCHES FOR ROCK FILTER DAM TYPE 3. REFER TO GRANULAR FILL IN SPECIFICATION SECTION NO. 02378-RIPRAP AND GRANULAR FILL.
  3. WIRE MESH: FOLD AT UPSTREAM SIDE OVER GRANULAR FILL AND TIGHTLY SECURED TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES OR HOG RINGS.
  4. IN STREAMS: SECURE OR STAKE MESH TO STREAM BED PRIOR TO AGGREGATE PLACEMENT.
  5. SEE SPECIFICATION SECTION NO. 02364-FILTER DAMS.
  6. EMBED ONE FOOT MINIMUM INTO SLOPE AND RAISE ONE FOOT HIGHER THAN CENTER OF DEPRESSED AREA AT SLOPE.

NO.	REVISIONS	DATE	NAME

HARRIS COUNTY  
ENGINEERING DEPARTMENT



PROJECT TITLE: **STORM WATER POLLUTION PREVENTION PLAN**

NO.	REVISIONS	DATE	NAME

DATE	APPROVED BY:	SHEET DESCRIPTION:	JOB NO.:

DATE: 11/15/2016

SCALE: 1" = 10'-0"

DATE: 11/15/2016

APPROVED BY: MEGAN E. HOUTCHENS

FILE NAME: C8.22

## CONSTRUCTION COST ESTIMATE

ITEM NO.	SPEC NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
<b>STORM WATER POLLUTION PREVENTION PLAN</b>						
1	162	Sodding for Erosion Control (Various Widths)	SY	35,843.00	\$4.00	\$143,372.00
2	165	Hydro-Mulch Seeding	AC	9.95	\$1,500.00	\$14,925.00
3	708	Filter Fabric Fence (60% of unit cost for furnish and installation and 40% of unit cost for removal)	LF	14,822.00	\$1.20	\$17,786.40
4	700	TPDES General Permit No. TXR150000, Notice of Intent (NOI) Application Fees (Contractor's NOI Fee & Harris County's NOI Fee, Each Fee shall be set price of \$325.00)	EA	2.00	\$325.00	\$650.00
5	719	Inlet Protection Barrier (Stage 1, With Fiber Rolls; 60% of unit cost for furnish and installation, and 40% of unit cost for removal)	LF	310.00	\$70.00	\$21,700.00
6	724	Stabilized Construction Access (Type 1-Rock; 60% of unit cost for furnish and installation, and 40% of unit cost for removal)	EA	2.00	\$3,500.00	\$7,000.00
7	730	Concrete Truck Washout Structures (60% of unit cost for furnish and installation, and 40% of unit cost for removal)	SY	12.00	\$1,000.00	\$12,000.00
8	741	Inlet Protection Barrier (For Stage II Inlets, Gravel Bags; 60% of unit cost for furnish and installation, and 40% of unit cost for removal)	LF	150.00	\$70.00	\$10,500.00
9	750	Rock Filter Dam (Type 1; 60% of unit cost for furnish and installation, and 40% of unit cost for removal)	LF	80.00	\$50.00	\$4,000.00
10	751	SWPPP Inspection and Maintenance (Min. Bid - \$6,000.)	LS	1.00	\$6,000.00	\$6,000.00
<b>Subtotal of Item</b>						<b>\$237,933.40</b>

**STORM WATER QUALITY MANAGEMENT PLAN**

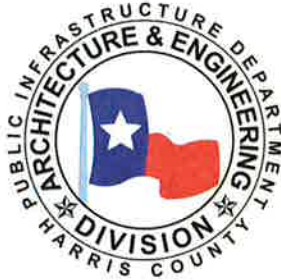
**FOR**

**East Aldine Town Center – Infrastructure Package  
Houston, Texas  
UPIN No.17035MF0M201**

**JANUARY 2017**

**Storm Water Quality Management Plan  
Prepared for**

**Harris County Public Infrastructure Department  
Architecture & Engineering Division  
1001 Preston, 7<sup>th</sup> Floor  
Houston, TX 77002**



**Prepared by**

**PGAL  
3131 Briarpark, Suite 200  
Houston, Texas 77042  
(713) 622-1444  
F-2742**



**TABLE OF CONTENTS**

**Section 1 – Project & Site Description.....1**

- 1.1 Site Location.....1
- 1.2 Owner Information.....1
- 1.3 Activities.....1
- 1.4 Total Site Area and Affected Area.....2
- 1.5 Wetlands, Surface Waters and Storm Water Discharge Locations.....2

**Section 2 – Controls: Structural & Non-Structural.....2**

- 2.1 Non-Structural Controls.....2
  - 1. Waste Materials
  - 2. Hazardous Waste
  - 3. Sanitary Waste
  - 4. Landscaping Practices/Fertilizer and Pesticide Practices
  - 5. Training and Educational Programs
- 2.2 Structural Controls.....3
  - 1. Floatable Collection Screen
  - 2. Wet Basin
  - 3. Infiltration/Filtration Facility
  - 4. Vegetative Practices
  - 5. Low Impact Development

**Section 3 – Maintenance Plan.....4**

- 3.1 Non-Structural Controls.....4
  - 1. Waste Materials/Litter Control
  - 2. Hazardous Waste and Materials
  - 3. Sanitary Waste
  - 4. Landscaping Practices/Fertilizer and Pesticide Practices
- 3.2 Structural Controls.....5
  - 1. Floatable Collection Screen
  - 2. Wet Basin

**Section 4 – Inspection Plan.....5**

- 4.1 Non-Structural Controls.....5
- 4.2 Structural Controls.....6
- 4.3 Prerequisites.....6

**Exhibits**

Exhibit 1	Vicinity Map
Exhibit 2	Site Drainage Map
Exhibit 3	Potential Pollutant Activities and Minimum Control Measures Map
Exhibit 4	Training and Educational Programs

**List of Appendices**

Appendix A	SWPPP Site Plan
Appendix B	SWQMP Site Plan
Appendix C	Documentation
Appendix D	Forms



**1. Project & Site Description**

1.1. Site Location:

The existing 61.57-acre site is bounded on the north by Aldine Mail Route Road, on the south by Keith Wiess Park, and is located approximately 0.5 miles east of Aldine Westfield Road. The project is within the City of Houston’s Extra Territorial Jurisdiction (ETJ) in Harris County, Texas. Sunbelt Municipal Utility District is located in the area and will be responsible for maintaining the water and wastewater utilities onsite. The legal address currently on file for the site is 3314 Aldine Mail Route Road and the legal description is, TR 1, ABST 157 S Brooks. There is a 100-year floodplain located in the southwest corner of the site, however, this 1.56-acre area will not be disturbed during or after construction.

1.2. Owner Information:

*East Aldine Management District*  
5333 Aldine Mail Route Road  
Houston, Texas 77039  
(713) 595-1220

*Harris County Pct 2*  
John Saavedra, P.E.  
14350 Wallisville Road  
Houston, Texas 77049  
(713) 455-8104

1.3. Activities:

The activities associated with this 60.01-acre mixed-use development include landscaping maintenance, building maintenance, pond maintenance, roadways, parking lots, and waste disposal. Sanitary waste travels to an offsite wastewater treatment facility through the use of gravity sanitary sewer lines. As part of the overall drainage study for the site, a wet basin is proposed and includes the addition of a floatable collection screen and a vegetated shelf to serve as the water quality requirement for the storm water runoff. A grass-lined swale currently located along the southern property line, which will be denoted as “EAMD channel” from herein, and HCFCD channel P118-37-00 will both be reconstructed. The activity associated with maintaining these channels is primarily vegetative management. The Standard Industrial Classification (SIC) Codes for this project primarily include 1542 (for the future building sites), 1611, and 1629.

These activities also have a potential to derive pollutants that can get into the nearby channels. Vegetative management, pest management and pollutant and trash removal are expected to occur in and around the wet basin. Landscaping maintenance will occur throughout the entire development. Fertilizers and pesticides are likely to be spread onsite to enhance the growth of the landscaping features. Waste disposal will be located in the vicinity of each individual tract, once developed, and it will be the responsibility of each owner to properly dispose of their waste. Potential pollutant activities are shown in ***Exhibit***

**3, Potential Pollutant Activities and Minimum Control Measures Map.**

**1.4. Total Site Area and Affected Area:**

The total area of the 61.57-acre site that will be disturbed during the construction of the infrastructure package is 19.30-acres plus an additional 1.05-acres of offsite area. The 1.56-acres that is the 100-year floodplain will not be disturbed to preserve the condition of the floodplain. The amount of impervious cover specific to the infrastructure package is approximately 24.7% and the amount of impervious cover for the future fully developed 61.57-acre site is 56.7%.

**1.5. Wetlands, Surface Waters and Storm Water Discharge Locations**

HCFC channel P118-37-00 is located along the western property boundary of the site. It drains towards HCFC Unit P518-02-00 located in Keith Wiess Park, south of the East Aldine Town Center site. Unit P518-02-00 is a regional detention basin that has been previously sized to account for the storm runoff for the area including this project site. All storm water within the roadway right-of-ways will enter one of the two storm sewer systems proposed through curb inlets. The remaining individual tracts of land to be developed at a future date, will each have their own private storm sewer system onsite, which will then discharge directly into the public system included in this infrastructure project. The storm systems outfall into the proposed wet basin from either a 4'x4' RCB or a 48-inch RCP. The basin discharges through a 4'x3' RCB to EAMD channel along the southern property boundary, eventually connecting to HCFC channel P118-37-00, and discharging to HCFC Unit P518-02-00. The Municipal Separate Storm Sewer System (MS4) operator for the wet basin and EAMD channel is the East Aldine Management District. The MS4 operator for channel P118-37-00 is the Harris County Flood Control District. No jurisdictional areas or wetlands have been identified on this site. All channels, storm sewer inlets and outfalls are shown in **Exhibit 2, Site Drainage Map**.

**2. Controls: Structural & Non-Structural**

**2.1. Non-Structural Controls:**

Non-structural controls are management-based activities that are designed to prevent or reduce the potential of storm water runoff contact with pollution-causing activities. Various non-structural controls will be used, including:

**1. Waste Materials**

All future developers of the tracts will provide and place trash receptacles on their property to store solid waste materials. The receptacles will have a functional lid and will be emptied at least once every week by a licensed waste management provider.

**2. Hazardous Waste**

Developers of the future tracts will be responsible for containing and disposing of any hazardous waste or materials per manufacturers' recommendations.

**3. Sanitary Waste**

All buildings or structures to be constructed on this site will have private sanitary sewers

that connect to the public sanitary line proposed in this plan. The public sanitary sewer line connects to an existing sanitary sewer manhole located near the southeastern corner of the site, which drains to an offsite wastewater treatment facility. In the green spaces, proper signage will be placed in clear view informing the public what to do with animal waste.

4. Landscaping Practices/Fertilizer and Pesticide Practices

Each tract is responsible for maintaining their own property. Native or low maintenance vegetation as well as mowing practices are two non-structural controls for landscaping practices likely to occur onsite for each tract, within the roadway right-of-ways, channels, and for the wet basin. Fertilizers and pesticides will only be applied when necessary and per manufacturer’s instructions. The wet basin should be mowed at least twice a year, while all other sites should be seasonally maintained by mowing or irrigating.

5. Training and Educational Programs

It is important that the public is educated on how to reduce pollution and instead enhance the environmental quality of the area we occupy. A few examples of good management practices for minimizing pollutants are located in **Exhibit 4, Examples of Training and Educational Programs**.

All non-structural controls will be used in accordance with the County’s Standard Maintenance and Operating Procedures.

2.2. Structural Controls:

1. Floatable Collection Screen

The collection screen is designed per Harris County standards and is located at the 4’x3’ RCB wet basin outfall structure. The screen is used to collect and contain floating trash and litter found in the wet basin to prevent clogging of downstream drainage structures and to protect the aquatic habitat and animal life.

2. Wet Basin

The basin will have a permanent water depth of 6 feet and is sized large enough to detain the 100-year storm event for the site and approximately 5.5-acres of adjacent Aldine Mail Route Road. All water above the permanent pool elevation exits the basin through a 4’x3’ RCB to EAMD channel located along the southern property boundary. In case there is a storm event greater than the 100 year storm, an emergency spillway is located above the outfall pipe to prevent the basin from overtopping. The wet basin’s main pool area provides storm water quality treatment by gravitational settling, and the plants and other vegetation located along the edge of the basin remove pollutants and sediment from land sheet flow entering the basin.

The wet basin will be maintained by East Aldine Management District.

3. Infiltration/Filtration Facility

No infiltration/filtration facilities are proposed for this project.

4. Vegetative Practices

No vegetative practices are proposed for this project.

5. Low Impact Development  
Not applicable for this project.

### 3. Maintenance Plan

Procedures for maintaining both non-structural and structural controls are described below and laid out in more detail in *Table 1*, located in **Appendix C**.

#### 3.1. Non-Structural Controls:

##### 1. Waste Materials/Litter Control

Each future developer of the tracts will be responsible for maintaining their trash receptacles and its' respective area. The following items need to be followed to assure the entire site continues to function properly into the future:

- i. Trash receptacles need to have functional and secure lids;
- ii. If trash receptacles become full prior to date of trash pick-up or garbage scent is a nuisance, they should be emptied immediately to prevent the litter from becoming floatables or toxic to surrounding areas. Trash should be picked up at least once per week;
- iii. Dumpster areas should be cleaned thoroughly once every two months;
- iv. Cigarette butts should be picked up from sidewalks and vegetation at least once per week;
- v. Trash should be removed prior to mowing;
- vi. Recycling is recommended to reduce litter

##### 2. Hazardous Waste and Materials

These practices are used to reduce the risks associated with hazardous materials (if applicable):

- i. Products will be kept in original containers unless they are not resealable;
- ii. Original labels and material safety data should be retained, as they contain important product information;
- iii. If surplus product must be disposed of, manufacturers' and/or local and state recommended methods for proper disposal will be followed;
- iv. Keep products out of reach of children and pets;
- v. Secure lids tightly

##### 3. Sanitary Waste

The public sanitary sewer line will be regularly inspected and maintained by Sunbelt Municipal Utility District (MUD), and all private sanitary sewers will be regularly inspected and maintained by the property owner to ensure the lines are functioning properly.

##### 4. Landscaping Practices/Fertilizer and Pesticide Practices

Each tract is responsible for maintaining their own property, however, good management practices for lawn and garden care should occur throughout the project site to keep everything aesthetically pleasing. Good landscaping practices should persist in areas within the roadway right-of-ways, performed by Harris County, to prevent overgrowth or a decline in vegetation health. Similar practices should occur around the wet basin, by East Aldine Management District, to prevent any overgrowth or health

decline near the walking trails. Fertilizers should be applied by a contract service provider when necessary and in accordance with manufacturers' recommendations.

### 3.2. Structural Controls:

#### 1. Floatable Collection Screen

The floatable collection screen is designed to collect and contain floatable trash and debris floating in the wet basin. The screen shall be cleaned monthly and after flood events.

#### 2. Wet Basin

The wet basin located on this site serves the entire 61.57-acre site as well as an additional 9.23-acres of offsite area. The following routine maintenance tasks should take place:

- i. *Mowing.* The side-slopes, embankment, and emergency spillway of the basin should be mowed at least twice a year to prevent woody growth and control weeds.
- ii. *Debris and Litter Removal.* As part of periodic mowing operations and inspections, debris and litter should be removed from the surface of the basin. The outlet should be checked for possible clogging.
- iii. *Erosion Control.* The basin side slopes, emergency spillway, and embankment all may periodically suffer from slumping and erosion. Corrective measures such as regrading and revegetation may be necessary.
- iv. *Nuisance Control.* Control of insects, weeds, odors, and algae may be needed. Nuisance control tends to be rare in wet basins except under extremely dry weather conditions. Twice a year, the facility should be evaluated in terms of nuisance control (insects, weeds, odors, algae, etc.). Means other than chemical applications is preferable.

All maintenance activities will occur in accordance with the County's Standard Maintenance and Operating Procedures.

## 4. Inspection Plan

Each future developer will be responsible for inspecting their site. Sunbelt MUD will be responsible for inspecting the public water and wastewater lines, Harris County will be responsible for inspecting all public areas within the roadway right-of-ways, the storm sewer systems, and HCFCD Unit P118-37-00, and East Aldine Management District will be responsible for inspecting the wet basin and EAMD channel. A qualified individual from each entity will be responsible for filling out an inspection form that includes the inspector's name, address, and qualifications.

### 4.1. Non-Structural Controls:

Visual inspections of the site will be performed by the qualified personnel at least once weekly. More detailed inspections of utility lines will be performed a minimum of twice annually. The items the qualified personnel will inspect include:

1. Litter control (e.g., trash receptacles have secure lid and area is free of debris)
2. Hazardous waste is being properly contained or disposed of (if applicable)
3. Utility lines are clear of any debris or clogs

4. Landscaping and fertilizer practices

4.2. Structural Controls:

1. Floatable Collection Screen

It is required that the collection screen be inspected monthly and after rainfall events of 1-inch or more in a 24-hour time period. The screen should be checked to make certain it is functioning properly and that it is in good working shape. Repairs or modifications should be evaluated and performed if necessary.

2. Wet Basin

Wet basins should be inspected at least twice a year (once during or immediately following a rainfall event of 1-inch or more in a 24-hour time period) to evaluate facility operation. When possible, inspections should be conducted during wet weather to determine if the basin is functioning properly. There are many functions and characteristics of these BMPs that should be inspected. The embankment should be checked for subsidence, erosion, leakage, cracking, and tree growth. The condition of the emergency spillway should be checked. The inlet and outlet should be inspected for clogging. The adequacy of upstream and downstream channel erosion protection measures should be checked. Stability of the side slopes should be checked. Modifications to the basin structure and contributing watershed should be evaluated. During semi-annual inspections, replace any dead or displaced vegetation. Replanting of various species of wetland vegetation may be required at first until a viable mix of species is established. Cracks, voids and undermining should be patched/filled to prevent additional structural damage. Trees and root systems should be removed to prevent growth in cracks and joints that can cause structural damage. The inspections should be carried out with as-built pond plans in hand.

If any maintenance or repairs are deemed necessary to either non-structural or structural controls, the inspector will mark the date and type of repair that needs to occur. Blank inspection checklists can be found in **Appendix B**. Each inspector shall also document complaints given to them by the public.

All inspection activities will occur in accordance with the County's Standard Maintenance and Operating Procedures.

4.3. Prerequisites

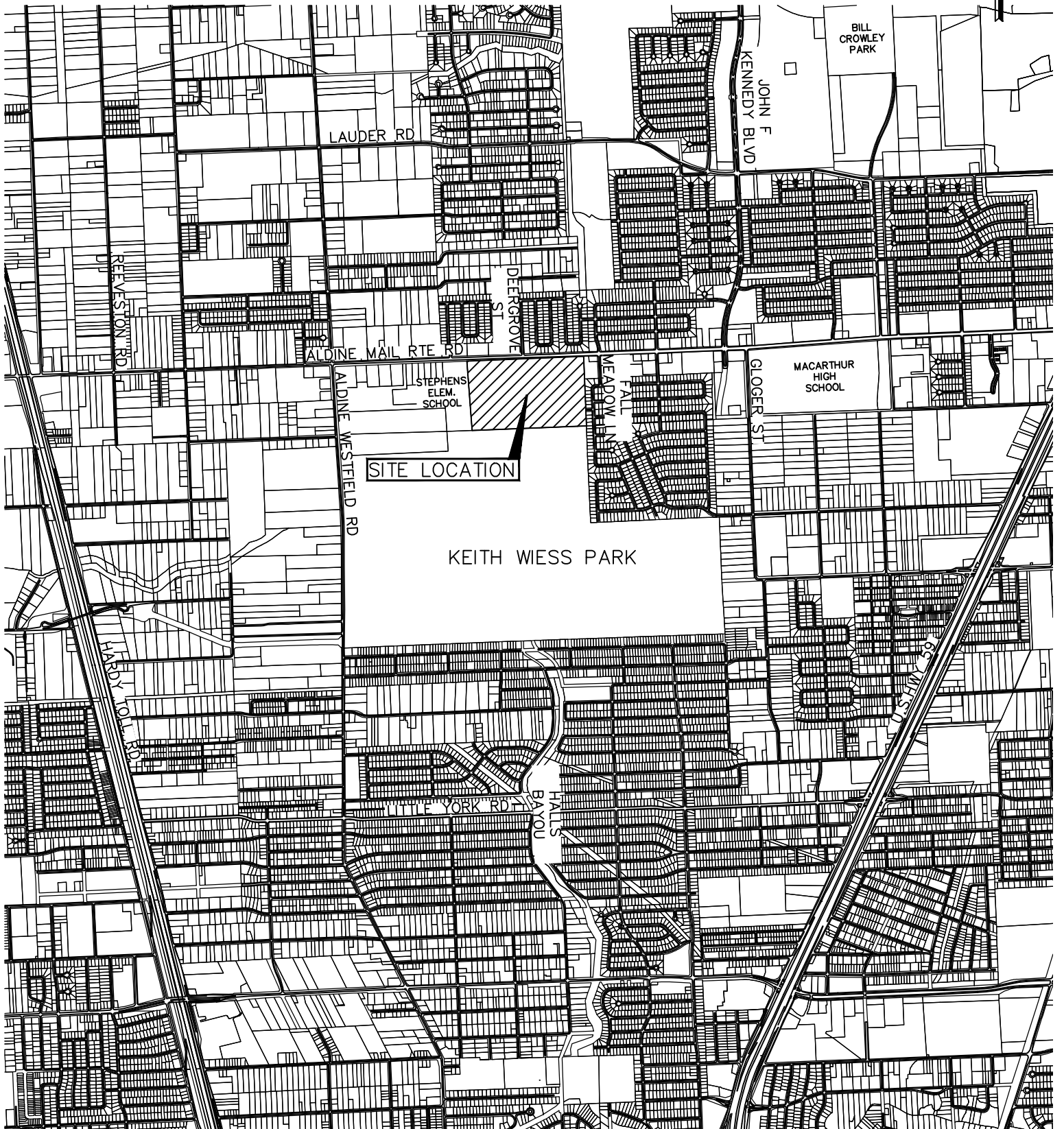
1. As a prerequisite for the permittee's annual renewal of the Storm Water Quality Permit, the structural storm water quality controls will be inspected by a Professional Engineer, licensed in the state of Texas, who will certify that the controls conform to the plans and technical specifications contained in the approved civil engineering drawings and the Storm Water Quality Management Plan on file with the Harris County Public Infrastructure Department, Engineering Division. The *Annual Professional Engineer Inspection Certification* form can be found in **Appendix B**.
2. As a prerequisite for the permittee's annual renewal of the Storm Water Quality Permit, the permittee/operator will complete the *Annual Permittee Certification of Proper*

*Maintenance for Permit Renewal* form. The Annual Permittee Certification of Proper Maintenance for Permit Renewal form can be found in **Appendix B**.

# **EXHIBIT 1**

## **VICINITY MAP**



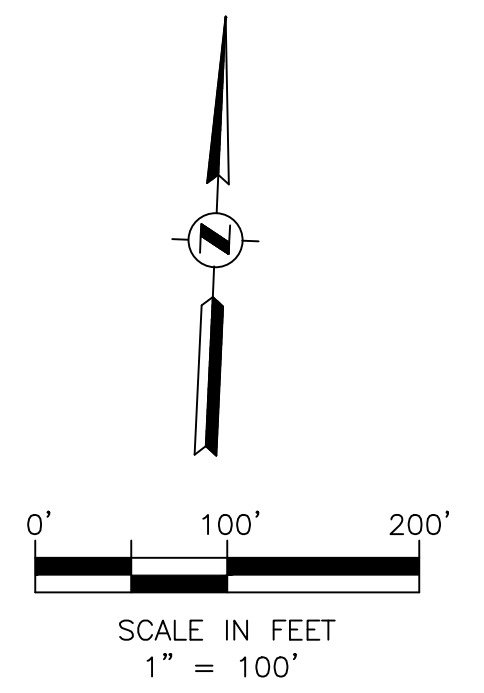
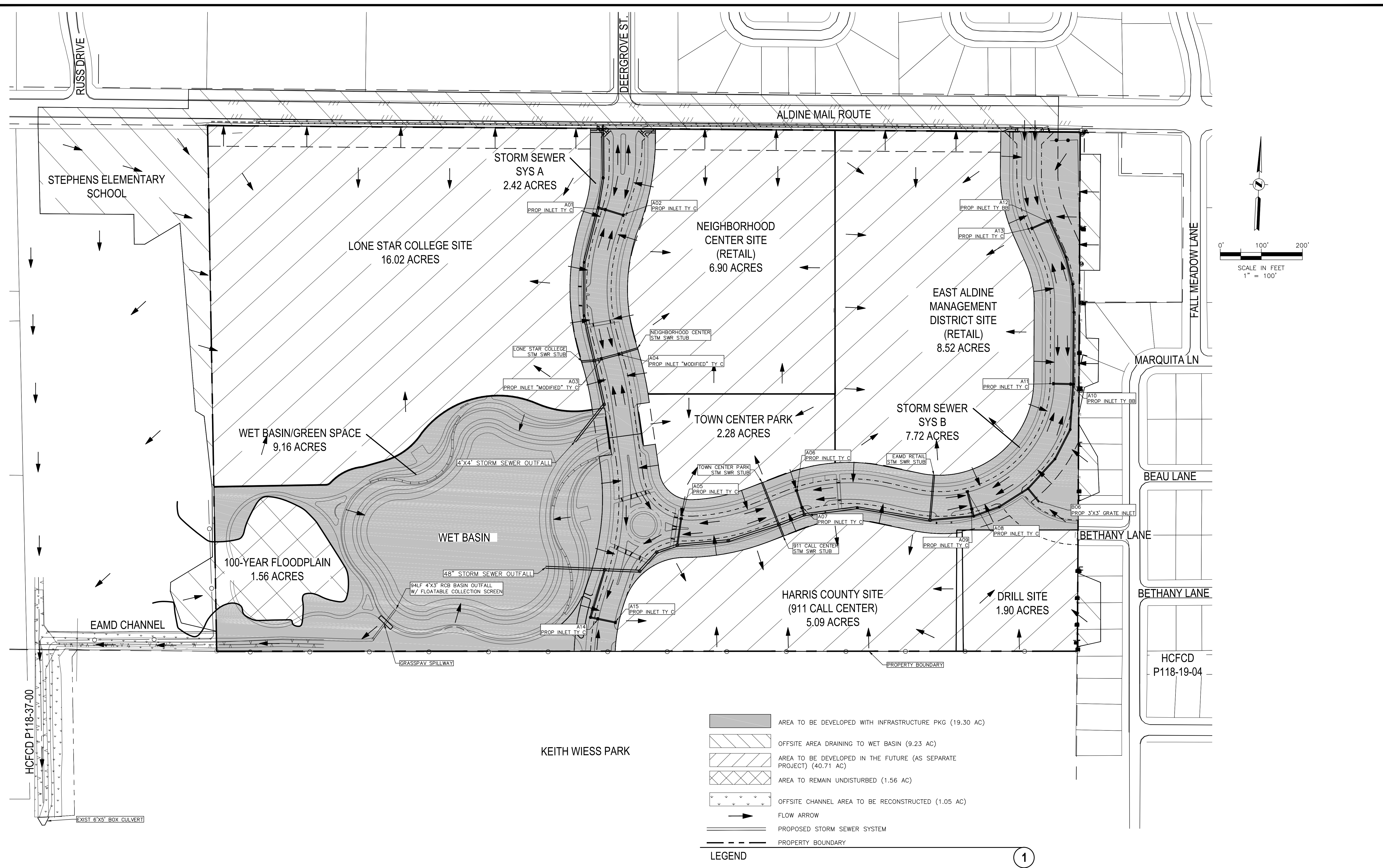


Site located on Key Map page 414E & J

VICINITY MAP

## **EXHIBIT 2**

### **SITE DRAINAGE MAP**



- AREA TO BE DEVELOPED WITH INFRASTRUCTURE PKG (19.30 AC)
- OFFSITE AREA DRAINING TO WET BASIN (9.23 AC)
- AREA TO BE DEVELOPED IN THE FUTURE (AS SEPARATE PROJECT) (40.71 AC)
- AREA TO REMAIN UNDISTURBED (1.56 AC)
- OFFSITE CHANNEL AREA TO BE RECONSTRUCTED (1.05 AC)
- FLOW ARROW
- PROPOSED STORM SEWER SYSTEM
- PROPERTY BOUNDARY

1

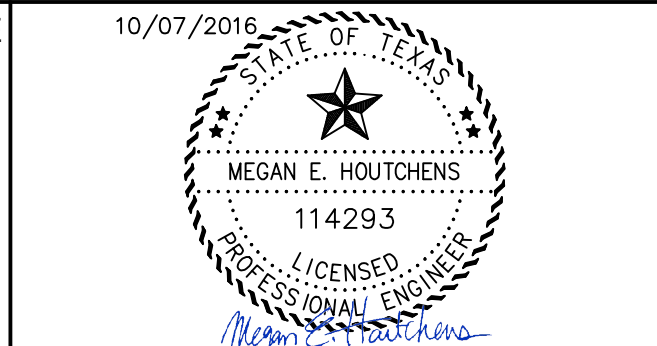
R:\1008945-V-ENGINEERING\4400-HEMO-TECHNICAL-REPORTS\EXHIBIT 2 - SITE DRN. MAP.DWG

NO.	REVISIONS	DATE	NAME

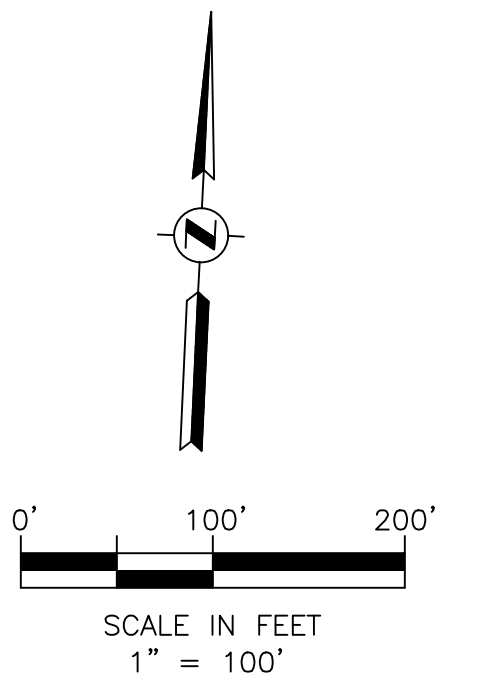
HARRIS COUNTY  
ENGINEERING DEPARTMENT



**PGAL**  
 3131 BRIARPARK DRIVE  
 SUITE 200  
 HOUSTON, TX 77042  
 (T) 713 622 1444  
 (F) 713 968 9333  
 www.pgal.com  
 PGAL TBPE REG. NO:  
 F-2742



PROJECT TITLE: <b>EAST ALDINE TOWN CENTER</b>		HCCD STANDARD
DRAWN BY: MH	SHEET DESCRIPTION: EXHIBIT 2 - SITE DRAINAGE MAP SHT 1	
CR'D BY: MH	APPROVED BY:	SHEET NO: <b>EXH 2</b>
SCALE: 1"=100'	DATE: 10/07/2016	



- FLOW ARROW
  - PROPOSED STORM SEWER SYSTEM
  - PROPERTY BOUNDARY
- LEGEND**

1

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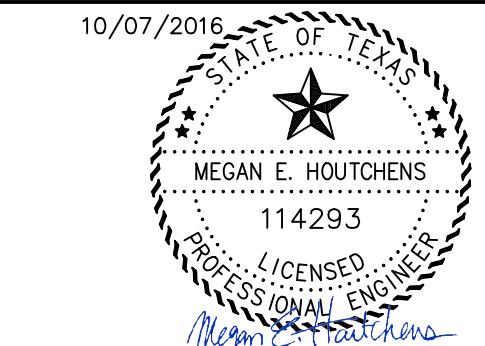
NO.	REVISIONS	DATE	NAME

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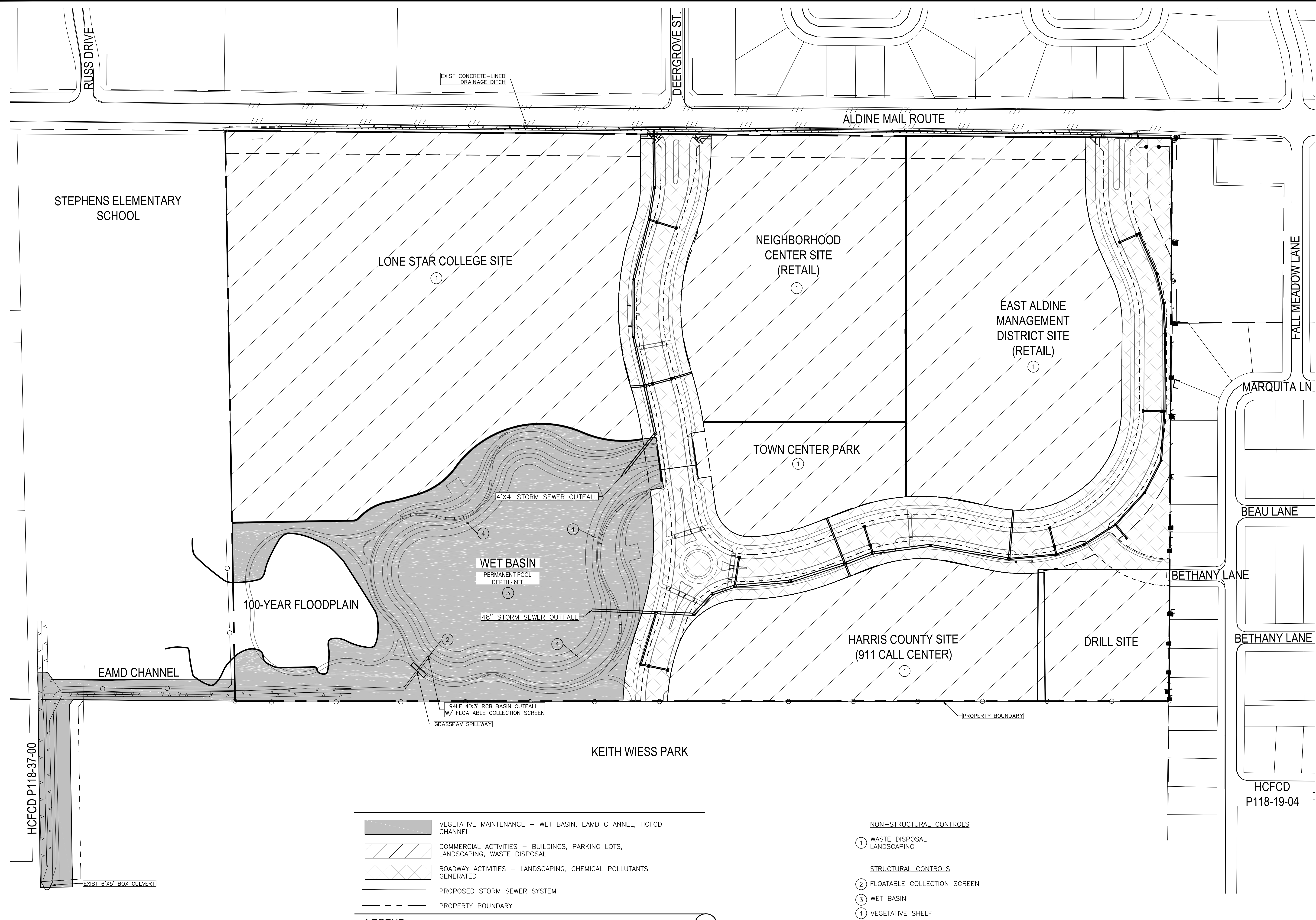
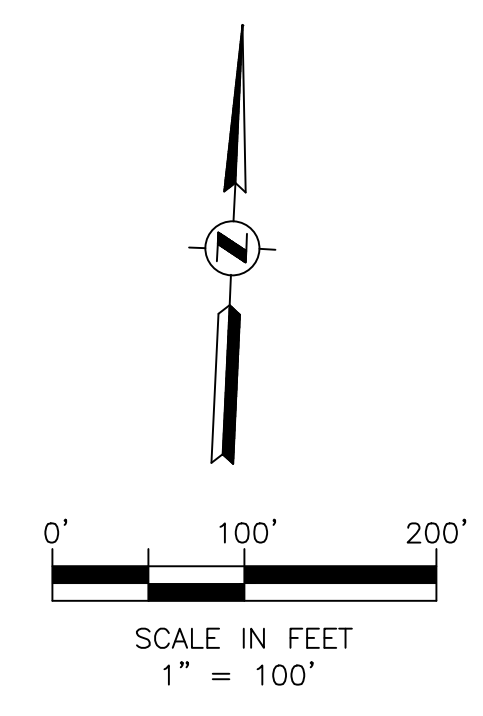
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F-2742



PROJECT TITLE:		EAST ALDINE TOWN CENTER
DRAWN BY:	SHEET DESCRIPTION:	HCED STANDARD
CR'D BY:	EXHIBIT 2 - SITE DRAINAGE MAP SHT 2	SHEET NO:
SCALE:	APPROVED BY:	EXH 2
1"=100'		
DATE:		
10/07/2016		

## **EXHIBIT 3**

# **POTENTIAL POLLUTANT ACTIVITIES AND MINIMUM CONTROL MEASURES MAP**



- LEGEND**
- VEGETATIVE MAINTENANCE - WET BASIN, EAMD CHANNEL, HCFCD CHANNEL
  - COMMERCIAL ACTIVITIES - BUILDINGS, PARKING LOTS, LANDSCAPING, WASTE DISPOSAL
  - ROADWAY ACTIVITIES - LANDSCAPING, CHEMICAL POLLUTANTS GENERATED
  - PROPOSED STORM SEWER SYSTEM
  - PROPERTY BOUNDARY

- NON-STRUCTURAL CONTROLS**
- ① WASTE DISPOSAL LANDSCAPING
- STRUCTURAL CONTROLS**
- ② FLOATABLE COLLECTION SCREEN
  - ③ WET BASIN
  - ④ VEGETATIVE SHELF

1

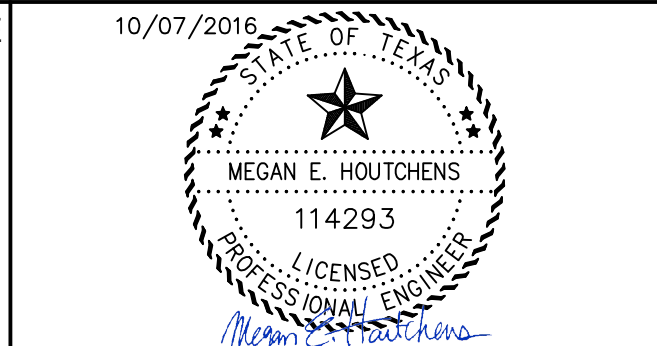
REV 1008945-V-ENGINEERING 4400 MEMO-TECHNICAL REPORTS/SWMP REPORTS/EXHIBITS EXHIBIT 3 - POLLUTANT ACTING

NO.	REVISIONS	DATE	NAME

HARRIS COUNTY  
ENGINEERING DEPARTMENT



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(F) 713 968 9333  
www.pgal.com  
PGAL TBPE REG. NO:  
F-2742



PROJECT TITLE: <b>EAST ALDINE TOWN CENTER</b>		HCFCD P118-19-04
DRAWN BY: MH	HCFCD STANDARD	
CR'D BY: MH	SHEET DESCRIPTION: EXHIBIT 3 - POTENTIAL POLLUTANT ACTIVITIES AND MINIMUM CONTROL MEASURES MAP	SHEET NO: <b>EXH 3</b>
SCALE: 1"=100'	DATE: 10/07/2016	
DATE: 10/07/2016	APPROVED BY:	

## **EXHIBIT 4**

### **TRAINING PROGRAMS**

**It stinks and it's easy to step on. But you just can't make yourself pick it up.**

**It also pollutes your environment.**

**Here's how it works.**

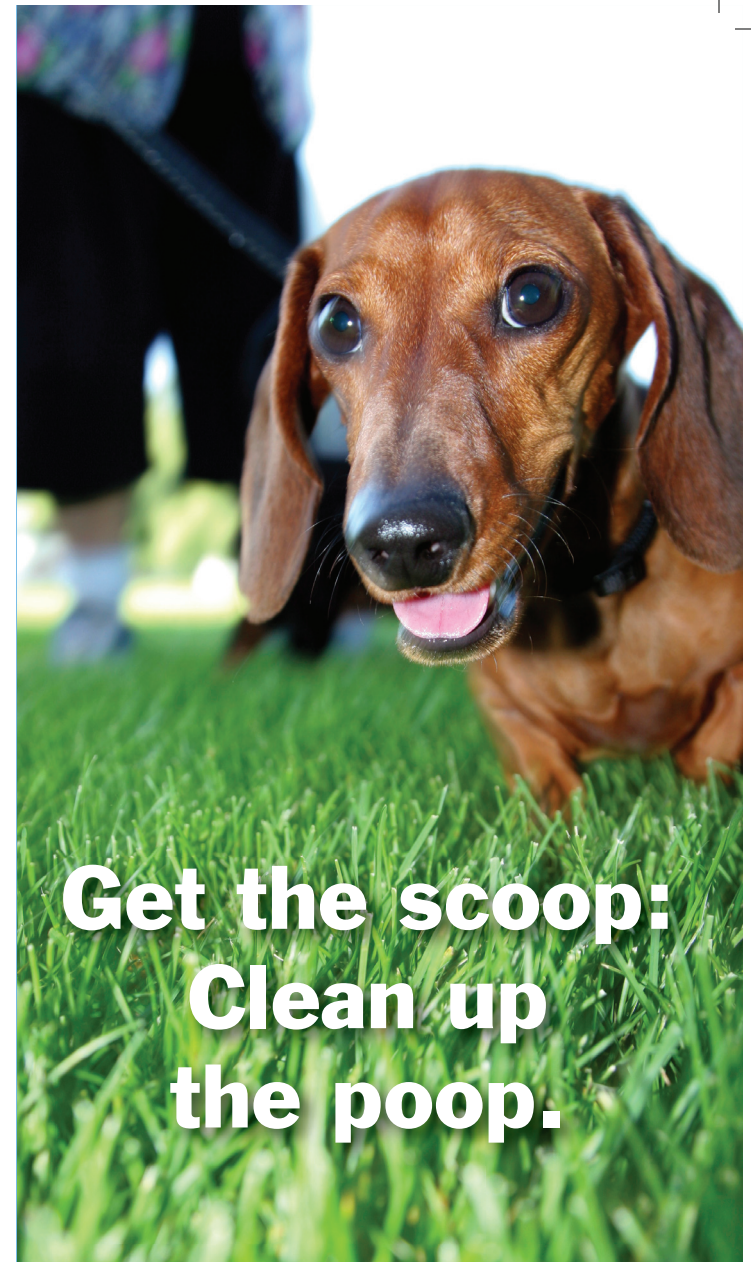
**Your dog poops on the grass. That poop contains bacteria that pose a health risk to people. When it rains or storms, the poop gets washed into the streets and flows down the storm drain into area bayous and waterways where people may come into contact with it.**



**For more information please call the Harris County Watershed Protection Group at 713.290.3000 or visit our website at [www.CleanWaterways.org](http://www.CleanWaterways.org).**



**Clean waterways start here.**



**Get the scoop:  
Clean up  
the poop.**



**Clean waterways start here.**



**Do your part. Pick up your pet waste and dispose of it properly.**



- Clean up after your dog daily.
- Pick up pet waste if rain is in the forecast, even if you don't do it on a regular basis.
- Consider buying a handy pooper scooper to make the task easier.



- Pick up waste when walking your dog.
- Throw pet waste in the trash, using a grocery or newspaper bag and tying it off to seal it. (You may

also purchase special biodegradable bags at pet stores.)



- Hire a poop collection service to do the dirty work for you. A quick Web search will turn up local companies that serve all areas of Harris County.
- Flush dog poop down the toilet. Unlike runoff after a rain, sewage from your toilet is treated to destroy dangerous bacteria.
- Bury pet waste in your yard at least five inches deep and away from vegetable gardens, streams, ditches or wells.
- Consider installing an underground pet waste disposal system, also known as a “doggy dooley.”
- DON'T leave pet waste on your lawn. Pathogens are dangerous to kids playing in the yard, and they can contaminate anything edible growing in your garden.
- DON'T add pet waste to your compost. The compost won't generate enough heat to kill the pathogens.



- **DON'T** leave pet waste near a curb. It's bad manners, and it can get washed into local waterways through the storm drain.



**Find a system that works for you and start scooping your dog's poop!**



**Fertilizer and lawn chemical runoff contributes to water pollution in Harris County.**

**Everything that washes off your lawn goes down a storm drain and directly into a local body of water.**

**Applying too much fertilizer to your lawn is like pouring chemicals directly into an area bayou or stream.**

**Lawn chemical runoff contains pollutants that may contaminate drinking water supplies and are toxic to humans and aquatic organisms.**

**For more information please call the Harris County Watershed Protection Group at 713.290.3000 or visit our website at [www.CleanWaterways.org](http://www.CleanWaterways.org).**



**Clean waterways start here.**

**Start a  
grass roots  
movement  
Don't  
over-fertilize**



**Clean waterways start here.**



Here's what you can do to protect your area waterways.

- Use the correct amount of fertilizer. More isn't better.
- Follow fertilizer package instructions or have your soil tested.
- Use lawn chemicals sparingly.
- Work with your lawn care service to make sure they "do the right thing."
- Bag your lawn waste and leave it on the curb for pickup.
- Mow the top 1/3 of your grass and leave the clippings on your lawn. Your lawn will require less water and fertilizer.

- Consider using organic fertilizers and pest control methods.
- Make your own compost using yard waste or use a commercially available variety. Mixing compost with your soil means you'll need less chemical fertilizer.
- Sweep up clippings and fertilizer from paved surfaces and dispose of them properly.



- Rake leaves and grass clippings out of the street and gutter.
- Keep soil covered with vegetation or mulch to control erosion.



- DON'T overwater after fertilizing.
- DON'T fertilize right before it rains.
- DON'T use fertilizer or mulch made with manure.



# It's Time to Think Outside the Trash Box When It Comes to What We Waste.

Before throwing away an item you think is broken, worn out, or is no longer wanted, ask yourself these questions:

***Can it be reused? Is it repairable? Is it recyclable?***

Choosing one of the above alternatives rather than trashing an item is the easiest and most convenient way we can

**DO SOMETHING GOOD.**



## REDUCE

**Stop waste in the first place by using less**

- Bring your own bag when you shop.
- Buy products with minimal packaging.
- Buy concentrates, economy-sized containers and products in bulk.
- Reach for a sponge or dishcloth instead of a paper towel.
- Use cloth napkins and towels instead of paper ones.
- Use washable mugs instead of disposable cups.
- Use rechargeable batteries and recycle them when they no longer work.
- Stop junk mail at [www.StopJunkMail.org](http://www.StopJunkMail.org).
- Use both sides of paper when printing.

## REUSE

**Find another use for your old items instead of throwing them in the trash**

- Use refillable containers, like water bottles and soap containers.
- Repair appliances and other products instead of buying new ones.
- Sell and donate clothes and items to charities and thrift stores.
- Use empty butter tubs and jars to store leftovers.
- Borrow books from the library instead of buying new ones.
- Try the [www.FreeCycle.com](http://www.FreeCycle.com) website to give away items in your area.

# RECYCLE

## Separate your recyclables from your trash

- Set up a home recycling center to separate paper, cardboard, plastic, metal, and glass from your garbage.
- Use your curbside recycling, if your neighborhood has it.
- If you can, recycle electronics (batteries, cell phones, etc.) and household hazardous waste (cleansers and chemicals).
- Find retailers that accept items like used batteries, antifreeze, motor oil, plastic bags, and cell phones, and give them your old products.
- Visit [www.RecycleInfo.org](http://www.RecycleInfo.org) to find the drop-off site closest to you and the items they accept for recycling.
- Encourage your place of work to set up a recycling program.

# REBUY

## Buy used products and those made from recycled materials

- Purchase products that contain recycled materials (read the label).
- Buy products that contain the words "postconsumer content." This means that recycled materials were used to make the product.
- Shop at places like garage sales, thrift shops and consignment stores to save money.
- Encourage your place of work to buy products made with recycled materials.



Prepared in cooperation with the  
Houston-Galveston Area Council (H-GAC)  
and the  
Texas Commission on Environmental Quality (TCEQ)

# STORM WATER IS NOT TREATED, SO BE PAINT SMART.

Painters work with a variety of materials including paints, stains, varnishes, thinners, strippers, brush cleaners and other solvents, epoxies, glues, sealants, wood preservatives and aerosol spray paints.

It is against the law to dump any of these materials into storm drains.

Penalties for illegal disposal are severe and can include fines, incarceration, and/or financial responsibility for clean-up costs. By disposing of paint waste properly you can help protect our drinking water and the aquatic life in our local waterways.

## REMEMBER TO PRACTICE SAFE DISPOSAL!

Clean water is all about prevention and being aware of behaviors that can lead to storm water pollution. Harris County and the City of Houston are here to help.

For more information visit  
our website at  
[www.cleanwaterclearchoice.org](http://www.cleanwaterclearchoice.org)

Report Illegal Dumping!  
Harris County Environmental  
Public Health Division  
(713) 920-2831  
City of Houston  
311



# THIS IS NOT A GARBAGE CAN.



Storm Water Quality  
A painter's guide to  
storage, disposal, and  
clean-up of paint wastes.

[www.CleanWaterClearChoice.org](http://www.CleanWaterClearChoice.org)

# So, how can painters manage paint wastes easily and economically?

Paint contains chemicals including solvents and metals that can pollute water when washed down a storm drain or when disposed of improperly.

## AVOID PAINT DISPOSAL

- For small leftover amounts, consider applying an additional coat or combining paint for use as a base or primer.
- For larger leftover amounts, arrange for the distributor or manufacturer to take back unused or unopened paints, or donate paint to schools, theaters, churches or graffiti projects in need of it.
- Scrape containers with a rubber spatula to remove the most paint possible. You can salvage up to 9% of your paint this way.

## PROPER PAINT DISPOSAL

- Latex paint may be solidified using commercial paint hardener or adsorbent materials such as, kitty litter.
- Dried latex paints can be thrown away in your regular trash.
- Oil-based paint is considered a hazardous waste and must be properly disposed of. You may find a licensed hazardous waste contractor in the yellow pages under "Hazardous Material Control and Removal."

## RECYCLE AND REUSE

- Keep latex and oil-based paints separate. Mixing these paints together makes disposal more costly.
- Buy recycled paints. They cost much less than virgin latex paint, are equivalent to most commercially available medium-grade paints and are available in a number of colors.
- Reuse thinners and solvents for equipment cleaning by filtering out particles with reusable wire screen, or by allowing particles to settle.

## BUY SMART

- Estimate paint needs carefully. Buy and tint/mix only what you think will be used.
- Use latex paints rather than oil-based paints whenever possible. Oil-based paints require solvents for cleanup, and cannot be recycled.

**Note:** If customers insist on oil-based paints, consider charging an environmental fee to cover disposal costs and your time.

- Avoid toxic components when possible.
  - Look for non-solvent stripping products (citrus-based, peel-away, etc.).
  - Choose solvents and thinners that are not chlorinated (for example, avoid methylene chloride).
  - Use organic additives for mold, mildew and algae control instead of heavy metal additives, such as mercury.
  - Choose paint pigments that do not contain heavy metals such as, copper and chromium.

## STORE SAFELY

- Cover and seal materials tightly to avoid contamination, and keep paint from drying. Store paint cans upside down to keep paint from drying out.
- Store all paint-related products/wastes in a covered area away from floor drains, the gutter, and street and storm drains, both in shop and at the site. Keep absorbent pads on hand to catch any spilled material and to block sewer or storm drains.
- Secure containers in vehicles to avoid spills during transportation.

## USE WISELY

- When outdoors, use tarps and drop cloths to prevent overspray and spills.
- Protect storm drains with burlap, sand bags, or other spill prevention products while painting in case of spills.

## CLEAN-UP WITH CARE

- Never clean equipment in gutters, streets, or storm drains.
- Paint out brushes and rollers as much as possible before cleaning, and **For Latex Paint:** Always clean equipment in a sink.  
**For Oil Based Paint:** Reuse cleaning solvents/thinners and look for the least toxic products available.

Most of all, never, ever dispose of paint down a storm drain!

**Appendix A**  
**SWPPP Site Plan**



RUSS DRIVE

DEERGROVE ST.

ALDINE MAIL ROUTE  
UPIN #16102MFOG801

STEPHENS  
ELEMENTARY  
SCHOOL

LONE STAR COLLEGE SITE  
(BY OTHERS)

NEIGHBORHOOD CENTER SITE  
(BY OTHERS)

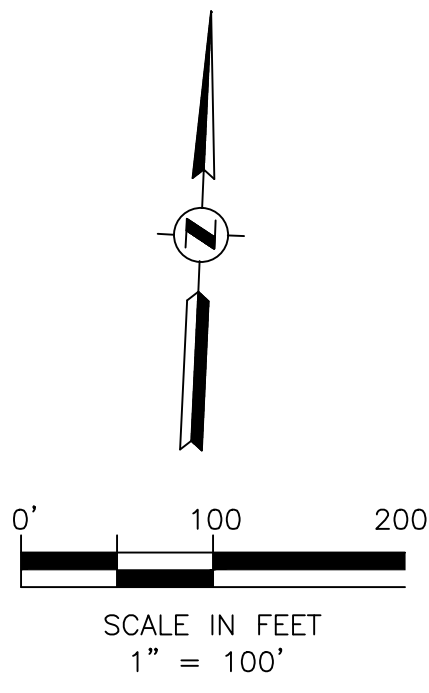
EAST ALDINE MANAGEMENT  
DISTRICT SITE  
(BY OTHERS)

TOWN CENTER PARK  
(BY OTHERS)

HARRIS COUNTY SITE  
UPIN #15035MF0DP01  
(BY OTHERS)

DRILL SITE  
(BY OTHERS)

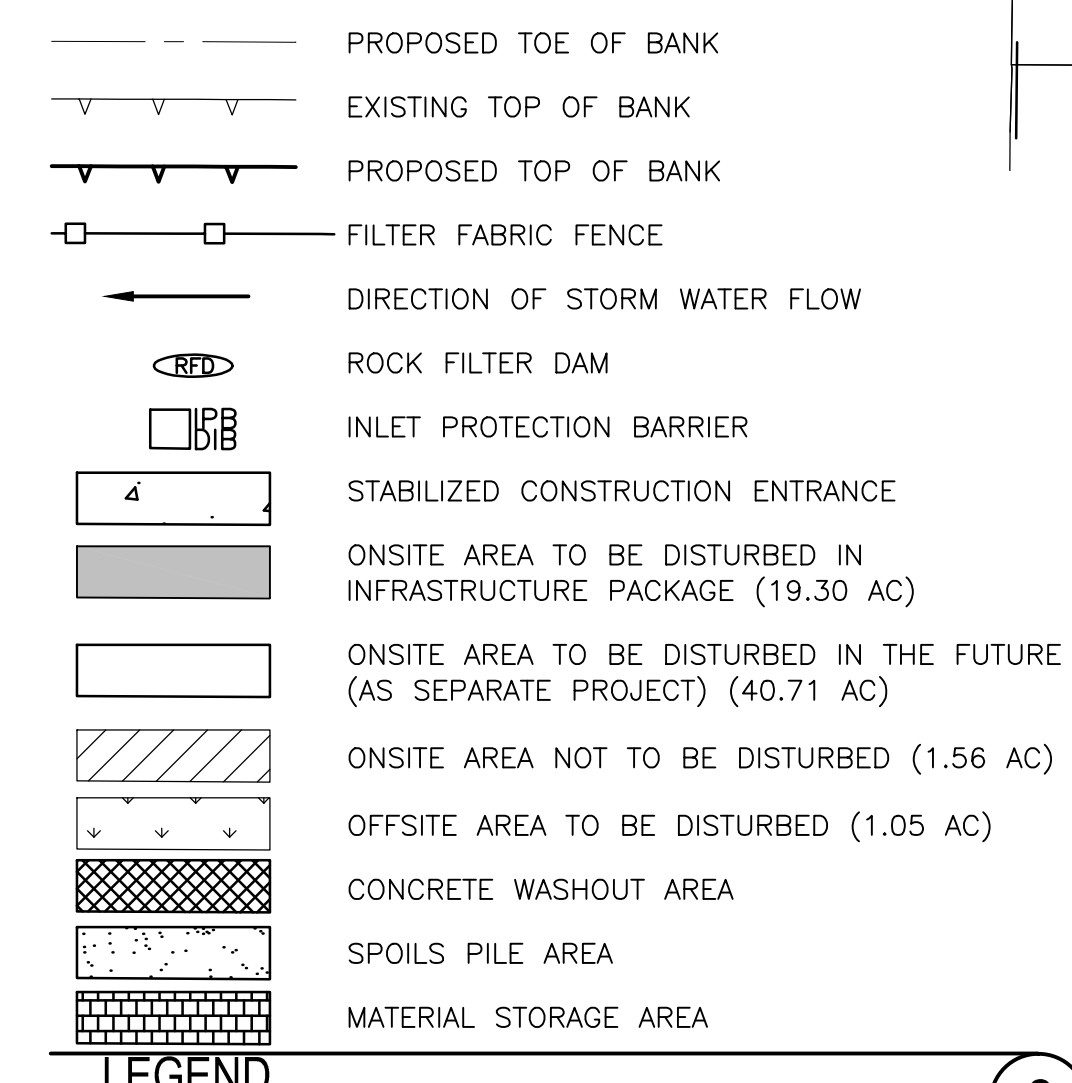
HCFCU UNIT  
P118-19-04



- CONTRACTOR SHALL IMPLEMENT INLET PROTECTION DEVICES, FILTER FABRIC BARRIERS, AND ROCK FILTER DAMS AT LOCATIONS SHOWN ON THE STORM WATER POLLUTION PREVENTION PLANS (SWPPP) TO KEEP SILT AND/OR EXCAVATED MATERIALS FROM ENTERING INTO THE STORM SEWER SYSTEM AND OUTFALL CHANNEL EVENTUALLY POLLUTING THE RECEIVING WATER SYSTEMS.
- CONTRACTOR SHALL CLEAN UP THE EXISTING STREET INTERSECTIONS DAILY, AS NECESSARY, TO REMOVE ANY EXCESS MUD, SILT, OR ROCK TRACKED FROM THE EXCAVATED AREA.
- CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT AND LOOSE MATERIAL AS CONSTRUCTION PROGRESSES.
- CONTRACTOR TO INSPECT AND MAINTAIN THE AREAS LISTED BELOW AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER.
  - DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED.
  - AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION.
  - STRUCTURAL CONTROL MEASURES.
  - LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE.
- RESTORE AND STABILIZE ALL DISTURBED SOIL AREAS AS SOON AS POSSIBLE BY INSTALLATION OF PAVING, HYDRO-MULCH SEEDING AND SODDING. MAINTAIN ALL SWPPP CONTROLS UNTIL ALL DRAINAGE AREAS ARE STABILIZED.
- THE LOCATION OF CONSTRUCTION SUPPORT ACTIVITIES INCLUDING MATERIALS, WASTE, BORROW, FILL, AND EQUIPMENT STORAGE AREA WILL BE SHOWN AND UPDATED ON THE PLAN SHEETS ONCE ESTABLISHED BY CONTRACTOR. THESE SITES WILL BE INCLUDED IN THE INSPECTION REPORT.
- THE LOCATION OF VEHICLE WASH AREA INCLUDING CONCRETE WASHOUTS WILL BE SHOWN AND UPDATED ON THE PLANS ONCE ESTABLISHED BY CONTRACTOR. THESE SITES WILL BE INCLUDED IN THE INSPECTION REPORT.
- THE FOLLOWING RECORDS WILL BE MAINTAINED BY THE CONTRACTOR AND WILL BE MADE READILY AVAILABLE UPON REQUEST TO PARTIES LISTED IN PART III.D.1 OF THE TPDES GENERAL PERMIT TXR150000:
  - DATES WHEN MAJOR GRADING ACTIVITIES OCCUR;
  - ALL DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND
  - THE DATES WHEN STABILIZATION (BOTH TEMPORARY AND/OR PERMANENT) MEASURES ARE INITIATED.
- SOD SHALL BE PLACED BEHIND CURB ALONG ALL ROADWAYS TO LANDSCAPE RIGHT-OF-WAY AS WELL AS AREAS WITHIN THE CHANNELS EXCEPT THE CHANNEL BOTTOMS PER HARRIS COUNTY REQUIREMENTS. ALL OTHER AREAS WILL BE HYDRO-MULCH SEEDED.
- REFER TO THE STORM WATER POLLUTION PREVENTION PLAN REPORT FOR ADDITIONAL DETAILED INFORMATION.
- THE ENTIRE 61.57-ACRE SITE, EXCLUDING THE 1.56-ACRES COVERING THE 100-YEAR FLOODPLAIN, IS TO BE GRADED TO AN EVEN ELEVATION OF 72.0 UP AT A 3:1 MAXIMUM SLOPE FROM THE PROPOSED ROADWAYS. EACH INDIVIDUAL TRACT WITHIN THIS SITE (LONE STAR COLLEGE, NEIGHBORHOOD CENTER, HARRIS COUNTY, TOWN CENTER PARK, DRILL SITE, AND EAST ALDINE MANAGEMENT DISTRICT SITE) ARE TO BE DEVELOPED IN THE FUTURE AS SEPARATE PROJECTS. AT THAT TIME, SWPPPS FOR EACH SITE WILL BE DETAILED AND SUBMITTED FOR APPROVAL INDEPENDENT OF THIS PROJECT.

NOTES

KEITH WIESS PARK



THIS SITE REQUIRES A SWPPP AND A CONSTRUCTION SITE NOTICE TO BE POSTED ONSITE AND A NOI AND NOT MUST BE FILED WITH THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY.

NO.	REVISIONS	DATE	NAME

HARRIS COUNTY  
ENGINEERING DEPARTMENT



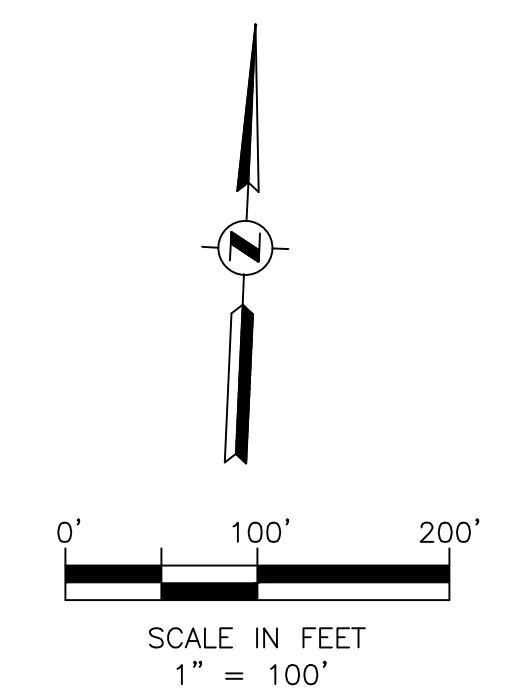
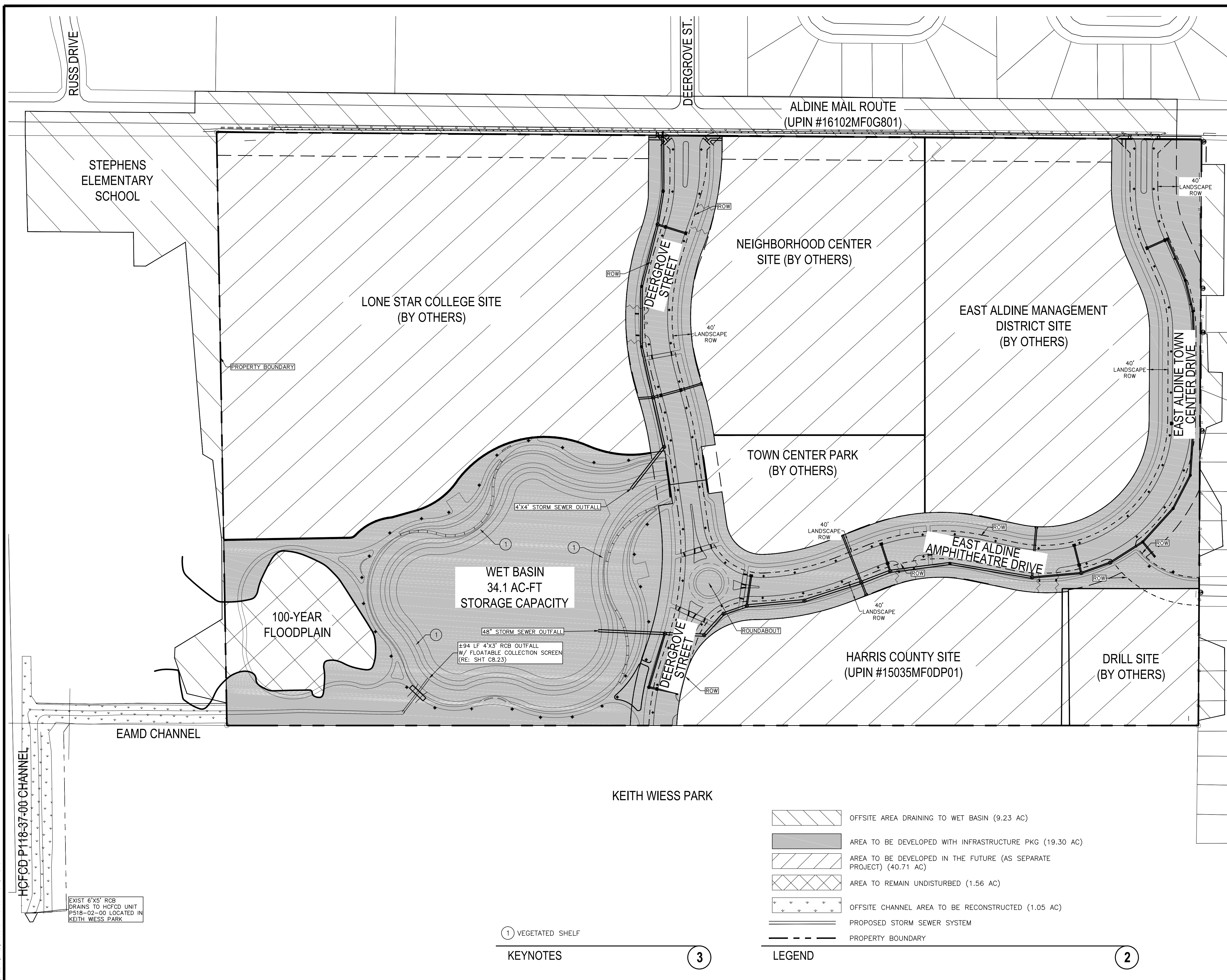
**PGAL**  
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SUITE 200  
HOUSTON, TX 77042  
(T) 713 622 1444  
(F) 713 968 9333  
www.pgal.com  
PGAL TBPE REG. NO:  
F-2742

11/15/2016  
MEGAN E. HOUTCHENS  
114293  
LICENSED PROFESSIONAL ENGINEER

PROJECT TITLE: <b>EAST ALDINE TOWN CENTER</b>		HCED STANDARD
DRAWN BY: MH	SHEET DESCRIPTION: STORM WATER POLLUTION PREVENTION PLAN	SHEET NO: C7.00
CR'D BY: MH		
SCALE: 1"=100'	APPROVED BY:	
DATE: 11/11/2016		

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**Appendix B**  
**SWQMP Site Plan**



- UPON COMPLETION OF CONSTRUCTION, THE PERMANENT STORM WATER QUALITY FEATURE WILL BE CLEANED OF ALL SEDIMENT AND DEBRIS THAT MAY HAVE ACCUMULATED. ADDITIONALLY ALL DISTURBED AREAS RELATED TO THIS PROJECT WILL BE COMPLETELY STABILIZED. THIS WILL BE DONE PRIOR TO SUBMITTING AN "AS BUILT CERTIFICATE" AND CALLING FOR FINAL INSPECTION. HARRIS COUNTY ENGINEERING WILL NOT PASS THE FINAL INSPECTION OR ISSUE THE CERTIFICATE OF COMPLIANCE UNTIL THE REQUIRED FINAL CLEAN OUT AND STABILIZATION HAVE BEEN COMPLETED. THE DEVELOPMENT IS NOT APPROVED FOR OPERATION UNTIL A CERTIFICATE OF COMPLIANCE HAS BEEN ISSUED.
- WET OR DRY DUAL-USE (QUANTITY/QUALITY) BASIN(S) DESIGNED IN GENERAL CONFORMANCE WITH THE STORM WATER QUALITY GUIDANCE MANUAL.
- CONSTRUCTED WETLAND SYSTEM DESIGNED IN GENERAL CONFORMANCE WITH THE STORM WATER QUALITY GUIDANCE MANUAL.
- WET BASIN EQUIPPED TO CAPTURE FLOATABLES TO THE 10-YEAR STORM AND DESIGNED TO DETAIN THE 10 AND 100-YEAR STORM FOR STREAM BANK/AQUATIC HABITAT PROTECTION (CONSTRUCTION CRITERIA FOLLOWS HCFCO GUIDANCE MANUAL OR THE HARRIS COUNTY REGULATIONS FOR APPROVAL AND ACCEPTANCE OF INFRASTRUCTURE, AS APPLICABLE.)
- COMMERCIAL PROPERTY GOOD-HOUSEKEEPING/NO-EXPOSURE COMMITMENT AS PART OF PROJECT'S STORM WATER QUALITY MANAGEMENT PLAN OR DESIGN THE PROJECT IN ACCORDANCE WITH STORM WATER POLLUTION MINIMIZATION PRACTICES CONTAINED IN THE STORM WATER QUALITY GUIDANCE MANUAL.
- PROPER LANDSCAPE PRACTICES COMMITMENT AS PART OF THE PROJECT'S STORM WATER QUALITY MANAGEMENT PLAN.
- THE STORM WATER QUALITY FEATURE FOR THIS SITE IS A COMBINATION OF A WET BASIN, VEGETATED SHELF AND FLOATABLE COLLECTION SCREEN. SEE "POND PLAN" SHEET C5.00 FOR ADDITIONAL INFORMATION.

**NOTES** 1

**TABLE 1: PEAK FLOWS BY SITE RUNOFF CURVES AND SWMM MODELING**

Table 2. Peak Flows by Site Runoff Curves and SWMM Modeling

Existing Conditions						
Land Use	Average	% Impervious	% Impervious	Q 10 (cfs)	Q 100 (cfs)	
Undeveloped	62.3	0	0.0			
Light Industrial / Commercial	2.8	60	182.0			
Residential - Small Lot	0.8	40	32.0			
Transportation	4.9	90	441.0			
<b>Total</b>	<b>70.8</b>		<b>641.0</b>	<b>3.1</b>	<b>10</b>	<b>100</b>

Impacted Conditions						
Land Use	Average	% Impervious	% Impervious	Q 10 (cfs)	Q 100 (cfs)	
High Density	49.0	85	4165.0			
Water	5.9	100	590.0			
Undeveloped	0.8	0	0.0			
Light Industrial / Commercial	2.7	60	162.0			
Residential - Small Lot	0.8	40	32.0			
Developed - Green Areas	6.2	15	93.0			
Transportation	5.5	90	495.0			
<b>Total</b>	<b>72.9</b>		<b>5587.0</b>	<b>78.1</b>	<b>100</b>	<b>200</b>

Proposed (Mitigated) Conditions						
Land Use	Average	% Impervious	% Impervious	Q 10 (cfs)	Q 100 (cfs)	
High Density	49.0	85	4165.0			
Water	5.9	100	590.0			
Undeveloped	0.8	0	0.0			
Light Industrial / Commercial	2.7	60	162.0			
Residential - Small Lot	0.8	40	32.0			
Developed - Green Areas	6.2	15	93.0			
Transportation	5.5	90	495.0			
<b>Total</b>	<b>72.9</b>		<b>5587.0</b>	<b>78.1</b>	<b>100</b>	<b>200</b>

**TABLE 2: DETENTION SUMMARY**

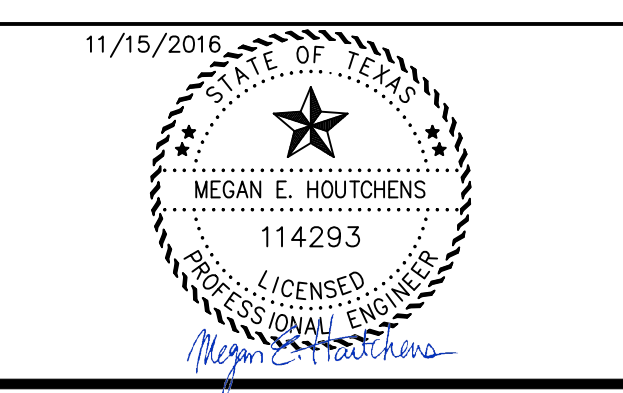
Project Name: East Aldine Town Center		
Detention Basin Drainage Area	70.8	acres
Development Area	61.6	acres
Detention Storage Rate	0.55	acre-feet/acre
Detention Storage Required	33.9	acre-feet
Detention Storage Provided	33.9	acre-feet
	10% (10-yr)	1% (100-yr)
Design Water Surface Elevation (NAVD88 Datum, 2001 Adjustment)	64.4	67.0
Maximum Allowable Outflow (cfs)	85	140
Maximum Outflow Provided (cfs)	63	93

NO.	REVISIONS	DATE	NAME

HARRIS COUNTY  
ENGINEERING DEPARTMENT

3131 BRIARPARK DRIVE  
SUITE 200  
HOUSTON, TX 77042  
(T) 713 622 1444  
(F) 713 968 9333  
www.pgal.com

PGAL TBPE REG. NO:  
F-2742



PROJECT TITLE:	<b>EAST ALDINE TOWN CENTER</b>	
DRAWN BY:	MH	HCED STANDARD
CK'D BY:	MH	SHEET DESCRIPTION: STORM WATER QUALITY MANAGEMENT PLAN
SCALE:	1"=100'	SHEET NO: C7.10
DATE:	11/11/2016	APPROVED BY:

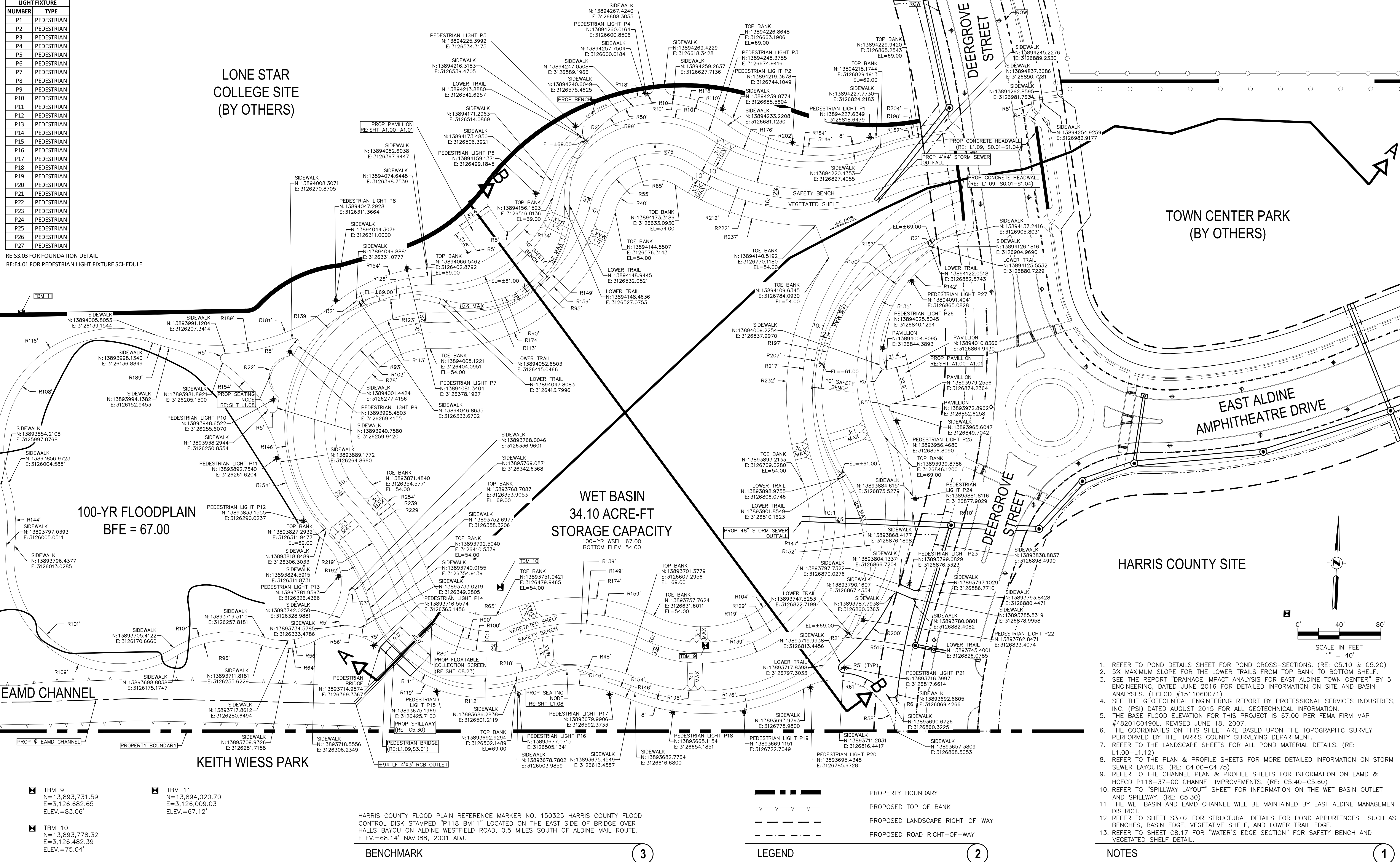
R:\1000945-0-CAD FILES\SHEETS\DWG\1000945 - C1.DWG - SWAMP.DWG

NUMBER	TYPE
P1	PEDESTRIAN
P2	PEDESTRIAN
P3	PEDESTRIAN
P4	PEDESTRIAN
P5	PEDESTRIAN
P6	PEDESTRIAN
P7	PEDESTRIAN
P8	PEDESTRIAN
P9	PEDESTRIAN
P10	PEDESTRIAN
P11	PEDESTRIAN
P12	PEDESTRIAN
P13	PEDESTRIAN
P14	PEDESTRIAN
P15	PEDESTRIAN
P16	PEDESTRIAN
P17	PEDESTRIAN
P18	PEDESTRIAN
P19	PEDESTRIAN
P20	PEDESTRIAN
P21	PEDESTRIAN
P22	PEDESTRIAN
P23	PEDESTRIAN
P24	PEDESTRIAN
P25	PEDESTRIAN
P26	PEDESTRIAN
P27	PEDESTRIAN

LONE STAR COLLEGE SITE (BY OTHERS)

TOWN CENTER PARK (BY OTHERS)

RE: S3.03 FOR FOUNDATION DETAIL  
RE: E4.01 FOR PEDESTRIAN LIGHT FIXTURE SCHEDULE



- TBM 9  
 N=13,893,731.59  
 E=3,126,682.65  
 ELEV.=83.06'
- TBM 11  
 N=13,894,020.70  
 E=3,126,009.03  
 ELEV.=67.12'
- TBM 10  
 N=13,893,778.32  
 E=3,126,482.39  
 ELEV.=75.04'

HARRIS COUNTY FLOOD PLAIN REFERENCE MARKER NO. 150325 HARRIS COUNTY FLOOD CONTROL DISK STAMPED "P118 BM11" LOCATED ON THE EAST SIDE OF BRIDGE OVER HALLS BAYOU ON ALDINE WESTFIELD ROAD, 0.5 MILES SOUTH OF ALDINE MAIL ROUTE. ELEV.=68.14' NAVD88, 2001 ADJ.

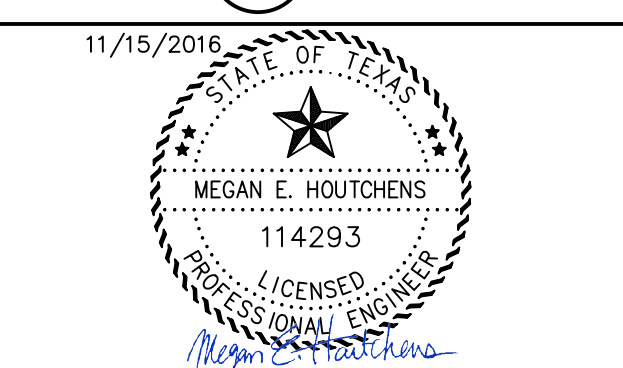
- LEGEND**
- PROPERTY BOUNDARY
  - PROPOSED TOP OF BANK
  - PROPOSED LANDSCAPE RIGHT-OF-WAY
  - PROPOSED ROAD RIGHT-OF-WAY

- NOTES**
1. REFER TO POND DETAILS SHEET FOR POND CROSS-SECTIONS. (RE: C5.10 & C5.20)
  2. 5% MAXIMUM SLOPE FOR THE LOWER TRAILS FROM TOP BANK TO BOTTOM SHELF.
  3. SEE THE REPORT "DRAINAGE IMPACT ANALYSIS FOR EAST ALDINE TOWN CENTER" BY 5 ENGINEERING, DATED JUNE 2016 FOR DETAILED INFORMATION ON SITE AND BASIN ANALYSES. (HCFCD #1511060071)
  4. SEE THE GEOTECHNICAL ENGINEERING REPORT BY PROFESSIONAL SERVICES INDUSTRIES, INC. (PSI) DATED AUGUST 2015 FOR ALL GEOTECHNICAL INFORMATION.
  5. THE BASE FLOOD ELEVATION FOR THIS PROJECT IS 67.00 PER FEMA FIRM MAP #48201C0490L, REVISED JUNE 18, 2007.
  6. THE COORDINATES ON THIS SHEET ARE BASED UPON THE TOPOGRAPHIC SURVEY PERFORMED BY THE HARRIS COUNTY SURVEYING DEPARTMENT.
  7. REFER TO THE LANDSCAPE SHEETS FOR ALL POND MATERIAL DETAILS. (RE: L1.00-L1.12)
  8. REFER TO THE PLAN & PROFILE SHEETS FOR MORE DETAILED INFORMATION ON STORM SEWER LAYOUTS. (RE: C4.00-C4.75)
  9. REFER TO THE CHANNEL PLAN & PROFILE SHEETS FOR INFORMATION ON EAMD & HCFCD P118-37-00 CHANNEL IMPROVEMENTS. (RE: C5.40-C5.60)
  10. REFER TO "SPILLWAY LAYOUT" SHEET FOR INFORMATION ON THE WET BASIN OUTLET AND SPILLWAY. (RE: C5.30)
  11. THE WET BASIN AND EAMD CHANNEL WILL BE MAINTAINED BY EAST ALDINE MANAGEMENT DISTRICT.
  12. REFER TO SHEET S3.02 FOR STRUCTURAL DETAILS FOR POND APPURTENANCES SUCH AS BENCHES, BASIN EDGE, VEGETATIVE SHELF, AND LOWER TRAIL EDGE.
  13. REFER TO SHEET C8.17 FOR "WATER'S EDGE SECTION" FOR SAFETY BENCH AND VEGETATED SHELF DETAIL.

