

July 16, 2019

IDEA PUBLIC SCHOOLS – MISSION PHASE III - GYMNASIUM  
MISSION, TEXAS

GOMEZ MENDEZ SAENZ, INC.  
1150 PAREDES LINE RD.  
BROWNSVILLE, TEXAS 78526  
(956) 546-0110

## **ADDENDUM NO. 2**

### **A. PURPOSE AND INTENT**

*This addendum is issued for the purpose of modifying the plans and specifications for the Idea Public Schools – Mission Phase III - Gymnasium.*

*This addendum shall become part of the contract and all CONTRACTORS shall be bound by its content. All aspects of the specifications and drawings not covered herein shall remain the same.*

*The General Conditions and the Special Conditions of the specifications shall govern all parts of the work and apply in full force to this addendum.*

### **B. SCOPE**

#### **I. CLARIFICATION:**

- N/A

#### **II. SPECIFICATIONS:**

- Add Terracon Geotechnical Report (34 Pages) to Construction Documents.
- Add Section 02810 - Irrigation (5 Pages) to Constructon Documents.
- Add Section 02900 – Planting (8 Pages) to Construction Documents.
- Add Section 02930 – Lawns (8 Pages) to Constructin Documents.

#### **II. PLANS:**

- Add Sheet L1.01 – Irrigation Plan to Construction Documents.
- Add Sheet L1.02 – Irrigation Notes and Details to Construction Documents.
- Add Sheet L2.01 – Landscape Plan to Construction Documents.
- Add Sheet L2.02 - Landscape Notes, Schedules and Details to Construction Documents.



# Geotechnical Engineering Report

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**IDEA Mission Gym  
Mission, Texas**

July 8, 2019

Terracon Project No. 88195097

**Prepared for:**

Gomez Mendez Saenz, Inc.  
Brownsville, Texas

**Prepared by:**

Terracon Consultants, Inc.  
Pharr, Texas



July 8, 2019



Gomez Mendez Saenz, Inc.  
1150 Paredes Line Road  
Brownsville, Texas 78521

Attn: Roan G. Gomez, AIA  
P: [956] 546-0110  
E: rgg@gmsarchitects.com

Re: Geotechnical Engineering Report  
IDEA Mission Gym  
1600 N Schuerbach Rd.  
Mission, Texas  
Terracon Project No. 88195097

Dear Mr. Gomez:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. P88195097 dated June 18, 2019. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

**Terracon Consultants, Inc.**

(Texas Firm Registration No.: F-3272)

A handwritten signature in blue ink, appearing to read "Stephany Chacón".

Stephany Chacón, E.I.T.  
Staff Engineer



7/8/19

A handwritten signature in blue ink, appearing to read "Alfonso A. Soto".

Alfonso A. Soto, P.E., D.GE  
Principal

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Environmental



Facilities



Geotechnical



Materials

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**Note:** This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the **GeoReport** logo will bring you back to this page. For more interactive features, please view your project online at [client.terracon.com](http://client.terracon.com).

## ATTACHMENTS

**EXPLORATION AND TESTING PROCEDURES**  
**SITE LOCATION AND EXPLORATION PLANS**  
**EXPLORATION RESULTS**  
**SUPPORTING INFORMATION**

**Note:** Refer to each individual Attachment for a listing of contents.

## REPORT SUMMARY

Topic <sup>1</sup>	Overview Statement <sup>2</sup>
<b>Project Description</b>	The project will include the construction of a single-story building with a footprint of approximately 20,000 square feet (sf).
<b>Geotechnical Characterization</b>	<ul style="list-style-type: none"> <li>■ Groundwater was not observed either during or upon completion of drilling operations.</li> <li>■ The subsurface soils at this site generally consist of Lean Clay (CL), Sandy Silty (ML) and Fat Clay (CH).</li> </ul>
<b>Potential Vertical Rise (PVR)</b>	The existing Potential Vertical Rise (PVR) of the soils within the proposed building area in present condition is about 1 inch or less.
<b>Seismic Site Classification</b>	The subsurface conditions within the site are consistent with the characteristics of Site Class D as defined in the International Building Code (IBC) Site Classification.
<b>Earthwork</b>	The subgrade should be prepared as noted in <b>Earthwork</b>
<b>Foundations</b>	A shallow or deep foundation system would be appropriate to support the structural loads of the proposed structure, provided the pad is prepared as recommended in this report.
<b>General Comments</b>	This section contains important information about the limitations of this geotechnical engineering report.

1. If the reader is reviewing this report as a pdf, the topics above can be used to access the appropriate section of the report by simply clicking on the topic itself.
2. This summary is for convenience only. It should be used in conjunction with the entire report for design purposes.

# Geotechnical Engineering Report

## IDEA Mission Gym

1600 N Schuerbach Rd.

Mission, Texas

Terracon Project No. 88195097

July 8, 2019

## INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed IDEA Mission Gym to be located at 1600 N Schuerbach Rd. in Mission, Texas. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Excavation considerations
- Foundation design and construction
- Floor slab design and construction
- Seismic site classification per IBC

The geotechnical engineering Scope of Services for this project included the advancement of 2 test borings to depths of approximately 30 feet below existing site grades.

Maps showing the site and boring locations are presented in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs in the **Exploration Results** section.

## SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
<b>Parcel Information</b>	The project site is located within the grounds of the existing IDEA Mission campus at 1600 N Schuerbach Rd. in Mission, Texas. Latitude: 26.197286° N Longitude: 98.367605° W. See <b>Site Location</b>
<b>Existing Improvements</b>	Undeveloped land.
<b>Current Ground Cover</b>	Native grasses and soils.
<b>Existing Topography</b>	Relatively flat and level.

Item	Description
<b>Geology</b>	Based on the Geologic Atlas of Texas, McAllen – Brownsville prepared by The University of Texas, the site is located on the Alluvium Formation of the Holocene (Recent) Period of the Quaternary Age. Floodplain deposits, lower course of Rio Grande, are divided into areas dominantly mud and areas dominantly silt and sand. All other areas are alluvium undivided, except for some areas where tidal flat areas are mapped. The soils are mostly composed of clay, silt, sand, gravel and organic matter. The silt and sand are described as calcareous and dark gray to dark brown in color. The sand is mostly quartz and the gravel along Rio Grande include sedimentary rocks from the Cretaceous and Tertiary and a wide variety of igneous and sedimentary rocks from Trans-Pecos Texas, Mexico, and New Mexico including agate. The gravel in side streams of the Rio Grande is mostly Tertiary rocks and chert derived from Uvalde Gravel which caps divide.

## PROJECT DESCRIPTION

Item	Description
<b>Project Description</b>	The project will include the construction of a single-story building with a footprint of approximately 20,000 square feet (sf).
<b>Construction Type</b>	We anticipate that the building construction may consist of brick veneer or stucco exterior walls with steel frame supported by a shallow or deep foundation system.
<b>Finished Floor Elevation (FFE)</b>	FFE is set at El. 117.5 feet. Existing grade within the building area is at about El. 114.5 feet
<b>Maximum loads (assumed)</b>	<ul style="list-style-type: none"> <li>■ Columns: 85 kips</li> <li>■ Walls: 3 kips per linear foot</li> <li>■ Slabs: 250 pounds per square foot</li> </ul>

## GEOTECHNICAL CHARACTERIZATION

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs and the GeoModel can be found in the **Exploration Results** section of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	CLAY	Lean Clay (CL) and Fat Clay (CH) Medium stiff to very stiff
2	SILT	Sandy Silt (ML) and Silt with Sand (ML) Loose to medium dense

## Groundwater Conditions

The boreholes were drilled to their full depths using dry drilling techniques to aid in the observation of groundwater. Groundwater was not observed in the borings while drilling, or for the short duration that the borings were allowed to remain open. The boreholes can be found on the boring logs in

### Exploration Results.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project. The boreholes were backfilled with on-site soil cuttings after completion of the groundwater level observations.

## GEOTECHNICAL OVERVIEW

Our findings indicate the proposed building structure can be supported on a shallow or deep foundation system. The desired foundation system may be used at this site provided the site and foundation are designed and constructed as recommended in this report.

The suitability and performance of a soil supported foundation for a structure depends on many factors including the magnitude of soil movement expected, the type of structure, the intended use of the structure, the construction methods available to stabilize the soils, and our understanding of the owner's expectations of the completed structure's performance.

Expansive soils are present on this site. This report provides recommendations to help mitigate the effects of soil shrinkage and expansion. However, even if these procedures are followed, some movement in the structure should be anticipated. Eliminating the risk of movement may not be feasible, but it may be possible to further reduce the risk of movement if significantly more expensive measures are used during construction. We would be pleased to discuss other construction alternatives with you upon request.

Geotechnical engineering recommendations for foundation systems and other earth connected phases of the project are outlined below. The recommendations contained in this report are based

upon the results of data presented herein, engineering analyses, and our current understanding of the proposed project.

The **General Comments** section provides an understanding of the report limitations.

## Swell Test Results

To further evaluate the expansive characteristics of the clayey soil, one-dimensional vertical swell tests were conducted on selected specimens. The results of these tests are shown in the following table.

Swell Test Results					
Boring	Depth (feet)	Surcharge (psf) *	Initial Moisture (%)	Final Moisture (%)	Percent Swell (%)
B-2	2 - 4	100	19.1	25.7	2.2
B-2	2 - 4	460	14.7	19.5	0.5

\* The swell test specimens were applied a surcharge pressure during testing that approximated the existing soil overburden.

The test results indicate that the onsite soils have a moderate swell potential in their existing condition. Also, these soils, if they were allowed to dry out, could have greater potential for volumetric changes.

## EARTHWORK

Earthwork will include clearing and grubbing, excavations and fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria as necessary to render the site in the state considered in our geotechnical engineering evaluation for foundations and pavements.

### Site Preparation

Construction areas should be stripped of all vegetation, topsoil and other unsuitable material. Additional excavation as recommended in this report or as needed should be performed within the proposed building area. Once final subgrade elevation has been achieved, the exposed subgrade should be carefully proofrolled with a 15-ton pneumatic roller or a fully loaded dump truck to detect weak zones in the subgrade. Special care should be exercised when proofrolling the fill soils to detect soft/weak areas. Weak areas detected during proofrolling, as well as zones of fill containing organic matter and/or debris should be removed and replaced with select fill in the proposed building area. Proper site drainage should be maintained during construction, so

that ponding of surface runoff does not occur and cause construction delays and/or inhibit site access.

Subsequent to proofrolling, and just prior to placement of fill, the exposed subgrade within the construction area should be evaluated for moisture and density. If the moisture, density, and/or the requirements do not meet the criteria described in the table below, the subgrade should be scarified to a minimum depth of 8 inches, moisture adjusted and compacted to at least 95 percent of the Standard Effort (ASTM D 698) maximum dry density. Select fill should meet the following criteria.