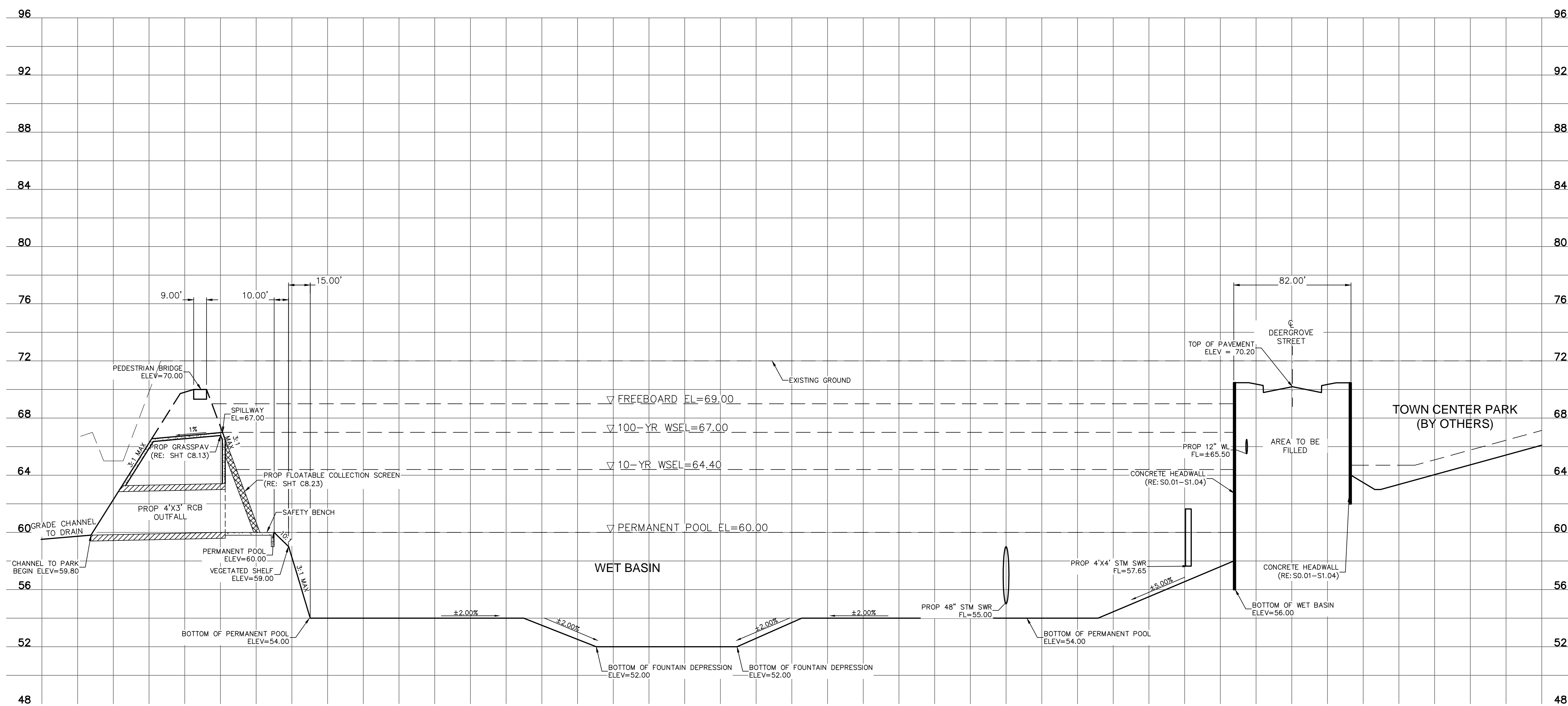
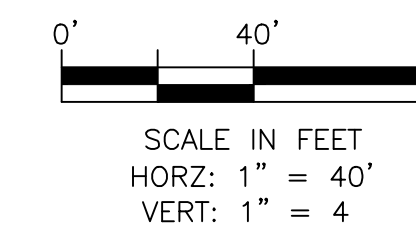
NO.	REVISIONS	DATE	NAME

HARRIS COUNTY  
ENGINEERING DEPARTMENT

3131 BRIARPARK DRIVE  
SUITE 200  
HOUSTON, TX 77042  
(713) 713 6222 1444  
(713) 713 968 9333  
www.pgal.com  
PGAL TBPE REG. NO:  
F-2742



PROJECT TITLE: <b>EAST ALDINE TOWN CENTER</b>		HCD STANDARD
DRAWN BY: MH	SHEET DESCRIPTION: POND PLAN	
SCALE: 1"=40'	APPROVED BY:	SHEET NO: C5.00
DATE: 11/11/2016		

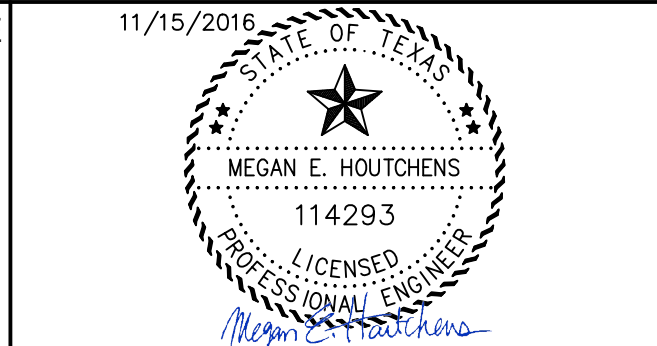


SECTION A-A

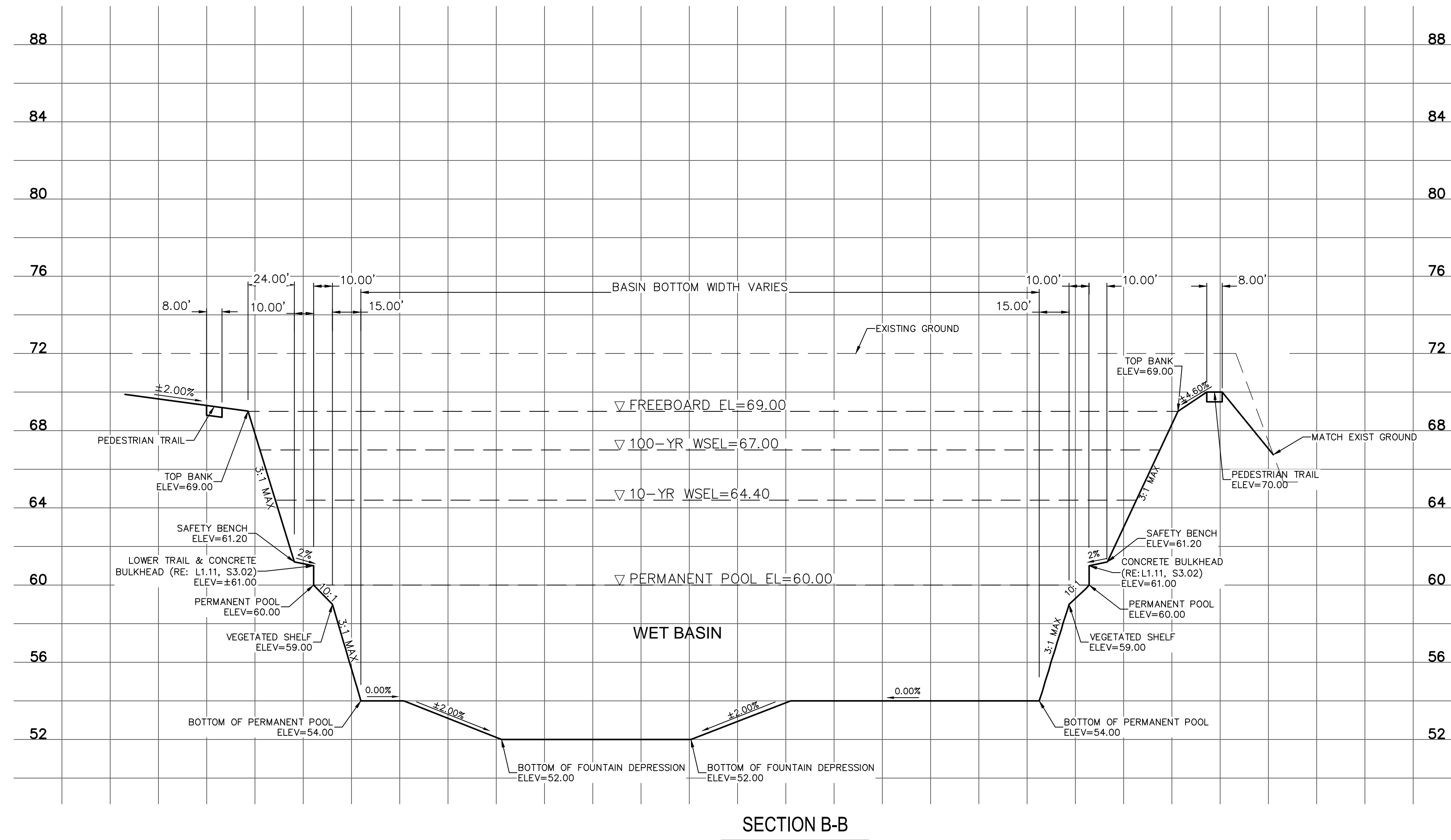
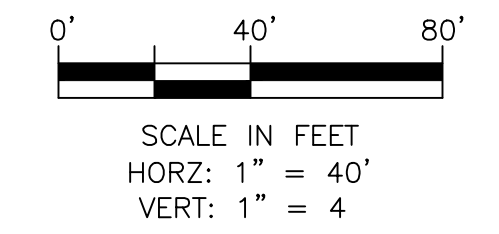
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NO.	REVISIONS	DATE	NAME

HARRIS COUNTY  
ENGINEERING DEPARTMENT



PROJECT TITLE:		EAST ALDINE TOWN CENTER
DRAWN BY:	MH	HCCD STANDARD
CR'D BY:	MH	
SCALE:	SHEET DESCRIPTION: POND DETAILS	
DATE:	APPROVED BY:	SHEET NO: C5.10
11/11/2016		



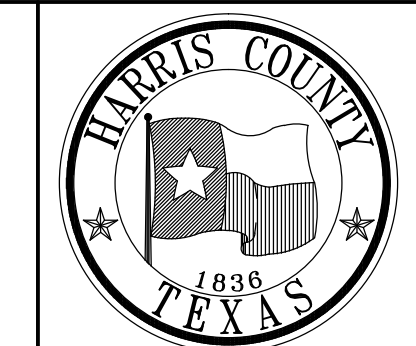
1. SEE SHEETS L3.01-L3.06 FOR TYPES OF WETLAND PLANTINGS TO BE PROVIDED ALONG THE VEGETATED SHELF.

NOTES 1

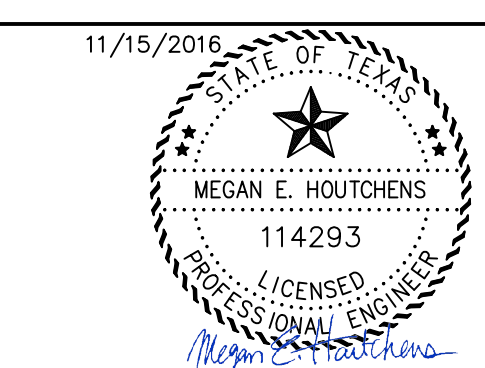
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NO.	REVISIONS	DATE	NAME

HARRIS COUNTY  
ENGINEERING DEPARTMENT



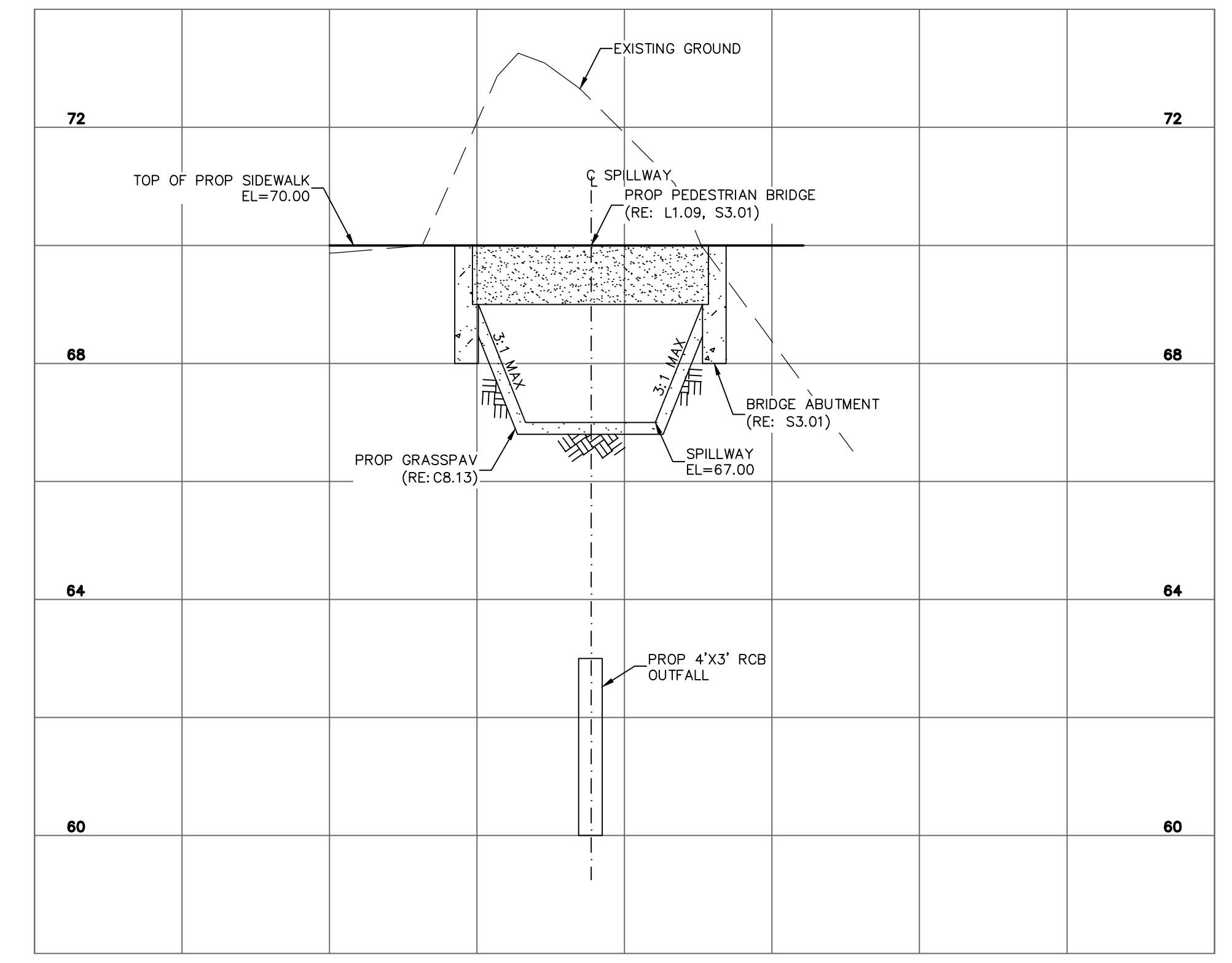
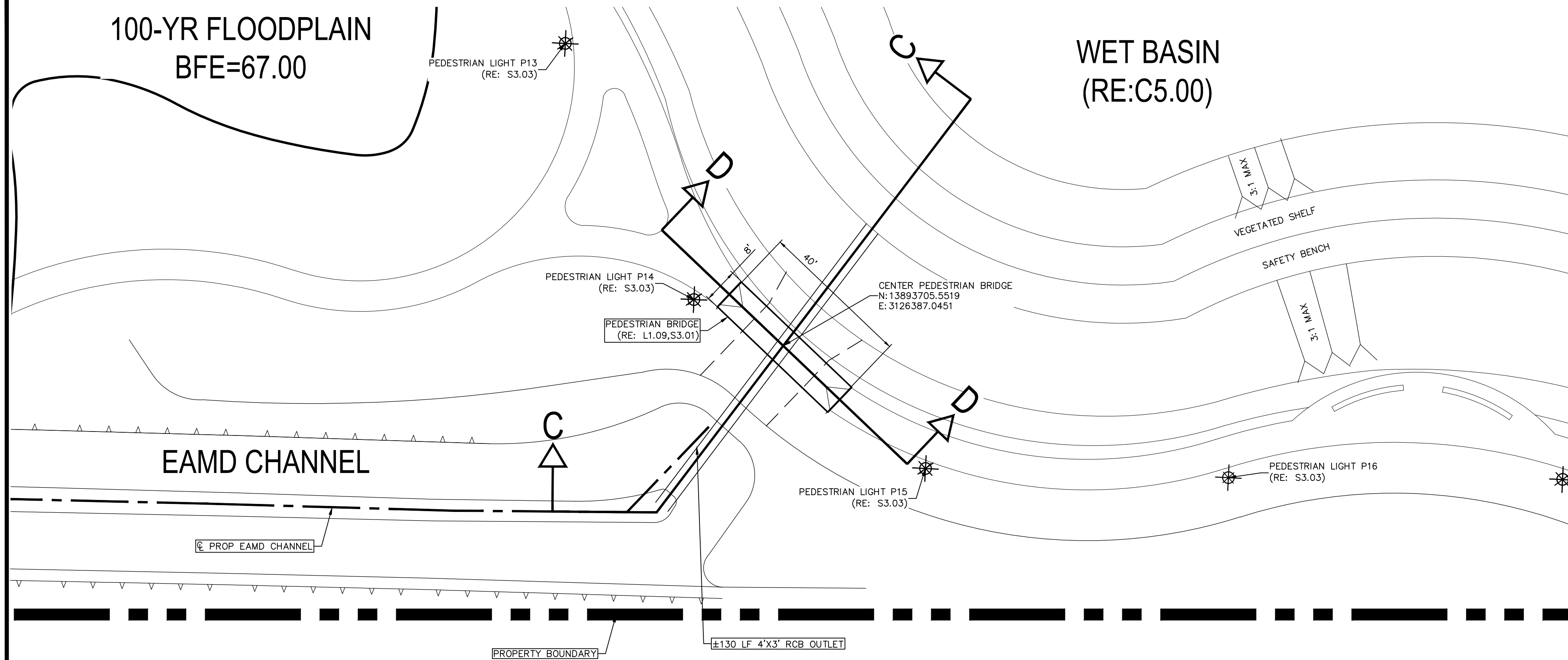
3131 BRIARPARK DRIVE  
SUITE 200  
HOUSTON, TX 77042  
[T] 713 622 1444  
[F] 713 968 9333  
www.pgal.com  
PGAL TBPE REG. NO:  
F-2742



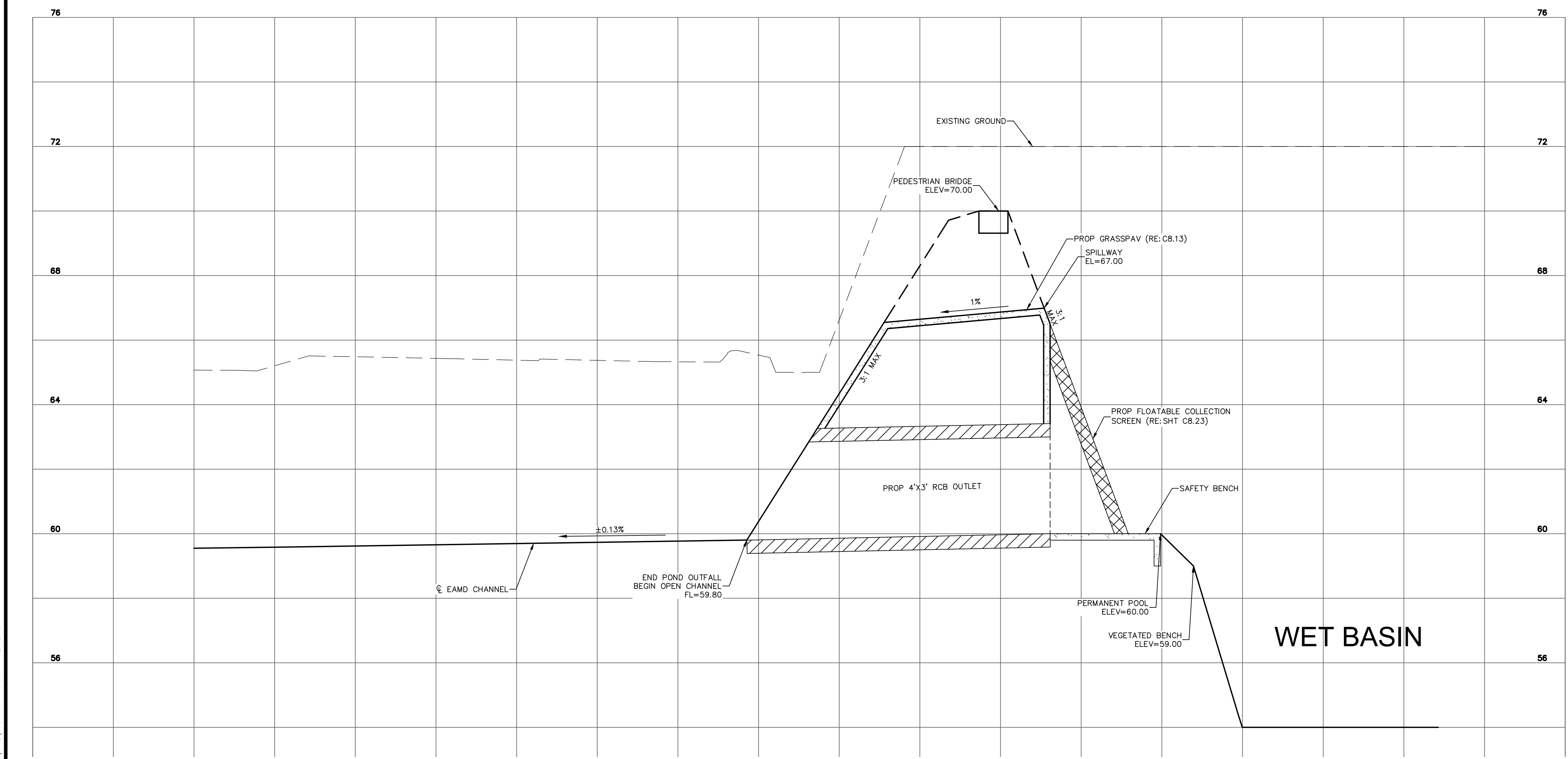
PROJECT TITLE: <b>EAST ALDINE TOWN CENTER</b>		HCCD STANDARD
DRAWN BY: MH	SHEET DESCRIPTION: POND DETAILS	
CR'D BY: MH	DATE: 11/11/2016	SHEET NO: C5.20
SCALE:	APPROVED BY:	

100-YR FLOODPLAIN  
BFE=67.00

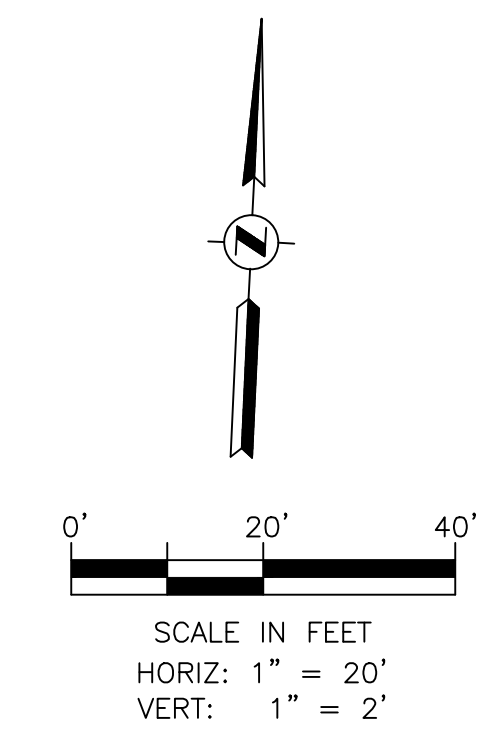
WET BASIN  
(RE:C5.00)



SECTION D-D

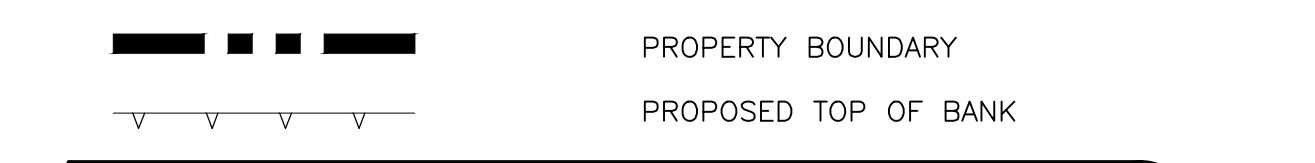


SECTION C-C



1. REFER TO THE CHANNEL PLAN & PROFILE SHEETS FOR INFORMATION ON EAMD CHANNEL IMPROVEMENTS. (RE: C5.40-C5.60)
2. REFER TO SHEET S3.01 FOR STRUCTURAL DETAILS FOR THE PEDESTRIAN BRIDGE.
3. SEE SHEETS L3.01-L3.06 FOR TYPES OF WETLAND PLANTINGS TO BE PROVIDED ALONG THE VEGETATED SHELF.

NOTES 1

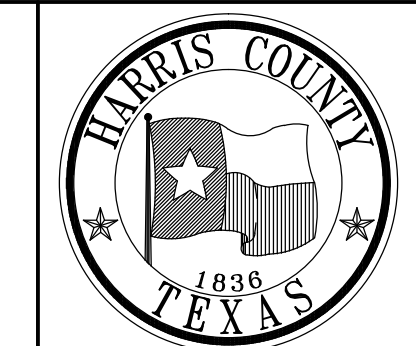


LEGEND 2

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NO.	REVISIONS	DATE	NAME

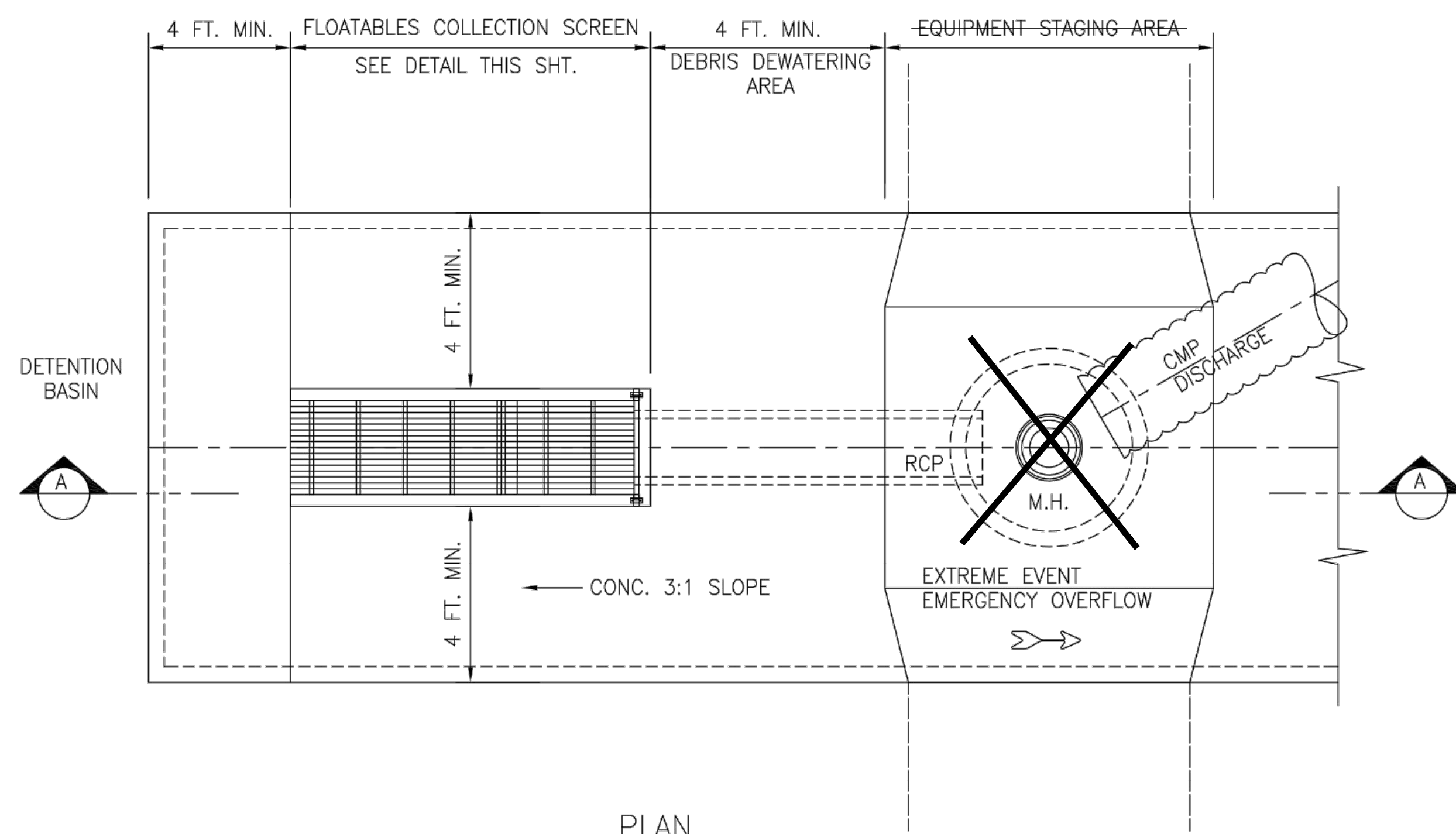
HARRIS COUNTY  
ENGINEERING DEPARTMENT



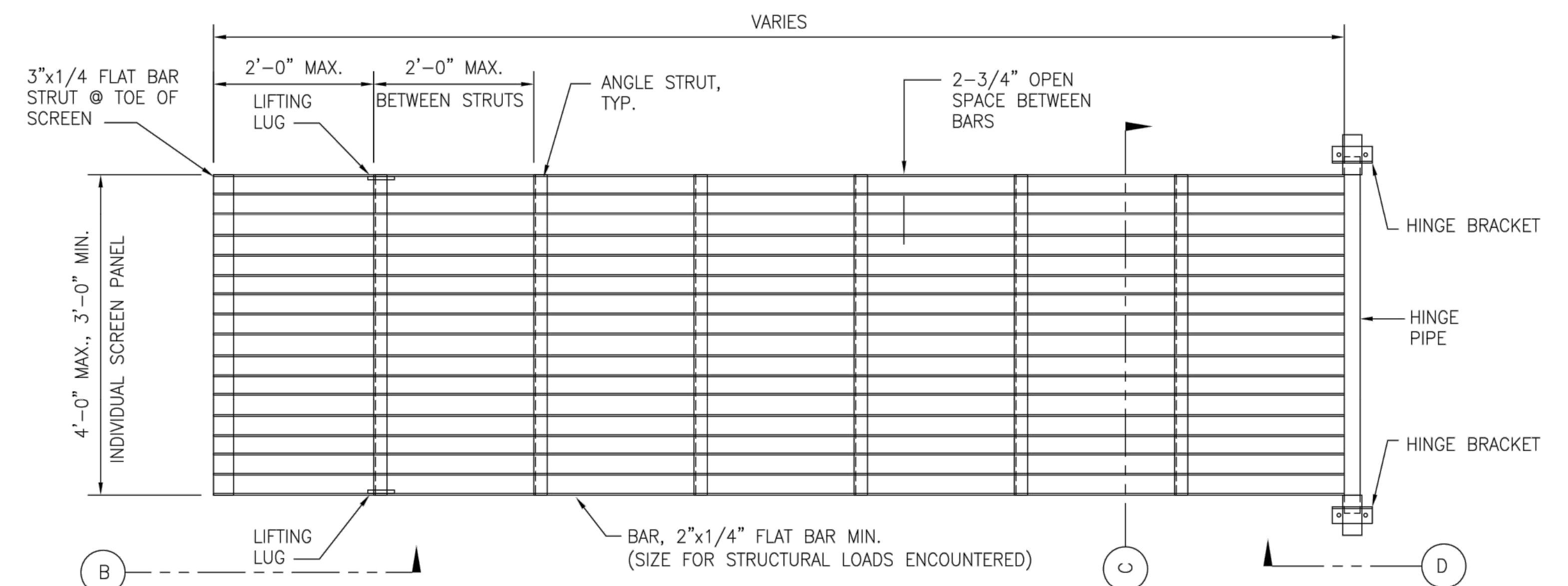
**PGAL**  
3131 BRIARPARK DRIVE  
SUITE 200  
HOUSTON, TX 77042  
(T) 713 622 1444  
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www.pgal.com  
PGAL TBPE REG. NO:  
F-2742

11/15/2016  
  
 MEGAN E. HOUTCHENS  
 114293  
 LICENSED PROFESSIONAL ENGINEER  
 STATE OF TEXAS

PROJECT TITLE: <b>EAST ALDINE TOWN CENTER</b>		HCCD STANDARD
DRAWN BY: MH	SHEET DESCRIPTION: SPILLWAY LAYOUT	
CR'D BY: MH	SCALE: 1"=20' H	SHEET NO: C5.30
DATE: 11/11/2016	APPROVED BY:	

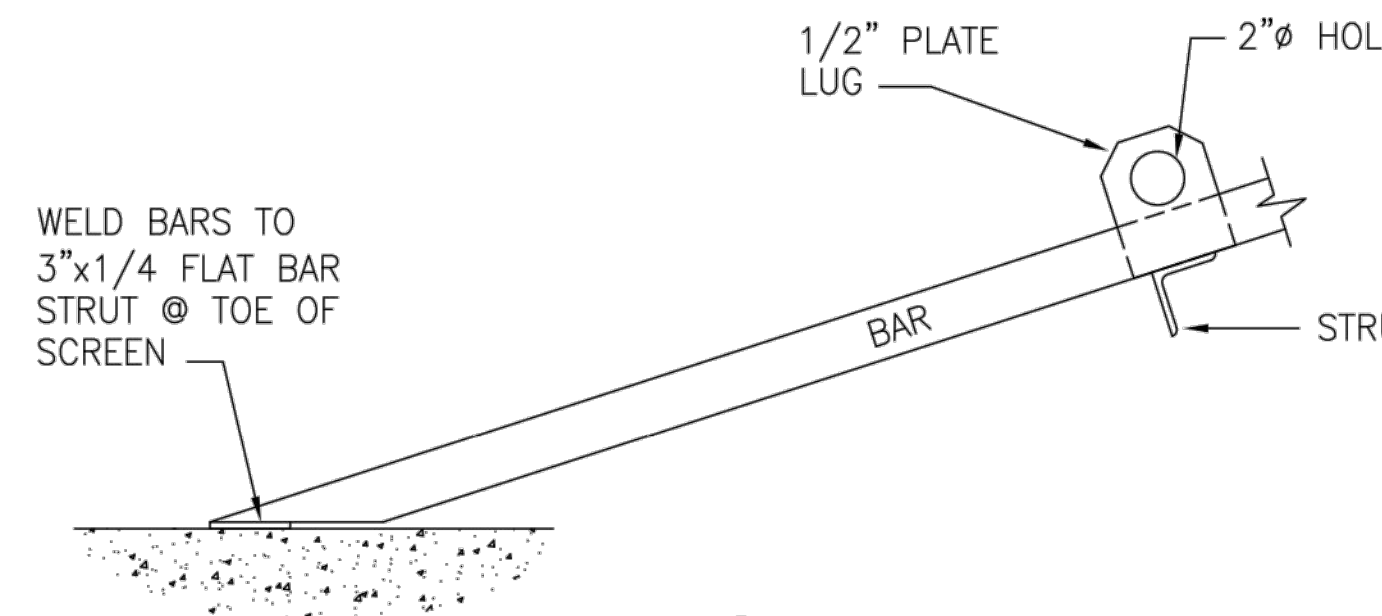


PLAN

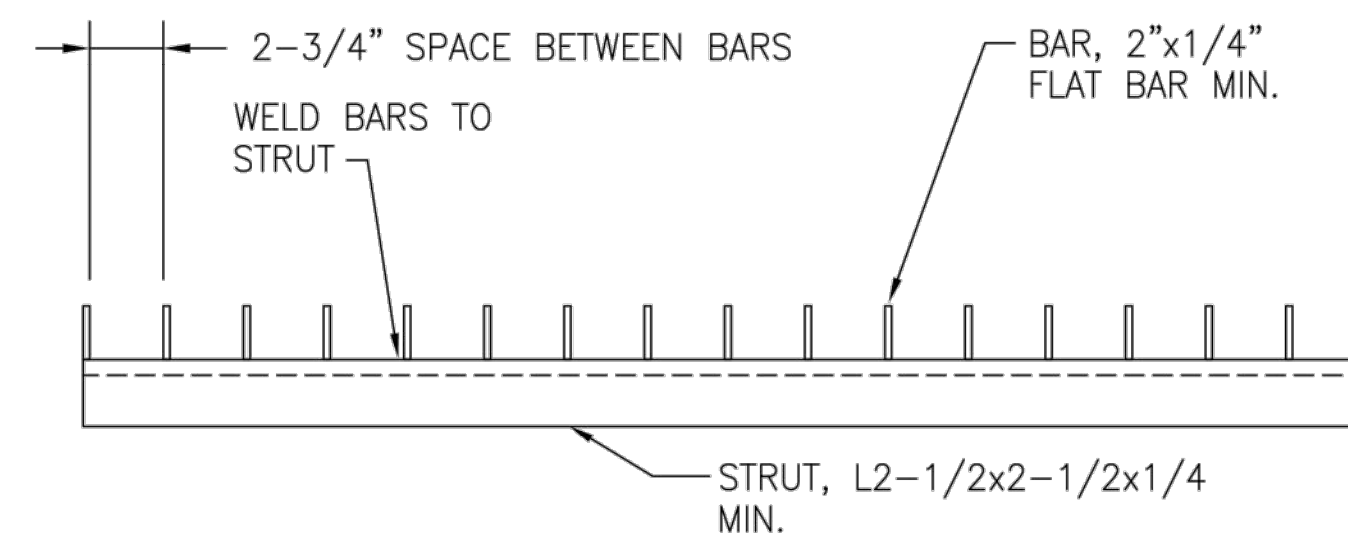


FLOATABLES COLLECTION SCREEN PLAN

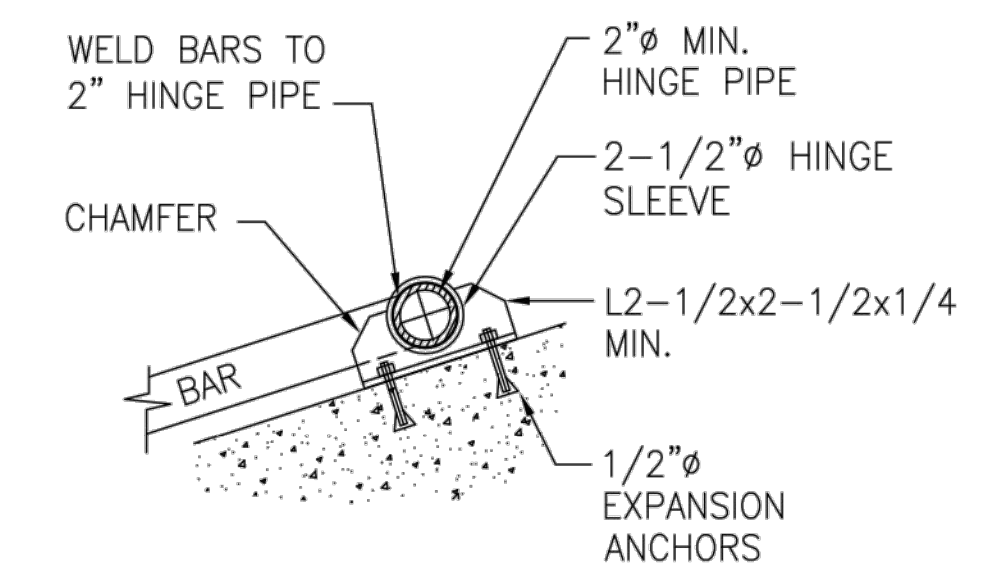
HOT DIP GALV. AFTER FAB.



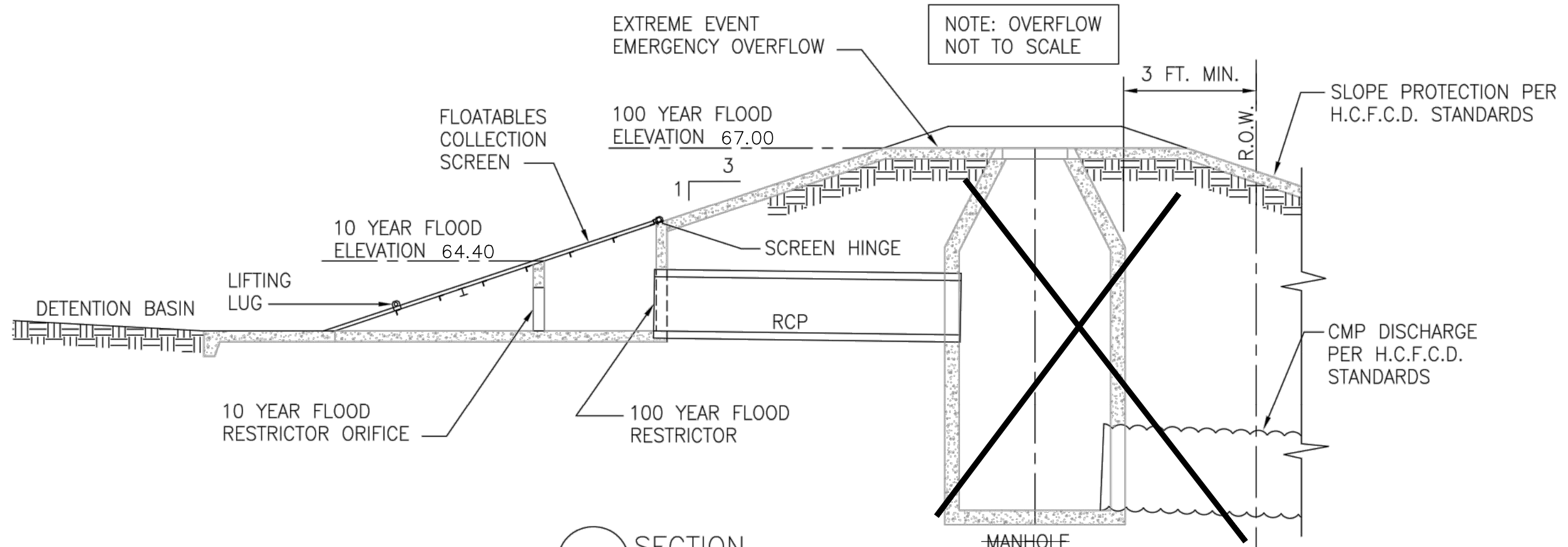
B SECTION



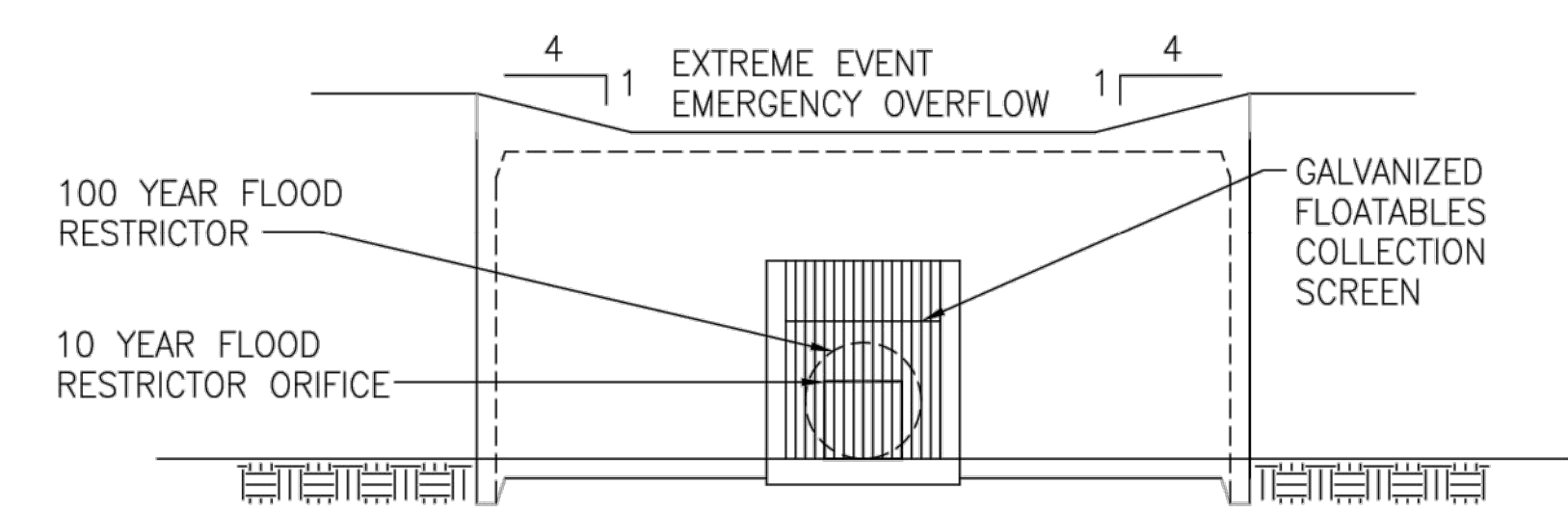
C SECTION



D SECTION



A SECTION



FRONT

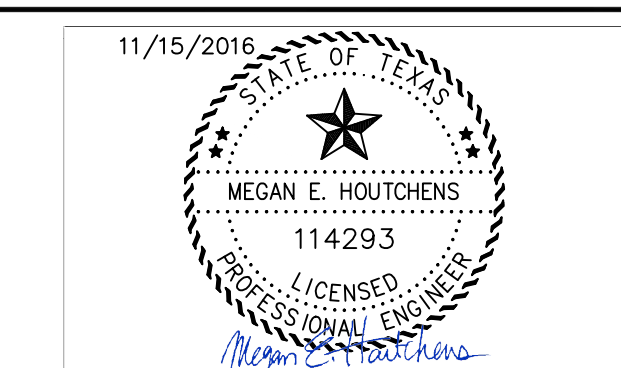
DESIGN CONSIDERATIONS FOR ENGINEER

1. DESIGN FOR ACCESSIBILITY BY H.C.F.C.D. MAINTENANCE PERSONNEL.
2. SCREEN TO BE DESIGNED FOR HAND RAKING OF DEBRIS TO TOP OF STRUCTURE FOR DEWATERING AND TRUCK PICK UP.
3. 4' MINIMUM CONCRETE PAVED ACCESS ON ALL SIDES FOR MAINTENANCE PERSONNEL.
4. 3:1 MAXIMUM SLOPE FOR TRASH COLLECTION SCREEN AND CONCRETE PAVING.
5. PROVIDE ALL-WEATHER ACCESS ROAD TO SCREEN AND DEBRIS REMOVAL SITE.
6. SCREEN SIZE AND NET OPENING AREA TO ALLOW FLOW RATE OF 1.0 CFS THROUGH SCREEN, ASSUMING NO BLINDING. SIZE AREA BELOW RESTRICTOR WALL FOR 10 YEAR FLOW RATE AND OVERALL SCREEN AREA FOR 100 YEAR FLOW RATE.
7. SCREEN DESIGN MAY REQUIRE MULTIPLE 4' WIDE SCREEN PANELS.

MINIMUM SCREEN AREA (SQ. FT.) =  $\frac{Q \text{ (CFS)}}{.92}$      93 cfs / 0.92 = 101.09 SF

NO.	REVISIONS	DATE	NAME

HARRIS COUNTY  
ENGINEERING DEPARTMENT



PROJECT TITLE: FLOATABLES COLLECTION SCREEN		JOB NO.
DRAWN BY: CADDOP	SHEET DESCRIPTION:	FILE NO.
CHKD BY:		FILENAME
SCALE: N.T.S.		FILE NO.
DATE:	APPROVED BY:	SHT NO. C8123



Harris County  
Flood Control District  
9900 Northwest Freeway  
Houston, Texas 77092



## **Appendix C**

### **Documentation**

*TPDES NOI, NOT, & LARGE CONSTRUCTION SITE NOTICE  
MAINTENANCE SCHEDULE*

**Table 1: Maintenance and Inspection Schedule for East Aldine Town Center**

Maintenance Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
<b>Non-Structural Controls</b>												
Litter Pickup in the Basin	X	X	X	X	X	X	X	X	X	X	X	X
Landscaping Practices around the Basin	X	X	X	X	X	X	X	X	X	X	X	X
Mowing of the Basin			X						X			
<b>Structural Controls</b>												
Cleaning of the Floatable Collection Screen	X	X	X	X	X	X	X	X	X	X	X	X
*Sediment Removal												
Nuisance Control			X						X			
<b>Inspections</b>												
Monthly	X	X	X	X	X	X	X	X	X	X	X	X
Annual												X

"X" identifies the months in which the activity will be performed (at a minimum)

\*Sediment removed from the basin when accumulations exceed one-third the design depth of the basin.



# TCEQ Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

## IMPORTANT:

- Use the [INSTRUCTIONS](#) to fill out each question in this form.
- Use the [CHECKLIST](#) to make certain all you filled out all required information. Incomplete applications **WILL** delay approval or result in automatic denial.
- Once processed your permit can be viewed at:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm)

**ePERMITS:** Sign up now for online NOI: <https://www3.tceq.texas.gov/steers/index.cfm>  
Pay a \$225 reduced application fee by using ePermits.

## APPLICATION FEE:

- You must pay the **\$325** Application Fee to TCEQ for the paper application to be complete.
- Payment and NOI must be mailed to separate addresses.
- Did you know you can pay on line?
  - Go to <https://www3.tceq.texas.gov/epay/index.cfm>
  - Select Fee Type: GENERAL PERMIT CONSTRUCTION STORM WATER DISCHARGE NOI APPLICATION
- **Provide your payment information below, for verification of payment:**

Mailed	Check/Money Order No.: _____	
	Name Printed on Check: _____	
EPAY	Voucher No.: _____	
	Is the Payment Voucher copy attached?	Yes

**RENEWAL: Is this NOI a Renewal of an existing General Permit Authorization?**  
(Note: A permit cannot be renewed after June 3, 2013.)

Yes    The Permit number is: TXR15\_\_\_\_\_

**(If a permit number is not provided, a new number will be assigned.)**

No

## 1) OPERATOR (Applicant)

**a)** If the applicant is currently a customer with TCEQ, what is the Customer Number (CN) issued to this entity? You may search for your CN at:  
<http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=cust.CustSearch>

CN \_\_\_\_\_

**b)** What is the Legal Name of the entity (applicant) applying for this permit?

\_\_\_\_\_  
(The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal document forming the entity.)

**c)** What is the name and title of the person signing the application? The person must be an executive official meeting signatory requirements in TAC 305.44(a).

Prefix (Mr. Ms. Miss): \_\_\_\_\_  
First/Last Name: \_\_\_\_\_ Suffix: \_\_\_\_\_  
Title: \_\_\_\_\_ Credential: \_\_\_\_\_

**d)** What is the Operator Contact's (Responsible Authority) contact information and mailing address as recognized by the US Postal Service (USPS)? You may verify the address at:

<http://zip4.usps.com/zip4/welcome.jsp>

Phone #: \_\_\_\_\_ ext: \_\_\_\_\_ Fax #: \_\_\_\_\_

E-mail: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Internal Routing (Mail Code, Etc.): \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_

If outside USA: Territory: \_\_\_\_\_ Country Code: \_\_\_\_\_ Postal Code: \_\_\_\_\_

**e)** Indicate the type of Customer (The instructions will help determine your customer type):

Individual	Limited Partnership	Sole Proprietorship-DBA
Joint Venture	General Partnership	Corporation
Trust	Estate	Federal Government
State Government	County Government	City Government
Other Government		

**f)** Independent Operator? Yes                  No  
(If governmental entity, subsidiary, or part of a larger corporation, check "No".)

**g)** Number of Employees: 0-20; 21-100; 101-250; 251-500; or 501 or higher

**h)** Customer Business Tax and Filing Numbers:  
(REQUIRED for Corporations and Limited Partnerships. Not Required for Individuals, Government, or Sole Proprietors)

State Franchise Tax ID Number: \_\_\_\_\_

Federal Tax ID: \_\_\_\_\_

Texas Secretary of State Charter (filing) Number: \_\_\_\_\_

DUNS Number (if known): \_\_\_\_\_

## **2) APPLICATION CONTACT**

If TCEQ needs additional information regarding this application, who should be contacted?

Is the application contact the same as the applicant identified above?

Yes, go to Section 3).      No, complete section below.

Prefix (Mr. Ms. Miss): \_\_\_\_\_  
First/Last Name: \_\_\_\_\_ Suffix: \_\_\_\_\_  
Title: \_\_\_\_\_ Credential: \_\_\_\_\_

Organization Name: \_\_\_\_\_  
Phone No.: \_\_\_\_\_ ext: \_\_\_\_\_ Fax Number: \_\_\_\_\_  
E-mail: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
Internal Routing (Mail Code, Etc.): \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_  
Mailing Information if outside USA:  
Territory: \_\_\_\_\_ Country Code: \_\_\_\_\_ Postal Code: \_\_\_\_\_

**3) REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

If the site of your business is part of a larger business site or if other businesses were located at this site before yours, a Regulated Entity Number (RN) may already be assigned for the larger site. Use the RN assigned for the larger site. Search TCEQ's Central Registry to see if the larger site may already be registered as a regulated site at:

<http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=regent.RNSearch>.

If the site is found, provide the assigned Regulated Entity Reference Number and provide the information for the site to be authorized through this application below. The site information for this authorization may vary from the larger site information.

**a)** TCEQ issued RE Reference Number (RN): RN \_\_\_\_\_

**b)** Name of project or site (the name known by the community where located):  
\_\_\_\_\_

**c)** In your own words, briefly describe the primary business of the Regulated Entity: (Do not repeat the SIC and NAICS code):  
\_\_\_\_\_

**d)** County (or counties if > 1) \_\_\_\_\_

**e)** Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

**f)** Does the site have a physical address?  
Yes, complete Section A for a physical address.  
No, complete Section B for site location information.

**Section A:** Enter the physical address for the site.  
Verify the address with USPS. If the address is not recognized as a delivery address, provide the address as identified for overnight mail delivery, 911 emergency or other online map tools to confirm an address.

Physical Address of Project or Site:  
Street Number: \_\_\_\_\_ Street Name: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_

**Section B:** Enter the site location information.

If no physical address (Street Number & Street Name), provide a written location access description to the site. (Ex.: located 2 miles west from intersection of Hwy 290 & IH35 accessible on Hwy 290 South)

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City where the site is located or, if not in a city, what is the nearest city:

State: \_\_\_\_\_ ZIP Code where the site is located: \_\_\_\_\_

**4) GENERAL CHARACTERISTICS**

**a)** Is the project/site located on Indian Country Lands?

Yes - If the answer is Yes, you must obtain authorization through EPA, Region 6.

No

**b)** Is your construction activity associated with a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources?

Yes - If the answer is Yes, you may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization through EPA, Region 6.

No

**c)** What is the Primary Standard Industrial Classification (SIC) Code that best describes the construction activity being conducted at the site?

Primary SIC Code: \_\_\_\_\_

**d)** If applicable, what is the Secondary SIC Code(s): \_\_\_\_\_

**e)** What is the total number of acres disturbed? \_\_\_\_\_

**f)** Is the project site part of a larger common plan of development or sale?

Yes - If the answer is Yes, the total number of acres disturbed can be less than 5 acres.

No - If the answer is No, the total number of acres disturbed must be 5 or more. If the total number of acres disturbed is less than 5 then the project site does not qualify for coverage through this Notice of Intent. Coverage will be denied. See the requirements in the general permit for small construction sites.

**g)** What is the name of the first water body(s) to receive the stormwater runoff or potential runoff from the site?

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**h)** What is the segment number(s) of the classified water body(s) that the discharge will eventually reach?

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**i)** Is the discharge into an MS4?

Yes - If the answer is Yes, provide the name of the MS4 operator below.

No

If Yes, provide the name of the MS4 operator:

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Note: The general permit requires you to send a copy of the NOI to the MS4 operator.

**j)** Are any of the surface water bodies receiving discharges from the construction site on the latest EPA-approved CWA 303(d) List of impaired waters?

Yes - If the answer is Yes, provide the name(s) of the impaired water body(s) below.

No

If Yes, provide the name(s) of the impaired water body(s):

**k)** Is the discharge or potential discharge within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer as defined in 30 TAC Chapter 213?

Yes - If the answer is Yes, complete certification below by checking "Yes."

No

I certify that a copy of the TCEQ approved Plan required by the Edwards Aquifer Rule (30 TAC Chapter 213) is either included or referenced in the Stormwater Pollution Prevention Plan.

Yes

**5) CERTIFICATION**

Check Yes to the certifications below. Failure to indicate Yes to **ALL** items may result in denial of coverage under the general permit.

- a) I certify that I have obtained a copy and understand the terms and conditions of the Construction General Permit (TXR150000). Yes
- b) I certify that the full legal name of the entity applying for this permit has been provided and is legally authorized to do business in Texas. Yes
- c) I understand that a Notice of Termination (NOT) must be submitted when this authorization is no longer needed. Yes
- d) I certify that a Stormwater Pollution Prevention Plan has been developed, will be implemented prior to construction and to the best of my knowledge and belief is compliant with any applicable local sediment and erosion control plans, as required in the general permit TXR150000. Note: For multiple operators who prepare a shared SWP3, the confirmation of an operator may be limited to its obligations under the SWP3 provided all obligations are confirmed by at least one operator. Yes

**Operator Certification:**

I, \_\_\_\_\_  
Typed or printed name Title

certify under penalty of law that this document and all attachments were prepared under my direction 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 gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code 305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
*(Use blue ink)*



## NOTICE OF INTENT CHECKLIST (TXR150000)

- Did you complete everything? Use this checklist to be sure!
- Are you ready to mail your form to TCEQ? Go to the General Information Section of the Instructions for mailing addresses.

This checklist is for use by the operator to ensure a complete application. Missing information may result in denial of coverage under the general permit. (See NOI process description in the Instructions)

### Application Fee:

If paying by Check:

Check was mailed **separately** to the TCEQs Cashier's Office. (See Instructions for Cashier's address and Application address.)

Check number and name on check is provided in this application.

If using ePay:

The voucher number is provided in this application or a copy of the voucher is attached.

### PERMIT NUMBER:

Permit number provided – if this application is for renewal of an existing authorization.

### OPERATOR INFORMATION - Confirm each item is complete:

Customer Number (CN) issued by TCEQ Central Registry

Legal name as filed to do business in Texas (Call TX SOS 512/463-5555)

Name and title of responsible authority signing the application

Mailing address is complete & verifiable with USPS. [www.usps.com](http://www.usps.com)

Phone numbers/e-mail address

Type of operator (entity type)

Independent operator

Number of employees

For corporations or limited partnerships – Tax ID and SOS filing numbers

Application contact and address is complete & verifiable with USPS. <http://www.usps.com>

### REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE - Confirm each item is complete:

Regulated Entity Reference Number (RN) (if site is already regulated by TCEQ)

Site/project name/regulated entity

Latitude and longitude <http://www.tceq.texas.gov/gis/sqmaview.html>

County

Site/project physical address. Do not use a rural route or post office box.

Business description

### GENERAL CHARACTERISTICS - Confirm each item is complete:

Indian Country Lands –the facility is not on Indian Country Lands

Construction activity related to facility associated to oil, gas, or geothermal resources

Standard Industrial Classification (SIC) Code [www.osha.gov/oshstats/sicsr.html](http://www.osha.gov/oshstats/sicsr.html)

Acres disturbed is provided and qualifies for coverage through a NOI

Common plan of development or sale

Receiving water body(s)

Segment number(s)

Impaired water body(s)

MS4 operator

Edwards Aquifer rule

### CERTIFICATION

Certification statements have been checked indicating “Yes”

Signature meets 30 Texas Administrative Code (TAC) 305.44 and is original.

# Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

## General Information and Instructions

### GENERAL INFORMATION

#### Where to Send the Notice of Intent (NOI):

BY REGULAR U.S. MAIL	BY OVERNIGHT/EXPRESS MAIL
Texas Commission on Environmental Quality	Texas Commission on Environmental Quality
Stormwater Processing Center (MC228)	Stormwater Processing Center (MC228)
P.O. Box 13087	12100 Park 35 Circle
Austin, Texas 78711-3087	Austin, TX 78753

#### TCEQ Contact List:

Application – status and form questions:	512/239-3700, <a href="mailto:swpermit@tceq.texas.gov">swpermit@tceq.texas.gov</a>
Technical questions:	512/239-4671, <a href="mailto:swgp@tceq.texas.gov">swgp@tceq.texas.gov</a>
Environmental Law Division:	512/239-0600
Records Management - obtain copies of forms:	512/239-0900
Reports from databases (as available):	512/239-DATA (3282)
Cashier's office:	512/239-0357 or 512/239-0187

#### Notice of Intent Process:

When your NOI is received by the program, the form will be processed as follows:

- 1) Administrative Review:** Each item on the form will be reviewed for a complete response. In addition, the operator's legal name must be verified with Texas Secretary of State as valid and active (if applicable). The address(s) on the form must be verified with the US Postal service as receiving regular mail delivery. Never give an overnight/express mailing address.
- 2) Notice of Deficiency:** If an item is incomplete or not verifiable as indicated above, a notice of deficiency (NOD) will be mailed to the operator. The operator will have 30 days to respond to the NOD. The response will be reviewed for completeness.
- 3) Acknowledgment of Coverage:** An Acknowledgment Certificate will be mailed to the operator. This certificate acknowledges coverage under the general permit.  
-OR-  
**Denial of Coverage:** If the operator fails to respond to the NOD or the response is inadequate, coverage under the general permit may be denied. If coverage is denied, the operator will be notified.

#### General Permit (Your Permit)

For NOIs submitted **electronically** through ePermits, provisional coverage under the general permit begins immediately following confirmation of receipt of the NOI form by the TCEQ.

For **paper** NOIs, provisional coverage under the general permit begins **7 days after a completed NOI is postmarked for delivery** to the TCEQ.

You should have a copy of your general permit when submitting your application. You may view and print your permit for which you are seeking coverage, on the TCEQ web site <http://www.tceq.texas.gov>. Search using key word TXR150000.

### **General Permit Forms**

The Notice of Intent (NOI), Notice of Termination (NOT), and Notice of Change (NOC) (including instructions) are available in Adobe Acrobat PDF format on the TCEQ web site <http://www.tceq.texas.gov>.

### **Change in Operator**

An authorization under the general permit is not transferable. If the operator of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be submitted no later than 10 days prior to the change in Operator status.

### **TCEQ Central Registry Core Data Form**

The Core Data Form has been incorporated into this form. Do not send a Core Data Form to TCEQ. After final acknowledgment of coverage under the general permit, the program will assign a Customer Number and Regulated Entity Number.

You can find the information on the Central Registry web site at <http://www12.tceq.texas.gov/crpub/index.cfm>. You can search by the Regulated Entity (RN), Customer Number (CN) or Name (Permittee), or by your permit number under the search field labeled "Additional ID". Capitalize all letters in the permit number.

The Customer (Permittee) is responsible for providing consistent information to the TCEQ, and for updating all CN and RN data for all authorizations as changes occur. For General Permits, a Notice of Change form must be submitted to the program area.

### **Fees associated with a General Permit**

Payment of the fee may be made by check or money order, payable to TCEQ, or through EPAY (electronic payment through the web).

**Application Fee:** This fee is required to be paid at the time the NOI is submitted. Failure to submit payment at the time the application is filed will cause delays in acknowledgment or denial of coverage under the general permit.

#### **Mailed Payments:**

Payment must be mailed under separate cover at one of the addresses below using the attached Application Fee submittal form. (DO NOT SEND A COPY OF THE NOI WITH THE APPLICATION FEE SUBMITTAL FORM)

#### **BY REGULAR U.S. MAIL**

Texas Commission on Environmental Quality  
Financial Administration Division  
Cashier's Office, MC-214  
P.O. Box 13088  
Austin, TX 78711-3088

#### **BY OVERNIGHT/EXPRESS MAIL**

Texas Commission on Environmental Quality  
Financial Administration Division  
Cashier's Office, MC-214  
12100 Park 35 Circle  
Austin, TX 78753

ePAY Electronic Payment: <http://www.tceq.texas.gov/epay>

When making the payment you must select Water Quality, and then select the fee category “General Permit Construction Storm Water Discharge NOI Application”. You must include a copy of the payment voucher with your NOI. Your NOI will not be considered complete without the payment voucher.

## INSTRUCTIONS FOR FILLING OUT THE NOI FORM

**Renewal of General Permit.** Dischargers holding active authorizations under the expired General Permit are required to submit a NOI to continue coverage. The existing permit number is required. If the permit number is not provided or has been terminated, expired, or denied a new permit number will be issued.

### 1. Operator (Applicant)

#### a) Enter assigned Customer Number (CN)

TCEQ’s Central Registry will assign each customer a number that begins with CN, followed by nine digits. **This is not a permit number, registration number, or license number.**

If this customer has not been assigned a CN, leave the space for the CN blank.

If this customer has already been assigned this number, enter the permittee’s CN.

#### b) Legal Name

Provide the current legal name of the permittee, as authorized to do business in Texas. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at 512/463-5555, for more information related to filing in Texas. If filed in the county where doing business, provide a copy of the legal documents showing the legal name.

#### c) Person Signing Application

Provide information about person signing section 5) Certification.

#### d) Operator Contact’s (Responsible Authority) Contact Information and Mailing Address

Provide a complete mailing address for receiving mail from the TCEQ. The address must be verifiable with the US Postal Service at <http://www.usps.com> for regular mail delivery (not overnight express mail). If you find that the address is not verifiable using the USPS web search, please indicate the address is used by the USPS for regular mail delivery.

The area code and phone number should provide contact to the operator. Leave Extension blank if not applicable.

The fax number and e-mail address are optional and should correspond to the operator.

#### e) Type of Customer (Entity Type)

Check only one box that identifies the type of entity. Use the descriptions below to identify the appropriate entity type. Note that the selected entity type also indicates the name that must be provided as an applicant for a permit, registration or authorization.

### **Sole Proprietorship – DBA**

A sole proprietorship is a customer that is owned by only one person and has not been incorporated. This business may:

- be under the person's name
- have its own name (doing business as or d.b.a.)
- have any number of employees

If the customer is a Sole Proprietorship or DBA, the 'legal name' of the individual business 'owner' must be provided. The DBA name is not recognized as the 'legal name' of the entity. The DBA name may be used for the site name (regulated entity).

### **Individual**

An individual is a customer who has not established a business, but conducts an activity that needs to be regulated by the TCEQ.

### **Partnership**

- A customer that is established as a partnership as defined by the Texas Secretary of State Office (TX SOS). A Limited Partnership or Limited Liability Partnership (Partnership) is required to file with the Texas Secretary of State. A General Partnership or Joint Venture is not required to register with the state.
- **Partnership (Limited Partnership or Limited Liability Partnership):** A limited partnership is defined in the Act as a partnership formed by two or more persons under the provisions of Section 3 of the Uniform Limited Partnership Act (Art. 6132a, Revised Civil Statutes of Texas) and having as members one or more general partners and one or more limited partners. The limited partners as such are not bound by the obligations of the partnership. Limited partners may not take part in the day-to-day operations of the business. A Limited Partnership must file with the Texas Secretary of State. A registered limited liability partnership is a general or limited partnership that is registered with the Texas Secretary of State. The partnership's name must contain the words "Registered Limited Liability Partnership" or the abbreviation "L.L.P." as the last words or letters of its name.
- **General Partnership:** A general partner may or may not invest, participates in running the partnership and is liable for all acts and debts of the partnership and any member of it. A General Partnership does not have limited partners. For a General Partnership, there is no registration with the state or even written agreement necessary for a general partnership to be formed. The legal definition of a partnership is generally stated as "an association of two or more persons to carry on as co-owners a business for profit" (Revised Uniform Partnership Act § 101 [1994]).
- **Joint Venture:** A joint venture is but another name for a special partnership. It might be distinguished from a general partnership in that the latter is formed for the transaction of a general business, while a joint venture is usually limited to a single transaction. That is, a joint venture is a special combination of persons in the nature of a partnership engaged in the joint prosecution of a particular transaction for mutual benefit or profit.

### **Corporation**

A customer meets all of these conditions:

- is a legally incorporated entity under the laws of any state or country
- is recognized as a corporation by the Texas Secretary of State

- has proper operating authority to operate in Texas.
- The corporation's 'legal name' as filed with the Texas Secretary of State must be provided as applicant. An 'assumed' name of a corporation is not recognized as the 'legal name' of the entity.

**Government**

Federal, state, county, or city government (as appropriate)

The customer is either an agency of one of these levels of government or the governmental body itself. The government agency's 'legal name' must be provided as the applicant. A department name or other description of the organization should not be included as a part of the 'legal name' as applicant.

**Trust or Estate**

A trust and an estate are fiduciary relationships governing the trustee/executor with respect to the trust/estate property.

**Other Government**

A utility district, water district, tribal government, college district, council of governments, or river authority. Write in the specific type of government.

**f) Independent Entity**

Check No if this customer is a subsidiary, part of a larger company, or is a governmental entity. Otherwise, check Yes.

**g) Number of Employees**

Check one box to show the number of employees for this customer's entire company, at all locations. This is not necessarily the number of employees at the site named in the application.

**h) Customer Business Tax and Filing Numbers**

These are required for Corporations and Limited Partnerships. These are not required for Individuals, Government, and Sole Proprietors.

**State Franchise Tax ID Number**

Corporations and limited liability companies that operate in Texas are issued a franchise tax identification number. If this customer is a corporation or limited liability company, enter this number here.

**Federal Tax ID**

All businesses, except for some small sole proprietors, individuals, or general partnerships should have a federal taxpayer identification number (TIN). Enter this number here. Use no prefixes, dashes, or hyphens. Sole proprietors, individuals, or general partnerships do not need to provide a federal tax ID.

**TX SOS Charter (filing) Number**

Corporations and Limited Partnerships required to register with the Texas Secretary of State are issued a charter or filing number. You may obtain further information by calling SOS at 512/463-5555.

**DUNS Number**

Most businesses have a DUNS (Data Universal Numbering System) number issued by Dun and Bradstreet Corp. If this customer has one, enter it here.

## **2. APPLICATION CONTACT**

Provide the name, title and communication information of the person that TCEQ can contact for additional information regarding this application.

## **3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

### **a) Regulated Entity Reference Number (RN)**

A number issued by TCEQ's Central Registry to sites (a location where a regulated activity occurs) regulated by TCEQ. This is not a permit number, registration number, or license number. If this regulated entity has not been assigned an RN, leave this space blank.

If the site of your business is part of a larger business site, a Regulated Entity Number (RN) may already be assigned for the larger site. Use the RN assigned for the larger site. Search TCEQ's Central Registry to see if the larger site may already be registered as a regulated site at: <http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=regent.RNSearch>

If the site is found, provide the assigned Regulated Entity Reference Number (RN) and provide the information for the site to be authorized through this application. The site information for this authorization may vary from the larger site information.

An example is a chemical plant where a unit is owned or operated by a separate corporation that is accessible by the same physical address of your unit or facility. Other examples include industrial parks identified by one common address but different corporations have control of defined areas within the site. In both cases, an RN would be assigned for the physical address location and the permitted sites would be identified separately under the same RN.

### **b) Site/Project Name/Regulated Entity**

Provide the name of the site as known by the public in the area where the site is located. The name you provide on this application will be used in the TCEQ Central Registry as the Regulated Entity name.

### **c) Description of Activity Regulated**

In your own words, briefly describe the primary business that you are doing that requires this authorization. Do not repeat the SIC Code description.

### **d) County**

Identify the county or counties in which the regulated entity is located.

### **e) Latitude and Longitude**

Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. For help obtaining the latitude and longitude, go to:

<http://www.tceq.texas.gov/gis/sqmaview.html> or <http://nationalmap.gov/ustopo>

### **f) Site/Project (RE) Physical Address/Location Information**

Enter the complete address for the site in Section A if the address can be validated through the US Postal Service. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate a site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

If a site does not have an address that includes a street (or house) number and street name, enter NO ADDRESS for the street name in Section A. In Section B provide a complete written location description. For example: "The site is located 2 miles west from intersection of Hwy 290 & IH35, located on the southwest corner of the Hwy 290 South bound lane."

Provide the city (or nearest city) and zip code of the facility location.

#### **4. GENERAL CHARACTERISTICS**

##### **a) Indian Country Lands**

If your site is located on Indian Country Lands, the TCEQ does not have authority to process your application. You must obtain authorization through EPA, Region 6, Dallas. Do not submit this form to TCEQ.

##### **b) Construction activity associated with facility associated with exploration, development, or production of oil, gas, or geothermal resources**

If your activity is associated with oil and gas exploration, development, or production, you may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization from EPA Region 6. For more information, see:

[http://info.sos.state.tx.us/pls/pub/readtac\\$ext.TacPage?sl=R&app=9&p\\_dir=&p\\_rloc=&p\\_tloc=&p\\_ploc=&pg=1&p\\_tac=&ti=16&pt=1&ch=3&rl=30](http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=30)

Construction activities associated with a facility related to oil, gas or geothermal resources may include the construction of a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel.

Where required by federal law, discharges of stormwater associated with construction activities under the Railroad Commission's jurisdiction must be authorized by the EPA and the Railroad Commission of Texas, as applicable. Activities under Railroad Commission of Texas jurisdiction include construction of a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources, such as a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility under the jurisdiction of the Railroad Commission of Texas; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel. The Railroad Commission of Texas also has jurisdiction over stormwater from land disturbance associated with a site survey that is conducted prior to construction of a facility that would be regulated by the Railroad Commission of Texas. Under 33 U.S.C. §1342(l)(2) and §1362(24), EPA cannot require a permit for discharges of stormwater from "field activities or operations associated with {oil and gas} exploration, production, processing, or treatment operations, or transmission facilities, including activities necessary to prepare a site for drilling and for the movement and placement of drilling equipment, whether or not such field activities or operations may be considered to be construction activities" unless the discharge is contaminated by contact with any overburden, raw material, intermediate product, finished product, byproduct, or waste product located on the site of the facility. Under §3.8 of this title (relating to Water Protection), the Railroad



Commission of Texas prohibits operators from causing or allowing pollution of surface or subsurface water. Operators are encouraged to implement and maintain best management practices (BMPs) to minimize discharges of pollutants, including sediment, in stormwater during construction activities to help ensure protection of surface water quality during storm events.

**c) Primary Standard Industrial Classification (SIC) Code**

Provide the SIC Code that best describes the construction activity being conducted at this site.

Common SIC Codes related to construction activities include:

- 1521 - Construction of Single Family Homes
- 1522 - Construction of Residential Bldgs. Other than Single Family Homes
- 1541 - Construction of Industrial Bldgs. and Warehouses
- 1542 - Construction of Non-residential Bldgs, other than Industrial Bldgs. and Warehouses
- 1611 - Highway and Street Construction, except Highway Construction
- 1622 - Bridge, Tunnel, and Elevated Highway Construction
- 1623 - Water, Sewer, Pipeline and Communications, and Power Line Construction

For help with SIC Codes, go to:

<http://www.osha.gov/pls/imis/sicsearch.html>

**d) Secondary SIC Code**

Secondary SIC Code(s) may be provided. Leave blank if not applicable. For help with SIC Codes, go to:

<http://www.osha.gov/pls/imis/sicsearch.html>

**e) Total Number of Acres Disturbed**

Provide the approximate number of acres that the construction site will disturb. Construction activities that disturb less than one acre, unless they are part of a larger common plan that disturbs more than one acre, do not require permit coverage. Construction activities that disturb between one and five acres, unless they are part of a common plan that disturbs more than five acres, do not require submission of an NOI. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

If you have any questions about this item, please contact the stormwater technical staff by phone at (512)239-4671 or by email at [swgp@tceq.texas.gov](mailto:swgp@tceq.texas.gov).

**f) Common Plan of Development**

Construction activities that disturb less than five acres do not require submission of an NOI unless they are part of a common plan of development or for sale where the area disturbed is five or more acres. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

For more information on "What is a common plan of development?" go to:

[www.tceq.texas.gov/permitting/stormwater/common\\_plan\\_of\\_development\\_steps.html](http://www.tceq.texas.gov/permitting/stormwater/common_plan_of_development_steps.html)

For further information, go to the TCEQ stormwater construction webpage at:

[www.tceq.texas.gov/goto/construction](http://www.tceq.texas.gov/goto/construction) and search for "Additional Guidance and Quick Links". If

you have any further questions about this item, please call the stormwater technical staff at (512)239-4671.

**g) Identify the water body(s) receiving stormwater runoff**

The stormwater may be discharged directly to a receiving stream or through a MS4 from your site. It eventually reaches a receiving water body such as a local stream or lake, possibly via a drainage ditch. You must provide the name of the water body that receives the discharge from the site (a local stream or lake).

If your site has more than one outfall you need to include the name of the first water body for each outfall, if they are different.

**h) Identify the segment number(s) of the classified water body(s)**

Identify the classified segment number(s) receiving a discharge directly or indirectly. Go to the following link to find the segment number of the classified water body where stormwater will flow from the site: [www.tceq.texas.gov/waterquality/monitoring/viewer.html](http://www.tceq.texas.gov/waterquality/monitoring/viewer.html)

You may also find the segment number in TCEQ publication GI-316:  
[www.tceq.texas.gov/publications/gi/gi-316](http://www.tceq.texas.gov/publications/gi/gi-316)

If the discharge is into an unclassified receiving water and then crosses state lines prior to entering a classified segment, select the appropriate watershed:

- 0100 (Canadian River Basin)
- 0200 (Red River Basin)
- 0300 (Sulfur River Basin)
- 0400 (Cypress Creek Basin)
- 0500 (Sabine River Basin)

Call the Water Quality Assessments section at (512)239-4671 for further assistance.

**i) Discharge into MS4 – Identify the MS4 Operator**

The discharge may initially be into a municipal separate storm sewer system (MS4). If the stormwater discharge is into an MS4, provide the name of the entity that operates the MS4 where the stormwater discharges. An MS4 operator is often a city, town, county, or utility district, but possibly can be another form of government. Please note that the Construction General Permit requires the Operator to supply the MS4 with a copy of the NOI submitted to TCEQ. For assistance, you may call the technical staff at (512)239-4671.

**j) Surface Water bodies on list of impaired waters – Identify the impaired water body(s)**

Indicate Yes or No if any surface water bodies receiving discharges from the construction site are on the latest EPA-approved CWA 303(d) List of impaired waters. Provide the name(s) of surface water bodies receiving discharges or potential discharges from the construction site that are on the latest EPA-approved CWA 303(d) List of impaired waters. The EPA-approved CWA 303(d) List of impaired waters in Texas can be found at:  
[www.tceq.texas.gov/waterquality/assessment/305\\_303.html](http://www.tceq.texas.gov/waterquality/assessment/305_303.html)

NOTE: Do not use any "draft" documents.

### **k) Discharges to the Edwards Aquifer Recharge Zone and Certification**

See maps on the TCEQ website to determine if the site is located within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer at: [www.tceq.texas.gov/field/eapp/viewer.html](http://www.tceq.texas.gov/field/eapp/viewer.html)

If the discharge or potential discharge is within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer, a site specific authorization approved by the Executive Director under the Edwards Aquifer Protection Program (30 TAC Chapter 213) is required before construction can begin. The certification must be answered "Yes" for coverage under the Construction General Permit. The TCEQ approved plan must be readily available for TCEQ staff to review at the time that the NOI is submitted.

The general permit requires the approved Contributing Zone Plan or Water Pollution Abatement Plan to be included or referenced as a part of the Stormwater Pollution Prevention Plan.

For questions regarding the Edwards Aquifer Protection Program, contact the appropriate TCEQ Regional Office. For projects in Hays, Travis and Williamson Counties: Austin Regional Office, 12100 Park 35 Circle, Austin, TX 78753, 512-339-2929. For Projects in Bexar, Comal, Kinney, Medina and Uvalde Counties: TCEQ San Antonio Regional Office, 14250 Judson Rd., San Antonio, TX 78233-4480, 210-490-3096.

## **5. CERTIFICATIONS**

Failure to indicate **Yes** to ALL of the certification items may result in denial of coverage under the general permit.

### **a) Certification of Understanding the Terms and Conditions of Construction General Permit (TXR150000)**

Provisional coverage under the Construction General Permit (TXR150000) begins 7 days after the completed paper NOI is postmarked for delivery to the TCEQ. (Electronic applications submitted through ePermits have immediate provisional coverage). You must obtain a copy and read the Construction General Permit before submitting your application. You may view and print the Construction General Permit for which you are seeking coverage at the TCEQ web site: [www.tceq.texas.gov/goto/construction](http://www.tceq.texas.gov/goto/construction)

### **b) Certification of Legal Name**

The full legal name of the applicant as authorized to do business in Texas is required. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at (512)463 5555, for more information related to filing in Texas.

### **c) Understanding of Notice of Termination**

A permittee shall terminate coverage under this Construction General Permit through the submittal of a NOT when the operator of the facility changes, final stabilization has been reached, the discharge becomes authorized under an individual permit, or the construction activity never began at this site.

### **d) Certification of Stormwater Pollution Prevention Plan**

The SWP3 identifies the areas and activities that could produce contaminated runoff at your site and then tells how you will ensure that this contamination is mitigated. For example, in describing your mitigation measures, your site's plan might identify the devices that collect and

filter stormwater, tell how those devices are to be maintained, and tell how frequently that maintenance is to be carried out. You must develop this plan in accordance with the TCEQ general permit requirements. This plan must be developed and implemented before you complete this NOI. The SWP3 must be available for a TCEQ investigator to review on request.

### **Operator Certification:**

The certification must bear an original signature of a person meeting the signatory requirements specified under 30 Texas Administrative Code (TAC) §305.44.

### **IF YOU ARE A CORPORATION:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(1) (see below). According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

### **IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(3) (see below). According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statute(s) under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a)(3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality's Environmental Law Division at (512)239-0600.

## **30 Texas Administrative Code**

### **§305.44. Signatories to Applications**

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

# Texas Commission on Environmental Quality General Permit Payment Submittal Form

**Use this form to submit your Application Fee only if you are mailing your payment.**

- Complete items 1 through 5 below:
- Staple your check in the space provided at the bottom of this document.
- Do not mail this form with your NOI form.
- Do not mail this form to the same address as your NOI.

**Mail this form and your check to:**

*BY REGULAR U.S. MAIL*

Texas Commission on Environmental  
Quality  
Financial Administration Division  
Cashier's Office, MC-214  
P.O. Box 13088  
Austin, TX 78711-3088

*BY OVERNIGHT/EXPRESS MAIL*

Texas Commission on Environmental  
Quality  
Financial Administration Division  
Cashier's Office, MC-214  
12100 Park 35 Circle  
Austin, TX 78753

Fee Code: GPA

General Permit:

TXR150000

1. Check / Money Order No: \_\_\_\_\_
2. Amount of Check/Money Order: \_\_\_\_\_
3. Date of Check or Money Order: \_\_\_\_\_
4. Name on Check or Money Order: \_\_\_\_\_
5. NOI INFORMATION

If the check is for more than one NOI, list each Project/Site (RE) Name and Physical Address exactly as provided on the NOI. **DO NOT SUBMIT A COPY OF THE NOI WITH THIS FORM AS IT COULD CAUSE DUPLICATE PERMIT ENTRIES.**

See Attached List of Sites (If more space is needed, you may attach a list.)

Project/Site (RE) Name: \_\_\_\_\_

Project/Site (RE) Physical Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Staple Check in This Space**

TCEQ Office Use Only  
Permit No:  
CN:  
RN:  
Region:



# Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR150000

ePermits: This form is available on our online permitting system.  
Sign up for online permitting at: <https://www3.tceq.texas.gov/steers/>

What is the permit number to be terminated?

TXR15 [redacted] TXRCW [redacted]

## Section 1. OPERATOR (Permittee)

a) What is the Customer Number (CN) issued to this entity?

CN [redacted]

b) What is the Legal Name of the current permittee?

[redacted]

c) Provide the contact information for the Operator (Responsible Authority).

Prefix (Mr. Ms. or Miss): [redacted]

First and Last Name: [redacted] Suffix: [redacted]

Title: [redacted] Credentials: [redacted]

Phone Number: [redacted] Fax Number: [redacted]

Email: [redacted]

Mailing Address: [redacted]

City, State, and Zip Code: [redacted]

Country Mailing Information, if outside USA: [redacted]

## Section 2. APPLICATION CONTACT

This is the person TCEQ will contact if additional information is needed regarding this application.

Is the application contact the same as the permittee identified above? Yes  No

If Yes, go to Section 3.

If No, complete section below

Prefix (Mr. Ms. or Miss): [redacted]  
First and Last Name: [redacted] Suffix: [redacted]  
Title: [redacted] Credentials: [redacted]  
Phone Number: [redacted] Fax Number: [redacted]  
Email: [redacted]  
Mailing Address: [redacted]  
City, State, and Zip Code: [redacted]  
Country Mailing Information, if outside USA: [redacted]

**Section 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

- a) TCEQ issued RE Reference Number (RN): RN [redacted]
- b) Name of project or site as known by the local community: East Aldine Town Center
- c) County, or counties if more than 1: Harris County
- d) Latitude: 29° 54' 8.352"N Longitude: 95° 20' 38.7168"W
- e) Site Address/Location:

If the site has a physical address such as 12100 Park 35 Circle, Austin, TX 78753, complete Section 3A.

If the site does not have a physical address, provide a location description in Section 3B. Example: located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1.

**Section 3A: Physical Address of Project or Site:**

Street Number and Name: 3314 Aldine Mail Route Road  
City, State, and Zip Code: Houston, TX 77039

**Section 3B: Site Location Description:**

Location description: [redacted]  
[redacted]

City where the site is located or, if not in a city, what is the nearest city: [redacted]  
[redacted]

Zip Code where the site is located: [redacted]



## **Section 4. REASON FOR TERMINATION**

Check the reason for termination:

- Final stabilization has been achieved on all portions of the site that are the responsibility of the Operator and all silt fences and other temporary erosion controls have been removed, or scheduled for removal as defined in the SWP3.
- Another permitted Operator has assumed control over all areas of the site that have not been finally stabilized, and temporary erosion controls that have been identified in the SWP3 have been transferred to the new Operator.
- The discharge is now authorized under an alternate TPDES permit.
- The activity never began at this site that is regulated under the general permit.

## **Section 5. CERTIFICATION**

Signatory Name: \_\_\_\_\_

Signatory Title: \_\_\_\_\_

I certify under penalty of law that this document and all attachments were prepared under my direction 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 gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature (use blue ink): \_\_\_\_\_ Date: \_\_\_\_\_

# Instructions for Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR150000

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## GENERAL INFORMATION

### Where to Send the Notice of Termination (NOT):

#### BY REGULAR U.S. MAIL:

Texas Commission on Environmental Quality  
Stormwater Processing Center (MC-228)  
P.O. Box 13087  
Austin, Texas 78711-3087

#### BY OVERNIGHT/EXPRESS MAIL:

Texas Commission on Environmental Quality  
Stormwater Processing Center (MC-228)  
12100 Park 35 Circle  
Austin, TX 78753

### TCEQ Contact List:

Application status and form questions:	512-239-3700, <a href="mailto:swpermit@tceq.texas.gov">swpermit@tceq.texas.gov</a>
Technical questions:	512-239-4671, <a href="mailto:swgp@tceq.texas.gov">swgp@tceq.texas.gov</a>
Environmental Law Division:	512-239-0600
Records Management - obtain copies of forms:	512-239-0900
Reports from databases (as available):	512-239-DATA (3282)
Cashier's office:	512-239-0357 or 512-239-0187

### Notice of Termination Process:

A Notice of Termination is effective on the date postmarked for delivery to TCEQ.

When your NOT is received by the program, the form will be processed as follows:

- 1) Administrative Review: The form will be reviewed to confirm the following:
  - the permit number is provided;
  - the permit is active and has been approved;
  - the entity terminating the permit is the current permittee;
  - the site information matches the original permit record; and
  - the form has the required original signature with title and date.
- 2) Notice of Deficiency: If an item is incomplete or not verifiable as indicated above, a phone call will be made to the applicant to clear the deficiency. A letter will not be sent to the permittee if unable to process the form.
- 3) Confirmation of Termination: A Notice of Termination Confirmation letter will be mailed to the operator.

### Change in Operator:

An authorization under the general permit is not transferable. If the operator of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be

submitted not later than 10 days prior to the change in Operator status.

### **Annual Water Quality Fee:**

This fee is assessed to permittees with an active authorization under the general permit on September 1 of each year. The designated billing contact will receive an invoice for payment of the annual fee in November of each year. The payment will be due 30 days from the invoice date. A 5% penalty will be assessed if the payment is not received by TCEQ by the due date. Annual fee assessments cannot be waived as long as the authorization under the general permit is active on September 1.

It is important for the permittees to submit a NOT when coverage under the general permit is no longer required. A NOT is effective on the postmarked date of mailing the form to TCEQ. It is recommended that the NOT be mailed using a method that documents the date mailed and received by TCEQ.

### **INSTRUCTIONS FOR FILLING OUT THE FORM**

The majority of permit information related to the current operator and regulated entity are available at the following website: [http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).

#### **Section 1. Operator (Current Permittee):**

- a) Customer Number (CN)  
TCEQ's Central Registry assigns each customer a number that begins with CN, followed by nine digits. This is not a permit number, registration number, or license number. The Customer Number, for the current permittee, is available at the following website: [http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- b) Legal Name of Operator  
The operator must be the same entity as previously submitted on the original Notice of Intent for the permit number provided. The current operator name, as provided on the current authorization, is available at the following website: [http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- c) Contact Information for the Operator (Responsible Authority)  
Provide information for person signing the NOT application in the Certification section. This person is also referred to as the Responsible Authority.

Provide a complete mailing address for receiving mail from the TCEQ. Update the address if different than previously submitted for the Notice of Intent or Notice of Change. The mailing address must be recognized by the US Postal Service. You may verify the address on the following website: <https://tools.usps.com/go/ZipLookupAction!input.action>.

The phone number should provide contact to the operator.

The fax number and e-mail address are optional and should correspond to the operator.

#### **Section 2. Application Contact:**

Provide the name, title and contact information of the person that TCEQ can contact for additional information regarding this application.

### **Section 3. Regulated Entity (RE) Information on Project or Site:**

- a) Regulated Entity Reference Number (RN)  
A number issued by TCEQ's Central Registry to sites where an activity regulated by TCEQ. This is not a permit number, registration number, or license number. The Regulated Entity Reference Number is available at the following website:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- b) Name of the Project or Site  
Provide the name of the site as known by the public in the area where the site is located.
- c) County  
Identify the county or counties in which the regulated entity is located.
- d) Latitude and Longitude  
Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. The latitude and longitude as provided on the current authorization is available at the following website:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).
- e) Site/Project (RE) Physical Address/Location Information  
The physical address/location information, as provided on the current authorization, is available at the following website:  
[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm).

Section 3A. If a site has an address that includes a street number and street name, enter the complete address for the site. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate the site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

Section 3B. If a site does not have an address that includes a street number and street name, provide a complete written location description. For example: "The site is located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1."

Provide the city (or nearest city) and Zip Code of the facility location.

### **Section 4. Reason for Termination:**

The Notice of Termination form is only for use to terminate the authorization (permit). The Permittee must indicate the specific reason for terminating by checking one of the options. If the reason is not listed then provide an attachment that explains the reason for termination.

Please read your general permit carefully to determine when to terminate your permit. Permits will not be reactivated after submitting a termination form. The termination is effective on the date postmarked for delivery to TCEQ.

### **Section 5. Certification:**

The certification must bear an original signature of a person meeting the signatory

requirements specified under 30 Texas Administrative Code §305.44.

**IF YOU ARE A CORPORATION:**

The regulation that controls who may sign an application form is 30 Texas Administrative

Code §305.44(a), which is provided below. According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

**IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a), which is provided below. According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statutes under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a) (3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality's Environmental Law Division at 512-239-0600.

**30 TEXAS ADMINISTRATIVE CODE §305.44. SIGNATORIES TO APPLICATIONS**

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).



# LARGE CONSTRUCTION SITE NOTICE

FOR THE  
Texas Commission on Environmental Quality (TCEQ)  
Storm Water Program  
**TPDES GENERAL PERMIT TXR150000**

## ***“PRIMARY OPERATOR” NOTICE***

This notice applies to construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of storm water runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.D.2. of the general permit. This notice shall be posted along with a copy of the signed Notice of Intent (NOI), as applicable. Additional information regarding the TCEQ storm water permit program may be found on the internet at:

[http://www.tceq.state.tx.us/nav/permits/sw\\_permits.html](http://www.tceq.state.tx.us/nav/permits/sw_permits.html)

Site-Specific TPDES Authorization Number:	
Operator Name:	
Contact Name and Phone Number:	
Project Description: <i>Physical address or description of the site's location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.</i>	
Location of Storm Water Pollution Prevention Plan:	

## **Appendix D**

### **Forms**

*Permittee Certification of Storm Water Quality Management Requirements*  
*Storm Water Quality Management Plan Engineer's Certification*  
*Storm Water Quality Permit As-Built Certificate*  
*Annual Permittee Certification of Proper Operation*  
*Annual Professional Engineer Inspection Certification*  
*Monthly Inspection Form*



**PERMITTEE CERTIFICATION OF STORM WATER  
QUALITY MANAGEMENT REQUIREMENTS**

I, *(Name)*, acting as *(Position)* for *(Permittee's Name)*, Permittee, certify under penalty Of law that the proposed development is subject to storm water quality requirements. It is my duty to see that all storm water quality features be placed in accordance with construction drawings approved by *(the City of Houston, Harris County, ... etc.)*. Once storm water quality features are in place, it is my responsibility that all features be inspected either yearly or at the frequency outlined in the Storm Water Quality Management Plan For *(Site Name)*. Also, all storm water quality features will be maintained in accordance with the above-mentioned report for the property known as *(Site Name)* at *(Address or Location)*.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

*(Printed Name)*: \_\_\_\_\_

*(Permittee's Name)*: \_\_\_\_\_

*(Address)*: \_\_\_\_\_

*(Phone Number)*: \_\_\_\_\_

State of Texas

County of \_\_\_\_\_

Before me, a notary is day personally appeared \_\_\_\_\_ known to me (or proved to me on the oath of \_\_\_\_\_) to be the person whose name is subscribed to foregoing instrument and acknowledged to me that he/she executed the same for the purposes and consideration therein expressed. Given under my hand and seal of office this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
Notary Public's Signature

**STORM WATER QUALITY MANAGEMENT PLAN  
ENGINEER'S CERTIFICATION**

**(NOTE: Engineer's Certification is required for SWQMPs submitted to Harris County for a Harris County Storm Water Quality Permit.**

I, Megan E. Houtchens (Name), a registered P.E. (Engineer) duly licensed to practice in the State of Texas do hereby certify that the information presented in this document was prepared under my direction and supervision and complies with the *Regulations of Harris County, Texas for Storm Water Quality Management* and the *Storm Water Quality Management Guidance Manual*, Any parts of the design/sizing of the permanent storm water quality feature(s) that do not meet the current minimum design criteria contained within the Regulations and Manual as noted below.

*(Describe any exceptions to the criteria here.)*

Signature: *Megan E. Houtchens* Date: 10/07/2016

(Printed Name): Megan Houtchens

(License Number): 114293

(Address): 3131 Briarpark Dr., Suite 200, Houston, TX 77042

(Phone Number): (713) 622-1444



*Megan E. Houtchens*  
Engineer's Seal and Signature

Project Name: East Aldine Town Center

Project Description: Utility & Infrastructure Construction for Multi-Use Development

Project Location: 3314 Aldine Mail Rt. Rd., Houston, TX 77039



## STORMWATER QUALITY PERMIT AS-BUILT CERTIFICATE

I, \_\_\_\_\_, a registered Professional Engineer  
(Name)

duly licensed to practice in the State of Texas do hereby certify that the

\_\_\_\_\_, constructed at  
(Storm Water Quality Features)

\_\_\_\_\_, under Permit Number  
(Project Named on Permit)

\_\_\_\_\_, were completed in accordance with the drawings and  
(Storm Water Quality Permit#)

specifications on file with the Harris County Engineering Department.

S E A L

\_\_\_\_\_  
Signature Date

\_\_\_\_\_  
Mailing Address

\_\_\_\_\_  
City, Zip

\_\_\_\_\_  
Phone No.



# ANNUAL PERMITTEE CERTIFICATION OF PROPER OPERATION

I, \_\_\_\_\_, acting as \_\_\_\_\_  
(Name) (Position)

for \_\_\_\_\_, permittee, certify under penalty of  
(Permittee's Name)

law that the Storm Water Quality Management Plan in effect for \_\_\_\_\_

\_\_\_\_\_,  
(Development Named on Permit)

under Storm Water Quality Permit No. \_\_\_\_\_, has been  
(SWQ Permit No.)

complied with according to the provisions contained therein.

\_\_\_\_\_  
(Signature) (Date)

\_\_\_\_\_  
(Printed Name) (Phone Number)

Permittee's Name: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, and Zip: \_\_\_\_\_

Phone No. \_\_\_\_\_

**State of Texas §**  
**County of Harris §**

Before me, a notary public, on this day personally appeared \_\_\_\_\_  
\_\_\_\_\_ known to me (or proved to me on the oath of  
\_\_\_\_\_) to be the person whose name is subscribed to the  
foregoing instrument and acknowledged to me that he/she executed the same for the  
purposes and consideration therein expressed.

Given under my hand and seal of office this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

**SEAL**

\_\_\_\_\_  
Notary Public



## ANNUAL PROFESSIONAL ENGINEER INSPECTION CERTIFICATION

I, \_\_\_\_\_, a registered Professional Engineer  
(Name)  
duly licensed to practice in the State of Texas do hereby certify that on  
\_\_\_\_\_, the \_\_\_\_\_  
(Inspection Date) [Structural Control(s)]  
designed and constructed as part of Storm Water Quality Permit Number  
\_\_\_\_\_, conformed to the plans and technical specifications  
(SWQ Permit No.)  
contained in the approved civil engineering drawings and Storm Water  
Quality Management Plan on file with the Harris County Engineering  
Department, Permit Office.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Mailing Address

\_\_\_\_\_  
City, Zip

\_\_\_\_\_  
Phone No.

**S E A L**

Form SWQ 01-006

**WET BASIN MONTHLY INSPECTION**

Inspection Date \_\_\_\_\_  
 Time \_\_\_\_\_

By: \_\_\_\_\_  
 Location: \_\_\_\_\_

ITEM	DESCRIPTION	Yes/No/NA	Correction Action/By	Corrected Date	Notes
<b>1</b>	<b>SEDIMENT REMOVAL</b>				
1.1	Design depth (feet): _____				
1.2	Sediment thickness: _____ (Measure sediment thickness directly, or measure current depth and subtract from design depth to arrive at sediment thickness. Remove sediment if thickness exceeds 1/3 of design depth.				
<b>2</b>	<b>EMBANKMENT</b>				
2.1	Evidence of subsidence				
2.2	Presence of erosion				
2.3	Presence of crack				
2.4	Presence of tree growth				
2.5	Presence of burrowing animals				
2.6	Other. Describe below. _____ _____				
2.7	Explanation: _____ _____				
<b>3</b>	<b>OUTFALL</b>				
3.1	Emergency spillway				
3.2	Outlet				
3.3	Discharge control such as valve, riser/barrel, weir, check dam, and other.				
3.4	Other. Describe below. _____ _____				
3.5	Explanation: _____ _____				
<b>4</b>	<b>DRAW DOWN TIME</b>				
	Design volume drains less than 24 hours or remains 72 hours or more after a storm. If answer is yes, outfall or outlet control should be checked, cleaned or adjusted as needed.				
<b>5</b>	<b>CONTRIBUTORY DRAINAGE</b>				
5.1	Inlet condition is satisfactory				
5.2	Upstream channel conditions are satisfactory				
5.3	Upstream erosion controls are satisfactory				
5.4	Upstream sediment controls are satisfactory				
5.5	Other. Describe below. _____ _____				
5.6	Explanation: _____ _____				

**WET BASIN MONTHLY INSPECTION (Continued)**

Inspection Date \_\_\_\_\_  
 Time \_\_\_\_\_

By: \_\_\_\_\_  
 Location: \_\_\_\_\_

ITEM	DESCRIPTION	Yes/No/NA	Correction Action/By	Corrected Date	Notes
<b>6</b>	<b>DEBRIS/LITTER REMOVAL</b>				
6.1	Date of last litter removal: _____				
6.2	Removal of litter is required. (Required if last litter removal was more than 6 months ago.)				
<b>7</b>	<b>MOWING</b>				
7.1	Date of last mowing performed: _____				
7.2	Mowing required. (Required if last mowing was more than 6 months ago or if trees or woody shrubs are present on embankment.)				
<b>8</b>	<b>NUISANCE CONTROL</b>				
8.1	Presence of insects				
8.2	Presence of weeds				
8.3	Presence of odors				
8.4	Other. Describe below. _____ _____				
8.5	Explanation: _____ _____				
<b>9</b>	<b>STRUCTURAL REPAIRS/REPLACEMENT</b>				
	Describe any item needing structural repair and replacement below. _____ _____				
<b>10</b>	<b>OTHER ITEMS</b>				
	Describe item and condition. Explain any problem below. _____ _____				
	<b>REQUIRED MAINTENANCE AND/OR REPAIRS:</b> _____ _____				
	_____				
	_____				
	_____				

August 24, 2015

**PGAL**

3131 Briarpark Drive, Suite 200  
Houston, TX 77042

Attn: Mr. Costas Georghiou, P.E.  
Principal  
Ph: 713-622-1444  
Fax: 713-968-9333  
Email: [CGeorghiou@pgal.com](mailto:CGeorghiou@pgal.com)

**Re: Final Geotechnical Engineering Services Report**  
Proposed Road, Bridges and Detention Pond at East Aldine Town Center  
Aldine Mail Route Road at Deergrove Street  
Houston, Texas  
**PSI Report No. 286-1224**

Dear Mr. Georghiou,

Professional Service Industries, Inc. is pleased to submit the Final Geotechnical Engineering Services Report for the referenced project. This report includes the results of our field and laboratory testing and geotechnical recommendations for the construction of the proposed perimeter road and storm detention pond as well as foundation design of the proposed bridges.

We appreciate the opportunity to perform the geotechnical services and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.



Amal K. Dutta, Ph.D., P.E.  
Principal Consultant



**FINAL GEOTECHNICAL ENGINEERING SERVICES REPORT**

**PROPOSED ROAD, BRIDGES AND DETENTION POND AT EAST ALDINE TOWN CENTER  
ALDINE MAIL ROUTE ROAD AT DEERGROVE STREET  
HOUSTON, TEXAS**

**PSI REPORT NO. 286-1224**

**PREPARED FOR**

**PGAL  
3131 BRIARPARK DRIVE, SUITE 200  
HOUSTON, TEXAS 77042**

**ATTENTION: MR. COSTAS GEORGHIOU, P.E.**

**AUGUST 24, 2015**

**BY**

**PROFESSIONAL SERVICE INDUSTRIES, INC.**

**3730 DACOMA STREET, HOUSTON, TEXAS 77092 PHONE: (713) 224-2047. FAX: (713) 682-2665**

**Amal K. Dutta, Ph.D., P.E.  
Principal Consultant**



**Ather Mohiuddin, P.E.  
Department Manager – Geotechnical Services**

**Shailendra N. Endley, Ph.D., P.E.  
Chief Engineer**

**Professional Service Industries, Inc,  
DBA PSI, Inc  
Registered Engineering Firm: F-3307  
1901 S. Meyers Rd. Ste 400 Oakbrook Terrace, IL 60191**



# TABLE OF CONTENTS

	Page No.
<b>PROJECT INFORMATION</b> .....	<b>1</b>
PROJECT AUTHORIZATION.....	1
PROJECT DESCRIPTION.....	1
PURPOSE AND SCOPE OF SERVICES.....	2
<b>SITE AND SUBSURFACE CONDITIONS</b> .....	<b>3</b>
SITE LOCATION AND DESCRIPTION.....	3
FIELD AND LABORATORY PROCEDURE.....	3
SUBSURFACE CONDITIONS.....	5
GROUNDWATER INFORMATION.....	6
<b>EVALUATION AND RECOMMENDATIONS</b> .....	<b>8</b>
DRILLED SHAFT FOUNDATION RECOMMENDATIONS FOR BRIDGES.....	8
DETENTION POND.....	10
PAVEMENT RECOMMENDATIONS.....	13
<b>CONSTRUCTION CONSIDERATIONS</b> .....	<b>16</b>
MOISTURE SENSITIVE SOILS/WEATHER RELATED CONCERNS.....	16
DRAINAGE AND GROUNDWATER CONCERNS.....	16
EXCAVATIONS.....	16
<b>REPORT LIMITATIONS</b> .....	<b>18</b>
<b>APPENDIX A</b>	
SITE LOCATION PLAN.....	PLATE 1A
BORING LOCATION PLAN.....	PLATE 1B
LOGS OF BORINGS.....	PLATES 2 THROUGH 12
KEY TO TERMS AND SYMBOLS USED ON THE LOGS.....	PLATE 13
<b>APPENDIX B</b>	
CLIENT PROVIDED DRAWING SHOWING DETENTION POND.....	PLATE B-1
CLIENT PROVIDED CROSS SECTION FOR THE DETENTION POND.....	PLATE B-2
SLOPE STABILITY ANALYSIS RESULTS.....	PLATES B-3 THROUGH B-5
<b>APPENDIX C</b>	
CONSOLIDATED UNDRAINED TRIAXIAL TEST RESULTS	
PINHOLE TESTS RESULTS	
<b>APPENDIX D</b>	
AXIAL CAPACITY CURVES FOR DRILLED SHAFTS.....	PLATES D-1 THROUGH D-4



## **PROJECT INFORMATION**

### **Project Authorization**

Professional Service Industries, Inc. (PSI) has completed the geotechnical exploration for the proposed East Aldine Town Center to be located on the south side of Aldine Mail Route Road at its intersection with Deergrove Street in Houston, Harris County, Texas. Plate 1A located in Appendix A shows the approximate site location. This subsurface exploration was conducted in general accordance with PSI Proposal No. 286-135485, dated October 7, 2014 as well as in accordance with PSI Project No. 286-1224-Change Order1-Revised, dated February 18, 2015. Authorization to perform this subsurface exploration was in the form of signed acceptance of the aforementioned proposal and change order by Mr. Costas Georghiou, P.E. with PGAL on February 7, 2015 and February 19, 2015, respectively.

### **Project Description**

Based on the information provided by PGAL, the scope of services for this report addressed in this project includes a subsurface exploration study for a planned perimeter road, storm detention/amenity pond and two bridges (one at the north side and the other at the south side) near the detention pond. The locations of the proposed facilities along with the borings performed for this project site are shown in Plate 1B located in Appendix A of this report. This report does not address planned building pads, interior streets and parking areas.

Specific design information for the road and two bridges was not made available to PSI at the time of this report, however it is understood that the proposed bridges will be supported on drilled shafts.

Based on the information provided by the client, PSI understands that site currently has numerous large fill soil mounds present and the existing elevation ranges between EL +67 feet to EL +94 feet. The surface elevation below soil mounds (predevelopment) was at EL +67 feet. Therefore, the fill mounds were approximately 12 to 27 feet high. The final grading plan is not available to PSI at the time of this report, however it is assumed that the final grade will be within two feet of EL +67 feet.

Provided information by the client indicated that the proposed detention pond will be constructed on the southwest portion of the project site. Based on the preliminary cross section provided by PGAL, PSI understands that the high bank elevation of the propose detention pond will be at EL +70 feet and the bottom elevation will be at EL +54 feet. The water elevation of the permanent pool section of the detention pond will be at EL +60 feet. Therefore, the depth of the proposed detention pond is anticipated to be about 16 feet, whereas the water depth is about 6 feet. The detention pond is planned to have a maximum slope inclination of 3 Horizontal to 1 vertical (3H:1V).The preliminary drawing and a cross section of the proposed detention pond provided by the client are shown in Plates B-1 and B-2 in Appendix B.

The recommendations provided in this geotechnical exploration report are based on the project information available to us and the subsurface conditions described in this report. If any of the noted information is incorrect, please inform PSI in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. PSI will not be



responsible for the implementation of its recommendations when it is not notified of changes in the project.

### **Purpose and Scope of Services**

The purpose of this geotechnical engineering study is to explore the subsurface conditions at the project site to enable an engineering evaluation of the subsurface conditions and provide recommendations for the proposed construction. The proposed geotechnical exploration for this project involved the collection of subsurface data, laboratory testing, and geotechnical analyses. Our scope of services included drilling a total of 11 soil borings to depths ranging from 15 to 80 feet below the elevation of EL +67 feet at the project site, laboratory testing and preparation of this geotechnical report. This report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and presents recommendations regarding the following:

- Description of subsurface conditions and groundwater information as observed at the boring locations during drilling;
- Boring logs, laboratory test results;
- Axial capacities for 24", 36", and 48" diameter drilled shafts for bridge foundations
- Soil parameters for lateral load analysis (L-Pile);
- Global slope stability analysis for the proposed detention pond;
- Pavement design recommendations for rigid and flexible pavements; and
- Comments regarding factors that will impact construction and/or performance of the proposed construction.

The Scope of Services did not include an environmental assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, surface water, groundwater, or air on or below, or around this site. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

A geologic fault study to evaluate the possibility of surface faulting at this site was beyond the scope of this investigation. Should you desire a detailed fault study, please contact us.

Furthermore PSI was not requested to provide any service to investigate or detect the presence of moisture, mold or other biological contaminants in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. Mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. As such, PSI cannot be held responsible for the occurrence or recurrence of mold amplification.

## SITE AND SUBSURFACE CONDITIONS

### Site Location and Description

The site for the proposed project is located on the south side of Aldine Mail Route Road at its intersection with Deergrove Street in Houston, Texas. The site is bordered by Aldine Mail Route Road to the north, commercial and residential development to the east, Keith-Weiss Park to the south, and Stephens Elementary School to the west, in Houston, Texas. Plate 1A located in Appendix A shows the approximate site location.

The proposed site is currently an undeveloped parcel. At the time of the field activities, it is observed that majority of the project site was covered with mounds of fill soils. Based on the information provided by the client, the mounds were approximately 12 to 27 feet high. In addition, there is a low lying area at the central portion of the project site where standing water was observed at the time of our field exploration. Based on the information provided by the client, PSI understands that the fill soil mounds will be removed before the construction of the proposed facilities.

At the time of the field activities, due to the presence of fill soil mounds and uneven surface terrain at the project site, an All-Terrain-Vehicle (ATV) mounted drill rig was required to perform the field exploration at some of the boring locations.

### Field and Laboratory Procedure

The subsurface conditions were explored by drilling a total of 11 soil borings. Plate 1B located in Appendix A shows the approximate boring locations. As discussed previously, at the time of the field activities, portions of the project site were occupied with fill soil mounds. Based on the information provided by the client, the mounds were approximately 12 to 27 feet high. PSI understands that these fill soil mounds will be removed to facilitate the construction of the proposed facilities. As discussed with PGAL, PSI performed drilling for using auger drilling for the top 12 to 27 feet without collecting any soil samples followed by drilling to the scheduled drilling depths for the respective borings. As provided by the client, the boring numbers, coordinates and the thickness of fill soil mounds are shown in Table 1. As discussed before, it is to be noted that the surface elevation below soil mounds is at EL +67 feet.

**Table 1: Details of Existing Fill soil Mounds during Drilling**

Structure Borings	Boring Number	Northing	Easting	Fill Mound Depth (Feet)
Road Borings	B-1	13894713.88	3126895.31	22
	B-9	13894069.64	3127441.77	0
	B-10	13894164.00	3127948.75	12
	B-11	13894660.97	3127976.39	0
Bridge Borings	B-2 <sup>1</sup>	13894214.13	3126919.62	27
	B-3 <sup>2</sup>	13894188.66	3126964.53	26
	B-6	13893734.80	3126379.28	0
	B-7	13893688.22	3126405.08	0
Pond Borings	B-4	13894102.39	3126702.72	23
	B-5	13893948.11	3126424.33	12
	B-8	13893802.96	3126609.25	0



- Note: 1. Due to site accessibility issue this boring was re-located about 75 feet northwest from the location as shown in the Boring Location Plan in Plate 1B.  
2. Due to site accessibility issue this boring was re-located about 75 feet east from the location as shown in the Boring location plan in Plate 1B.

As requested, the details of the boring schedule along with the additional auger drilling performed for this project are summarized in Table 2.

**Table 2: Boring Schedule**

Structure Borings	Boring Number	Depth Below Soil Mounds (Feet) (Below EL +67 Feet)	Additional Auger Drilling Depth (Feet) (Above EL +67 Feet)	Total Drilling Depth (Feet) (Below Existing Grade)
Road Borings	B-1	15	22	37
	B-9	15	0	15
	B-10	15	12	27
	B-11	15	0	15
Bridge Borings (North Side)	B-2	80	27	107
	B-3	80	26	106
Bridge Borings (South Side)	B-6	40	0	40
	B-7	40	0	40
Pond Borings	B-4	25	23	48
	B-5	25	12	37
	B-8	25	0	25

Based on the information provided by the client, the borings were located in the field by PSI's field crews using a hand held GPS. The borings were drilled with truck and ATV-mounted drilling equipment utilizing solid flight auger and wet rotary methods. In general, continuous samples were obtained to a depth of about 10 feet below the existing ground surface and at 5-foot interval to the boring depth. However, for detention pond borings (Borings B-4, B-5 and B-8), continuous samples were obtained to a depth of about 20 feet below the existing ground surface. After the completion of the drilling, the boreholes were backfilled with onsite soil cuttings.

Soil samples were routinely obtained during the drilling process. This is to be noted that no soil samples were collected for the top 12 to 27 feet high fill soil mound for the borings as shown in Tables 1 and 2. The boring logs showing the subsurface soil conditions which were encountered from the existing grade below the soil mound. Drilling and sampling techniques were accomplished generally in accordance with ASTM procedures (ASTM D 1586 and D 1587).

The soil samples obtained during the field exploration were transported to PSI's laboratory and selected soil samples were tested to determine material properties for engineering evaluation. Laboratory testing was accomplished in general accordance with ASTM procedures. Laboratory testing on selected samples included moisture content (ASTM D 2216), unit weight determinations, Atterberg limits (ASTM D 4318), percent passing U.S. Standard No. 200 Sieve (ASTM D 1140), unconfined compression (ASTM D 2166), consolidated undrained triaxial with pore pressure measurements (ASTM D 4767) and pinhole tests (ASTM D 4647). The samples which were not altered by laboratory testing will be retained for 60 days from the date of this report and then will be discarded without further notice.



**Subsurface Conditions**

The soil samples obtained from the drilling operation were classified in general accordance with ASTM D 2487 or D 2488. Laboratory test data along with detailed descriptions of the soils can be found on the logs of the borings, which are presented on Plates 2 through 12 in the Appendix A. A key to terms and symbols used on the logs is presented on Plate 13 in Appendix A. The Consolidated Undrained Triaxial test and pinhole tests results are shown in Appendix C of this report.

Based on the borings performed, the generalized subsurface soil conditions identified at the north side and south side bridge areas, the detention pond areas and pavement areas are described below separately.

**Table 3: Generalized Soil Profile – Bridge Area (North Side)  
(Borings B-02 and B-03)**

<b>Depth Rang (feet) (Below EL +67 Feet)</b>	<b>Description</b>
0 to 6	Fill: Lean Clay with Sand (CL) and Sandy Lean Clay, firm to very stiff
6 to 23	Lean Clay with Sand (CL); stiff to very stiff
23 to 48	Silty Sand (SM), Clayey Sand (SC) and Poorly Graded Sand with Silt (SP-SM); medium dense to very dense
40 to 80	Lean Clay with Sand (CL), Sandy Lean Clay (CL), Fat Clay (CH) and Fat Clay with Sand (CH); stiff to hard (Very dense Silty Sand (SM) soil layer was encountered from a depth of about 50 feet to 58 feet in Boring B-02)

**Table 4: Generalized Soil Profile – Bridge Area (South Side)  
(Borings B-06 and B-07)**

<b>Depth Rang (feet) (Below EL +67 Feet)</b>	<b>Description</b>
0 to 8	Fill: Sandy Lean Clay (CL); soft to hard
5 to 18	Sandy Lean Clay (CL); soft to very stiff
13 to 40	Poorly Graded Sand with Silt (SP-SM) and Poorly Graded Sand (SP); medium dense to very dense
32 to 40	Sandy Fat Clay (CH) and Fat Clay (CH); very stiff



**Table 5: Generalized Soil Profile – Detention Pond Area  
(Borings B-04, B-05 and B-08)**

<b>Depth Rang (feet) (Below EL +67 Feet)</b>	<b>Description</b>
0 to 16 <sup>1</sup>	Fill: Sandy Lean Clay (CL); stiff to very stiff
0 to 25	Clayey Sand (SC), Silty Sand (SM) and Poorly Graded Sand with Silt (SP-SM), loose to dense
0 to 25	Sandy Lean Clay (CL); stiff to very stiff

Note: 1. Fill soils were encountered in Boring B-8 only.

**Table 6: Generalized Soil Profile – Pavement Areas  
(Borings B-01, B-09, B-10 and B-11)**

<b>Depth Rang (feet) (Below EL +67 Feet)</b>	<b>Description</b>
0 to 10	Fill: Sandy Lean Clay (CL) and Lean Clay with Sand (CL); stiff to very stiff
0 to 2	Clayey Sand (SC)
0 to 15	Lean Clay with Sand (CL), Sandy Lean Clay (CL) and Lean Clay (CL); stiff to very stiff
8 to 15	Silty Sand (SM) and Clayey Sand (SC); medium dense

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in Appendix A should be reviewed for specific information at individual boring locations. These records include soil descriptions, stratification, locations of the samples, and laboratory test data. The stratification shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected across the site. The stratification represents the approximate boundary between subsurface materials and the actual transition may be gradual and indistinct.

**Groundwater Information**

The groundwater level was measured during drilling operations. The groundwater depths encountered at each boring location during and after drilling are shown in Table 7. It should be realized that this groundwater level was recorded immediately after initial encounter and do not represent stabilized ground water reading. The use of slurry to maintain the borehole stability precluded measurement of stabilized ground water after the completion of some of the borings.





**Table 7: Groundwater Depths**

<b>Boring No.</b>	<b>Groundwater Depth (Feet); During Drilling (Below EL +67 Feet)</b>	<b>Groundwater Depth (Feet); After 24 Hours of Drilling (Below EL +67 Feet)</b>
B-1	Dry	At Surface
B-2	Dry	At Surface
B-3	5	At Surface
B-4	Dry	At Surface
B-5	14	5
B-6	14	5
B-7	Dry	At Surface
B-8	17	Dry
B-9	Dry	Dry
B-10	6	3
B-11	Dry	Dry

It is possible that seasonal variations (tide, temperature, rainfall, etc.) as well as the water level in the nearby waterbody will cause fluctuations in the groundwater level. Additionally, perched water may be encountered in discontinuous zones within the overburden. The groundwater levels presented in this report are the levels that were measured at the time of our field activities. It is recommended that the contractor determine the actual groundwater levels at the site at the time of the construction activities to determine the impact, if any, on the construction procedures



## **EVALUATION AND RECOMMENDATIONS**

### **Drilled Shaft Foundation Recommendations for Bridges**

The proposed bridges can be supported on drilled shafts. The axial load carrying capacity of a drilled shaft can be computed using the static method of analysis. According to this method, axial capacity,  $Q$ , at a given penetration is taken as the sum of the skin friction on the side of the shaft,  $Q_s$ , and the end or point bearing at the shaft tip,  $Q_p$ , so that:

$$Q = Q_s + Q_p = fA_s + qA_p$$

where  $A_s$  and  $A_p$  represent, respectively, the embedded surface area and the end area of the shaft;  $f$  and  $q$  represent, respectively, the unit skin friction and the unit end or point bearing. The total allowable axial capacity in compression will be the summation of the allowable frictional capacity and the allowable end bearing capacity. The total allowable axial capacity in tension will be the allowable frictional capacity alone neglecting end bearing component.

Axial Capacity: Using the static method analyses and soil profile determined the ultimate axial capacity for drilled shafts were computed. As requested, the capacity curves for the following shaft sizes are shown in Appendix D on the following plates:

- 24-inch, 36-inch and 48-inch diameter drilled shafts for Bridge at North side - Plates D-1 and D-2
- 24-inch, 36-inch and 48-inch diameter drilled shafts for Bridge at South side - Plates D-3 and D-4

The curves on the plates show the (compression and tension) ultimate axial pile capacity in kips versus depth in feet. It is recommended that a factor of safety of at least 2.0 be applied to arrive at allowable values. Proper reinforcement should be provided in the shafts to account for tension loads.

Lateral Capacity: For shafts, the soil as well as the rigidity of the shaft resists the lateral loads on the shaft. Once the locations, loads and other pertinent information are provided, PSI can assist in performing lateral load analyses based on methods ranging from chart solutions to the 'p-y' approach utilizing computer programs such as L-PILE.

The lateral design information regarding the 'p-y' data for North and South side bridges are provided in Tables 8 and 9, respectively. The relationship between the soil resistance ( $p$ ) and pile deflection ( $y$ ) is commonly referred to as 'p-y'. Along the depth of the pile, soil resistance ( $p$ ) is expressed as a non-linear function of lateral pile deflection ( $y$ ). Various researchers developed 'p-y' criteria for different kinds of soils. The 'p-y' curves can be automatically generated utilizing the computer program LPILE. The program LPILE was developed by Lymon Reese and Shin-Tower Wang, Ensoft, Inc. 'p-y' parameters for LPILE analyses are provided for the analyses of individual shafts.

**Table 8: Soil Parameters to be used in the Lateral Load Analyses (Bridge – North Side)  
(Based on Borings B-02 and B-03)**

Depth Range (ft) /Elevation Range (ft)	'p-y' Criteria	Effective Unit Weight, $\gamma$ (pcf)	Su (psf) or $\phi$ (degrees)	Ks (pci) or Kc (pci) or k (pci)	$\epsilon_{50}$
0 to 6 (EL 67 to EL 61)	Neglect	120	NA	NA	NA
6 to 23 (EL 61 to EL 44)	Stiff Clay Criteria	60	Su = 1,200	Ks = 500 Kc = 200	0.007
23 to 40 (EL 44 to EL 27)	Sand Criteria	60	$\phi = 32$	k = 60	-
40 to 80 (EL 27 to EL -13)	Stiff Clay Criteria	60	Su = 2,200	Ks = 1,000 Kc = 400	0.005

Note: Su-Undrained Shear Strength (ksf);  $\phi$ -Angle of Internal friction; Ks-modulus of subgrade reaction (pci) for static loading condition; Kc-modulus of subgrade reaction (pci) for cyclic loading condition; k-soil modulus parameter for sand,  $\epsilon_{50}$  – strain corresponding to one-half the principle stress.

Neglect top 6 feet of fill soil for analysis.

**Table 9: Soil Parameters to be used in the Lateral Load Analyses (Bridge – South Side)  
(Based on Borings B-06 and B-07)**

Depth Range (ft) /Elevation Range (ft)	'p-y' Criteria	Effective Unit Weight, $\gamma$ (pcf)	Su (psf) or $\phi$ (degrees)	Ks (pci) or Kc (pci) or k (pci)	$\epsilon_{50}$
0 to 8 (EL 67 to EL 59)	Neglect	120	NA	NA	NA
8 to 18 (EL 59 to EL 49)	Stiff Clay Criteria	60	Su = 1,000	Ks = 500 Kc = 200	0.007
18 to 32 (EL 49 to EL 35)	Sand Criteria	60	$\phi = 32$	k = 60	-
32 to 40 (EL 35 to EL 27)	Stiff Clay Criteria	60	Su = 2,200	Ks = 1,000 Kc = 400	0.005

Note: Su-Undrained Shear Strength (ksf);  $\phi$ -Angle of Internal friction; Ks-modulus of subgrade reaction (pci) for static loading condition; Kc-modulus of subgrade reaction (pci) for cyclic loading condition; k-soil modulus parameter for sand,  $\epsilon_{50}$  – strain corresponding to one-half the principle stress.

Neglect top 8 feet of fill soil for analysis.

**Group Effects:** Shaft groups subjected to vertical loads do not necessarily have the same capacity as the sum of the capacity of the individual shafts. For axially loaded shafts, published results indicate that the ratio of capacity per shaft in a group to that of a single isolated shaft typically ranges from 0.5 to 1.0. This efficiency factor depends on the shaft spacing or distance between

each shaft. In planning shaft groups, a minimum spacing of three (3) shaft diameters (center to center) should be maintained for an efficiency factor of 1.0.

Shaft groups subjected to lateral loads do not have the same capacity as the sum of the capacity of the individual drilled shafts. For laterally loaded shafts, published results indicate that the ratio of capacity per shaft in a group to that of a single isolated shaft typically ranges from 0.5 to 1.0. This efficiency factor depends on the shaft spacing (distance between each shaft) and on the direction of loading with respect to the orientation of the shaft group. Research indicates a minimum spacing of 3 diameters to 6 diameters is required depending on the direction of loading with respect to the orientation of the shafts in a group to achieve an efficiency factor of 1.0. PSI should be contacted, once the shaft group orientation, spacing and loading direction is determined.

Settlement: For a single isolated shaft designed in accordance with the computed ultimate capacities and recommended factor of safety, the settlement should be less than 1 inch. Settlement of a shaft group depends on the number of shafts, as well as other geotechnical factors. A detailed settlement analysis for shafts in a group was beyond the scope of this study. If desired, PSI can assist in performing such a study.

Drilled Shaft Installation: Groundwater was encountered at depths ranging between 5 to 14 feet below the existing ground surface during the time of field exploration at the project site. Therefore, drilled shaft excavations installed below a depth of 5 feet may experience ground water infiltration. Also, considering the presence of intermittent sand seams below the ground water level, we recommend slurry displacement method for the installation of the drilled shafts.

The successful completion of drilled shaft excavations will depend, to a large extent, on the suitability of the drilling equipment together with the skill of the operator. The sequence of operations should be scheduled so that each shaft can be drilled, reinforcing steel placed, and the concrete poured in a continuous, rapid, and orderly manner to reduce the time that the excavation is open.

The drilled shafts should be installed in accordance with Item Item 416 of TxDOT specifications or FHWA-NHI-10-016. We recommend a PSI representative should verify the bearing depth, bearing soil condition (if possible), and, that the shaft installation procedures meet the specifications.

### **Detention Pond**

The preliminary drawing and a cross section of the proposed detention pond provided by the client are shown in Plates B-1 and B-2 in Appendix B. Based on the preliminary cross-section, the high bank elevation of the propose detention pond will be at EL +70 feet and the bottom elevation will be at EL +54 feet. The water elevation of the permanent pool section of the proposed detention pond will be at EL +60 feet. Therefore, the depth of the proposed detention pond is anticipated to be about 16 feet, whereas the water depth is about 6 feet.

As discussed above, the high bank elevation of the propose detention pond will be at EL +70 feet, whereas, the existing elevation at the pool area (below soil mounds) is at EL +67 feet. So, it is assumed that 3 feet of compacted fill soil will be placed at the pond area.

Soil Borings B-04, B-05 and B-08 were performed at the proposed detention pond area. Subsurface conditions identified by the borings (specifically near Boring B-8) indicated that the

soil at the detention pond area may include about 16 feet of fill materials. The fill materials appear to be of varied quality and, unknown/varied degree of compaction. We recommend that the fill soils from the detention pond slope areas be removed, free of organic or other deleterious materials and re-compacted in place. The fill should be compacted to at least 95 percent of standard Proctor maximum dry density as determined by ASTM D 698. The fill should be placed in maximum lifts of eight inches of loose material and should be compacted within the range of zero to three percentage (0% to +3%) points above the optimum moisture content value.

The soil borings also indicated presence of sandy soils at the shallower depths at some areas of the proposed detention pond. The sandy soils consists of clayey sand, silty sand and poorly graded sand with silt. Considering the subsurface soil at some areas of the detention pond consists of sandy soils, PSI recommend placing of suitable clay liner on the slopes in sandy soil areas with a minimum thickness of 2 feet.

Based on the preliminary drawing, PSI understands that the side slopes of the proposed pond are planned to have a slope inclination of 3 Horizontal to 1 vertical (3H:1V) or flatter. The slope stability analysis results are shown in the following report sections.

#### Slope Stability Analysis:

Generally, slope failure occurs when the weight of the sliding soil exceeds the resistance derived from the shear strength or frictional resistance of the soil along the sliding surface. Slope stability analysis involves the determination of the most likely sliding surface by comparing the developed shearing resistance along a sliding surface with the weight forces associated with the sliding soil. The method of comparison involves the determination of the factor of safety i.e., a ratio of shear resistance along a sliding surface to the weight of the sliding soil. Slope stability analysis is a method to check the stability of the soil slope. The check for stability involves determination of various values of factor of safety along various assumed likely sliding surfaces. The least value of factor of safety corresponding to a sliding surface is considered the stability of the slope. For the slope stability analysis, the failing surfaces are typically assumed to be circular.

For the present study, to predict the factor of safety against sliding, a computer program Slope/W was utilized. The analysis included the determination of a particular sliding surface that has a least factor of safety against sliding. For the slope stability analyses, three (3) different analysis conditions were considered. They are:

Short term (or Undrained) Condition: This condition occurs when the pore pressures within the soil mass are not dissipated. Typically, this condition corresponds to the state of the soils that exist immediately after performing any cut/fill or during the construction of any slope. For this condition, slopes are analyzed using undrained soil parameters obtained from laboratory tests such as unconfined compression tests.

Long term or Drained Condition: This condition occurs when the pore pressures within the soil mass are dissipated. Typically, this condition corresponds to the state of the soils a few months or years after the construction is complete. For this condition, slopes are analyzed using drained or effective stress parameters obtained from consolidated-undrained tests with pore pressure measurements as well as based on the correlations with Atterberg limits.

**Rapid Drawdown Conditions:** This condition occurs when the water level rises during a flood saturating the land side, and then drains rapidly as the flood waters recede. The state of stress within the soils after a flood event depends largely on the permeability and drainage characteristics of the slope as well as the state of the soils prior to drawdown (i.e., flood event). For the present study, the analysis was performed using effective stress parameters and a water condition where the slopes are fully saturated (phreatic surface along the face of the slope) and the phreatic surface that developed within the slope during the flood condition.

The soil strength parameters selected for the slope stability calculations are based on: 1) the results of field and laboratory test data, 2) engineering judgment based on experience with similar soils and 3) published correlations. The soil strength parameters used in the stability analysis for various soil layers are presented in Table 10.

**Table 10: Soil Parameters for Slope Stability Analyses**

Stratum (Elev. Range, feet)	Total Unit Weight (pcf)	Soil Strength Parameter(s)	
		Undrained (Short-Term)	Drained (Long-Term, Rapid Draw-Down)
Compacted Clay Fill (+70 to +67)	120	$S_u = 1,000$ psf	$c' = 100$ psf $\phi' = 19^\circ$
Clay (CL) (+67 to +59)	120	$S_u = 1,500$ psf	$c' = 150$ psf $\phi' = 22^\circ$
Sand (SM/SP-SM) (+59 to +42)	115	$\phi = 32^\circ$	$\phi = 32^\circ$

Notes:  $S_u$  - Undrained Shear Strength,  $c'$  - drained cohesion,  $\phi'$  - drained angle of internal friction.

**Discussion of Results and Recommendations:** Critical circles having minimum factors of safety were determined for the short term, long term and rapid drawdown conditions. According to HCFCD criteria, a factor of safety of 1.3 should be considered as the minimum acceptable safety factor for these types of slopes for short term condition and 1.5 for long term condition. A factor of safety of 1.25 is considered as a stable slope for the rapid drawdown condition.

The results of the slope stability analyses are summarized in Table 11 and are presented on Plates B-3 through B-5 in Appendix B.

**Table 11: Results of Slope Stability Analysis of the Detention Pond**

Condition	Factor of Safety	Plate No.
Short Term	4.38	B-3
Long Term	2.45	B-4
Rapid Draw Down	1.59	B-5

Based on the slope stability analyses results, the factors of safety obtained for the conditions analyzed are greater than the required minimum factor of safety indicating stable slopes in all



conditions. However, localized failure in the form of minor sloughing may occur along the slope where the sandy soils are presents and should be repaired immediately.

Slope Erosion Protection and Permeability of Bottom Excavation: If water flow is permitted along the side slopes of the detention pond, the near-surface soils will likely erode, causing gradual steepening and subsequent sloughing of the side slopes. Consequently, progressive slope failures can occur. Therefore, the side slopes should be protected against sheet flow down the banks or concentrated high velocity water flow. Due to the potential for erosion, the earthen slopes will require establishing a good vegetation cover as soon as practical and maintaining it over the life of the slope. In addition, considering the subsurface soil consists of sandy soils, PSI recommend placing of suitable clay liner on the slopes with a minimum thickness of 2 feet. Regular maintenance of the pond slopes and vegetative cover will be necessary.

### **Pavement Recommendations**

In order to design a pavement, the subgrade soil conditions and anticipated levels of traffic must be known. The subgrade soils are evaluated based on our limited testing. The anticipated traffic on the proposed pavement is not known at this time. Based on our previous experience with similar facilities, the traffic for the proposed pavement could include lightly loaded cars/pick trucks, delivery vans and occasional 18-wheeler truck traffic.

Pavement Subgrade Preparation: The subgrade soils found at this site include fill materials of varied composition and unknown degree of compaction. The fill materials may not provide uniform or adequate support to the proposed pavement. The thickness of the fill materials extend to a depth of about 10 feet below the existing ground surface.

Therefore, as a minimum it is recommended that after removal of any organics and pavement materials, at least the upper 24 inches of the fill materials should be scarified and compacted in-place. The materials should be compacted to at least 95 percent of standard Proctor maximum dry density as determined by ASTM D 698 within zero to three percentage points of the optimum moisture content. It should be realized that even after scarifying and compacting the upper 24 inches there could be some 6 feet of fill of existing varied or poor quality fill. Therefore, the pavement may require periodic maintenance. It should be noted that if the entire 10 feet fill materials are removed and compacted in-place, the pavement performance or life can be relatively improved. Alternatively, provision of geogrids or geofabrics can be considered and PSI can be contacted for further recommendations.

Pavement Design: AASHTO design methodology could be used to design the pavements. According to AASHTO design methodology, the pavement design thickness considers pavement performance, traffic, subgrade soils, pavement materials, environment, drainage and reliability. Traffic includes several types of vehicles with various magnitudes of axle loads that may be subjected to the pavement during its service life. The design involves a traffic analyses that converts various types of vehicles with various magnitudes axle loads to a number of 18-kip equivalent single axle load repetitions. The design engineer should perform the traffic analyses to compute the number of ESALs repetitions that would be subjected to the pavement during its service life or design life. Based on the computed ESALs, an economical and appropriate pavement can be designed accordingly.

Based on AASHTO design methodology and our previous experience with similar projects in the

local area, we are providing pavement thickness for both flexible pavement and rigid pavement systems in Tables 12 and 13. The tables include pavement sections corresponding to traffic (total ESALs). In general, pavement thicknesses corresponding to the lower traffic conditions may be considered for parking areas, while the higher traffic conditions may be considered for driveways, exit and entry lanes and frequently used areas. Pavements within trash pick-up areas should be cement concrete with at least 7 inches in thickness

**Table 12: Flexible Pavement Design Thickness**

Pavement Material(s) Life Expectancy, ESALs	Design Thickness	
	Light Duty 15,000	Heavy Duty 75,000
Hot Mix Asphalt Concrete (a1 = 0.44) Item 340. TXDOT-Type D	2.0 in.	3.0 in.
Crushed Limestone Base (a2 = 0.12, CBR = 55) Item 247. TXDOT-Type A, Grade 1	6.0 in.	8.0 in.
Subgrade or Subbase (a2 = 0.06)	As Discussed Previously	

**Table 13: Rigid Pavement Design Thickness**

Pavement Material(s) Life Expectancy, ESALs	Design Thickness	
	Light Duty 116,000	Heavy Duty 833,000
Cement Concrete	5.0 in.	7.0 in.
Subgrade or Subbase	As Discussed Previously	

The final pavement sections should be adjusted by the project Civil Engineer based the actual design traffic loading criteria for the project when that information becomes available. PSI can assist with the final pavement section design if requested. The pavement design provided here assumes that the pavement will not be subjected to heavy forklift or crane loading.

Civil and Drainage Considerations: Related civil design factors such as drainage, cross-sectional configurations, surface elevations and environmental factors which will significantly affect the service life of the pavement, must be included in the preparation of the construction drawings and specifications. Concrete pavement slabs should be provided with adequate steel reinforcement. Proper finishing of concrete pavements requires the use of sawed and sealed joints. Joint spacing is recommended at maximum 15-foot intervals for plain concrete. Dowel bars should be used to transfer loads at the transverse joints. Normal periodic maintenance will be required.

Surface water infiltration to the pavement subgrade layers may soften the subgrade soils. Considering several factors in the pavement design can reduce surface infiltration. To summarize, the following are some of the factors that need to be emphasized in order to maintain proper drainage.

- Appropriate slopes should be provided.





- Joints should be properly sealed and maintained.
- Side drains or sub drains along a pavement section may be provided.
- Proper pavement maintenance programs such as sealing surface cracks, and immediate repair of distressed pavement areas should be adopted.
- During and after the construction, site grading should be kept in such a way that the water drains freely off the site and off any prepared or unprepared subgrade soils. Excavations should not be kept open for a long period of time.

## **CONSTRUCTION CONSIDERATIONS**

It is recommended that PSI be retained to provide observation and testing of construction activities involved in the foundations, earthwork, and related activities of this project. PSI cannot accept any responsibility for any conditions that deviated from those described in this report, nor for the performance of the foundations if not engaged to also provide construction observation and testing for this project.

### **Moisture Sensitive Soils/Weather Related Concerns**

During wet weather periods and/or poor site drainage, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. Soils that become wet might be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform any earthwork and foundation construction activities during dry weather.

### **Drainage and Groundwater Concerns**

Water should not be allowed to collect in the excavations or on prepared subgrade of the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff. Positive site surface drainage should be provided to reduce infiltration of surface water around the perimeter of the structures. The grades should be sloped away from the subgrade/structural areas and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill and subgrade area.

For groundwater conditions, refer to the Groundwater Information section of this report. Any water accumulation should be removed from excavations by pumping. Should excessive and uncontrolled amounts of seepage occur, the geotechnical engineer should be consulted. It is possible that the depth to ground water may vary with changes in seasonal conditions, recent rainfall or temperature effects. The ground water levels presented in this report are the levels that were measured at the time of our field activities. We recommend that the Contractor determine the actual ground water levels at the site at the time of the construction activities.

### **Excavations**

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "competent", as defined in 29 CFR Part 1926.650 to 652 should evaluate the soil exposed in the excavations as part of the contractor's



safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor's or other party's compliance with local, state, and federal safety or other regulations.



### **REPORT LIMITATIONS**

The information submitted in this report is based on the available subsurface information obtained by PSI and design details furnished by the client representatives for the proposed project. If there are any revisions to the plans for this project, or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in the foundation recommendations are required. If PSI is not notified of such changes, PSI will not be responsible for the impact of those changes on the project.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete, the geotechnical engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At this time, it may be necessary to submit supplementary recommendations. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the project. This geotechnical report has been prepared for the exclusive use of PGAL and their representatives for the specific application to the proposed East Aldine Town Center to be located on the south side of Aldine Mail Route Road at its intersection with Deergrove Street in Houston, Harris County, Texa

## APPENDIX A

**SITE LOCATION PLAN**



East Aldine Town Center

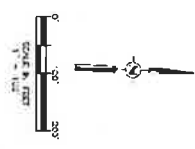
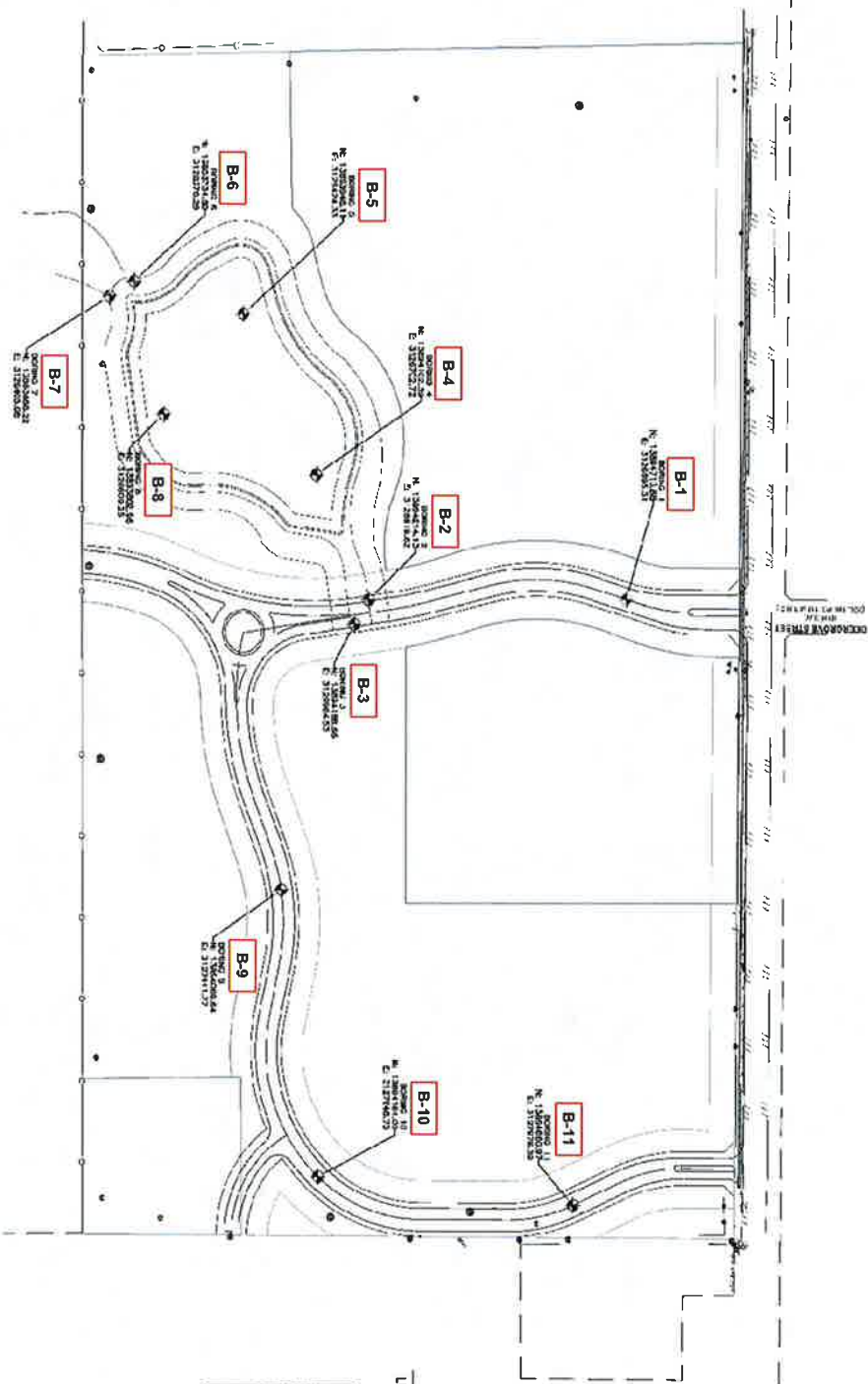
Houston, Texas

PSI REPORT NO: 286-1224



PLATE NO.: 1A

# BORING LOCATION PLAN



LEGEND

➤ BORING LOCATION

BORING NO.	DATE	DEPTH (FEET)	SOIL TYPE	REMARKS
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

BORING LOCATION MAP

East Aldine Town Center

Houston, Texas

PSI Report No. 286-1224



PLATE NO: 1B



**PCAT**

215 BRADSHAW  
HOUSTON, TX 77025  
TEL: 713.259.4444  
FAX: 713.259.4444  
WWW.PCAT.COM

PROJECT TITLE  
PROJECT LOCATION  
PROJECT NUMBER  
PROJECT SHEET  
PROJECT DATE

PROJECT NO. 286-1224  
PROJECT TITLE  
PROJECT LOCATION  
PROJECT NUMBER  
PROJECT SHEET  
PROJECT DATE

**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-01**

PROJECT: EAST ALPINE TOWN CENTER  
 HOUSTON, TEXAS  
 PROJECT NO.: 286-1224

BORING TYPE: SOLID FLIGHT AUGER

DATE: 2/24/2015  
 SURFACE ELEVATION: 67.0

DEPTH (ft.)	SAMPLES	USC	WATER LEVEL	LOCATION		FIELD STRENGTH DATA	SOIL TEST DATA				MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			PASSING #200 SIEVE (%)	ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS		
				Northing: 13894713.88 Easting: 3126895.31	MATERIAL DESCRIPTION		DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)		Natural Moisture Content and Atterberg Limits	LL	PL			PI	
0 - 1		CL			LEAN CLAY WITH SAND (CL), stiff to very stiff, high plasticity, light gray, yellowish brown, moist	P=1.50	118	1.53	13.08	2.2	19	38	14	24	74	UU		
1 - 2		CL			- with ferrous nodules. 2 to 4 feet	P=2.00					17				UU			
2 - 3		CL			SANDY LEAN CLAY (CL), stiff, high plasticity, light gray, light brown, with sand seams, moist	N=12					23						UU	
3 - 4		CL			- reddish brown, 6 to 8 feet	N=14					19							UU
4 - 5		CL			LEAN CLAY (CL), stiff, medium plasticity, light gray, reddish brown, with sand seams, moist	P=2.00					24	36	18	18				
5 - 15		SM			SILTY SAND (SM), medium dense, non plastic, light brown, moist	N=20					26					UU		

Water Level:  Estimated  Measured  Perched   
 Water Observations: DRY DURING DRILLING, AT SURFACE AFTER 24 HOURS OF DRILLING  
 Sample Key:  SPT  Shelby Tube  Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 SS - Shear Strength (P/2, tsf)

Notes: UU - Unconsolidated Undrained



**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-02**

PROJECT: EAST ALDINE TOWN CENTER  
 HOUSTON, TEXAS  
 PROJECT NO.: 286-1224 BORING TYPE: WET ROTARY

DATE: 2/25/2015  
 SURFACE ELEVATION: 67.0

DEPTH (ft.)	SAMPLES	WATER LEVEL	LOCATION	FIELD STRENGTH DATA	SOIL PROPERTIES				MOISTURE CONTENT (%)			ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS		
					DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	LL	PL	PI		PASSING #200 SIEVE (%)	
0	USC		Northing: 13894214.13 Easting: 3126919.62											
			<b>MATERIAL DESCRIPTION</b>											
0 - 5	CL		FILL: LEAN CLAY WITH SAND (CL), firm to stiff, medium plasticity, gray, yellowish brown, brown, with gravel, decayed wood, moist	P=2.00 N=11	104	0.83	14.83	1.9	17	33	13	20	82	UU
5 - 10	CL		LEAN CLAY WITH SAND (CL), stiff to very stiff, medium to high plasticity, gray, yellowish brown, with ferrous and calcareous nodules, moist	P=1.25 N=11					19	30	13	17	75	UU
10 - 15	CL			P=1.50	120	1.12	14.84	8.2	16	15	31	71		
15 - 20	SM		- light brown, with sand seams, 18 to 20 feet	P=2.25	114	1.05	5.07	6	19	46	15	31	71	UU
20 - 25	SM		SILTY SAND (SM), medium dense to dense, non plastic, yellowish brown, moist	N=20					28				25	
25 - 30	SM			N=40					22					
30 - 35	SP		POORLY GRADED SAND WITH SILT (SP-SM), very dense, non plastic, yellowish brown, moist	N=58					21					
35 - 40	SP			N=59					22					
40 - 45	CL		LEAN CLAY WITH SAND (CL), very stiff, medium plasticity, reddish brown,	N=50/1*					22					
45 - 50	CL			N=26					21	32	14	18	71	

Water Level Est.:  Measured:  Perched:   
 Water Observations: DRY DURING DRILLING, AT SURFACE AFTER 24 HOURS OF DRILLING  
 Sample Key:  SPT  Shelby Tube  Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 S<sub>s</sub> - Shear Strength (P/2, tsf)

Notes:  
 UU - Unconsolidated Undrained  
 Due to site accessibility issues, the boring was relocated about 75 feet to the northwest from the above referenced coordinates.

**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-02**

PROJECT: EAST ALDINE TOWN CENTER  
 HOUSTON, TEXAS  
 PROJECT NO.: 286-1224  
 BORING TYPE: WET ROTARY

DATE: 2/25/2015  
 SURFACE ELEVATION: 67.0

DEPTH (ft.)	SAMPLES	WATER LEVEL	LOCATION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			PASSING #200 SIEVE (%)	ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS
									Plastic Limit	Liquid Limit		LL	PL	PI		
50	SM		USC	with calcareous nodules, sand seams, moist												
55	CL		SILTY SAND (SM), very dense, non plastic, reddish brown, moist	N=58							21					
60	CL		SANDY LEAN CLAY (CL), very stiff, high plasticity, reddish brown, with sand seams, moist	N=20							18					
65	CH		FAT CLAY (CH), stiff to very stiff, high plasticity, brown, with silt seams, moist	P=2.50							27	65	21	44	92	
70	CH		- reddish brown, 68 to 70 feet	P=3.00							33					
75	CH		FAT CLAY WITH SAND (CH), very stiff, high plasticity, light brown, gray, with ferrous and calcareous nodules, moist	P=1.50	107	1.64	14.35	33.1			23	50	17	33	85	UU
80				P=4.50												

Water Level: Est.  Measured:  Perched:   
 Water Observations: DRY DURING DRILLING, AT SURFACE AFTER 24 HOURS OF DRILLING  
 Sample Key:  SPT  Shelby Tube  Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 SS - Shear Strength (P/2, tsf)

Notes:  
 UU - Unconsolidated Undrained  
 Due to site accessibility issues, the boring was relocated about 75 feet to the northwest from the above referenced coordinates.

**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-03**

PROJECT: EAST ALDINE TOWN CENTER  
 HOUSTON, TEXAS

PROJECT NO.: 286-1224

BORING TYPE: WET ROTARY

DATE: 2/25/2015

SURFACE ELEVATION: 67.0

DEPTH (ft.)	SAMPLES	WATER LEVEL	LOCATION		FIELD STRENGTH DATA	DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits			MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			PASSING #200 SIEVE (%)	ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS
			Northing: 13894188.66	Easting: 3126964.53						● BLOW COUNT	▲ C <sub>u</sub> (tsf)	■ SS (tsf)		◆ Torvane (psf)	Plastic Limit	Moisture Content		
0	USC		MATERIAL DESCRIPTION															
0			FILL: SANDY LEAN CLAY (CL), stiff to very stiff, high plasticity, gray, brown, reddish brown, with gravel, sand pockets - dark gray, with decayed wood, 4 to 6 feet		P=3.25	114	1.2	14.84	5.1			21	36	13	23	62	UU	
5	CL		LEAN CLAY WITH SAND (CL), stiff to very stiff, high plasticity, brown, gray, with ferrous nodules, moist		P=2.50	116	1.85	11.58	16			15	43	11	32		UU	
10			- yellowish brown, 18 to 20 feet		P=4.50	108	1.18	14.59	12			17	45	14	31	79	UU	
15			CLAYEY SAND (SC), medium plasticity, gray, reddish brown, moist		P=2.00	106	0.98	14.83	15.9			22					UU	
20	SC		POORLY GRADED SAND WITH SILT (SP-SM), medium dense to very dense, non plastic, yellowish brown, moist		P=1.25							22						
25	SP		- with clay pockets, 38 to 40 feet		N=26							22						
30	SM		FAT CLAY (CH), stiff to hard, high plasticity, reddish brown, moist		N=36							22				8		
35	CH		- with calcareous nodules, 48 to 50 feet		N=89							28						
40					P=3.75							23	58	20	38			
45					P=4.50	106	2.45	10.59	27			23					UU	

Water Level Est.:  Measured:  Perched:   
 Water Observations: 5 FEET DURING DRILLING, AT SURFACE AFTER 24 HOURS OF DRILLING  
 Sample Key:  SPT  Shelby Tube  Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 SS - Shear Strength (P/2, tsf)

Notes:  
 UU - Unconsolidated Undrained; UC - Unconfined Compression  
 Due to site accessibility issues, the boring was relocated about 75 feet to the east from the above referenced coordinates.

**Professional Service Industries, Inc.**  
**3730 Dacona Street**  
**Houston, Texas 77092**

**LOG OF BORING B-03**

PROJECT: EAST ALDINE TOWN CENTER  
 HOUSTON, TEXAS  
 PROJECT NO.: 286-1224 BORING TYPE: WET ROTARY

DATE: 2/25/2015  
 SURFACE ELEVATION: 67.0

DEPTH (ft.)	SAMPLES	WATER LEVEL	LOCATION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS
										LL	PL	PI	
50													
53 to 55			Northing: 13894188.66 Easting: 3126964.53	N=26				0	24				UC
53 to 55			- with silt seam, 53 to 55 feet	●									
63 to 65			- with silt seams, 63 to 65 feet	▲	91	1.15	3.61		36				
63 to 65				■									
68 to 75			- gray, 68 to 75 feet	■	114	2.25	14.84	35.1	36				
68 to 75				■									
78 to 80			- with calcareous nodules, 78 to 80 feet	■					24				
78 to 80				■									
78 to 80				■					23				
78 to 80				■									
78 to 80				■					18				
78 to 80				■									

Water Level Est.:  Measured:  Perched:   
 Water Observations: 5 FEET DURING DRILLING, AT SURFACE AFTER 24 HOURS OF DRILLING  
 Sample Key:  SPT  Shelby Tube  Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 S<sub>s</sub> - Shear Strength (P/2, tsf)

Notes:  
 UU - Unconsolidated Undrained; UC - Unconfined Compression  
 Due to site accessibility issues, the boring was relocated about 75 feet to the east from the above referenced coordinates.

**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-04**

PROJECT: EAST ALDINE TOWN CENTER  
 HOUSTON, TEXAS

PROJECT NO.: 286-1224 BORING TYPE: WET ROTARY

DATE: 2/24/2015

SURFACE ELEVATION: 67.0

DEPTH (ft.)	SAMPLES	WATER LEVEL	LOCATION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	MOISTURE CONTENT (%)			PASSING #200 SIEVE (%)	ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS	
									LL	PL	PI			
0			Northing: 13894102.39 Easting: 3126702.72											
0 - 12	USC		<b>MATERIAL DESCRIPTION</b>											
0 - 4	SC		CLAYEY SAND (SC), medium plasticity, light gray, light brown, moist	P=3.25	116	1.05	11.09	2.1	21	32	14	18	49	UU
4 - 8	SM		- with clay layers, 4 to 8 feet	P=3.25					18	27	14	13	38	
8 - 12	SM		- loose, 6 to 8 feet	P=4.00					22					
12 - 18	SM		SILTY SAND (SM), medium dense to dense, non plastic, light gray, moist	N=7					21					
18 - 25	SP		- brown, 12 to 18 feet	N=20					22					
25 - 28	SP		POORLY GRADED SAND WITH SILT (SP-SM), medium dense to dense, non plastic, light brown, moist	N=21					23					
28 - 37	SM			N=41					20					
37 - 40	SM			N=45					21					
40 - 43	SM			N=33					21					
43 - 46	SM			N=23					20					
46 - 49	SM			N=37					21					
49 - 52	SM								20					
52 - 55	SM								21					
55 - 58	SM								21					
58 - 61	SM								20					
61 - 64	SM								21					
64 - 67	SM								21					
67 - 70	SM								20					
70 - 73	SM								21					
73 - 76	SM								21					
76 - 79	SM								20					
79 - 82	SM								21					
82 - 85	SM								21					
85 - 88	SM								20					
88 - 91	SM								21					
91 - 94	SM								21					
94 - 97	SM								20					
97 - 100	SM								21					

Water Level Est.:  Measured:  Perched:   
 Water Observations: DRY DURING DRILLING, AT SURFACE AFTER 24 HOURS OF DRILLING  
 Sample Key:  SPT  Shelby Tube  Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 S<sub>s</sub> - Shear Strength (P/2, tsf)

Notes:  
 UU - Unconsolidated Undrained

**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-05**

PROJECT: EAST ALDINE TOWN CENTER  
 HOUSTON, TEXAS

PROJECT NO.: 286-1224

BORING TYPE: SOLID FLIGHT AUGER

DATE

2/24/2015

SURFACE ELEVATION

67.0

DEPTH (ft.)	SAMPLES	WATER LEVEL	LOCATION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)			PASSING #200 SIEVE (%)	ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS
									Atterberg Limits	Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index		
0			Northing: 13893948.11 Easting: 3126424.33												
0-15	USC		SANDY LEAN CLAY (CL), stiff to very stiff, medium to high plasticity, gray, brown, with sand seams, moist  - with ferrous nodules, 6 to 10 feet	P=3.50											
15-18	SP SM			POORLY GRADED SAND WITH SILT (SP-SM), medium dense, non plastic, light gray to yellowish brown, moist - light brown, 18 to 25 feet	P=2.00 P=1.50 P=3.00 P=2.00 P=3.25 P=2.50 P=1.50 N=13 N=15 N=24	113	1.17	13.57	2.2						UU 8-10 feet: Cu=0.25 ksf Phiu=21.3 deg. C'=0.26 ksf Phi=25.6 deg. UU; PH: ND3
18-21					116	1.51	15.02	7.3							
21-25															

Water Level Est.:  Measured:  Perched:   
 Water Observations: 14 FEET DURING DRILLING, 5 FEET AFTER 24 HOURS OF DRILLING  
 Sample Key:  SPT  Shelby Tube  Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 Cu - Undrained Cohesion (tsf)  
 Ss - Shear Strength (P/2, tsf)

Notes:  
 UU - Unconsolidated Undrained; PH - Pinhole; ND3 - Moderately Dispersive

**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-06**

PROJECT: EAST ALDINE TOWN CENTER  
 HOUSTON, TEXAS

PROJECT NO.: 286-1224

BORING TYPE: SOLID FLIGHT AUGER TO 15 FEET,  
 WET ROTARY THEREAFTER

DATE: 2/26/2015

SURFACE ELEVATION: 67.0

DEPTH (ft.)	SAMPLES	WATER LEVEL	LOCATION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits			ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS	
									MOISTURE CONTENT (%)	LL	PL		PI
0	USC		Northing: 13893734.8 Easting: 3126376.28										
			<b>MATERIAL DESCRIPTION</b>										
0 - 5	CL		FILL: SANDY LEAN CLAY (CL), soft, medium plasticity, gray, brown, reddish brown, with sand pockets, root fibers, moist	P=0.75									
5 - 10	CL		SANDY LEAN CLAY (CL), soft to stiff, medium to high plasticity, light gray, brown, with ferrous nodules, moist	P=1.75									
10 - 15	CL		- with calcareous nodules, 4 to 8 feet	P=0.50									
15 - 20	SP SM		POORLY GRADED SAND WITH SILT (SP-SM), medium dense, non plastic, light brown, moist	P=1.50									
20 - 25	SP			P=2.50	106	0.55	14.84	7.6					
25 - 30	SP			P=0.25									
30 - 35	CH		POORLY GRADED SAND (SP), dense, non plastic, light brown, moist	N=16									
35 - 40	CH		SANDY FAT CLAY (CH), very stiff, high plasticity, reddish brown, with silt seams, moist	N=15									
40 - 45	CH		FAT CLAY (CH), very stiff, high plasticity, reddish brown, moist	N=41									
45 - 50	CH			N=21									
50 - 55	CH			P=3.00	96	1.02	4.72	0					

Water Level: Est.:  Measured:  Perched:   
 Water Observations: 14 FEET DURING DRILLING, 5 FEET AFTER 24 HOURS OF DRILLING  
 Sample Key:  SPT  Shelby Tube  Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 S<sub>s</sub> - Shear Strength (P/2, tsf)

Notes:  
 UU - Unconsolidated Undrained; UC - Unconfined Compression

**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-07**

PROJECT: EAST ALDINE TOWN CENTER  
 HOUSTON, TEXAS

PROJECT NO.: 286-1224

BORING TYPE: SOLID FLIGHT AUGER TO 20 FEET,  
 WET ROTARY THEREAFTER

DATE

2/24/2015

SURFACE ELEVATION

67.0

DEPTH (ft.)	SAMPLES	USC	WATER LEVEL	LOCATION	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits			MOISTURE CONTENT (%)	ATTEMBERG LIMITS (%)	PASSING #200 SIEVE (%)	ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS		
												Plastic Limit	Moisture Content	Liquid Limit						
0				Northing: 13893688.22 Easting: 3126405.08																
13		CL		<b>FILL: SANDY LEAN CLAY (CL),</b> firm to hard, medium to high plasticity, light brown, gray, reddish brown, with sand pockets, calcareous nodules, rock fragments, moist - with decayed wood, 6 to 8 feet  <b>SANDY LEAN CLAY (CL),</b> firm to very stiff, medium to high plasticity, light gray, with calcareous nodules, moist - yellowish brown, with sand seams, 13 to 15 feet  <b>POORLY GRADED SAND WITH SILT (SP-SM),</b> medium dense to very dense, non plastic, brown to light brown, moist - with clay pockets, 28 to 35 feet	N=5	121	2.03	7.57	3.9				13	LL	34	13	21	66	UU	
16					N=5								16							
19					P=4.50								12							
22					P=4.50								13							
24					P=3.50								16							
25				P=2.00				106	0.49	14.84	5.9	22							UU	
28				N=18								24								
29				N=19								21								
30				N=18								25								
35				N=50/5"								19								
40				N=50/5"								19								

Water Level: Est:  Measured:  Perched:

Water Observations: DRY DURING DRILLING, AT SURFACE AFTER 24 HOURS OF DRILLING

Sample Key:  SPT  Shelby Tube  Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 SS - Shear Strength (P/2, tsf)

Notes:  
 UU - Unconsolidated Undrained



**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-08**

PROJECT: EAST ALDINE TOWN CENTER  
 HOUSTON, TEXAS  
 PROJECT NO.: 286-1224

BORING TYPE: SOLID FLIGHT AUGER

DATE: 2/24/2015  
 SURFACE ELEVATION: 67.0

DEPTH (ft.)	SAMPLES	WATER LEVEL	LOCATION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			PASSING #200 SIEVE (%)	ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS
									● BLOW COUNT ●	▲ C <sub>u</sub> (tsf) ▲		■ SS (tsf) ■	◆ Torvane (psf) ◆	LL		
0			USC													
0				Northing: 13893802.96 Easting: 3126609.25												
				<b>MATERIAL DESCRIPTION</b>												
0				FILL: SANDY LEAN CLAY (CL), stiff to very stiff, medium to high plasticity, brown, gray, with sand pockets, gravels, rock fragments, moist - clayey sand, 2 to 4 feet - with broken glass fragments, 6 to 8 feet - yellowish brown, 8 to 10 feet												
5				- dark brown, with decayed wood, 14 to 16 feet												
5				SANDY LEAN CLAY (CL), stiff to very stiff, slight plasticity, brown, gray, with sand seams, moist												
10																
15																
20																
25																

Water Level: Est.:  Measured:  Perched:   
 Water Observations: 17 FEET DURING DRILLING, DRY AFTER 24 HOURS OF DRILLING  
 Sample Key:  SPT  Shelby Tube  Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 SS - Shear Strength (P/2, tsf)

Notes:  
 UU - Unconsolidated Undrained; UC - Unconfined Compression

**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-09**

PROJECT: EAST ALDINE TOWN CENTER  
 HOUSTON, TEXAS

PROJECT NO.: 286-1224 BORING TYPE: SOLID FLIGHT AUGER

DATE: 2/24/2015  
 SURFACE ELEVATION: 67.0

DEPTH (ft.)	SAMPLES	USC	WATER LEVEL	LOCATION	FIELD STRENGTH DATA	SOIL TEST DATA				MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			PASSING #200 SIEVE (%)	ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS				
						BLOW COUNT	C <sub>u</sub> (tsf)	SS (tsf)	Torvane (psf)		DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)			CONFINING PRESSURE (psi)	LL	PL	PI
0																			
5					P=2.50	▲	▲	■	◆	111	0.59	12.04	0	22	44	18	26	85	UC
10					P=4.50	▲	▲	■	◆	122	1.04	14.85	5.1	10	29	14	15	74	UU
15					P=3.75	▲	▲	■	◆					16	13	15		71	
					P=4.00	▲	▲	■	◆					16	13	15			
					N=10	●								32	28	13			

Water Level:  Measured:  Perched:   
 Water Observations: DRY DURING DRILLING AND AFTER 24 HOURS OF DRILLING  
 Sample Key:  SPT  Shelby Tube  Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 SS<sub>6</sub> - Shear Strength (P/2, tsf)

Notes:  
 UU - Unconsolidated Undrained, UC - Unconfined Compression

**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-10**

PROJECT: EAST ALDINE TOWN CENTER  
 HOUSTON, TEXAS  
 PROJECT NO.: 286-1224

BORING TYPE: SOLID FLIGHT AUGER

DATE: 2/24/2015  
 SURFACE ELEVATION: 67.0

DEPTH (ft.)	SAMPLES	WATER LEVEL	LOCATION	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits			MOISTURE CONTENT (%)	PASSING #200 SIEVE (%)	ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS
										BLOW COUNT	C <sub>u</sub> (tsf)	SS (tsf)			
0			Northing: 13894164 Easting: 3127976.39												
0 - 15	USC														
0 - 15	SC			CLAYEY SAND (SC), medium plasticity, brown, moist	P=2.25										
0 - 15	CL			SANDY LEAN CLAY (CL), very stiff, medium plasticity, brown, gray, with sand seams, moist	P=3.25										
0 - 15	SC			CLAYEY SAND (SC), medium dense, medium plasticity, light gray, light brown, moist	P=4.00	118	1.22	14.85	3.9						UU
0 - 15	SC				P=3.25										
0 - 15	SC				P=3.25										
0 - 15	SC				N=15										
0 - 15	SC				N=15										

Water Level: Est.:  Measured:  Perched:   
 Water Observations: 6 FEET DURING DRILLING, 3 FEET AFTER 24 HOURS OF DRILLING  
 Sample Key:  SPT  Shelby Tube  Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 SS - Shear Strength (P/2, tsf)

Notes:  
 UU - Unconsolidated Undrained

**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-11**

PROJECT: EAST ALDINE TOWN CENTER  
 HOUSTON, TEXAS  
 PROJECT NO.: 286-1224  
 BORING TYPE: SOLID FLIGHT AUGER

DATE: 2/23/2015  
 SURFACE ELEVATION: 67.0

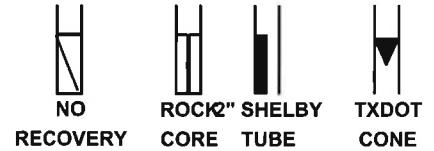
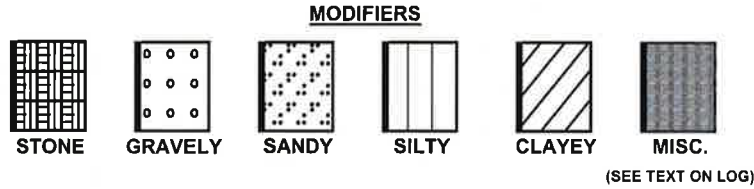
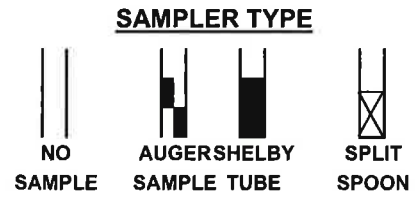
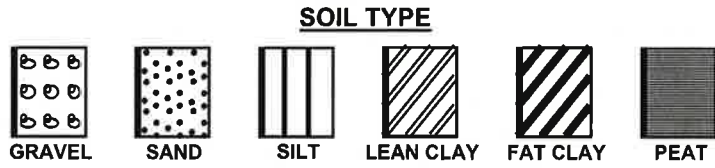
DEPTH (ft.)	SAMPLES	USC	WATER LEVEL	LOCATION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	UU SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			PASSING #200 SIEVE (%)	ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS
											LL	PL	PI		
0				Northing: 13894660.97 Easting: 3127948.75 <b>MATERIAL DESCRIPTION</b>	P=3.00 P=3.50 P=4.00 P=3.25 P=2.75 P=2.50	108	1.07	14.84	7.3	12 13 13 14 16 18	28 13 14 40	13 15 26 76	67	UU	
5	CL	CL	FILL: SANDY LEAN CLAY (CL), very stiff, medium plasticity, dark gray, dark brown, with sand seams, moist SANDY LEAN CLAY (CL), very stiff, medium plasticity, gray, brown, with sand seams, moist LEAN CLAY WITH SAND (CL), stiff to very stiff, high plasticity, light brown, gray, with ferrous and calcareous nodules, sand seams, moist												
10															
15															

Water Level: Est.:  Measured:  Perched:   
 Water Observations: DRY DURING DRILLING AND AFTER 24 HOURS OF DRILLING  
 Sample Key:  SPT  Shelby Tube  Disturbed

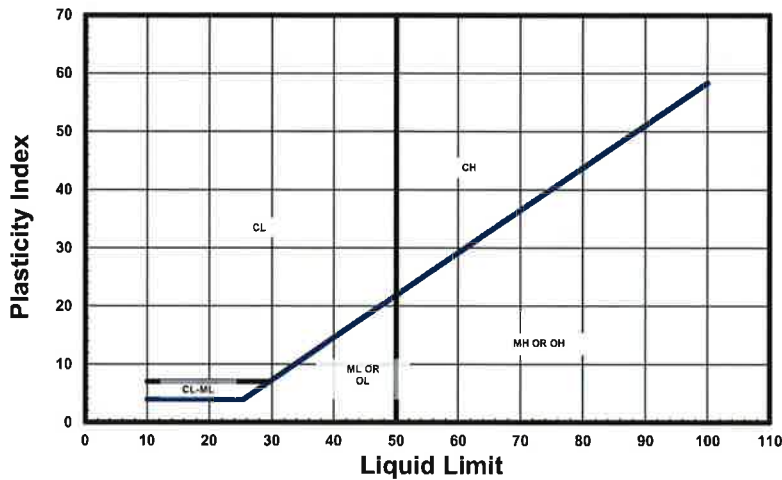
Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 S<sub>s</sub> - Shear Strength (P/2, tsf)

Notes: UU - Unconsolidated Undrained

## KEY TO TERMS AND SYMBOLS USED ON LOGS



**UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D 2487**



**CONSISTENCY OF COHESIVE SOILS**

CONSISTENCY	SHEAR STRENGTH IN TONS/FT <sup>2</sup>
VERY SOFT	0 TO 0.125
SOFT	0.125 TO 0.25
FIRM	0.25 TO 0.5
STIFF	0.5 TO 1.0
VERY STIFF	1.0 TO 2.0
HARD	> 2.0 OR 2.0+

**RELATIVE DENSITY - GRANULAR SOILS**

CONSISTENCY	N-VALUE (BLOWS/FOOT)
VERY LOOSE	0 TO 4
LOOSE	5 TO 9
MEDIUM DENSE	10 TO 29
DENSE	30 TO 50
VERY DENSE	> 50 OR 50+

**DEGREE OF PLASTICITY OF  
COHESIVE SOILS**

DEGREE OF PLASTICITY	PLASTICITY INDEX	SWELL POTENTIAL
NONE OR SLIGHT	0 TO 4	NONE
LOW	4 TO 20	LOW
MEDIUM	20 TO 30	MEDIUM
HIGH	30 TO 40	HIGH
VERY HIGH	> 40	VERY HIGH

**MOISTURE CONDITION  
COHESIVE SOILS**

DESCRIPTION	CONDITION
Absence of moisture, dusty, dry to touch	DRY
Damp but no visible water	MOIST
Visible free water	WET

**CONSISTENCY OF COHESIVE SOILS  
AFTER TERZAGHI (1948)**

CONSISTENCY	N-VALUE (BLOWS/FOOT)
VERY SOFT	< 2
SOFT	2 TO 4
FIRM	4 TO 8
STIFF	8 TO 15
VERY STIFF	15 TO 30
HARD	> 30

**ABBREVIATIONS**

HP - HAND PENETROMETER      UC - UNCONFINED COMPRESSION TEST  
 TV - TORVANE      UU - UNCONSOLIDATED UNDRAINED TRIAXIAL  
 MV - MINIATURE VANE      CU - CONSOLIDATED UNDRAINED

NOTE: PLOT INDICATES SHEAR STRENGTH AS OBTAINED BY ABOVE TESTS

FINAL GROUND WATER LEVEL  
 INITIAL GROUND WATER LEVEL

**CLASSIFICATION OF GRANULAR SOILS**

**U.S. STANDARD SIEVE SIZE(S)**

6"		3"		3/4"		4		10		40		200	
BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY	CLAY					
		COARSE	FINE	COARSE	MEDIUM	FINE							
		152	76.2	19.1	4.76	2.0	0.42	0.074					0.002
<b>GRAIN SIZE IN MM</b>													



## APPENDIX B

# DETENTION POND PLAN



East Aldine Town Center

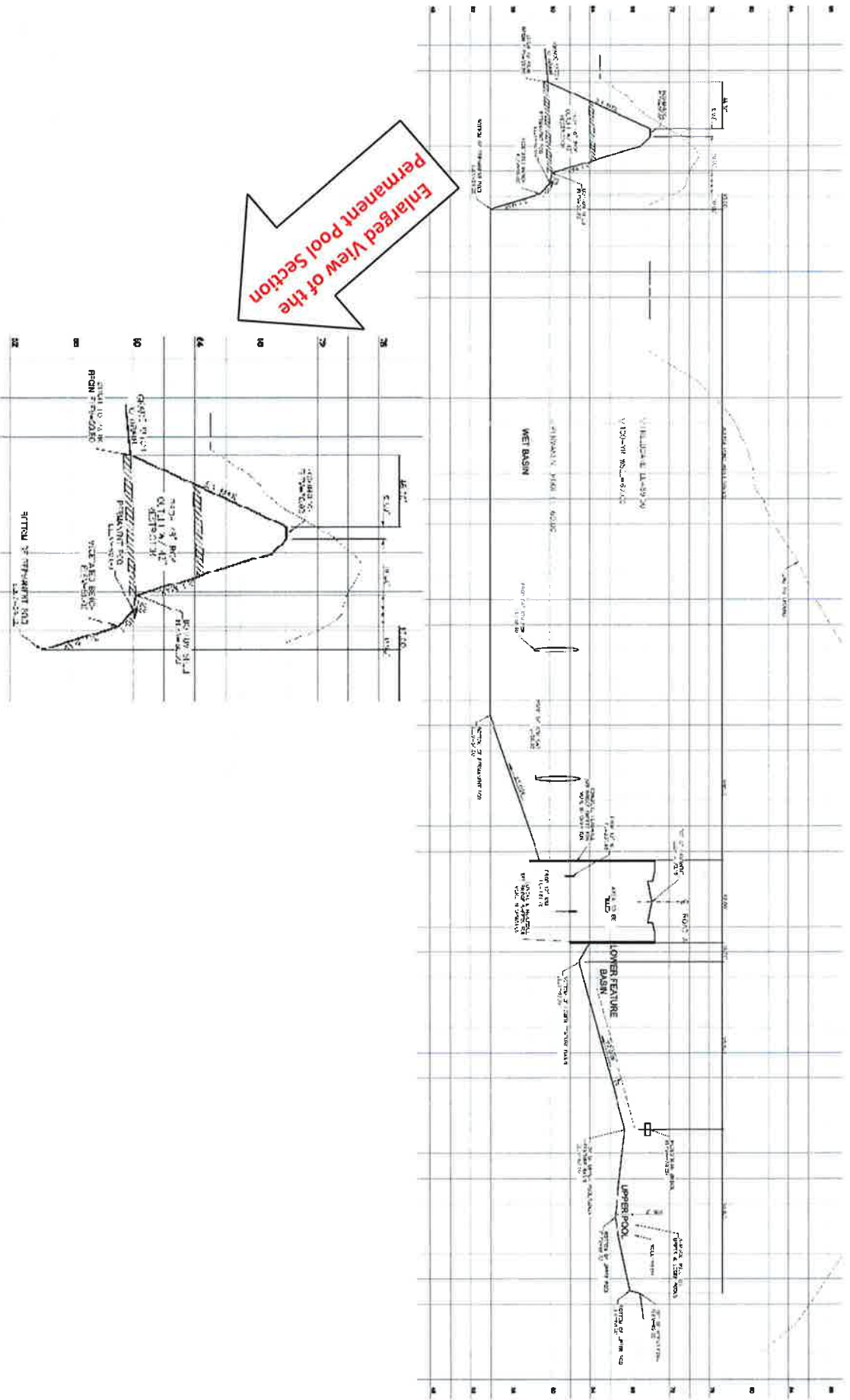
Houston, Texas

PSI Report No.: 286-1224



PLATE NO: B-1

# DETENTION POND CROSS SECTION



East Aldine Town Center

Houston, Texas

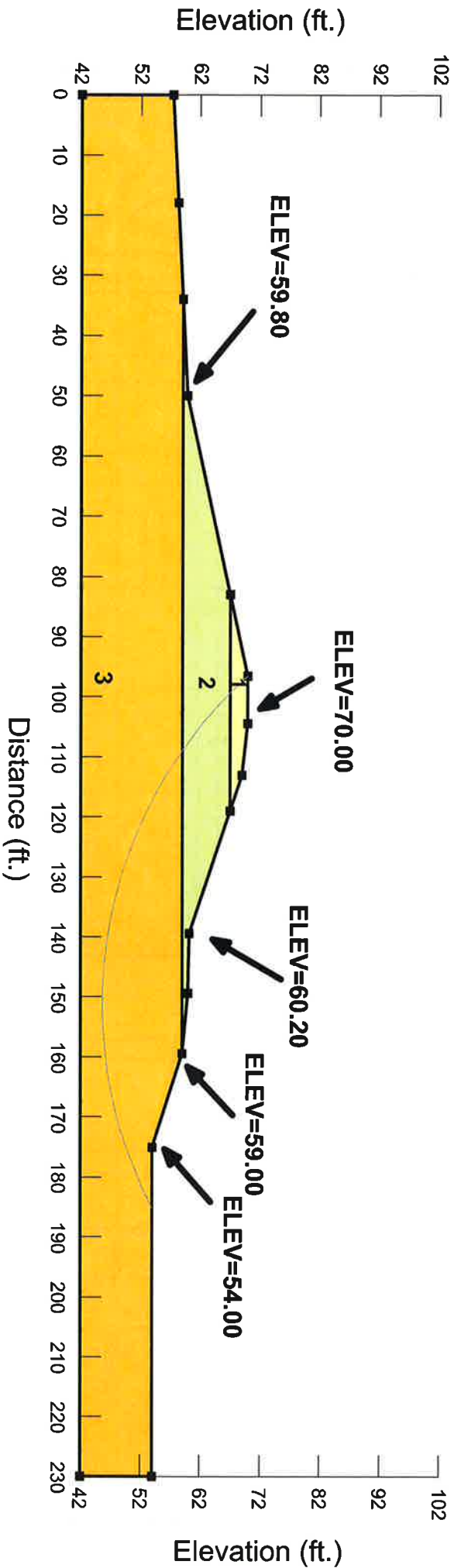
PSI Report No.: 286-1224





**Title: 286-1224 East Aldine Town Center (Permanent Pool Side Slope)**  
**Slope Stability Analysis**  
**Name: Short Term**  
**Method: Spencer**  
**F of S: 4.38**