### Fill Material Types

Engineered fill should consist of approved materials, free of organic material, debris and particles larger than about 2 inches. The maximum particle size criteria may be relaxed by the geotechnical engineer of record depending on construction techniques, material gradation, allowable lift thickness and observations during fill placement. Soils for use as engineered fill material should conform to the following specifications:

Fill Type <sup>1</sup>	USCS Classification	Acceptable Location for Placement
<b>Aggregate Base Course</b> <sup>2</sup>	SC, GC, Caliche, Crushed Limestone, Crushed Concrete	Top 6 inches of building pad area.
<b>Select Fill</b>	CL and/or SC (7 ≤ PI ≤ 20)	Must be used to construct the building pad, pavements and all grade adjustments within the construction area.
<b>On-Site Soils</b>	CL	On-site CL soils may be suitable for use as fill within the building and landscaping areas as long as they are free from organics and have a PI between 7 and 20.

1. Prior to any filling operations, samples of the proposed borrow and on-site materials should be obtained for laboratory moisture-density testing. The tests will provide a basis for evaluation of fill compaction by in-place density testing. A qualified soil technician should perform sufficient in-place density tests during the filling operations to evaluate that proper levels of compaction, including dry unit weight and moisture content, are being attained.
2. Crushed limestone and crushed concrete material should meet the requirements of 2014 TxDOT Item 247, Type A, or D, Grades 1-2 and 3. The select fill materials should be free of organic material and debris, and should not contain stones larger than 2 inches in the maximum dimension. The clayey gravel and caliche materials should meet the gradation requirements of Item 247, Type B, Grades 1-2 and 3 as specified in the 2014 TxDOT Standard Specifications Manual and a Plasticity Index between 7 and 20.

### Fill Compaction Requirements

Structural and general fill should meet the following compaction requirements.

Item	Description
<b>Fill Lift Thickness</b>	The fill should be placed in thin; loose lifts of about 8 inches, with compacted thickness not exceeding 6 inches.
<b>Compaction Requirements (on-site soils)</b>	The on-site soils should be compacted to at least 95 percent of The Standard Effort (ASTM D698) maximum dry density within 4 percentage points above the optimum moisture content.
<b>Compaction Requirements (select fill)</b>	The select fill should be compacted to at least 95 percent of The Standard Effort (ASTM D698) maximum dry density within 2 percentage points of the optimum moisture content.

### **Wet Weather/Soft Subgrade Conditions**

Construction operations may encounter difficulties due to the wet or soft surface soils becoming a general hindrance to equipment due to rutting and pumping of the soil surface, especially during and soon after periods of wet weather.

If the subgrade cannot be adequately compacted to minimum densities as described above, one of the following measures will be required: 1) removal and replacement with select fill, 2) chemical treatment of the soil to dry and increase the stability of the subgrade, or 3) drying by natural means if the schedule allows.

In our experience with similar soils in this area, chemical treatment is the most efficient and effective method to increase the supporting value of wet and weak subgrade. Terracon should be contacted for additional recommendations if chemical treatment of the soils is needed.

Prior to placing any fill, all surface vegetation, topsoil, possible fill material and any otherwise unsuitable materials should be removed from the construction areas. Wet or dry material should either be removed or moisture conditioned and recompacted. After stripping and grubbing, the subgrade should be proof-rolled where possible to aid in locating loose or soft areas. Proof-rolling can be performed with a 15-ton roller or fully loaded dump truck. Soft, dry and low-density soil should be removed or compacted in place prior to placing fill.

### **Grading and Drainage**

Positive drainage should be provided during construction and maintained throughout the life of the development. Infiltration of water into utility trenches or foundation excavations should be prevented during construction. Planters and other surface features which could retain water in areas adjacent to the building should be sealed or eliminated. In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a

minimum grade of approximately 3 percent for at least 10 feet from perimeter walls, except in areas where ADA ramps are required, these areas should comply with state and local regulations. Backfill against exterior walls, and in utility and sprinkler line trenches, should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

Downspouts, roof drains or scuppers should discharge into extensions when the ground surface beneath such features is not protected by exterior slabs or paving. Consideration should be given to extending drainage piping to day light at the face of curbs then empty onto pavement surfaces. Sprinkler systems should not be installed within 5 feet of foundation walls. Landscaped irrigation adjacent to the foundation systems should be minimized or eliminated.

Where paving or flatwork abuts the structure, effectively seal and maintain joints to prevent surface water infiltration. The joint between the sidewalk curb and building should be sealed. The sidewalk curb along the building line is recommended to prevent water from standing over the joint between the building and sidewalk should the outside edge of the slab rise due to soil swelling at the sidewalk edge.

Utility trenches are a common source of water infiltration and migration. All utility trenches that penetrate beneath the building should be effectively sealed to restrict water intrusion and flow through the trenches that could migrate below the building.

We recommend constructing an effective clay “trench plug” that extends at least 5 feet out from the face of the building exterior. The plug material should consist of clay compacted at a water content at or above the soils optimum water content. The clay fill should be placed to completely surround the utility line and be compacted in accordance with recommendations in this report.

## **Earthwork Construction Considerations**

Shallow excavations, for the proposed structure, are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over, or adjacent to construction area should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted, prior to floor slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, “Excavations” and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

## **Construction Observation and Testing**

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of vegetation and top soil, proof-rolling and mitigation of areas delineated by the proof-roll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked as necessary until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building area and 5,000 square feet in pavement areas. One density and water content test for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. In the event unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

## **SHALLOW FOUNDATIONS**

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

### **Design Parameters – Slab-on-Grade Foundation**

The foundation design parameters presented below are based on our evaluation using published theoretical and empirical design methods.

These were developed based on our understanding of the proposed project, our interpretation of the information and data collected as a part of this study, our area experience and the results of our evaluation. The structural engineer should select the appropriate slab design method and code for the amount of anticipated slab movement indicated.

The slab-on-grade foundation may be designed using the following parameters provided the subgrade is prepared as outlined in the **Earthwork** and **Floor Slabs** sections of this report:

Item	Description
Select Fill Pad	Minimum 2½ feet of select fill over 6 inches of moisture conditioned and compacted on-site soils.
Allowable Bearing Pressure <sup>1</sup> ■ Compacted select fill	Net Total Load - 2,500 psf
Climatic Rating	15
Design Plasticity Index	22
Soil Support Index	0.93
Estimated PVR <sup>2</sup>	Less than 1 inch
Approximate total settlement <sup>3</sup>	About 1 inch
Estimated Differential Settlement <sup>3</sup>	Approximately ½ of total settlement
Min. perimeter grade beam embedment <sup>4</sup>	18 inches below finished grade

1. The net allowable bearing pressure provided above include a factor of safety of at least 2.
2. The slab-on-grade foundation system should be designed to tolerate the anticipated soil movement and provide satisfactory support to the proposed structure. The foundation should have adequate exterior and interior grade beams to provide sufficient rigidity to the foundation system such that the slab deflections that result are considered tolerable to the supported structure.
3. This estimated post-construction settlement is assuming proper construction practices are followed. Settlement response of a select fill supported slab is influenced more by the quality of construction than by soil-structure interaction. Therefore, it is essential that the recommendations for foundation construction be strictly followed during the construction phases of the building pad and foundation.
4. To bear within the select fill or moisture conditioned and recompacted on-site soils. The grade beams may be thickened and widened where necessary to support column loads.

### Construction Considerations for Slab-on-Grade Foundation

Excavations for grade beams should be performed with equipment capable of providing a relatively clean bearing area. The bottom 6 inches of the excavations should be completed with a smooth-mouthed bucket or by hand labor. The excavations should be neatly excavated and properly formed. Debris in the bottom of the excavation should be removed prior to reinforcing steel placement. Water should not be allowed to accumulate at the bottom of the excavation. Due to the presence of dry soils, caving of grade beam excavation may occur. Therefore, the foundation contractor should be prepared to use forms.

To reduce the potential for groundwater seepage into the excavations and to minimize disturbance to the bearing area, we recommend that concrete and reinforcing steel be placed as soon as possible after the excavations are completed. Excavations should not be left open for

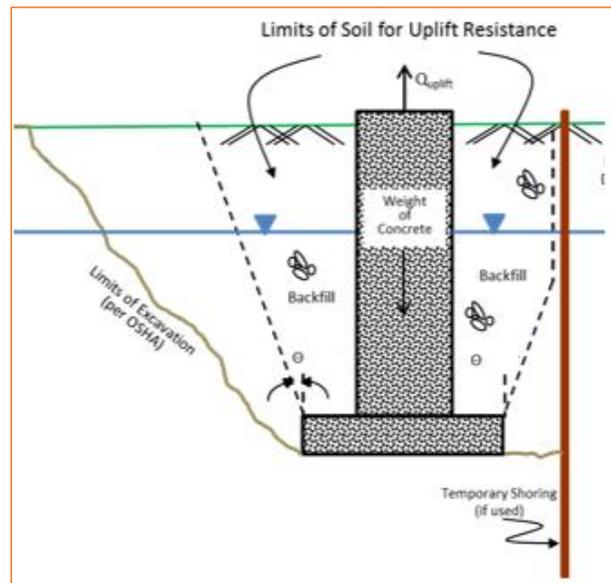
more than 36 hours. The bearing surface of the grade beams should be evaluated after excavation is completed and immediately prior to placing concrete.

### Design Recommendations – Spread Footing Foundation

Spread footings may be considered in the design of the foundations to support the main column loads. Lateral loads transmitted to the footings should be resisted by a combination of soil-concrete friction on the base of the footing and passive pressure on the side of the footing. To resist lateral forces, a net allowable passive resistance may be utilized for portions of footings extending at least 30 inches below finished grade. If the footing is formed during construction, the open space between the footing and the in-situ soils should be backfilled with soils. Also, care should be taken to avoid disturbance of the footing bearing area since loose material could increase settlement and decrease resistance to lateral loading.

The spread footings can provide some uplift resistance for those structures subjected to wind or other induced structural loading.

Uplift resistance of spread footings can be developed from the effective weight of the footing and the overlying soils. As illustrated on the subsequent figure, the effective weight of the soil prism defined by diagonal planes extending up from the top of the perimeter of the foundation to the ground surface at an angle,  $\theta$ , of 20 degrees from the vertical can be included in uplift resistance. The maximum allowable uplift capacity should be taken as a sum of the effective weight of soil plus the dead weight of the foundation, divided by an appropriate factor of safety. A soil unit weight of 120 pcf should be used for the backfill. This unit weight should be reduced to 58 pcf for portions of the backfill or natural soils below the groundwater elevation.



Design values for the footings are presented below.