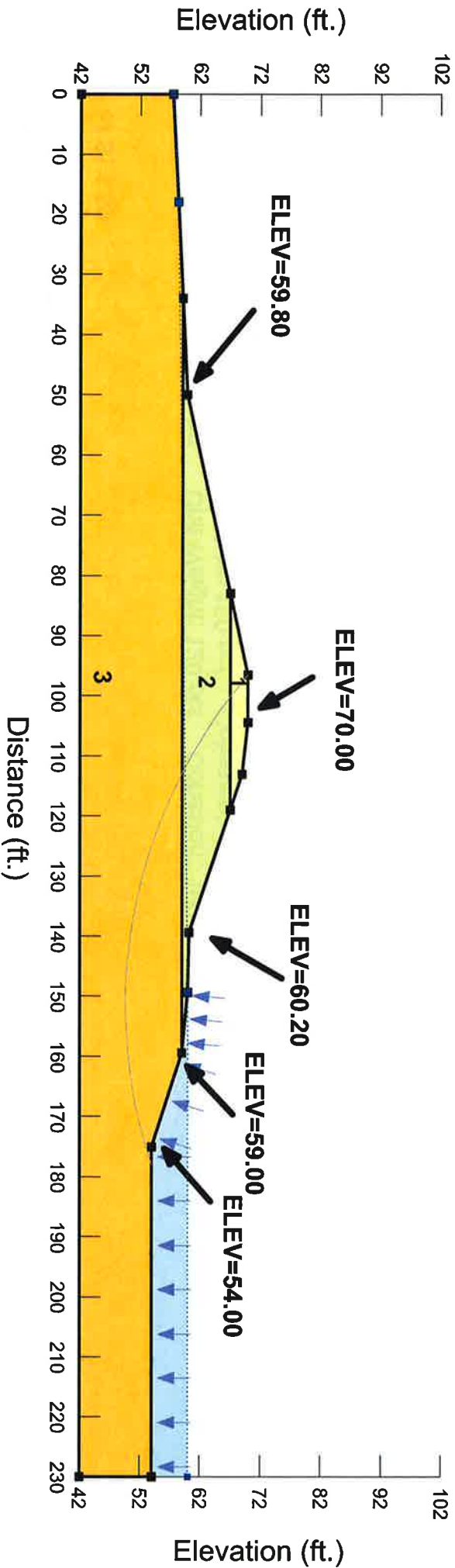
Name: 1. Fill Soils (CL) Undrained    Unit Weight: 120 pcf    Cohesion: 1,000 psf  
 Name: 2. Clay (CL) Undrained    Unit Weight: 120 pcf    Cohesion: 1,500 psf  
 Name: 3. Sand (SM/SC/SP-SM)    Unit Weight: 115 pcf    Cohesion: 0 psf    Phi: 32 °



**PLATE NO: B-3**

**Title: 286-1224 East Aldine Town Center (Permanent Pool Side Slope)**  
**Slope Stability Analysis**  
**Name: Long Term**  
**Method: Spencer**  
**F of S: 2.45**

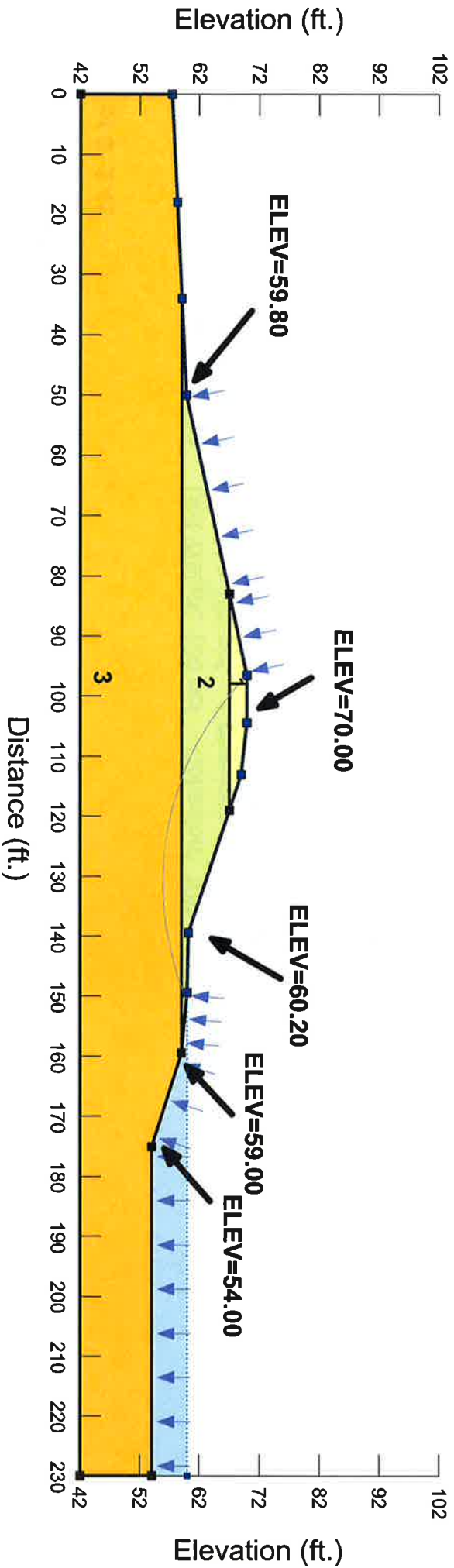
Name: 1. Fill Soils (CL) Drained    Unit Weight: 120 pcf    Cohesion: 100 psf    Phi: 19 °  
 Name: 2. Clay (CL) Drained    Unit Weight: 120 pcf    Cohesion: 150 psf    Phi: 22 °  
 Name: 3. Sand (SM/SC/SP-SM)    Unit Weight: 115 pcf    Cohesion: 0 psf    Phi: 32 °



**PLATE NO: B-4**

**Title: 286-1224 East Aldine Town Center (Permanent Pool Side Slope)**  
**Slope Stability Analysis**  
**Name: Rapid Draw Down**  
**Method: Spencer**  
**F of S: 1.59**

Name: 1. Fill Soils (CL) Drained    Unit Weight: 120 pcf    Cohesion: 100 psf    Phi: 19 °  
 Name: 2. Clay (CL) Drained    Unit Weight: 120 pcf    Cohesion: 150 psf    Phi: 22 °  
 Name: 3. Sand (SM/SC/SP-SM)    Unit Weight: 115 pcf    Cohesion: 0 psf    Phi: 32 °



**PLATE NO: B-5**

## APPENDIX C



## Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

Project Name: East Aldine Town Center

Classification: Brown and Gray, Sandy Lean Clay

Project Number: 286-1224

Boring Number: B-05

Depth, feet: 8-10 ft

Sample No./ID: NA

Liquid Limit: 41

Plastic Limit: 14

Plasticity Index: 27

Percent Passing No. 200: 68

Specimen/Stage Data	Before Test			After Consolidation/Shear			Description	Saturation/Consolidation		
	1	2	3	1	2	3		1	2	3
Diameter (D), in.:	2.810	2.821	2.814	2.821	2.814	2.801				
Height (H), in.:	5.637	5.589	5.586	5.589	5.586	5.578	Method	Wet Mounting Method		
Correc. Dia. After Consol (D <sub>a</sub> ), in.:	2.809	2.813	2.799	-	-	-	Cell Pressure, lbs/in <sup>2</sup>	42.0	46.1	54.0
Correc. Ht. After Consol (H <sub>a</sub> ), in.:	5.637	5.589	5.586	-	-	-	Back Pressure, lbs/in <sup>2</sup>	38.0	37.0	38.0
Corrected Cross-Sec. Area, in <sup>2</sup> :	6.196	6.214	6.154	6.249	6.218	6.162	B-Parameter	0.96	0.96	0.96
Volume (V <sub>o</sub> , V <sub>f</sub> = V <sub>o</sub> - ΔV), cm <sup>3</sup> :	572.9	572.4	569.1	572.4	569.1	563.2	Consolidation Pressure, lbs/in <sup>2</sup>	4.0	9.0	16.0
Moisture, {W <sub>o</sub> , W <sub>f</sub> } %:	21.4%	21.2%	20.8%	21.2%	20.8%	20.2%	Volume Change After (ΔV), cm <sup>3</sup>	0.5	3.3	5.9
Wet Soil Wt. {M <sub>o</sub> , M <sub>f</sub> }, gm:	1196.67	1196.17	1192.87	1196.17	1192.87	1186.97	Time for Consolidation, min.	0	0	0
Wet Unit Weight, pcf:	130.3	130.39	130.8	130.4	130.78	131.5	Failure Type:	Stage 1	Bulge-Fractures	
Dry Unit Weight, pcf:	107.4	107.6	108.2	107.6	108.2	109.4		Stage 2	Bulge-Fractures	
Specific Gravity (Assumed):	2.7	2.7	2.7	2.7	2.7	2.7		Stage 3		
Void Ratio, eo, ef:	0.57	0.57	0.57	0.57	0.56	0.55				
Degree of Saturation, So, Sf:	1.02	1.02	1.02	1.01	1.01	1.00				

Equipment	Specimen/Stage			Shear Data			Specimen/Stage		
	1	2	3	1	2	3	1	2	3
Oven:	B33ER01048	B33ER01048	B33ER01048	Total Shearing Time, min			240	480	1488
Scale:	AE444189	AE444189	AE444189	Strain Rate, %/hr			0.50	0.49	0.46
Calipers:	7174871	7174871	7174871	Axial Strain at Failure, %			1.71	2.57	3.08
Digital Dial:	2123	2123	2123	Deviator Stress, lbs/in <sup>2</sup> (Δσ)			9.51	13.42	23.26
Load Frame:	Geo Jac Frame A	Geo Jac Frame A	Geo Jac Frame A	Excess Pore Pressure, lbs/in <sup>2</sup> (u)			1.49	3.21	4.46
Load Cell ID:	LC05	LC05	LC05	A-Parameter, (u/Δσ)			0.16	0.24	0.19
DCDT:	MG0966	MG0966	MG0966	Total Major Principal Stress, lbs/in <sup>2</sup> (σ <sub>1</sub> = σ <sub>3</sub> + Δσ)			13.47	22.44	39.26
Cell Pressure Transducer:	PS-2830	PS-2830	PS-2830	Total Minor Principal Stress, lbs/in <sup>2</sup> (σ <sub>3</sub> )			3.96	9.03	16.00
Pore Pressure Transducer:	PS-2829	PS-2829	PS-2829	Effective Major Principal Stress, lbs/in <sup>2</sup> (σ <sub>1</sub> - u)			11.98	19.23	34.80
Radial Drainage Filter Strip:	Yes	Yes	Yes	Effective Minor Principal Stress, lbs/in <sup>2</sup> (σ <sub>3</sub> - u)			2.47	5.81	11.54

Remarks:



## Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

**Project Name:** East Aldine Town Center

**Classification:** Brown and Gray, Sandy Lean Clay

**Project Number:** 286-1224

**Boring Number:** B-5

**Depth, feet:** 8-10 ft

**Sample No./ID:** 1

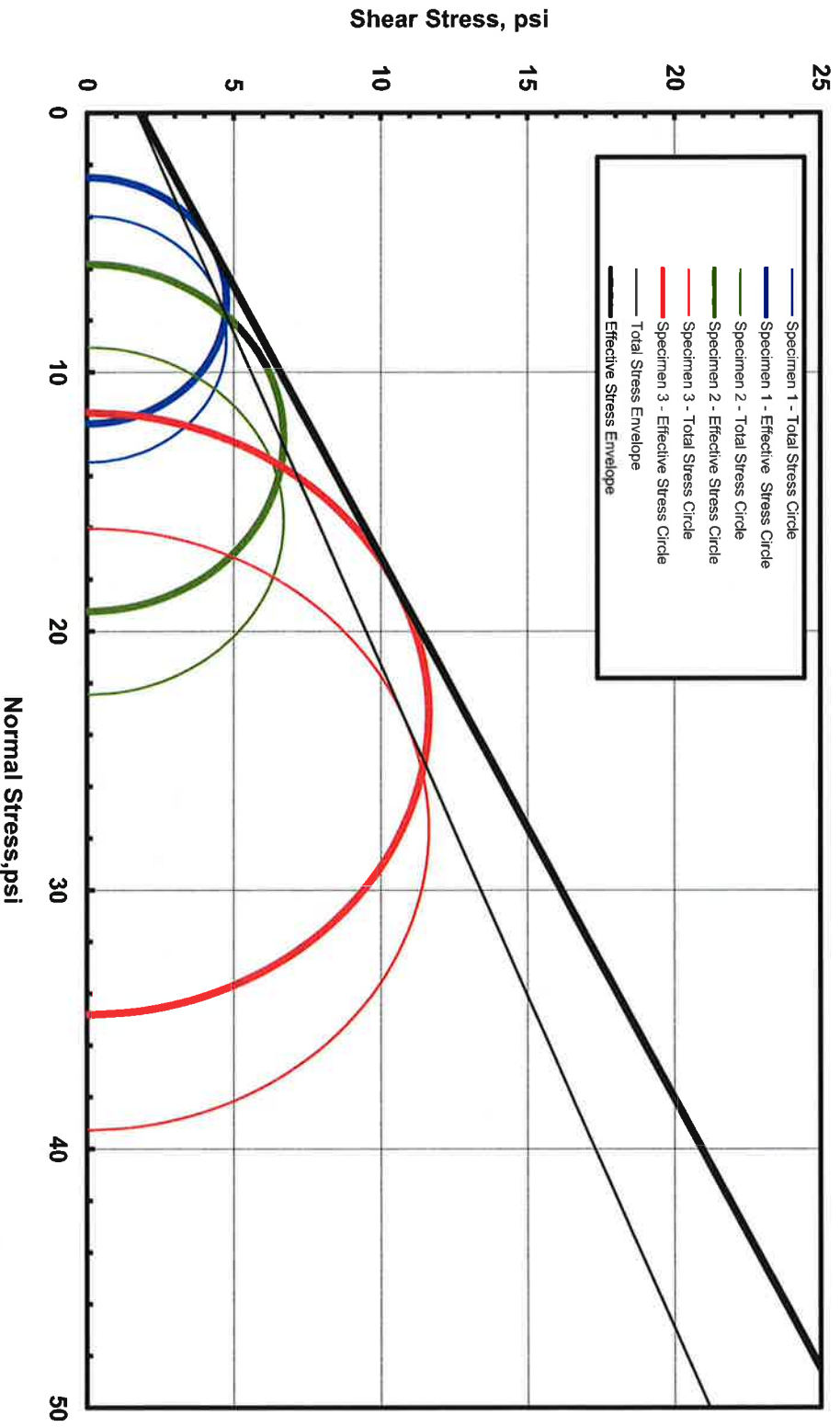
**Cohesion (C<sub>u</sub>), ksf:** 0.25

**Friction Angle (φ<sub>u</sub>), deg:** 21.3

**Cohesion (C<sub>d</sub>), ksf:** 0.26

**Friction Angle (φ<sub>d</sub>), deg:** 25.6

**Remarks:**



## Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

**Project Name:** East Aldine Town Center

**Classification:** Brown and Gray, Sandy Lean Clay

**Project Number:** 286-1224

**Boring Number:** B-5

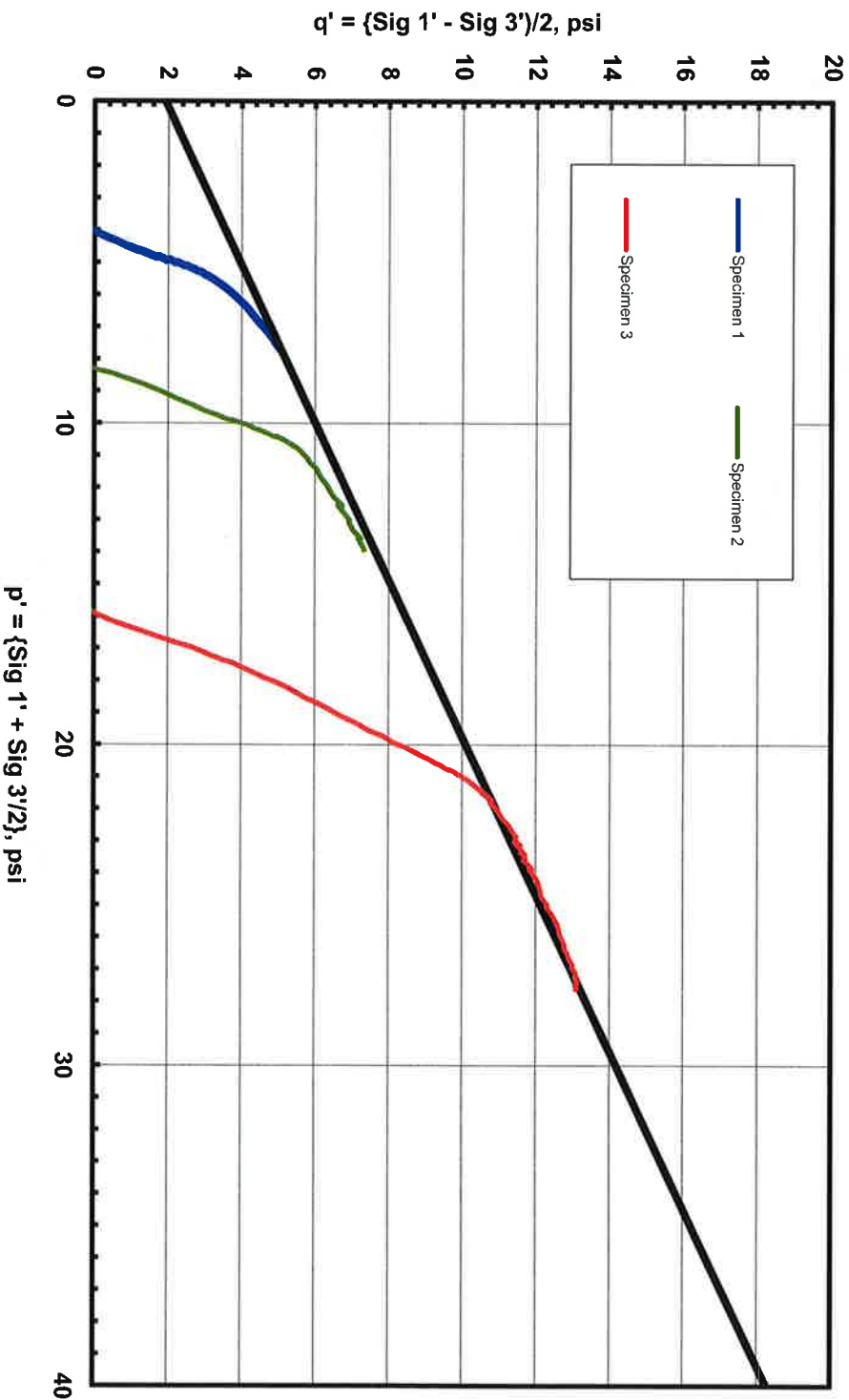
**Depth, feet:** 8-10 ft

**Sample No./ID:** 1

**Cohesion ( $C_u$ ), ksf:** 0.28

**Friction Angle ( $\phi_u$ ), deg:** 24.1

**Remarks:** 0.00



# Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

Project Name: **East Aldine Town Center**

Classification: **Brown and Gray, Sandy Lean Clay**

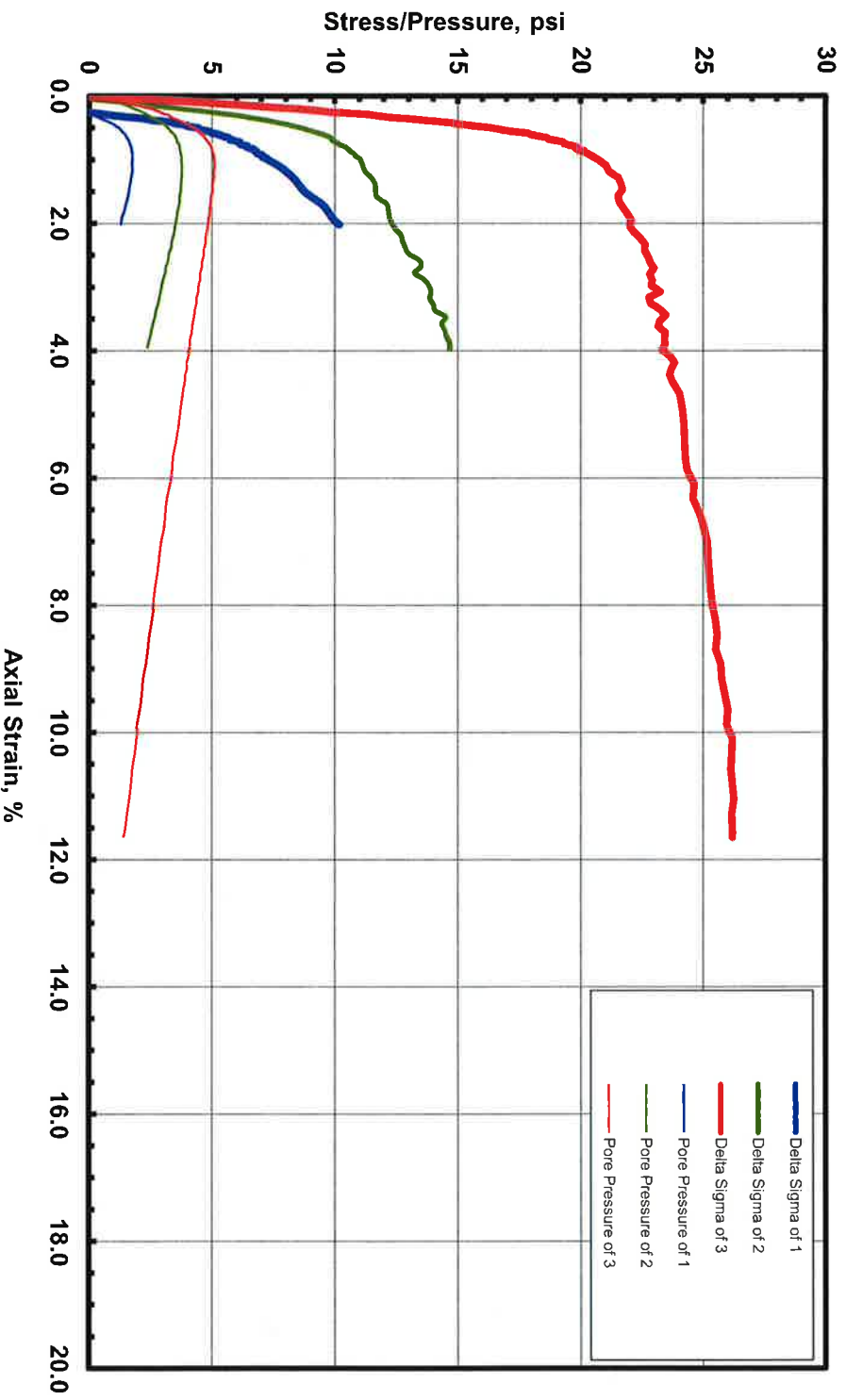
Project Number: **286-1224**

Boring Number: **B-5**

Depth, feet: **8-10 ft**

Sample No./ID: **1**

Remarks: **0.00**





# Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

**Project Name:** East Aldine Town Center

**Classification:** Brown and Gray, Sandy Lean Clay

**Project Number:** 286-1224

**Boring Number:** B-5

**Depth, feet:** 10

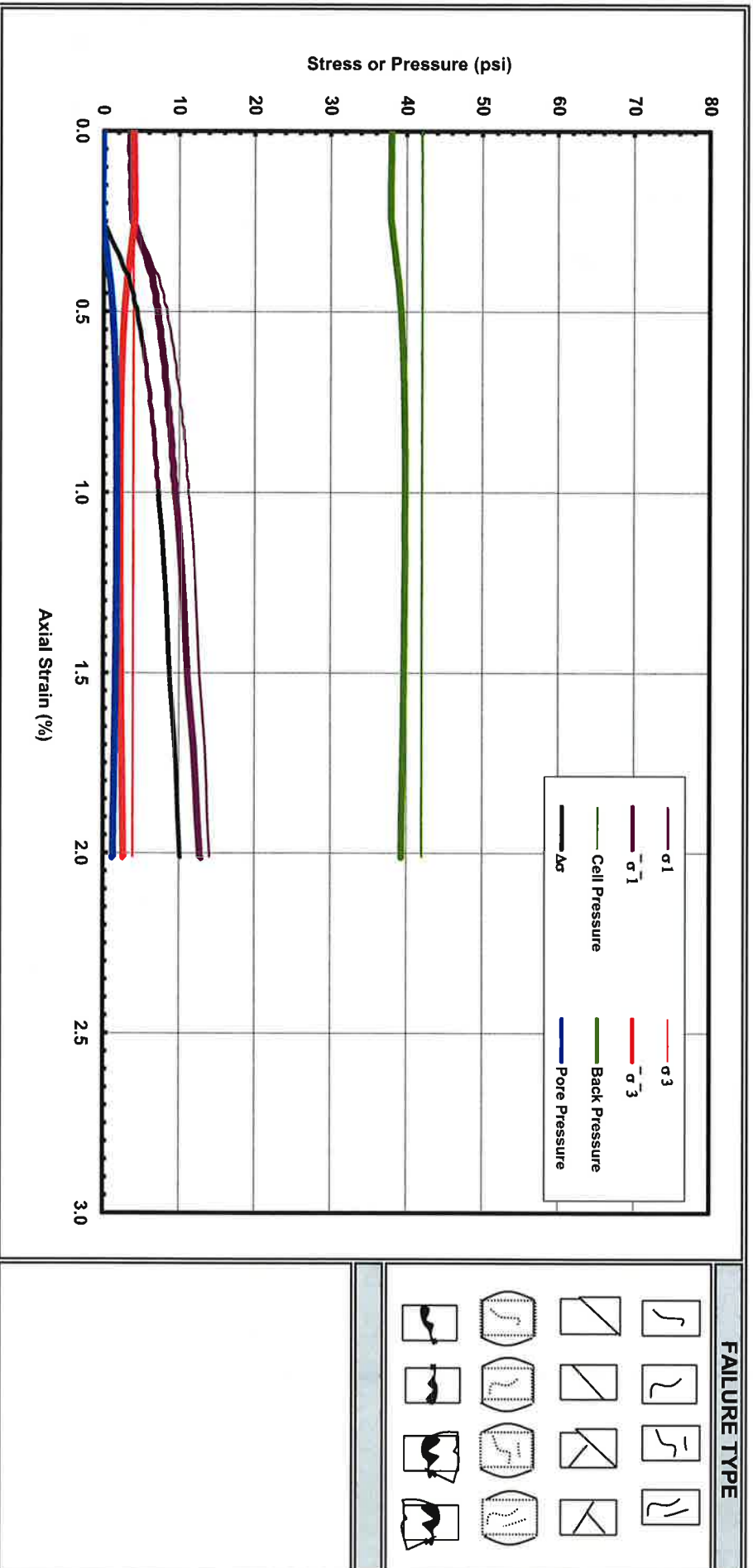
**Sample No./ID:** 1

**Specimen/Stage:** Stage 1

**Effective Confining Pressure, psi:** 4.0

**Failure Type:** Bulge-Fractures

**Remarks:**



# Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

**Project Name:** East Aldine Town Center

**Classification:** Brown and Gray, Sandy Lean Clay

**Project Number:** 286-1224

**Boring Number:** B-5

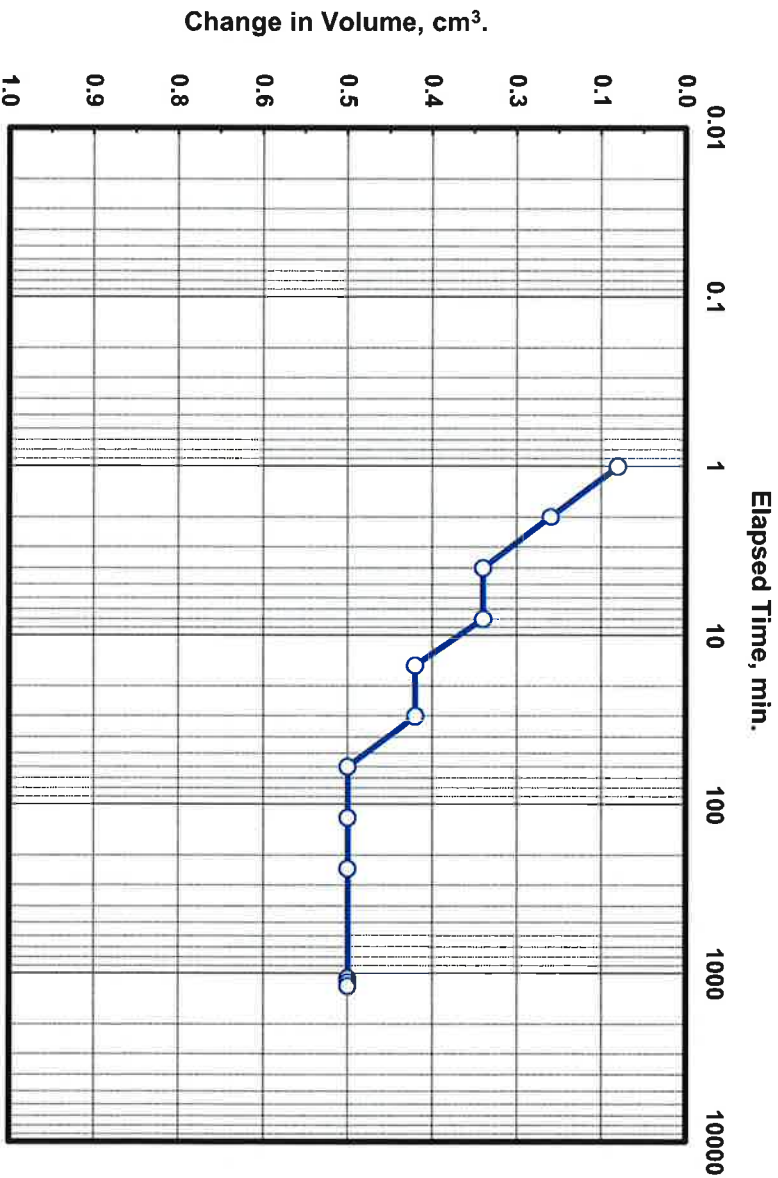
**Depth, feet:** 10

**Specimen/Stage:** Stage 1

**Effective Confining Pressure, psi:** 4.0

**Remarks:**

Date	Clock Time	Elapsed Time, min.	Burette Readings	Volume cm <sup>3</sup>
4/9/2015	1:10:00 PM	0.0	24.5	0.0
4/9/2015	1:11:00 PM	1.0	24.4	0.1
4/9/2015	1:12:00 PM	2.0	24.3	0.2
4/9/2015	1:14:00 PM	4.0	24.2	0.3
4/9/2015	1:18:00 PM	8.0	24.2	0.3
4/9/2015	1:25:00 PM	15.0	24.1	0.4
4/9/2015	1:40:00 PM	30.0	24.1	0.4
4/9/2015	2:10:00 PM	60.0	24.0	0.5
4/9/2015	3:10:00 PM	120.0	24.0	0.5
4/9/2015	5:10:00 PM	240.0	24.0	0.5
4/10/2015	7:00:00 AM	1070.0	24.0	0.5
4/10/2015	8:00:00 AM	1130.0	24.0	0.5
4/10/2015	9:00:00 AM	1190.0	24.0	0.5



# Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

**Project Name:** East Aldine Town Center

**Classification:** Brown and Gray, Sandy Lean Clay

**Project Number:** 286-1224

**Boring Number:** B-5

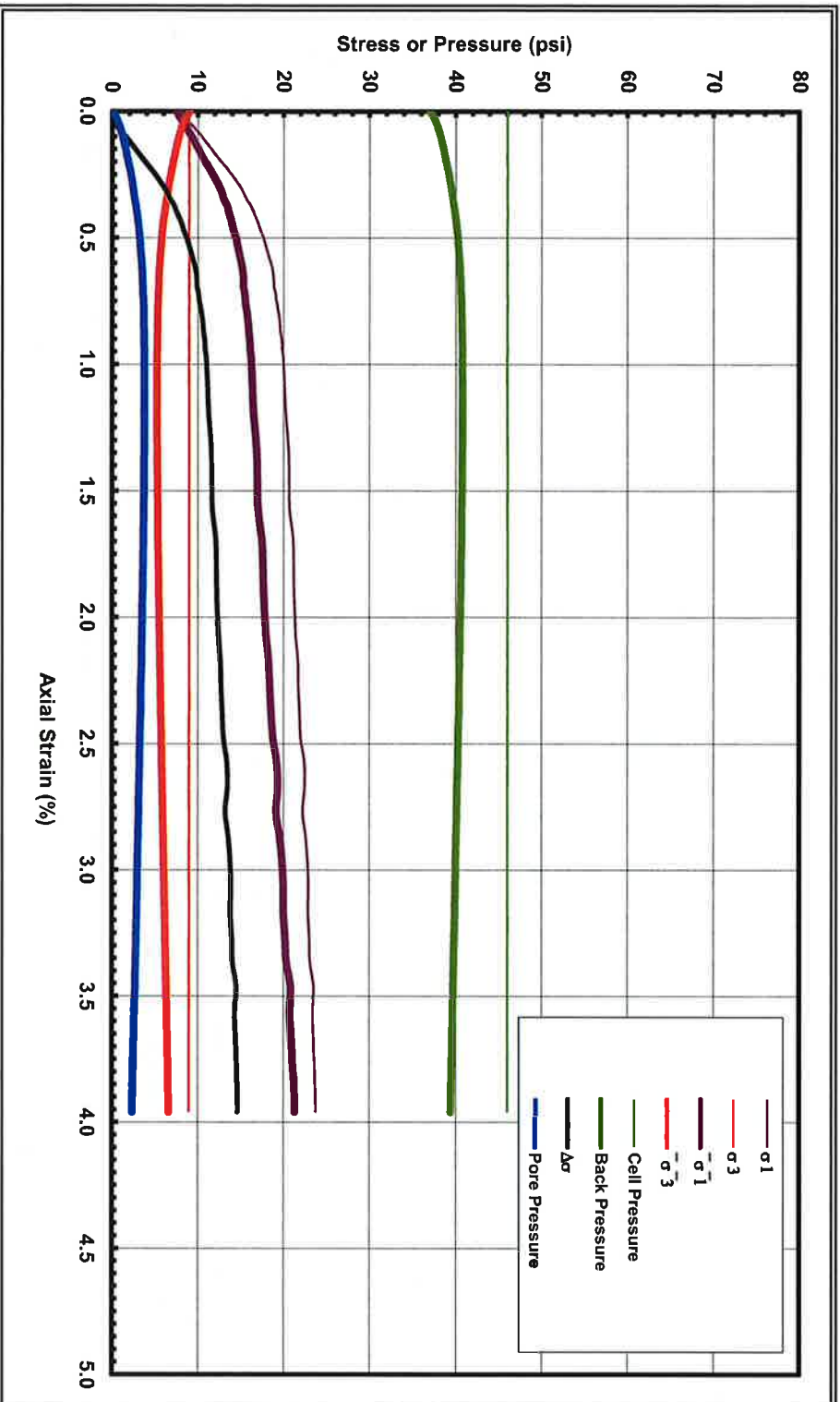
**Depth, feet:** 10

**Specimen/Stage:** Stage 2

**Effective Confining Pressure, psi:** 9.0

**Failure Type:** Bulge-Fractures

**Remarks:**



**FAILURE TYPE**

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<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



## Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

**Project Name:** East Aldine Town Center

**Classification:** Brown and Gray, Sandy Lean Clay

**Project Number:** 286-1224

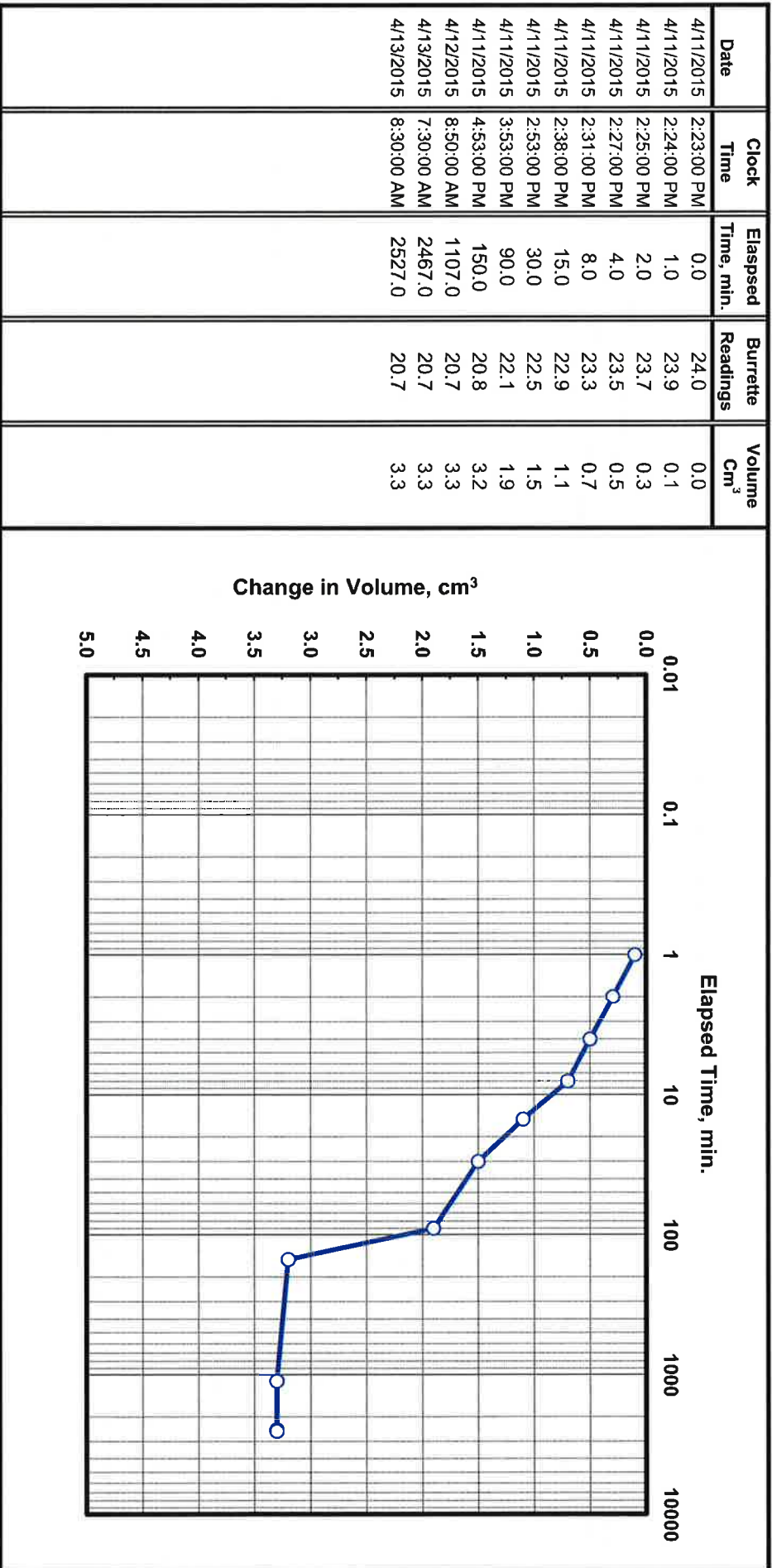
**Boring Number:** B-5

**Depth, feet:** 10

**Specimen/Stage:** Stage 2

**Effective Confining Pressure, psi:** 9.0

**Remarks:**



# Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

**Project Name:** East Aldine Town Center

**Classification:** Brown and Gray, Sandy Lean Clay

**Project Number:** 286-1224

**Boring Number:** B-5

**Depth, feet:** 10

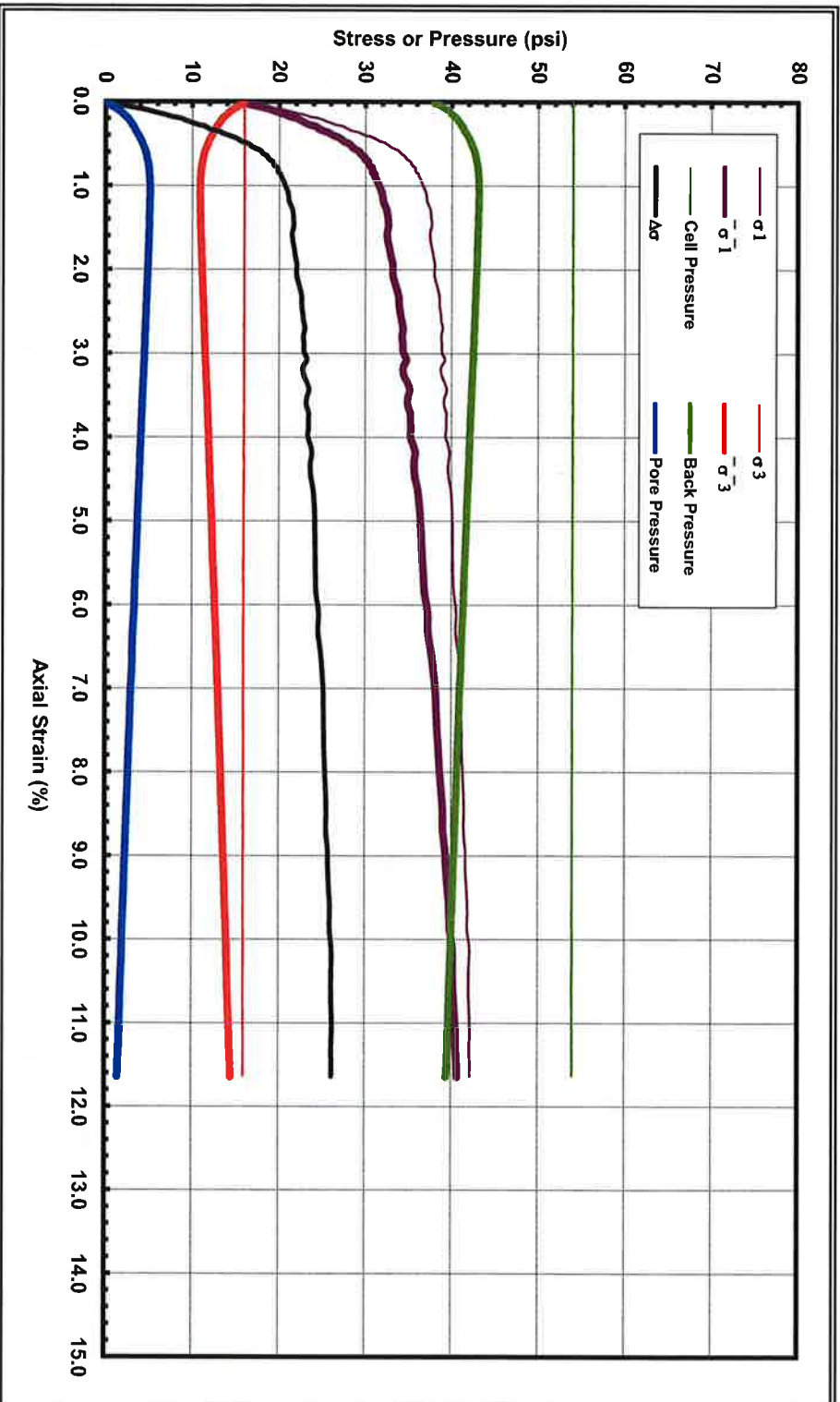
**Sample No./ID:** 3

**Specimen/Stage:** Stage 3

**Effective Confining Pressure, psi:** 16.0

**Failure Type:** Bulge

**Remarks:**



**FAILURE TYPE**

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## Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

**Project Name:** East Aldine Town Center

**Classification:** Brown and Gray, Sandy Lean Clay

**Project Number:** 286-1224

**Boring Number:** B-5

**Depth, feet:** 10

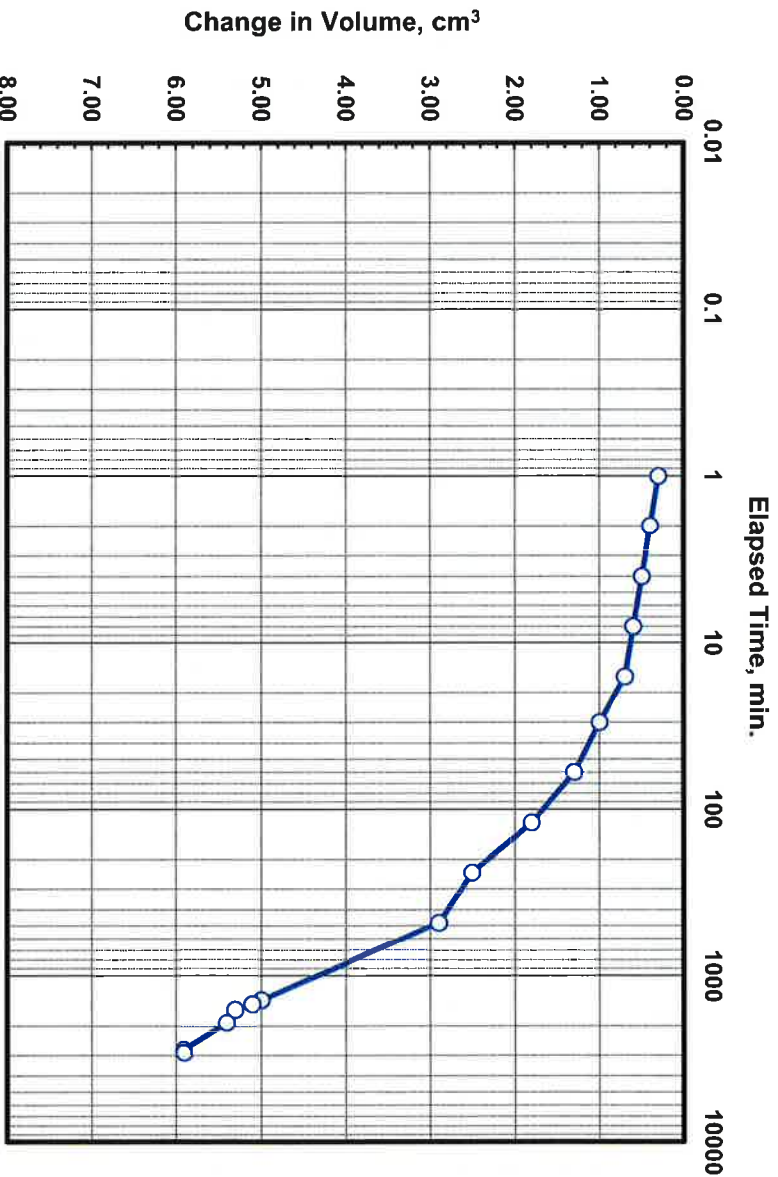
**Sample No./ID:** 3

**Specimen/Stage:** Stage 3

**Effective Confining Pressure, psi:** 16.0

**Remarks:**

Date	Clock Time	Elapsed Time, min.	Burette Readings	Volume cm <sup>3</sup>
4/14/2015	9:14:00 AM	0.0	24.0	0.0
4/14/2015	9:15:00 AM	1.0	23.7	0.3
4/14/2015	9:16:00 AM	2.0	23.6	0.4
4/14/2015	9:18:00 AM	4.0	23.5	0.5
4/14/2015	9:22:00 AM	8.0	23.4	0.6
4/14/2015	9:30:00 AM	16.0	23.3	0.7
4/14/2015	9:44:00 AM	30.0	23.0	1.0
4/14/2015	10:14:00 AM	60.0	22.7	1.3
4/14/2015	11:14:00 AM	120.0	22.2	1.8
4/14/2015	1:14:00 PM	240.0	21.5	2.5
4/14/2015	5:14:00 PM	480.0	21.1	2.9
4/15/2015	8:30:00 AM	1396.0	19.0	5.0
4/15/2015	9:50:00 AM	1476.0	18.9	5.1
4/15/2015	11:45:00 AM	1591.0	18.7	5.3
4/15/2015	4:55:00 PM	1901.0	18.6	5.4
4/16/2015	7:20:00 AM	2766.0	18.1	5.9
4/16/2015	9:20:00 AM	2886.0	18.1	5.9

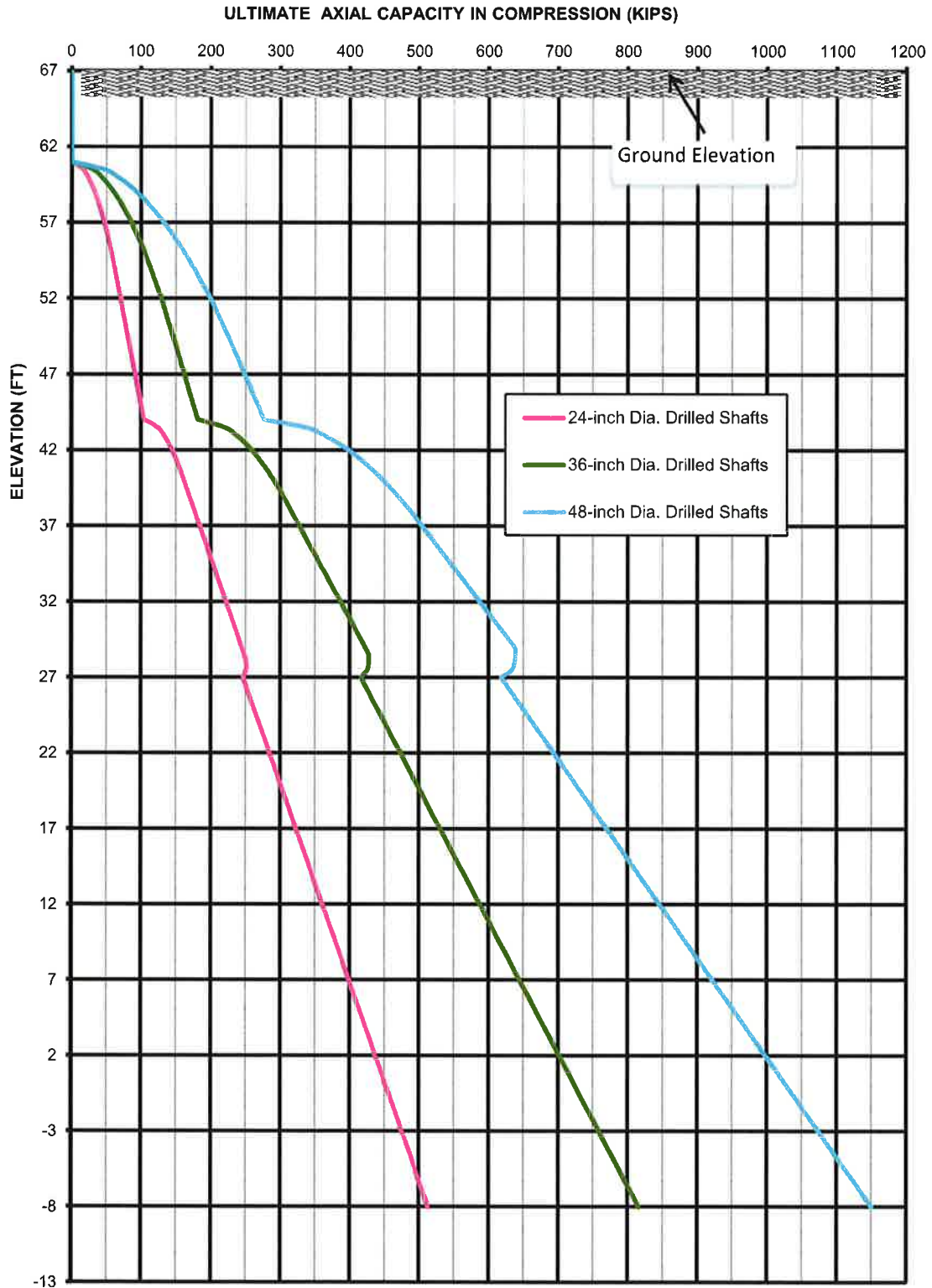




## APPENDIX D



**DRILLED SHAFTS CAPACITY CURVES FOR NORTH BRIDGE**  
**ULTIMATE AXIAL CAPACITY IN COMPRESSION**

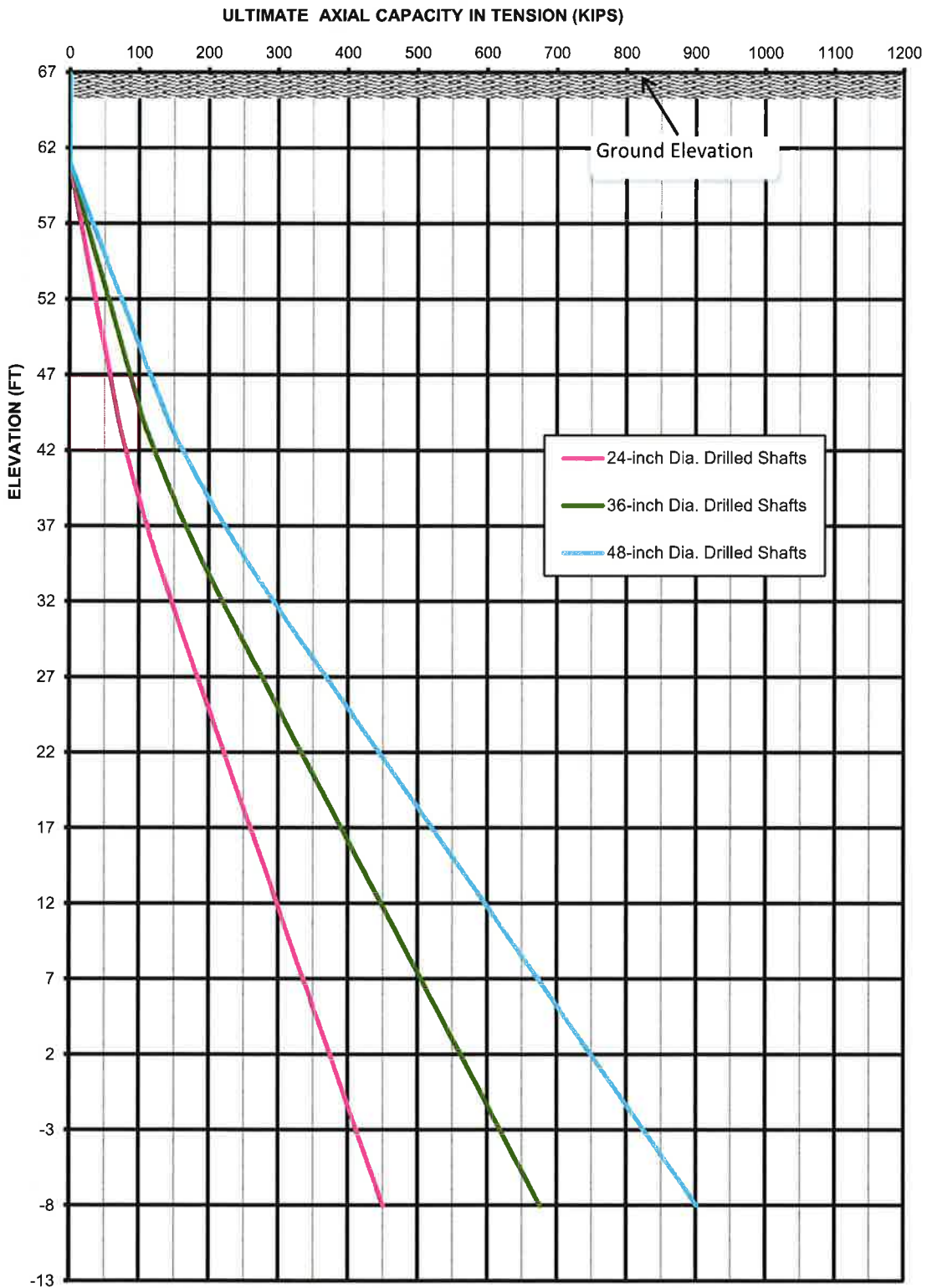


**NOTES:** 1. A factor of safety of at least 2.0 is recommended in arriving at the allowable loads.

**EAST ALDINE TOWN CENTER, HOUSTON, TEXAS**  
**PSI REPORT NO. 286-1224**



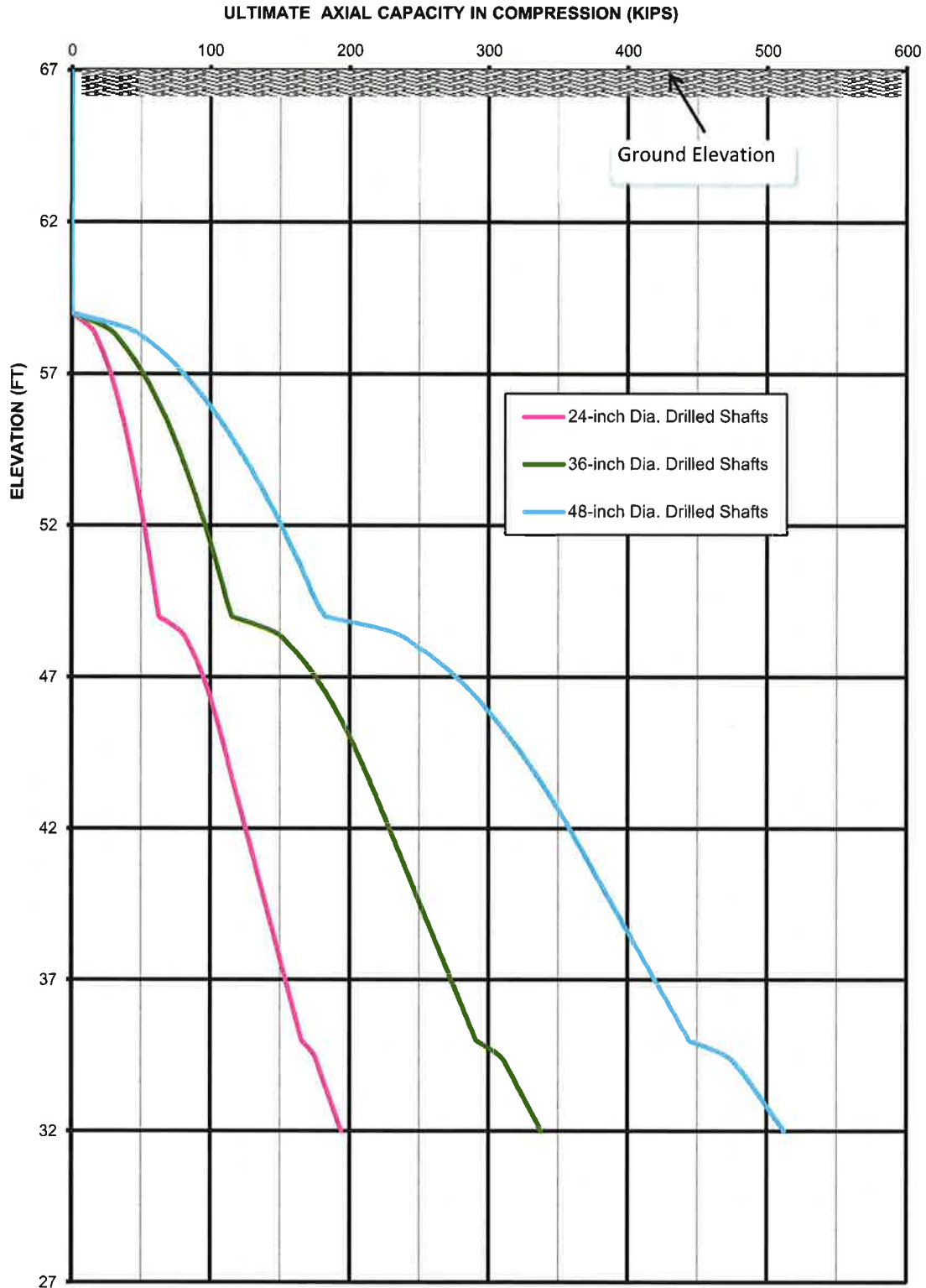
**DRILLED SHAFTS CAPACITY CURVES FOR NORTH BRIDGE**  
**ULTIMATE AXIAL CAPACITY IN TENSION**



**NOTES:** 1. A factor of safety of at least 2.0 is recommended in arriving at the allowable loads.  
 2. Adequate reinforcement should be provided in the shaft for tension loads.

**EAST ALDINE TOWN CENTER, HOUSTON, TEXAS**  
**PSI REPORT NO. 286-1224**

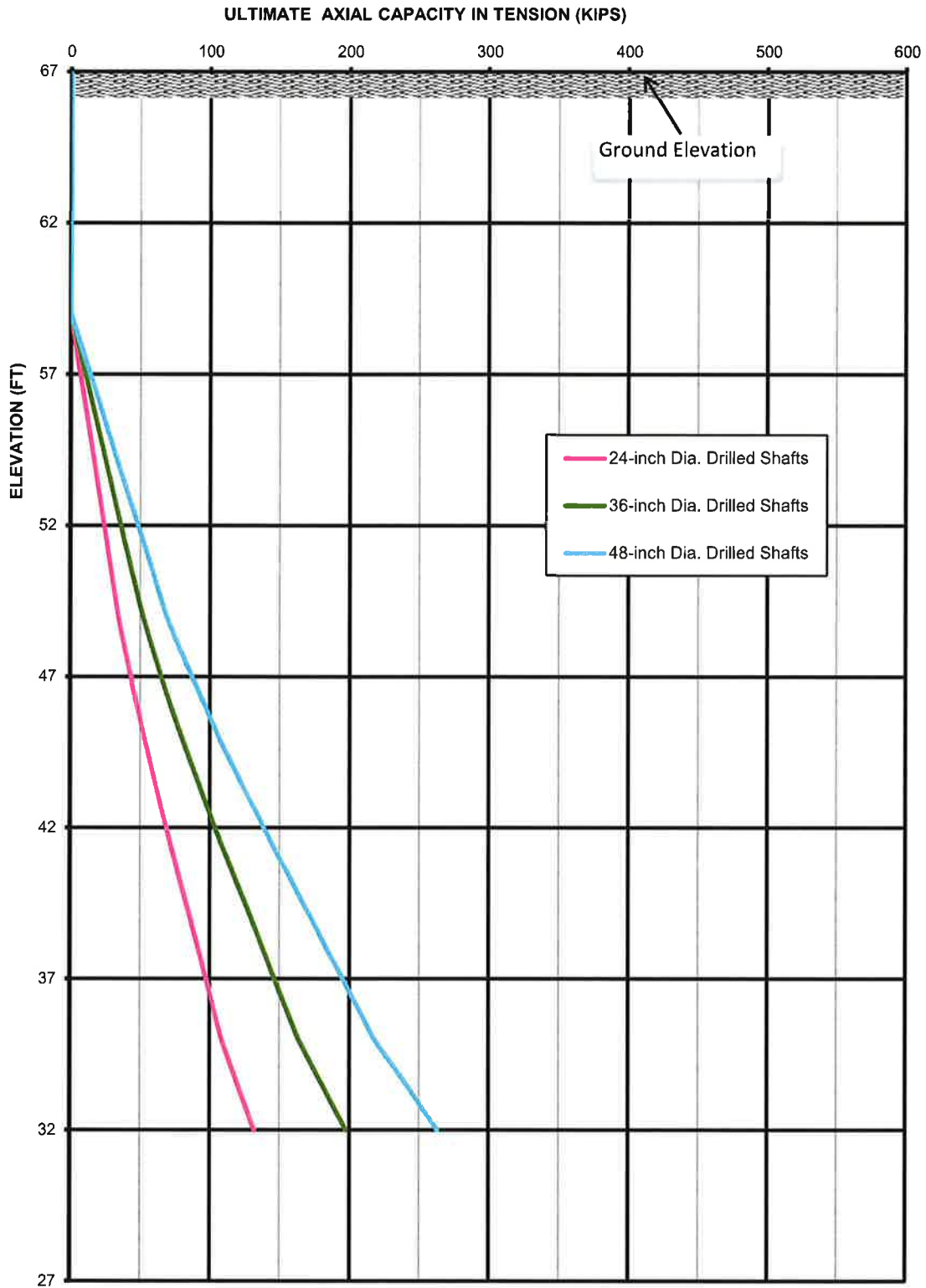
**DRILLED SHAFTS CAPACITY CURVES FOR SOUTH BRIDGE**  
**ULTIMATE AXIAL CAPACITY IN COMPRESSION**



**NOTES:** 1. A factor of safety of at least 2.0 is recommended in arriving at the allowable loads.

**EAST ALDINE TOWN CENTER, HOUSTON, TEXAS**  
**PSI REPORT NO. 286-1224**

**DRILLED SHAFTS CAPACITY CURVES FOR SOUTH BRIDGE**  
**ULTIMATE AXIAL CAPACITY IN TENSION**



**NOTES:** 1. A factor of safety of at least 2.0 is recommended in arriving at the allowable loads.  
2. Adequate reinforcement should be provided in the shaft for tension loads.

**EAST ALDINE TOWN CENTER, HOUSTON, TEXAS**  
**PSI REPORT NO. 286-1224**



9900 Northwest Freeway  
Houston, Texas 77092  
713-684-4000  
www.hcfcd.org

December 27, 2016

Ms. Megan Houtchens, P.E.  
PGAL, Inc  
3131 Briarpark  
Houston, TX 77042  
MHoutchens@pgal.com

SENT VIA ELECTRONIC MAIL: NO HARD COPY TO FOLLOW

RE: Project No. 1609210100  
Geotechnical Report Review  
Proposed HCFCD Ditch P118-37-00 Improvements  
HCFCD Unit P118-37-00; Key Map 414-J; Pct. 2

Dear Ms. Houtchens:

The Flood Control District has reviewed the referenced geotechnical report. Details of our understanding of the design are stated on the attached review memo.

The report includes statements that the design is in compliance with the geotechnical criteria in Flood Control District's Policy, Criteria and Procedure Manual. The documentation within the report generally supports the conclusions stated by the engineer. Based on the stated conclusions, HCFCD interposes no objection to the referenced report. Please note, this acceptance does not necessarily mean that the entire report, including all supporting data and calculations, has been completely checked and verified. However, the report is signed, dated, and sealed by a Professional Engineer licensed to practice in the State of Texas, which therefore conveys the licensed engineer's responsibility and accountability.

Thank you for coordinating this project with the Flood Control District. If you have any questions or need any additional information, please contact me at [david.saha@hcfcd.org](mailto:david.saha@hcfcd.org).

Sincerely,

A handwritten signature in cursive script that reads "David B Saha".

David B. Saha, P.E.  
Watershed Coordinator

DBS:ag

Attachment: Geotechnical Report Review Memo dated December 21, 2016

cc: Dennis Miller, P.E., HCFCD

December 21, 2016

Dennis Miller, P.E.  
Watershed Management Department  
Harris County Flood Control District  
Houston, Texas 77092



9900 Northwest Freeway  
Houston, TX 77092  
713-684-4000

**RE: E-Permits Application –Id: 1609210100**  
Improvements of HCFCD Ditch No.: P118-37-00  
Near East Aldine Town Center  
Geotechnical Acceptance Letter  
HCFCD Unit No.: P1118-37-00.  
Precincts: 1 & 2, Key Map No.: 414 J

---

Flood Control District has reviewed the submitted PSI Geotechnical report dated December 14, 2016 for the proposed improvements of HCFCD Ditch P118-37-00 near East Aldine Town Center, pursuant to the HCFCD Policy, Criteria, and Procedure Manual. This letter addresses issues with the geotechnical report regarding geotechnical design criteria applicable to Flood Control Facilities, responses and conclusions.

Details of the applicant, the project background and the Geotechnical report are as noted below;

E-Permits Applicant: Megan Houtchens  
PGAL  
3131 Briar Park, Houston, Texas 77042  
(512) 634 5103, mhoutchens@pgal.com

Geotechnical Engineer: Ather Mohiuddin, P.E. (TX PE License No.: 100330)  
Professional Service Industries, Inc., Houston, Texas

Geotechnical Report No.: PSI Report No. 286-1224-2, dated December 14, 2016

**Project Information:**

HCFCD Ditch P118-37-00 is located within the southwestern quadrant of the East Aldine Town Center site, which is located on the south side of Aldine Mail Route Road at its intersection with Deergrove Street in Houston, Texas. The existing HCFCD ditch is currently grass lined with a depth of approximately 5 feet and side slopes of 4(H):1(V). The proposed HCFCD Ditch improvements include widening (approximately 40 feet) and deepening the ditch to approximately 7 feet with 4(H):1(V) side slopes.

A total of two (2) borings were drilled and sampled for this project each to depth of 20 feet. Laboratory testing is carried out for classification testing and developing the design shear parameters for the study, in addition to evaluating the dispersion potential of slope soils.

**E-Permits Application ID: 1609210100**  
**P118-37-00 Improvements at East Aldine Town Center**  
**Geotechnical Review Acceptance**  
**December 21, 2016**

Page 2 of 2

Engineering analyses were carried out to evaluate the 4(H):1(V) side slope for HCFCD ditch improvement (widen and deepen).

**Technical Evaluation:**

The subject Geotechnical report has been revised and resubmitted based on HCFCD comments provided previously in a memo dated October 18, 2016 and further discussions through telephone and email communications (December 07 thru December 14, 2016) with the e-Permits applicant, HCFCD Project Manager and the District. Based on the technical review of the PSI revised Geotechnical report dated 12-14-2016, HCFCD concludes that all the previously provided comments by HCFCD are satisfactorily addressed.

**Conclusion:**

Consequent to findings of HCFCD technical review of the revised Geotechnical report and PGAL responses, it is concluded that the PSI Geotechnical report dated 12-14-2016 may be accepted as adequate for facilities to be maintained by the District. If you have any questions regarding the technical evaluation, please contact Kris Goparaju, P.E. by phone at 713-684-4000 or by email at [Krishna.goparaju@hcfcd.org](mailto:Krishna.goparaju@hcfcd.org).



B. Krishna "Kris" Goparaju, Ph.D., P.E.  
Geotechnical Program Manager  
Engineering Support Services

December 14, 2016

**PGAL**

3131 Briarpark Drive, Suite 200  
Houston, TX 77042

Attn: Mr. Costas Georghiou, P.E.  
Principal  
Ph: 713-622-1444  
Fax: 713-968-9333  
Email: [CGeorghiou@pgal.com](mailto:CGeorghiou@pgal.com)

**Re: Geotechnical Engineering Services Report**  
Proposed HCFCD Ditch P118-37-00 Improvements  
East Aldine Town Center  
Aldine Mail Route Road at Deergrove Street  
Houston, Texas  
**PSI Report No. 286-1224-2**

Dear Mr. Georghiou,

Professional Service Industries, Inc. is pleased to submit the Geotechnical Engineering Services Report for the referenced project. This report includes the results of our field and laboratory testing and geotechnical recommendations for the proposed HCFCD Drainage Ditch P118-37-00 Improvement planned at East Aldine Town Center in Houston, Texas.

We appreciate the opportunity to perform the geotechnical services and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.



Ather Mohiuddin, P.E.  
Department Manager



**GEOTECHNICAL ENGINEERING SERVICES REPORT**

**PROPOSED HCFCD DITCH P118-37-00 IMPROVEMENTS  
EAST ALDINE TOWN CENTER**

ALDINE MAIL ROUTE ROAD AT DEERGROVE STREET  
HOUSTON, TEXAS

**PSI REPORT NO. 286-1224-2**

PREPARED FOR

**PGAL**

3131 BRIARPARK DRIVE, SUITE 200  
HOUSTON, TEXAS 77042

ATTENTION: MR. COSTAS GEORGHIOU, P.E.

DECEMBER 14, 2016

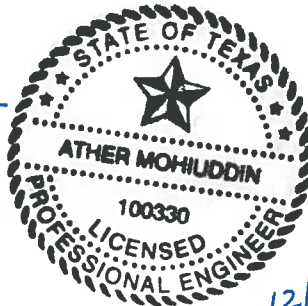
BY

**PROFESSIONAL SERVICE INDUSTRIES, INC.**

3730 DACOMA STREET, HOUSTON, TEXAS 77092 PHONE: (713) 224-2047. FAX: (713) 682-2665



Ather Mohiuddin, P.E.  
Department Manager



*for*   
Alejandro Pino Bravo, Ph.D., P.E.  
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Chief Engineer

12/14/2016



Professional Service Industries, Inc,  
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# TABLE OF CONTENTS

	Page No.
<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>PROJECT INFORMATION.....</b>	<b>2</b>
PROJECT AUTHORIZATION.....	2
PROJECT DESCRIPTION.....	2
PURPOSE AND SCOPE OF SERVICES .....	2
<b>SITE AND SUBSURFACE CONDITIONS.....</b>	<b>3</b>
SITE LOCATION AND DESCRIPTION.....	3
FIELD AND LABORATORY PROCEDURE .....	4
SUBSURFACE CONDITIONS .....	4
GROUNDWATER INFORMATION.....	5
<b>EVALUATION AND RECOMMENDATIONS .....</b>	<b>5</b>
SLOPE STABILITY ANALYSES .....	5
DISPERSION TESTS.....	8
SLOPE GRADING.....	8
SLOPE PROTECTION AND EROSION CONTROL .....	8
GROUNDWATER CONTROL .....	9
<b>CONSTRUCTION CONSIDERATIONS .....</b>	<b>9</b>
MOISTURE SENSITIVE SOILS/WEATHER RELATED CONCERNS.....	9
DRAINAGE AND GROUNDWATER CONCERNS.....	10
EXCAVATIONS.....	10
<b>REPORT LIMITATIONS .....</b>	<b>11</b>
<b>APPENDIX A</b>	
SITE LOCATION PLAN .....	PLATE 1A
BORING LOCATION PLAN .....	PLATE 1B
LOGS OF BORINGS .....	PLATES 2 AND 3
KEY TO TERMS AND SYMBOLS USED ON THE LOGS .....	PLATE 4
<b>APPENDIX B</b>	
CLIENT PROVIDED DRAWING SHOWING DRAINAGE DITCH .....	PLATE B-1
SLOPE STABILITY ANALYSIS RESULTS .....	PLATES B-2 THROUGH B-7
SOIL PARAMETERS - HAND CALCULATIONS .....	B-8
SLOPE STABILITY OUT PUT	
<b>APPENDIX C</b>	
CONSOLIDATED UNDRAINED TRIAXIAL TEST RESULTS	
DOUBLE HYDROMETER TEST RESULTS	



## **EXECUTIVE SUMMARY**

PSI understands that plans are to improve/modify approximately 450 linear feet of drainage ditch P118-37-00 at the East Aldine Town Center to be located on the south side of Aldine Mail Route Road at its intersection with Deergrove Street in Houston, Harris County, Texas. Two soil borings, designated B-01 and B-02, were drilled to depths of about 20 feet below the existing ground surface along the drainage ditch.

Based on the information obtained from our subsurface exploration, the drainage ditch can be improved as planned. The following geotechnical considerations were identified.

- Groundwater was initially encountered in PSI test borings B-01 and B-02 at depths of about 16 feet and 12 feet, below the existing grade during drilling operations, respectively. After 24 hours, water was observed at borings B-01 and B-02 at depths of approximately 15 feet and 10 feet, respectively.
- Subsurface soils generally consisted of stiff to very stiff Sandy Lean Clay (CL) soils to depths of about 12 to 13 feet, underlain by medium dense Clayey Sand (SC) and Silty Sand (SM) to boring termination depths of about 20 feet.
- The slope stability analyses results indicate that the proposed drainage ditch slope configuration of 4 horizontal to 1 vertical (4H:1V) are stable under short-term, long-term and rapid drawdown conditions.
- This report also includes recommendations on groundwater control and slope erosion protection.

This executive summary provides only brief descriptions and recommendations and should not be entirely relied upon to provide all necessary information for the design and construction of the proposed ditch improvements. Details about drainage ditch sections are discussed in “**EVALUATION AND RECOMMENDATIONS**” section of this report. The complete report should be referenced for recommendations and other design considerations. The section titled “**REPORT LIMITATIONS**” should be read for an understanding of the report limitations.

## **PROJECT INFORMATION**

### **Project Authorization**

Professional Service Industries, Inc. (PSI) has completed the geotechnical exploration for the proposed 450 linear feet of drainage ditch P118-37-00 improvement planned at the East Aldine Town Center to be located on the south side of Aldine Mail Route Road at its intersection with Deergrove Street in Houston, Harris County, Texas (Harris County Key Map 414 J). Plate 1A located in Appendix A shows the approximate location of the proposed ditch improvement. This subsurface exploration was conducted in general accordance with PSI Proposal No. 286-135485-1, dated May 13, 2016. Authorization to perform this subsurface exploration was in the form of signed acceptance of the aforementioned proposal and change by Mr. Costas Georghiou, P.E. with PGAL on May 18, 2016.

### **Project Description**

Based on the information provided by PGAL, the scope of services for this this project includes a subsurface exploration study for the proposed improvements along an approximately 450 feet of existing HCFCD ditch P118-37-00, which is located near the southwestern quadrant of the site. The location of the proposed ditch improvements along with the borings performed for this project site are shown in Plate 1B located in Appendix A of this report.

Based on the information provided by the client, PSI understands that the client is planning to widen (approximately 40 feet) and deepen (approximately 7 feet) the existing HCFCD ditch, which is located near the southwestern quadrant of the site. Based on the available cross-section presented in Appendix B, Plate B-1, PSI understands that the side slopes of the proposed channel improvements are planned to be 4H:1V. Additionally, PSI understands that the proposed design and analysis will be performed per Harris County Flood Control District (HCFCD) guidelines.

The recommendations provided in this geotechnical exploration report are based on the project information available to us and the subsurface conditions described in this report. If any of the noted information is incorrect, please inform PSI in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. PSI will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

### **Purpose and Scope of Services**

The purpose of this geotechnical engineering study is to explore the subsurface conditions at the project site to enable an engineering evaluation of the subsurface conditions and provide recommendations for the proposed construction. The proposed geotechnical exploration for this project involved the collection of subsurface data, laboratory testing, and geotechnical analyses. Our scope of services included drilling two soil borings to depths of about 20 feet below the existing grade (tope of the high banks of the ditch), laboratory testing and preparation of this geotechnical report.

This report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and presents recommendations regarding the following:

- Description of subsurface conditions and groundwater information as observed at the boring locations during drilling;
- Boring logs, laboratory test results;
- Slope stability analysis for the proposed drainage ditch;
- Erosion potential considerations; and
- Comments regarding factors that will impact construction and/or performance of the proposed construction.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, surface water, groundwater, or air on or below, or around this site. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

Furthermore, PSI was not requested to provide any service to investigate or detect the presence of moisture, mold or other biological contaminants in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. Mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. As such, PSI cannot be held responsible for the occurrence or recurrence of mold amplification.

## **SITE AND SUBSURFACE CONDITIONS**

### **Site Location and Description**

The existing HCFCD ditch is located near the southwestern quadrant of the site, which is located on the south side of Aldine Mail Route Road at its intersection with Deergrove Street in Houston, Texas. The existing HCFCD ditch is currently grass lined with a depth of approximately 5 feet with side slopes of 4H:1V.

### **Area Geology**

According to the Geologic Atlas of Texas Houston Sheet (revised 1982), the subject area is located with the Pleistocene age of the Lissie formation.

Lissie formation consists of clay, silt, sand and very minor siliceous gravel of granule and small pebble size within the upper part of Houston, with more abundant gravel within the northwestward of central Houston. Calcareous, concretions of calcium carbonate, iron oxide, and iron manganese oxides are common in zones of weathering. Surface is fairly flat and featureless except for numerous rounded shallow depressions and pimple mounds.

The lower part of the formation consists of clay, silt, sand, and minor amount of gravel, with the gravel slightly coarser than in the upper part, non-calcareous, iron oxide concretions more abundant than in upper part. Surface slopes very gently rolling and the thickness approximately 200 feet.

A geologic fault study to evaluate the possibility of surface faulting at this site was beyond the scope of this investigation. Should you desire a detailed fault study, please contact us.

### **Field and Laboratory Procedure**

The subsurface conditions were explored by drilling two soil borings to depths of 20 feet below the existing grade (top of high banks of the existing drainage ditch). Plate 1B located in Appendix A shows the approximate boring locations.

Based on the information provided by the client, the borings were located in the field by PSI's field crews using a hand held GPS. Borings B-01 and B-02 were drilled with ATV-mounted drilling equipment utilizing dry drilling methods. Continuous samples were obtained to a depth of about 20 feet below the existing ground surface. After the completion of the drilling, the boreholes were backfilled with onsite soil cuttings.

Soil samples were routinely obtained during the drilling process. The boring logs showing the subsurface soil conditions which were encountered from the existing grade below the top of high banks of the existing ditch. Drilling and sampling techniques were accomplished generally in accordance with ASTM procedures (ASTM D 1586 and D 1587).

The soil samples obtained during the field exploration were transported to PSI's laboratory and selected soil samples were tested to determine material properties for engineering evaluation. Laboratory testing was accomplished in general accordance with ASTM procedures. Laboratory testing on selected samples included moisture content (ASTM D 2216), unit weight determinations, Atterberg limits (ASTM D 4318), percent passing U.S. Standard No. 200 Sieve (ASTM D 1140), unconfined compression (ASTM D 2166), consolidated undrained triaxial with pore pressure measurements (ASTM D 4767) and double hydrometer tests. The samples which were not altered by laboratory testing will be retained for 60 days from the date of this report and then will be discarded without further notice.

### **Subsurface Conditions**

The soil samples obtained from the drilling operation were classified in general accordance with ASTM D 2487 or D 2488. Laboratory test data along with detailed descriptions of the soils can be found on the logs of the borings, which are presented on Plates 2 and 3 in the Appendix A. A key to terms and symbols used on the logs is presented on Plate 4 in Appendix A. The Consolidated Undrained Triaxial test and double hydrometer tests results are shown in Appendix C of this report.

Based on the borings performed, the generalized subsurface soil conditions identified along the drainage ditch areas are described below separately.

**Table 1: Generalized Soil Profile (Borings B-01 and B-02)**

<b>Depth Range (feet)</b>	<b>Description</b>
0 to 2	Fill: Sandy Lean Clay
0 to 14	Sandy Lean Clay (CL); medium stiff to very stiff
12 to 20	Silty Sand (SM) and Clayey Sand (SC): medium dense

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in Appendix A should be reviewed for specific information at individual boring locations. These records include soil descriptions, stratification, locations of the samples, and laboratory test data. The stratification shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected across the site. The stratification represents the approximate boundary between subsurface materials and the actual transition may be gradual and indistinct.

### **Groundwater Information**

The groundwater level was measured during drilling operations. The groundwater was initially observed at borings B-01 and B-02 at depths of about 16 feet and 10 feet, respectively. After an observation period of 24 hours, water was observed at borings B-01 and B-02 at depths of about 15 feet and 12 feet, respectively. It should be realized that this groundwater level was recorded immediately after initial encounter and only after 24 hours, and do not represent stabilized ground water reading.

It is possible that seasonal variations (tide, temperature, rainfall, etc.) as well as the water level in the nearby waterbody will cause fluctuations in the groundwater level. Additionally, perched water may be encountered in discontinuous zones within the overburden. The groundwater levels presented in this report are the levels that were measured at the time of our field activities. It is recommended that the contractor determine the actual groundwater levels at the site at the time of the construction activities to determine the impact, if any, on the construction procedures.

## **EVALUATION AND RECOMMENDATIONS**

### **Slope Stability Analyses**

Based on the information provided by the client, PSI understands that the client is planning to widen (approximately 40 feet) and deepen (approximately 7 feet) the existing HCFCD ditch, which is located within the southwestern quadrant of the site. Based on the available cross-section of the proposed channel improvements, PSI understands that the side slopes are planned to be 4H:1V. Therefore, the depth of the proposed drainage ditch is anticipated to be a maximum of 8 feet.

The slope stability was analyzed for the representative cross section of the proposed drainage ditch modification. Generally, slope failure occurs when the weight of the sliding soil exceeds the resistance derived from the shear strength or frictional resistance of the soil along the sliding surface. Slope stability analysis by limit equilibrium methodology involves the determination of the



most likely sliding surface by comparing the developed shearing resistance along a sliding surface with the weight forces associated with the sliding soil. The method of comparison involves the determination of the factor of safety i.e., a ratio of shear resistance along a sliding surface to the weight of the sliding soil. The check for stability involves determination of various values factor of safety along various trial sliding surfaces until a minimum value of factor of safety is reached, for the critical sliding surface. For the slope stability analysis, the sliding surfaces are typically assumed to be circular.

For the present study, the computer program SLIDE was used to implement the methodology described above for the cross section developed for analysis. Three (3) analysis conditions were considered:

Short term or Undrained Condition: This condition occurs when the pore pressures within the soil mass have not dissipated. Typically, this condition corresponds to the state of the soils that exist immediately after performing any cut/fill or during the construction. For this condition, the slope stability analysis is performed using undrained soil parameters.

Long term or Drained Condition: This condition occurs when the pore pressures within the soil mass have dissipated. Typically, this condition corresponds to the state of the soils a few months or years after the construction is complete. For this condition, slopes are analyzed using drained or effective stress parameters obtained from consolidated-undrained tests with pore pressure measurements. Correlations with Atterberg limits were also utilized to obtain drained or effective stress parameters.

Rapid Drawdown Condition: This condition occurs when the water level rises during a flood saturating the land side, and then drains rapidly as the flood waters recede. The state of stresses within the soils after a flood event depends largely on the permeability and drainage characteristics of the slope as well as the state of the soils prior to drawdown (i.e., flood event). For clay or low permeability soil, stability at the end of rapid drawdown can typically be analyzed in two basically different ways: 1) effective stress analyses using effective strength or drained soil parameters, and 2) using total stress methods, in which undrained shear strengths corresponding to the consolidation condition preceding the drawdown. The disadvantage of the first method is that it is difficult to estimate the pore water pressures that will exist in low-permeability soils during drawdown, i.e., the pore pressure changes during drawdown depend on the changes in the stress that result from the changing water loads and the undrained response of the soils to these changes in the load. For the total stress methods, it is difficult to estimate the undrained strength that exists preceding the drawdown and the undrained strengths are based on the effective stresses that exist in the slope prior to drawdown. Some zones within the soil slope may consolidate following construction and their undrained strength will increase. Portions of the same soils at lower stresses (near the surface of the slope) may expand and their undrained strength may decrease. For free-draining soils, both methods treat the free-draining materials the same and their strength is expressed in terms of effective stress. Several other methods have been suggested and are also typically used for drawdown analyses. They include Lowe and Karafiath (1959), Army Corps of Engineers (1970), and three-stage analyses proposed by Duncan et.al (1990). Each of the above methods has inherent uncertainty associated with it. Hence, in practice, the choice of analyses and corresponding results obtained are related to experience associated with the performance of the slope in relation to the chosen analyses method.



For the present study, the analysis was performed using effective stress parameters and a water condition where the slopes are fully saturated (phreatic surface along the face of the slope) and the phreatic surface that developed within the slope during the flood condition.

The soil strength parameters selected for the slope stability calculations are based on: 1) the results of field and laboratory test data, 2) engineering judgment based on experience with similar soils and 3) published correlations. The soil strength parameters used in the stability analysis for various soil layers are presented in Table 2 and backup calculations are presented in Appendix B.

**Table 2: Soil Parameters for Slope Stability Analysis**

Soil Description	Depth (feet)	Design PI	Design SPT N Value	Unit Weight (pcf)	End-of-Construction		Long-Term/Rapid Drawdown	
					c (psf)	$\phi$ (deg)	Effective Stress	
							c' (psf)	$\phi'$ (deg)
Sandy Silt	0 – 4	--	--	120	0	28	0	28
Sandy Lean Clay	0 – 12	21	--	120	1,000	0	150	25
Clayey/Silty Sand	12 – 20	---	15	120	0	30	0	30

A surcharge of 250 pounds per square foot (psf) was placed at the top of the banks to account for construction and maintenance equipment. The computed minimum factors of safety for the critical sections are tabulated below and are also presented in Appendix B.

**Table 3: Results of Slope Stability Analyses**

Analyzed Section	Condition	Factor of Safety	
		Left Side	Right Side
4H:1V	Short Term	2.02	2.37
	Long Term	1.95	2.41
	Rapid Draw Down	1.68	1.79

HCFCD requires minimum factors of safety (FS) of 1.3 for End-of-Construction condition, 1.5 for Long-Term condition and 1.25 for Rapid Drawdown condition. The above table indicate the slope stability factors of safety exceed the minimum HCFCD safety factor requirements. Therefore, the drainage ditch side slopes with maximum excavation depth of 8 feet should be stable with regards to slope failure.



### **Dispersion Tests**

Double hydrometer tests (ASTM D 4221) were performed on selected samples. The double hydrometer test results indicate the on-site soils are dispersive. The double hydrometer tests indicated a dispersion potential on the order of 55 percent and 67 percent for the representative samples tested at depths of 2 to 4 feet and 8 to 10 feet, respectively.

### **Slope Grading**

The slope grading should be in accordance with HCFCD requirements as specified in Sections 02314 and 02316. The soils excavated from the sides of the proposed drainage ditch during the slope grading will generally consist of sandy lean clay soils.

Based on the subsurface soils observed at this site, sands and/or silts may generally be exposed between depths of 12 to 20 feet. Sand and/or silts may not be observed within the depths shallower than 12 feet below existing grades.

Generally, the soils excavated from the sides of the drainage ditch during the slope grading will consist of predominantly sandy lean clay soils. These clays, after removing any foreign materials (i.e. grass, roots, debris, etc.) can be utilized as fill for slope grading if properly compacted. The placement of the fill material should be continuously monitored by an experienced Soil Technician. If the on-site fill soils are used in slope grading, the soils should be tested for its dispersive characteristics as per 2005 HCFCD Standard Specifications Section 02314, part 2.1.B.

### **Slope Protection and Erosion Control**

Based on the soil conditions encountered at the site, the new slopes of the drainage ditch will generally be formed in layers of sandy lean clays. Based on the double hydrometer test results, the unprotected slope sections may experience erosion-related problems and local sloughing with time. In order to protect the slope from erosion and to minimize groundwater influx during flooding, it is recommended that a good grass cover or other means be established and maintained. A back-slope swale and drains should be constructed to prevent over-bank runoff.

If silts and clay consisting of excessive sand content are exposed during the proposed excavation, we recommend that the sands and silts be over-excavated to a depth of at least 12 inches and replaced with compacted select fill as required by Sections 02314 and 02315 of the 2005 HCFCD Standard Specifications. The on-site excavated lean clay soils meeting the above specifications can be utilized as a clay cover. However, we recommend to mix the soil uniformly with the exposed sands/silts as an alternate to just placing the fill on top of exposed sands/silts.

Options such as buried rip-raps with geotextiles may be placed in the areas of exposed sands or silts. If this option is selected, the type of geotextile can be selected based upon the type of exposed soil and the type of riprap.

### **Groundwater Control**

As noted on the Boring Logs and presented in the “**Groundwater Information**” section of this report, Groundwater was initially observed in the borings at depths of approximately 10 to 16 feet. After the completion of the borings (24 hours later), the water levels were observed at depths that ranged from about 12 to 15 feet. Excavation for the proposed ditch improvements may not extend below the groundwater level depending upon the water level in the drainage ditch and the time of construction. However, in cohesive soils, if water is seeping into the excavation, the seepage may be collected by a sump and pump arrangement.

Excavations which penetrate layers of water bearing silty/sandy soils will likely require advance dewatering. Groundwater extraction from silty/sandy soils is typically facilitated by the installation of vacuum well points.

The suggested methods given above are intended to serve as a guideline for groundwater control; other appropriate means may be required for groundwater control during installation. Control of groundwater should be accomplished in a manner that will preserve the strength of the soils, will not cause instability of the excavation, and will not result in damage to existing structures. Where necessary to this purpose, the water should be lowered in advance of excavation by well points, or similar methods. Open pumping should not be permitted if it results in boils, loss of fines, softening of the subgrade, or excavation instability. Well points should be installed with suitable screen and filter so that pumping of fines does not occur.

The well system should be in operation for at least several days prior to excavating to the design depth. It is recommended that the groundwater head be lowered at least 3 feet below the bottom of the excavation to provide a working area with increased stability. It is also important that the dewatering continue until the construction has been completed and that the dewatering system be turned off in stages to allow groundwater to recover to its original level gradually, over a period of about 3 to 5 days. Dewatering should be maintained throughout the excavation phase.

### **CONSTRUCTION CONSIDERATIONS**

It is recommended that PSI be retained to provide observation and testing of construction activities involved in the foundations, earthwork, and related activities of this project. PSI cannot accept any responsibility for any conditions that deviated from those described in this report, nor for the performance of the foundations if not engaged to also provide construction observation and testing for this project.

### **Moisture Sensitive Soils/Weather Related Concerns**

During wet weather periods and/or poor site drainage, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. Soils that become wet might be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform any earthwork and foundation construction activities during dry weather.

### **Drainage and Groundwater Concerns**

Water should not be allowed to collect in the excavations or on prepared subgrade of the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff. Positive site surface drainage should be provided to reduce infiltration of surface water around the perimeter of the structures. The grades should be sloped away from the subgrade/structural areas and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill and subgrade area.

For groundwater conditions, refer to the Groundwater Information section of this report. Any water accumulation should be removed from excavations by pumping. Should excessive and uncontrolled amounts of seepage occur, the geotechnical engineer should be consulted. It is possible that the depth to ground water may vary with changes in seasonal conditions, recent rainfall or temperature effects. The ground water levels presented in this report are the levels that were measured at the time of our field activities. We recommend that the Contractor determine the actual ground water levels at the site at the time of the construction activities.

### **Excavations**

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "competent", as defined in 29 CFR Part 1926.650 to 652 should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor's or other party's compliance with local, state, and federal safety or other regulations.

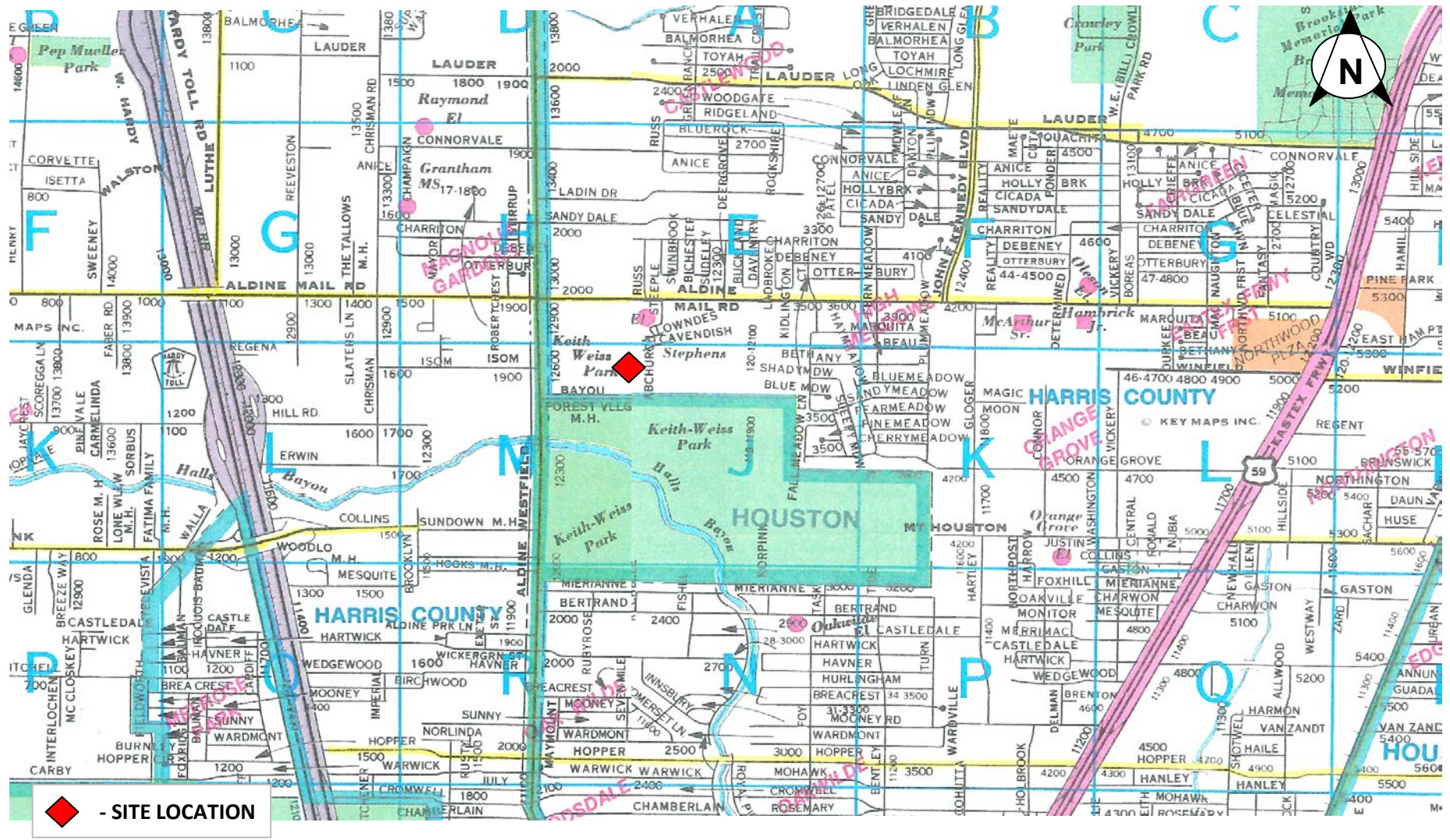
### **REPORT LIMITATIONS**

The information submitted in this report is based on the available subsurface information obtained by PSI and design details furnished by the client representatives for the proposed project. If there are any revisions to the plans for this project, or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in the foundation recommendations are required. If PSI is not notified of such changes, PSI will not be responsible for the impact of those changes on the project.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete, the geotechnical engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At this time, it may be necessary to submit supplementary recommendations. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the project. This geotechnical report has been prepared for the exclusive use of PGAL and their representatives for the specific application to the proposed East Aldine Town Center to be located on the south side of Aldine Mail Route Road at its intersection with Deergrove Street in Houston, Harris County, Texa

# SITE LOCATION PLAN



EAST ALDINE TOWN CENTER

HOUSTON, TEXAS

PSI REPORT NO: 286-1224-2



# BORING LOCATION PLAN



EAST ALDINE TOWN CENTER

HOUSTON, TEXAS

PSI REPORT NO: 286-1224-2



PLATE NO: 1B

**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-01**

DATE **6/30/2016**  
 SURFACE ELEVATION (feet)  
**64.1**

PROJECT: PROPOSED HCFC D DITCH #P118-37-00 IMPROVEMENTS  
 EAST ALDINE TOWN CENTER  
 PROJECT NO. 286-1224-2 BORING TYPE DRY AUGER

DEPTH (ft.)	SAMPLES	USC	WATER LEVEL	LOCATION		FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits			MOISTURE CONTENT (%)	PASSING #200 SIEVE (%)	ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS
				Northing: 13892402.8	Easting: 3125314.58							Plastic Limit	Moisture Content	Liquid Limit			
				Location:			● BLOW COUNT ● 20 40 60 80 ▲ C <sub>u</sub> (tsf) ▲ 1.0 2.0 3.0 4.0 ■ SS (tsf) ■ 1.0 2.0 3.0 4.0 ◆ Torvane (psf) ◆ 200 400 600 800										
				<b>MATERIAL DESCRIPTION</b>													
				FILL: SANDY LEAN CLAY (CL), gray, slight plasticity, with scattered roots, moist		P = 2.75	■										
				SANDY SILT (ML), dark gray, no plasticity, moist		P = 1.50	■										
				SANDY LEAN CLAY (CL), stiff to very stiff, medium plasticity, light gray and tan, with ferrous nodules, moist		P = 0.50	■										
						P = 1.00	■	126			0						
						P = 1.75	■										
						P = 3.50	■										
						P = 4.50	■										
				CLAYEY SAND (SC), slight plasticity, light gray and tan, moist		P = 1.50	■	113									
				SILTY SAND (SM), medium dense, no plasticity, tan, wet		N = 15	●										
						N = 18	●										

Water Level Est.: ▽ Measured: ▼ Perched: ▼  
 Water Observations: Water level was observed at a depth of 16 feet during drilling and at 15 feet after 24 hours.  
 Sample Key: ☒ SPT ☒ Shelby Tube ☒ Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 SS - Shear Strength (P/2, tsf)

Notes:  
 1. All grid coordinates shown hereon are referenced to the Texas coordinate system of 1983, south central zone.  
 2. All elevations shown hereon are referenced to NAVD88.  
 3. All geodetic coordinates shown hereon are referenced to NAD83.



**Professional Service Industries, Inc.**  
**3730 Dacoma Street**  
**Houston, Texas 77092**

**LOG OF BORING B-02**

DATE **6/30/2016**  
 SURFACE ELEVATION (feet)  
**66.7**

PROJECT: PROPOSED HCFC D DITCH #P118-37-00 IMPROVEMENTS  
 EAST ALDINE TOWN CENTER  
 PROJECT NO. 286-1224-2 BORING TYPE DRY AUGER

DEPTH (ft.)	SAMPLES	USC	WATER LEVEL	LOCATION		FIELD STRENGTH DATA	DRY DENSITY (pcf)	SHEAR STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits			MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			ESTIMATED ANGLE OF INTERNAL FRICTION (°), OTHER TESTS & REMARKS	
				Northing: 13891986.45 Easting: 3125353.45							BLOW COUNT 20 40 60 80	Plastic Limit	Moisture Content		Liquid Limit	LIQUID LIMIT	PLASTIC LIMIT		PLASTICITY INDEX
				Location:															
				MATERIAL DESCRIPTION															
0				<b>SANDY LEAN CLAY (CL)</b> , stiff to very stiff, medium plasticity, gray, moist - with scattered roots to 4 feet		P = 2.75	121			0		12	24	12	12	62	67% dispersion at 8 to 10 feet CU TRIAXIAL: 8 to 12 feet c' = 150 psf = 25.1		
5				- with ferrous nodules below 6 feet		P = 2.50					13								
						P = 1.50					14	26	12	14	56				
						P = 0.75					14								
						P = 1.50					16	25	11	14	56				
10						P = 1.00	114				16								
						N = 14					18	NP	NP	NP	23				
						N = 16					25								
						N = 12					22	NP	NP	NP	7				
						N = 26					20								

Water Level Est.: ▽ Measured: ▼ Perched: ▼  
 Water Observations: Water level was observed at a depth of about 10 feet during drilling and at 12 feet after 24 hours.  
 Sample Key: ☒ SPT ☒ Shelby Tube ☒ Disturbed

Key to Abbreviations:  
 N - SPT Data (Blows/Ft)  
 P - Pocket Penetrometer (tsf)  
 T - Torvane (psf)  
 C<sub>u</sub> - Undrained Cohesion (tsf)  
 SS - Shear Strength (P/2, tsf)

Notes:  
 1. All grid coordinates shown hereon are referenced to the Texas coordinate system of 1983, south central zone.  
 2. All elevations shown hereon are referenced to NAVD88.  
 3. All geodetic coordinates shown hereon are referenced to NAD83.

## TERMS USED ON BORING LOGS

### SOIL GRAIN SIZE

#### U.S. STANDARD SIEVE

		6"	3"	3/4"	#4	#10	#40	#200		
BOULDERS	COBBLES	GRAVEL			SAND			SILT	CLAY	
		COARSE	FINE	COARSE	MEDIUM	FINE				
		152	76.2	19.1	4.76	2.00	0.420	0.074	0.002	

#### SOIL GRAIN SIZE IN MILLIMETERS

#### STRENGTH OF COHESIVE SOILS

##### Consistency

Undrained Shear Strength,  
tons per sq. ft.

Very Soft.....	less than 0.125
Soft.....	0.125 - 0.250
Firm.....	0.250 - 0.500
Stiff.....	0.500 - 1.000
Very Stiff.....	1.000 - 2.000
Hard.....	2.00 & higher

#### RELATIVE DENSITY OF COHESIONLESS SOILS FROM STANDARD PENETRATION TEST

Very Loose.....	< 4 bpf
Loose.....	5-10 bpf
Medium Dense.....	11-30 bpf
Dense.....	31-50 bpf
Very Dense.....	> 50 bpf

(bpf = blow per foot, ASTM D 1586)

#### SPLIT-BARREL SAMPLER DRIVING RECORD

Blows per foot

##### Description

25.....	25 blows driving sampler 12 inches, after initial 6 inches of seating.
50/7".....	50 blows driving sampler 7 inches, after initial 6 inches of seating.
Ref/3".....	50 blows driving sampler 3 inches during initial 6 inch seating interval

Note: To avoid change to sampling tools, driving is limited to 50 blows during or after seating interval.

#### DRY STRENGTH    ASTM D2488

#### MOISTURE CONDITION

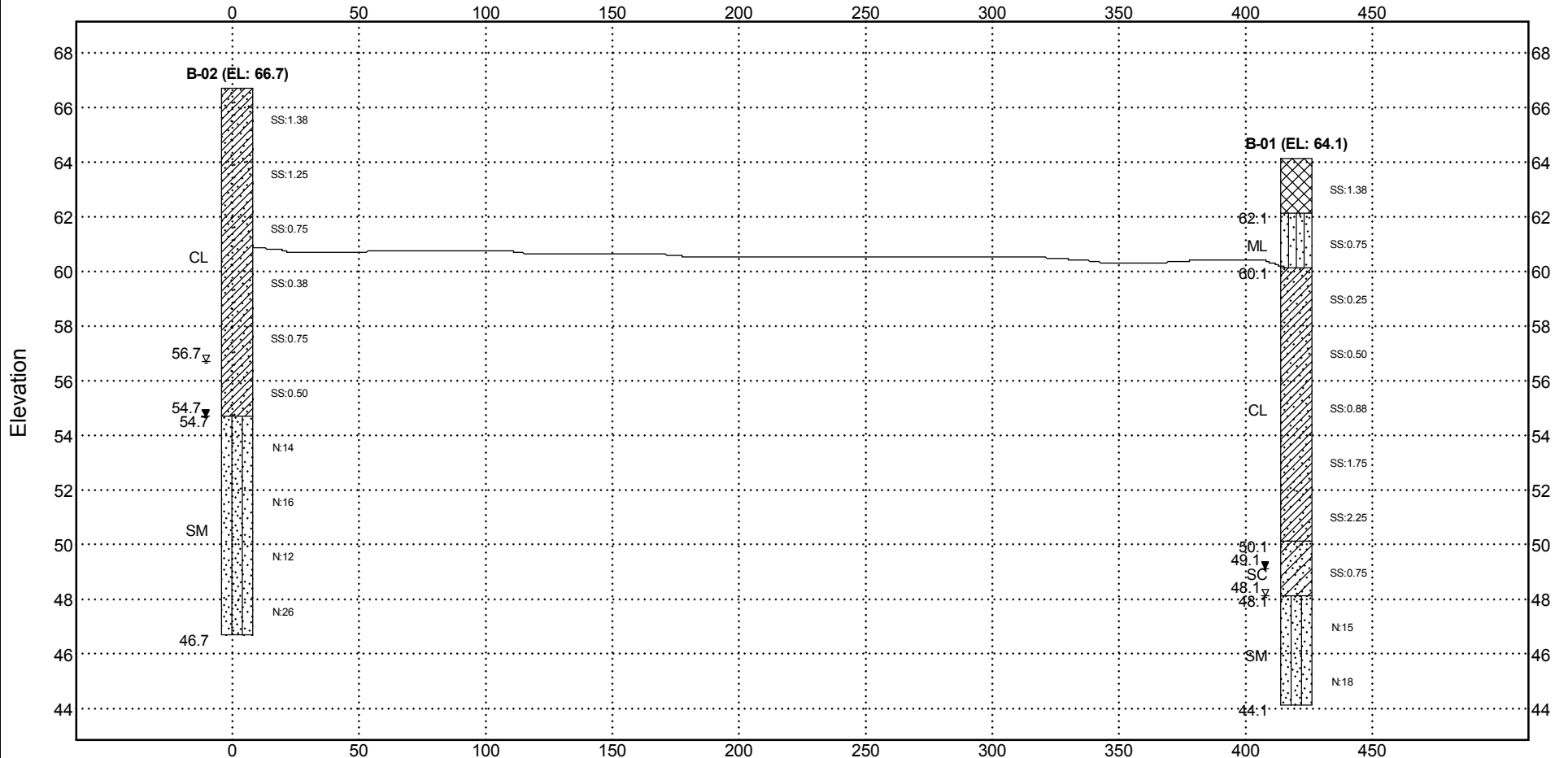
None	Dry Specimen crumbles into powder with mere pressure of handling	Dry	Absence of moisture, dusty, dry to the touch.
Low	Dry Specimen crumbles into powder with some finger pressure.		
Medium	Dry Specimen breaks into pieces or crumbles with considerable pressure.	Moist	Damp but no visible water.
High	Dry Specimen cannot be broken with finger pressure, it can be broken between thumb and hard surface.	Wet	Visible free water.
Very High	Dry Specimen cannot be broken between the thumb and hard surface.		

#### SOIL STRUCTURE

Slickensided	Having planes of weakness that appear slick and glossy. The degree of slickensidedness depends upon the spacing of slickensides and the easiness of breaking along these planes.
Fissured	Containing shrinkage or relief cracks, often filled with fine sand or silt; usually more or less vertical.
Pocket	Inclusion of material of different texture that is smaller than the diameter of the sample.
Parting	Inclusion less than 1/8" thick extending through the sample.
Seam	Inclusion 1/8" to 3" thick extending through the sample.
Layer	Inclusion greater than 3" thick extending through the sample.
Laminated	Soil sample composed of alternating partings or seams of different soil types.
Interlayered	Soil sample composed of alternating layers of different soil types.
Intermixed	Soil sample composed of pockets of different soil types and layered or laminated structure is not evident.
Calcareous	Having appreciable quantities of calcium material.

FENCE\_PSI\_286-1224-2 LOGS (HCFCD).GPJ PS\HOUSTON.GDT 11/17/16

Distance Along Baseline



Notes: Stratifications shown are generalized and variations could occur in the field. The SS (shear strength) values are Pocket Penetrometer readings divided by 2 in tsf. C<sub>u</sub> values are undrained cohesion or shear strength values in tsf.



STRATUM	START	END	STRATUM DESCRIPTION	GENERALIZED SUBSURFACE PROFILE		
1	64.1	62.1	FILL SOILS	PROPOSED HCFCD DITCH #P118-37-00 IMPROVEMENTS EAST ALDINE TOWN CENTER PROJECT No. 286-1224-2    DATE Nov 2016    PLATE 5		
2	62.1	60.1	SANDY SILT (ML)			
3	66.7	60.1	SANDY LEAN CLAY (CL)			
4	50.1	48.1	CLAYEY SAND (SC)			
5	54.7	44.1	SILTY SAND (SM)			

## APPENDIX B

**CONSTRUCTION IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY**

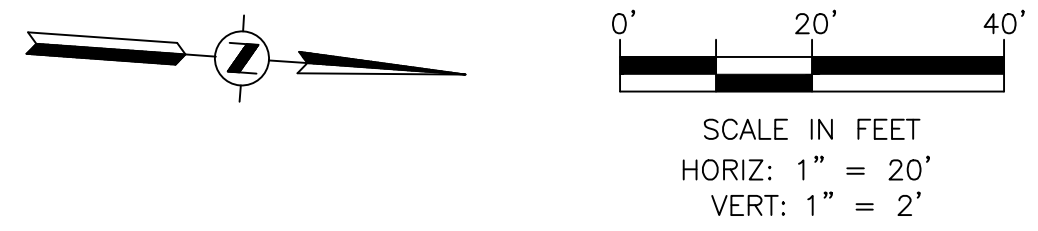
AN HCFC D RIGHT-OF-WAY NOTIFICATION (PERMIT) AND HCFC D 48-HR PRE-CONSTRUCTION NOTICE ARE REQUIRED PRIOR TO ENTERING OR WORKING WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. BOTH THE HCFC D RIGHT-OF-WAY NOTIFICATION AND 48-HR NOTICE MUST BE PROVIDED TO HCFC D AT DCIS@HCFC D.ORG. SITE PLANS MUST BE APPROVED PRIOR TO OBTAINING THE REQUIRED HCFC D RIGHT-OF-WAY NOTIFICATION. BE ADVISED THAT THE HCFC D RIGHT-OF-WAY NOTIFICATION IS SEPARATE FROM THE SITE DEVELOPMENT PERMIT PACKAGE.

TO APPLY FOR THE HCFC D RIGHT-OF-WAY NOTIFICATION PLEASE GO TO <http://apps.harriscountytx.gov/EPermits> AND APPLY FOR THE HCFC D ROW UNDER ROW NOTIFICATION.

COUNTY OF HARRIS VOL 7974, PG. 221 H.C.D.R.

PROF 24" CMP OUTFALL PIPE  
REPLACE EXIST 6" PVC & ADJUST OUTFALL FROM WWTP  
ELEV.=±59.80  
(RE: SHT C8.18, "PIPE ADJUSTMENT  
DETAIL 24-INCH TO 42-INCH DIAMETER")  
CONTRACTOR TO VERIFY EXACT  
LOCATION PRIOR TO CONSTRUCTION.

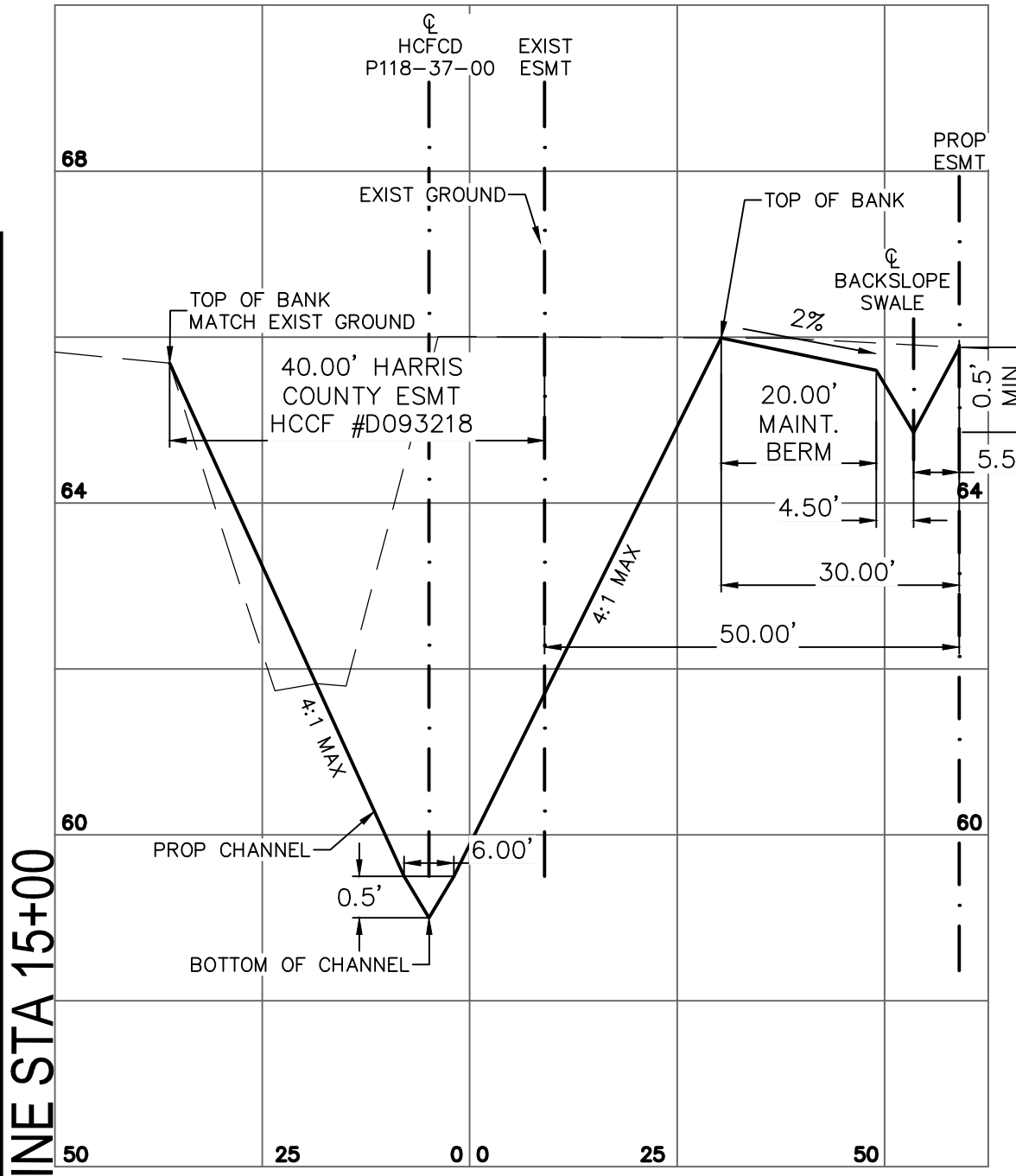
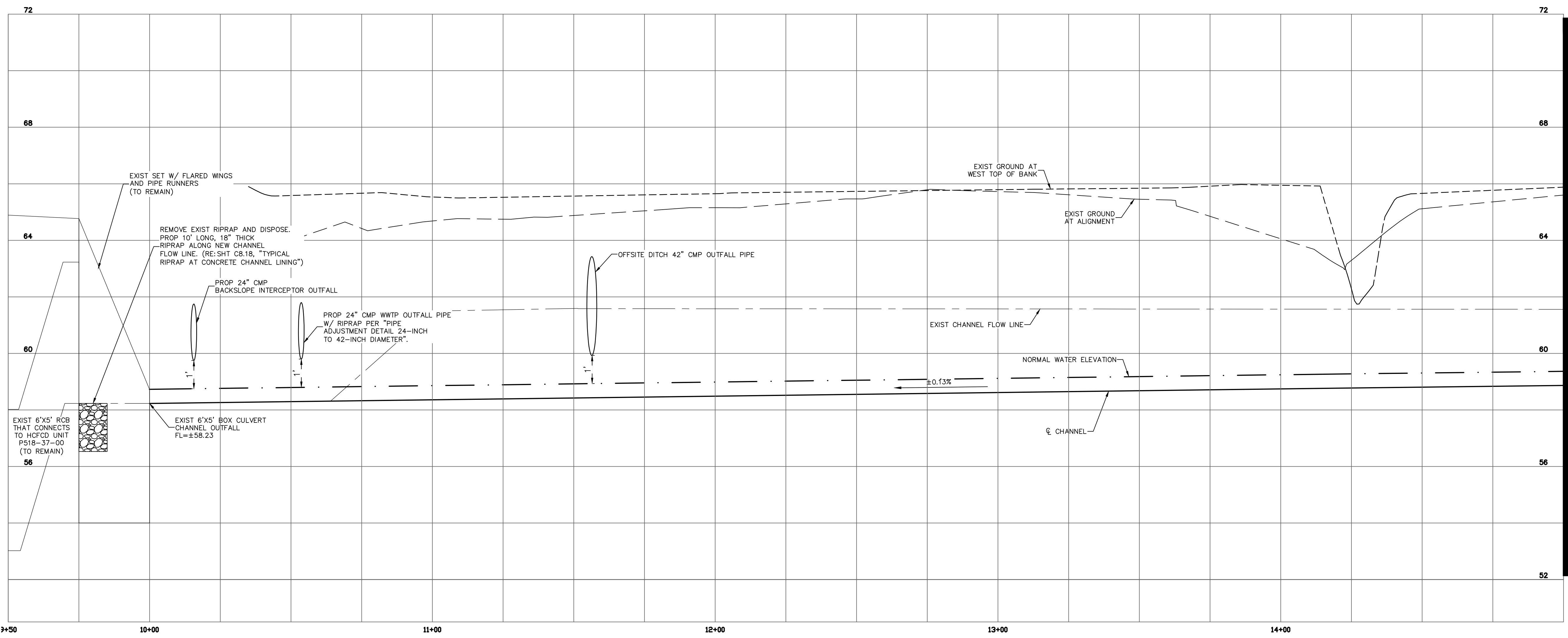
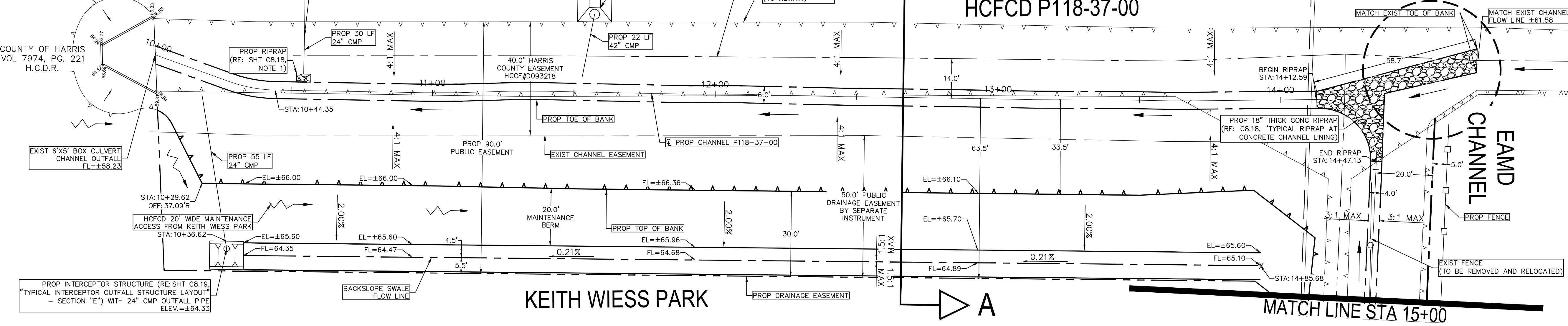
OFFSITE DITCH INTERCEPTOR STRUCTURE  
(RE: SHT C8.19, "TYPICAL OFFSITE DITCH  
INTERCEPTOR STRUCTURE" - SECTION "A")  
WITH 24" CMP OUTFALL PIPE SET  
ELEV.=±64.85 (MATCH FLOWLINE OF EXIST DITCH)



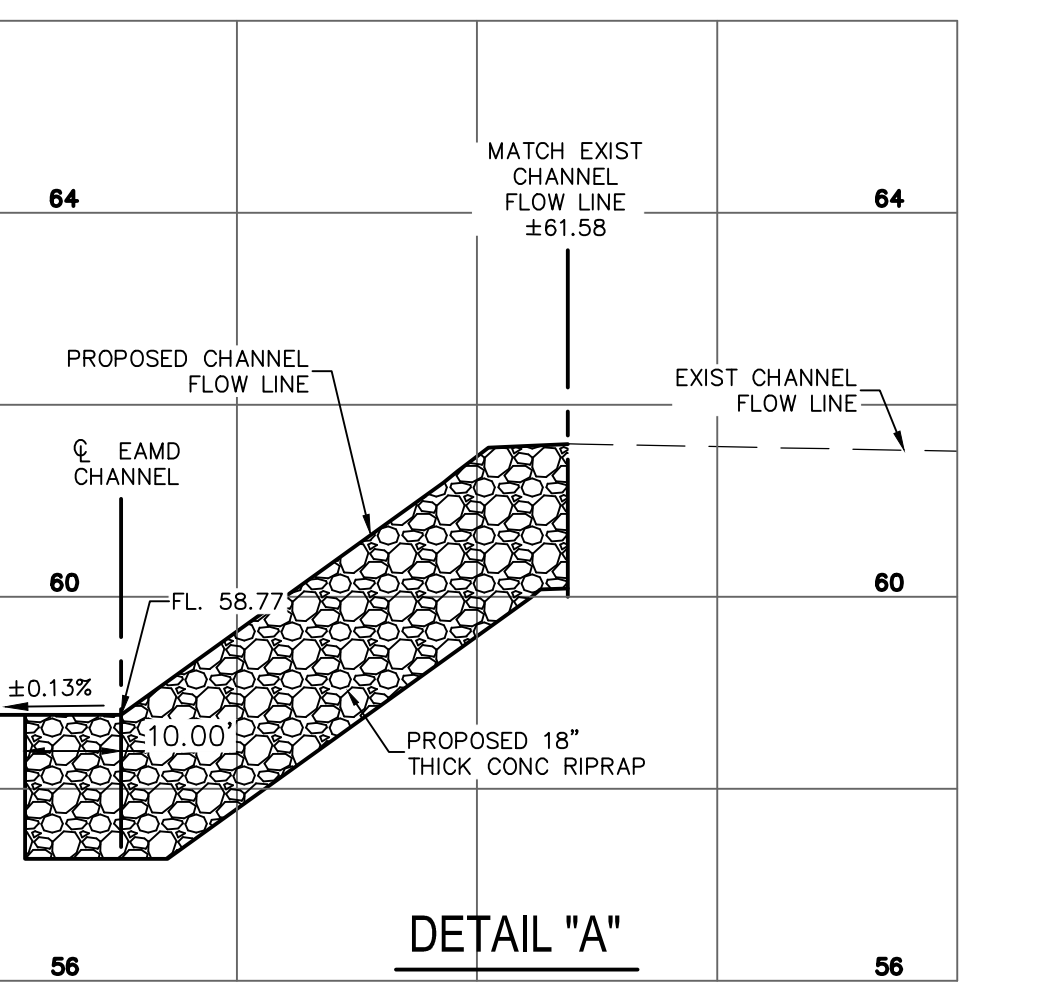
1. THE WOODED AREA LOCATED ON THE KEITH WESS PARK PROPERTY WILL BE CLEARED TO ALLOW FOR EASEMENT WIDENING.
2. NO AREA WEST OF THE EXISTING TOP OF BANK WILL BE DISTURBED.
3. HARRIS COUNTY FLOOD CONTROL DISTRICT WILL BE MAINTAINING THE HCFC D P118-37-00 CHANNEL.
4. EAST ALDINE MANAGEMENT DISTRICT WILL BE MAINTAINING THE "EAMD CHANNEL".
5. SEE THE "STORM WATER PREVENTION PLAN" SHEET FOR EROSION CONTROL PROTECTION. (RE: C7.00)
6. REFER TO SHEET C8.24 FOR HCFC D STORM WATER POLLUTION PREVENTION STANDARD DETAIL.
7. THE BACKSLOPE SWALE SHALL BE IN ACCORDANCE WITH THE HARRIS COUNTY FLOOD CONTROL POLICY CRITERIA & PROCEDURE MANUAL.

- NOTES**
- EXISTING TOP OF BANK
  - PROPOSED TOP OF BANK
  - PROPOSED CHANNEL EASEMENT
  - PROPOSED TOE OF BANK
  - EXISTING FENCE
  - PROPOSED FENCE
  - DIRECTION OF FLOW
  - HCFC D MAINTENANCE ACCESS ROUTE
  - PROPOSED CONCRETE RIPRAP

**LEGEND**



**CHANNEL CROSS-SECTION A-A**



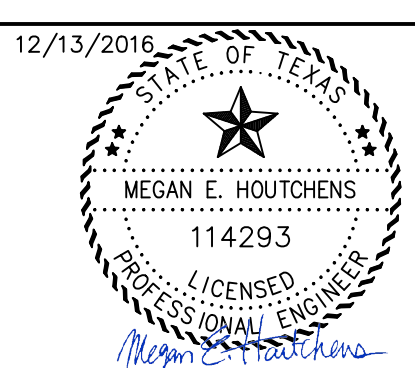
**DETAIL "A"**

NO.	REVISIONS	DATE	NAME

HARRIS COUNTY  
ENGINEERING DEPARTMENT

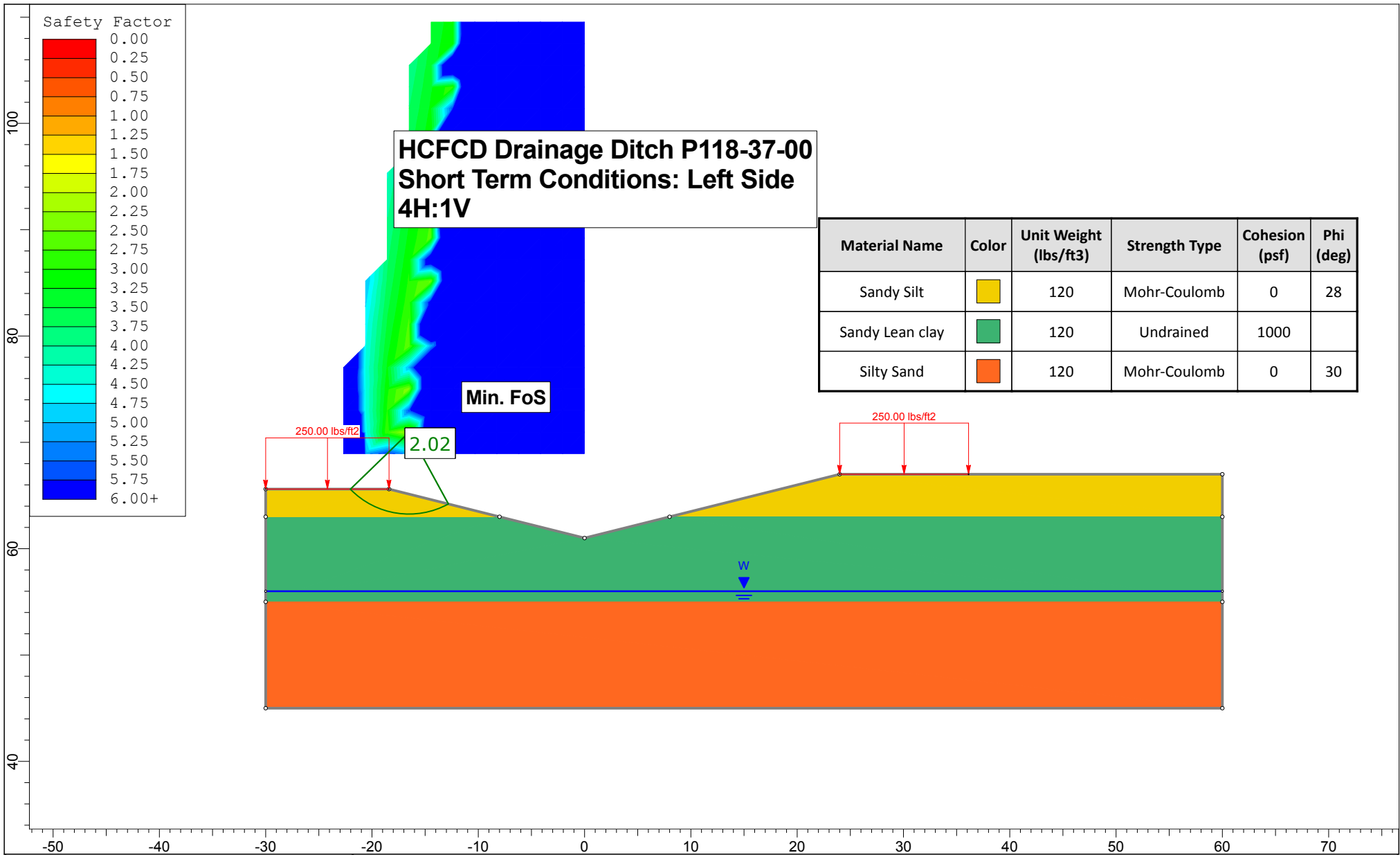



3131 BRIARPARK DRIVE  
SUITE 200  
HOUSTON, TX 77042  
(T) 713 622 1444  
(F) 713 968 9333  
www.pgal.com  
PGAL TBPE REG. NO:  
F-2742

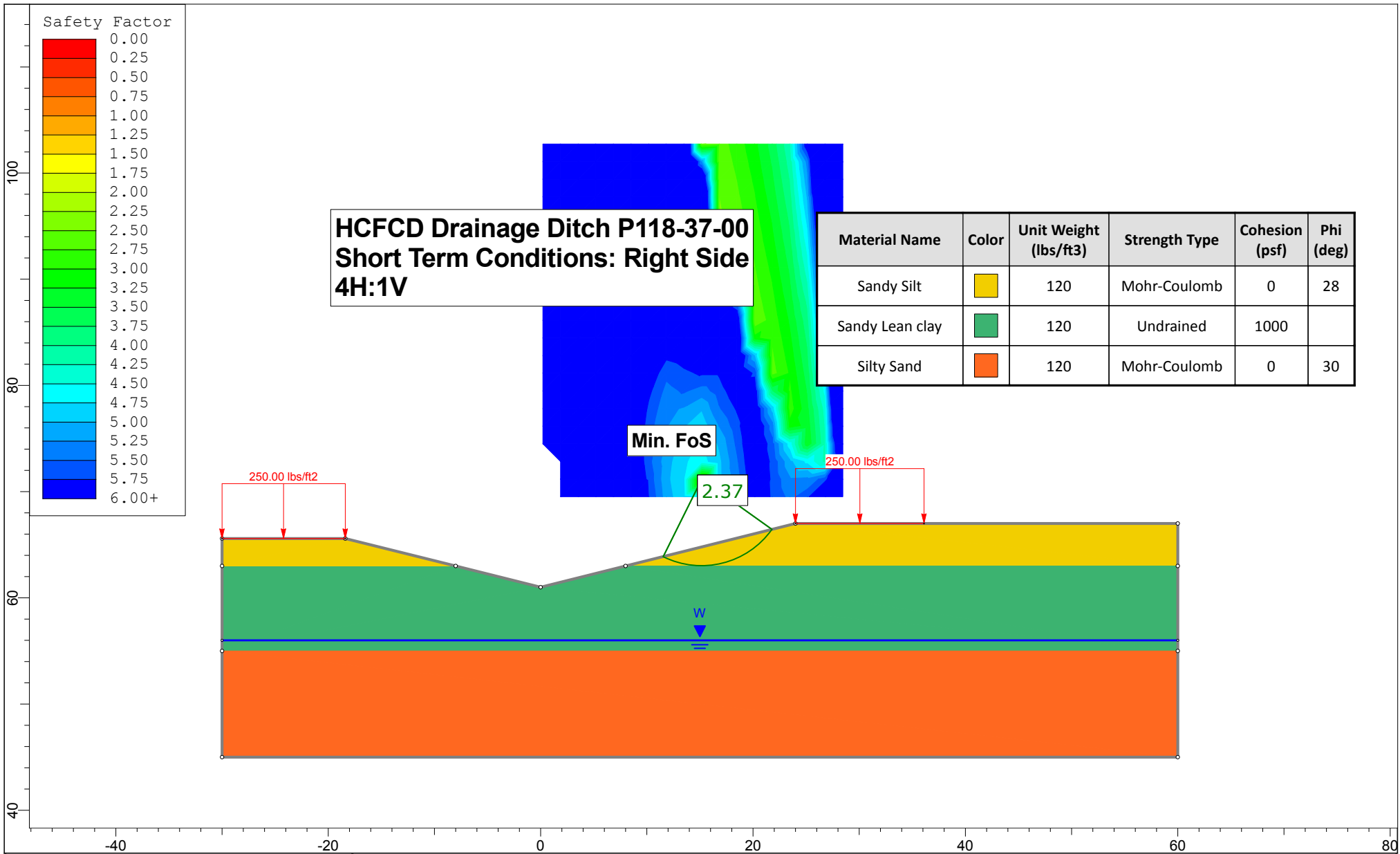



PROJECT TITLE: <b>EAST ALDINE TOWN CENTER</b>		HCFC D STANDARD
DRAWN BY: MH	SHEET DESCRIPTION: CHANNEL PLAN & PROFILE SHT 1	SHEET NO: C5.40
CR'D BY: MH		
SCALE: 1"=20'	APPROVED BY:	
DATE: 11/11/2016		

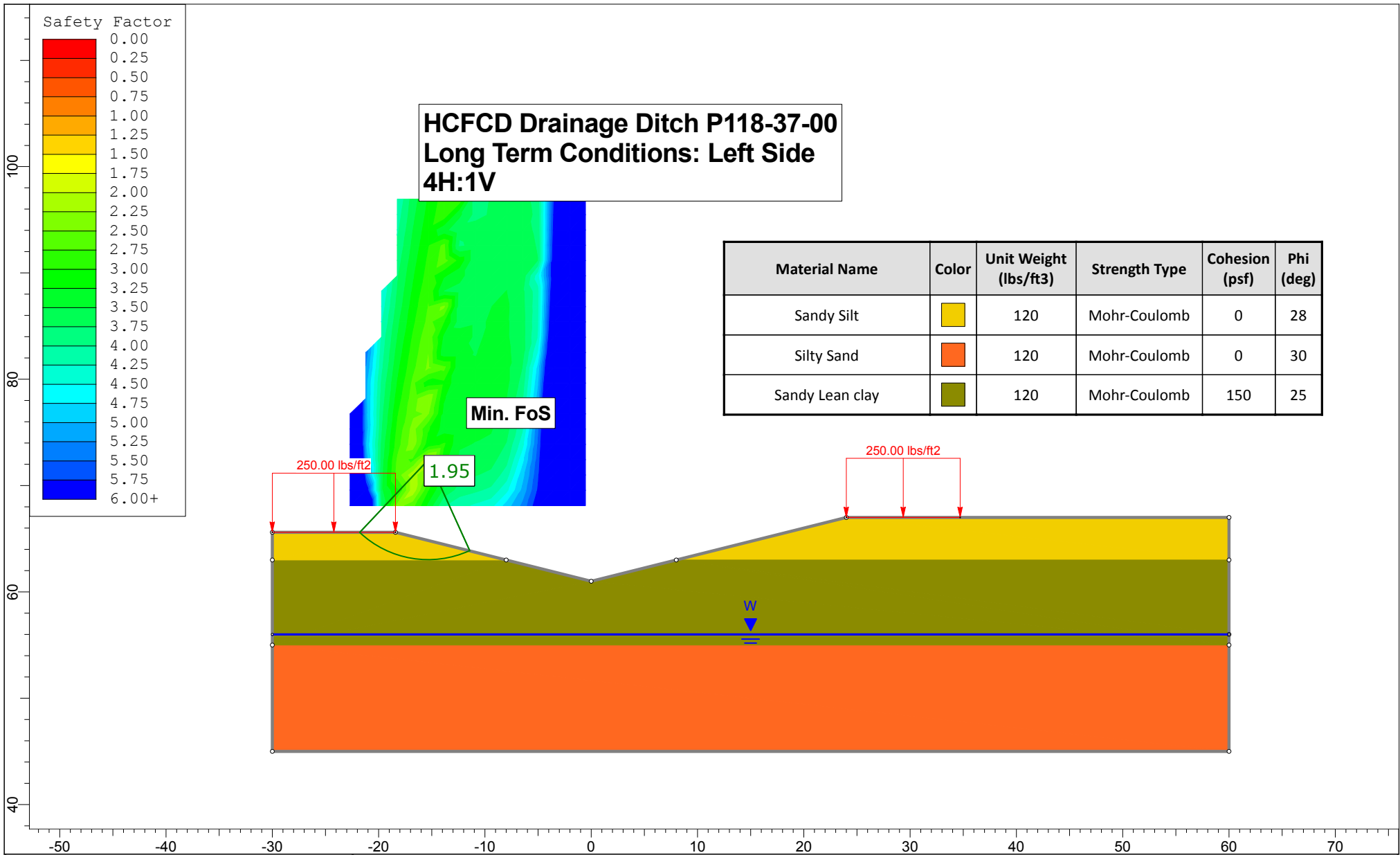
R:\1000945-CAD-FILES\SHEETS\DWG\1000945 - C1.00 - PP - DITCH.DWG




	Project				
	286-1224(2) HCFC Ditch				
	Analysis Description				
	Short term Analysis				
Drawn By	Prasoon Tiwari	Scale	1:150	Company	Intertek-PSI
Date	11/11/2016, 11:14:19 AM			File Name	Ditch Left Side.slim

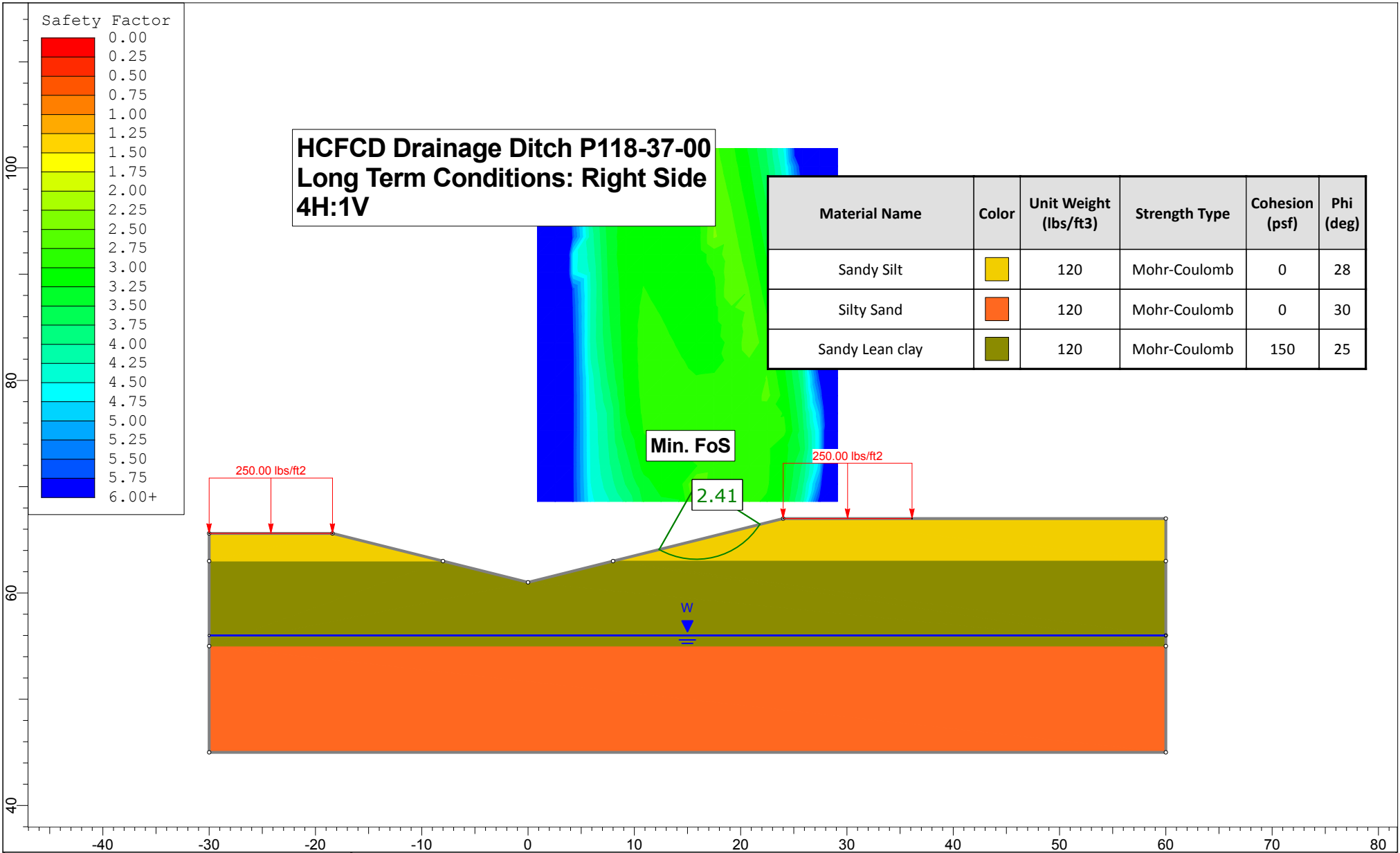


	Project				286-1224(2) HCFCD Ditch		
	Analysis Description				Short term Analysis		
	Drawn By		Prasoon Tiwari	Scale	1:150	Company	Intertek-PSI
	Date		11/11/2016, 11:14:19 AM		File Name		Ditch Right Side.slim

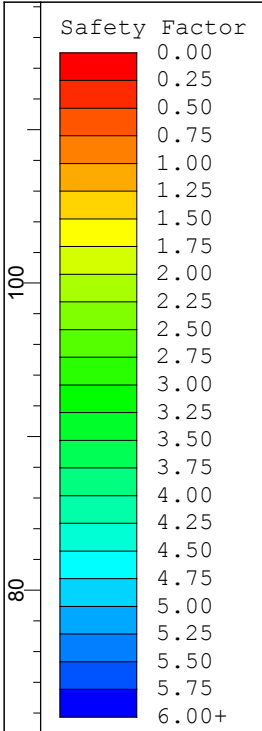


	Project				
	286-1224(2) HCFCD Ditch				
	Analysis Description				
	Long term Analysis				
Drawn By	Prasoon Tiwari	Scale	1:150	Company	Intertek-PSI
Date	11/11/2016, 11:14:19 AM			File Name	Ditch Left Side.slim

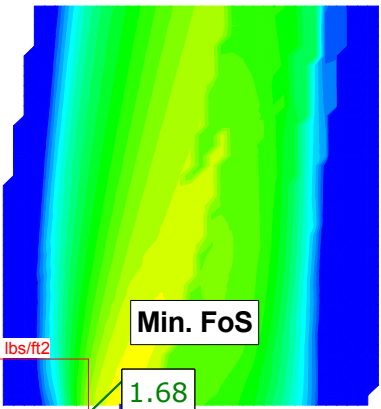




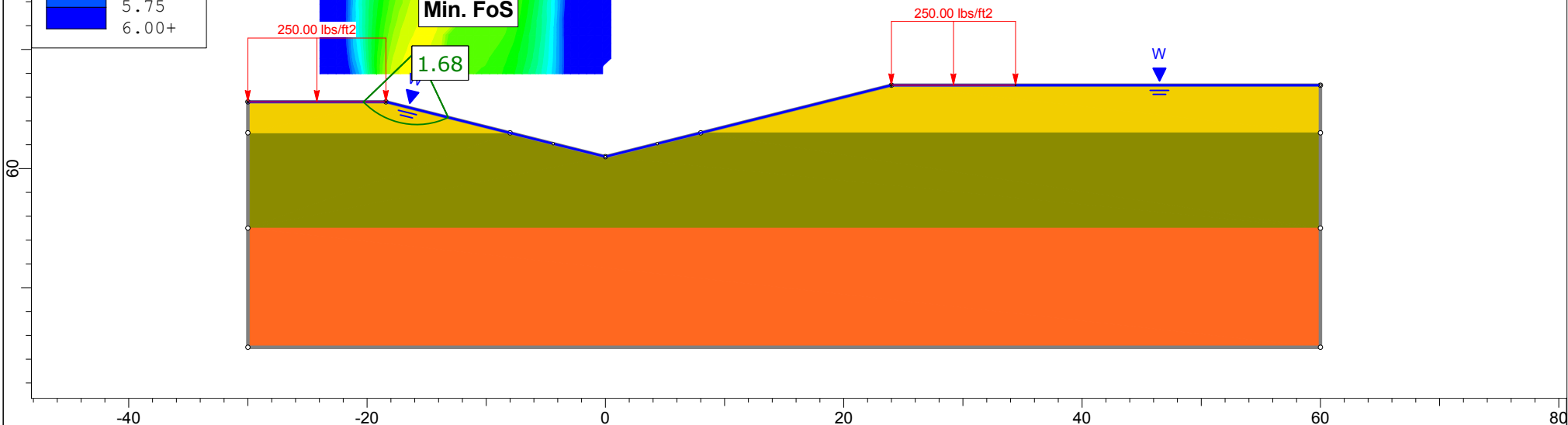
	Project			286-1224(2) HCFCD Ditch		
	Analysis Description			Long term Analysis		
	Drawn By	Prasoon Tiwari	Scale	1:150	Company	Intertek-PSI
	Date	11/11/2016, 11:14:19 AM		File Name	Ditch Right Side.slim	



**HCFCD Drainage Ditch P118-37-00**  
**Rapid Drawdown Conditions: Left Side**  
**4H:1V**

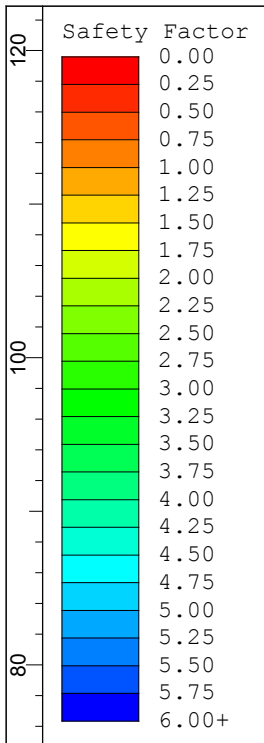


Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
Sandy Silt		120	Mohr-Coulomb	0	28
Silty Sand		120	Mohr-Coulomb	0	30
Sandy Lean clay		120	Mohr-Coulomb	150	25



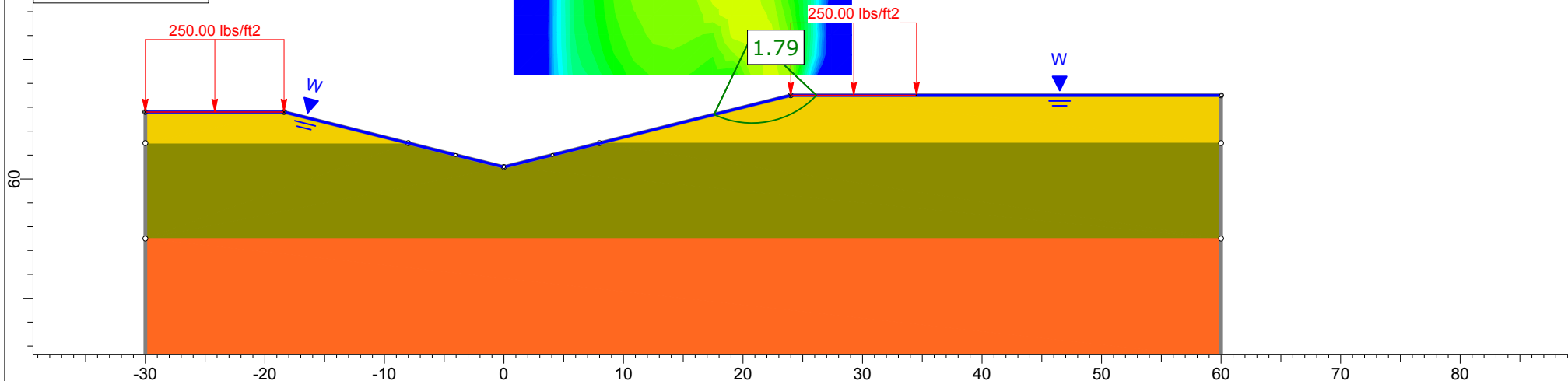
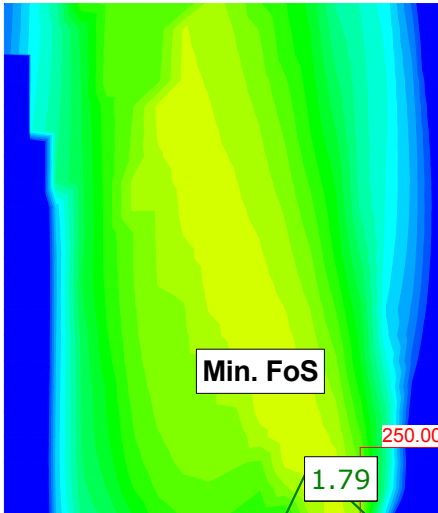
SLIDEINTERPRET 7.010

Project		286-1224(2) HCFCD Ditch	
Analysis Description		Rapid Drawdown Analysis	
Drawn By	Prasoon Tiwari	Scale	1:150
Date	11/11/2016, 11:14:19 AM	Company	Intertek-PSI
		File Name	Ditch Left Side.slim



**HCFCD Drainage Ditch P118-37-00**  
**Rapid Drawdown Conditions: Right Side**  
**4H:1V**

Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
Sandy Silt		120	Mohr-Coulomb	0	28
Silty Sand		120	Mohr-Coulomb	0	30
Sandy Lean clay		120	Mohr-Coulomb	150	25



	Project					286-1224(2) HCFCD Ditch
	Analysis Description					Rapid Drawdown Analysis
	Drawn By	Prasoon Tiwari	Scale	1:150	Company	Intertek-PSI
	Date	11/11/2016, 11:14:19 AM			File Name	Ditch Right Side.slim

HCPCD Drainage Ditch P118-37-00  
determination of short-term parameters

① Sandy Silt: 0-4 ft

Use,  $\phi = 28^\circ$

$c = 0$  psf

② Sandy Lean clay: 4-12 ft

Boerings B-01 & B-02

Average  $S_u = 0.5$  tsf

Use,  $S_u = 1000$  psf

[ Avg. shear strength from pocket penetrometer = 1000 psf ]

③ Silty sand: 12-20 ft

$N = 15$

Use,  $\phi = 30^\circ$

$c = 0$  psf

HCFC DRAINAGE Ditch P118-37-00  
Determination of long term parameters

① Sandy silt: 0-4 ft

Use,  $\phi = 28^\circ$

$c = 0$  psf

② Sandy lean clay: 4-12 ft

Based on CU test results

Use,  $c = 150$  psf

$\phi = 25^\circ$

③ Silty sand: 12-20 ft

$N = 15$

Use,  $\phi = 30^\circ$

$c = 0$  psf.

## *Slide Analysis Information*

### *286-1224(2) HCFCD Ditch*

#### *Project Summary*

---

File Name: Ditch Left Side.slim  
 Slide Modeler Version: 7.01  
 Project Title: 286-1224(2) HCFCD Ditch  
 Analysis: Short term Analysis  
 Author: Prasoon Tiwari  
 Company: Intertek-PSI  
 Date Created: 11/11/2016, 11:14:19 AM

#### *General Settings*

---

Units of Measurement: Imperial Units  
 Time Units: days  
 Permeability Units: feet/second  
 Failure Direction: Left to Right  
 Data Output: Standard  
 Maximum Material Properties: 20  
 Maximum Support Properties: 20

#### *Analysis Options*

---

Slices Type: Vertical

##### Analysis Methods Used

Bishop simplified  
 Janbu simplified  
 Spencer

Number of slices: 50  
 Tolerance: 0.005  
 Maximum number of iterations: 75  
 Check malpha < 0.2: Yes  
 Create Interslice boundaries at intersections with water tables and piezos: Yes  
 Initial trial value of FS: 1  
 Steffensen Iteration: Yes

#### *Groundwater Analysis*

---

Groundwater Method: Water Surfaces  
 Pore Fluid Unit Weight [lbs/ft<sup>3</sup>]: 62.4  
 Advanced Groundwater Method: Excess Pore Pressure

## Random Numbers

---

Pseudo-random Seed: 10116  
 Random Number Generation Method: Park and Miller v.3

## Surface Options

---

Surface Type: Circular  
 Search Method: Grid Search  
 Radius Increment: 10  
 Composite Surfaces: Disabled  
 Reverse Curvature: Invalid Surfaces  
 Minimum Elevation: Not Defined  
 Minimum Depth [ft]: 2  
 Minimum Area: Not Defined  
 Minimum Weight: Not Defined

## Seismic

---

Advanced seismic analysis: No  
 Staged pseudostatic analysis: No

## Loading

---

2 Distributed Loads present

### Distributed Load 1

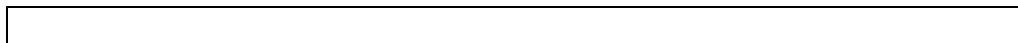
Distribution: Constant  
 Magnitude [psf]: 250  
 Orientation: Normal to boundary  
 Creates Excess Pore Pressure: No




### Distributed Load 2

Distribution: Constant  
 Magnitude [psf]: 250  
 Orientation: Normal to boundary  
 Creates Excess Pore Pressure: No

## Material Properties

---



Property	Sandy Silt	Sandy Lean clay	Silty Sand
Color			
Strength Type	Mohr-Coulomb	Undrained	Mohr-Coulomb
Unit Weight [lbs/ft3]	120	120	120
Cohesion [psf]	0		0
Friction Angle [deg]	28		30
Cohesion Type		1000	
Water Surface	Water Table	Water Table	Water Table
Hu Value	0	0	1
Material Weight Causes Excess Pore Pressure			
B_bar value	0	0	0

## Global Minimums

### Method: bishop simplified

FS	2.016520
Center:	-16.502, 70.964
Radius:	7.702
Left Slip Surface Endpoint:	-22.029, 65.600
Right Slip Surface Endpoint:	-12.813, 64.203
Resisting Moment:	10002.5 lb-ft
Driving Moment:	4960.31 lb-ft
Total Slice Area:	12.5074 ft2
Surface Horizontal Width:	9.21668 ft
Surface Average Height:	1.35704 ft

### Method: janbu simplified

FS	1.865260
Center:	-16.502, 70.964
Radius:	7.702
Left Slip Surface Endpoint:	-22.029, 65.600
Right Slip Surface Endpoint:	-12.813, 64.203
Resisting Horizontal Force:	1184.17 lb
Driving Horizontal Force:	634.856 lb
Total Slice Area:	12.5074 ft2
Surface Horizontal Width:	9.21668 ft
Surface Average Height:	1.35704 ft

### Method: spencer



FS	2.019950
Center:	-16.502, 70.964
Radius:	7.702
Left Slip Surface Endpoint:	-22.029, 65.600
Right Slip Surface Endpoint:	-12.813, 64.203
Resisting Moment:	10019.6 lb-ft
Driving Moment:	4960.31 lb-ft
Resisting Horizontal Force:	1197.32 lb
Driving Horizontal Force:	592.747 lb
Total Slice Area:	12.5074 ft <sup>2</sup>
Surface Horizontal Width:	9.21668 ft
Surface Average Height:	1.35704 ft

## Valid / Invalid Surfaces

---

### Method: bishop simplified

Number of Valid Surfaces: 1413  
 Number of Invalid Surfaces: 3438

#### Error Codes:

Error Code -103 reported for 227 surfaces  
 Error Code -107 reported for 1277 surfaces  
 Error Code -108 reported for 38 surfaces  
 Error Code -112 reported for 8 surfaces  
 Error Code -115 reported for 1888 surfaces

### Method: janbu simplified

Number of Valid Surfaces: 1372  
 Number of Invalid Surfaces: 3479

#### Error Codes:

Error Code -103 reported for 227 surfaces  
 Error Code -107 reported for 1277 surfaces  
 Error Code -108 reported for 78 surfaces  
 Error Code -112 reported for 9 surfaces  
 Error Code -115 reported for 1888 surfaces

### Method: spencer

Number of Valid Surfaces: 1371  
 Number of Invalid Surfaces: 3480

#### Error Codes:

Error Code -103 reported for 227 surfaces  
 Error Code -107 reported for 1277 surfaces  
 Error Code -108 reported for 79 surfaces  
 Error Code -112 reported for 9 surfaces  
 Error Code -115 reported for 1888 surfaces

**Error Codes**

The following errors were encountered during the computation:

- 103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
- 107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
- 108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
- 112 = The coefficient M-Alpha =  $\cos(\alpha)(1+\tan(\alpha)\tan(\phi))/F < 0.2$  for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.
- 115 = Surface too shallow, below the minimum depth.

**Slice Data**

**Global Minimum Query (bishop simplified) - Safety Factor: 2.01652**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.184334	2.03082	-44.8886	Sandy Silt	0	28	54.5102	109.921	206.731	0	206.731
2	0.184334	5.96169	-42.9836	Sandy Silt	0	28	59.7639	120.515	226.656	0	226.656
3	0.184334	9.64251	-41.136	Sandy Silt	0	28	64.7928	130.656	245.729	0	245.729
4	0.184334	13.0943	-39.3391	Sandy Silt	0	28	69.609	140.368	263.995	0	263.995
5	0.184334	16.3346	-37.5874	Sandy Silt	0	28	74.2234	149.673	281.494	0	281.494
6	0.184334	19.3784	-35.876	Sandy Silt	0	28	78.6444	158.588	298.261	0	298.261
7	0.184334	22.2385	-34.2009	Sandy Silt	0	28	82.8809	167.131	314.328	0	314.328
8	0.184334	24.9258	-32.5584	Sandy Silt	0	28	86.9399	175.316	329.722	0	329.722
9	0.184334	27.4499	-30.9455	Sandy Silt	0	28	90.8283	183.157	344.469	0	344.469
10	0.184334	29.8191	-29.3595	Sandy Silt	0	28	94.552	190.666	358.59	0	358.59
11	0.184334	32.0408	-27.7977	Sandy Silt	0	28	98.1156	197.852	372.106	0	372.106
12	0.184334	34.1213	-26.2581	Sandy Silt	0	28	101.524	204.726	385.033	0	385.033
13	0.184334	36.0665	-24.7387	Sandy Silt	0	28	104.782	211.296	397.389	0	397.389
14	0.184334	37.8812	-23.2377	Sandy Silt	0	28	107.893	217.569	409.187	0	409.187
15	0.184334	39.5701	-21.7533	Sandy Silt	0	28	110.86	223.552	420.44	0	420.44
16	0.184334	41.1372	-20.2842	Sandy Silt	0	28	113.686	229.251	431.158	0	431.158
17	0.184334	42.5859	-18.8289	Sandy	0	28	116.374	234.671	441.353	0	441.353

				Silt							
18	0.184334	43.9194	-17.386	Sandy Silt	0	28	118.927	239.818	451.031	0	451.031
19	0.184334	45.1406	-15.9545	Sandy Silt	0	28	121.345	244.694	460.203	0	460.203
20	0.184334	46.2027	-14.5331	Sandy Silt	0	28	104.378	210.48	395.854	0	395.854
21	0.184334	46.429	-13.1208	Sandy Silt	0	28	62.5687	126.171	237.294	0	237.294
22	0.184334	46.3077	-11.7166	Sandy Silt	0	28	62.8062	126.65	238.194	0	238.194
23	0.184334	46.0824	-10.3195	Sandy Silt	0	28	62.8985	126.836	238.544	0	238.544
24	0.184334	45.7545	-8.92861	Sandy Silt	0	28	62.8459	126.73	238.344	0	238.344
25	0.184334	45.3254	-7.54297	Sandy Silt	0	28	62.648	126.331	237.594	0	237.594
26	0.184334	44.7961	-6.16177	Sandy Silt	0	28	62.3044	125.638	236.292	0	236.292
27	0.184334	44.1675	-4.78415	Sandy Silt	0	28	61.8149	124.651	234.434	0	234.434
28	0.184334	43.4402	-3.4093	Sandy Silt	0	28	61.1777	123.366	232.017	0	232.017
29	0.184334	42.6148	-2.03641	Sandy Silt	0	28	60.3917	121.781	229.036	0	229.036
30	0.184334	41.6915	-	Sandy Silt	0	28	59.4549	119.892	225.485	0	225.485
			0.664693	Sandy Silt							
31	0.184334	40.6707	0.706644	Sandy Silt	0	28	58.3664	117.697	221.356	0	221.356
32	0.184334	39.5522	2.07839	Sandy Silt	0	28	57.1232	115.19	216.641	0	216.641
33	0.184334	38.3359	3.45132	Sandy Silt	0	28	55.7227	112.366	211.33	0	211.33
34	0.184334	37.0214	4.82624	Sandy Silt	0	28	54.1621	109.219	205.411	0	205.411
35	0.184334	35.6083	6.20396	Sandy Silt	0	28	52.4379	105.742	198.872	0	198.872
36	0.184334	34.0958	7.58529	Sandy Silt	0	28	50.546	101.927	191.697	0	191.697
37	0.184334	32.4831	8.97107	Sandy Silt	0	28	48.4825	97.7659	183.871	0	183.871
38	0.184334	30.7691	10.3622	Sandy Silt	0	28	46.2421	93.2481	175.374	0	175.374
39	0.184334	28.9525	11.7595	Sandy Silt	0	28	43.8193	88.3625	166.186	0	166.186
40	0.184334	27.0319	13.1639	Sandy Silt	0	28	41.208	83.0968	156.282	0	156.282
41	0.184334	25.0056	14.5765	Sandy Silt	0	28	38.4012	77.4368	145.637	0	145.637
42	0.184334	22.8715	15.9981	Sandy Silt	0	28	35.3911	71.3668	134.222	0	134.222
43	0.184334	20.6276	17.43	Sandy Silt	0	28	32.1687	64.8689	122.001	0	122.001
44	0.184334	18.2712	18.8732	Sandy Silt	0	28	28.7242	57.923	108.938	0	108.938
45	0.184334	15.7995	20.3289	Sandy Silt	0	28	25.0463	50.5064	94.9889	0	94.9889

46	0.184334	13.2095	21.7985	Sandy Silt	0	28	21.1222	42.5933	80.1065	0	80.1065
47	0.184334	10.4974	23.2833	Sandy Silt	0	28	16.9372	34.1542	64.2347	0	64.2347
48	0.184334	7.65936	24.7849	Sandy Silt	0	28	12.4747	25.1554	47.3104	0	47.3104
49	0.184334	4.69079	26.3049	Sandy Silt	0	28	7.71527	15.558	29.2604	0	29.2604
50	0.184334	1.58664	27.8452	Sandy Silt	0	28	2.63677	5.31709	10	0	10

**Global Minimum Query (janbu simplified) - Safety Factor: 1.86526**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.184334	2.03082	-44.8886	Sandy Silt	0	28	57.9394	108.072	203.254	0	203.254
2	0.184334	5.96169	-42.9836	Sandy Silt	0	28	63.5788	118.591	223.038	0	223.038
3	0.184334	9.64251	-41.136	Sandy Silt	0	28	68.9856	128.676	242.004	0	242.004
4	0.184334	13.0943	-39.3391	Sandy Silt	0	28	74.1704	138.347	260.193	0	260.193
5	0.184334	16.3346	-37.5874	Sandy Silt	0	28	79.1445	147.625	277.642	0	277.642
6	0.184334	19.3784	-35.876	Sandy Silt	0	28	83.917	156.527	294.384	0	294.384
7	0.184334	22.2385	-34.2009	Sandy Silt	0	28	88.496	165.068	310.448	0	310.448
8	0.184334	24.9258	-32.5584	Sandy Silt	0	28	92.8895	173.263	325.861	0	325.861
9	0.184334	27.4499	-30.9455	Sandy Silt	0	28	97.1039	181.124	340.645	0	340.645
10	0.184334	29.8191	-29.3595	Sandy Silt	0	28	101.145	188.662	354.821	0	354.821
11	0.184334	32.0408	-27.7977	Sandy Silt	0	28	105.018	195.886	368.408	0	368.408
12	0.184334	34.1213	-26.2581	Sandy Silt	0	28	108.728	202.806	381.423	0	381.423
13	0.184334	36.0665	-24.7387	Sandy Silt	0	28	112.279	209.43	393.881	0	393.881
14	0.184334	37.8812	-23.2377	Sandy Silt	0	28	115.675	215.764	405.793	0	405.793
15	0.184334	39.5701	-21.7533	Sandy Silt	0	28	118.919	221.815	417.174	0	417.174
16	0.184334	41.1372	-20.2842	Sandy Silt	0	28	122.015	227.589	428.033	0	428.033
17	0.184334	42.5859	-18.8289	Sandy Silt	0	28	124.964	233.09	438.379	0	438.379
18	0.184334	43.9194	-17.386	Sandy Silt	0	28	127.769	238.323	448.221	0	448.221
19	0.184334	45.1406	-15.9545	Sandy Silt	0	28	130.433	243.292	457.565	0	457.565
20	0.184334	46.2027	-14.5331	Sandy Silt	0	28	112.251	209.378	393.783	0	393.783
21	0.184334	46.429	-13.1208	Sandy	0	28	67.3225	125.574	236.17	0	236.17

				Silt							
22	0.184334	46.3077	-11.7166	Sandy Silt	0	28	67.6109	126.112	237.183	0	237.183
23	0.184334	46.0824	-10.3195	Sandy Silt	0	28	67.7439	126.36	237.649	0	237.649
24	0.184334	45.7545	-8.92861	Sandy Silt	0	28	67.7209	126.317	237.567	0	237.567
25	0.184334	45.3254	-7.54297	Sandy Silt	0	28	67.5413	125.982	236.937	0	236.937
26	0.184334	44.7961	-6.16177	Sandy Silt	0	28	67.204	125.353	235.755	0	235.755
27	0.184334	44.1675	-4.78415	Sandy Silt	0	28	66.7092	124.43	234.018	0	234.018
28	0.184334	43.4402	-3.4093	Sandy Silt	0	28	66.0546	123.209	231.722	0	231.722
29	0.184334	42.6148	-2.03641	Sandy Silt	0	28	65.2392	121.688	228.861	0	228.861
30	0.184334	41.6915	-	Sandy Silt	0	28	64.2602	119.862	225.428	0	225.428
		0.664693									
31	0.184334	40.6707	0.706644	Sandy Silt	0	28	63.1167	117.729	221.415	0	221.415
32	0.184334	39.5522	2.07839	Sandy Silt	0	28	61.8048	115.282	216.813	0	216.813
33	0.184334	38.3359	3.45132	Sandy Silt	0	28	60.3219	112.516	211.611	0	211.611
34	0.184334	37.0214	4.82624	Sandy Silt	0	28	58.6642	109.424	205.796	0	205.796
35	0.184334	35.6083	6.20396	Sandy Silt	0	28	56.828	105.999	199.355	0	199.355
36	0.184334	34.0958	7.58529	Sandy Silt	0	28	54.809	102.233	192.273	0	192.273
37	0.184334	32.4831	8.97107	Sandy Silt	0	28	52.602	98.1164	184.53	0	184.53
38	0.184334	30.7691	10.3622	Sandy Silt	0	28	50.2011	93.6381	176.108	0	176.108
39	0.184334	28.9525	11.7595	Sandy Silt	0	28	47.6001	88.7865	166.983	0	166.983
40	0.184334	27.0319	13.1639	Sandy Silt	0	28	44.7918	83.5483	157.132	0	157.132
41	0.184334	25.0056	14.5765	Sandy Silt	0	28	41.7681	77.9084	146.525	0	146.525
42	0.184334	22.8715	15.9981	Sandy Silt	0	28	38.5201	71.85	135.13	0	135.13
43	0.184334	20.6276	17.43	Sandy Silt	0	28	35.0374	65.3539	122.913	0	122.913
44	0.184334	18.2712	18.8732	Sandy Silt	0	28	31.3086	58.3987	109.832	0	109.832
45	0.184334	15.7995	20.3289	Sandy Silt	0	28	27.3206	50.9601	95.842	0	95.842
46	0.184334	13.2095	21.7985	Sandy Silt	0	28	23.0586	43.0102	80.8903	0	80.8903
47	0.184334	10.4974	23.2833	Sandy Silt	0	28	18.5055	34.5175	64.9179	0	64.9179
48	0.184334	7.65936	24.7849	Sandy Silt	0	28	13.6417	25.4454	47.8559	0	47.8559
49	0.184334	4.69079	26.3049	Sandy Silt	0	28	8.44499	15.7521	29.6254	0	29.6254

50	0.184334	1.58664	27.8452	Sandy Silt	0	28	2.88903	5.38879	10.1348	0	10.1348
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**Global Minimum Query (spencer) - Safety Factor: 2.01995**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.184334	2.03082	-44.8886	Sandy Silt	0	28	48.5105	97.9887	184.29	0	184.29
2	0.184334	5.96169	-42.9836	Sandy Silt	0	28	53.6112	108.292	203.669	0	203.669
3	0.184334	9.64251	-41.136	Sandy Silt	0	28	58.5643	118.297	222.484	0	222.484
4	0.184334	13.0943	-39.3391	Sandy Silt	0	28	63.3738	128.012	240.756	0	240.756
5	0.184334	16.3346	-37.5874	Sandy Silt	0	28	68.0448	137.447	258.5	0	258.5
6	0.184334	19.3784	-35.876	Sandy Silt	0	28	72.5805	146.609	275.732	0	275.732
7	0.184334	22.2385	-34.2009	Sandy Silt	0	28	76.9856	155.507	292.465	0	292.465
8	0.184334	24.9258	-32.5584	Sandy Silt	0	28	81.2624	164.146	308.714	0	308.714
9	0.184334	27.4499	-30.9455	Sandy Silt	0	28	85.415	172.534	324.489	0	324.489
10	0.184334	29.8191	-29.3595	Sandy Silt	0	28	89.4458	180.676	339.802	0	339.802
11	0.184334	32.0408	-27.7977	Sandy Silt	0	28	93.3578	188.578	354.663	0	354.663
12	0.184334	34.1213	-26.2581	Sandy Silt	0	28	97.1529	196.244	369.082	0	369.082
13	0.184334	36.0665	-24.7387	Sandy Silt	0	28	100.834	203.679	383.064	0	383.064
14	0.184334	37.8812	-23.2377	Sandy Silt	0	28	104.402	210.886	396.619	0	396.619
15	0.184334	39.5701	-21.7533	Sandy Silt	0	28	107.859	217.869	409.752	0	409.752
16	0.184334	41.1372	-20.2842	Sandy Silt	0	28	111.206	224.631	422.47	0	422.47
17	0.184334	42.5859	-18.8289	Sandy Silt	0	28	114.446	231.175	434.777	0	434.777
18	0.184334	43.9194	-17.386	Sandy Silt	0	28	117.579	237.503	446.678	0	446.678
19	0.184334	45.1406	-15.9545	Sandy Silt	0	28	120.605	243.617	458.176	0	458.176
20	0.184334	46.2027	-14.5331	Sandy Silt	0	28	104.29	210.66	396.194	0	396.194
21	0.184334	46.429	-13.1208	Sandy Silt	0	28	62.8466	126.947	238.752	0	238.752
22	0.184334	46.3077	-11.7166	Sandy Silt	0	28	63.4179	128.101	240.924	0	240.924
23	0.184334	46.0824	-10.3195	Sandy Silt	0	28	63.8476	128.969	242.556	0	242.556
24	0.184334	45.7545	-8.92861	Sandy Silt	0	28	64.1333	129.546	243.641	0	243.641
25	0.184334	45.3254	-7.54297	Sandy	0	28	64.2734	129.829	244.174	0	244.174