Item	Description
<b>Minimum Embedment Below Finished Grade</b> <sup>1</sup>	2½ feet
<b>Net Allowable Bearing Pressure</b> <sup>7</sup>	Total Load - 2,500 psf
<b>Approximate total settlement</b> <sup>2</sup>	About 1 inch

Item	Description
Estimated Differential Settlement <sup>3</sup>	Approximately ½ of total settlement
Allowable Passive Pressure <sup>4</sup>	650 psf (if considered)
Coefficient of Sliding Friction <sup>5</sup>	0.40
Uplift Resistance <sup>6</sup>	Foundation Weight (150 pcf) & Soil Weight (120 pcf)

1. To bear within the native soils or select fill.
2. This estimated post-construction settlement of the shallow footings is without considering the effect of stress distribution from adjacent foundations and assuming proper construction practices are followed. A clear distance between the footings of one footing size should not produce overlapping stress distributions and would essentially behave as independent foundations.
3. Differential settlement may result from variances in subsurface conditions, loading conditions and construction procedures. The settlement response of the footings will be more dependent upon the quality of construction than upon the response of the subgrade to the foundation loads. We estimate that the differential settlement should be approximately one-half of the total settlement. Settlement of footings will be more sensitive to installation techniques than to soil-structure interaction.
4. The passive pressure along the exterior of the footings should be neglected unless pavement is provided up to the edge of the structure. For interior footings, the allowable passive pressure may be used for the entire depth of the footing. The passive pressure provided above includes a factor of safety of at least 3.
5. Lateral loads transmitted to the footings will be resisted by a combination of soil-concrete friction on the base of the footings and passive pressure on the side of the footings.
6. The ultimate uplift capacity of shallow footings should be reduced by an appropriate factor of safety to compute allowable uplift capacity.
7. The net allowable bearing pressure provided above include a factor of safety of at least 2.

## Construction Considerations for Spread Footing Foundations

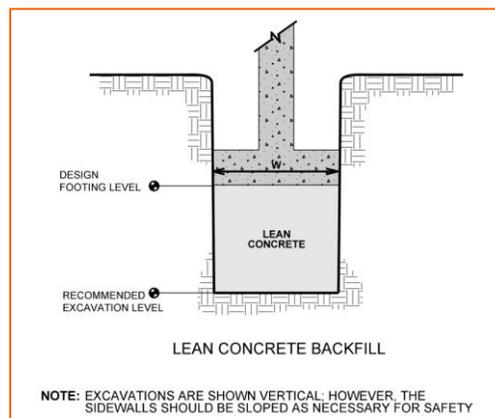
As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed. Due to the presence of dry soils, caving of excavation may occur. Therefore, the foundation contractor should be prepared to use forms.

Excavation should be accomplished with a smooth-mouthed bucket. If a toothed bucket is used, excavation with this bucket should be stopped 6 inches above the final bearing surface and the excavation completed with a smooth-mouthed bucket or by hand labor.

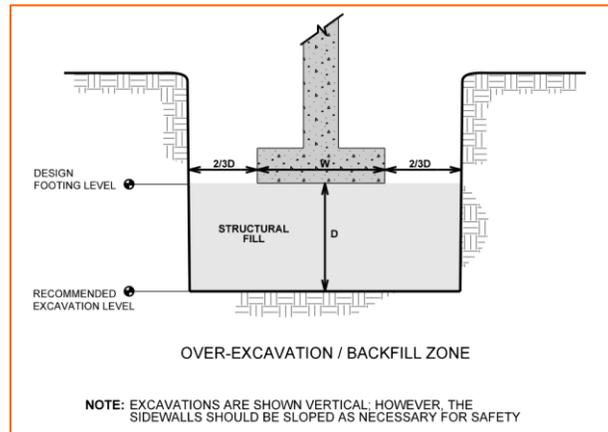
If the footing foundations are over-excavated and formed, the backfill around the foundation sides should be achieved with compacted select fill, lean concrete, compacted cement stabilized sand (two sacks cement to one cubic yard of sand) or flowable fill. Compaction of select fill should be as described later in this section of the report.

The bearing surface should be excavated with a slight slope to create an internal sump for runoff water collection and removal. If surface runoff water in excess of 2 inches accumulates at the bottom of the excavation, it should be pumped out prior to concrete placement. Under no circumstances should water be allowed to adversely affect the quality of the bearing surface. If the spread footing is buried, backfill above the foundation may be the excavated on-site soils or select fill soils. Backfill soils should be compacted to at least 95 percent of the maximum dry density as determined by the standard moisture/density relationship test (ASTM D 698). Moisture contents for on-site soils and imported select fill soils should be within 2 percentage points of the optimum moisture content. The backfill should be placed in thin, loose lifts of about 8 inches, with compacted thickness not to exceed 6 inches.

If unsuitable bearing soils are encountered at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. This is illustrated on the sketch below.



Over-excavation for structural fill placement below footings should be conducted as shown below. The over-excavation should be backfilled up to the footing base elevation, with select fill placed, as recommended in the **Earthwork** section.



## DEEP FOUNDATIONS

Drilled pier foundations may also be considered to support the proposed building. Drilled piers may be designed using the following parameters.

Description	Column
<b>Minimum embedment depth</b> <sup>1</sup>	El. 94 feet (about 20 feet below existing grade)
<b>Maximum embedment depth</b> <sup>1</sup>	El. 89 feet (about 25 feet below existing grade)
<b>Bearing pressures</b> <sup>1,2,4</sup>	Net total load – 7,500 psf
<b>Average allowable side-shear</b> <sup>4</sup>	400 psf
<b>Minimum percentage of steel</b> <sup>3</sup>	As per structural engineer
<b>Approximate total settlement</b> <sup>4</sup>	1 inch
<b>Estimated differential settlement</b> <sup>5</sup>	Approximately ½ of total settlement
<b>Allowable passive pressure</b> <sup>6</sup>	1,000 psf

1. For drilled piers to bear into the native clayey soils.
2. Whichever condition yields a larger bearing area.
3. The structural engineer should determine the required reinforcing steel throughout the entire shaft length of DP to resist the axial and lateral forces.
4. A minimum center-to-center spacing between the piers equal to three times the pier diameter should be provided to develop the recommended allowable capacities for a single pier and to control settlements of the pier. If this clearance cannot be maintained for a given pair or within a single line of piers, the above allowable capacities for a single pier may need to be reduced. Also, large concentrated of group of piers may have a reduced efficiency (decrease in load carrying capacity) even with the minimum pier spacing recommended previously. It is not recommended to have pier groups with elements closer than 2½ times the pier diameter (center-to-center). The

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final foundation plan should be reviewed by Terracon to re-evaluate, if applicable, load carrying capacity and settlements, including the efficiency of pier groups.

5. Will result from variances in subsurface conditions, loading conditions and construction procedures, such a cleanliness of the bearing area or flowing water in the shaft. Settlements provided for single, isolated piers only.
  6. For piers placed against an undisturbed vertical face of the in-situ soils. Lateral resistance of the drilled piers is primarily developed by passive resistance of the soils against the side of the pier. Due to surface effects, the lateral resistance of the upper 5 feet of the soils at the surface for exterior piers should be neglected unless area paving is provided around the piers
- 

The drilled pier parameters provided above are for calculating single pier capacities only. The structural engineer should determine the required reinforcing steel throughout the entire shaft length of piers to resist the axial and lateral forces.

### **Drilled Pier Foundation Construction Considerations**

Drilled excavations to at least El. 94 feet will be necessary for installation of the drilled piers for the proposed structure at this site. Groundwater was not encountered in the borings during drilling activities. Depending on weather conditions, groundwater levels may vary from the levels observed during our field program. Water must not be allowed to accumulate in the bottom of the pier excavations. Preferably, pier excavations should be backfilled with concrete within about 2 to 4 hours of completion of the drilling and in no case should an excavation be left open overnight. The concrete placed in the excavations should have a 6-inch slump with a plus or minus one inch tolerance. The bottom of pier footing excavation should be free of all loose materials and/or water, and the bearing surface should be evaluated immediately prior to placing concrete.

### **Foundation Construction Monitoring**

The performance of the foundation system for the proposed structure will be highly dependent upon the quality of construction. Thus, we recommend that fill pad compaction and foundation installation be monitored full time by an experienced Terracon soil technician under the direction of our Geotechnical Engineer.

During foundation installation, the base should be monitored to evaluate the condition of the subgrade. We would be pleased to develop a plan for compaction and foundation installation monitoring to be incorporated in the overall quality control program.

## **SEISMIC CONSIDERATIONS**

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear

strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our professional opinion that the **Seismic Site Classification is D**. Subsurface explorations at this site were extended to a maximum depth of 30 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

## FLOOR SLABS

We understand FFE for the proposed building is set at El. 117.5 feet (about 3 feet above existing grade).

### Floor Slab Design Parameters

The subsurface soils at this site generally exhibit low expansion potential. Based on the information developed from our field and laboratory programs and on method TEX-124-E in the Texas Department of Transportation (TxDOT) Manual of Testing Procedures, we estimate that the subgrade soils at this site exhibit a Potential Vertical Rise (PVR) of about 1 inch or less in present condition.

The actual movements could be greater if poor drainage, ponded water, and/or other sources of moisture are allowed to infiltrate beneath the structure after construction. We have provided recommendations to maintain the site PVR to about 1 inch or less. In addition, positive structure perimeter drainage should be carefully observed.

After site stripping and over-excavation activities as recommended, select fill over 6 inches of moisture conditioned and compacted subgrade soils should be constructed directly below the floor slab and should also extend a minimum of 3 feet beyond the edge of the proposed building area, including any movement sensitive flatwork that abuts the structure such as sidewalks. The final exterior grade adjacent to the building should be sloped to promote positive drainage away from the structure.

The subgrade and select fill soils should be prepared as outlined in the **Earthwork** section of this report, which contains material and placement requirements for select fill, as well as other subgrade preparation recommendations. The floor slab should be designed using the following recommendations.

Item	Description
Excavation	Topsoil

Item	Description
<b>Floor Slab Support</b> <sup>1</sup>	Min. 6 inches of moisture conditioned and compacted native soils plus 2½ feet of select fill as needed to achieve Finished Building Pad Elevation. This recommendation applies to building area and flatwork that abuts the structure such as sidewalks.
<b>Estimated Modulus of Subgrade Reaction</b> <sup>2</sup>	125 pounds per square inch per inch (psi/in) for point loads.
<b>Estimated Potential Vertical Rise (PVR)</b>	Less than 1 inch

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

### Floor Slab Construction Considerations

Finished subgrade within and for at least 10 feet beyond the floor slab should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should approve the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

## **GENERAL COMMENTS**

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

## ATTACHMENTS

## EXPLORATION AND TESTING PROCEDURES

### Field Exploration

Number of Borings	Boring Depth (feet) <sup>1</sup>	Location
2	30	IDEA Mission Gym

1. Below ground surface

**Boring Layout and Elevations:** Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about  $\pm 10$  feet).

**Subsurface Exploration Procedures:** We advanced the soil borings with a truck-mounted drill rig using continuous flight augers (solid stem and/or hollow stem as necessary depending on soil conditions). Five samples were obtained in the upper 10 feet of the borings and at intervals of 5 feet thereafter. Soil sampling was performed using thin-wall tube and/or split-barrel sampling procedures. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, the borings were backfilled with auger cuttings after their completion.