26	0.184334	44.7961	-6.16177	Silt Sandy Silt	0	28	64.2659	129.814	244.144	0	244.144
27	0.184334	44.1675	-4.78415	Silt Sandy Silt	0	28	64.107	129.493	243.542	0	243.542
28	0.184334	43.4402	-3.4093	Silt Sandy Silt	0	28	63.7951	128.863	242.356	0	242.356
29	0.184334	42.6148	-2.03641	Silt Sandy Silt	0	28	63.3263	127.916	240.574	0	240.574
30	0.184334	41.6915	-	Silt Sandy Silt	0	28	62.6966	126.644	238.182	0	238.182
31	0.184334	40.6707	0.706644	Silt Sandy Silt	0	28	61.9015	125.038	235.163	0	235.163
32	0.184334	39.5522	2.07839	Silt Sandy Silt	0	28	60.9372	123.09	231.498	0	231.498
33	0.184334	38.3359	3.45132	Silt Sandy Silt	0	28	59.797	120.787	227.168	0	227.168
34	0.184334	37.0214	4.82624	Silt Sandy Silt	0	28	58.4762	118.119	222.149	0	222.149
35	0.184334	35.6083	6.20396	Silt Sandy Silt	0	28	56.9673	115.071	216.417	0	216.417
36	0.184334	34.0958	7.58529	Silt Sandy Silt	0	28	55.2628	111.628	209.942	0	209.942
37	0.184334	32.4831	8.97107	Silt Sandy Silt	0	28	53.3543	107.773	202.692	0	202.692
38	0.184334	30.7691	10.3622	Silt Sandy Silt	0	28	51.2325	103.487	194.632	0	194.632
39	0.184334	28.9525	11.7595	Silt Sandy Silt	0	28	48.8869	98.7491	185.72	0	185.72
40	0.184334	27.0319	13.1639	Silt Sandy Silt	0	28	46.305	93.5338	175.912	0	175.912
41	0.184334	25.0056	14.5765	Silt Sandy Silt	0	28	43.4735	87.8143	165.154	0	165.154
42	0.184334	22.8715	15.9981	Silt Sandy Silt	0	28	40.3768	81.5591	153.39	0	153.39
43	0.184334	20.6276	17.43	Silt Sandy Silt	0	28	36.9973	74.7327	140.552	0	140.552
44	0.184334	18.2712	18.8732	Silt Sandy Silt	0	28	33.3149	67.2944	126.562	0	126.562
45	0.184334	15.7995	20.3289	Silt Sandy Silt	0	28	29.3062	59.1971	111.334	0	111.334
46	0.184334	13.2095	21.7985	Silt Sandy Silt	0	28	24.9444	50.3865	94.7633	0	94.7633
47	0.184334	10.4974	23.2833	Silt Sandy Silt	0	28	20.1982	40.7993	76.7325	0	76.7325
48	0.184334	7.65936	24.7849	Silt Sandy Silt	0	28	15.0307	30.3612	57.1013	0	57.1013
49	0.184334	4.69079	26.3049	Silt Sandy Silt	0	28	9.39845	18.9844	35.7045	0	35.7045
50	0.184334	1.58664	27.8452	Silt Sandy Silt	0	28	3.22916	6.52275	12.2675	0	12.2675

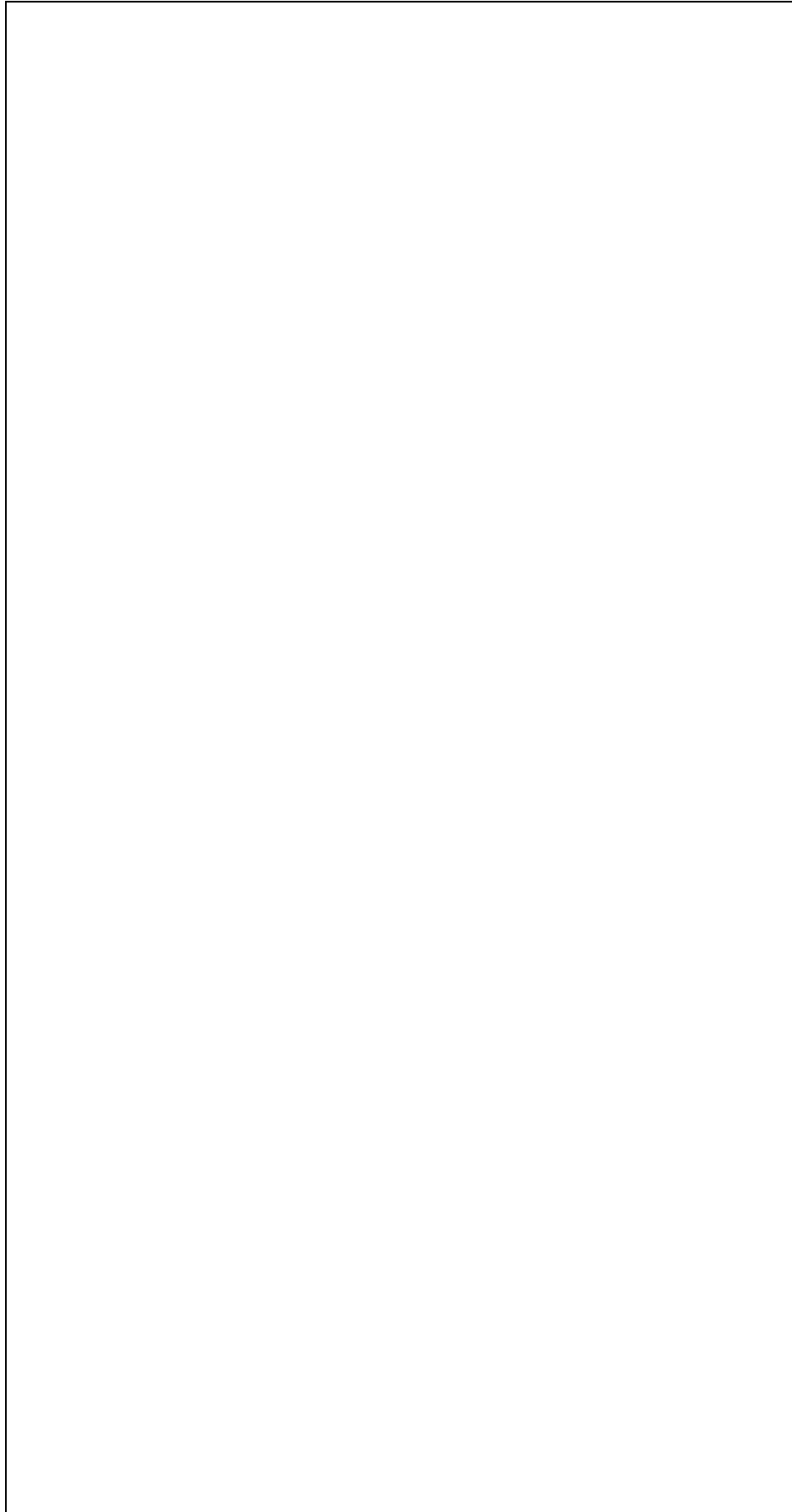
### Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 2.01652

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-22.0294	65.6	0	0	0
2	-21.845	65.4164	27.9137	0	0
3	-21.6607	65.2446	55.8381	0	0
4	-21.4764	65.0836	83.4617	0	0
5	-21.292	64.9325	110.519	0	0
6	-21.1077	64.7906	136.782	0	0
7	-20.9234	64.6573	162.052	0	0
8	-20.739	64.532	186.156	0	0
9	-20.5547	64.4143	208.941	0	0
10	-20.3703	64.3038	230.273	0	0
11	-20.186	64.2001	250.032	0	0
12	-20.0017	64.1029	268.111	0	0
13	-19.8173	64.012	284.414	0	0
14	-19.633	63.927	298.856	0	0
15	-19.4487	63.8479	311.358	0	0
16	-19.2643	63.7743	321.853	0	0
17	-19.08	63.7062	330.276	0	0
18	-18.8957	63.6434	336.571	0	0
19	-18.7113	63.5856	340.686	0	0
20	-18.527	63.5329	342.575	0	0
21	-18.3427	63.4852	342.255	0	0
22	-18.1583	63.4422	340.92	0	0
23	-17.974	63.404	338.451	0	0
24	-17.7897	63.3704	334.866	0	0
25	-17.6053	63.3414	330.187	0	0
26	-17.421	63.317	324.44	0	0
27	-17.2367	63.2971	317.661	0	0
28	-17.0523	63.2817	309.885	0	0
29	-16.868	63.2707	301.159	0	0
30	-16.6837	63.2642	291.53	0	0
31	-16.4993	63.262	281.055	0	0
32	-16.315	63.2643	269.796	0	0
33	-16.1307	63.271	257.819	0	0
34	-15.9463	63.2821	245.201	0	0
35	-15.762	63.2977	232.022	0	0
36	-15.5777	63.3177	218.373	0	0
37	-15.3933	63.3423	204.352	0	0
38	-15.209	63.3714	190.067	0	0
39	-15.0247	63.4051	175.633	0	0
40	-14.8403	63.4434	161.181	0	0
41	-14.656	63.4865	146.849	0	0
42	-14.4717	63.5345	132.791	0	0
43	-14.2873	63.5873	119.175	0	0
44	-14.103	63.6452	106.186	0	0
45	-13.9187	63.7082	94.0275	0	0
46	-13.7343	63.7765	82.9246	0	0
47	-13.55	63.8502	73.1263	0	0
48	-13.3657	63.9296	64.9096	0	0
49	-13.1813	64.0147	58.5838	0	0
50	-12.997	64.1058	54.4957	0	0
51	-12.8127	64.2032	0	0	0

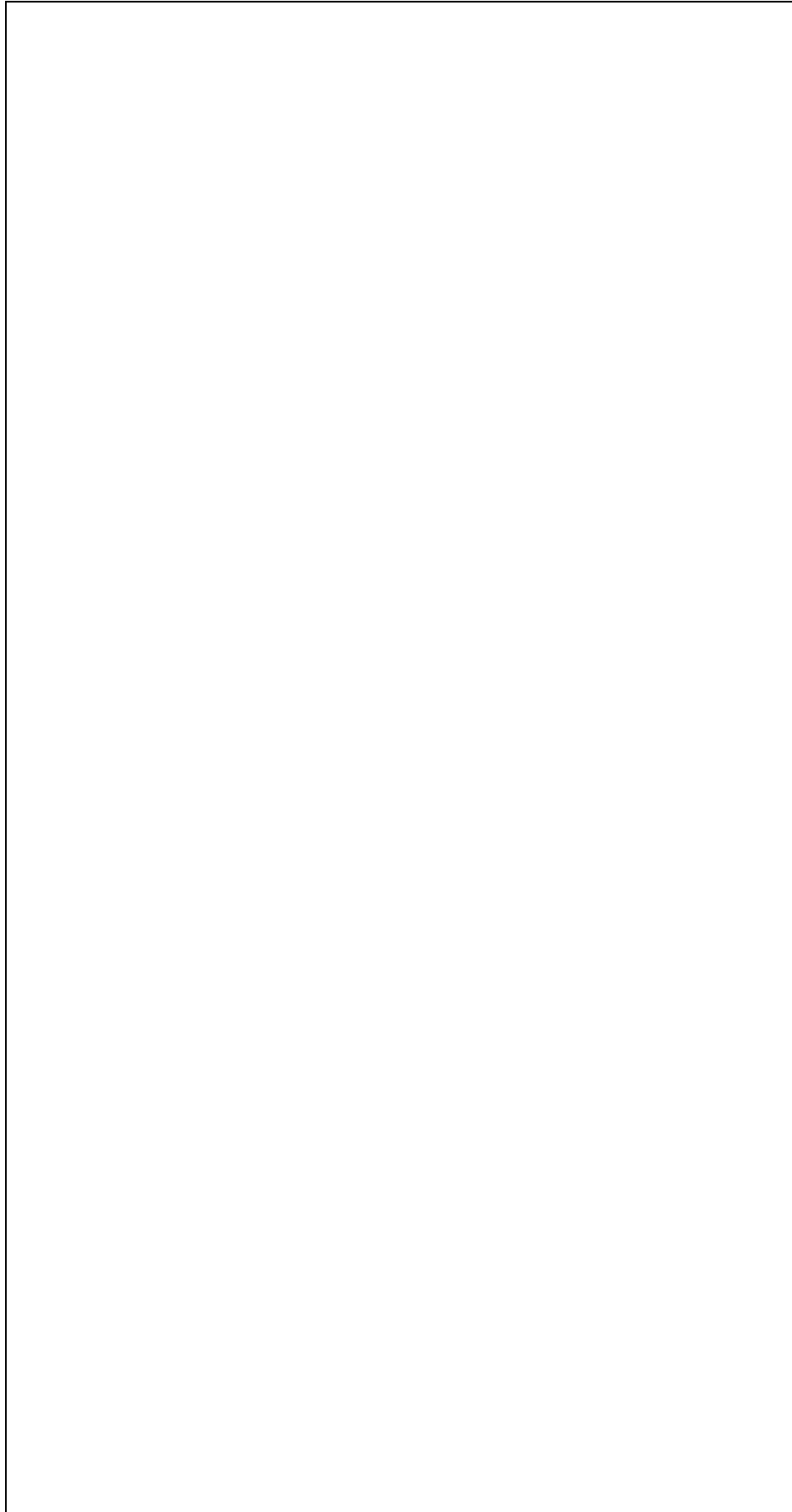


**Global Minimum Query (janbu simplified) - Safety Factor: 1.86526**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-22.0294	65.6	0	0	0
2	-21.845	65.4164	26.6319	0	0
3	-21.6607	65.2446	53.2192	0	0
4	-21.4764	65.0836	79.4568	0	0
5	-21.292	64.9325	105.085	0	0
6	-21.1077	64.7906	129.878	0	0
7	-20.9234	64.6573	153.643	0	0
8	-20.739	64.532	176.209	0	0
9	-20.5547	64.4143	197.425	0	0
10	-20.3703	64.3038	217.158	0	0
11	-20.186	64.2001	235.292	0	0
12	-20.0017	64.1029	251.718	0	0
13	-19.8173	64.012	266.344	0	0
14	-19.633	63.927	279.084	0	0
15	-19.4487	63.8479	289.862	0	0
16	-19.2643	63.7743	298.607	0	0
17	-19.08	63.7062	305.259	0	0
18	-18.8957	63.6434	309.759	0	0
19	-18.7113	63.5856	312.057	0	0
20	-18.527	63.5329	312.107	0	0
21	-18.3427	63.4852	310.215	0	0
22	-18.1583	63.4422	307.942	0	0
23	-17.974	63.404	304.536	0	0
24	-17.7897	63.3704	300.014	0	0
25	-17.6053	63.3414	294.401	0	0
26	-17.421	63.317	287.723	0	0
27	-17.2367	63.2971	280.017	0	0
28	-17.0523	63.2817	271.32	0	0
29	-16.868	63.2707	261.678	0	0
30	-16.6837	63.2642	251.142	0	0
31	-16.4993	63.262	239.769	0	0
32	-16.315	63.2643	227.622	0	0
33	-16.1307	63.271	214.769	0	0
34	-15.9463	63.2821	201.288	0	0
35	-15.762	63.2977	187.262	0	0
36	-15.5777	63.3177	172.783	0	0
37	-15.3933	63.3423	157.952	0	0
38	-15.209	63.3714	142.877	0	0
39	-15.0247	63.4051	127.68	0	0
40	-14.8403	63.4434	112.491	0	0
41	-14.656	63.4865	97.4528	0	0
42	-14.4717	63.5345	82.7235	0	0
43	-14.2873	63.5873	68.4753	0	0
44	-14.103	63.6452	54.898	0	0
45	-13.9187	63.7082	42.2009	0	0
46	-13.7343	63.7765	30.6152	0	0
47	-13.55	63.8502	20.3977	0	0
48	-13.3657	63.9296	11.8342	0	0
49	-13.1813	64.0147	5.24417	0	0
50	-12.997	64.1058	0.986597	0	0
51	-12.8127	64.2032	0	0	0

**Global Minimum Query (spencer) - Safety Factor: 2.01995**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-22.0294	65.6	0	0	0
2	-21.845	65.4164	24.8758	5.26687	11.9545
3	-21.6607	65.2446	49.9595	10.5777	11.9544
4	-21.4764	65.0836	74.9607	15.8712	11.9545
5	-21.292	64.9325	99.6261	21.0935	11.9545
6	-21.1077	64.7906	123.733	26.1975	11.9545
7	-20.9234	64.6573	147.082	31.1412	11.9545
8	-20.739	64.532	169.497	35.887	11.9545
9	-20.5547	64.4143	190.817	40.4011	11.9545
10	-20.3703	64.3038	210.898	44.6528	11.9545
11	-20.186	64.2001	229.608	48.614	11.9545
12	-20.0017	64.1029	246.824	52.2591	11.9545
13	-19.8173	64.012	262.436	55.5647	11.9545
14	-19.633	63.927	276.341	58.5087	11.9545
15	-19.4487	63.8479	288.443	61.071	11.9545
16	-19.2643	63.7743	298.653	63.2328	11.9545
17	-19.08	63.7062	306.889	64.9765	11.9545
18	-18.8957	63.6434	313.071	66.2855	11.9545
19	-18.7113	63.5856	317.128	67.1443	11.9545
20	-18.527	63.5329	318.989	67.5384	11.9545
21	-18.3427	63.4852	318.652	67.4671	11.9545
22	-18.1583	63.4422	317.299	67.1805	11.9545
23	-17.974	63.404	314.792	66.6497	11.9545
24	-17.7897	63.3704	311.136	65.8757	11.9545
25	-17.6053	63.3414	306.342	64.8607	11.9545
26	-17.421	63.317	300.426	63.6082	11.9545
27	-17.2367	63.2971	293.411	62.1228	11.9545
28	-17.0523	63.2817	285.323	60.4105	11.9545
29	-16.868	63.2707	276.197	58.4783	11.9545
30	-16.6837	63.2642	266.074	56.3348	11.9545
31	-16.4993	63.262	254.999	53.99	11.9545
32	-16.315	63.2643	243.027	51.4552	11.9545
33	-16.1307	63.271	230.219	48.7435	11.9545
34	-15.9463	63.2821	216.645	45.8695	11.9545
35	-15.762	63.2977	202.383	42.8499	11.9545
36	-15.5777	63.3177	187.521	39.7032	11.9545
37	-15.3933	63.3423	172.157	36.4502	11.9545
38	-15.209	63.3714	156.4	33.1141	11.9545
39	-15.0247	63.4051	140.374	29.7209	11.9545
40	-14.8403	63.4434	124.215	26.2996	11.9545
41	-14.656	63.4865	108.075	22.8824	11.9545
42	-14.4717	63.5345	92.1262	19.5055	11.9545
43	-14.2873	63.5873	76.5592	16.2096	11.9545
44	-14.103	63.6452	61.5892	13.0401	11.9545
45	-13.9187	63.7082	47.4584	10.0482	11.9545
46	-13.7343	63.7765	34.4403	7.29193	11.9545
47	-13.55	63.8502	22.8452	4.83694	11.9545
48	-13.3657	63.9296	13.0267	2.75809	11.9545
49	-13.1813	64.0147	5.38931	1.14106	11.9545
50	-12.997	64.1058	0.399296	0.0845415	11.9545
51	-12.8127	64.2032	0	0	0

## List Of Coordinates

---

### Water Table

X	Y
-30	56
60	56

### Distributed Load

X	Y
36.1118	67
24	67

### Distributed Load

X	Y
-18.4	65.6
-30	65.6

### External Boundary

X	Y
-18.4	65.6
-30	65.6
-30	63
-30	55
-30	45
60	45
60	55
60	63
60	67
24	67
8	63
0	61
-8	63

### Material Boundary

X	Y
8	63
60	63

### Material Boundary

X	Y
-30	63
-8	63

## Material Boundary

X	Y
-30	55
60	55

## *Slide Analysis Information*

### *286-1224(2) HCFCD Ditch*

#### *Project Summary*

---

File Name: Ditch Right Side.slim  
 Slide Modeler Version: 7.01  
 Project Title: 286-1224(2) HCFCD Ditch  
 Analysis: Short term Analysis  
 Author: Prasoon Tiwari  
 Company: Intertek-PSI  
 Date Created: 11/11/2016, 11:14:19 AM

#### *General Settings*

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Units of Measurement: Imperial Units  
 Time Units: days  
 Permeability Units: feet/second  
 Failure Direction: Right to Left  
 Data Output: Standard  
 Maximum Material Properties: 20  
 Maximum Support Properties: 20

#### *Analysis Options*

---

Slices Type: Vertical

##### Analysis Methods Used

Bishop simplified  
 Janbu simplified  
 Spencer

Number of slices: 50  
 Tolerance: 0.005  
 Maximum number of iterations: 75  
 Check malpha < 0.2: Yes  
 Create Interslice boundaries at intersections with water tables and piezos: Yes  
 Initial trial value of FS: 1  
 Steffensen Iteration: Yes

#### *Groundwater Analysis*

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Groundwater Method: Water Surfaces  
 Pore Fluid Unit Weight [lbs/ft<sup>3</sup>]: 62.4  
 Advanced Groundwater Method: Excess Pore Pressure

## Random Numbers

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Pseudo-random Seed: 10116  
 Random Number Generation Method: Park and Miller v.3

## Surface Options

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Surface Type: Circular  
 Search Method: Grid Search  
 Radius Increment: 10  
 Composite Surfaces: Disabled  
 Reverse Curvature: Invalid Surfaces  
 Minimum Elevation: Not Defined  
 Minimum Depth [ft]: 2  
 Minimum Area: Not Defined  
 Minimum Weight: Not Defined

## Seismic

---

Advanced seismic analysis: No  
 Staged pseudostatic analysis: No

## Loading

---

2 Distributed Loads present

### Distributed Load 1

Distribution: Constant  
 Magnitude [psf]: 250  
 Orientation: Normal to boundary  
 Creates Excess Pore Pressure: No




### Distributed Load 2

Distribution: Constant  
 Magnitude [psf]: 250  
 Orientation: Normal to boundary  
 Creates Excess Pore Pressure: No

## Material Properties

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Property	Sandy Silt	Sandy Lean clay	Silty Sand
Color			
Strength Type	Mohr-Coulomb	Undrained	Mohr-Coulomb
Unit Weight [lbs/ft3]	120	120	120
Cohesion [psf]	0		0
Friction Angle [deg]	28		30
Cohesion Type		1000	
Water Surface	Water Table	Water Table	Water Table
Hu Value	0	0	1
Material Weight Causes Excess Pore Pressure			
B_bar value	0	0	0

## Global Minimums

### Method: bishop simplified

FS	2.500920
Center:	15.161, 102.743
Radius:	39.692
Left Slip Surface Endpoint:	9.707, 63.427
Right Slip Surface Endpoint:	32.422, 67.000
Resisting Moment:	147035 lb-ft
Driving Moment:	58792.3 lb-ft
Total Slice Area:	41.2381 ft2
Surface Horizontal Width:	22.7157 ft
Surface Average Height:	1.8154 ft

### Method: janbu simplified

FS	2.370580
Center:	15.161, 71.184
Radius:	8.144
Left Slip Surface Endpoint:	11.545, 63.886
Right Slip Surface Endpoint:	21.786, 66.446
Resisting Horizontal Force:	851.658 lb
Driving Horizontal Force:	359.261 lb
Total Slice Area:	14.0193 ft2
Surface Horizontal Width:	10.2406 ft
Surface Average Height:	1.369 ft

### Method: spencer

FS	2.504230
Center:	15.161, 102.743
Radius:	39.692
Left Slip Surface Endpoint:	9.707, 63.427
Right Slip Surface Endpoint:	32.422, 67.000
Resisting Moment:	147230 lb-ft
Driving Moment:	58792.3 lb-ft
Resisting Horizontal Force:	3588.94 lb
Driving Horizontal Force:	1433.15 lb
Total Slice Area:	41.2381 ft <sup>2</sup>
Surface Horizontal Width:	22.7157 ft
Surface Average Height:	1.8154 ft

## Valid / Invalid Surfaces

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### Method: bishop simplified

Number of Valid Surfaces: 3094  
 Number of Invalid Surfaces: 1757

#### Error Codes:

Error Code -103 reported for 558 surfaces  
 Error Code -107 reported for 622 surfaces  
 Error Code -108 reported for 10 surfaces  
 Error Code -112 reported for 6 surfaces  
 Error Code -115 reported for 561 surfaces

### Method: janbu simplified

Number of Valid Surfaces: 3034  
 Number of Invalid Surfaces: 1817

#### Error Codes:

Error Code -103 reported for 558 surfaces  
 Error Code -107 reported for 622 surfaces  
 Error Code -108 reported for 70 surfaces  
 Error Code -112 reported for 6 surfaces  
 Error Code -115 reported for 561 surfaces

### Method: spencer

Number of Valid Surfaces: 3024  
 Number of Invalid Surfaces: 1827

#### Error Codes:

Error Code -103 reported for 558 surfaces  
 Error Code -107 reported for 622 surfaces  
 Error Code -108 reported for 80 surfaces  
 Error Code -112 reported for 6 surfaces  
 Error Code -115 reported for 561 surfaces

## Error Codes

The following errors were encountered during the computation:

- 103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
- 107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
- 108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
- 112 = The coefficient  $M\text{-Alpha} = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi))/F < 0.2$  for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.
- 115 = Surface too shallow, below the minimum depth.

## Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 2.50092

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.454314	4.74122	-7.56737	Sandy Silt	0	28	2.28323	5.71018	10.7393	0	10.7393
2	0.454314	14.0785	-6.90629	Sandy Silt	0	28	6.76243	16.9123	31.8073	0	31.8073
3	0.454314	23.1259	-6.24613	Sandy Silt	0	28	11.08	27.7103	52.1156	0	52.1156
4	0.454314	31.8848	-5.58681	Sandy Silt	0	28	15.238	38.109	71.6725	0	71.6725
5	0.454314	40.356	-4.92822	Sandy Silt	0	28	19.238	48.1128	90.4872	0	90.4872
6	0.454314	48.5406	-4.27029	Sandy Silt	0	28	23.0819	57.7261	108.567	0	108.567
7	0.454314	56.4393	-3.61293	Sandy Silt	0	28	26.7713	66.9528	125.92	0	125.92
8	0.454314	64.0527	-2.95604	Sandy Silt	0	28	30.3075	75.7966	142.553	0	142.553
9	0.454314	71.3815	-2.29953	Sandy Silt	0	28	33.6921	84.2612	158.472	0	158.472
10	0.454314	78.4261	-1.64333	Sandy Silt	0	28	36.9263	92.3498	173.685	0	173.685
11	0.454314	85.1869	-0.987347	Sandy Silt	0	28	40.0117	100.066	188.196	0	188.196
12	0.454314	91.664	-0.331491	Sandy Silt	0	28	42.949	107.412	202.012	0	202.012
13	0.454314	97.8576	0.324321	Sandy Silt	0	28	45.7396	114.391	215.138	0	215.138
14	0.454314	103.768	0.980176	Sandy Silt	0	28	48.3842	121.005	227.578	0	227.578
15	0.454314	109.394	1.63616	Sandy Silt	0	28	50.8841	127.257	239.336	0	239.336
16	0.454314	114.737	2.29236	Sandy Silt	0	28	53.2404	133.15	250.419	0	250.419
17	0.454314	119.795	2.94886	Sandy	0	28	55.4532	138.684	260.826	0	260.826

				Silt							
18	0.454314	124.569	3.60574	Sandy Silt	0	28	57.524	143.863	270.567	0	270.567
19	0.454314	129.057	4.2631	Sandy Silt	0	28	59.4529	148.687	279.638	0	279.638
20	0.454314	133.26	4.92103	Sandy Silt	0	28	61.2407	153.158	288.05	0	288.05
21	0.454314	137.176	5.5796	Sandy Silt	0	28	62.8885	157.279	295.798	0	295.798
22	0.454314	140.804	6.23892	Sandy Silt	0	28	64.3959	161.049	302.888	0	302.888
23	0.454314	144.144	6.89907	Sandy Silt	0	28	65.7638	164.47	309.322	0	309.322
24	0.454314	147.194	7.56013	Sandy Silt	0	28	66.9925	167.543	315.101	0	315.101
25	0.454314	149.953	8.22222	Sandy Silt	0	28	68.0821	170.268	320.228	0	320.228
26	0.454314	152.419	8.88541	Sandy Silt	0	28	69.0338	172.648	324.703	0	324.703
27	0.454314	154.592	9.5498	Sandy Silt	0	28	69.8467	174.681	328.528	0	328.528
28	0.454314	156.469	10.2155	Sandy Silt	0	28	70.5212	176.368	331.7	0	331.7
29	0.454314	158.048	10.8826	Sandy Silt	0	28	71.0579	177.71	334.224	0	334.224
30	0.454314	159.328	11.5512	Sandy Silt	0	28	71.4565	178.707	336.099	0	336.099
31	0.454314	160.307	12.2213	Sandy Silt	0	28	71.7168	179.358	337.323	0	337.323
32	0.454314	160.083	12.8932	Sandy Silt	0	28	98.7453	246.954	464.453	0	464.453
33	0.454314	154.918	13.5669	Sandy Silt	0	28	119.518	298.905	562.158	0	562.158
34	0.454314	148.786	14.2425	Sandy Silt	0	28	116.494	291.341	547.932	0	547.932
35	0.454314	142.343	14.9202	Sandy Silt	0	28	113.344	283.464	533.119	0	533.119
36	0.454314	135.586	15.6	Sandy Silt	0	28	110.069	275.274	517.714	0	517.714
37	0.454314	128.511	16.282	Sandy Silt	0	28	106.668	266.768	501.718	0	501.718
38	0.454314	121.116	16.9664	Sandy Silt	0	28	103.141	257.947	485.129	0	485.129
39	0.454314	113.396	17.6534	Sandy Silt	0	28	99.4874	248.81	467.943	0	467.943
40	0.454314	105.349	18.3429	Sandy Silt	0	28	95.7064	239.354	450.159	0	450.159
41	0.454314	96.9704	19.0352	Sandy Silt	0	28	91.7982	229.58	431.777	0	431.777
42	0.454314	88.2562	19.7305	Sandy Silt	0	28	87.7617	219.485	412.792	0	412.792
43	0.454314	79.2019	20.4287	Sandy Silt	0	28	83.5968	209.069	393.202	0	393.202
44	0.454314	69.8032	21.1302	Sandy Silt	0	28	79.3024	198.329	373.002	0	373.002
45	0.454314	60.0551	21.8349	Sandy Silt	0	28	74.878	187.264	352.191	0	352.191

46	0.454314	49.9524	22.5432	Sandy Silt	0	28	70.3225	175.871	330.765	0	330.765
47	0.454314	39.4899	23.2551	Sandy Silt	0	28	65.6358	164.15	308.721	0	308.721
48	0.454314	28.6618	23.9709	Sandy Silt	0	28	60.8164	152.097	286.052	0	286.052
49	0.454314	17.462	24.6906	Sandy Silt	0	28	55.8634	139.71	262.757	0	262.757
50	0.454314	5.88424	25.4146	Sandy Silt	0	28	50.7765	126.988	238.83	0	238.83

**Global Minimum Query (janbu simplified) - Safety Factor: 2.37058**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.204811	1.83287	-25.5589	Sandy Silt	0	28	2.24841	5.33004	10.0243	0	10.0243
2	0.204811	5.41405	-23.9719	Sandy Silt	0	28	6.5859	15.6124	29.3627	0	29.3627
3	0.204811	8.82916	-22.4041	Sandy Silt	0	28	10.6543	25.2568	47.5009	0	47.5009
4	0.204811	12.084	-20.8539	Sandy Silt	0	28	14.4699	34.302	64.5124	0	64.5124
5	0.204811	15.1835	-19.3195	Sandy Silt	0	28	18.047	42.7819	80.4612	0	80.4612
6	0.204811	18.1323	-17.7994	Sandy Silt	0	28	21.3982	50.7261	95.4019	0	95.4019
7	0.204811	20.9344	-16.2922	Sandy Silt	0	28	24.5343	58.1605	109.384	0	109.384
8	0.204811	23.5933	-14.7965	Sandy Silt	0	28	27.4649	65.1078	122.45	0	122.45
9	0.204811	26.112	-13.311	Sandy Silt	0	28	30.1986	71.5881	134.638	0	134.638
10	0.204811	28.4933	-11.8345	Sandy Silt	0	28	32.7427	77.6193	145.981	0	145.981
11	0.204811	30.7395	-10.3661	Sandy Silt	0	28	35.104	83.2169	156.508	0	156.508
12	0.204811	32.8526	-8.90443	Sandy Silt	0	28	37.2883	88.3948	166.246	0	166.246
13	0.204811	34.8344	-7.44863	Sandy Silt	0	28	39.3007	93.1655	175.219	0	175.219
14	0.204811	36.6863	-5.99764	Sandy Silt	0	28	41.146	97.5398	183.446	0	183.446
15	0.204811	38.4095	-4.55052	Sandy Silt	0	28	42.8279	101.527	190.945	0	190.945
16	0.204811	40.0048	-3.10629	Sandy Silt	0	28	44.3503	105.136	197.732	0	197.732
17	0.204811	41.473	-1.66404	Sandy Silt	0	28	45.7162	108.374	203.822	0	203.822
18	0.204811	42.8143	-0.222849	Sandy Silt	0	28	46.9282	111.247	209.225	0	209.225
19	0.204811	44.029	1.2182	Sandy Silt	0	28	47.9887	113.761	213.953	0	213.953
20	0.204811	45.117	2.66003	Sandy Silt	0	28	48.8994	115.92	218.014	0	218.014
21	0.204811	46.0779	4.10354	Sandy	0	28	49.6621	117.728	221.414	0	221.414

				Silt							
22	0.204811	46.9112	5.54967	Sandy Silt	0	28	50.278	119.188	224.161	0	224.161
23	0.204811	47.6161	6.99936	Sandy Silt	0	28	50.7483	120.303	226.257	0	226.257
24	0.204811	48.1914	8.45357	Sandy Silt	0	28	51.0736	121.074	227.707	0	227.707
25	0.204811	48.6359	9.91329	Sandy Silt	0	28	51.2537	121.501	228.51	0	228.51
26	0.204811	48.948	11.3795	Sandy Silt	0	28	51.2891	121.585	228.668	0	228.668
27	0.204811	49.1256	12.8534	Sandy Silt	0	28	51.1795	121.325	228.18	0	228.18
28	0.204811	49.1665	14.336	Sandy Silt	0	28	50.9247	120.721	227.043	0	227.043
29	0.204811	49.0681	15.8284	Sandy Silt	0	28	50.5235	119.77	225.254	0	225.254
30	0.204811	48.8276	17.3319	Sandy Silt	0	28	49.9747	118.469	222.807	0	222.807
31	0.204811	48.4414	18.8479	Sandy Silt	0	28	49.277	116.815	219.696	0	219.696
32	0.204811	47.9058	20.3777	Sandy Silt	0	28	48.4282	114.803	215.913	0	215.913
33	0.204811	47.2164	21.9229	Sandy Silt	0	28	47.4268	112.429	211.449	0	211.449
34	0.204811	46.3683	23.485	Sandy Silt	0	28	46.2701	109.687	206.291	0	206.291
35	0.204811	45.356	25.0659	Sandy Silt	0	28	44.9548	106.569	200.427	0	200.427
36	0.204811	44.1732	26.6674	Sandy Silt	0	28	43.4775	103.067	193.842	0	193.842
37	0.204811	42.8128	28.2918	Sandy Silt	0	28	41.835	99.1732	186.518	0	186.518
38	0.204811	41.2669	29.9414	Sandy Silt	0	28	40.0221	94.8757	178.435	0	178.435
39	0.204811	39.5261	31.6188	Sandy Silt	0	28	38.0342	90.1631	169.572	0	169.572
40	0.204811	37.58	33.3271	Sandy Silt	0	28	35.8654	85.0219	159.903	0	159.903
41	0.204811	35.4166	35.0696	Sandy Silt	0	28	33.5095	79.4369	149.399	0	149.399
42	0.204811	33.0219	36.8502	Sandy Silt	0	28	30.959	73.3909	138.028	0	138.028
43	0.204811	30.3795	38.6734	Sandy Silt	0	28	28.206	66.8645	125.754	0	125.754
44	0.204811	27.4705	40.5443	Sandy Silt	0	28	25.241	59.8358	112.535	0	112.535
45	0.204811	24.2722	42.4691	Sandy Silt	0	28	22.0535	52.2797	98.324	0	98.324
46	0.204811	20.7574	44.4551	Sandy Silt	0	28	18.6319	44.1683	83.0684	0	83.0684
47	0.204811	16.8932	46.5113	Sandy Silt	0	28	14.9624	35.4695	66.7085	0	66.7085
48	0.204811	12.6386	48.6487	Sandy Silt	0	28	11.03	26.1475	49.1763	0	49.1763
49	0.204811	7.94245	50.8811	Sandy Silt	0	28	6.81766	16.1618	30.396	0	30.396

50	0.204811	2.73838	53.2265	Sandy Silt	0	28	2.30664	5.46808	10.284	0	10.284
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**Global Minimum Query (spencer) - Safety Factor: 2.50423**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.454314	4.74122	-7.56737	Sandy Silt	0	28	2.45375	6.14476	11.5566	0	11.5566
2	0.454314	14.0785	-6.90629	Sandy Silt	0	28	7.24758	18.1496	34.1343	0	34.1343
3	0.454314	23.1259	-6.24613	Sandy Silt	0	28	11.8427	29.6569	55.7766	0	55.7766
4	0.454314	31.8848	-5.58681	Sandy Silt	0	28	16.2432	40.6768	76.5018	0	76.5018
5	0.454314	40.356	-4.92822	Sandy Silt	0	28	20.4527	51.2183	96.3278	0	96.3278
6	0.454314	48.5406	-4.27029	Sandy Silt	0	28	24.4748	61.2906	115.271	0	115.271
7	0.454314	56.4393	-3.61293	Sandy Silt	0	28	28.3129	70.9019	133.347	0	133.347
8	0.454314	64.0527	-2.95604	Sandy Silt	0	28	31.97	80.0602	150.571	0	150.571
9	0.454314	71.3815	-2.29953	Sandy Silt	0	28	35.4493	88.7732	166.958	0	166.958
10	0.454314	78.4261	-1.64333	Sandy Silt	0	28	38.7537	97.0481	182.521	0	182.521
11	0.454314	85.1869	-0.987347	Sandy Silt	0	28	41.8859	104.892	197.273	0	197.273
12	0.454314	91.664	-0.331491	Sandy Silt	0	28	44.8485	112.311	211.226	0	211.226
13	0.454314	97.8576	0.324321	Sandy Silt	0	28	47.6438	119.311	224.392	0	224.392
14	0.454314	103.768	0.980176	Sandy Silt	0	28	50.2745	125.899	236.782	0	236.782
15	0.454314	109.394	1.63616	Sandy Silt	0	28	52.7424	132.079	248.405	0	248.405
16	0.454314	114.737	2.29236	Sandy Silt	0	28	55.0501	137.858	259.274	0	259.274
17	0.454314	119.795	2.94886	Sandy Silt	0	28	57.1996	143.241	269.397	0	269.397
18	0.454314	124.569	3.60574	Sandy Silt	0	28	59.1922	148.231	278.783	0	278.783
19	0.454314	129.057	4.2631	Sandy Silt	0	28	61.0303	152.834	287.44	0	287.44
20	0.454314	133.26	4.92103	Sandy Silt	0	28	62.7155	157.054	295.376	0	295.376
21	0.454314	137.176	5.5796	Sandy Silt	0	28	64.2493	160.895	302.601	0	302.601
22	0.454314	140.804	6.23892	Sandy Silt	0	28	65.6333	164.361	309.118	0	309.118
23	0.454314	144.144	6.89907	Sandy Silt	0	28	66.8693	167.456	314.938	0	314.938
24	0.454314	147.194	7.56013	Sandy Silt	0	28	67.9578	170.182	320.067	0	320.067
25	0.454314	149.953	8.22222	Sandy	0	28	68.901	172.544	324.509	0	324.509

				Silt							
26	0.454314	152.419	8.88541	Sandy Silt	0	28	69.6997	174.544	328.27	0	328.27
27	0.454314	154.592	9.5498	Sandy Silt	0	28	70.3554	176.186	331.358	0	331.358
28	0.454314	156.469	10.2155	Sandy Silt	0	28	70.8689	177.472	333.775	0	333.775
29	0.454314	158.048	10.8826	Sandy Silt	0	28	71.2411	178.404	335.529	0	335.529
30	0.454314	159.328	11.5512	Sandy Silt	0	28	71.4731	178.985	336.623	0	336.623
31	0.454314	160.307	12.2213	Sandy Silt	0	28	71.5661	179.218	337.06	0	337.06
32	0.454314	160.083	12.8932	Sandy Silt	0	28	98.3073	246.184	463.005	0	463.005
33	0.454314	154.918	13.5669	Sandy Silt	0	28	118.709	297.275	559.094	0	559.094
34	0.454314	148.786	14.2425	Sandy Silt	0	28	115.435	289.075	543.669	0	543.669
35	0.454314	142.343	14.9202	Sandy Silt	0	28	112.05	280.599	527.732	0	527.732
36	0.454314	135.586	15.6	Sandy Silt	0	28	108.557	271.851	511.277	0	511.277
37	0.454314	128.511	16.282	Sandy Silt	0	28	104.955	262.831	494.314	0	494.314
38	0.454314	121.116	16.9664	Sandy Silt	0	28	101.245	253.54	476.84	0	476.84
39	0.454314	113.396	17.6534	Sandy Silt	0	28	97.4272	243.98	458.859	0	458.859
40	0.454314	105.349	18.3429	Sandy Silt	0	28	93.5018	234.15	440.373	0	440.373
41	0.454314	96.9704	19.0352	Sandy Silt	0	28	89.4694	224.052	421.381	0	421.381
42	0.454314	88.2562	19.7305	Sandy Silt	0	28	85.3304	213.687	401.888	0	401.888
43	0.454314	79.2019	20.4287	Sandy Silt	0	28	81.0852	203.056	381.892	0	381.892
44	0.454314	69.8032	21.1302	Sandy Silt	0	28	76.7334	192.158	361.396	0	361.396
45	0.454314	60.0551	21.8349	Sandy Silt	0	28	72.2757	180.995	340.403	0	340.403
46	0.454314	49.9524	22.5432	Sandy Silt	0	28	67.7126	169.568	318.911	0	318.911
47	0.454314	39.4899	23.2551	Sandy Silt	0	28	63.0437	157.876	296.921	0	296.921
48	0.454314	28.6618	23.9709	Sandy Silt	0	28	58.2694	145.92	274.435	0	274.435
49	0.454314	17.462	24.6906	Sandy Silt	0	28	53.3901	133.701	251.456	0	251.456
50	0.454314	5.88424	25.4146	Sandy Silt	0	28	48.4476	121.324	228.178	0	228.178

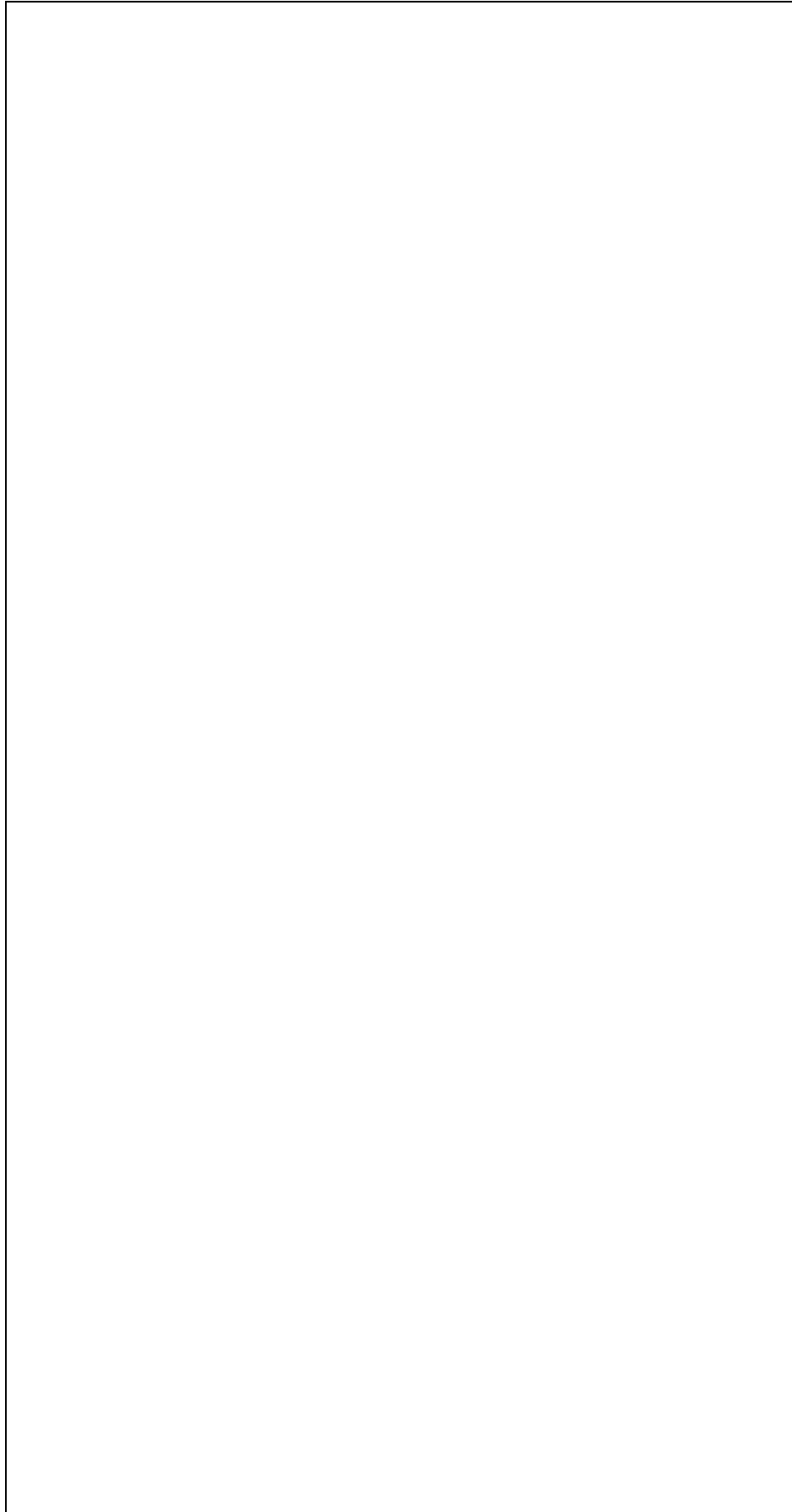
**Interslice Data**

Global Minimum Query (bishop simplified) - Safety Factor: 2.50092



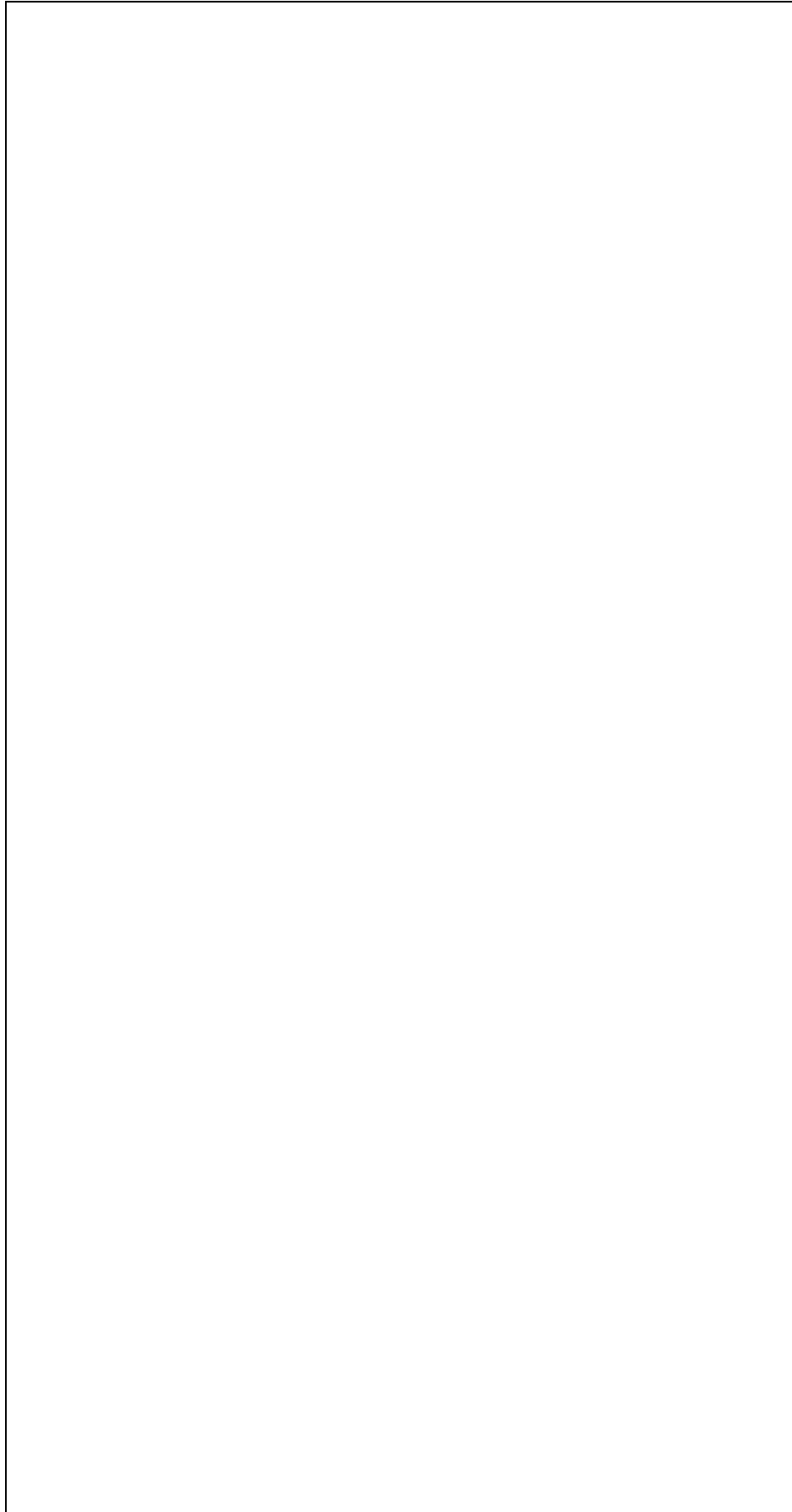
Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	9.70673	63.4267	0	0	0
2	10.161	63.3663	1.6853	0	0
3	10.6154	63.3113	6.50736	0	0
4	11.0697	63.2616	14.1318	0	0
5	11.524	63.2171	24.2386	0	0
6	11.9783	63.178	36.522	0	0
7	12.4326	63.144	50.6896	0	0
8	12.8869	63.1154	66.4622	0	0
9	13.3412	63.0919	83.5733	0	0
10	13.7956	63.0736	101.769	0	0
11	14.2499	63.0606	120.806	0	0
12	14.7042	63.0528	140.454	0	0
13	15.1585	63.0502	160.494	0	0
14	15.6128	63.0527	180.717	0	0
15	16.0671	63.0605	200.926	0	0
16	16.5214	63.0735	220.934	0	0
17	16.9757	63.0917	240.564	0	0
18	17.4301	63.1151	259.648	0	0
19	17.8844	63.1437	278.032	0	0
20	18.3387	63.1776	295.568	0	0
21	18.793	63.2167	312.118	0	0
22	19.2473	63.2611	327.556	0	0
23	19.7016	63.3107	341.764	0	0
24	20.1559	63.3657	354.632	0	0
25	20.6103	63.426	366.063	0	0
26	21.0646	63.4916	375.967	0	0
27	21.5189	63.5627	384.262	0	0
28	21.9732	63.6391	390.879	0	0
29	22.4275	63.721	395.756	0	0
30	22.8818	63.8083	398.841	0	0
31	23.3361	63.9012	400.091	0	0
32	23.7905	63.9996	399.474	0	0
33	24.2448	64.1036	396.027	0	0
34	24.6991	64.2132	388.686	0	0
35	25.1534	64.3285	378.415	0	0
36	25.6077	64.4496	365.363	0	0
37	26.062	64.5764	349.691	0	0
38	26.5163	64.7091	331.567	0	0
39	26.9706	64.8477	311.176	0	0
40	27.425	64.9923	288.71	0	0
41	27.8793	65.1429	264.377	0	0
42	28.3336	65.2997	238.397	0	0
43	28.7879	65.4626	211.001	0	0
44	29.2422	65.6318	182.437	0	0
45	29.6965	65.8074	152.968	0	0
46	30.1508	65.9894	122.869	0	0
47	30.6052	66.178	92.4353	0	0
48	31.0595	66.3733	61.9759	0	0
49	31.5138	66.5753	31.8192	0	0
50	31.9681	66.7841	2.31229	0	0
51	32.4224	67	0	0	0

**Global Minimum Query (janbu simplified) - Safety Factor: 2.37058**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	11.5451	63.8863	0	0	0
2	11.7499	63.7883	1.44237	0	0
3	11.9547	63.6973	5.46521	0	0
4	12.1595	63.6128	11.658	0	0
5	12.3644	63.5348	19.655	0	0
6	12.5692	63.463	29.1285	0	0
7	12.774	63.3972	39.7842	0	0
8	12.9788	63.3374	51.3569	0	0
9	13.1836	63.2833	63.6065	0	0
10	13.3884	63.2348	76.3156	0	0
11	13.5932	63.1919	89.2866	0	0
12	13.798	63.1545	102.34	0	0
13	14.0028	63.1224	115.311	0	0
14	14.2077	63.0956	128.052	0	0
15	14.4125	63.0741	140.427	0	0
16	14.6173	63.0578	152.311	0	0
17	14.8221	63.0467	163.592	0	0
18	15.0269	63.0407	174.168	0	0
19	15.2317	63.0399	183.946	0	0
20	15.4365	63.0443	192.843	0	0
21	15.6413	63.0538	200.783	0	0
22	15.8461	63.0685	207.701	0	0
23	16.051	63.0884	213.538	0	0
24	16.2558	63.1135	218.242	0	0
25	16.4606	63.144	221.772	0	0
26	16.6654	63.1797	224.09	0	0
27	16.8702	63.221	225.168	0	0
28	17.075	63.2677	224.987	0	0
29	17.2798	63.32	223.533	0	0
30	17.4846	63.3781	220.801	0	0
31	17.6894	63.442	216.795	0	0
32	17.8943	63.5119	211.527	0	0
33	18.0991	63.588	205.02	0	0
34	18.3039	63.6704	197.304	0	0
35	18.5087	63.7594	188.423	0	0
36	18.7135	63.8552	178.431	0	0
37	18.9183	63.9581	167.396	0	0
38	19.1231	64.0683	155.402	0	0
39	19.3279	64.1863	142.549	0	0
40	19.5327	64.3124	128.957	0	0
41	19.7376	64.4471	114.768	0	0
42	19.9424	64.5909	100.15	0	0
43	20.1472	64.7444	85.3038	0	0
44	20.352	64.9083	70.466	0	0
45	20.5568	65.0835	55.9197	0	0
46	20.7616	65.271	42.0035	0	0
47	20.9664	65.4719	29.1267	0	0
48	21.1712	65.6878	17.7881	0	0
49	21.376	65.9205	8.60327	0	0
50	21.5809	66.1724	2.34437	0	0
51	21.7857	66.4464	0	0	0

**Global Minimum Query (spencer) - Safety Factor: 2.50423**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	9.70673	63.4267	0	0	0
2	10.161	63.3663	1.81251	0.362502	11.3099
3	10.6154	63.3113	6.98424	1.39685	11.3099
4	11.0697	63.2616	15.1391	3.02783	11.31
5	11.524	63.2171	25.92	5.184	11.3099
6	11.9783	63.178	38.9874	7.79749	11.3099
7	12.4326	63.144	54.0194	10.8039	11.31
8	12.8869	63.1154	70.7102	14.142	11.3099
9	13.3412	63.0919	88.7701	17.754	11.3099
10	13.7956	63.0736	107.924	21.5849	11.31
11	14.2499	63.0606	127.914	25.5827	11.3099
12	14.7042	63.0528	148.491	29.6983	11.31
13	15.1585	63.0502	169.426	33.8852	11.3099
14	15.6128	63.0527	190.499	38.0998	11.3099
15	16.0671	63.0605	211.504	42.3007	11.3099
16	16.5214	63.0735	232.247	46.4494	11.3099
17	16.9757	63.0917	252.547	50.5094	11.3099
18	17.4301	63.1151	272.234	54.4469	11.31
19	17.8844	63.1437	291.151	58.2301	11.3099
20	18.3387	63.1776	309.149	61.8298	11.3099
21	18.793	63.2167	326.094	65.2187	11.3099
22	19.2473	63.2611	341.859	68.3718	11.3099
23	19.7016	63.3107	356.331	71.2661	11.3099
24	20.1559	63.3657	369.404	73.8809	11.3099
25	20.6103	63.426	380.986	76.1972	11.3099
26	21.0646	63.4916	390.992	78.1985	11.3099
27	21.5189	63.5627	399.349	79.8698	11.3099
28	21.9732	63.6391	405.993	81.1986	11.3099
29	22.4275	63.721	410.87	82.174	11.3099
30	22.8818	63.8083	413.936	82.7873	11.3099
31	23.3361	63.9012	415.158	83.0315	11.3099
32	23.7905	63.9996	414.51	82.9021	11.3099
33	24.2448	64.1036	411.032	82.2064	11.3099
34	24.6991	64.2132	403.68	80.7359	11.3099
35	25.1534	64.3285	393.439	78.6879	11.3099
36	25.6077	64.4496	380.472	76.0943	11.3099
37	26.062	64.5764	364.947	72.9894	11.3099
38	26.5163	64.7091	347.046	69.4093	11.3099
39	26.9706	64.8477	326.96	65.392	11.3099
40	27.425	64.9923	304.889	60.9777	11.3099
41	27.8793	65.1429	281.045	56.2089	11.3099
42	28.3336	65.2997	255.651	51.1302	11.3099
43	28.7879	65.4626	228.942	45.7885	11.31
44	29.2422	65.6318	201.166	40.2331	11.3099
45	29.6965	65.8074	172.58	34.516	11.3099
46	30.1508	65.9894	143.458	28.6916	11.3099
47	30.6052	66.178	114.086	22.8172	11.3099
48	31.0595	66.3733	84.7636	16.9527	11.3099
49	31.5138	66.5753	55.8066	11.1613	11.3099
50	31.9681	66.7841	27.5459	5.50919	11.31
51	32.4224	67	0	0	0

## List Of Coordinates

---

### Water Table

X	Y
-30	56
60	56

### Distributed Load

X	Y
36.1118	67
24	67

### Distributed Load

X	Y
-18.4	65.6
-30	65.6

### External Boundary

X	Y
-18.4	65.6
-30	65.6
-30	63
-30	55
-30	45
60	45
60	55
60	63
60	67
24	67
8	63
0	61
-8	63

### Material Boundary

X	Y
8	63
60	63

### Material Boundary

X	Y
-30	63
-8	63

## Material Boundary

X	Y
-30	55
60	55

## *Slide Analysis Information*

### *286-1224(2) HCFCD Ditch*

#### *Project Summary*

---

File Name: Ditch Left Side.slim  
 Slide Modeler Version: 7.01  
 Project Title: 286-1224(2) HCFCD Ditch  
 Analysis: Long term Analysis  
 Author: Prasoon Tiwari  
 Company: Intertek-PSI  
 Date Created: 11/11/2016, 11:14:19 AM

#### *General Settings*

---

Units of Measurement: Imperial Units  
 Time Units: days  
 Permeability Units: feet/second  
 Failure Direction: Left to Right  
 Data Output: Standard  
 Maximum Material Properties: 20  
 Maximum Support Properties: 20

#### *Analysis Options*

---

Slices Type: Vertical

##### Analysis Methods Used

Bishop simplified  
 Janbu simplified  
 Spencer

Number of slices: 50  
 Tolerance: 0.005  
 Maximum number of iterations: 75  
 Check malpha < 0.2: Yes  
 Create Interslice boundaries at intersections with water tables and piezos: Yes  
 Initial trial value of FS: 1  
 Steffensen Iteration: Yes

#### *Groundwater Analysis*

---



Groundwater Method: Water Surfaces  
 Pore Fluid Unit Weight [lbs/ft<sup>3</sup>]: 62.4  
 Advanced Groundwater Method: None

## Random Numbers

---

Pseudo-random Seed: 10116  
 Random Number Generation Method: Park and Miller v.3

## Surface Options

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Surface Type: Circular  
 Search Method: Grid Search  
 Radius Increment: 10  
 Composite Surfaces: Disabled  
 Reverse Curvature: Invalid Surfaces  
 Minimum Elevation: Not Defined  
 Minimum Depth [ft]: 2  
 Minimum Area: Not Defined  
 Minimum Weight: Not Defined

## Seismic

---

Advanced seismic analysis: No  
 Staged pseudostatic analysis: No

## Loading

---

2 Distributed Loads present

### Distributed Load 1

Distribution: Constant  
 Magnitude [psf]: 250  
 Orientation: Normal to boundary




### Distributed Load 2

Distribution: Constant  
 Magnitude [psf]: 250  
 Orientation: Normal to boundary

## Material Properties

---



Property	Sandy Silt	Silty Sand	Sandy Lean clay
Color			
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft <sup>3</sup> ]	120	120	120
Cohesion [psf]	0	0	150
Friction Angle [deg]	28	30	25
Water Surface	Water Table	Water Table	Water Table
Hu Value	0	1	1

## Global Minimums

### Method: bishop simplified

FS	1.946350
Center:	-15.295, 72.440
Radius:	9.420
Left Slip Surface Endpoint:	-21.771, 65.600
Right Slip Surface Endpoint:	-11.419, 63.855
Resisting Moment:	12907.2 lb-ft
Driving Moment:	6631.48 lb-ft
Total Slice Area:	14.3259 ft <sup>2</sup>
Surface Horizontal Width:	10.3521 ft
Surface Average Height:	1.38385 ft

### Method: janbu simplified

FS	1.813090
Center:	-15.295, 72.440
Radius:	9.420
Left Slip Surface Endpoint:	-21.771, 65.600
Right Slip Surface Endpoint:	-11.419, 63.855
Resisting Horizontal Force:	1254.29 lb
Driving Horizontal Force:	691.797 lb
Total Slice Area:	14.3259 ft <sup>2</sup>
Surface Horizontal Width:	10.3521 ft
Surface Average Height:	1.38385 ft

### Method: spencer

FS	1.953060
Center:	-15.295, 72.440
Radius:	9.420
Left Slip Surface Endpoint:	-21.771, 65.600
Right Slip Surface Endpoint:	-11.419, 63.855
Resisting Moment:	12951.7 lb-ft
Driving Moment:	6631.48 lb-ft
Resisting Horizontal Force:	1268.03 lb
Driving Horizontal Force:	649.255 lb
Total Slice Area:	14.3259 ft <sup>2</sup>
Surface Horizontal Width:	10.3521 ft
Surface Average Height:	1.38385 ft

## Valid / Invalid Surfaces

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### Method: bishop simplified

Number of Valid Surfaces: 2262  
 Number of Invalid Surfaces: 2589

#### Error Codes:

Error Code -103 reported for 155 surfaces  
 Error Code -107 reported for 899 surfaces  
 Error Code -108 reported for 3 surfaces  
 Error Code -112 reported for 27 surfaces  
 Error Code -115 reported for 1505 surfaces

### Method: janbu simplified

Number of Valid Surfaces: 2230  
 Number of Invalid Surfaces: 2621

#### Error Codes:

Error Code -103 reported for 155 surfaces  
 Error Code -107 reported for 899 surfaces  
 Error Code -108 reported for 31 surfaces  
 Error Code -112 reported for 31 surfaces  
 Error Code -115 reported for 1505 surfaces

### Method: spencer

Number of Valid Surfaces: 2230  
 Number of Invalid Surfaces: 2621

#### Error Codes:

Error Code -103 reported for 155 surfaces  
 Error Code -107 reported for 899 surfaces  
 Error Code -108 reported for 31 surfaces  
 Error Code -112 reported for 31 surfaces  
 Error Code -115 reported for 1505 surfaces

#### Error Codes

The following errors were encountered during the computation:

- 103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
- 107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
- 108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
- 112 = The coefficient  $M\text{-Alpha} = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi))/F < 0.2$  for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

-115 = Surface too shallow, below the minimum depth.

## Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.94635

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.207043	2.36331	-42.5786	Sandy Silt	0	28	57.0879	111.113	208.973	0	208.973
2	0.207043	6.95381	-40.8905	Sandy Silt	0	28	62.6537	121.946	229.346	0	229.346
3	0.207043	11.282	-39.2445	Sandy Silt	0	28	68.0088	132.369	248.95	0	248.95
4	0.207043	15.3663	-37.6363	Sandy Silt	0	28	73.1626	142.4	267.816	0	267.816
5	0.207043	19.2226	-36.0622	Sandy Silt	0	28	78.1221	152.053	285.97	0	285.97
6	0.207043	22.8645	-34.519	Sandy Silt	0	28	82.8936	161.34	303.436	0	303.436
7	0.207043	26.304	-33.004	Sandy Silt	0	28	87.4838	170.274	320.239	0	320.239
8	0.207043	29.5515	-31.5145	Sandy Silt	0	28	91.8982	178.866	336.398	0	336.398
9	0.207043	32.6164	-30.0485	Sandy Silt	0	28	96.142	187.126	351.933	0	351.933
10	0.207043	35.5068	-28.6038	Sandy Silt	0	28	100.219	195.062	366.859	0	366.859
11	0.207043	38.2299	-27.1788	Sandy Silt	0	28	104.135	202.683	381.192	0	381.192
12	0.207043	40.7924	-25.7718	Sandy Silt	0	28	107.892	209.996	394.945	0	394.945
13	0.207043	43.1998	-24.3812	Sandy Silt	0	28	111.495	217.008	408.133	0	408.133
14	0.207043	45.4576	-23.0058	Sandy Silt	0	28	114.945	223.724	420.764	0	420.764
15	0.207043	47.5703	-21.6443	Sandy Silt	0	28	118.247	230.15	432.849	0	432.849
16	0.207043	49.5421	-20.2955	Sandy Silt	0	28	121.402	236.291	444.399	0	444.399
17	0.207043	51.0467	-18.9584	Sandy Silt	0	28	79.273	154.293	290.184	0	290.184
18	0.207043	51.5133	-17.6319	Sandy Silt	0	28	62.5407	121.726	228.932	0	228.932
19	0.207043	51.7976	-16.3151	Sandy Silt	0	28	63.2851	123.175	231.659	0	231.659
20	0.207043	51.9539	-15.0071	Sandy Silt	0	28	63.8739	124.321	233.814	0	233.814
21	0.207043	51.9848	-13.707	Sandy Silt	0	28	64.3076	125.165	235.401	0	235.401
22	0.207043	51.8922	-12.4142	Sandy Silt	0	28	64.5865	125.708	236.422	0	236.422
23	0.207043	51.6783	-11.1277	Sandy Silt	0	28	64.7109	125.95	236.877	0	236.877

24	0.207043	51.3446	-9.84687	Sandy Silt	0	28	64.6806	125.891	236.766	0	236.766
25	0.207043	50.8927	-8.571	Sandy Silt	0	28	64.4956	125.531	236.089	0	236.089
26	0.207043	50.3238	-7.29941	Sandy Silt	0	28	64.1555	124.869	234.844	0	234.844
27	0.207043	49.639	-6.03142	Sandy Silt	0	28	63.6592	123.903	233.028	0	233.028
28	0.207043	48.8392	-4.76639	Sandy Silt	0	28	63.0061	122.632	230.637	0	230.637
29	0.207043	47.9251	-3.50369	Sandy Silt	0	28	62.1949	121.053	227.667	0	227.667
30	0.207043	46.8973	-2.24269	Sandy Silt	0	28	61.2238	119.163	224.113	0	224.113
31	0.207043	45.7562	-0.982771	Sandy Silt	0	28	60.0915	116.959	219.968	0	219.968
32	0.207043	44.5019	0.276667	Sandy Silt	0	28	58.7957	114.437	215.224	0	215.224
33	0.207043	43.1345	1.53624	Sandy Silt	0	28	57.334	111.592	209.873	0	209.873
34	0.207043	41.6539	2.79656	Sandy Silt	0	28	55.7032	108.418	203.905	0	203.905
35	0.207043	40.0597	4.05823	Sandy Silt	0	28	53.9014	104.911	197.308	0	197.308
36	0.207043	38.3517	5.32187	Sandy Silt	0	28	51.9244	101.063	190.071	0	190.071
37	0.207043	36.529	6.58813	Sandy Silt	0	28	49.7681	96.8661	182.178	0	182.178
38	0.207043	34.591	7.85762	Sandy Silt	0	28	47.4288	92.313	173.616	0	173.616
39	0.207043	32.5367	9.13101	Sandy Silt	0	28	44.9015	87.3941	164.365	0	164.365
40	0.207043	30.3648	10.409	Sandy Silt	0	28	42.1811	82.0991	154.406	0	154.406
41	0.207043	28.074	11.6922	Sandy Silt	0	28	39.2613	76.4163	143.718	0	143.718
42	0.207043	25.6629	12.9814	Sandy Silt	0	28	36.1359	70.3332	132.277	0	132.277
43	0.207043	23.1294	14.2773	Sandy Silt	0	28	32.7976	63.8356	120.057	0	120.057
44	0.207043	20.4717	15.5807	Sandy Silt	0	28	29.2381	56.9075	107.027	0	107.027
45	0.207043	17.6875	16.8925	Sandy Silt	0	28	25.4484	49.5315	93.1554	0	93.1554
46	0.207043	14.7741	18.2134	Sandy Silt	0	28	21.4185	41.6879	78.4036	0	78.4036
47	0.207043	11.7288	19.5445	Sandy Silt	0	28	17.137	33.3546	62.731	0	62.731
48	0.207043	8.54824	20.8866	Sandy Silt	0	28	12.5912	24.5069	46.091	0	46.091
49	0.207043	5.22902	22.2409	Sandy Silt	0	28	7.76685	15.117	28.4309	0	28.4309
50	0.207043	1.76713	23.6083	Sandy Silt	0	28	2.64768	5.15332	9.692	0	9.692

Global Minimum Query (janbu simplified) - Safety Factor: 1.81309

Angle	Base	Base	Shear	Shear	Base	Pore	Effective
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Number	[ft]	[lbs]	of Slice Base [degrees]	Material	Cohesion [psf]	Friction Angle [degrees]	Stress [psf]	Strength [psf]	Normal Stress [psf]	Pressure [psf]	Normal Stress [psf]
1	0.207043	2.36331	-42.5786	Sandy Silt	0	28	60.3837	109.481	205.905	0	205.905
2	0.207043	6.95381	-40.8905	Sandy Silt	0	28	66.3166	120.238	226.134	0	226.134
3	0.207043	11.282	-39.2445	Sandy Silt	0	28	72.0317	130.6	245.623	0	245.623
4	0.207043	15.3663	-37.6363	Sandy Silt	0	28	77.5383	140.584	264.399	0	264.399
5	0.207043	19.2226	-36.0622	Sandy Silt	0	28	82.8431	150.202	282.489	0	282.489
6	0.207043	22.8645	-34.519	Sandy Silt	0	28	87.9532	159.467	299.914	0	299.914
7	0.207043	26.304	-33.004	Sandy Silt	0	28	92.8746	168.39	316.695	0	316.695
8	0.207043	29.5515	-31.5145	Sandy Silt	0	28	97.6129	176.981	332.852	0	332.852
9	0.207043	32.6164	-30.0485	Sandy Silt	0	28	102.173	185.249	348.402	0	348.402
10	0.207043	35.5068	-28.6038	Sandy Silt	0	28	106.56	193.202	363.36	0	363.36
11	0.207043	38.2299	-27.1788	Sandy Silt	0	28	110.777	200.849	377.741	0	377.741
12	0.207043	40.7924	-25.7718	Sandy Silt	0	28	114.829	208.195	391.557	0	391.557
13	0.207043	43.1998	-24.3812	Sandy Silt	0	28	118.718	215.247	404.82	0	404.82
14	0.207043	45.4576	-23.0058	Sandy Silt	0	28	122.449	222.011	417.541	0	417.541
15	0.207043	47.5703	-21.6443	Sandy Silt	0	28	126.023	228.491	429.728	0	429.728
16	0.207043	49.5421	-20.2955	Sandy Silt	0	28	129.443	234.692	441.391	0	441.391
17	0.207043	51.0467	-18.9584	Sandy Silt	0	28	84.5612	153.317	288.347	0	288.347
18	0.207043	51.5133	-17.6319	Sandy Silt	0	28	66.7413	121.008	227.582	0	227.582
19	0.207043	51.7976	-16.3151	Sandy Silt	0	28	67.5653	122.502	230.392	0	230.392
20	0.207043	51.9539	-15.0071	Sandy Silt	0	28	68.2228	123.694	232.635	0	232.635
21	0.207043	51.9848	-13.707	Sandy Silt	0	28	68.7153	124.587	234.314	0	234.314
22	0.207043	51.8922	-12.4142	Sandy Silt	0	28	69.0424	125.18	235.43	0	235.43
23	0.207043	51.6783	-11.1277	Sandy Silt	0	28	69.2051	125.475	235.983	0	235.983
24	0.207043	51.3446	-9.84687	Sandy Silt	0	28	69.2017	125.469	235.973	0	235.973
25	0.207043	50.8927	-8.571	Sandy Silt	0	28	69.033	125.163	235.398	0	235.398
26	0.207043	50.3238	-7.29941	Sandy Silt	0	28	68.6982	124.556	234.256	0	234.256
27	0.207043	49.639	-6.03142	Sandy Silt	0	28	68.1957	123.645	232.544	0	232.544

28	0.207043	48.8392	-4.76639	Sandy Silt	0	28	67.5251	122.429	230.256	0	230.256
29	0.207043	47.9251	-3.50369	Sandy Silt	0	28	66.6845	120.905	227.39	0	227.39
30	0.207043	46.8973	-2.24269	Sandy Silt	0	28	65.6719	119.069	223.937	0	223.937
31	0.207043	45.7562	-0.982771	Sandy Silt	0	28	64.486	116.919	219.892	0	219.892
32	0.207043	44.5019	0.276667	Sandy Silt	0	28	63.1232	114.448	215.245	0	215.245
33	0.207043	43.1345	1.53624	Sandy Silt	0	28	61.5816	111.653	209.988	0	209.988
34	0.207043	41.6539	2.79656	Sandy Silt	0	28	59.8575	108.527	204.11	0	204.11
35	0.207043	40.0597	4.05823	Sandy Silt	0	28	57.948	105.065	197.598	0	197.598
36	0.207043	38.3517	5.32187	Sandy Silt	0	28	55.8489	101.259	190.44	0	190.44
37	0.207043	36.529	6.58813	Sandy Silt	0	28	53.5555	97.1009	182.62	0	182.62
38	0.207043	34.591	7.85762	Sandy Silt	0	28	51.0633	92.5823	174.122	0	174.122
39	0.207043	32.5367	9.13101	Sandy Silt	0	28	48.3667	87.6932	164.927	0	164.927
40	0.207043	30.3648	10.409	Sandy Silt	0	28	45.4596	82.4224	155.014	0	155.014
41	0.207043	28.074	11.6922	Sandy Silt	0	28	42.3354	76.7579	144.361	0	144.361
42	0.207043	25.6629	12.9814	Sandy Silt	0	28	38.9865	70.686	132.941	0	132.941
43	0.207043	23.1294	14.2773	Sandy Silt	0	28	35.4046	64.1917	120.727	0	120.727
44	0.207043	20.4717	15.5807	Sandy Silt	0	28	31.5804	57.2581	107.687	0	107.687
45	0.207043	17.6875	16.8925	Sandy Silt	0	28	27.5036	49.8665	93.7853	0	93.7853
46	0.207043	14.7741	18.2134	Sandy Silt	0	28	23.1626	41.9958	78.9826	0	78.9826
47	0.207043	11.7288	19.5445	Sandy Silt	0	28	18.5444	33.6227	63.2353	0	63.2353
48	0.207043	8.54824	20.8866	Sandy Silt	0	28	13.6345	24.7205	46.4926	0	46.4926
49	0.207043	5.22902	22.2409	Sandy Silt	0	28	8.41629	15.2595	28.6989	0	28.6989
50	0.207043	1.76713	23.6083	Sandy Silt	0	28	2.87119	5.20573	9.79056	0	9.79056

**Global Minimum Query (spencer) - Safety Factor: 1.95306**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.207043	2.36331	-42.5786	Sandy Silt	0	28	50.8711	99.3544	186.859	0	186.859
2	0.207043	6.95381	-40.8905	Sandy Silt	0	28	56.2435	109.847	206.592	0	206.592
3	0.207043	11.282	-39.2445	Sandy	0	28	61.4851	120.084	225.844	0	225.844

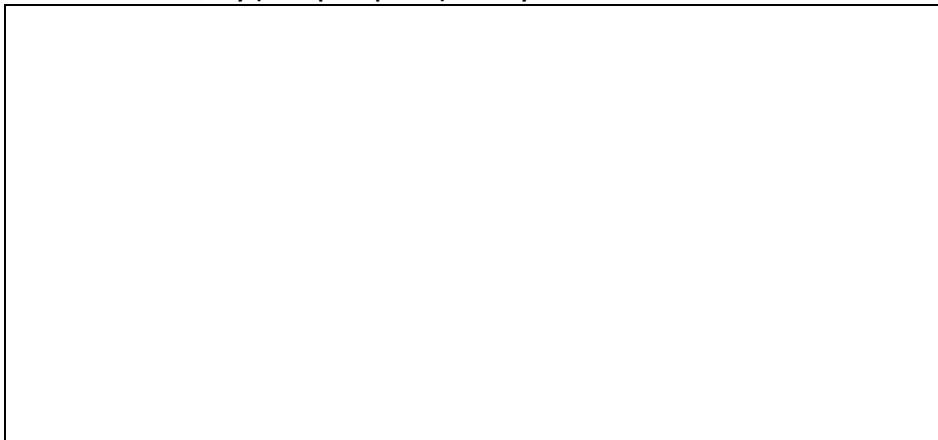
				Silt							
4	0.207043	15.3663	-37.6363	Sandy Silt	0	28	66.597	130.068	244.623	0	244.623
5	0.207043	19.2226	-36.0622	Sandy Silt	0	28	71.5825	139.805	262.935	0	262.935
6	0.207043	22.8645	-34.519	Sandy Silt	0	28	76.4431	149.298	280.789	0	280.789
7	0.207043	26.304	-33.004	Sandy Silt	0	28	81.1808	158.551	298.192	0	298.192
8	0.207043	29.5515	-31.5145	Sandy Silt	0	28	85.7977	167.568	315.15	0	315.15
9	0.207043	32.6164	-30.0485	Sandy Silt	0	28	90.2957	176.353	331.671	0	331.671
10	0.207043	35.5068	-28.6038	Sandy Silt	0	28	94.676	184.908	347.761	0	347.761
11	0.207043	38.2299	-27.1788	Sandy Silt	0	28	98.9401	193.236	363.424	0	363.424
12	0.207043	40.7924	-25.7718	Sandy Silt	0	28	103.09	201.341	378.667	0	378.667
13	0.207043	43.1998	-24.3812	Sandy Silt	0	28	107.126	209.224	393.493	0	393.493
14	0.207043	45.4576	-23.0058	Sandy Silt	0	28	111.05	216.888	407.907	0	407.907
15	0.207043	47.5703	-21.6443	Sandy Silt	0	28	114.863	224.335	421.913	0	421.913
16	0.207043	49.5421	-20.2955	Sandy Silt	0	28	118.566	231.567	435.514	0	435.514
17	0.207043	51.0467	-18.9584	Sandy Silt	0	28	77.8373	152.021	285.91	0	285.91
18	0.207043	51.5133	-17.6319	Sandy Silt	0	28	61.7359	120.574	226.766	0	226.766
19	0.207043	51.7976	-16.3151	Sandy Silt	0	28	62.8035	122.659	230.688	0	230.688
20	0.207043	51.9539	-15.0071	Sandy Silt	0	28	63.7246	124.458	234.071	0	234.071
21	0.207043	51.9848	-13.707	Sandy Silt	0	28	64.4978	125.968	236.911	0	236.911
22	0.207043	51.8922	-12.4142	Sandy Silt	0	28	65.1214	127.186	239.202	0	239.202
23	0.207043	51.6783	-11.1277	Sandy Silt	0	28	65.594	128.109	240.938	0	240.938
24	0.207043	51.3446	-9.84687	Sandy Silt	0	28	65.914	128.734	242.113	0	242.113
25	0.207043	50.8927	-8.571	Sandy Silt	0	28	66.0784	129.055	242.717	0	242.717
26	0.207043	50.3238	-7.29941	Sandy Silt	0	28	66.085	129.068	242.741	0	242.741
27	0.207043	49.639	-6.03142	Sandy Silt	0	28	65.9309	128.767	242.176	0	242.176
28	0.207043	48.8392	-4.76639	Sandy Silt	0	28	65.6134	128.147	241.009	0	241.009
29	0.207043	47.9251	-3.50369	Sandy Silt	0	28	65.1286	127.2	239.228	0	239.228
30	0.207043	46.8973	-2.24269	Sandy Silt	0	28	64.4722	125.918	236.818	0	236.818
31	0.207043	45.7562	0.982771	Sandy Silt	0	28	63.6406	124.294	233.763	0	233.763



32	0.207043	44.5019	0.276667	Sandy Silt	0	28	62.6284	122.317	230.045	0	230.045
33	0.207043	43.1345	1.53624	Sandy Silt	0	28	61.4303	119.977	225.644	0	225.644
34	0.207043	41.6539	2.79656	Sandy Silt	0	28	60.0412	117.264	220.54	0	220.54
35	0.207043	40.0597	4.05823	Sandy Silt	0	28	58.4534	114.163	214.709	0	214.709
36	0.207043	38.3517	5.32187	Sandy Silt	0	28	56.6603	110.661	208.123	0	208.123
37	0.207043	36.529	6.58813	Sandy Silt	0	28	54.6537	106.742	200.753	0	200.753
38	0.207043	34.591	7.85762	Sandy Silt	0	28	52.4249	102.389	192.566	0	192.566
39	0.207043	32.5367	9.13101	Sandy Silt	0	28	49.9643	97.5833	183.528	0	183.528
40	0.207043	30.3648	10.409	Sandy Silt	0	28	47.2605	92.3026	173.596	0	173.596
41	0.207043	28.074	11.6922	Sandy Silt	0	28	44.3014	86.5233	162.727	0	162.727
42	0.207043	25.6629	12.9814	Sandy Silt	0	28	41.0734	80.2188	150.869	0	150.869
43	0.207043	23.1294	14.2773	Sandy Silt	0	28	37.561	73.3589	137.968	0	137.968
44	0.207043	20.4717	15.5807	Sandy Silt	0	28	33.747	65.91	123.959	0	123.959
45	0.207043	17.6875	16.8925	Sandy Silt	0	28	29.612	57.8341	108.77	0	108.77
46	0.207043	14.7741	18.2134	Sandy Silt	0	28	25.1338	49.0878	92.3206	0	92.3206
47	0.207043	11.7288	19.5445	Sandy Silt	0	28	20.2872	39.6222	74.5183	0	74.5183
48	0.207043	8.54824	20.8866	Sandy Silt	0	28	15.0434	29.3807	55.2573	0	55.2573
49	0.207043	5.22902	22.2409	Sandy Silt	0	28	9.3693	18.2988	34.415	0	34.415
50	0.207043	1.76713	23.6083	Sandy Silt	0	28	3.21667	6.28235	11.8154	0	11.8154

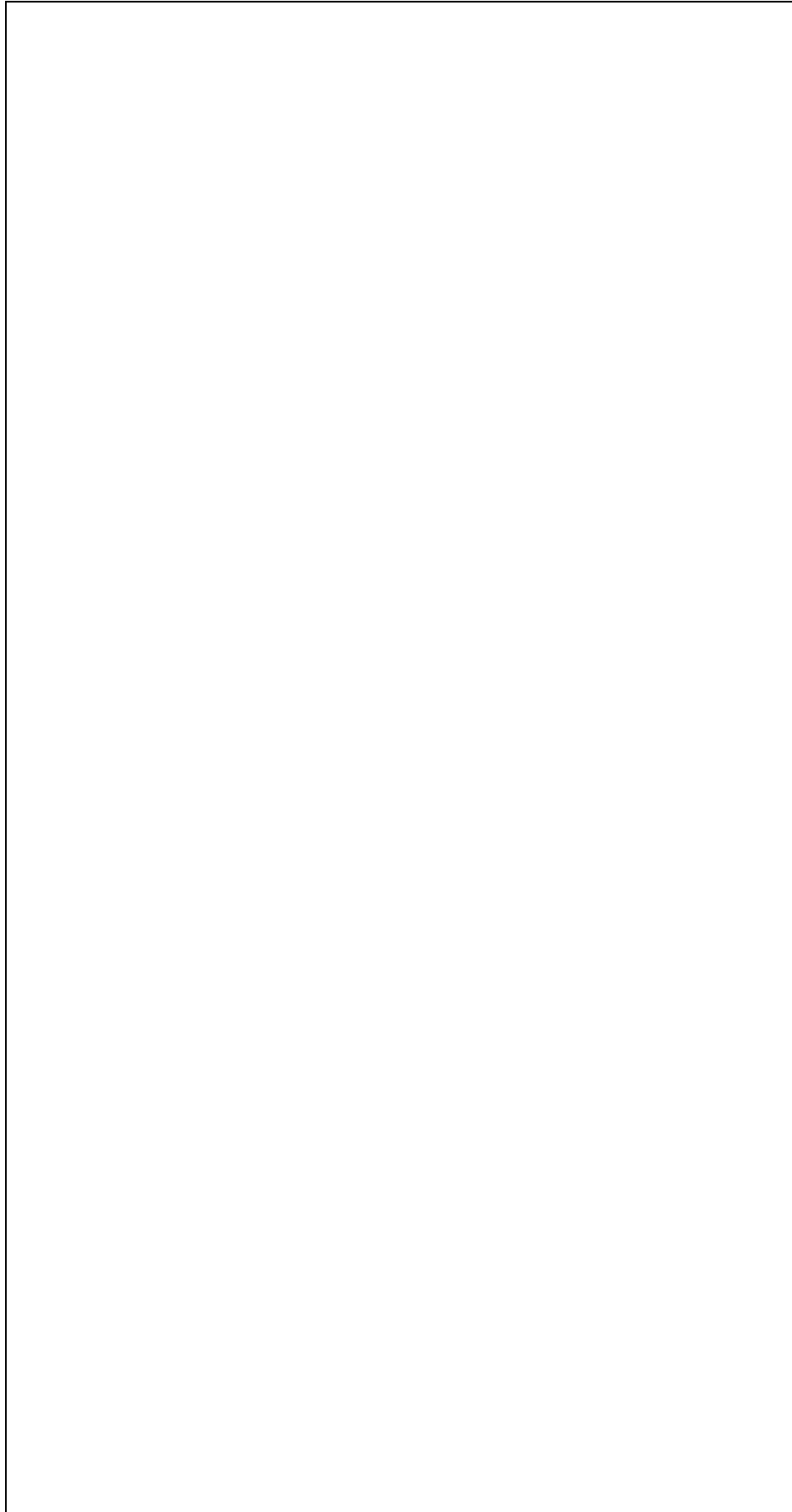
**Interslice Data**

Global Minimum Query (bishop simplified) - Safety Factor: 1.94635



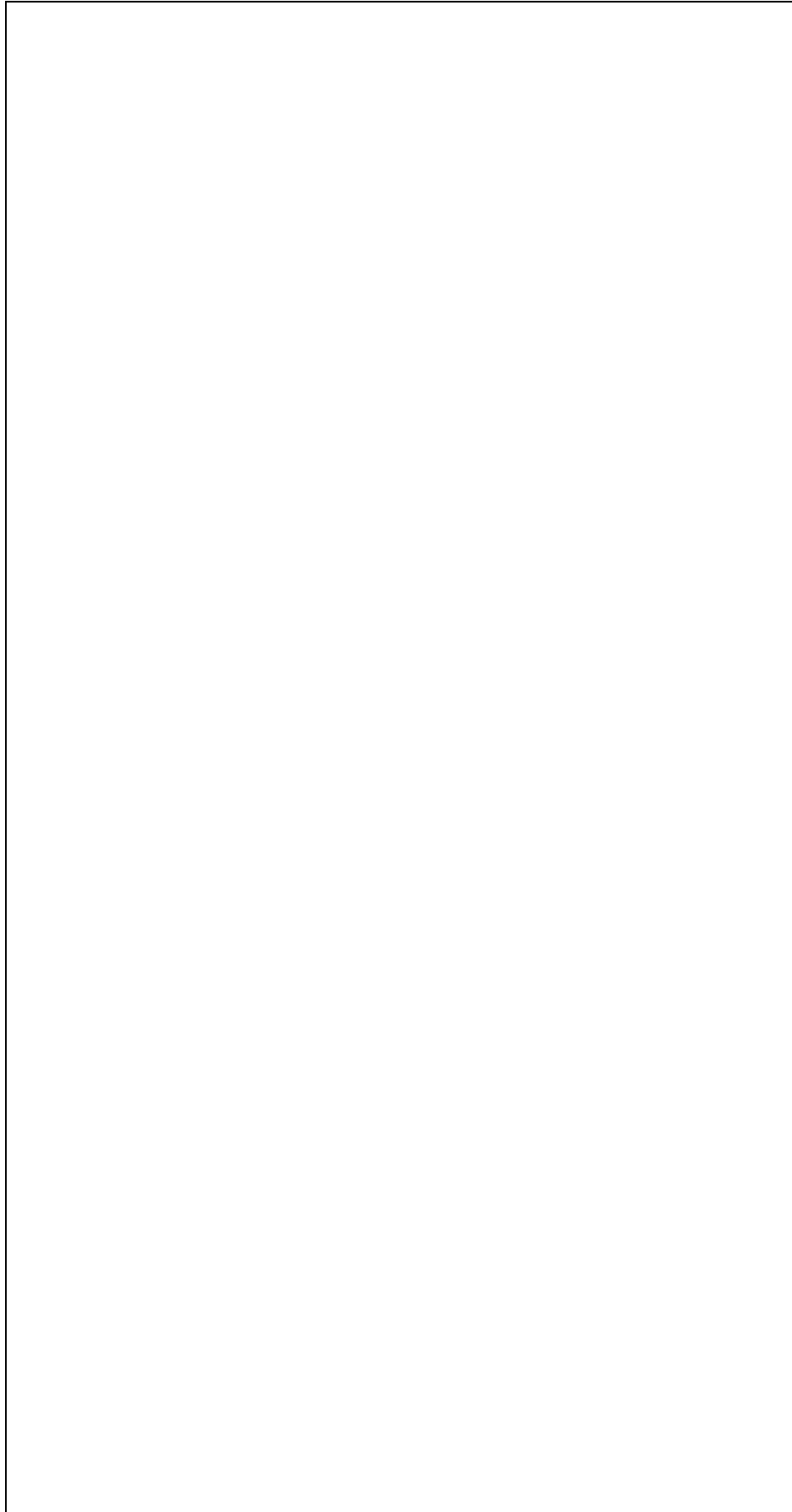
Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-21.7714	65.6	0	0	0
2	-21.5643	65.4098	27.939	0	0
3	-21.3573	65.2305	56.0889	0	0
4	-21.1502	65.0613	84.1163	0	0
5	-20.9432	64.9017	111.73	0	0
6	-20.7362	64.7509	138.675	0	0
7	-20.5291	64.6085	164.726	0	0
8	-20.3221	64.474	189.682	0	0
9	-20.115	64.3471	213.365	0	0
10	-19.908	64.2273	235.615	0	0
11	-19.7009	64.1144	256.29	0	0
12	-19.4939	64.0081	275.259	0	0
13	-19.2869	63.9082	292.406	0	0
14	-19.0798	63.8143	307.626	0	0
15	-18.8728	63.7264	320.822	0	0
16	-18.6657	63.6442	331.909	0	0
17	-18.4587	63.5677	340.807	0	0
18	-18.2516	63.4966	345.037	0	0
19	-18.0446	63.4308	347.156	0	0
20	-17.8376	63.3702	348.096	0	0
21	-17.6305	63.3146	347.852	0	0
22	-17.4235	63.2641	346.429	0	0
23	-17.2164	63.2186	343.835	0	0
24	-17.0094	63.1778	340.087	0	0
25	-16.8023	63.1419	335.208	0	0
26	-16.5953	63.1107	329.225	0	0
27	-16.3883	63.0842	322.174	0	0
28	-16.1812	63.0623	314.094	0	0
29	-15.9742	63.045	305.034	0	0
30	-15.7671	63.0324	295.047	0	0
31	-15.5601	63.0243	284.191	0	0
32	-15.353	63.0207	272.534	0	0
33	-15.146	63.0217	260.149	0	0
34	-14.939	63.0273	247.116	0	0
35	-14.7319	63.0374	233.524	0	0
36	-14.5249	63.0521	219.468	0	0
37	-14.3178	63.0714	205.055	0	0
38	-14.1108	63.0953	190.397	0	0
39	-13.9037	63.1238	175.619	0	0
40	-13.6967	63.1571	160.855	0	0
41	-13.4897	63.1951	146.251	0	0
42	-13.2826	63.238	131.967	0	0
43	-13.0756	63.2857	118.174	0	0
44	-12.8685	63.3384	105.059	0	0
45	-12.6615	63.3961	92.8284	0	0
46	-12.4544	63.459	81.7037	0	0
47	-12.2474	63.5271	71.929	0	0
48	-12.0404	63.6006	63.7711	0	0
49	-11.8333	63.6796	57.5234	0	0
50	-11.6263	63.7643	53.5086	0	0
51	-11.4192	63.8548	0	0	0

**Global Minimum Query (janbu simplified) - Safety Factor: 1.81309**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-21.7714	65.6	0	0	0
2	-21.5643	65.4098	26.6641	0	0
3	-21.3573	65.2305	53.47	0	0
4	-21.1502	65.0613	80.0912	0	0
5	-20.9432	64.9017	106.242	0	0
6	-20.7362	64.7509	131.673	0	0
7	-20.5291	64.6085	156.161	0	0
8	-20.3221	64.474	179.511	0	0
9	-20.115	64.3471	201.547	0	0
10	-19.908	64.2273	222.111	0	0
11	-19.7009	64.1144	241.062	0	0
12	-19.4939	64.0081	258.273	0	0
13	-19.2869	63.9082	273.629	0	0
14	-19.0798	63.8143	287.025	0	0
15	-18.8728	63.7264	298.367	0	0
16	-18.6657	63.6442	307.569	0	0
17	-18.4587	63.5677	314.553	0	0
18	-18.2516	63.4966	317.545	0	0
19	-18.0446	63.4308	318.696	0	0
20	-17.8376	63.3702	318.663	0	0
21	-17.6305	63.3146	317.444	0	0
22	-17.4235	63.2641	315.042	0	0
23	-17.2164	63.2186	311.471	0	0
24	-17.0094	63.1778	306.746	0	0
25	-16.8023	63.1419	300.892	0	0
26	-16.5953	63.1107	293.938	0	0
27	-16.3883	63.0842	285.92	0	0
28	-16.1812	63.0623	276.881	0	0
29	-15.9742	63.045	266.869	0	0
30	-15.7671	63.0324	255.939	0	0
31	-15.5601	63.0243	244.151	0	0
32	-15.353	63.0207	231.575	0	0
33	-15.146	63.0217	218.284	0	0
34	-14.939	63.0273	204.362	0	0
35	-14.7319	63.0374	189.899	0	0
36	-14.5249	63.0521	174.993	0	0
37	-14.3178	63.0714	159.752	0	0
38	-14.1108	63.0953	144.292	0	0
39	-13.9037	63.1238	128.739	0	0
40	-13.6967	63.1571	113.232	0	0
41	-13.4897	63.1951	97.9201	0	0
42	-13.2826	63.238	82.9653	0	0
43	-13.0756	63.2857	68.5446	0	0
44	-12.8685	63.3384	54.8502	0	0
45	-12.6615	63.3961	42.0916	0	0
46	-12.4544	63.459	30.4978	0	0
47	-12.2474	63.5271	20.3192	0	0
48	-12.0404	63.6006	11.8302	0	0
49	-11.8333	63.6796	5.33275	0	0
50	-11.6263	63.7643	1.15961	0	0
51	-11.4192	63.8548	0	0	0

**Global Minimum Query (spencer) - Safety Factor: 1.95306**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-21.7714	65.6	0	0	0
2	-21.5643	65.4098	24.9943	5.79088	13.0446
3	-21.3573	65.2305	50.3646	11.6689	13.0446
4	-21.1502	65.0613	75.805	17.5631	13.0446
5	-20.9432	64.9017	101.043	23.4105	13.0446
6	-20.7362	64.7509	125.834	29.1543	13.0446
7	-20.5291	64.6085	149.959	34.7436	13.0446
8	-20.3221	64.474	173.216	40.132	13.0446
9	-20.115	64.3471	195.423	45.2771	13.0446
10	-19.908	64.2273	216.414	50.1404	13.0446
11	-19.7009	64.1144	236.034	54.6862	13.0446
12	-19.4939	64.0081	254.142	58.8816	13.0446
13	-19.2869	63.9082	270.607	62.6963	13.0446
14	-19.0798	63.8143	285.305	66.1018	13.0446
15	-18.8728	63.7264	298.125	69.0719	13.0446
16	-18.6657	63.6442	308.958	71.5818	13.0446
17	-18.4587	63.5677	317.706	73.6087	13.0446
18	-18.2516	63.4966	321.892	74.5784	13.0446
19	-18.0446	63.4308	324.006	75.0682	13.0446
20	-17.8376	63.3702	324.956	75.2884	13.0446
21	-17.6305	63.3146	324.727	75.2354	13.0446
22	-17.4235	63.2641	323.31	74.907	13.0446
23	-17.2164	63.2186	320.701	74.3025	13.0446
24	-17.0094	63.1778	316.904	73.4228	13.0446
25	-16.8023	63.1419	311.929	72.2703	13.0446
26	-16.5953	63.1107	305.794	70.8489	13.0446
27	-16.3883	63.0842	298.521	69.1638	13.0446
28	-16.1812	63.0623	290.14	67.2221	13.0446
29	-15.9742	63.045	280.688	65.0321	13.0446
30	-15.7671	63.0324	270.209	62.6041	13.0446
31	-15.5601	63.0243	258.753	59.9499	13.0446
32	-15.353	63.0207	246.38	57.0832	13.0446
33	-15.146	63.0217	233.156	54.0195	13.0446
34	-14.939	63.0273	219.158	50.7764	13.0446
35	-14.7319	63.0374	204.471	47.3735	13.0446
36	-14.5249	63.0521	189.19	43.8331	13.0446
37	-14.3178	63.0714	173.421	40.1795	13.0446
38	-14.1108	63.0953	157.281	36.4402	13.0446
39	-13.9037	63.1238	140.903	32.6454	13.0445
40	-13.6967	63.1571	124.429	28.8287	13.0446
41	-13.4897	63.1951	108.022	25.0273	13.0445
42	-13.2826	63.238	91.858	21.2824	13.0446
43	-13.0756	63.2857	76.1357	17.6397	13.0446
44	-12.8685	63.3384	61.0738	14.1501	13.0446
45	-12.6615	63.3961	46.9159	10.8699	13.0446
46	-12.4544	63.459	33.9334	7.86197	13.0446
47	-12.2474	63.5271	22.4295	5.19664	13.0446
48	-12.0404	63.6006	12.7435	2.95251	13.0446
49	-11.8333	63.6796	5.25676	1.21793	13.0446
50	-11.6263	63.7643	0.399177	0.0924844	13.0446
51	-11.4192	63.8548	0	0	0

## List Of Coordinates

---

### Water Table

X	Y
-30	56
60	56

### Distributed Load

X	Y
34.7121	67
24	67

### Distributed Load

X	Y
-18.4	65.6
-30	65.6

### External Boundary

X	Y
-18.4	65.6
-30	65.6
-30	63
-30	55
-30	45
60	45
60	55
60	56
60	63
60	67
24	67
8	63
0	61
-8	63

### Material Boundary

X	Y
8	63
60	63

### Material Boundary

X	Y
-30	63
-8	63

## Material Boundary

X	Y
-30	55
60	55



## *Slide Analysis Information*

### *286-1224(2) HCFCD Ditch*

#### *Project Summary*

---

File Name: Ditch Right Side.slim  
 Slide Modeler Version: 7.01  
 Project Title: 286-1224(2) HCFCD Ditch  
 Analysis: Long term Analysis  
 Author: Prasoon Tiwari  
 Company: Intertek-PSI  
 Date Created: 11/11/2016, 11:14:19 AM

#### *General Settings*

---

Units of Measurement: Imperial Units  
 Time Units: days  
 Permeability Units: feet/second  
 Failure Direction: Right to Left  
 Data Output: Standard  
 Maximum Material Properties: 20  
 Maximum Support Properties: 20

#### *Analysis Options*

---

Slices Type: Vertical

##### Analysis Methods Used

Bishop simplified  
 Janbu simplified  
 Spencer

Number of slices: 50  
 Tolerance: 0.005  
 Maximum number of iterations: 75  
 Check malpha < 0.2: Yes  
 Create Interslice boundaries at intersections with water tables and piezos: Yes  
 Initial trial value of FS: 1  
 Steffensen Iteration: Yes

#### *Groundwater Analysis*

---

## **Slide Analysis Information**

### **286-1224(2) HCFCD Ditch**

#### **Project Summary**

---

File Name: Ditch Left Side.slim  
 Slide Modeler Version: 7.01  
 Project Title: 286-1224(2) HCFCD Ditch  
 Analysis: Rapid Drawdown Analysis  
 Author: Prasoon Tiwari  
 Company: Intertek-PSI  
 Date Created: 11/11/2016, 11:14:19 AM

#### **General Settings**

---

Units of Measurement: Imperial Units  
 Time Units: days  
 Permeability Units: feet/second  
 Failure Direction: Left to Right  
 Data Output: Standard  
 Maximum Material Properties: 20  
 Maximum Support Properties: 20

#### **Analysis Options**

---

Slices Type: Vertical

##### **Analysis Methods Used**

Bishop simplified  
 Janbu simplified  
 Spencer

Number of slices: 50  
 Tolerance: 0.005  
 Maximum number of iterations: 75  
 Check malpha < 0.2: Yes  
 Create Interslice boundaries at intersections with water tables and piezos: Yes  
 Initial trial value of FS: 1  
 Steffensen Iteration: Yes

#### **Groundwater Analysis**

---

Groundwater Method: Water Surfaces  
Pore Fluid Unit Weight [lbs/ft<sup>3</sup>]: 62.4  
Advanced Groundwater Method: None

---

## Random Numbers

Pseudo-random Seed: 10116  
Random Number Generation Method: Park and Miller v.3

---

## Surface Options

Surface Type: Circular  
Search Method: Grid Search  
Radius Increment: 10  
Composite Surfaces: Disabled  
Reverse Curvature: Invalid Surfaces  
Minimum Elevation: Not Defined  
Minimum Depth [ft]: 1  
Minimum Area: Not Defined  
Minimum Weight: Not Defined

---

## Seismic

Advanced seismic analysis: No  
Staged pseudostatic analysis: No

---

## Loading

2 Distributed Loads present

### Distributed Load 1

Distribution: Constant  
Magnitude [psf]: 250  
Orientation: Normal to boundary




### Distributed Load 2

Distribution: Constant  
Magnitude [psf]: 250  
Orientation: Normal to boundary

---

## Material Properties



Property	Sandy Silt	Silty Sand	Sandy Lean clay
Color			
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	120	120	120
Cohesion [psf]	0	0	150
Friction Angle [deg]	28	30	25
Water Surface	Water Table	Water Table	Water Table
Hu Value	0	1	1

## Global Minimums

### Method: bishop simplified

FS	1.684870
Center:	-15.818, 69.904
Radius:	6.204
Left Slip Surface Endpoint:	-20.287, 65.600
Right Slip Surface Endpoint:	-13.171, 64.293
Resisting Moment:	4319.96 lb-ft
Driving Moment:	2563.98 lb-ft
Total Slice Area:	6.95798 ft2
Surface Horizontal Width:	7.11574 ft
Surface Average Height:	0.977829 ft

### Method: janbu simplified

FS	1.485240
Center:	-16.497, 67.955
Radius:	4.281
Left Slip Surface Endpoint:	-20.072, 65.600
Right Slip Surface Endpoint:	-13.977, 64.494
Resisting Horizontal Force:	569.552 lb
Driving Horizontal Force:	383.474 lb
Total Slice Area:	6.59017 ft2
Surface Horizontal Width:	6.09445 ft
Surface Average Height:	1.08134 ft

### Method: spencer

FS	1.690560
Center:	-16.497, 68.605
Radius:	4.841
Left Slip Surface Endpoint:	-20.292, 65.600
Right Slip Surface Endpoint:	-13.951, 64.488
Resisting Moment:	3281.17 lb-ft
Driving Moment:	1940.88 lb-ft
Resisting Horizontal Force:	603.716 lb
Driving Horizontal Force:	357.11 lb
Total Slice Area:	6.45807 ft2
Surface Horizontal Width:	6.34098 ft
Surface Average Height:	1.01847 ft

## Valid / Invalid Surfaces

---

### Method: bishop simplified

Number of Valid Surfaces: 12409

Number of Invalid Surfaces: 6082

#### Error Codes:

Error Code -103 reported for 163 surfaces  
 Error Code -107 reported for 734 surfaces  
 Error Code -108 reported for 297 surfaces  
 Error Code -112 reported for 176 surfaces  
 Error Code -115 reported for 4712 surfaces

### Method: janbu simplified

Number of Valid Surfaces: 12260

Number of Invalid Surfaces: 6231

#### Error Codes:

Error Code -103 reported for 163 surfaces  
 Error Code -107 reported for 734 surfaces  
 Error Code -108 reported for 401 surfaces  
 Error Code -112 reported for 221 surfaces  
 Error Code -115 reported for 4712 surfaces

### Method: spencer

Number of Valid Surfaces: 12208

Number of Invalid Surfaces: 6283

#### Error Codes:

Error Code -103 reported for 163 surfaces  
 Error Code -107 reported for 734 surfaces  
 Error Code -108 reported for 453 surfaces  
 Error Code -112 reported for 221 surfaces  
 Error Code -115 reported for 4712 surfaces

#### Error Codes

The following errors were encountered during the computation:

- 103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
- 107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
- 108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
- 112 = The coefficient  $M\text{-Alpha} = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi))/F < 0.2$  for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

-115 = Surface too shallow, below the minimum depth.

## Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.68487

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.142315	1.22128	-45.1427	Sandy Silt	0	28	61.9585	104.392	196.332	0	196.332
2	0.142315	3.58803	-43.3079	Sandy Silt	0	28	66.9434	112.791	212.129	0	212.129
3	0.142315	5.80965	-41.5271	Sandy Silt	0	28	71.7355	120.865	227.314	0	227.314
4	0.142315	7.89807	-39.794	Sandy Silt	0	28	76.3454	128.632	241.921	0	241.921
5	0.142315	9.8633	-38.1036	Sandy Silt	0	28	80.7807	136.105	255.976	0	255.976
6	0.142315	11.7139	-36.4515	Sandy Silt	0	28	85.0505	143.299	269.505	0	269.505
7	0.142315	13.4572	-34.8339	Sandy Silt	0	28	89.1606	150.224	282.531	0	282.531
8	0.142315	15.0995	-33.2476	Sandy Silt	0	28	93.1182	156.892	295.072	0	295.072
9	0.142315	16.6464	-31.6895	Sandy Silt	0	28	96.9285	163.312	307.146	0	307.146
10	0.142315	18.1026	-30.1572	Sandy Silt	0	28	100.597	169.493	318.77	0	318.77
11	0.142315	19.4726	-28.6484	Sandy Silt	0	28	104.128	175.442	329.958	0	329.958
12	0.142315	20.7599	-27.161	Sandy Silt	0	28	107.525	181.165	340.722	0	340.722
13	0.142315	21.9681	-25.6932	Sandy Silt	0	28	110.791	186.669	351.074	0	351.074
14	0.142315	22.9333	-24.2432	Sandy Silt	0	28	62.4386	105.201	197.855	0	197.855
15	0.142315	23.4044	-22.8096	Sandy Silt	0	28	45.8193	77.1996	145.191	0	145.191
16	0.142315	23.7839	-21.391	Sandy Silt	0	28	46.9393	79.0867	148.74	0	148.74
17	0.142315	24.0943	-19.986	Sandy Silt	0	28	47.929	80.7541	151.877	0	151.877
18	0.142315	24.3374	-18.5934	Sandy Silt	0	28	48.7895	82.2039	154.603	0	154.603
19	0.142315	24.5151	-17.2121	Sandy Silt	0	28	49.5216	83.4375	156.923	0	156.923
20	0.142315	24.6288	-15.8411	Sandy Silt	0	28	50.1264	84.4564	158.84	0	158.84
21	0.142315	24.6798	-14.4793	Sandy Silt	0	28	50.604	85.2612	160.353	0	160.353
22	0.142315	24.6693	-13.1258	Sandy Silt	0	28	50.955	85.8525	161.465	0	161.465
23	0.142315	24.5985	-11.7798	Sandy Silt	0	28	51.1793	86.2305	162.176	0	162.176

24	0.142315	24.4683	-10.4403	Sandy Silt	0	28	51.2768	86.3948	162.485	0	162.485
25	0.142315	24.2794	-9.10658	Sandy Silt	0	28	51.2472	86.3449	162.391	0	162.391
26	0.142315	24.0325	-7.77781	Sandy Silt	0	28	51.0899	86.0798	161.892	0	161.892
27	0.142315	23.7284	-6.45324	Sandy Silt	0	28	50.804	85.5982	160.987	0	160.987
28	0.142315	23.3673	-5.13213	Sandy Silt	0	28	50.3886	84.8983	159.67	0	159.67
29	0.142315	22.9499	-3.81375	Sandy Silt	0	28	49.8425	83.9781	157.94	0	157.94
30	0.142315	22.4763	-2.49739	Sandy Silt	0	28	49.164	82.835	155.79	0	155.79
31	0.142315	21.9468	-1.18235	Sandy Silt	0	28	48.3515	81.466	153.215	0	153.215
32	0.142315	21.3614	0.132068	Sandy Silt	0	28	47.4028	79.8676	150.209	0	150.209
33	0.142315	20.7203	1.44656	Sandy Silt	0	28	46.3157	78.036	146.764	0	146.764
34	0.142315	20.0234	2.76181	Sandy Silt	0	28	45.0876	75.9667	142.872	0	142.872
35	0.142315	19.2706	4.07852	Sandy Silt	0	28	43.7153	73.6546	138.524	0	138.524
36	0.142315	18.4615	5.39739	Sandy Silt	0	28	42.1955	71.094	133.708	0	133.708
37	0.142315	17.5959	6.71914	Sandy Silt	0	28	40.5246	68.2787	128.413	0	128.413
38	0.142315	16.6734	8.04449	Sandy Silt	0	28	38.6982	65.2015	122.626	0	122.626
39	0.142315	15.6934	9.37419	Sandy Silt	0	28	36.7117	61.8545	116.332	0	116.332
40	0.142315	14.6554	10.709	Sandy Silt	0	28	34.5598	58.2288	109.512	0	109.512
41	0.142315	13.5586	12.0497	Sandy Silt	0	28	32.2367	54.3146	102.151	0	102.151
42	0.142315	12.4021	13.3972	Sandy Silt	0	28	29.7357	50.1008	94.2261	0	94.2261
43	0.142315	11.1851	14.7523	Sandy Silt	0	28	27.0497	45.5752	85.7148	0	85.7148
44	0.142315	9.90636	16.1158	Sandy Silt	0	28	24.1703	40.7238	76.5903	0	76.5903
45	0.142315	8.56474	17.4888	Sandy Silt	0	28	21.0883	35.5311	66.8243	0	66.8243
46	0.142315	7.15884	18.8723	Sandy Silt	0	28	17.7934	29.9796	56.3835	0	56.3835
47	0.142315	5.6871	20.2673	Sandy Silt	0	28	14.2738	24.0495	45.2306	0	45.2306
48	0.142315	4.14778	21.6749	Sandy Silt	0	28	10.5162	17.7184	33.3234	0	33.3234
49	0.142315	2.53896	23.0965	Sandy Silt	0	28	6.50531	10.9606	20.6139	0	20.6139
50	0.142315	0.858458	24.5332	Sandy Silt	0	28	2.22383	3.74686	7.04682	0	7.04682

Global Minimum Query (janbu simplified) - Safety Factor: 1.48524

Angle	Base	Base	Shear	Shear	Base	Pore	Effective
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Number	[ft]	[lbs]	of Slice Base [degrees]	Material	Cohesion [psf]	Friction Angle [degrees]	Stress [psf]	Strength [psf]	Normal Stress [psf]	Pressure [psf]	Normal Stress [psf]
1	0.121889	1.28233	-55.1948	Sandy Silt	0	28	61.523	91.3764	171.854	0	171.854
2	0.121889	3.72335	-52.4277	Sandy Silt	0	28	68.5	101.739	191.344	0	191.344
3	0.121889	5.93783	-49.8253	Sandy Silt	0	28	75.0552	111.475	209.655	0	209.655
4	0.121889	7.96156	-47.3566	Sandy Silt	0	28	81.2428	120.665	226.938	0	226.938
5	0.121889	9.82088	-44.9988	Sandy Silt	0	28	87.1044	129.371	243.311	0	243.311
6	0.121889	11.5358	-42.7345	Sandy Silt	0	28	92.6726	137.641	258.865	0	258.865
7	0.121889	13.1221	-40.5503	Sandy Silt	0	28	97.9741	145.515	273.674	0	273.674
8	0.121889	14.5922	-38.4353	Sandy Silt	0	28	103.031	153.026	287.801	0	287.801
9	0.121889	15.9564	-36.3807	Sandy Silt	0	28	107.862	160.201	301.295	0	301.295
10	0.121889	17.223	-34.379	Sandy Silt	0	28	112.482	167.063	314.2	0	314.2
11	0.121889	18.3991	-32.4242	Sandy Silt	0	28	116.904	173.631	326.553	0	326.553
12	0.121889	19.4907	-30.511	Sandy Silt	0	28	121.14	179.922	338.385	0	338.385
13	0.121889	20.5027	-28.6347	Sandy Silt	0	28	125.199	185.951	349.722	0	349.722
14	0.121889	21.4213	-26.7915	Sandy Silt	0	28	107.352	159.444	299.87	0	299.87
15	0.121889	21.9545	-24.9777	Sandy Silt	0	28	55.2507	82.0605	154.333	0	154.333
16	0.121889	22.3059	-23.1904	Sandy Silt	0	28	56.7883	84.3443	158.629	0	158.629
17	0.121889	22.5919	-21.4266	Sandy Silt	0	28	58.1669	86.3918	162.479	0	162.479
18	0.121889	22.8149	-19.684	Sandy Silt	0	28	59.3889	88.2068	165.892	0	165.892
19	0.121889	22.9771	-17.9601	Sandy Silt	0	28	60.4564	89.7923	168.875	0	168.875
20	0.121889	23.0802	-16.2529	Sandy Silt	0	28	61.371	91.1506	171.429	0	171.429
21	0.121889	23.1259	-14.5604	Sandy Silt	0	28	62.1338	92.2836	173.56	0	173.56
22	0.121889	23.1156	-12.8808	Sandy Silt	0	28	62.7455	93.1922	175.269	0	175.269
23	0.121889	23.0504	-11.2124	Sandy Silt	0	28	63.2066	93.877	176.557	0	176.557
24	0.121889	22.9314	-9.5536	Sandy Silt	0	28	63.5169	94.3378	177.424	0	177.424
25	0.121889	22.7595	-7.90284	Sandy Silt	0	28	63.6758	94.5739	177.868	0	177.868
26	0.121889	22.5353	-6.25866	Sandy Silt	0	28	63.6826	94.5839	177.886	0	177.886
27	0.121889	22.2594	-4.61965	Sandy Silt	0	28	63.5358	94.3659	177.476	0	177.476



28	0.121889	21.9322	-2.98442	Sandy Silt	0	28	63.2337	93.9172	176.632	0	176.632
29	0.121889	21.554	-1.35162	Sandy Silt	0	28	62.774	93.2345	175.348	0	175.348
30	0.121889	21.1249	0.280078	Sandy Silt	0	28	62.1541	92.3138	173.617	0	173.617
31	0.121889	20.6451	1.91201	Sandy Silt	0	28	61.3707	91.1502	171.428	0	171.428
32	0.121889	20.1144	3.54549	Sandy Silt	0	28	60.4199	89.738	168.773	0	168.773
33	0.121889	19.5326	5.18186	Sandy Silt	0	28	59.2972	88.0705	165.636	0	165.636
34	0.121889	18.8994	6.82249	Sandy Silt	0	28	57.9974	86.1401	162.006	0	162.006
35	0.121889	18.2143	8.46876	Sandy Silt	0	28	56.5146	83.9377	157.864	0	157.864
36	0.121889	17.4768	10.1221	Sandy Silt	0	28	54.8418	81.4532	153.192	0	153.192
37	0.121889	16.6859	11.784	Sandy Silt	0	28	52.9711	78.6748	147.966	0	147.966
38	0.121889	15.841	13.4561	Sandy Silt	0	28	50.8933	75.5888	142.162	0	142.162
39	0.121889	14.9408	15.1399	Sandy Silt	0	28	48.5981	72.1798	135.751	0	135.751
40	0.121889	13.9841	16.8373	Sandy Silt	0	28	46.073	68.4294	128.697	0	128.697
41	0.121889	12.9695	18.55	Sandy Silt	0	28	43.304	64.3169	120.963	0	120.963
42	0.121889	11.8953	20.28	Sandy Silt	0	28	40.2748	59.8178	112.501	0	112.501
43	0.121889	10.7595	22.0297	Sandy Silt	0	28	36.9659	54.9033	103.258	0	103.258
44	0.121889	9.55992	23.8012	Sandy Silt	0	28	33.3546	49.5396	93.1705	0	93.1705
45	0.121889	8.29398	25.5973	Sandy Silt	0	28	29.4138	43.6865	82.1625	0	82.1625
46	0.121889	6.95875	27.4208	Sandy Silt	0	28	25.1108	37.2955	70.1427	0	70.1427
47	0.121889	5.55084	29.275	Sandy Silt	0	28	20.4061	30.3079	57.0008	0	57.0008
48	0.121889	4.06631	31.1634	Sandy Silt	0	28	15.2509	22.6513	42.6008	0	42.6008
49	0.121889	2.50063	33.0904	Sandy Silt	0	28	9.58465	14.2355	26.773	0	26.773
50	0.121889	0.848439	35.0607	Sandy Silt	0	28	3.33011	4.94601	9.30209	0	9.30209

**Global Minimum Query (spencer) - Safety Factor: 1.69056**

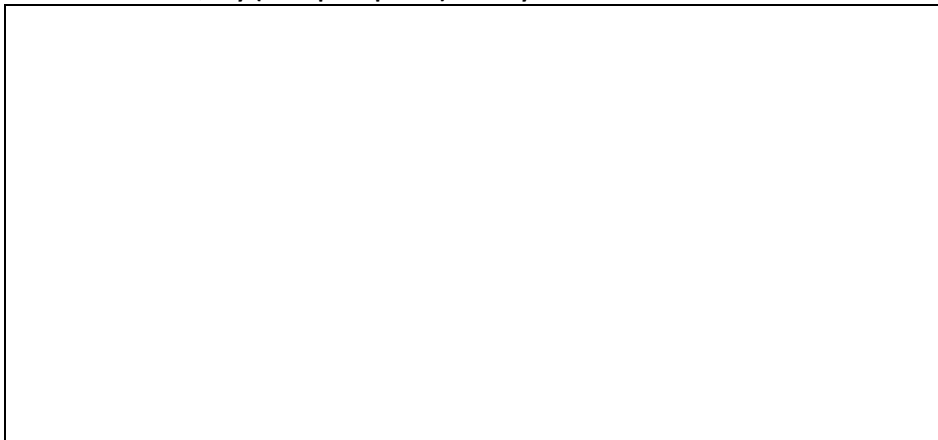
Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.12682	1.16861	-50.4514	Sandy Silt	0	28	50.9008	86.0509	161.838	0	161.838
2	0.12682	3.41452	-48.1476	Sandy Silt	0	28	56.2472	95.0893	178.837	0	178.837
3	0.12682	5.48912	-45.9432	Sandy	0	28	61.4175	103.83	195.275	0	195.275

				Silt							
4	0.12682	7.41257	-43.8234	Sandy Silt	0	28	66.4236	112.293	211.193	0	211.193
5	0.12682	9.20081	-41.7765	Sandy Silt	0	28	71.2776	120.499	226.626	0	226.626
6	0.12682	10.8667	-39.7932	Sandy Silt	0	28	75.9884	128.463	241.603	0	241.603
7	0.12682	12.4208	-37.8655	Sandy Silt	0	28	80.5644	136.199	256.153	0	256.153
8	0.12682	13.8719	-35.9871	Sandy Silt	0	28	85.0133	143.72	270.298	0	270.298
9	0.12682	15.2273	-34.1525	Sandy Silt	0	28	89.3414	151.037	284.059	0	284.059
10	0.12682	16.4933	-32.3569	Sandy Silt	0	28	93.5542	158.159	297.454	0	297.454
11	0.12682	17.6753	-30.5964	Sandy Silt	0	28	97.657	165.095	310.499	0	310.499
12	0.12682	18.7779	-28.8673	Sandy Silt	0	28	101.654	171.853	323.209	0	323.209
13	0.12682	19.8051	-27.1666	Sandy Silt	0	28	105.551	178.441	335.598	0	335.598
14	0.12682	20.7605	-25.4914	Sandy Silt	0	28	109.351	184.864	347.678	0	347.678
15	0.12682	21.6453	-23.8393	Sandy Silt	0	28	107.522	181.772	341.863	0	341.863
16	0.12682	22.1864	-22.2079	Sandy Silt	0	28	47.783	80.78	151.925	0	151.925
17	0.12682	22.4605	-20.5954	Sandy Silt	0	28	49.1495	83.0901	156.27	0	156.27
18	0.12682	22.6729	-18.9997	Sandy Silt	0	28	50.3978	85.2005	160.239	0	160.239
19	0.12682	22.8254	-17.4193	Sandy Silt	0	28	51.5276	87.1105	163.831	0	163.831
20	0.12682	22.9197	-15.8523	Sandy Silt	0	28	52.5384	88.8194	167.045	0	167.045
21	0.12682	22.9571	-14.2975	Sandy Silt	0	28	53.4294	90.3256	169.878	0	169.878
22	0.12682	22.939	-12.7534	Sandy Silt	0	28	54.1994	91.6274	172.326	0	172.326
23	0.12682	22.8663	-11.2186	Sandy Silt	0	28	54.8471	92.7223	174.385	0	174.385
24	0.12682	22.74	-9.69197	Sandy Silt	0	28	55.3708	93.6076	176.05	0	176.05
25	0.12682	22.5609	-8.17224	Sandy Silt	0	28	55.7683	94.2796	177.314	0	177.314
26	0.12682	22.3296	-6.65829	Sandy Silt	0	28	56.0373	94.7345	178.169	0	178.169
27	0.12682	22.0467	-5.149	Sandy Silt	0	28	56.1751	94.9674	178.607	0	178.607
28	0.12682	21.7127	-3.64328	Sandy Silt	0	28	56.1785	94.9731	178.618	0	178.618
29	0.12682	21.3277	-2.14008	Sandy Silt	0	28	56.0437	94.7452	178.19	0	178.19
30	0.12682	20.892	-0.638352	Sandy Silt	0	28	55.7666	94.2768	177.309	0	177.309
31	0.12682	20.4057	0.862936	Sandy Silt	0	28	55.3425	93.5599	175.961	0	175.961

32	0.12682	19.8688	2.36482	Sandy Silt	0	28	54.7661	92.5853	174.127	0	174.127
33	0.12682	19.2812	3.86833	Sandy Silt	0	28	54.031	91.3427	171.791	0	171.791
34	0.12682	18.6427	5.37451	Sandy Silt	0	28	53.1306	89.8204	168.927	0	168.927
35	0.12682	17.9529	6.88443	Sandy Silt	0	28	52.0567	88.0049	165.513	0	165.513
36	0.12682	17.2114	8.39918	Sandy Silt	0	28	50.8004	85.8812	161.519	0	161.519
37	0.12682	16.4177	9.91986	Sandy Silt	0	28	49.3516	83.4319	156.912	0	156.912
38	0.12682	15.571	11.4476	Sandy Silt	0	28	47.6983	80.6368	151.656	0	151.656
39	0.12682	14.6706	12.9837	Sandy Silt	0	28	45.8269	77.4732	145.706	0	145.706
40	0.12682	13.7155	14.5294	Sandy Silt	0	28	43.7219	73.9145	139.013	0	139.013
41	0.12682	12.7046	16.0859	Sandy Silt	0	28	41.3648	69.9297	131.519	0	131.519
42	0.12682	11.6367	17.6548	Sandy Silt	0	28	38.7344	65.4828	123.155	0	123.155
43	0.12682	10.5103	19.2374	Sandy Silt	0	28	35.8054	60.5311	113.842	0	113.842
44	0.12682	9.32385	20.8355	Sandy Silt	0	28	32.5479	55.0241	103.485	0	103.485
45	0.12682	8.07536	22.4507	Sandy Silt	0	28	28.926	48.9012	91.97	0	91.97
46	0.12682	6.76276	24.085	Sandy Silt	0	28	24.8967	42.0893	79.1587	0	79.1587
47	0.12682	5.38365	25.7404	Sandy Silt	0	28	20.4068	34.4989	64.883	0	64.883
48	0.12682	3.93527	27.4193	Sandy Silt	0	28	15.3911	26.0195	48.9356	0	48.9356
49	0.12682	2.41452	29.1241	Sandy Silt	0	28	9.76741	16.5124	31.0553	0	31.0553
50	0.12682	0.817816	30.8576	Sandy Silt	0	28	3.64764	6.16655	11.5976	0	11.5976

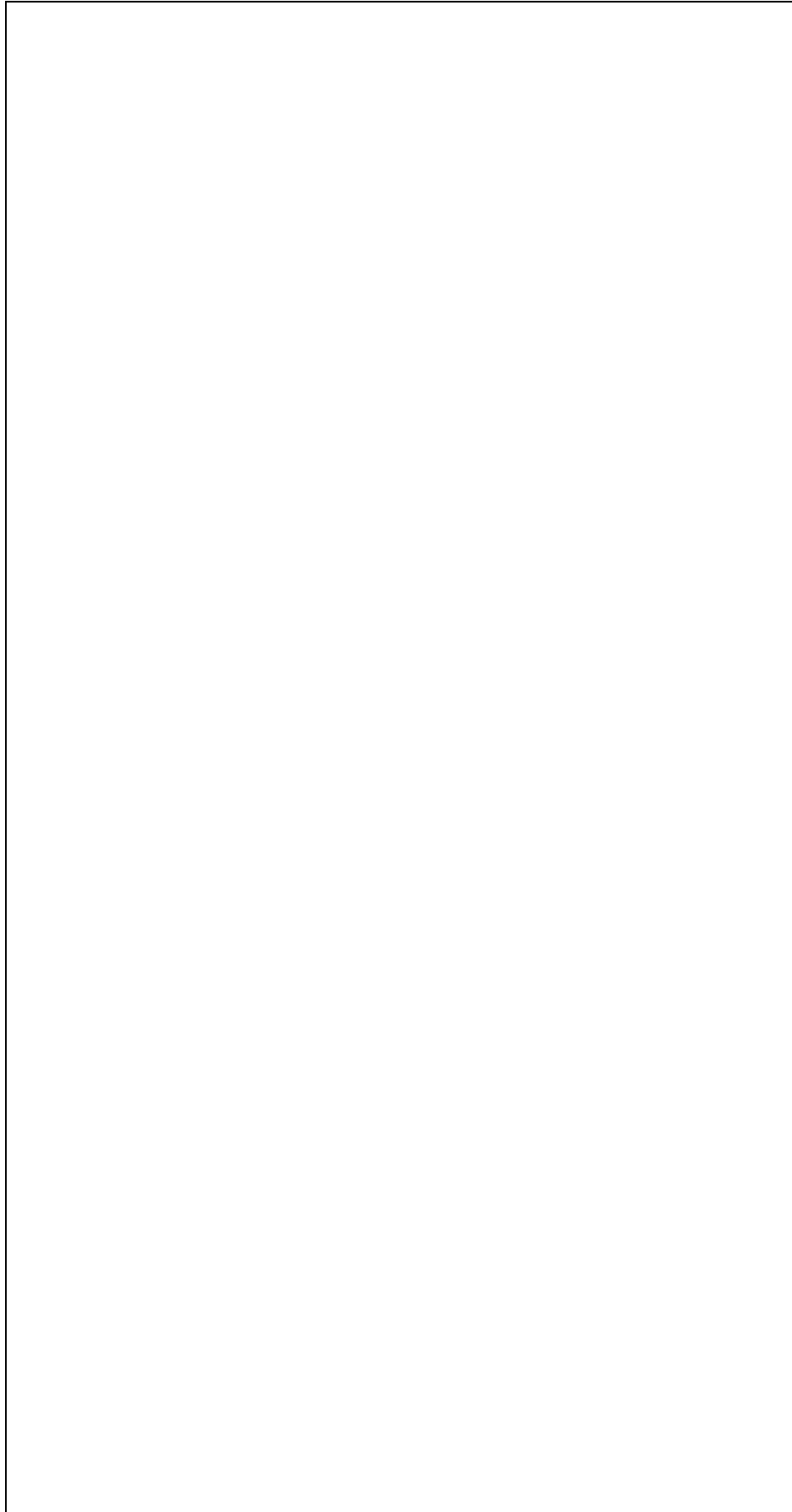
**Interslice Data**

Global Minimum Query (bishop simplified) - Safety Factor: 1.68487



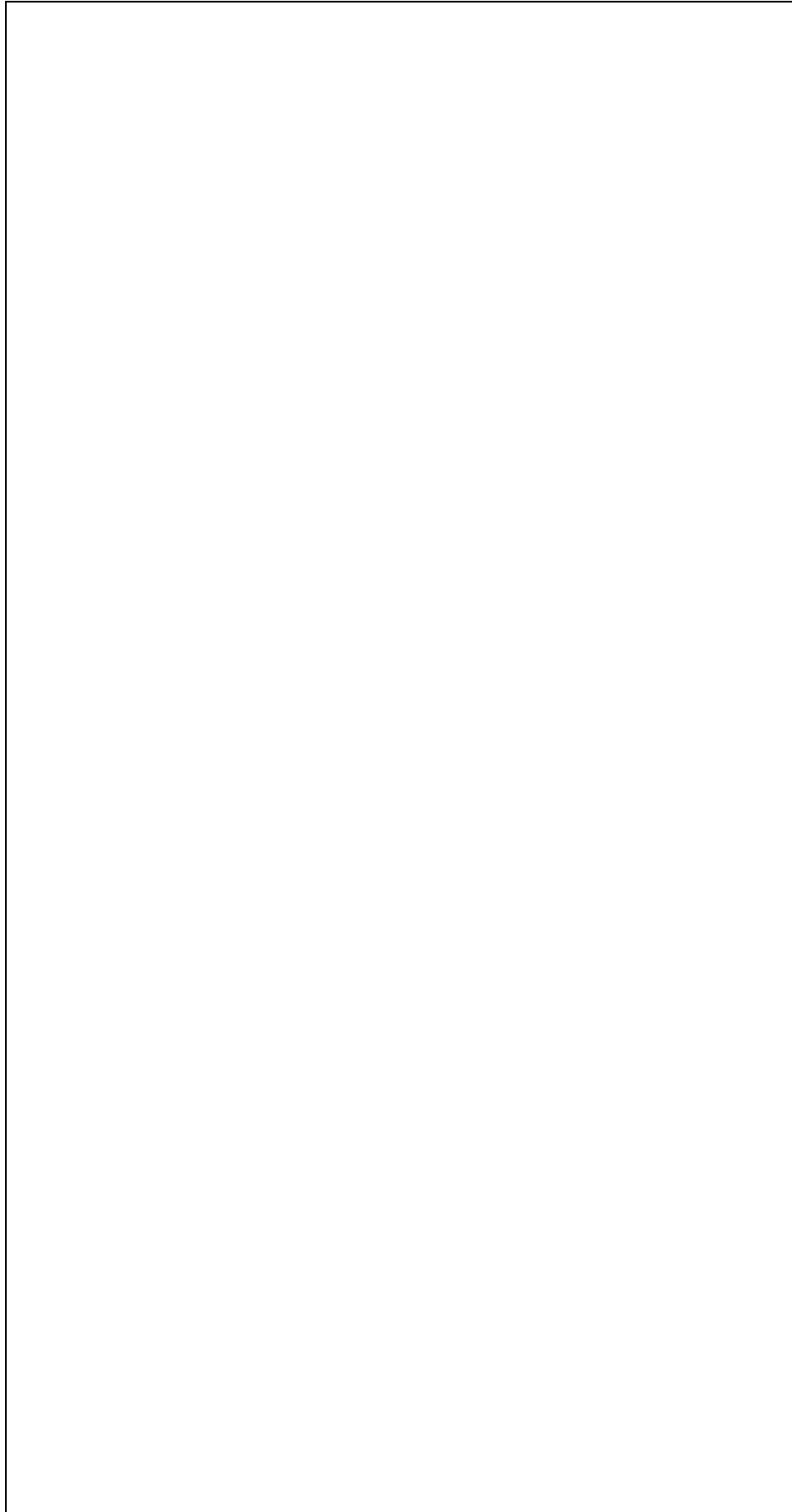
Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-20.287	65.6	0	0	0
2	-20.1447	65.457	19.2655	0	0
3	-20.0024	65.3228	38.1979	0	0
4	-19.86	65.1968	56.6401	0	0
5	-19.7177	65.0783	74.4573	0	0
6	-19.5754	64.9666	91.5322	0	0
7	-19.4331	64.8615	107.763	0	0
8	-19.2908	64.7625	123.058	0	0
9	-19.1485	64.6692	137.339	0	0
10	-19.0062	64.5813	150.535	0	0
11	-18.8638	64.4986	162.581	0	0
12	-18.7215	64.4209	173.42	0	0
13	-18.5792	64.3479	183.001	0	0
14	-18.4369	64.2794	191.276	0	0
15	-18.2946	64.2153	195.073	0	0
16	-18.1523	64.1555	197.244	0	0
17	-18.01	64.0997	198.858	0	0
18	-17.8676	64.048	199.899	0	0
19	-17.7253	64.0001	200.36	0	0
20	-17.583	63.956	200.232	0	0
21	-17.4407	63.9156	199.515	0	0
22	-17.2984	63.8789	198.208	0	0
23	-17.1561	63.8457	196.317	0	0
24	-17.0138	63.816	193.849	0	0
25	-16.8714	63.7898	190.814	0	0
26	-16.7291	63.767	187.228	0	0
27	-16.5868	63.7475	183.106	0	0
28	-16.4445	63.7314	178.469	0	0
29	-16.3022	63.7187	173.341	0	0
30	-16.1599	63.7092	167.748	0	0
31	-16.0175	63.703	161.721	0	0
32	-15.8752	63.7	155.292	0	0
33	-15.7329	63.7004	148.498	0	0
34	-15.5906	63.7039	141.381	0	0
35	-15.4483	63.7108	133.986	0	0
36	-15.306	63.721	126.361	0	0
37	-15.1637	63.7344	118.559	0	0
38	-15.0213	63.7512	110.641	0	0
39	-14.879	63.7713	102.669	0	0
40	-14.7367	63.7948	94.7124	0	0
41	-14.5944	63.8217	86.8481	0	0
42	-14.4521	63.8521	79.1584	0	0
43	-14.3098	63.886	71.7339	0	0
44	-14.1675	63.9234	64.6733	0	0
45	-14.0251	63.9646	58.0852	0	0
46	-13.8828	64.0094	52.0884	0	0
47	-13.7405	64.0581	46.8139	0	0
48	-13.5982	64.1106	42.4062	0	0
49	-13.4559	64.1672	39.0252	0	0
50	-13.3136	64.2279	36.8486	0	0
51	-13.1713	64.2928	0	0	0

**Global Minimum Query (janbu simplified) - Safety Factor: 1.48524**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-20.0716	65.6	0	0	0
2	-19.9497	65.4247	22.6202	0	0
3	-19.8278	65.2662	44.5708	0	0
4	-19.7059	65.1219	65.6724	0	0
5	-19.584	64.9895	85.7871	0	0
6	-19.4621	64.8676	104.806	0	0
7	-19.3402	64.755	122.641	0	0
8	-19.2183	64.6507	139.218	0	0
9	-19.0964	64.554	154.475	0	0
10	-18.9746	64.4642	168.36	0	0
11	-18.8527	64.3808	180.827	0	0
12	-18.7308	64.3034	191.834	0	0
13	-18.6089	64.2315	201.347	0	0
14	-18.487	64.165	209.333	0	0
15	-18.3651	64.1034	214.681	0	0
16	-18.2432	64.0467	216.697	0	0
17	-18.1213	63.9944	218.045	0	0
18	-17.9994	63.9466	218.714	0	0
19	-17.8776	63.903	218.695	0	0
20	-17.7557	63.8635	217.985	0	0
21	-17.6338	63.828	216.582	0	0
22	-17.5119	63.7963	214.49	0	0
23	-17.39	63.7684	211.713	0	0
24	-17.2681	63.7443	208.26	0	0
25	-17.1462	63.7238	204.144	0	0
26	-17.0243	63.7068	199.378	0	0
27	-16.9024	63.6935	193.979	0	0
28	-16.7805	63.6836	187.968	0	0
29	-16.6587	63.6773	181.369	0	0
30	-16.5368	63.6744	174.208	0	0
31	-16.4149	63.675	166.514	0	0
32	-16.293	63.6791	158.322	0	0
33	-16.1711	63.6866	149.67	0	0
34	-16.0492	63.6977	140.598	0	0
35	-15.9273	63.7122	131.153	0	0
36	-15.8054	63.7304	121.387	0	0
37	-15.6835	63.7521	111.356	0	0
38	-15.5617	63.7776	101.125	0	0
39	-15.4398	63.8067	90.7641	0	0
40	-15.3179	63.8397	80.3526	0	0
41	-15.196	63.8766	69.9792	0	0
42	-15.0741	63.9175	59.7435	0	0
43	-14.9522	63.9625	49.7584	0	0
44	-14.8303	64.0119	40.1516	0	0
45	-14.7084	64.0656	31.0694	0	0
46	-14.5865	64.124	22.6799	0	0
47	-14.4647	64.1873	15.1779	0	0
48	-14.3428	64.2556	8.79108	0	0
49	-14.2209	64.3293	3.7885	0	0
50	-14.099	64.4087	0.491516	0	0
51	-13.9771	64.4943	0	0	0

**Global Minimum Query (spencer) - Safety Factor: 1.69056**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-20.2919	65.6	0	0	0
2	-20.165	65.4464	18.3888	4.5037	13.7617
3	-20.0382	65.3048	36.563	8.95486	13.7618
4	-19.9114	65.1738	54.3546	13.3123	13.7617
5	-19.7846	65.0521	71.6219	17.5413	13.7617
6	-19.6578	64.9388	88.243	21.6121	13.7617
7	-19.5309	64.8331	104.112	25.4987	13.7618
8	-19.4041	64.7345	119.135	29.1781	13.7618
9	-19.2773	64.6424	133.229	32.6299	13.7618
10	-19.1505	64.5564	146.318	35.8356	13.7618
11	-19.0237	64.476	158.333	38.7783	13.7618
12	-18.8968	64.4011	169.212	41.4426	13.7617
13	-18.77	64.3311	178.895	43.8142	13.7617
14	-18.6432	64.2661	187.328	45.8795	13.7617
15	-18.5164	64.2056	194.459	47.6262	13.7618
16	-18.3896	64.1496	199.958	48.9728	13.7617
17	-18.2627	64.0978	201.754	49.4126	13.7617
18	-18.1359	64.0501	202.957	49.7074	13.7618
19	-18.0091	64.0065	203.552	49.8531	13.7617
20	-17.8823	63.9667	203.525	49.8465	13.7618
21	-17.7555	63.9307	202.866	49.6851	13.7618
22	-17.6286	63.8983	201.569	49.3675	13.7618
23	-17.5018	63.8696	199.631	48.8927	13.7617
24	-17.375	63.8445	197.05	48.2605	13.7617
25	-17.2482	63.8228	193.829	47.4717	13.7617
26	-17.1214	63.8046	189.974	46.5275	13.7617
27	-16.9945	63.7898	185.493	45.43	13.7617
28	-16.8677	63.7784	180.397	44.1822	13.7618
29	-16.7409	63.7703	174.703	42.7875	13.7617
30	-16.6141	63.7656	168.428	41.2507	13.7618
31	-16.4873	63.7641	161.594	39.577	13.7618
32	-16.3604	63.7661	154.228	37.7728	13.7617
33	-16.2336	63.7713	146.359	35.8455	13.7617
34	-16.1068	63.7799	138.022	33.8037	13.7617
35	-15.98	63.7918	129.257	31.657	13.7617
36	-15.8532	63.8071	120.109	29.4167	13.7618
37	-15.7263	63.8258	110.632	27.0954	13.7617
38	-15.5995	63.848	100.882	24.7076	13.7618
39	-15.4727	63.8737	90.928	22.2697	13.7617
40	-15.3459	63.9029	80.8459	19.8004	13.7617
41	-15.2191	63.9358	70.7227	17.3211	13.7617
42	-15.0922	63.9724	60.6582	14.8561	13.7617
43	-14.9654	64.0127	50.7666	12.4335	13.7617
44	-14.8386	64.057	41.1799	10.0856	13.7617
45	-14.7118	64.1053	32.0506	7.84969	13.7617
46	-14.585	64.1577	23.5565	5.76935	13.7617
47	-14.4582	64.2144	15.9063	3.8957	13.7617
48	-14.3313	64.2755	9.34669	2.28915	13.7617
49	-14.2045	64.3413	4.17197	1.02178	13.7617
50	-14.0777	64.4119	0.736892	0.180476	13.7617
51	-13.9509	64.4877	0	0	0



## List Of Coordinates

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### Water Table

X	Y
-30	65.6
-18.4	65.6
-4.35812	62.0895
0	61
4.35812	62.0895
24	67
60	67

### Distributed Load

X	Y
-18.4	65.6
-30	65.6

### Distributed Load

X	Y
34.4247	67
24	67

### External Boundary

X	Y
-18.4	65.6
-30	65.6
-30	63
-30	55
-30	45
60	45
60	55
60	63
60	67
24	67
8	63
0	61
-8	63

### Material Boundary

X	Y
8	63
60	63

### Material Boundary

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X	Y
-30	63
-8	63

**Material Boundary**

X	Y
-30	55
60	55

## **Slide Analysis Information**

### **286-1224(2) HCFCD Ditch**

#### **Project Summary**

---

File Name: Ditch Right Side.slim  
 Slide Modeler Version: 7.01  
 Project Title: 286-1224(2) HCFCD Ditch  
 Analysis: Rapid Drawdown Analysis  
 Author: Prasoon Tiwari  
 Company: Intertek-PSI  
 Date Created: 11/11/2016, 11:14:19 AM

#### **General Settings**

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Units of Measurement: Imperial Units  
 Time Units: days  
 Permeability Units: feet/second  
 Failure Direction: Right to Left  
 Data Output: Standard  
 Maximum Material Properties: 20  
 Maximum Support Properties: 20

#### **Analysis Options**

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Slices Type: Vertical

##### **Analysis Methods Used**

Bishop simplified  
 Janbu simplified  
 Spencer

Number of slices: 50  
 Tolerance: 0.005  
 Maximum number of iterations: 75  
 Check malpha < 0.2: Yes  
 Create Interslice boundaries at intersections with water tables and piezos: Yes  
 Initial trial value of FS: 1  
 Steffensen Iteration: Yes

#### **Groundwater Analysis**

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Groundwater Method: Water Surfaces  
 Pore Fluid Unit Weight [lbs/ft<sup>3</sup>]: 62.4  
 Advanced Groundwater Method: Excess Pore Pressure

## Random Numbers

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Pseudo-random Seed: 10116  
 Random Number Generation Method: Park and Miller v.3

## Surface Options

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Surface Type: Circular  
 Search Method: Grid Search  
 Radius Increment: 10  
 Composite Surfaces: Disabled  
 Reverse Curvature: Invalid Surfaces  
 Minimum Elevation: Not Defined  
 Minimum Depth [ft]: 1  
 Minimum Area: Not Defined  
 Minimum Weight: Not Defined

## Seismic

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Advanced seismic analysis: No  
 Staged pseudostatic analysis: No

## Loading

---

2 Distributed Loads present

### Distributed Load 1




Distribution: Constant  
 Magnitude [psf]: 250  
 Orientation: Normal to boundary  
 Creates Excess Pore Pressure: No

### Distributed Load 2

Distribution: Constant  
 Magnitude [psf]: 250  
 Orientation: Normal to boundary  
 Creates Excess Pore Pressure: No

## Material Properties

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Property	Sandy Silt	Silty Sand	Sandy Lean clay
Color			
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	120	120	120
Cohesion [psf]	0	0	150
Friction Angle [deg]	28	30	25
Water Surface	Water Table	Water Table	Water Table
Hu Value	0	1	1
Material Weight Causes Excess Pore Pressure			
B_bar value	0	0	0

## Global Minimums

### Method: bishop simplified

FS	1.781930
Center:	20.771, 72.064
Radius:	7.389
Left Slip Surface Endpoint:	17.586, 65.396
Right Slip Surface Endpoint:	26.151, 67.000
Resisting Moment:	6961.5 lb-ft
Driving Moment:	3906.72 lb-ft
Total Slice Area:	10.1516 ft2
Surface Horizontal Width:	8.56541 ft
Surface Average Height:	1.18518 ft

### Method: janbu simplified

FS	1.542090
Center:	22.432, 68.742
Radius:	3.847
Left Slip Surface Endpoint:	19.788, 65.947
Right Slip Surface Endpoint:	25.862, 67.000
Resisting Horizontal Force:	656.571 lb
Driving Horizontal Force:	425.766 lb
Total Slice Area:	7.63467 ft2
Surface Horizontal Width:	6.07413 ft
Surface Average Height:	1.25692 ft

### Method: spencer

FS	1.788970
Center:	20.771, 72.064
Radius:	7.389
Left Slip Surface Endpoint:	17.586, 65.396
Right Slip Surface Endpoint:	26.151, 67.000
Resisting Moment:	6989.01 lb-ft
Driving Moment:	3906.72 lb-ft
Resisting Horizontal Force:	857.718 lb
Driving Horizontal Force:	479.448 lb
Total Slice Area:	10.1516 ft <sup>2</sup>
Surface Horizontal Width:	8.56541 ft
Surface Average Height:	1.18518 ft

## Valid / Invalid Surfaces

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### Method: bishop simplified

Number of Valid Surfaces: 3399  
 Number of Invalid Surfaces: 1452

#### Error Codes:

Error Code -103 reported for 601 surfaces  
 Error Code -107 reported for 599 surfaces  
 Error Code -108 reported for 10 surfaces  
 Error Code -112 reported for 25 surfaces  
 Error Code -115 reported for 217 surfaces

### Method: janbu simplified

Number of Valid Surfaces: 3371  
 Number of Invalid Surfaces: 1480

#### Error Codes:

Error Code -103 reported for 601 surfaces  
 Error Code -107 reported for 599 surfaces  
 Error Code -108 reported for 26 surfaces  
 Error Code -112 reported for 37 surfaces  
 Error Code -115 reported for 217 surfaces

### Method: spencer

Number of Valid Surfaces: 3368  
 Number of Invalid Surfaces: 1483

#### Error Codes:

Error Code -103 reported for 601 surfaces  
 Error Code -107 reported for 599 surfaces  
 Error Code -108 reported for 28 surfaces  
 Error Code -111 reported for 1 surface  
 Error Code -112 reported for 37 surfaces  
 Error Code -115 reported for 217 surfaces

## Error Codes

The following errors were encountered during the computation:

- 103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
- 107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
- 108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
- 111 = safety factor equation did not converge
- 112 = The coefficient  $M\text{-Alpha} = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi))/F < 0.2$  for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.
- 115 = Surface too shallow, below the minimum depth.

## Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.78193

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.171308	1.25376	-24.7989	Sandy Silt	0	28	2.53294	4.51353	8.48873	0	8.48873
2	0.171308	3.70763	-23.3438	Sandy Silt	0	28	7.4123	13.2082	24.8411	0	24.8411
3	0.171308	6.05593	-21.9045	Sandy Silt	0	28	11.986	21.3583	40.1692	0	40.1692
4	0.171308	8.30195	-20.4796	Sandy Silt	0	28	16.2736	28.9984	54.5382	0	54.5382
5	0.171308	10.4486	-19.0679	Sandy Silt	0	28	20.2919	36.1588	68.0048	0	68.0048
6	0.171308	12.4985	-17.668	Sandy Silt	0	28	24.0559	42.866	80.6191	0	80.6191
7	0.171308	14.4539	-16.279	Sandy Silt	0	28	27.5786	49.1432	92.4252	0	92.4252
8	0.171308	16.317	-14.8998	Sandy Silt	0	28	30.8718	55.0113	103.461	0	103.461
9	0.171308	18.0896	-13.5293	Sandy Silt	0	28	33.9455	60.4885	113.763	0	113.763
10	0.171308	19.7733	-12.1667	Sandy Silt	0	28	36.809	65.5911	123.359	0	123.359
11	0.171308	21.3695	-10.811	Sandy Silt	0	28	39.4705	70.3336	132.278	0	132.278
12	0.171308	22.8796	-9.46149	Sandy Silt	0	28	41.9372	74.7292	140.545	0	140.545
13	0.171308	24.3046	-8.11722	Sandy Silt	0	28	44.2157	78.7892	148.181	0	148.181
14	0.171308	25.6454	-6.77743	Sandy Silt	0	28	46.3117	82.5242	155.206	0	155.206
15	0.171308	26.9028	-5.44136	Sandy Silt	0	28	48.2305	85.9434	161.636	0	161.636
16	0.171308	28.0774	-4.10824	Sandy	0	28	49.9767	89.055	167.488	0	167.488

17	0.171308	29.1696	-2.77736	Silt Sandy Silt	0	28	51.5546	91.8667	172.776	0	172.776
18	0.171308	30.18	-1.44797	Sandy Silt	0	28	52.9677	94.3848	177.512	0	177.512
19	0.171308	31.1085	- 0.119366	Sandy Silt	0	28	54.2194	96.6152	181.707	0	181.707
20	0.171308	31.9554	1.20918	Sandy Silt	0	28	55.3126	98.5632	185.371	0	185.371
21	0.171308	32.7206	2.53837	Sandy Silt	0	28	56.2497	100.233	188.511	0	188.511
22	0.171308	33.4039	3.86893	Sandy Silt	0	28	57.0331	101.629	191.137	0	191.137
23	0.171308	34.0049	5.20159	Sandy Silt	0	28	57.665	102.755	193.253	0	193.253
24	0.171308	34.5232	6.53708	Sandy Silt	0	28	58.1459	103.612	194.866	0	194.866
25	0.171308	34.9583	7.87614	Sandy Silt	0	28	58.4782	104.204	195.979	0	195.979
26	0.171308	35.3093	9.21955	Sandy Silt	0	28	58.6622	104.532	196.596	0	196.596
27	0.171308	35.5754	10.5681	Sandy Silt	0	28	58.6993	104.598	196.72	0	196.72
28	0.171308	35.7555	11.9226	Sandy Silt	0	28	58.5898	104.403	196.353	0	196.353
29	0.171308	35.8484	13.2839	Sandy Silt	0	28	58.3334	103.946	195.494	0	195.494
30	0.171308	35.8527	14.6529	Sandy Silt	0	28	57.931	103.229	194.145	0	194.145
31	0.171308	35.7668	16.0305	Sandy Silt	0	28	57.3816	102.25	192.304	0	192.304
32	0.171308	35.5888	17.4177	Sandy Silt	0	28	56.6846	101.008	189.969	0	189.969
33	0.171308	35.3169	18.8155	Sandy Silt	0	28	55.8403	99.5035	187.139	0	187.139
34	0.171308	34.9486	20.225	Sandy Silt	0	28	54.8467	97.733	183.809	0	183.809
35	0.171308	34.4815	21.6475	Sandy Silt	0	28	53.7028	95.6946	179.976	0	179.976
36	0.171308	33.9126	23.0841	Sandy Silt	0	28	52.4069	93.3854	175.632	0	175.632
37	0.171308	33.2387	24.5362	Sandy Silt	0	28	50.9572	90.8021	170.774	0	170.774
38	0.171308	32.3191	26.0054	Sandy Silt	0	28	85.5039	152.362	286.551	0	286.551
39	0.171308	30.6296	27.4931	Sandy Silt	0	28	110.755	197.358	371.176	0	371.176
40	0.171308	28.7372	29.0013	Sandy Silt	0	28	106.965	190.604	358.474	0	358.474
41	0.171308	26.7226	30.5319	Sandy Silt	0	28	103.019	183.572	345.249	0	345.249
42	0.171308	24.5801	32.087	Sandy Silt	0	28	98.9119	176.254	331.486	0	331.486
43	0.171308	22.3032	33.669	Sandy Silt	0	28	94.6395	168.641	317.168	0	317.168
44	0.171308	19.8845	35.2807	Sandy Silt	0	28	90.196	160.723	302.276	0	302.276



45	0.171308	17.3154	36.9252	Sandy Silt	0	28	85.5741	152.487	286.786	0	286.786
46	0.171308	14.5862	38.606	Sandy Silt	0	28	80.7669	143.921	270.675	0	270.675
47	0.171308	11.6856	40.3272	Sandy Silt	0	28	75.7662	135.01	253.916	0	253.916
48	0.171308	8.60024	42.0936	Sandy Silt	0	28	70.5623	125.737	236.478	0	236.478
49	0.171308	5.31452	43.9107	Sandy Silt	0	28	65.1462	116.086	218.326	0	218.326
50	0.171308	1.80972	45.7851	Sandy Silt	0	28	59.5057	106.035	199.423	0	199.423

**Global Minimum Query (janbu simplified) - Safety Factor: 1.54209**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.121483	1.02387	-42.1857	Sandy Silt	0	28	4.22678	6.51807	12.2587	0	12.2587
2	0.121483	3.00654	-39.7875	Sandy Silt	0	28	11.9705	18.4596	34.7175	0	34.7175
3	0.121483	4.86544	-37.4704	Sandy Silt	0	28	18.7699	28.9448	54.4373	0	54.4373
4	0.121483	6.61208	-35.2232	Sandy Silt	0	28	24.805	38.2516	71.9409	0	71.9409
5	0.121483	8.25584	-33.0367	Sandy Silt	0	28	30.2047	46.5784	87.601	0	87.601
6	0.121483	9.80444	-30.9033	Sandy Silt	0	28	35.0639	54.0717	101.694	0	101.694
7	0.121483	11.2643	-28.8165	Sandy Silt	0	28	39.4547	60.8427	114.428	0	114.428
8	0.121483	12.6409	-26.7708	Sandy Silt	0	28	43.4331	66.9777	125.967	0	125.967
9	0.121483	13.9388	-24.7614	Sandy Silt	0	28	47.0432	72.5449	136.437	0	136.437
10	0.121483	15.1619	-22.784	Sandy Silt	0	28	50.3209	77.5993	145.943	0	145.943
11	0.121483	16.3136	-20.8349	Sandy Silt	0	28	53.2949	82.1856	154.568	0	154.568
12	0.121483	17.3966	-18.9107	Sandy Silt	0	28	55.9894	86.3407	162.383	0	162.383
13	0.121483	18.4136	-17.0085	Sandy Silt	0	28	58.4242	90.0954	169.445	0	169.445
14	0.121483	19.3665	-15.1254	Sandy Silt	0	28	60.6162	93.4756	175.802	0	175.802
15	0.121483	20.2572	-13.2589	Sandy Silt	0	28	62.5793	96.5029	181.496	0	181.496
16	0.121483	21.0873	-11.4067	Sandy Silt	0	28	64.3258	99.1961	186.56	0	186.56
17	0.121483	21.8579	-9.56643	Sandy Silt	0	28	65.8658	101.571	191.027	0	191.027
18	0.121483	22.5702	-7.73613	Sandy Silt	0	28	67.2075	103.64	194.919	0	194.919
19	0.121483	23.2249	-5.91374	Sandy Silt	0	28	68.3598	105.417	198.26	0	198.26
20	0.121483	23.8228	-4.09734	Sandy	0	28	69.3273	106.909	201.067	0	201.067

				Silt							
21	0.121483	24.3643	-2.28506	Sandy Silt	0	28	70.1165	108.126	203.356	0	203.356
22	0.121483	24.8497	-0.475076	Sandy Silt	0	28	70.7319	109.075	205.14	0	205.14
23	0.121483	25.2792	1.33444	Sandy Silt	0	28	71.1768	109.761	206.431	0	206.431
24	0.121483	25.6526	3.14529	Sandy Silt	0	28	71.455	110.19	207.237	0	207.237
25	0.121483	25.9699	4.95929	Sandy Silt	0	28	71.5678	110.364	207.564	0	207.564
26	0.121483	26.2306	6.77829	Sandy Silt	0	28	71.5179	110.287	207.42	0	207.42
27	0.121483	26.4341	8.6042	Sandy Silt	0	28	71.3065	109.961	206.806	0	206.806
28	0.121483	26.5797	10.439	Sandy Silt	0	28	70.9336	109.386	205.726	0	205.726
29	0.121483	26.6665	12.2846	Sandy Silt	0	28	70.4006	108.564	204.18	0	204.18
30	0.121483	26.6933	14.1433	Sandy Silt	0	28	69.706	107.493	202.165	0	202.165
31	0.121483	26.6587	16.0174	Sandy Silt	0	28	68.8494	106.172	199.68	0	199.68
32	0.121483	26.5611	17.9093	Sandy Silt	0	28	67.8294	104.599	196.722	0	196.722
33	0.121483	26.3985	19.8215	Sandy Silt	0	28	66.6433	102.77	193.282	0	193.282
34	0.121483	26.1686	21.7571	Sandy Silt	0	28	65.2893	100.682	189.354	0	189.354
35	0.121483	25.8454	23.7192	Sandy Silt	0	28	88.1278	135.901	255.593	0	255.593
36	0.121483	25.1304	25.7114	Sandy Silt	0	28	135.097	208.332	391.815	0	391.815
37	0.121483	24.2384	27.7375	Sandy Silt	0	28	131.206	202.331	380.53	0	380.53
38	0.121483	23.2656	29.8021	Sandy Silt	0	28	127.128	196.043	368.704	0	368.704
39	0.121483	22.2071	31.9103	Sandy Silt	0	28	122.853	189.45	356.304	0	356.304
40	0.121483	21.0569	34.068	Sandy Silt	0	28	118.366	182.531	343.292	0	343.292
41	0.121483	19.8081	36.2823	Sandy Silt	0	28	113.654	175.264	329.623	0	329.623
42	0.121483	18.4522	38.5614	Sandy Silt	0	28	108.695	167.618	315.244	0	315.244
43	0.121483	16.9788	40.9155	Sandy Silt	0	28	103.47	159.56	300.089	0	300.089
44	0.121483	15.3753	43.3568	Sandy Silt	0	28	97.9502	151.048	284.08	0	284.08
45	0.121483	13.6254	45.901	Sandy Silt	0	28	92.1016	142.029	267.117	0	267.117
46	0.121483	11.7084	48.5681	Sandy Silt	0	28	85.8815	132.437	249.078	0	249.078
47	0.121483	9.59652	51.3849	Sandy Silt	0	28	79.2334	122.185	229.797	0	229.797
48	0.121483	7.25161	54.3882	Sandy Silt	0	28	72.082	111.157	209.056	0	209.056

49	0.121483	4.61832	57.6317	Sandy Silt	0	28	64.3198	99.1869	186.543	0	186.543
50	0.121483	1.61066	61.1997	Sandy Silt	0	28	55.785	86.0255	161.79	0	161.79

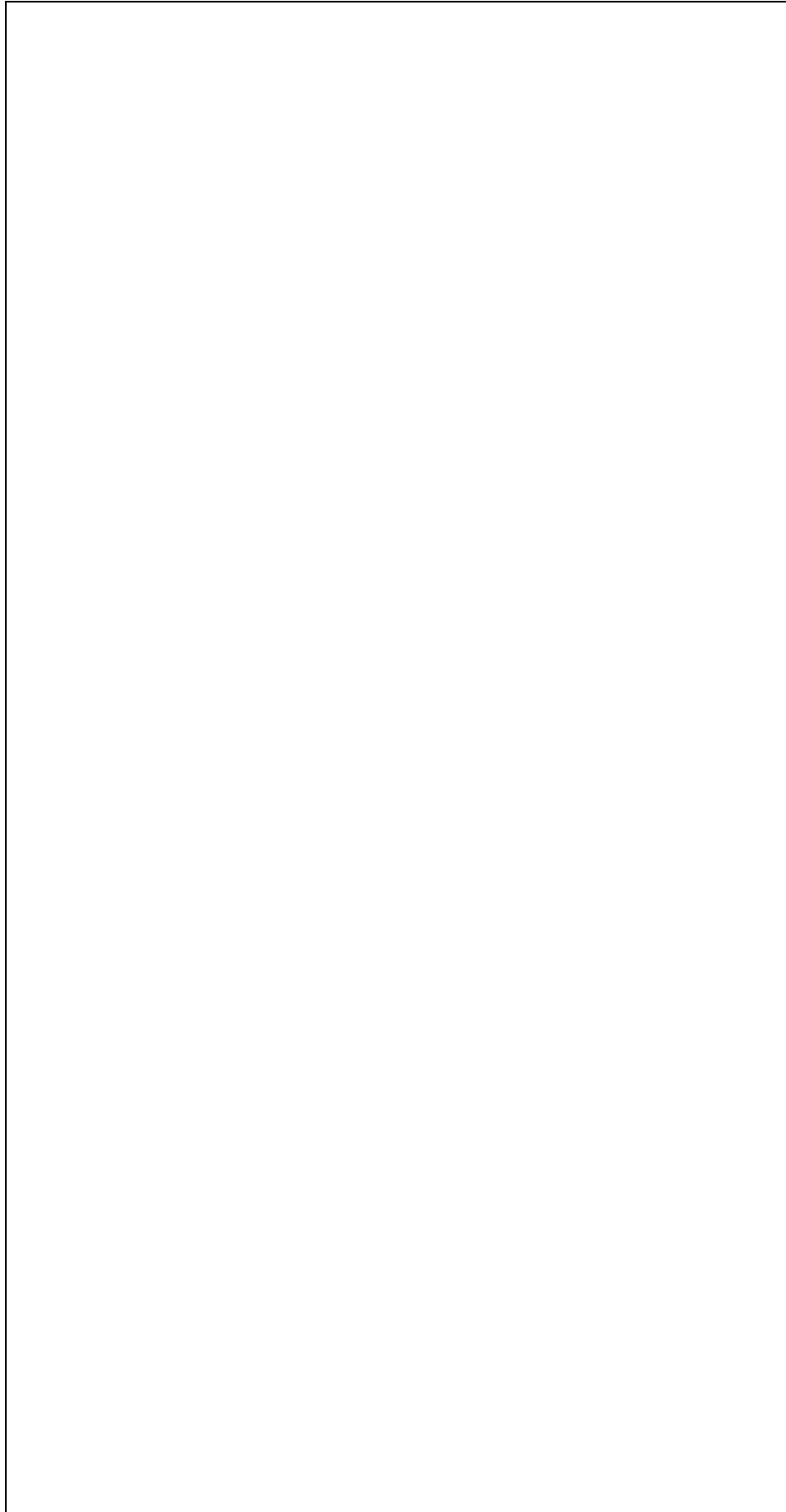
**Global Minimum Query (spencer) - Safety Factor: 1.78897**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.171308	1.25376	-24.7989	Sandy Silt	0	28	3.23518	5.78764	10.8849	0	10.8849
2	0.171308	3.70763	-23.3438	Sandy Silt	0	28	9.34387	16.7159	31.4381	0	31.4381
3	0.171308	6.05593	-21.9045	Sandy Silt	0	28	14.9233	26.6974	50.2105	0	50.2105
4	0.171308	8.30195	-20.4796	Sandy Silt	0	28	20.0249	35.8239	67.375	0	67.375
5	0.171308	10.4486	-19.0679	Sandy Silt	0	28	24.692	44.1732	83.0777	0	83.0777
6	0.171308	12.4985	-17.668	Sandy Silt	0	28	28.9618	51.8118	97.4438	0	97.4438
7	0.171308	14.4539	-16.279	Sandy Silt	0	28	32.8663	58.7968	110.581	0	110.581
8	0.171308	16.317	-14.8998	Sandy Silt	0	28	36.433	65.1776	122.581	0	122.581
9	0.171308	18.0896	-13.5293	Sandy Silt	0	28	39.6861	70.9972	133.526	0	133.526
10	0.171308	19.7733	-12.1667	Sandy Silt	0	28	42.6463	76.2929	143.486	0	143.486
11	0.171308	21.3695	-10.811	Sandy Silt	0	28	45.3322	81.0979	152.523	0	152.523
12	0.171308	22.8796	-9.46149	Sandy Silt	0	28	47.7599	85.441	160.691	0	160.691
13	0.171308	24.3046	-8.11722	Sandy Silt	0	28	49.9438	89.348	168.039	0	168.039
14	0.171308	25.6454	-6.77743	Sandy Silt	0	28	51.8967	92.8417	174.61	0	174.61
15	0.171308	26.9028	-5.44136	Sandy Silt	0	28	53.63	95.9424	180.441	0	180.441
16	0.171308	28.0774	-4.10824	Sandy Silt	0	28	55.1536	98.6682	185.568	0	185.568
17	0.171308	29.1696	-2.77736	Sandy Silt	0	28	56.4766	101.035	190.02	0	190.02
18	0.171308	30.18	-1.44797	Sandy Silt	0	28	57.6075	103.058	193.824	0	193.824
19	0.171308	31.1085	-	Sandy Silt	0	28	58.5532	104.75	197.006	0	197.006
			0.119366								
20	0.171308	31.9554	1.20918	Sandy Silt	0	28	59.3207	106.123	199.587	0	199.587
21	0.171308	32.7206	2.53837	Sandy Silt	0	28	59.9149	107.186	201.588	0	201.588
22	0.171308	33.4039	3.86893	Sandy Silt	0	28	60.3425	107.951	203.026	0	203.026
23	0.171308	34.0049	5.20159	Sandy Silt	0	28	60.6069	108.424	203.917	0	203.917
24	0.171308	34.5232	6.53708	Sandy	0	28	60.7137	108.615	204.276	0	204.276

				Silt							
25	0.171308	34.9583	7.87614	Sandy Silt	0	28	60.6662	108.53	204.115	0	204.115
26	0.171308	35.3093	9.21955	Sandy Silt	0	28	60.4672	108.174	203.446	0	203.446
27	0.171308	35.5754	10.5681	Sandy Silt	0	28	60.1206	107.554	202.28	0	202.28
28	0.171308	35.7555	11.9226	Sandy Silt	0	28	59.6293	106.675	200.626	0	200.626
29	0.171308	35.8484	13.2839	Sandy Silt	0	28	58.9948	105.54	198.492	0	198.492
30	0.171308	35.8527	14.6529	Sandy Silt	0	28	58.2201	104.154	195.884	0	195.884
31	0.171308	35.7668	16.0305	Sandy Silt	0	28	57.3062	102.519	192.811	0	192.811
32	0.171308	35.5888	17.4177	Sandy Silt	0	28	56.2558	100.64	189.276	0	189.276
33	0.171308	35.3169	18.8155	Sandy Silt	0	28	55.0693	98.5174	185.284	0	185.284
34	0.171308	34.9486	20.225	Sandy Silt	0	28	53.7484	96.1542	180.84	0	180.84
35	0.171308	34.4815	21.6475	Sandy Silt	0	28	52.2936	93.5517	175.945	0	175.945
36	0.171308	33.9126	23.0841	Sandy Silt	0	28	50.7058	90.7111	170.603	0	170.603
37	0.171308	33.2387	24.5362	Sandy Silt	0	28	48.9853	87.6332	164.814	0	164.814
38	0.171308	32.3191	26.0054	Sandy Silt	0	28	48.16593	146.086	274.748	0	274.748
39	0.171308	30.6296	27.4931	Sandy Silt	0	28	105.077	187.98	353.539	0	353.539
40	0.171308	28.7372	29.0013	Sandy Silt	0	28	100.801	180.33	339.151	0	339.151
41	0.171308	26.7226	30.5319	Sandy Silt	0	28	96.4203	172.493	324.411	0	324.411
42	0.171308	24.5801	32.087	Sandy Silt	0	28	91.9328	164.465	309.313	0	309.313
43	0.171308	22.3032	33.669	Sandy Silt	0	28	87.3363	156.242	293.849	0	293.849
44	0.171308	19.8845	35.2807	Sandy Silt	0	28	82.6291	147.821	278.01	0	278.01
45	0.171308	17.3154	36.9252	Sandy Silt	0	28	77.8073	139.195	261.788	0	261.788
46	0.171308	14.5862	38.606	Sandy Silt	0	28	72.8693	130.361	245.173	0	245.173
47	0.171308	11.6856	40.3272	Sandy Silt	0	28	67.8111	121.312	228.155	0	228.155
48	0.171308	8.60024	42.0936	Sandy Silt	0	28	62.6299	112.043	210.723	0	210.723
49	0.171308	5.31452	43.9107	Sandy Silt	0	28	57.3229	102.549	192.866	0	192.866
50	0.171308	1.80972	45.7851	Sandy Silt	0	28	51.9199	92.8832	174.688	0	174.688