The sampling depths, penetration distances, and other sampling information were recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a geotechnical engineer. Our exploration team prepared field boring logs as part of the drilling operations. The field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field log. The final boring logs represent the geotechnical engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

### Laboratory Testing

The project engineer reviewed the field data and assigned various laboratory tests to better understand the engineering properties of the various soil strata as necessary for this project.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D422 Standard Test Method for Particle-Size Analysis of Soils
- ASTM D2166/D2166M Standard Test Method for Unconfined Compressive Strength of Cohesive Soil

- ASTM D4546 Standard Test Methods for One-Dimensional Swell or Collapse of Soils

The laboratory testing program often included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System (USCS).

## **SITE LOCATION AND EXPLORATION PLANS**

### **Contents:**

Site Location Plan

Exploration Plan

Note: All attachments are one page unless noted above.

**SITE LOCATION**

IDEA Mission Gym ■ Mission, Texas

July 8, 2019 ■ Terracon Project No. 88195097



DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

**EXPLORATION PLAN**

IDEA Mission Gym ■ Mission, Texas

July 8, 2019 ■ Terracon Project No. 88195097



DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

## EXPLORATION RESULTS

**Contents:**  
Boring Logs  
GeoModel

# BORING LOG NO. B-1

**PROJECT: IDEA Mission Gym**

**CLIENT: Gomez Mendez Saenz, Inc.  
Brownsville, TX**

**SITE: 1600 N Schuerbach Rd.  
Mission, TX**

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 26.1975° Longitude: -98.3676°  Surface Elev.: 114.5 (Ft.) ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES	
							TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)					
1		<b>LEAN CLAY (CL)</b> , brown, very stiff to medium stiff	8.0		X	8-12-10 N=22				10			94	
					X	2-3-4 N=7				11		40-18-22		
					X	3-3-5 N=8				21				
			106.5		X	2-3-3 N=6				19		28-17-11		
2		<b>SANDY SILT (ML)</b> , non-plastic, brown, loose	12.0		X	2-2-3 N=5				23		NP	58	
1		<b>FAT CLAY (CH)</b> , brown, very stiff			X	7-7-10 N=17				22				
					X	6-8-11 N=19				25		59-22-37		
					X	8-10-9 N=19				24			97	
			30.0		X	9-9-12 N=21				24				
		<b>Boring Terminated at 30 Feet</b>	30											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Dry augered to termination depth.

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with soil cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

**WATER LEVEL OBSERVATIONS**

Groundwater not encountered



Boring Started: 06-26-2019

Boring Completed: 06-26-2019

Drill Rig: CME-55

Driller: SWD

Project No.: 88195097

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_ 88195097 IDEA MISSION GYM.GPJ TERRACON\_DATATEMPLATE.GDT 7/5/19

# BORING LOG NO. B-2

**PROJECT: IDEA Mission Gym**

**CLIENT: Gomez Mendez Saenz, Inc.  
Brownsville, TX**

**SITE: 1600 N Schuerbach Rd.  
Mission, TX**

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 26.1972° Longitude: -98.3677°  Surface Elev.: 114.5 (Ft.) ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
1		<b>LEAN CLAY (CL)</b> , brown, very stiff to stiff	8.0 106.5		X	7-9-8 N=17				11		44-20-24	
						3.5 (HP)				13			
						3.5 (HP)	UC	3.51	10.3	18	104	43-20-23	
						1.0 (HP)				20			
2		<b>SILT WITH SAND (ML)</b> , non-plastic, brown, medium dense	106.5 102.5			1.0 (HP)				19	NP	77	
1		<b>FAT CLAY (CH)</b> , brown, very stiff to medium stiff	102.5 84.5			3.5 (HP)	UC	3.68	9	23	103	56-21-35	
						1.0 (HP)	UC	1.29	9	22	101		
						1.5 (HP)	UC	1.24	8.5	27	96		
						0.5 (HP)				21			
		<b>Boring Terminated at 30 Feet</b>	30										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Dry augered to termination depth.

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with soil cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

**WATER LEVEL OBSERVATIONS**

Groundwater not encountered



Boring Started: 06-26-2019

Boring Completed: 06-26-2019

Drill Rig: CME-55

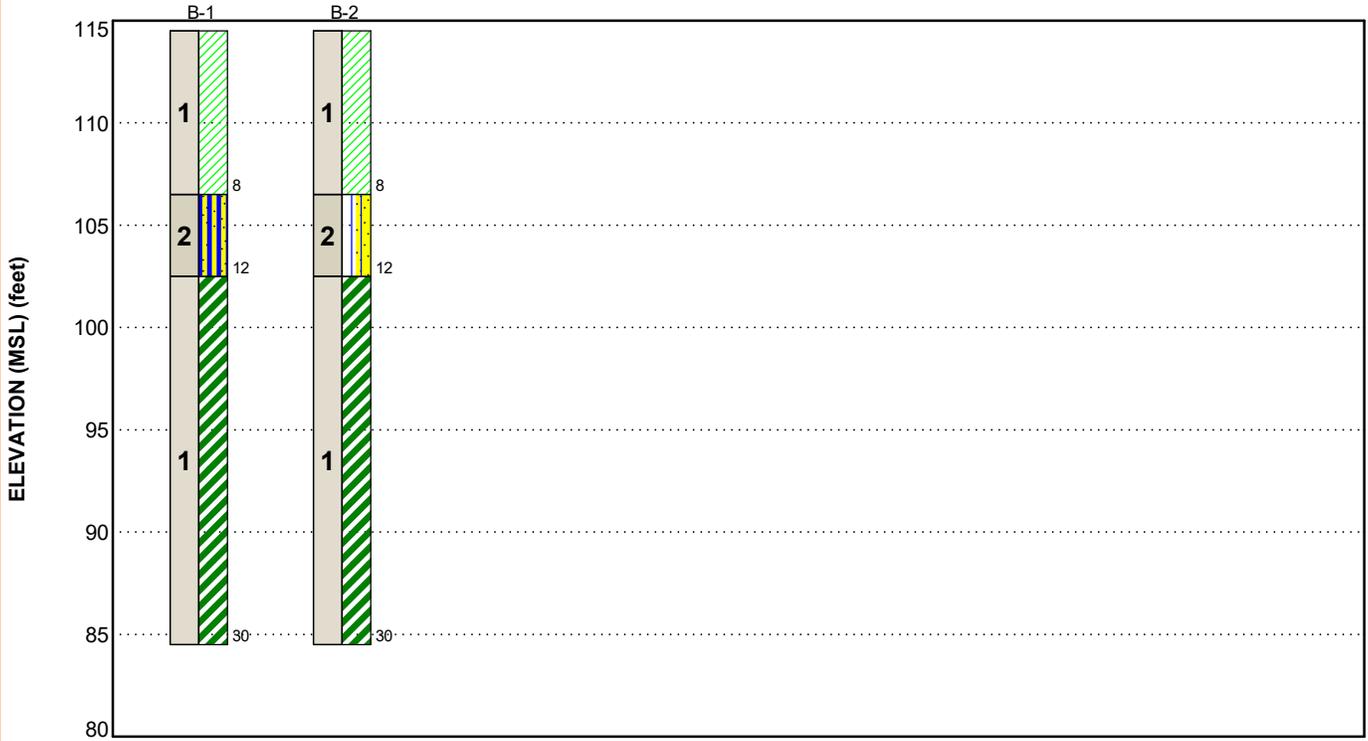
Driller: SWD

Project No.: 88195097

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_ 88195097 IDEA MISSION GYM.GPJ TERRACON\_DATATEMPLATE.GDT 7/5/19

**GEOMODEL**

IDEA Mission Gym ■ Mission, TX  
 7/3/2019 ■ Terracon Project No. 88195097



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	CLAY	Lean Clay (CL), Fat Clay (CH) medium stiff to very stiff
2	SILT	Sandy Silt (ML), Silt with Sand (ML) loose to medium dense

**LEGEND**

- Lean Clay
- Sandy Silt
- Fat Clay
- Silt with Sand

**NOTES:**

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

## **SUPPORTING INFORMATION**

### **Contents:**

General Notes

Unified Soil Classification System

## GENERAL NOTES

### DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING	WATER LEVEL	FIELD TESTS
 Shelby Tube  Split Spoon	 Water Initially Encountered  Water Level After a Specified Period of Time  Water Level After a Specified Period of Time  Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	(N) Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer (UC) Unconfined Compressive Strength (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer

### DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

### LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

### STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength Qu, (tsf)	Standard Penetration or N-Value Blows/Ft.
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

RELATIVE PROPORTIONS OF SAND AND GRAVEL		RELATIVE PROPORTIONS OF FINES	
Descriptive Term(s) of other constituents	Percent of Dry Weight	Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	<15	Trace	<5
With	15-29	With	5-12
Modifier	>30	Modifier	>12
GRAIN SIZE TERMINOLOGY		PLASTICITY DESCRIPTION	
Major Component of Sample	Particle Size	Term	Plasticity Index
Boulders	Over 12 in. (300 mm)	Non-plastic	0
Cobbles	12 in. to 3 in. (300mm to 75mm)	Low	1 - 10
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)	Medium	11 - 30
Sand	#4 to #200 sieve (4.75mm to 0.075mm)	High	> 30
Silt or Clay	Passing #200 sieve (0.075mm)		

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests <sup>A</sup>				Soil Classification		
				Group Symbol	Group Name <sup>B</sup>	
<b>Coarse-Grained Soils:</b> More than 50% retained on No. 200 sieve	<b>Gravels:</b> More than 50% of coarse fraction retained on No. 4 sieve	<b>Clean Gravels:</b> Less than 5% fines <sup>C</sup>	$Cu \geq 4$ and $1 \leq Cc \leq 3$ <sup>E</sup>	GW	Well-graded gravel <sup>F</sup>	
			$Cu < 4$ and/or $[Cc < 1$ or $Cc > 3.0]$ <sup>E</sup>	GP	Poorly graded gravel <sup>F</sup>	
		<b>Gravels with Fines:</b> More than 12% fines <sup>C</sup>	Fines classify as ML or MH	GM	Silty gravel <sup>F, G, H</sup>	
			Fines classify as CL or CH	GC	Clayey gravel <sup>F, G, H</sup>	
	<b>Sands:</b> 50% or more of coarse fraction passes No. 4 sieve	<b>Clean Sands:</b> Less than 5% fines <sup>D</sup>	$Cu \geq 6$ and $1 \leq Cc \leq 3$ <sup>E</sup>	SW	Well-graded sand <sup>I</sup>	
			$Cu < 6$ and/or $[Cc < 1$ or $Cc > 3.0]$ <sup>E</sup>	SP	Poorly graded sand <sup>I</sup>	
		<b>Sands with Fines:</b> More than 12% fines <sup>D</sup>	Fines classify as ML or MH	SM	Silty sand <sup>G, H, I</sup>	
			Fines classify as CL or CH	SC	Clayey sand <sup>G, H, I</sup>	
<b>Fine-Grained Soils:</b> 50% or more passes the No. 200 sieve	<b>Silts and Clays:</b> Liquid limit less than 50	<b>Inorganic:</b>	$PI > 7$ and plots on or above "A"	CL	Lean clay <sup>K, L, M</sup>	
			$PI < 4$ or plots below "A" line <sup>J</sup>	ML	Silt <sup>K, L, M</sup>	
		<b>Organic:</b>	Liquid limit - oven dried	< 0.75	OL	Organic clay <sup>K, L, M, N</sup>
			Liquid limit - not dried			Organic silt <sup>K, L, M, O</sup>
	<b>Silts and Clays:</b> Liquid limit 50 or more	<b>Inorganic:</b>	$PI$ plots on or above "A" line	CH	Fat clay <sup>K, L, M</sup>	
			$PI$ plots below "A" line	MH	Elastic Silt <sup>K, L, M</sup>	
		<b>Organic:</b>	Liquid limit - oven dried	< 0.75	OH	Organic clay <sup>K, L, M, P</sup>
			Liquid limit - not dried			Organic silt <sup>K, L, M, Q</sup>
	<b>Highly organic soils:</b>	Primarily organic matter, dark in color, and organic odor			PT	Peat

<sup>A</sup> Based on the material passing the 3-inch (75-mm) sieve.

<sup>B</sup> If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

<sup>C</sup> Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

<sup>D</sup> Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

<sup>E</sup>  $Cu = D_{60}/D_{10}$      $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

<sup>F</sup> If soil contains  $\geq 15\%$  sand, add "with sand" to group name.

<sup>G</sup> If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

<sup>H</sup> If fines are organic, add "with organic fines" to group name.

<sup>I</sup> If soil contains  $\geq 15\%$  gravel, add "with gravel" to group name.

<sup>J</sup> If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

<sup>K</sup> If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

<sup>L</sup> If soil contains  $\geq 30\%$  plus No. 200 predominantly sand, add "sandy" to group name.

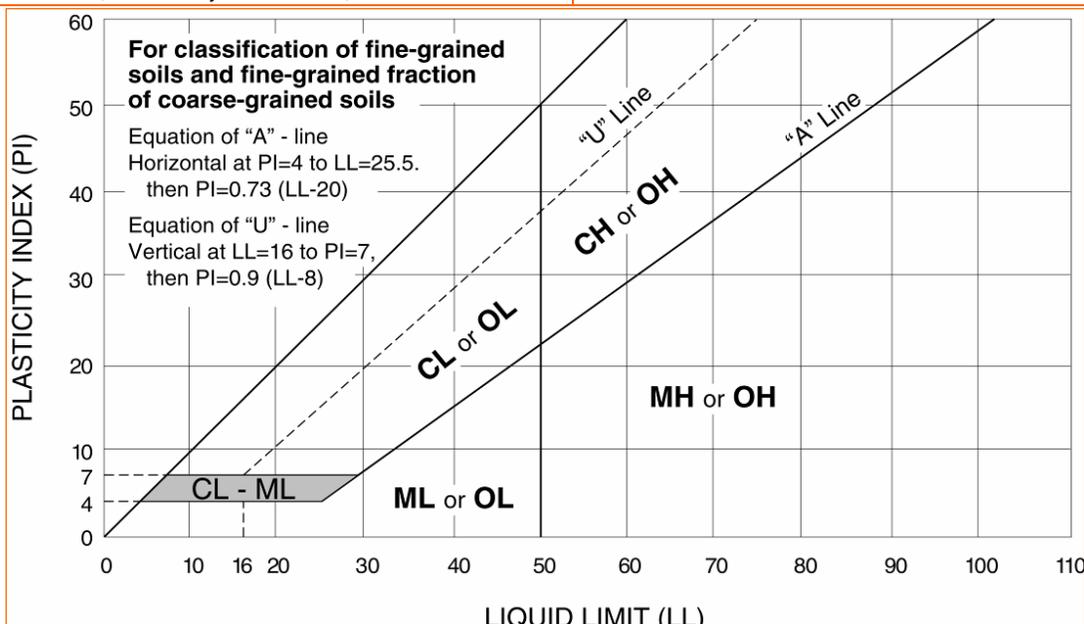
<sup>M</sup> If soil contains  $\geq 30\%$  plus No. 200, predominantly gravel, add "gravelly" to group name.

<sup>N</sup>  $PI \geq 4$  and plots on or above "A" line.

<sup>O</sup>  $PI < 4$  or plots below "A" line.

<sup>P</sup>  $PI$  plots on or above "A" line.

<sup>Q</sup>  $PI$  plots below "A" line.



## SECTION 02810 – IRRIGATION

### PART 1 – GENERAL

#### 1.01 SCOPE

- A. An automatic underground irrigation system for exterior landscaped areas including, but not limited to, supply an installation of water meter, backflow device and controller, boring and sleeving, rotary heads and spray heads in lawn areas and spray heads and drip lines in shrub, ground cover, and flower bed areas.

**NOTE: This project is an addition to an existing school with existing irrigation, lawns and landscape. Contractors shall protect existing irrigation, lawns, landscape, etc. Any damage whatsoever to existing irrigation, landscape or lawns shall be repaired and replaced at contractor's expense.**

#### 1.02 SYSTEM DESCRIPTION

- A. Design Requirements:
  - 1. Provide connection to water source (existing mainline) and new water meters as specified and in accordance with local code requirements.
  - 2. Provide for an electro-mechanical controller.
- B. Performance Requirements: Provide for irrigation at a rate of 1 in. per week applied at 2 or 3 day intervals.

#### 1.03 QUALIFICATIONS

- A. Irrigation work to be performed by a Texas licensed irrigation company specializing in commercial irrigation installation with a minimum of five (5) years experience on similar projects. Owner/SSP Design to review qualifications and approve subcontractor prior to commencing work.

#### 1.04 SUBMITTALS

- A. Submittals shall be formatted electronically in a PDF file with a table of contents and tabs identifying each section. The following submittals are required for this section:
  - 1. Product Data: Manufacturers' technical data (Cut Sheets) and installation information for all components including: Backflow Assembly (Pressure Vacuum Breaker PVB or Reduced Pressure, Backflow Preventer RPZ (as specified), Y strainer (if required), Ball valves, PVC pipe, PVC fittings, PVC primers, solvents, cement, glue, etc., Control wire / tracking wire, Wire connectors, Pump stations, booster pumps (if specified), Pump enclosures (if specified), Controller (incl. communications modules, etc.), Rain/freeze sensors, Valves, Valve boxes, Decoders (if specified), Rotors, Sprays, Nozzles, Bubblers, Drip line, Drip filters, Drip indicators (operind), Air relief valves

#### 1.05 QUALITY CONTROL

- A. Submit verification of water pressure at meter or point of connection.

## SECTION 02810 – IRRIGATION

### 1.06 MAINTENANCE/WARRANTY

- A. Provide the following extra materials to the Owner:
  - 1. Two (2) quick coupler hose bib keys.
  - 2. Four (4) keys for the controller door lock.
- B. Maintenance Requirements: Maintain the work of this Section for ninety days after 'substantial completion' and until final acceptance by Owner. Notify the owner in writing of 'substantial completion'. Maintenance period begins after owner's acceptance of 'substantial completion'.
- C. Maintenance Service: Perform the following maintenance operations at least once a week:
  - a. Test entire system and adjust timer as necessary and as directed by landscape contractor, landscape designer or owner.
  - b. Replace or repair any broken parts or equipment.
  - c. Report any significant problems in writing to landscape contractor, owner and landscape designer.
- D. Warranty: Warranty shall cover all parts and equipment for a period of one year from the date of final acceptance. Repairs and replacements shall be completed within two weeks of notification from owner.

## PART 2- PRODUCTS

### 2.1 MATERIALS

- A. PVC Plastic Pipe: ASTM D 2241-83, SDR21, class 160 lateral piping; ASTM D1785, class 200 mainline piping.
- B. Pipe Fittings:
  - 1. Pipe under 3 in., id: Socket type, ASTM D 2466-78, with solvent Cement, ASTM D 2564-80.
  - 2. Pipe 3 in. id and Larger: Gasketed fittings of epoxy coated steel with non-hardening pipe dope or Teflon tape for threads.
- C. Concrete: 2500 psi min. compressive strength.

### 2.2 MANUFACTURED UNITS

- A. Controller: Electro-mechanical, 24 hr./14-day clock with manual operation capacity, with adequate number of stations for system operating requirements (two wire) (see irrigation equipment table). Provide both freeze-protection and rain-sensor devices with controller. Provide ground-fault interrupt and lightning protection. Provide flow control, ET Management, and IQ System. Contractor to coordinate setup and connection to IQ software including training.
- B. Water Meters: Water meters in locations shown on plans. Contractor to coordinate application, permit and installation with local utility company. Contractor responsible

## SECTION 02810 – IRRIGATION

for water meters and all associated installation costs.

- C. **Booster Pump:** If required contractor shall furnish and install booster pump with enclosure as specified in plans/details. Contractor shall also provide a concrete pad and any and all fittings, adaptors, connections, enclosure, etc. for the complete installation and proper operation of booster pump.
- D. **Backflow Preventers:** Provide and install backflow devices per local codes, specifications and requirements. Provide steel mesh enclosure per plans/schedule.
- E. **Electric Valves:** Normally closed, 24v AC, 60 cycle, solenoid actuated, globe pattern, diaphragm type. Cast brass or plastic body and nylon reinforced nitrile rubber diaphragm.
- F. **Quick coupling Valves:** Cast brass body with self-closing cover. Provide (2) brass keys with 1 in. female threaded outlet.
- G. **Sprinkler Heads:** Heavy-duty plastic sprinkler case, high density plastic sprinkler body, corrosion-resistant internal parts, plastic spray nozzles with adjustable flow and direction features.
- H. **Control Wire:** 24v UL/UF., approved for direct burial. Provide color-coded wire with white used for common (14-gauge, single-strand copper) and red for control (14-gauge single-strand copper).
- I. **Tracking Wire:** 18 gauge copper (only where mainline and wiring bundle are separated)
- J. **Valve Boxes:** Heavy-duty commercial grade, fiberglass reinforced, plastic with locking covers. Rainbird/Hunter/Approved Equal VB series, 10” Round or Standard Rectangular Min. or apprvd equal.
- K. **Swing Joints:** 3 high density polyethylene street ells with 8 in. Schedule 80 PVC nipple; sized the same as inlet to sprinkler head.
- L. **Sleeves:** Schedule 40 PVC. Boring as required under all existing pavement, walls or curbs.