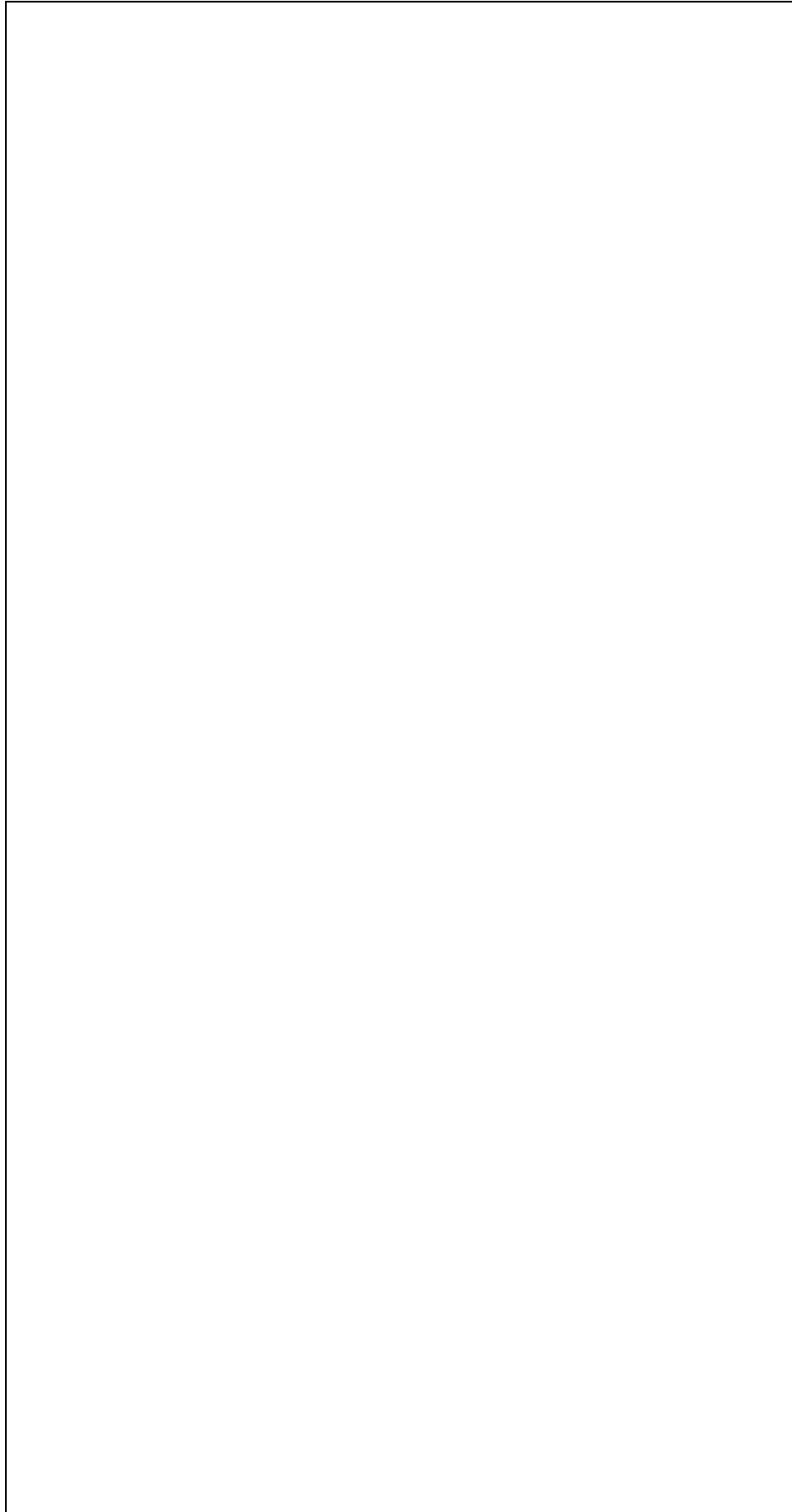
## Interslice Data

**Global Minimum Query (bishop simplified) - Safety Factor: 1.78193**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	17.5859	65.3965	0	0	0
2	17.7572	65.3173	1.10569	0	0
3	17.9286	65.2434	4.21167	0	0
4	18.0999	65.1745	9.0313	0	0
5	18.2712	65.1105	15.3077	0	0
6	18.4425	65.0513	22.8096	0	0
7	18.6138	64.9968	31.3285	0	0
8	18.7851	64.9467	40.6753	0	0
9	18.9564	64.9012	50.6782	0	0
10	19.1277	64.8599	61.181	0	0
11	19.299	64.823	72.041	0	0
12	19.4703	64.7903	83.1279	0	0
13	19.6416	64.7617	94.3225	0	0
14	19.8129	64.7373	105.515	0	0
15	19.9843	64.7169	116.606	0	0
16	20.1556	64.7006	127.504	0	0
17	20.3269	64.6883	138.124	0	0
18	20.4982	64.68	148.389	0	0
19	20.6695	64.6757	158.229	0	0
20	20.8408	64.6753	167.579	0	0
21	21.0121	64.6789	176.382	0	0
22	21.1834	64.6865	184.583	0	0
23	21.3547	64.6981	192.136	0	0
24	21.526	64.7137	198.998	0	0
25	21.6973	64.7333	205.131	0	0
26	21.8686	64.757	210.502	0	0
27	22.04	64.7848	215.081	0	0
28	22.2113	64.8168	218.847	0	0
29	22.3826	64.853	221.779	0	0
30	22.5539	64.8934	223.862	0	0
31	22.7252	64.9382	225.087	0	0
32	22.8965	64.9874	225.449	0	0
33	23.0678	65.0412	224.947	0	0
34	23.2391	65.0996	223.587	0	0
35	23.4104	65.1627	221.379	0	0
36	23.5817	65.2307	218.34	0	0
37	23.753	65.3037	214.492	0	0
38	23.9243	65.3819	209.864	0	0
39	24.0957	65.4654	200.56	0	0
40	24.267	65.5546	186.437	0	0
41	24.4383	65.6496	170.714	0	0
42	24.6096	65.7506	153.474	0	0
43	24.7809	65.858	134.809	0	0
44	24.9522	65.9721	114.824	0	0
45	25.1235	66.0933	93.6328	0	0
46	25.2948	66.2221	71.3674	0	0
47	25.4661	66.3588	48.1756	0	0
48	25.6374	66.5043	24.2267	0	0
49	25.8087	66.659	-0.284694	0	0
50	25.98	66.8239	-25.1331	0	0
51	26.1514	67	0	0	0

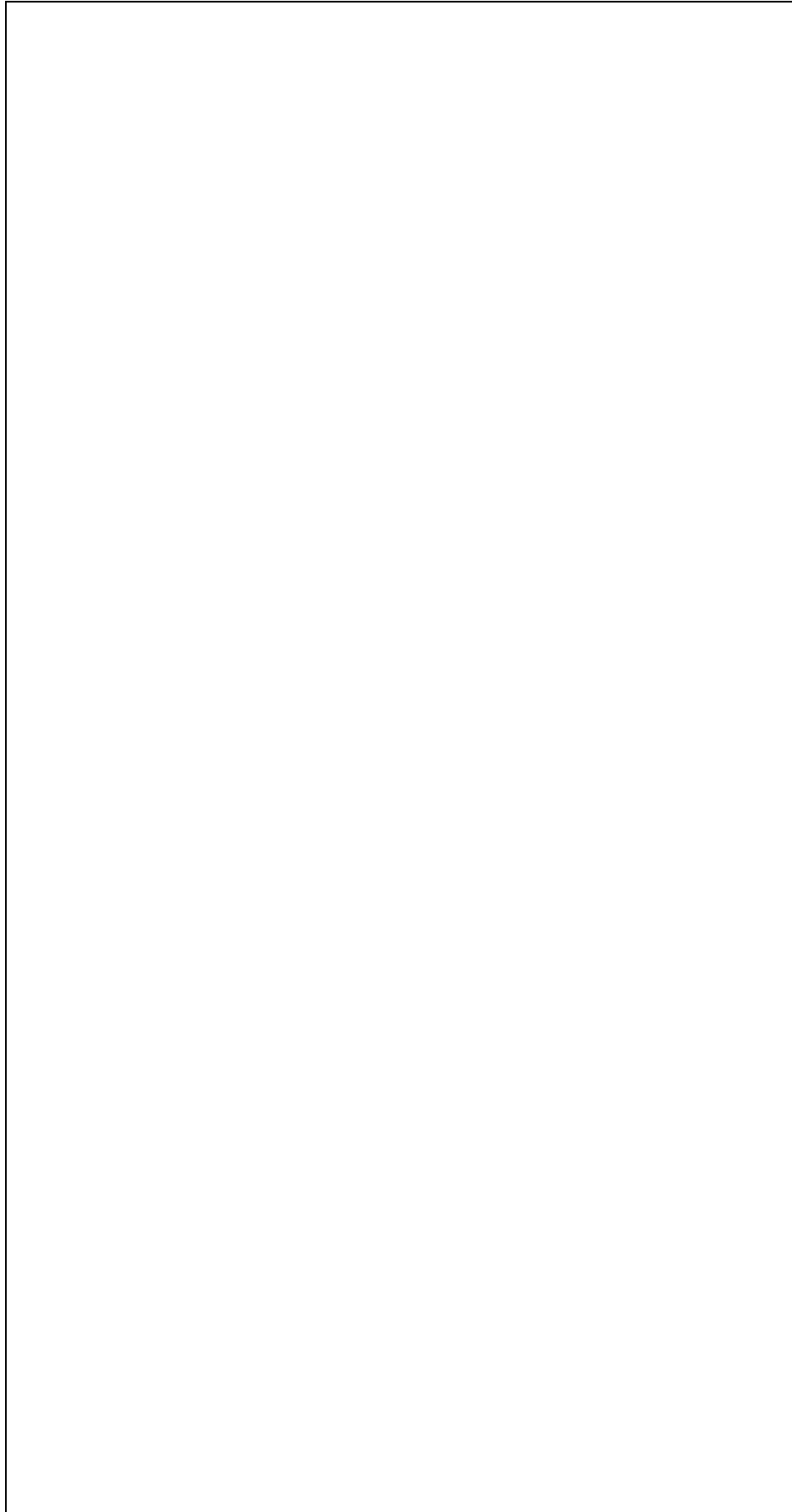
**Global Minimum Query (janbu simplified) - Safety Factor: 1.54209**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	19.7877	65.9469	0	0	0
2	19.9092	65.8368	1.86313	0	0
3	20.0307	65.7357	6.82969	0	0
4	20.1522	65.6426	14.1789	0	0
5	20.2737	65.5568	23.3625	0	0
6	20.3952	65.4778	33.9525	0	0
7	20.5166	65.4051	45.6067	0	0
8	20.6381	65.3382	58.047	0	0
9	20.7596	65.2769	71.0434	0	0
10	20.8811	65.2209	84.4032	0	0
11	21.0026	65.1699	97.9631	0	0
12	21.1241	65.1237	111.583	0	0
13	21.2455	65.082	125.143	0	0
14	21.367	65.0449	138.537	0	0
15	21.4885	65.012	151.673	0	0
16	21.61	64.9834	164.47	0	0
17	21.7315	64.9589	176.857	0	0
18	21.8529	64.9384	188.77	0	0
19	21.9744	64.9219	200.151	0	0
20	22.0959	64.9093	210.95	0	0
21	22.2174	64.9006	221.121	0	0
22	22.3389	64.8958	230.625	0	0
23	22.4604	64.8948	239.424	0	0
24	22.5818	64.8976	247.486	0	0
25	22.7033	64.9043	254.783	0	0
26	22.8248	64.9148	261.289	0	0
27	22.9463	64.9293	266.982	0	0
28	23.0678	64.9477	271.843	0	0
29	23.1893	64.97	275.855	0	0
30	23.3107	64.9965	279.006	0	0
31	23.4322	65.0271	281.285	0	0
32	23.5537	65.062	282.685	0	0
33	23.6752	65.1012	283.202	0	0
34	23.7967	65.145	282.834	0	0
35	23.9182	65.1935	281.585	0	0
36	24.0396	65.2469	278.648	0	0
37	24.1611	65.3054	272.14	0	0
38	24.2826	65.3693	263.77	0	0
39	24.4041	65.4388	253.559	0	0
40	24.5256	65.5145	241.53	0	0
41	24.647	65.5966	227.707	0	0
42	24.7685	65.6858	212.118	0	0
43	24.89	65.7827	194.793	0	0
44	25.0115	65.8879	175.766	0	0
45	25.133	66.0027	155.079	0	0
46	25.2545	66.128	132.78	0	0
47	25.3759	66.2657	108.93	0	0
48	25.4974	66.4178	83.6037	0	0
49	25.6189	66.5874	56.902	0	0
50	25.7404	66.779	28.9624	0	0
51	25.8619	67	0	0	0



**Global Minimum Query (spencer) - Safety Factor: 1.78897**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	17.5859	65.3965	0	0	0
2	17.7572	65.3173	1.4173	0.366293	14.4907
3	17.9286	65.2434	5.3467	1.38182	14.4907
4	18.0999	65.1745	11.3688	2.93819	14.4906
5	18.2712	65.1105	19.1193	4.94127	14.4907
6	18.4425	65.0513	28.2802	7.30884	14.4907
7	18.6138	64.9968	38.5724	9.96879	14.4907
8	18.7851	64.9467	49.7501	12.8576	14.4907
9	18.9564	64.9012	61.596	15.9191	14.4907
10	19.1277	64.8599	73.9172	19.1034	14.4906
11	19.299	64.823	86.5426	22.3664	14.4907
12	19.4703	64.7903	99.3192	25.6684	14.4906
13	19.6416	64.7617	112.111	28.9743	14.4906
14	19.8129	64.7373	124.796	32.2527	14.4906
15	19.9843	64.7169	137.266	35.4754	14.4906
16	20.1556	64.7006	149.423	38.6174	14.4906
17	20.3269	64.6883	161.18	41.656	14.4907
18	20.4982	64.68	172.461	44.5715	14.4907
19	20.6695	64.6757	183.196	47.3459	14.4907
20	20.8408	64.6753	193.325	49.9636	14.4907
21	21.0121	64.6789	202.793	52.4106	14.4907
22	21.1834	64.6865	211.555	54.6749	14.4906
23	21.3547	64.6981	219.568	56.746	14.4907
24	21.526	64.7137	226.799	58.6148	14.4907
25	21.6973	64.7333	233.219	60.2738	14.4906
26	21.8686	64.757	238.803	61.717	14.4906
27	22.04	64.7848	243.533	62.9395	14.4906
28	22.2113	64.8168	247.395	63.9377	14.4907
29	22.3826	64.853	250.382	64.7095	14.4906
30	22.5539	64.8934	252.488	65.2538	14.4906
31	22.7252	64.9382	253.715	65.571	14.4907
32	22.8965	64.9874	254.069	65.6624	14.4906
33	23.0678	65.0412	253.56	65.531	14.4907
34	23.2391	65.0996	252.205	65.1807	14.4906
35	23.4104	65.1627	250.024	64.6172	14.4907
36	23.5817	65.2307	247.045	63.8471	14.4906
37	23.753	65.3037	243.299	62.879	14.4906
38	23.9243	65.3819	238.825	61.7228	14.4907
39	24.0957	65.4654	229.891	59.4139	14.4907
40	24.267	65.5546	216.423	55.9331	14.4906
41	24.4383	65.6496	201.532	52.0846	14.4906
42	24.6096	65.7506	185.318	47.8941	14.4906
43	24.7809	65.858	167.887	43.3894	14.4907
44	24.9522	65.9721	149.358	38.6005	14.4906
45	25.1235	66.0933	129.855	33.5602	14.4907
46	25.2948	66.2221	109.518	28.3043	14.4907
47	25.4661	66.3588	88.5002	22.8723	14.4906
48	25.6374	66.5043	66.9706	17.3081	14.4906
49	25.8087	66.659	45.119	11.6607	14.4906
50	25.98	66.8239	23.1594	5.98539	14.4906
51	26.1514	67	0	0	0

## List Of Coordinates

---

### Water Table

X	Y
-30	65.6
-18.4	65.6
-4.05267	62.0132
0	61
4.05267	62.0132
24	67
60	67

### Distributed Load

X	Y
34.5122	67
24	67

### Distributed Load

X	Y
-18.4	65.6
-30	65.6

### External Boundary

X	Y
-18.4	65.6
-30	65.6
-30	63
-30	55
-30	45
60	45
60	55
60	63
60	67
24	67
8	63
0	61
-8	63

### Material Boundary

X	Y
8	63
60	63

### Material Boundary

┌──────────┐

X	Y
-30	63
-8	63

**Material Boundary**

X	Y
-30	55
60	55

Groundwater Method: Water Surfaces  
 Pore Fluid Unit Weight [lbs/ft<sup>3</sup>]: 62.4  
 Advanced Groundwater Method: Excess Pore Pressure

## Random Numbers

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Pseudo-random Seed: 10116  
 Random Number Generation Method: Park and Miller v.3

## Surface Options

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Surface Type: Circular  
 Search Method: Grid Search  
 Radius Increment: 10  
 Composite Surfaces: Disabled  
 Reverse Curvature: Invalid Surfaces  
 Minimum Elevation: Not Defined  
 Minimum Depth [ft]: 2  
 Minimum Area: Not Defined  
 Minimum Weight: Not Defined

## Seismic

---

Advanced seismic analysis: No  
 Staged pseudostatic analysis: No

## Loading

---

2 Distributed Loads present

### Distributed Load 1

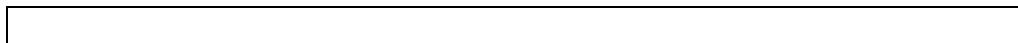
Distribution: Constant  
 Magnitude [psf]: 250  
 Orientation: Normal to boundary  
 Creates Excess Pore Pressure: No




### Distributed Load 2

Distribution: Constant  
 Magnitude [psf]: 250  
 Orientation: Normal to boundary  
 Creates Excess Pore Pressure: No

## Material Properties

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Property	Sandy Silt	Silty Sand	Sandy Lean clay
Color			
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft <sup>3</sup> ]	120	120	120
Cohesion [psf]	0	0	150
Friction Angle [deg]	28	30	25
Water Surface	Water Table	Water Table	Water Table
Hu Value	0	1	1
Material Weight Causes Excess Pore Pressure			
B_bar value	0	0	0

## Global Minimums

### Method: bishop simplified

FS	2.507570
Center:	15.822, 100.156
Radius:	37.101
Left Slip Surface Endpoint:	10.034, 63.509
Right Slip Surface Endpoint:	32.472, 67.000
Resisting Moment:	139296 lb-ft
Driving Moment:	55550.1 lb-ft
Total Slice Area:	41.856 ft <sup>2</sup>
Surface Horizontal Width:	22.4376 ft
Surface Average Height:	1.86544 ft

### Method: janbu simplified

FS	2.414780
Center:	15.822, 70.258
Radius:	7.102
Left Slip Surface Endpoint:	12.320, 64.080
Right Slip Surface Endpoint:	21.820, 66.455
Resisting Horizontal Force:	801.679 lb
Driving Horizontal Force:	331.988 lb
Total Slice Area:	13.1736 ft <sup>2</sup>
Surface Horizontal Width:	9.50011 ft
Surface Average Height:	1.38668 ft

### Method: spencer

FS	2.511330
Center:	15.822, 100.156
Radius:	37.101
Left Slip Surface Endpoint:	10.034, 63.509
Right Slip Surface Endpoint:	32.472, 67.000
Resisting Moment:	139505 lb-ft
Driving Moment:	55550.1 lb-ft
Resisting Horizontal Force:	3633.86 lb
Driving Horizontal Force:	1446.98 lb
Total Slice Area:	41.856 ft <sup>2</sup>
Surface Horizontal Width:	22.4376 ft
Surface Average Height:	1.86544 ft

## Valid / Invalid Surfaces

---

### Method: bishop simplified

Number of Valid Surfaces: 3132  
 Number of Invalid Surfaces: 1719

#### Error Codes:

Error Code -103 reported for 610 surfaces  
 Error Code -107 reported for 552 surfaces  
 Error Code -108 reported for 1 surface  
 Error Code -112 reported for 15 surfaces  
 Error Code -115 reported for 541 surfaces

### Method: janbu simplified

Number of Valid Surfaces: 3106  
 Number of Invalid Surfaces: 1745

#### Error Codes:

Error Code -103 reported for 610 surfaces  
 Error Code -107 reported for 552 surfaces  
 Error Code -108 reported for 23 surfaces  
 Error Code -112 reported for 19 surfaces  
 Error Code -115 reported for 541 surfaces

### Method: spencer

Number of Valid Surfaces: 3100  
 Number of Invalid Surfaces: 1751

#### Error Codes:

Error Code -103 reported for 610 surfaces  
 Error Code -107 reported for 552 surfaces  
 Error Code -108 reported for 28 surfaces  
 Error Code -112 reported for 20 surfaces  
 Error Code -115 reported for 541 surfaces

## Error Codes

The following errors were encountered during the computation:

- 103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
- 107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
- 108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
- 112 = The coefficient  $M\text{-Alpha} = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi))/F < 0.2$  for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.
- 115 = Surface too shallow, below the minimum depth.

## Slice Data

### Global Minimum Query (bishop simplified) - Safety Factor: 2.50757

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.448751	4.85331	-8.62461	Sandy Silt	0	28	2.36945	5.94157	11.1745	0	11.1745
2	0.448751	14.4091	-7.92429	Sandy Silt	0	28	7.01556	17.592	33.0857	0	33.0857
3	0.448751	23.6641	-7.22516	Sandy Silt	0	28	11.4904	28.8131	54.1896	0	54.1896
4	0.448751	32.6196	-6.52712	Sandy Silt	0	28	15.7964	39.6106	74.4967	0	74.4967
5	0.448751	41.2771	-5.83004	Sandy Silt	0	28	19.9356	49.9899	94.0174	0	94.0174
6	0.448751	49.6377	-5.13383	Sandy Silt	0	28	23.91	59.9559	112.761	0	112.761
7	0.448751	57.7024	-4.43838	Sandy Silt	0	28	27.7214	69.5134	130.736	0	130.736
8	0.448751	65.4722	-3.74358	Sandy Silt	0	28	31.3718	78.6669	147.951	0	147.951
9	0.448751	72.9478	-3.04933	Sandy Silt	0	28	34.8626	87.4205	164.414	0	164.414
10	0.448751	80.1298	-2.35554	Sandy Silt	0	28	38.1956	95.7782	180.133	0	180.133
11	0.448751	87.0187	-1.66208	Sandy Silt	0	28	41.3723	103.744	195.113	0	195.113
12	0.448751	93.615	-0.968873	Sandy Silt	0	28	44.3936	111.32	209.363	0	209.363
13	0.448751	99.9188	-0.275806	Sandy Silt	0	28	47.2613	118.511	222.887	0	222.887
14	0.448751	105.93	0.417221	Sandy Silt	0	28	49.9767	125.32	235.692	0	235.692
15	0.448751	111.65	1.11031	Sandy Silt	0	28	52.5401	131.748	247.783	0	247.783
16	0.448751	117.076	1.80356	Sandy Silt	0	28	54.9536	137.8	259.162	0	259.162
17	0.448751	122.21	2.49707	Sandy	0	28	57.2171	143.476	269.84	0	269.84



				Silt							
18	0.448751	127.051	3.19096	Sandy Silt	0	28	59.3323	148.78	279.814	0	279.814
19	0.448751	131.598	3.88531	Sandy Silt	0	28	61.2996	153.713	289.091	0	289.091
20	0.448751	135.851	4.58023	Sandy Silt	0	28	63.1197	158.277	297.675	0	297.675
21	0.448751	139.809	5.27583	Sandy Silt	0	28	64.793	162.473	305.567	0	305.567
22	0.448751	143.47	5.97221	Sandy Silt	0	28	66.3208	166.304	312.772	0	312.772
23	0.448751	146.835	6.66947	Sandy Silt	0	28	67.703	169.77	319.292	0	319.292
24	0.448751	149.901	7.36773	Sandy Silt	0	28	68.9404	172.873	325.127	0	325.127
25	0.448751	152.667	8.06709	Sandy Silt	0	28	70.0331	175.613	330.28	0	330.28
26	0.448751	155.132	8.76767	Sandy Silt	0	28	70.9815	177.991	334.753	0	334.753
27	0.448751	157.295	9.46956	Sandy Silt	0	28	71.7858	180.008	338.544	0	338.544
28	0.448751	159.153	10.1729	Sandy Silt	0	28	72.4458	181.663	341.66	0	341.66
29	0.448751	160.704	10.8778	Sandy Silt	0	28	72.9627	182.959	344.094	0	344.094
30	0.448751	161.947	11.5843	Sandy Silt	0	28	73.3351	183.893	345.853	0	345.853
31	0.448751	162.878	12.2927	Sandy Silt	0	28	73.564	184.467	346.933	0	346.933
32	0.448751	161.162	13.003	Sandy Silt	0	28	117.026	293.451	551.901	0	551.901
33	0.448751	155.467	13.7153	Sandy Silt	0	28	120.249	301.533	567.101	0	567.101
34	0.448751	149.409	14.4297	Sandy Silt	0	28	117.214	293.923	552.789	0	552.789
35	0.448751	143.03	15.1465	Sandy Silt	0	28	114.049	285.986	537.862	0	537.862
36	0.448751	136.325	15.8657	Sandy Silt	0	28	110.753	277.72	522.317	0	522.317
37	0.448751	129.292	16.5875	Sandy Silt	0	28	107.325	269.125	506.152	0	506.152
38	0.448751	121.927	17.312	Sandy Silt	0	28	103.766	260.2	489.364	0	489.364
39	0.448751	114.225	18.0394	Sandy Silt	0	28	100.074	250.942	471.954	0	471.954
40	0.448751	106.184	18.7698	Sandy Silt	0	28	96.2494	241.352	453.917	0	453.917
41	0.448751	97.7986	19.5033	Sandy Silt	0	28	92.2917	231.428	435.252	0	435.252
42	0.448751	89.0639	20.2402	Sandy Silt	0	28	88.1997	221.167	415.955	0	415.955
43	0.448751	79.9753	20.9807	Sandy Silt	0	28	83.9729	210.568	396.021	0	396.021
44	0.448751	70.5276	21.7248	Sandy Silt	0	28	79.6105	199.629	375.449	0	375.449
45	0.448751	60.7152	22.4728	Sandy Silt	0	28	75.1122	188.349	354.233	0	354.233

46	0.448751	50.5322	23.2248	Sandy Silt	0	28	70.4762	176.724	332.368	0	332.368
47	0.448751	39.9726	23.9811	Sandy Silt	0	28	65.7019	164.752	309.854	0	309.854
48	0.448751	29.0297	24.7419	Sandy Silt	0	28	60.7883	152.431	286.681	0	286.681
49	0.448751	17.6966	25.5073	Sandy Silt	0	28	55.7344	139.758	262.846	0	262.846
50	0.448751	5.96578	26.2777	Sandy Silt	0	28	50.539	126.73	238.346	0	238.346

**Global Minimum Query (janbu simplified) - Safety Factor: 2.41478**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.190002	1.72623	-28.6763	Sandy Silt	0	28	2.27439	5.49216	10.3292	0	10.3292
2	0.190002	5.0949	-26.9428	Sandy Silt	0	28	6.64843	16.0545	30.1941	0	30.1941
3	0.190002	8.29978	-25.2357	Sandy Silt	0	28	10.7322	25.916	48.741	0	48.741
4	0.190002	11.3479	-23.5522	Sandy Silt	0	28	14.547	35.1279	66.066	0	66.066
5	0.190002	14.2454	-21.89	Sandy Silt	0	28	18.111	43.734	82.2516	0	82.2516
6	0.190002	16.9977	-20.247	Sandy Silt	0	28	21.4396	51.7718	97.3687	0	97.3687
7	0.190002	19.6095	-18.6212	Sandy Silt	0	28	24.5462	59.2737	111.478	0	111.478
8	0.190002	22.0851	-17.0108	Sandy Silt	0	28	27.4426	66.2678	124.632	0	124.632
9	0.190002	24.428	-15.4142	Sandy Silt	0	28	30.1388	72.7785	136.876	0	136.876
10	0.190002	26.6415	-13.8298	Sandy Silt	0	28	32.6436	78.8272	148.253	0	148.253
11	0.190002	28.7283	-12.256	Sandy Silt	0	28	34.965	84.4328	158.795	0	158.795
12	0.190002	30.6908	-10.6917	Sandy Silt	0	28	37.1096	89.6115	168.535	0	168.535
13	0.190002	32.5311	-9.1353	Sandy Silt	0	28	39.0834	94.3778	177.499	0	177.499
14	0.190002	34.2509	-7.58573	Sandy Silt	0	28	40.8917	98.7444	185.711	0	185.711
15	0.190002	35.8516	-6.04172	Sandy Silt	0	28	42.5389	102.722	193.193	0	193.193
16	0.190002	37.3344	-4.50211	Sandy Silt	0	28	44.0293	106.321	199.961	0	199.961
17	0.190002	38.7002	-2.96575	Sandy Silt	0	28	45.3665	109.55	206.033	0	206.033
18	0.190002	39.9496	-1.43152	Sandy Silt	0	28	46.5529	112.415	211.422	0	211.422
19	0.190002	41.0829	0.101674	Sandy Silt	0	28	47.5915	114.923	216.139	0	216.139
20	0.190002	42.1003	1.63495	Sandy Silt	0	28	48.4843	117.079	220.194	0	220.194
21	0.190002	43.0015	3.16939	Sandy	0	28	49.2335	118.888	223.595	0	223.595

				Silt							
22	0.190002	43.7863	4.70612	Sandy Silt	0	28	49.8397	120.352	226.348	0	226.348
23	0.190002	44.454	6.24625	Sandy Silt	0	28	50.3044	121.474	228.46	0	228.46
24	0.190002	45.0035	7.79093	Sandy Silt	0	28	50.6282	122.256	229.931	0	229.931
25	0.190002	45.4339	9.34133	Sandy Silt	0	28	50.8121	122.7	230.765	0	230.765
26	0.190002	45.7435	10.8987	Sandy Silt	0	28	50.8552	122.804	230.961	0	230.961
27	0.190002	45.9307	12.4642	Sandy Silt	0	28	50.7578	122.569	230.518	0	230.518
28	0.190002	45.9933	14.0393	Sandy Silt	0	28	50.5193	121.993	229.435	0	229.435
29	0.190002	45.9289	15.6252	Sandy Silt	0	28	50.1383	121.073	227.706	0	227.706
30	0.190002	45.7347	17.2236	Sandy Silt	0	28	49.6145	119.808	225.325	0	225.325
31	0.190002	45.4073	18.8359	Sandy Silt	0	28	48.9452	118.192	222.287	0	222.287
32	0.190002	44.9431	20.4639	Sandy Silt	0	28	48.129	116.221	218.58	0	218.58
33	0.190002	44.3379	22.1093	Sandy Silt	0	28	47.1633	113.889	214.195	0	214.195
34	0.190002	43.5868	23.7742	Sandy Silt	0	28	46.0456	111.19	209.118	0	209.118
35	0.190002	42.6843	25.4607	Sandy Silt	0	28	44.7722	108.115	203.334	0	203.334
36	0.190002	41.6242	27.1712	Sandy Silt	0	28	43.3394	104.655	196.827	0	196.827
37	0.190002	40.3993	28.9083	Sandy Silt	0	28	41.7425	100.799	189.574	0	189.574
38	0.190002	39.0013	30.6751	Sandy Silt	0	28	39.9766	96.5346	181.555	0	181.555
39	0.190002	37.4209	32.4749	Sandy Silt	0	28	38.036	91.8486	172.742	0	172.742
40	0.190002	35.6471	34.3114	Sandy Silt	0	28	35.9141	86.7246	163.105	0	163.105
41	0.190002	33.6673	36.1891	Sandy Silt	0	28	33.6032	81.1444	152.611	0	152.611
42	0.190002	31.4664	38.113	Sandy Silt	0	28	31.0948	75.0871	141.218	0	141.218
43	0.190002	29.027	40.0891	Sandy Silt	0	28	28.3789	68.5289	128.884	0	128.884
44	0.190002	26.3279	42.1244	Sandy Silt	0	28	25.4442	61.4422	115.556	0	115.556
45	0.190002	23.3436	44.2276	Sandy Silt	0	28	22.2777	53.7957	101.175	0	101.175
46	0.190002	20.0429	46.4089	Sandy Silt	0	28	18.8642	45.5529	85.6728	0	85.6728
47	0.190002	16.3867	48.6815	Sandy Silt	0	28	15.1865	36.672	68.97	0	68.97
48	0.190002	12.325	51.0621	Sandy Silt	0	28	11.2244	27.1044	50.9762	0	50.9762
49	0.190002	7.79221	53.5726	Sandy Silt	0	28	6.95513	16.7951	31.5868	0	31.5868

50	0.190002	2.69935	56.2429	Sandy Silt	0	28	2.35303	5.68204	10.6864	0	10.6864
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**Global Minimum Query (spencer) - Safety Factor: 2.51133**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.448751	4.85331	-8.62461	Sandy Silt	0	28	2.55695	6.42135	12.0768	0	12.0768
2	0.448751	14.4091	-7.92429	Sandy Silt	0	28	7.54839	18.9565	35.6519	0	35.6519
3	0.448751	23.6641	-7.22516	Sandy Silt	0	28	12.3272	30.9576	58.2228	0	58.2228
4	0.448751	32.6196	-6.52712	Sandy Silt	0	28	16.898	42.4364	79.8111	0	79.8111
5	0.448751	41.2771	-5.83004	Sandy Silt	0	28	21.2651	53.4037	100.438	0	100.438
6	0.448751	49.6377	-5.13383	Sandy Silt	0	28	25.4328	63.8702	120.122	0	120.122
7	0.448751	57.7024	-4.43838	Sandy Silt	0	28	29.4049	73.8455	138.883	0	138.883
8	0.448751	65.4722	-3.74358	Sandy Silt	0	28	33.1852	83.3391	156.738	0	156.738
9	0.448751	72.9478	-3.04933	Sandy Silt	0	28	36.7772	92.3598	173.704	0	173.704
10	0.448751	80.1298	-2.35554	Sandy Silt	0	28	40.1843	100.916	189.795	0	189.795
11	0.448751	87.0187	-1.66208	Sandy Silt	0	28	43.4097	109.016	205.029	0	205.029
12	0.448751	93.615	-0.968873	Sandy Silt	0	28	46.4559	116.666	219.417	0	219.417
13	0.448751	99.9188	-0.275806	Sandy Silt	0	28	49.3265	123.875	232.975	0	232.975
14	0.448751	105.93	0.417221	Sandy Silt	0	28	52.0234	130.648	245.713	0	245.713
15	0.448751	111.65	1.11031	Sandy Silt	0	28	54.55	136.993	257.647	0	257.647
16	0.448751	117.076	1.80356	Sandy Silt	0	28	56.9077	142.914	268.784	0	268.784
17	0.448751	122.21	2.49707	Sandy Silt	0	28	59.0998	148.419	279.137	0	279.137
18	0.448751	127.051	3.19096	Sandy Silt	0	28	61.1278	153.512	288.714	0	288.714
19	0.448751	131.598	3.88531	Sandy Silt	0	28	62.9941	158.199	297.529	0	297.529
20	0.448751	135.851	4.58023	Sandy Silt	0	28	64.7004	162.484	305.589	0	305.589
21	0.448751	139.809	5.27583	Sandy Silt	0	28	66.2486	166.372	312.901	0	312.901
22	0.448751	143.47	5.97221	Sandy Silt	0	28	67.6407	169.868	319.475	0	319.475
23	0.448751	146.835	6.66947	Sandy Silt	0	28	68.8778	172.975	325.319	0	325.319
24	0.448751	149.901	7.36773	Sandy Silt	0	28	69.9617	175.697	330.438	0	330.438
25	0.448751	152.667	8.06709	Sandy	0	28	70.8939	178.038	334.841	0	334.841

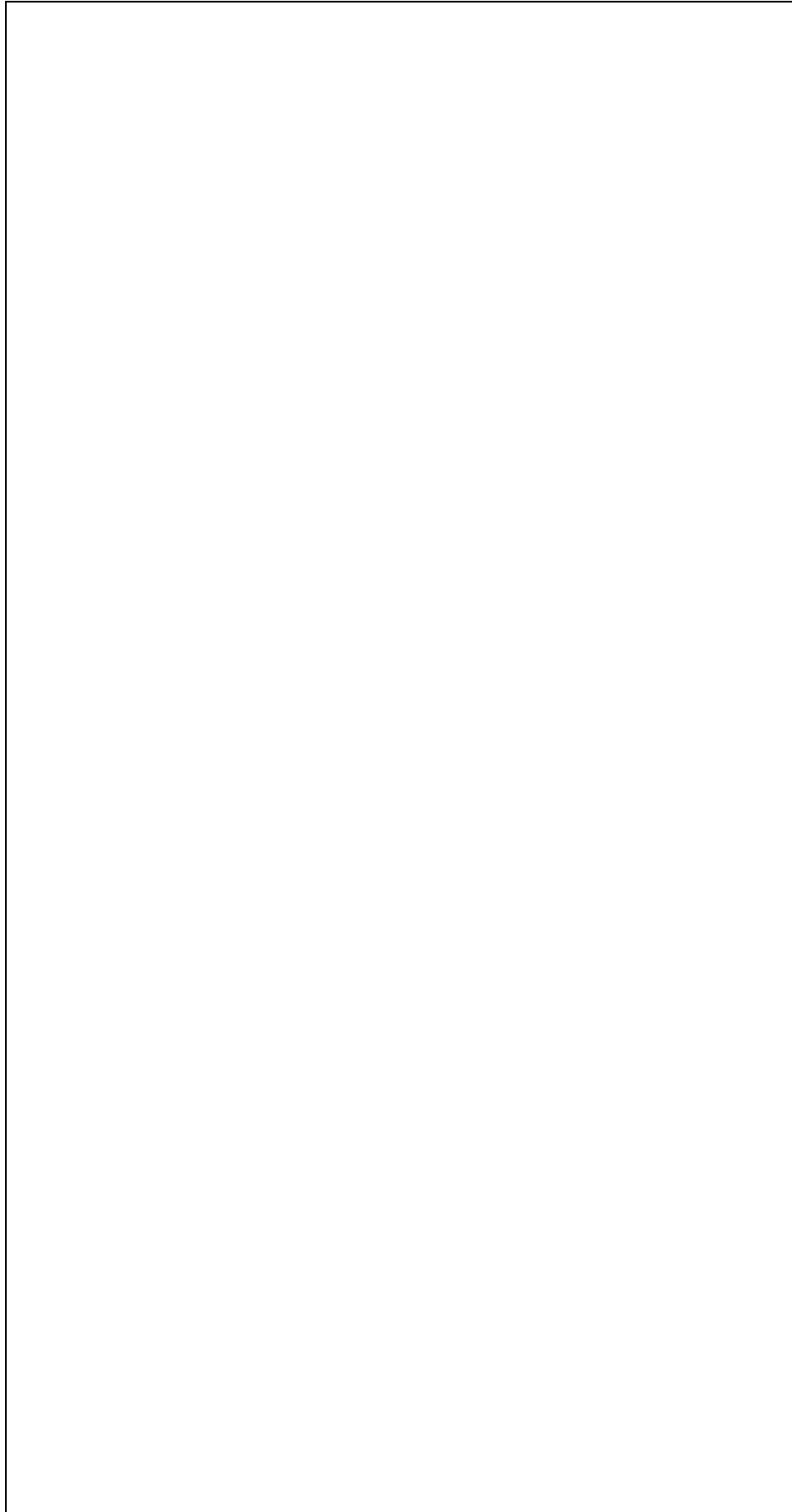
				Silt							
26	0.448751	155.132	8.76767	Sandy Silt	0	28	71.6756	180.001	338.532	0	338.532
27	0.448751	157.295	9.46956	Sandy Silt	0	28	72.3083	181.59	341.52	0	341.52
28	0.448751	159.153	10.1729	Sandy Silt	0	28	72.7929	182.807	343.809	0	343.809
29	0.448751	160.704	10.8778	Sandy Silt	0	28	73.1306	183.655	345.405	0	345.405
30	0.448751	161.947	11.5843	Sandy Silt	0	28	73.3229	184.138	346.313	0	346.313
31	0.448751	162.878	12.2927	Sandy Silt	0	28	73.3699	184.256	346.537	0	346.537
32	0.448751	161.162	13.003	Sandy Silt	0	28	116.429	292.392	549.908	0	549.908
33	0.448751	155.467	13.7153	Sandy Silt	0	28	119.34	299.702	563.657	0	563.657
34	0.448751	149.409	14.4297	Sandy Silt	0	28	116.041	291.416	548.073	0	548.073
35	0.448751	143.03	15.1465	Sandy Silt	0	28	112.627	282.843	531.951	0	531.951
36	0.448751	136.325	15.8657	Sandy Silt	0	28	109.1	273.986	515.292	0	515.292
37	0.448751	129.292	16.5875	Sandy Silt	0	28	105.46	264.845	498.1	0	498.1
38	0.448751	121.927	17.312	Sandy Silt	0	28	101.707	255.421	480.377	0	480.377
39	0.448751	114.225	18.0394	Sandy Silt	0	28	97.8434	245.717	462.127	0	462.127
40	0.448751	106.184	18.7698	Sandy Silt	0	28	93.867	235.731	443.346	0	443.346
41	0.448751	97.7986	19.5033	Sandy Silt	0	28	89.7795	225.466	424.041	0	424.041
42	0.448751	89.0639	20.2402	Sandy Silt	0	28	85.5809	214.922	404.211	0	404.211
43	0.448751	79.9753	20.9807	Sandy Silt	0	28	81.2717	204.1	383.856	0	383.856
44	0.448751	70.5276	21.7248	Sandy Silt	0	28	76.8517	193	362.98	0	362.98
45	0.448751	60.7152	22.4728	Sandy Silt	0	28	72.321	181.622	341.581	0	341.581
46	0.448751	50.5322	23.2248	Sandy Silt	0	28	67.6809	169.969	319.664	0	319.664
47	0.448751	39.9726	23.9811	Sandy Silt	0	28	62.93	158.038	297.226	0	297.226
48	0.448751	29.0297	24.7419	Sandy Silt	0	28	58.07	145.833	274.271	0	274.271
49	0.448751	17.6966	25.5073	Sandy Silt	0	28	53.0998	133.351	250.797	0	250.797
50	0.448751	5.96578	26.2777	Sandy Silt	0	28	48.0733	120.728	227.056	0	227.056

**Interslice Data**

Global Minimum Query (bishop simplified) - Safety Factor: 2.50757

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	10.0345	63.5086	0	0	0
2	10.4832	63.4406	1.8237	0	0
3	10.932	63.3781	7.03805	0	0
4	11.3807	63.3212	15.2764	0	0
5	11.8295	63.2699	26.1889	0	0
6	12.2782	63.224	39.4414	0	0
7	12.727	63.1837	54.7154	0	0
8	13.1757	63.1489	71.7071	0	0
9	13.6245	63.1195	90.1271	0	0
10	14.0732	63.0956	109.7	0	0
11	14.522	63.0772	130.162	0	0
12	14.9707	63.0641	151.265	0	0
13	15.4195	63.0565	172.773	0	0
14	15.8682	63.0544	194.459	0	0
15	16.317	63.0577	216.112	0	0
16	16.7657	63.0664	237.531	0	0
17	17.2145	63.0805	258.525	0	0
18	17.6632	63.1001	278.916	0	0
19	18.112	63.1251	298.537	0	0
20	18.5607	63.1555	317.23	0	0
21	19.0095	63.1915	334.849	0	0
22	19.4583	63.2329	351.257	0	0
23	19.907	63.2799	366.331	0	0
24	20.3558	63.3324	379.953	0	0
25	20.8045	63.3904	392.019	0	0
26	21.2533	63.454	402.435	0	0
27	21.702	63.5232	411.114	0	0
28	22.1508	63.598	417.982	0	0
29	22.5995	63.6786	422.975	0	0
30	23.0483	63.7648	426.038	0	0
31	23.497	63.8568	427.128	0	0
32	23.9458	63.9546	426.21	0	0
33	24.3945	64.0582	421.525	0	0
34	24.8433	64.1677	413.369	0	0
35	25.292	64.2832	402.131	0	0
36	25.7408	64.4047	387.966	0	0
37	26.1895	64.5322	371.042	0	0
38	26.6383	64.6659	351.538	0	0
39	27.087	64.8058	329.646	0	0
40	27.5358	64.9519	305.571	0	0
41	27.9845	65.1044	279.532	0	0
42	28.4333	65.2633	251.762	0	0
43	28.882	65.4288	222.509	0	0
44	29.3308	65.6009	192.036	0	0
45	29.7795	65.7797	160.623	0	0
46	30.2283	65.9653	128.569	0	0
47	30.677	66.1579	96.1868	0	0
48	31.1258	66.3575	63.8128	0	0
49	31.5745	66.5643	31.8013	0	0
50	32.0233	66.7784	0.528859	0	0
51	32.472	67	0	0	0

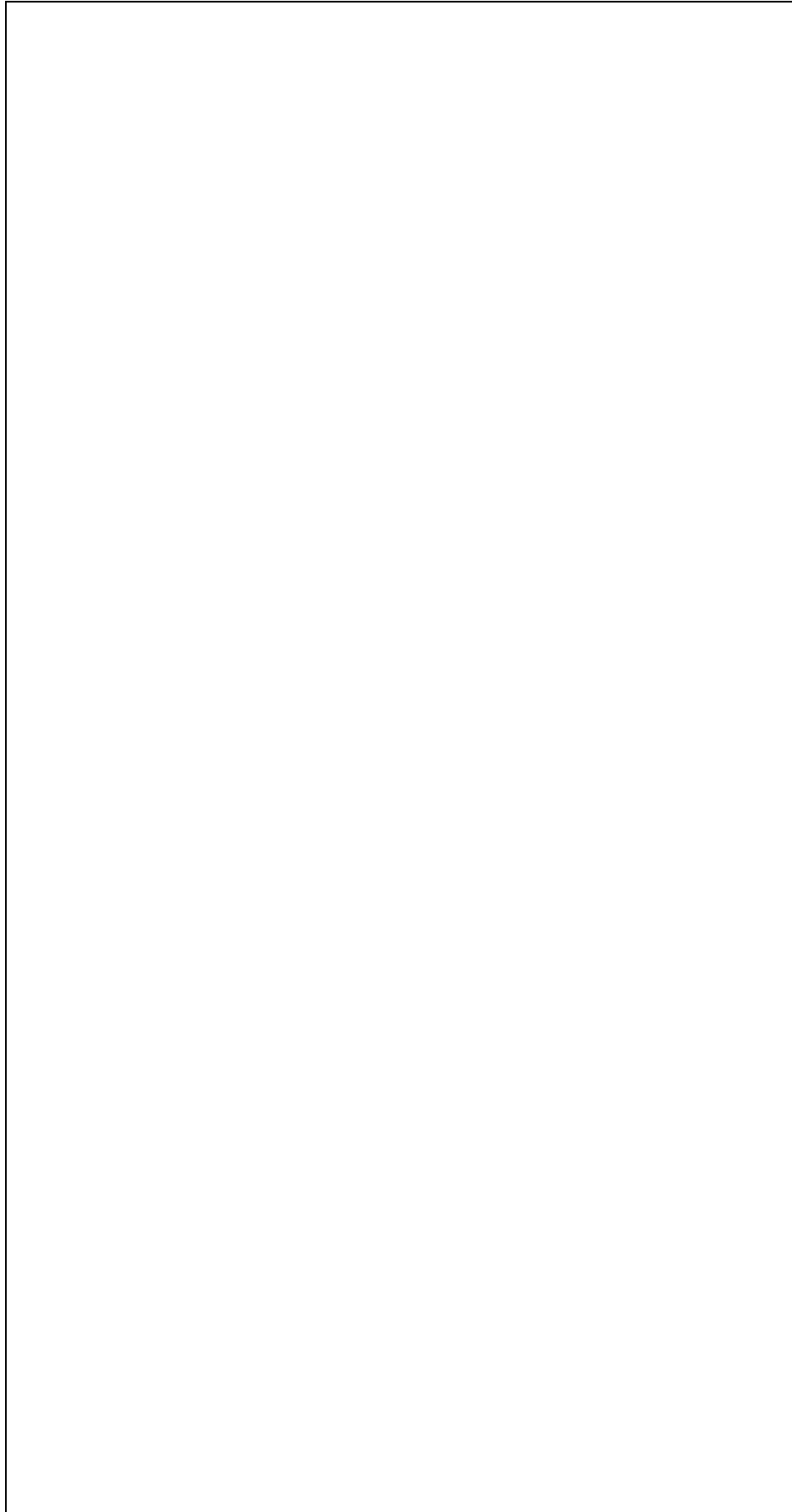
**Global Minimum Query (janbu simplified) - Safety Factor: 2.41478**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	12.32	64.08	0	0	0
2	12.51	63.9761	1.50556	0	0
3	12.7	63.8795	5.68467	0	0
4	12.89	63.79	12.0887	0	0
5	13.08	63.7071	20.3243	0	0
6	13.27	63.6308	30.0446	0	0
7	13.46	63.5607	40.9421	0	0
8	13.65	63.4967	52.7428	0	0
9	13.84	63.4386	65.2015	0	0
10	14.03	63.3862	78.0983	0	0
11	14.22	63.3394	91.2349	0	0
12	14.41	63.2981	104.432	0	0
13	14.6	63.2623	117.529	0	0
14	14.79	63.2317	130.378	0	0
15	14.98	63.2064	142.847	0	0
16	15.17	63.1863	154.814	0	0
17	15.3601	63.1713	166.171	0	0
18	15.5501	63.1615	176.819	0	0
19	15.7401	63.1567	186.668	0	0
20	15.9301	63.1571	195.637	0	0
21	16.1201	63.1625	203.655	0	0
22	16.3101	63.173	210.657	0	0
23	16.5001	63.1887	216.586	0	0
24	16.6901	63.2095	221.393	0	0
25	16.8801	63.2354	225.035	0	0
26	17.0701	63.2667	227.477	0	0
27	17.2601	63.3033	228.69	0	0
28	17.4501	63.3453	228.652	0	0
29	17.6401	63.3928	227.35	0	0
30	17.8301	63.4459	224.776	0	0
31	18.0201	63.5048	220.931	0	0
32	18.2101	63.5697	215.823	0	0
33	18.4001	63.6406	209.47	0	0
34	18.5901	63.7177	201.898	0	0
35	18.7801	63.8014	193.143	0	0
36	18.9701	63.8919	183.255	0	0
37	19.1601	63.9894	172.293	0	0
38	19.3501	64.0944	160.334	0	0
39	19.5401	64.2071	147.467	0	0
40	19.7301	64.328	133.805	0	0
41	19.9201	64.4577	119.479	0	0
42	20.1101	64.5967	104.65	0	0
43	20.3001	64.7457	89.5098	0	0
44	20.4901	64.9056	74.2887	0	0
45	20.6801	65.0775	59.2674	0	0
46	20.8701	65.2624	44.7881	0	0
47	21.0601	65.462	31.2734	0	0
48	21.2501	65.6781	19.2521	0	0
49	21.4401	65.9133	9.39746	0	0
50	21.6301	66.1707	2.58671	0	0
51	21.8201	66.455	0	0	0



**Global Minimum Query (spencer) - Safety Factor: 2.51133**



Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	10.0345	63.5086	0	0	0
2	10.4832	63.4406	1.96972	0.393944	11.3099
3	10.932	63.3781	7.58485	1.51697	11.3099
4	11.3807	63.3212	16.4304	3.28608	11.3099
5	11.8295	63.2699	28.1131	5.62261	11.3099
6	12.2782	63.224	42.2603	8.45205	11.3099
7	12.727	63.1837	58.5191	11.7038	11.3099
8	13.1757	63.1489	76.5554	15.3111	11.3099
9	13.6245	63.1195	96.0532	19.2106	11.3099
10	14.0732	63.0956	116.714	23.3427	11.3099
11	14.522	63.0772	138.254	27.6509	11.31
12	14.9707	63.0641	160.409	32.0818	11.3099
13	15.4195	63.0565	182.926	36.5853	11.31
14	15.8682	63.0544	205.57	41.1141	11.31
15	16.317	63.0577	228.119	45.6238	11.3099
16	16.7657	63.0664	250.363	50.0727	11.31
17	17.2145	63.0805	272.109	54.4218	11.3099
18	17.6632	63.1001	293.174	58.6348	11.3099
19	18.112	63.1251	313.389	62.6778	11.3099
20	18.5607	63.1555	332.597	66.5194	11.3099
21	19.0095	63.1915	350.653	70.1305	11.3099
22	19.4583	63.2329	367.423	73.4846	11.3099
23	19.907	63.2799	382.787	76.5573	11.3099
24	20.3558	63.3324	396.632	79.3265	11.3099
25	20.8045	63.3904	408.862	81.7723	11.3099
26	21.2533	63.454	419.386	83.8772	11.3099
27	21.702	63.5232	428.128	85.6257	11.3099
28	22.1508	63.598	435.022	87.0044	11.3099
29	22.5995	63.6786	440.011	88.0022	11.3099
30	23.0483	63.7648	443.05	88.6101	11.3099
31	23.497	63.8568	444.106	88.8211	11.3099
32	23.9458	63.9546	443.153	88.6306	11.3099
33	24.3945	64.0582	438.428	87.6857	11.3099
34	24.8433	64.1677	430.264	86.0527	11.3099
35	25.292	64.2832	419.065	83.813	11.3099
36	25.7408	64.4047	405.001	81.0002	11.3099
37	26.1895	64.5322	388.251	77.6503	11.3099
38	26.6383	64.6659	369.006	73.8013	11.3099
39	27.087	64.8058	347.467	69.4934	11.3099
40	27.5358	64.9519	323.846	64.7691	11.3099
41	27.9845	65.1044	298.367	59.6735	11.31
42	28.4333	65.2633	271.269	54.2538	11.3099
43	28.882	65.4288	242.8	48.56	11.3099
44	29.3308	65.6009	213.224	42.6447	11.3099
45	29.7795	65.7797	182.817	36.5634	11.3099
46	30.2283	65.9653	151.872	30.3743	11.3099
47	30.677	66.1579	120.695	24.1389	11.3099
48	31.1258	66.3575	89.6092	17.9218	11.3099
49	31.5745	66.5643	58.9553	11.7911	11.31
50	32.0233	66.7784	29.0906	5.81812	11.3099
51	32.472	67	0	0	0

## List Of Coordinates

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### Water Table

X	Y
-30	56
60	56

### Distributed Load

X	Y
36.1118	67
24	67

### Distributed Load

X	Y
-18.4	65.6
-30	65.6

### External Boundary

X	Y
-18.4	65.6
-30	65.6
-30	63
-30	55
-30	45
60	45
60	55
60	56
60	63
60	67
24	67
8	63
0	61
-8	63

### Material Boundary

X	Y
8	63
60	63

### Material Boundary

X	Y
-30	63
-8	63

## Material Boundary

X	Y
-30	55
60	55

## APPENDIX C

**Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)**

**Project Name:** HCFC Ditch Improvements

**Classification:** Sandy Lean Clay (CL)

**Project Number:** 286-1224-2

**Boring Number:** B-02

**Depth, feet:** 8-12

**Sample No./ID:** 5-6

**Liquid Limit:** 25

**Plastic Limit:** 11

**Plasticity Index:** 14

**Percent Passing No. 200:** 56.0%

Specimen/Stage Data Specimen/Stage No.	Before Test			After Consolidation or Shear			Description Specimen/Stage No.	Saturation/Consolidation		
	1	2	3	1	2	3		1	2	3
Diameter (D), in.:	2.840	2.786	2.774	2.827	2.759	2.793	Method Cell Pressure, lbs/in <sup>2</sup> Back Pressure, lbs/in <sup>2</sup> B-Parameter Consolidation Pressure, lbs/in <sup>2</sup> Volume Change After (ΔV), cm <sup>3</sup> Time for Consolidation, min. Failure Type: 1 2 3	Wet Mounting Method		
Height (H), in.:	5.540	5.580	5.570	5.531	5.568	5.546		42.1	46.0	64.0
Cross-Sectional Area, in <sup>2</sup>	6.335	6.096	6.044	6.278	5.977	6.127		38.0	38.0	48.0
Vol. (Vo, Vf), cm <sup>3</sup> :	575.1	557.4	551.6	569.0	545.4	556.9		0.95	0.95	0.95
Moisture, {Wo, Wf} %:	15.9%	16.0%	17.1%	16.7%	16.8%	17.7%		4.1	8.0	16.1
Wet Soil Wt. {Mo, Mf}, gm:	1227.19	1176.11	1192.29	1235.56	1183.61	1198.04		-6.1029777	-12.035754	5.27534121
Wet Unit Weight, pcf:	133.2	131.66	134.9	135.5	135.42	134.2		5	240	4309
Dry Unit Weight, pcf:	114.9	113.5	115.2	116.1	116.0	114.1		Bulge		
Specific Gravity (Assumed):	2.7	2.7	2.7	2.7	2.7	2.7		Single Shear		
Void Ratio, eo, ef:	0.47	0.48	0.46	0.45	0.45	0.48		Single Shear		
Degree of Saturation, So, Sf:	0.92	0.89	1.00	1.00	1.00	1.00		Single Shear		

Equipment	Specimen/Stage			Shear Data	Specimen/Stage		
	1	2	3		1	2	3
Oven:	B33ER01048	B33ER01048	B33ER01048	Total Shearing Time, min	1414	1311	1339
Scale:	AE444189	AE444189	AE444189	Strain Rate, %/hr	0.5	0.5	0.5
Calipers:	7174871	7174871	7174871	Axial Strain at Failure, %	1.00	1.00	1.80
Digital Dial:	2123	2123	2123	Deviator Stress, lbs/in <sup>2</sup> (Δσ)	7.57	10.64	18.73
Load Frame:	Load Frame	Load Frame	Load Frame	Excess Pore Pressure, lbs/in <sup>2</sup> (u)	1.17	3.16	8.20
Load Cell ID:	LC02	LC-06	LC02	A-Parameter, (u/Δσ)	0.15	0.30	0.44
DCDT:	ID2	LP454	ID2	Total Major Pincipal Stress, lbs/in <sup>2</sup> (σ <sub>1</sub> = σ <sub>3</sub> + Δσ)	11.67	18.81	34.78
Cell Pressure Transducer:	PS02	PS-05	PS02	Total Minor Pincipal Stress, lbs/in <sup>2</sup> (σ <sub>3</sub> )	4.10	8.17	16.05
Pore Pressure Transducer:	PS01	PS-04	PS01	Effective Major Pincipal Stress, lbs/in <sup>2</sup> (σ <sub>1</sub> - u)	10.50	15.65	26.58
Radial Drainage Filter Strip:	Yes	Yes	Yes	Effective Minor Pincipal Stress, lbs/in <sup>2</sup> (σ <sub>3</sub> - u)	2.93	5.01	7.85

Remarks: Other tests may have been performed in accordance with ASTM D1140, ASTM D4318, ASTM D854



Project Name: **HCFC Ditch Improvements**

Classification: **Sandy Lean Clay (CL)**

Project Number: **286-1224-2**

Boring Number: **B-02**

Depth, feet: **8-12**

Sample No./ID: **5-6**

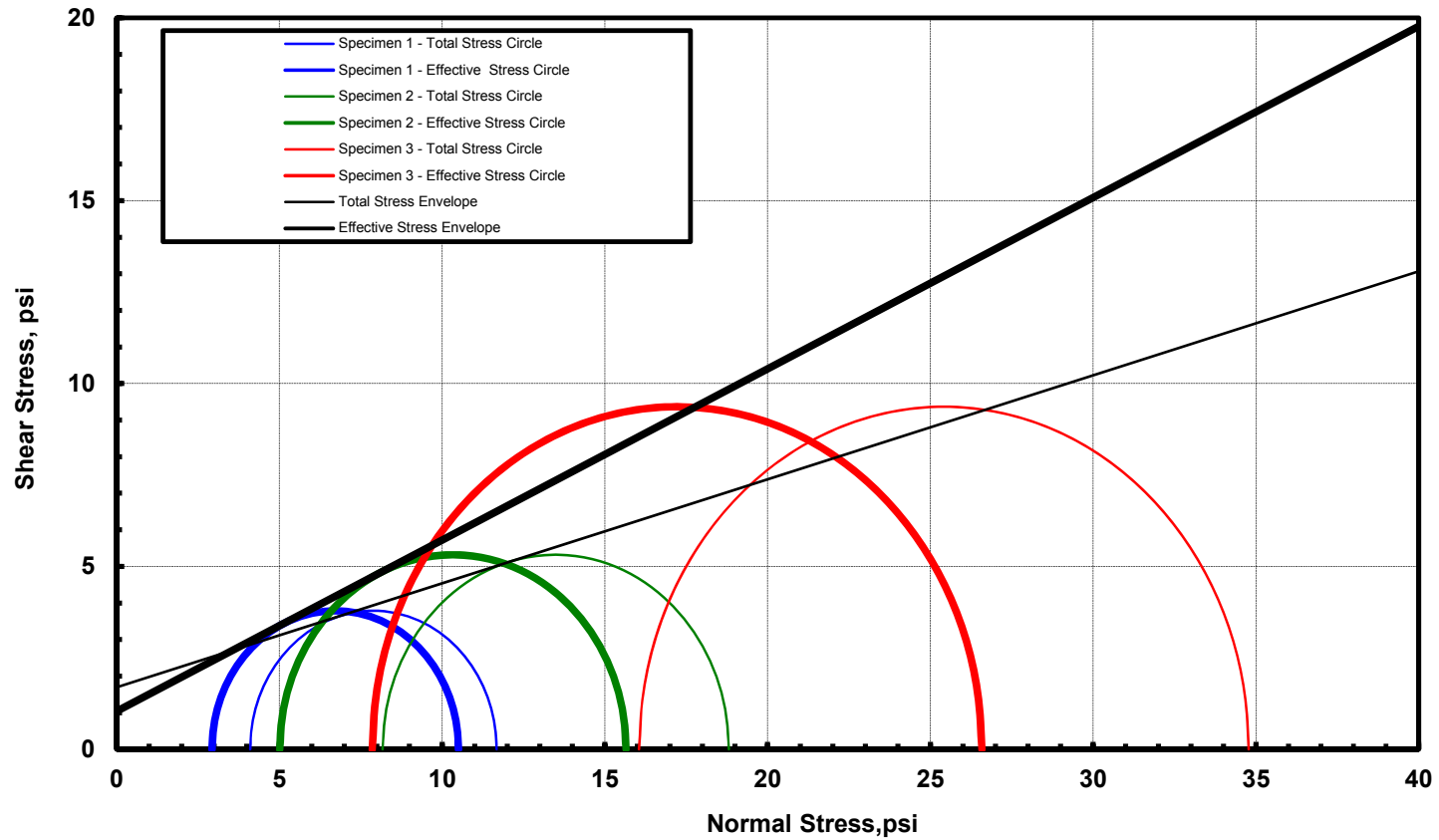
Cohesion ( $C_T$ ), ksf: **0.24**

Friction Angle ( $\phi_T$ ), deg: **15.9**

Cohesion ( $C_d$ ), ksf: **0.15**

Friction Angle ( $\phi_d$ ), deg: **25.1**

Remarks:



Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

Project Name: **HCFC Ditch Improvements**

Classification: **Sandy Lean Clay (CL)**

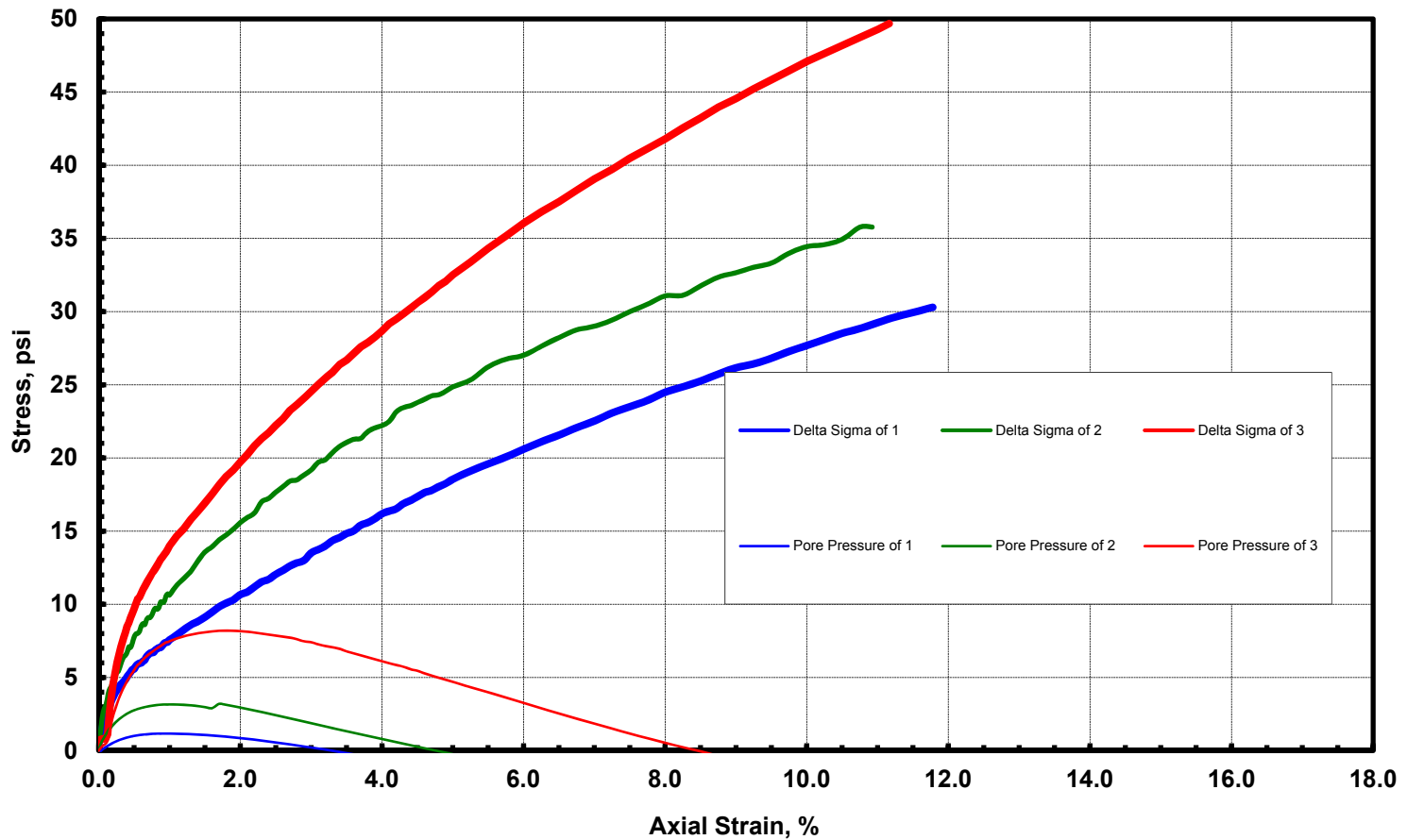
Project Number: **286-1224-2**

Boring Number: **B-02**

Depth, feet: **8-12**

Sample No./ID: **5-6**

Remarks:





## Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

**Project Name:** *HCFC Ditch Improvements*

**Classification:** *Sandy Lean Clay (CL)*

**Project Number:** *286-1224-2*

**Boring Number:** *B-02*

**Depth, feet:** *10*

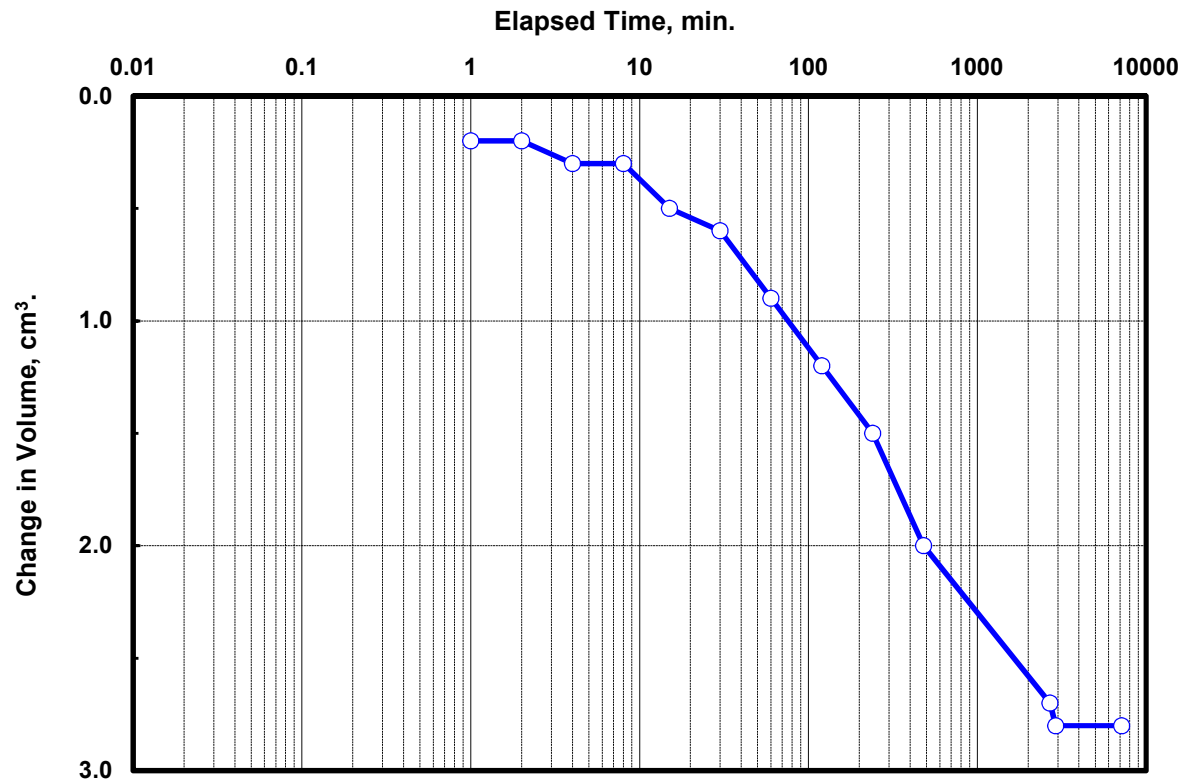
**Sample No./ID:** *S-5 B*

**Specimen/Stage:** *Specimen 1*

**Effective Confining Pressure, psi:** *4.1*

**Remarks:**

Date	Clock Time	Elapsed Time, min.	Burette Readings	Volume cm <sup>3</sup>
7/9/2016	10:00:00 AM	0.0	24.0	0.0
7/9/2016	10:01:00 AM	1.0	23.6	0.2
7/9/2016	10:02:00 AM	2.0	23.5	0.2
7/9/2016	10:04:00 AM	4.0	23.5	0.3
7/9/2016	10:08:00 AM	8.0	23.5	0.3
7/9/2016	10:15:00 AM	15.0	23.4	0.5
7/9/2016	10:30:00 AM	30.0	23.1	0.6
7/9/2016	11:00:00 AM	60.0	23.0	0.9
7/9/2016	12:00:00 PM	120.0	22.6	1.2
7/9/2016	2:00:00 PM	240.0	22.2	1.5
7/9/2016	6:00:00 PM	480.0	21.7	2.0
7/11/2016	7:00:00 AM	2700.0	21.6	2.7
7/11/2016	10:30:00 AM	2910.0	21.5	2.8
7/14/2016	9:30:00 AM	7170.0	21.5	2.8



**Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)**

**Project Name:** *HCFC Ditch Improvements*

**Classification:** *Sandy Lean Clay (CL)*

**Project Number:** *286-1224-2*

**Boring Number:** *B-02*

**Depth, feet:** *12*

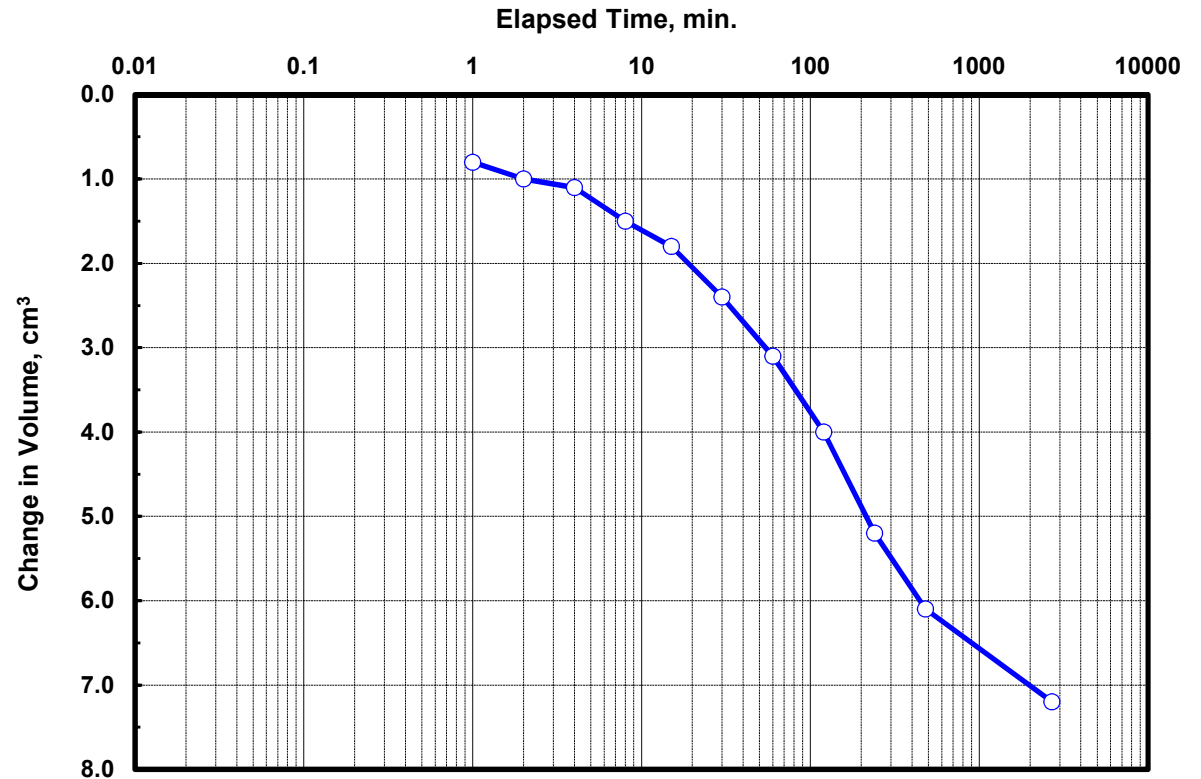
**Sample No./ID:** *S-6 A*

**Specimen/Stage:** *Specimen 2*

**Effective Confining Pressure, psi:** *8.0*

**Remarks:**

Date	Clock Time	Elapsed Time, min.	Burette Readings	Volume Cm <sup>3</sup>
7/9/2016	10:00:00 AM	0.0	24.0	0.0
7/9/2016	10:01:00 AM	1.0	23.0	0.8
7/9/2016	10:02:00 AM	2.0	22.8	1.0
7/9/2016	10:04:00 AM	4.0	22.7	1.1
7/9/2016	10:08:00 AM	8.0	22.4	1.5
7/9/2016	10:15:00 AM	15.0	22.0	1.8
7/9/2016	10:30:00 AM	30.0	21.5	2.4
7/9/2016	11:00:00 AM	60.0	20.7	3.1
7/9/2016	12:00:00 PM	120.0	19.8	4.0
7/9/2016	2:00:00 PM	240.0	18.7	5.2
7/9/2016	6:00:00 PM	480.0	17.6	6.1
7/11/2016	7:00:00 AM	2700.0	16.9	7.2



## Consolidated Undrained Triaxial Test with Pore Pressure Measurements (ASTM D 4767)

**Project Name:** *HCFC Ditch Improvements*

**Classification:** *Sandy Lean Clay (CL)*

**Project Number:** *286-1224-2*

**Boring Number:** *B-02*

**Depth, feet:** *12*

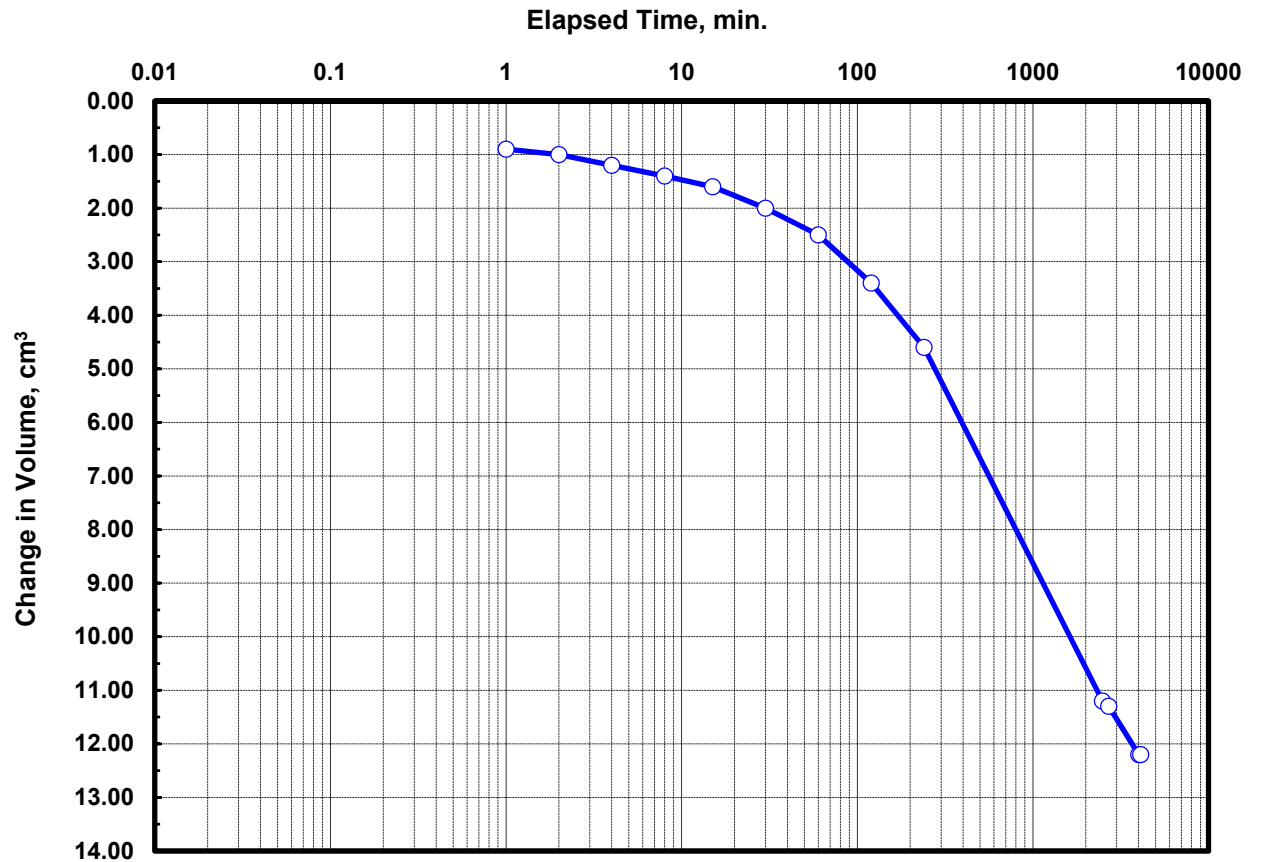
**Sample No./ID:** *S-6 B*

**Specimen/Stage:** *Specimen 3*

**Effective Confining Pressure, psi:** *16.1*

**Remarks:**

Date	Clock Time	Elapsed Time, min.	Burette Readings	Volume cm <sup>3</sup>
7/9/2016	1:30:00 PM	0.0	24.0	0.0
7/9/2016	1:31:00 PM	1.0	23.4	0.9
7/9/2016	1:32:00 PM	2.0	23.0	1.0
7/9/2016	1:34:00 PM	4.0	22.8	1.2
7/9/2016	1:38:00 PM	8.0	22.6	1.4
7/9/2016	1:45:00 PM	15.0	22.4	1.6
7/9/2016	2:00:00 PM	30.0	22.0	2.0
7/9/2016	2:30:00 PM	60.0	21.5	2.5
7/9/2016	3:30:00 PM	120.0	20.7	3.4
7/9/2016	5:30:00 PM	240.0	19.4	4.6
7/11/2016	7:00:00 AM	2490.0	13.5	11.2
7/11/2016	10:30:00 AM	2700.0	13.2	11.3
7/12/2016	8:15:00 AM	4005.0	12.4	12.2
7/12/2016	9:55:00 AM	4105.0	12.4	12.2





# Dispersive Characteristics of Clay Soil by Double Hydrometer

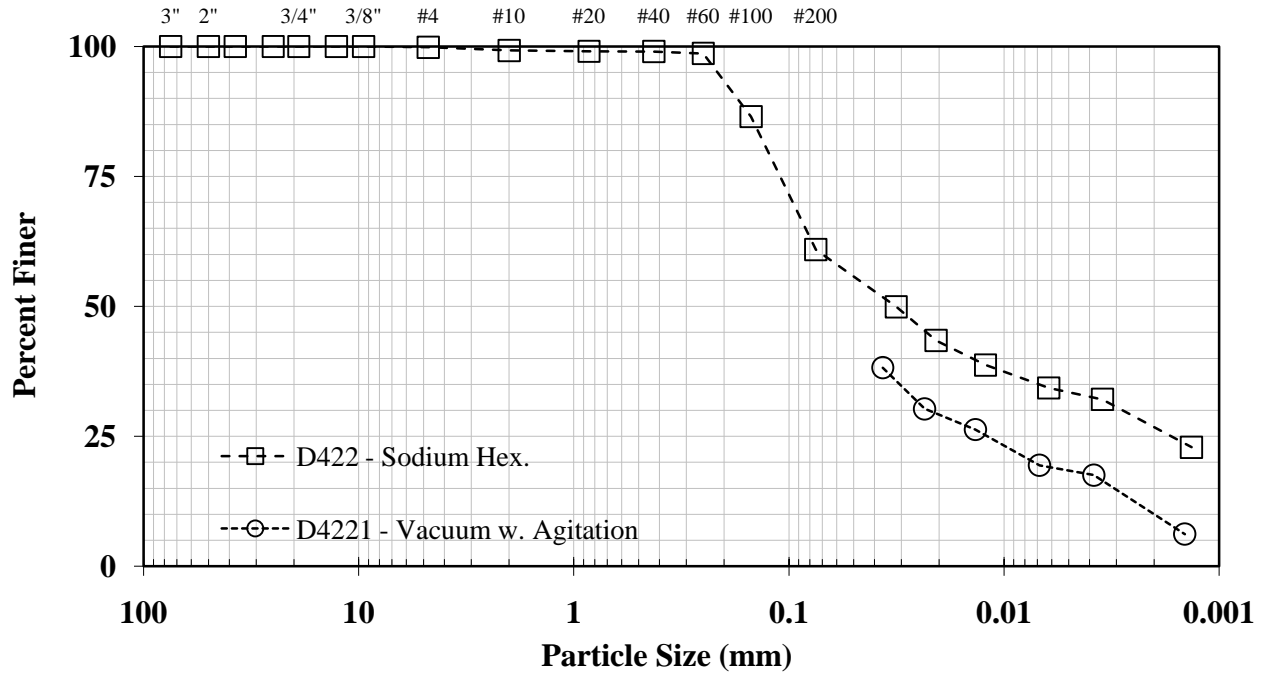
Client: Intertek - PSI

TRI Log#: 22073

Project: HCFCD Ditch Improvements East

Test Method: ASTM D4221

Sample: B-1 (2-4ft)



Sieve Analysis	
Sieve Size	Percent Passing
3 in. (76.2 mm)	100.0
2 in. (50.8 mm)	100.0
1.5 in. (38.1 mm)	100.0
1 in. (25.4 mm)	100.0
3/4 in. (19.0 mm)	100.0
1/2 in. (12.7 mm)	100.0
3/8 in. (9.51 mm)	100.0
No. 4 (4.76 mm)	99.8
No. 10 (2.00 mm)	99.2
No. 20 (0.841 mm)	99.1
No. 40 (0.420 mm)	99.0
No. 60 (0.250 mm)	98.7
No. 100 (0.149 mm)	86.5
No. 200 (0.074 mm)	60.9
Hydrometer Analysis	
Particle Size	Percent Passing
0.005 mm	33.5
0.002 mm	26.7

<b>USCS Classification</b> (ASTM D2487)	--	
<b>As-Received Moisture Content (%)</b>	(ASTM D2216)	--
<b>Atterberg Limits</b> (ASTM D4318, Method A : Multipoint)	Liquid Limit (3 pt)	--
	Plastic Limit	--
	Plastic Index	--
Notes: Specimen was air dried, 3 point Liquid Limit procedure was used. (NL = No Liquid Limit, NP = No Plastic Limit)		
<b>Specific Gravity</b>	(ASTM D854)	--
<b>Organic Content (%)</b>	(ASTM D2974)	--
<b>Carbonate Content (%)</b>	(ASTM D4373)	--
<b>Double Hydrometer Dispersive Characteristics of Clay Soil</b> (ASTM D4221)	0.005 mm	18.4
	0.002 mm	10.0
	Percent Dispersion	55

Shawn Hutcherson, P.E. 8/10/2016

Quality Review/Date

Tested by: KH & PC



# Dispersive Characteristics of Clay Soil by Double Hydrometer

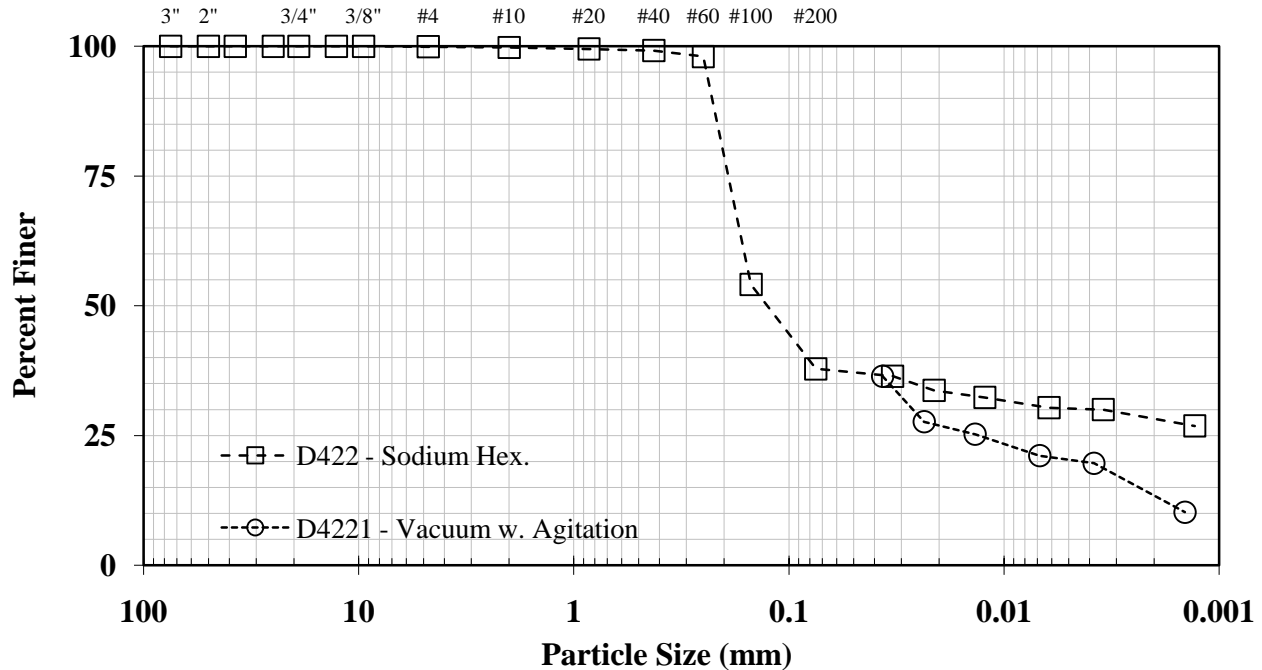
Client: Intertek - PSI

TRI Log#: 22073

Project: HCFCD Ditch Improvements East

Test Method: ASTM D4221

Sample: B-2 (8-10ft)



Sieve Analysis	
Sieve Size	Percent Passing
3 in. (76.2 mm)	100.0
2 in. (50.8 mm)	100.0
1.5 in. (38.1 mm)	100.0
1 in. (25.4 mm)	100.0
3/4 in. (19.0 mm)	100.0
1/2 in. (12.7 mm)	100.0
3/8 in. (9.51 mm)	100.0
No. 4 (4.76 mm)	99.9
No. 10 (2.00 mm)	99.8
No. 20 (0.841 mm)	99.5
No. 40 (0.420 mm)	99.2
No. 60 (0.250 mm)	98.0
No. 100 (0.149 mm)	54.1
No. 200 (0.074 mm)	37.8
Hydrometer Analysis	
Particle Size	Percent Passing
0.005 mm	30.2
0.002 mm	28.2

<b>USCS Classification</b> (ASTM D2487)	--	
<b>As-Received Moisture Content (%)</b>	(ASTM D2216)	--
<b>Atterberg Limits</b> (ASTM D4318, Method A : Multipoint)	Liquid Limit (3 pt)	--
	Plastic Limit	--
	Plastic Index	--
Notes: Specimen was air dried, 3 point Liquid Limit procedure was used. (NL = No Liquid Limit, NP = No Plastic Limit)		
<b>Specific Gravity</b>	(ASTM D854)	--
<b>Organic Content (%)</b>	(ASTM D2974)	--
<b>Carbonate Content (%)</b>	(ASTM D4373)	--
<b>Double Hydrometer</b> Dispersive Characteristics of Clay Soil (ASTM D4221)	0.005 mm	20.3
	0.002 mm	13.4
	Percent Dispersion	67

Shawn Hutcherson, P.E. 8/10/2016

Quality Review/Date

Tested by: KH & PC