### PART 3 – EXECUTION

#### 3.01 EXAMINATION

- A. **Verification of Conditions:** Examine the site and conditions under which irrigation work is to be performed. Irrigation contractor shall notify the landscape contractor in writing, with a copy to Construction Manager, if the site is unsatisfactory. Do not begin the work until unsatisfactory conditions have been corrected in a manner acceptable to irrigation contractor. Beginning of work indicates acceptance of the site as satisfactory by the irrigation contractor.

## SECTION 02810 – IRRIGATION

### 3.02 INSTALLATION

- A. General: Install tracking wire along mainline pipe if separate from valve wiring bundle.
- B. Excavating and Filling:
  - 1. Cover for Piping:
    - a) Mains: 18 in. min.
    - b) Laterals: 12 in. min.
  - 2. Use clean backfill material without stones larger than 1/2 in., debris or extraneous material that may damage pipe assembly.
  - 3. Compact all trenches to a minimum 95% Standard Proctor Density.
- C. Pipe:
  - 1. Install in existing sleeves under pavement or provide boring and sleeves under pavement as required.
  - 2. Clean pipe and joints before making connections. Purple primer to be used on all joints before applying solvent. Per TCEQ Regulations.
  - 3. Attach joints according to manufacturer's instructions. Threaded joints to be coated with "Teflon" tape. Allow joints to set for at least 24 hrs. before applying water pressure to the system.
  - 4. Thoroughly flush piping before sprinkler heads are installed and test under pressure for leaks in each line separated by valves.
- D. Water Meters: Provide and install water meters per local codes, specifications and requirements. Coordinate permit and application with owner and local utility company. Adjust locations as necessary to coordinate with existing water line locations.
- E. Back Flow Protection: Provide and install backflow devices per local codes, specifications and requirements including enclosure.
- F. Valves:
  - 1. Provide isolation valve on inlet side of every electric control valve (if specified).
  - 2. Install electric and gate valves with at least 10 in. of cover over the valve and at least 6 in. of cover over the stem.
  - 3. Install valve box centered over the flow control handle. Provide 1 cu. ft. of clean pea gravel in the bottom of each valve box with filter fabric below.
  - 4. In lawn areas, valve boxes to be set flush with existing grade; in planting bed areas valve boxes shall be set 2" above grade.
- G. Controllers: Hard wire to nearest power source and CAT6 data line. Coordinate with general contractor. Install on exterior wall in location as shown on plans or as directed/approved by Owner / SSP.
- H. Sprinkler Heads: Install all heads on swing joint assemblies and flush with finish grade.

## SECTION 02810 – IRRIGATION

- I. Wiring:
  - 1. Bundle and tape wires at 10 ft. o.c., max.
  - 2. Snake wire in trenches to allow for expansion. Provide expansion coils at 100 ft. o.c. max., and at the entry to each valve box.
  - 3. Splice wires using mechanical sealant connector for a waterproof connection. Make all wire splices within valve boxes. Use RB WPCONN N90300 or approved equal.

### 3.03 FIELD QUALITY WORK

- A. General: Notify the Construction Manager at least 48 hours before testing is begun.
- B. Hydrostatic Test: Test mainline piping to a hydrostatic pressure of not less than 100 psi for a minimum of 24 hours. Piping may be tested in sections to expedite work. Remove and repair piping and connections which do not pass hydrostatic testing.
- C. Operational Testing: Perform operational testing after hydrostatic testing is completed, backfill is in place, and sprinkler heads adjusted to final position.

### 3.04 ADJUSTING

- A. Check sprinkler heads for arc of spray. Adjust as necessary to provide 100% coverage of all landscaped areas.
- B. Adjust layout to conform to actual layout of landscape plantings.

### 3.05 DEMONSTRATION

- A. Demonstrate operation of the system to Owner's personnel and staff.

### 3.06 CLOSE-OUT DOCUMENTS

- A. As-Built Drawings: Submit 'As-Built' drawings before project close-out showing the irrigation system layout, including line locations and sizes, spray heads and types, points of connection, booster pump, location of backflow device(s), controller, and other installation information.
- B. Warranty Letters: Submit warranty letters for all irrigation items including labor for the specified warranty period.
- C. Operation and Maintenance Data: Submit Manufacturers' operation and maintenance instructions and laminated colored (11x17) valve Zoning Diagram.

**END OF SECTION**

## SECTION 02900 – PLANTING

### PART 1 - GENERAL

#### 1.01 SCOPE

- A. Supply and installation of all approved materials, labor, equipment, transportation and services required and incidental thereto, in conformity with the plans and specifications, including but not limited to; vegetation protection/pruning, fine grading, earth mounding, bed excavation and preparation, bed edging, planting soil/compost mixes, fertilizer, mulch, trees, palms, shrubs, ground covers, staking, paving, site furniture, clean-up, maintenance, and warranty.
- B. Related Sections:
  - 1. Irrigation – 02810
  - 2. Lawns – 02930

**NOTE: This project is an addition to an existing school with existing irrigation, lawns and landscape. Contractors shall protect existing irrigation, lawns, landscape, etc. Any damage whatsoever to existing irrigation, landscape or lawns shall be repaired and replaced at contractor's expense.**

#### 1.02 REFERENCE STANDARDS

- A. General: "Hortus Third," 1976.
- B. Texas Association of Nurserymen, Grades and Standards for Nursery Stock.
- C. Plant Material: "American Standard for Nursery Stock," ANSI Z60.1-1990.
- D. National Arborist Association Standards

#### 1.03 DEFINITIONS

- A. Specimen Plants: Plants having exceptional character, superiority in form and branching, and the best attributes of the species; all as determined by the Architect, Landscape Designer or Owner.

#### 1.04 QUALIFICATIONS

- A. Landscape work to be performed by a single firm specializing in commercial landscape work with a minimum of five (5) years experience on similar type projects. Owner/SSP Design to review qualifications and approve subcontractor prior to commencing work.

#### 1.04 SUBMITTALS

- A. Submittals shall be formatted electronically in a pdf file with a table of contents and tabs identifying each section. The following submittals are required for this section:
  - 1. Landscape Construction Sequence

## SECTION 02900 – PLANTING

2. Edging Materials
3. Post emergent Herbicides
4. Pre emergent Herbicides
5. Soils, Compost and Mulch
6. Sources of all Plant Materials (including address and telephone numbers)
7. Product Data Material Safety Data Sheets
8. Paving Materials
9. Staking Materials
10. Samples: One foot sections of edging (as specified on plans), one pound bag sample of each; topsoil, premium compost, mulch, decomposed granite, river rock, washed gravel and example boulder/rocks.
11. Photographs of all plant material prior to ordering/installation
12. Name and License Number of Subcontractor for pruning trees (Certified I.S.A. Arborist required)

### 1.05 PROTECTION

- A. Before commencing work, contractor shall place orange construction fencing around all vegetation labeled “to remain” on landscape plans. Fencing shall be placed squarely around each tree 6’ x 6’ and at least 60” in height or continuously around groups of vegetation as shown on plans. No work may begin until this requirement is fulfilled. All other vegetation not labeled “to remain” shall be cleared and grubbed including root systems.
- B. In order to avoid damage to roots, bark or lower branches, no truck or other equipment shall be driven or parked within the drip line of any tree, unless the tree overspreads a paved way.
- C. The contractor shall use any and all precautionary measure when performing work around trees, walks, pavements, utilities, and any other features either existing or previously installed under this Contract.
- D. The Contractor shall adjust depth of earthwork and loaming when working immediately adjacent to any of the aforementioned features in order to prevent disturbing tree roots, undermining walks and pavements, and damage in general to any existing or newly incorporated item.
- E. Where excavating, fill or grading is required within the branch spread of trees that are to remain, the work shall be performed as follows:
  - a. TRENCHING: When trenching occurs around trees to remain, the tree roots shall not be cut but the trench shall be tunneled under or around the roots by careful hand digging and without injury to the roots.
  - b. RAISING GRADES: When the existing grade at tree is below the now finished grade, and fill not exceeding 16 inches (16") is required, clean, washed gravel graded from one to two inches (1" - 2") in size shall be placed directly around the tree trunk. The gravel shall extend out from trunk on all sides a minimum of 18 inches (18") and finish approximately two inches (2") above the finished grade at tree. Install gravel

## SECTION 02900 – PLANTING

before any earth fill is placed. New earth fill shall not be left in contact with the trunks of any trees requiring fill. Where fill exceeding 16 inches (16") is required, a dry laid tree well shall be constructed around the trunk of the tree. The tree well shall extend out from the trunk on all sides a minimum of three feet (3') and to three inches (3") above finish grade. Coarse grade rock shall be placed directly around the tree well extending out the drip line of the tree. Clean, washed gravel graded from one to two inches (1" - 2") in size shall be placed directly over the coarse rock to a depth of three inches (3"). Approved backfill material shall be placed directly over the washed gravel to desired finished grade.

- c. LOWERING GRADES: Existing trees in areas where the now finished grade is to be lowered shall have regarding work done by hand to elevation as indicated. Roots as required shall be cut cleanly three inches (3") below finished grade and scars covered with tree paint.
  - d. Trees marked for preservation that are located more than six inches (6") above proposed grades shall stand on broad rounded mounds and be graded smoothly into the lower level. Trees located more than 16 inches (16") above proposed grades shall have a dry laid stonewall, or other retaining structure as detailed on the plans, constructed a minimum of five feet (5') from the trunk. Exposed or broken roots shall be cut clean and covered with topsoil.
- F. Contractor is responsible for all protection measures listed above. If these procedures are not followed, contractor is responsible for replacement of existing trees with approved trees of equal caliper and height.

### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Transport plant materials covered or in closed vehicles to protect from exposure to heat and wind. Spray trees and in full leaf with anti-desiccant - as recommended by the manufacturer - before shipping. Take precautions to protect plant materials from desiccation and from damage to bark, branches and roots. Do not allow root balls to crack. Schedule shipments to coincide with planting work schedule.
- B. Storage and Protection: If planting is delayed after delivery, keep plants in a shaded area, cover roots with mulch or topsoil, and keep plants constantly watered until planted.

### 1.07 MAINTENANCE/WARRANTY

- A. Maintenance Requirements: Maintain the work of this Section throughout construction and for ninety days after 'substantial completion' and until final written acceptance by Owner. Notify the owner in writing of 'substantial completion'. Maintenance period begins after owner's written acceptance of 'substantial completion'.
- B. Maintenance Service: Perform the following maintenance operations at least once a week:
  - 1. Remove and replace dead plant material. Prune plants to remove dead wood and to maintain health of plants.

## SECTION 02900 – PLANTING

2. Maintain all mulched areas at a 2 in. depth. Remove weeds and grass from shrub and ground cover areas and from watering basins.
  3. Provide insect and disease control to maintain health of plants.
  4. Irrigation:
    - a) If the irrigation system is operating, program and monitor the system to provide adequate water for plants.
    - b) If the irrigation system is not operating, hand water plants. Deep water trees each week.
  5. Dispose of all maintenance debris/clippings off-site. Owner's dumpsters shall not be used.
  6. Keep all site areas tidy and free of grass clippings, mulch or other foreign materials.
  7. Submit dates, descriptions and receipts of all maintenance operations to SSP Design for approval.
- C. Warranty: Warranty shall cover all shrubs/groundcovers for a period of three months and trees/palms for a period of one year from the date of final acceptance. Any plant material deemed dead or unrecoverable by the owner shall be replaced with similar species and size within two weeks of notification from owner.

### 1.08 RIGHT OF REJECTION

- A. The Owner/SSP Design reserve the right to inspect and reject plants at any time and at any place.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Fertilizer: 13-13-13 Osmocote slow release fertilizer granules or approved equal.
- B. Planting tablets: Agraform 21 gram slow release fertilizer tablets or approved equal.
- C. Compost: Premium grade compost ('9 Kids Compost' or approved equal).
- D. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0; organic matter to exceed 1.5%, magnesium to exceed 100 units; phosphorus to exceed 150 units; potassium to exceed 120 units; soluble salts/conductivity not to exceed 900 ppm/0.9 mmhos/GC in soil.
- E. Sand: Clean, screened inorganic masonry sand. Silica sand only. River sand not acceptable. Mathis sand, Wright Materials, Plant 3 masonry sand (361) 387-0293 or approved equal
- F. Mulch:
  1. Shrub and Ground Cover Planting Areas: Grade A Shredded Hardwood; long, fibrous bark strands free from wood chips. Texas Natives or Approved Equal.
  2. Watering basins: Grade A Shredded Hardwood; long, fibrous bark strands free from wood chips. Texas Natives or Approved Equal.

## SECTION 02900 – PLANTING

### G. Plants:

1. General: Provide plant materials that are healthy and free from disease, insects, and larvae and without damage to bark, branches, and roots.
2. Approval: All plants must be approved by Owner/SSP Design prior to installation. Any plants not approved by Owner/SSP Design shall be subject to rejection. All trees/palms must be inspected, approved and tagged by Owner/SSP Design at their place of origin or as directed in writing by Owner/SSP Design. Container grown trees shall be obtained by Glen Flora Farms, Inc. or approved equal.
3. Sizes: Measured after pruning and in accordance with the plant schedule.
4. Root Treatment: As follows in accordance with the Reference Standards:
  - i. Palms: Balled and burlapped or containerized if they have been in the container for at least one growing season.
  - ii. Trees, Shrubs, Ground Cover Plants: Container grown with a well-established fibrous root system.
5. Palms: All new palms shall be field dug or containerized material in specified sizes shown in plant schedule. All palms shall have good form (straight trunks) consistent of its species, free of scars/abrasions/burn marks and disease and insects, with large healthy root systems. Rootballs sizes for B/B material must meet the following minimum specifications:
  - a) Sabal Palms - 44" diameter, 36" height
  - b) Washingtonia Palms - 44" diameter, 36" height
  - c) Cuban Royal Palms, Mediterranean Fan Palms, Cocos Palms - 30" diameter, 30" height

### H. Staking material:

1. Tree stakes shall be commercial grade T-Posts, 1.25 Gauge, 8' Ht., Green with orange safety caps on tops. Note: Do not drive through stakes through root balls.
2. Tree ties shall be Poly Chain Lock – 1" width, black, ProLock or approved equal
3. Palm stakes shall be treated timber braces, stakes, and battens including burlap protection and steel straps sized per palm planting detail. Ground stakes must be at least 48" in length with at least 42" securely embedded in undisturbed soil.

### I. Edging:

1. Concrete Edging: Extruded, colored, fibermesh reinforced concrete edging (per details)  
*Curb Appeal (or approved equal)*
2. Tree Rings: 4" Ht., 30" Dia., Black Anodized Aluminum tree rings.  
*Dreamscapes (or approved equal)*
3. Aluminum edging: 4" Ht., Black Anodized Aluminum Edging. *Dreamscapes (or approved equal)*

## 2.2 PLANTING SOILS

- A. Planting Mix: 75 percent sandy-loam topsoil; 25 percent premium compost; (3:1 ratio by volume); and specified fertilizer or planting tablets.
- B. Shrub and Ground Cover Areas:

## SECTION 02900 – PLANTING

1. Where no topsoil has been installed: Remove twelve inches of existing soil and replace with ten inches of 'Planting Mix' as described in Item A above.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verification of Conditions: Examine the site and conditions under which landscape work is to be performed. Have the installer notify the Contractor in writing, with a copy to SSP Design if the site is unsatisfactory. Do not begin the work until unsatisfactory conditions have been corrected in a manner acceptable to installer. Beginning of work indicates acceptance of the site as satisfactory by the installer.

#### 3.02 EXECUTION

- A. Site Preparation: Contractors must visit and review site prior to bidding. Compacted soils and sub-soils from construction activities must be ripped and tilled until a loose, friable and free-draining condition is met. All existing weeds, grass, stabilized sub-base material, rubble, excavated soil and other material shall be removed from the site and disposed of by the contractor prior to starting any new landscape work. Soil conditions around entire site must be approved by Owner/SSP Design prior to rough and finished grading operations. Contractor shall not install any fill or topsoil in landscape areas prior to site condition approval by Owner/SSP Design.
- B. Drainage: Landscape contractor shall follow grading as shown and specified on Civil Engineer's grading plans. Landscape contractor shall coordinate grading operations with site contractor. Landscape contractor shall ensure final grades conform to the Civil Engineer's grading plan including grades around building, swales, sidewalk under-drains/swales, roof drains, splash blocks and rock swales through planting beds.
- C. Vegetation Protection: Contractors are responsible for protection of existing vegetation labeled on plans "to remain". Protection of existing vegetation includes supply and installation of protective fencing around all existing planting areas.
- D. Bed Preparation and herbicide: All planting areas shall be free of weeds, grass, insects, or any other deleterious material prior to bed preparation. Contractor shall herbicide all planting areas with 'RoundUp' or approved equal at least two times prior to installation of any new plants. Pre-emergent herbicide shall be applied after planting and before placement of mulch.
- E. Planting Beds: Excavate 12" of existing soil within planting beds and replace with 8" of imported topsoil and 2" of premium compost. Mechanically till into top six inches of bed until a loose, friable soil condition is met. Final grades within all planting beds shall be 2-3" below adjacent curbs to allow for mulch. Contractor to ensure positive drainage throughout all landscape areas. Adjust grades as necessary to direct water away from planting beds. Report any discrepancies on all drainage issues in writing to Construction Manager or the Civil Engineer. Owner or SSP Design to approve planting beds prior to planting operations.

## SECTION 02900 – PLANTING

- F. Edging: Edging shall be installed as shown on plans. Edging shall allow for tapered drainage points to ensure free drainage away from all structures and walkways. Edging shall be set flush with adjacent paving, sidewalks or driveways.
- G. Grass Areas: Scarify, float and fine grade all areas to receive sod or hydromulch for approval by SSP prior to placement of sod or application of hydromulch. Supply additional topsoil as necessary to fill any/all low areas and ensure positive drainage away building / planting beds. (see specification on lawns for further requirements).
- H. Berms and Mounding: Supply topsoil and construct berms as indicated on plans. Berms shall have a maximum slope of 1:4. Owner or Construction manager to approve berming and mounding prior to planting operations.
- I. Planting:
  - 1. Installation:
    - a) Excavate planting pit and french drains to depth and width indicated on details in drawings.
    - b) Set root ball on undisturbed or compacted soil in planting pit. Remove burlap, rope, wire, and all other wrapping material from top of ball. Remove any binding rope which is not biodegradable completely. Top of root ball shall be set 1" above adjacent finished grade.
    - c) Fill planting pit 2/3 full with planting mix, soak with water and allow settling, and adding fertilizer tablets as detailed. Finish filling pit with planting mix and tamp lightly.
    - d) Construct a watering basin as detailed (or install aluminum edge tree ring) and install 2 in. layer of mulch. Water-in to completely saturate the root ball and planting mix. Add planting mix where any settling or air pockets occur.
    - e) Stake all trees/palms immediately after planting as detailed.
  - 2. Palms: New Washingtonia palms shall be cleaned (skinned) completely of their leafstem bases and fibers to a height 4 feet below the crown. Sabal palms shall be planted with their leafstem bases remaining but cleaned and trimmed evenly. All palms shall be planted with several petioles or fronds tied up straight with natural twine. Remaining fronds shall be trimmed or 'hurricane cut' to lighten wind load on terminal bud. Contractor is responsible for removing or cutting the twine supporting the fronds at the appropriate time. All palms must be inspected and approved on site by SSP Design prior to installation.
  - 3. Shrubs: All plants shall be of species denoted on plans and shall be container-grown material at specified sizes. All plants shall be of size equal or greater than T.A.N. standards for their respective container size. All material shall be vigorous, well established, of good form consistent of species, free of disease and insects, with large healthy root systems and with no evidence of being restricted or damaged. All plants shall be inspected and approved on site by SSP Design prior to installation.

## SECTION 02900 – PLANTING

4. Planting Holes: All tree/palm holes shall be excavated with a diameter at least two times the rootball size and to a depth equal to the height of the rootball. The bottoms and sides of each hole shall be scarified with a pick to allow for free drainage and maximum root penetration. After tree/palm placement, the hole shall be backfilled with a mixture of excavated soil and premium compost mixture (9 Kids Compost or approved equal). All holes shall be tested/inspected by SSP Design for free drainage prior to installation of trees.
  5. Tree Rings: Tree rings shall be installed on trees within grass areas as indicated on plans. Tree rings are to be aluminum edge or extruded concrete per plans and details. A minimum of 2 inches of specified mulch shall be placed within the tree rings. Tree rings must be maintained and kept free of weeds during the entire maintenance period.
  6. Watering Basins: Watering basins for all trees/palms that do not include an aluminum edge tree ring shall be constructed in a ring shape around each tree or palm trunk. This earthen berm shall be constructed 6” in height and 36” in diameter so as to hold water and allow infiltration around root ball. A minimum of 2 inches of specified mulch shall be placed within the watering basin. Watering basins must be maintained and kept free of weeds during the entire maintenance period.
- J. Insect and Disease Control: Apply treatment as frequently as required during construction and 90-day maintenance period to prevent damage to plant material. Use only chemicals specifically approved by TNRCC.
- K. Pruning: All existing and new vegetation shall be pruned/trimmed by a Certified I.S.A. Arborist as directed on site by SSP Design.

### 3.03 CLEANUP AND PROTECTION

- A. Remove debris from landscaped areas daily and sweep clean adjacent pavements, if soiled by landscape activities.
- B. Provide temporary barriers or fences as required to protect landscaping from damage or theft until final acceptance.

### 3.04 CLOSE-OUT DOCUMENTS

- A. As-Built Drawings: Submit ‘As-Built’ drawings before project close-out showing the landscape layout, including revised plant material, and other installation information.
- B. Warranty Letters: Submit warranty letters for trees / palms / lawns / shrubs / pavers / furniture / masonry / stone / amenities.

## END OF SECTION

## SECTION 02930 – LAWNS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes: The establishment of a complete and uniform lawn by sodding and/or hydromulching.
- B. Related Sections:
  - 1. Section 02810-Irrigation
  - 2. Section 02900-Planting

**NOTE: This project is an addition to an existing school with existing irrigation, lawns and landscape. Contractors shall protect existing irrigation, lawns, landscape, etc. Any damage whatsoever to existing irrigation, landscape or lawns shall be repaired and replaced at contractor's expense.**

#### 1.02 QUALIFICATIONS

- A. Lawn work to be performed by a single firm specializing in commercial landscape work with a minimum of five (5) years experience on similar type projects. Owner/SSP Design to review qualifications and approve subcontractor prior to commencing work.

#### 1.03 SUBMITTALS

- A. Submittals shall be formatted electronically in a pdf file with a table of contents and tabs identifying each section. The following submittals are required for this section:
  - 1. Product Data: Manufacturer's specifications and application instructions for fertilizer.
  - 2. Hydromulch mixes, percentages, lbs per acre, etc. for SSP review and approval before application.
  - 3. Samples: Topsoil, compost, silica/masonry sand for SSP review and approval before installation.
  - 4. Certificates: Inspection certificate from Texas Department of Agriculture indicating sod has been found free of diseases, insects and larvae.
  - 5. Certificates: Breakdown of seed types, percentages, and mixture composition.
  - 6. Sod Delivery Tickets: One per truckload indicating sod species, nursery certification, date and time of cutting.

#### 1.04 DELIVERY, STORAGE AND HANDLING

- A. Sod Delivery: Have sod delivered within forty-eight hours of cutting. Stack sod

## SECTION 02930 – LAWNS

with roots to roots, protected from exposure to elements during shipment.

- B. Storage: Lay sod as soon as practicable after delivery. If installation is delayed more than four hours, store sod under shade and keep constantly moist. Sod must be laid within forty-eight hours of cutting. Do not pile more than two foot depth of sod. Do not tear, stretch or drop sod. Do not allow soil to break free of turf roots.

### 1.05 PROJECT CONDITIONS

- A. Utility Construction: Do not lay sod or begin hydro-mulching until all underlying utility work is complete, trenches backfilled, compacted and graded, and topsoil placed and fine graded and sports fields laser leveled and approved by Owner/SSP.

### 1.06 MAINTENANCE/WARRANTY

- A. Maintenance Service: Maintain the work of this Section throughout construction until the Date of Substantial Completion and ninety (90) days thereafter until a complete and uniform lawn has been established and accepted by the Owner / SSP.
1. Establish hydro-mulched or sodded lawns per planting plans. Reapply hydro-mulch or re-sod as necessary until **full and uniform** coverage is obtained.
  2. Mow general lawn areas **at least once per week** to maintain height of grass at 2 inches or as directed by Owner/SSP. Mowing of general lawn areas may be carried out using standard rotary type mowing equipment.
  3. Mow Sports Fields **at least twice per week** to maintain an initial height of 2” for the establishment period then begin lowering the height over the next 90-days to achieve a final height of one inch. Mowing of Sports Field areas shall be carried out using reel type mowers only. Rotary mowers will not be accepted for Sports Field maintenance.
  4. Trim/edge all lawn areas adjacent to watering basins, pavements, driveways, walls, structures, curbs, planting beds, edges and islands.
  5. Provide insect and disease control to maintain health of grass.
  6. Apply pre and post emergent herbicides as required or directed to control weed growth throughout the establishment and maintenance periods.
  7. Fertilize general lawn areas (minimum two applications) with balanced commercial grade lawn fertilizer until complete and uniform coverage is obtained.
  8. Fertilize Sports Field areas (minimum four applications) using a high nitrogen formula such as HJ 25-0-0 with Wolftrax or Scotts Sierrablen 27+5+5+Fe or Scotts Fairwaymaster 20+5+8 or approved equal.

Note: Submit fertilizer type for SSP review and approval prior to application. Depending on time of year, SSP may require a fertilizer that includes pre or post emergent herbicide.

## SECTION 02930 – LAWNS

9. Verti-cut or de-thatch Sports Field turf at least one time during the maintenance period.
10. Apply top dressing (clean inorganic sand) to level any divots, depressions or low spots during the maintenance period.
11. Irrigation:
  - a) If the irrigation system is operating, program and monitor the system to provide adequate water for grass.
  - b) If the irrigation system is not operating, hand water grass.
12. Submit receipts/dates of all maintenance operations to SSP Design for approval.
  - B. Warranty: Warranty shall cover all lawn grasses for a period of three months from the date of final acceptance. Final acceptance will not be approved until full and uniform lawns are completely established and proof of all fertilizations including receipts have been reviewed and accepted.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0; organic matter to exceed 1.5%, magnesium to exceed 100 units; phosphorus to exceed 150 units; potassium to exceed 120 units; soluble salts/conductivity not to exceed 900 ppm/0.9 mmhos/cm in soil.
- B. Sand: For athletic/sports fields. Silica sand, clean, screened and free of debris. (Mathis Sand, Wright Materials Plant-3, Tel. (361) 387-0293 or approved equal).
- C. Sod: (See schedule for type). Provide premium #1 certified sod grown in a sod nursery on sandy soil, at least 1 yr. old with a heavy top and a strong, well-knit root system, and not more than five percent weeds or foreign grasses.
- D. Hydromulch Material. Material for hydraulic mulching shall consist of virgin wood fibers manufactured expressly from clean whole wood chips. The chips shall be processed in such a manner as to contain no growth or germination inhibiting factors. Fiber shall not be produced from recycled materials such as sawdust, paper, cardboard, or residue from pulp and pure plants. The wood cellulose fiber mulch shall be dyed green to aid in visual metering during application. The dye shall be biodegradable and not inhibit plant growth. The wood cellulose fibers of the mulch must maintain uniform suspension in water under agitation. Upon application, the moist material shall form a blotter-like mat covering the ground. This mat shall have the characteristics of moisture absorption, percolation, and shall cover and hold seed in contact with the soil. The Contractor shall obtain certifications from suppliers that laboratory, field-testing of their product has been accomplished, and that it meets all of the foregoing requirements pertaining to wood cellulose fiber mulch. Terra-Mulch Terra-Blend with UltraGro or approved equal.

## SECTION 02930 – LAWNS

- E. Fertilizer: Starter fertilizer (BCF 15-15-15) shall be used in hydro-mulch mix. The Contractor shall provide a Soil Analysis Report and shall use report to determine quantity and ratio of fertilizer for sustained growth of grass.
- F. Soil and Mulch Tackifier: Tackifier used with mulch shall be organic. Tackifier shall be mixed and applied with the hydromulch at an appropriate rate to stabilize soils and minimize erosion. Tackifier shall be pH stable with fertilizer and shall hydrate and disperse in mixing tank with water and other materials to form homogeneous slurry. Tackifier shall leave loose, chain-like stabilizing film on surface of soil, allow moisture to percolate into soil during seed germination and seedling growth, and break itself down through microbial action. Tackifier shall not inhibit plant germination or growth.
  - 1. Organic Tackifier. Organic tackifier shall be, starch-based tackifier formulated for use with conventional mulches. Active ingredient in tackifier shall be 100 percent derived from plant starch.
  - 2. Dry powder tackifier shall be blended with insolubilizer. After blending and mixing with water, tackifier shall swell, become sticky, and be suitable for use during heavy rain. Tackifier shall be applied at rate of 80 pounds per acre. Emulsion shall cure on surface of soil and become insoluble. Tackifier shall not inhibit plant germination or growth.
- G. Fertilizer: 12-4-8 (N-P-K), formulated for slow-release Nitrogen.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verification of Conditions: Examine the site and conditions under which this work is to be performed. Have the installer notify the Contractor in writing, with a copy to SSP Design, if the site is unsatisfactory. Do not begin the work until unsatisfactory conditions have been corrected in a manner acceptable to installer. Beginning of work indicates acceptance of the site as satisfactory by the installer.

#### 3.02 PREPARATION

- A. Topsoil: Refer to Section 02900 'Landscaping' for topsoil amendment.
- B. Site Preparation: Contractors must visit and review site prior to bidding. Compacted soils and sub-soils from construction activities must be ripped and tilled until a loose, friable and free-draining condition is met. All existing weeds, grass, stabilized sub-base material, rubble, excavated soil and other material shall be removed from the site and disposed of by the contractor prior to starting any new landscape work. Soil conditions around entire site must be approved by SSP Design prior to rough and finished grading operations. Contractor shall not install any fill or topsoil in landscape areas prior to site condition approval by SSP Design.

## SECTION 02930 – LAWNS

### 3.03 INSTALLATION – HYDROMULCH

- A. All exterior ground within the limit of contract or any other areas site areas disturbed by construction for egress, laydown areas, storage areas, staging areas, etc. shall be hydromulched or planted as shown on drawings. Furnish topsoil, finish grading, hydromulch and maintain areas as indicated on the drawings.
- B. Lawn Area Preparations - Grade areas to finish grades, filling as needed or removing surplus material. Float all lawn areas to a smooth, uniform grade as indicated on engineers grading plans. All lawn areas shall slope to drain away from structures and planting beds. Where no grades are shown, areas shall have a smooth and continual grade between existing or fixed controls (such as walks, curbs, catch basin, elevational steps or structures) and elevations shown on plans. Contractor to ensure proper drainage around all structures. Adjust grades as necessary to direct water away from structures and planting beds. Report any discrepancies on all drainage issues in writing to SSP Design or the project engineer.
- C. Roll, scarify, rake and level as necessary to obtain true, even lawn surfaces. All finish grades shall meet approval of the SSP, before seeding/hydromulching operations. Loosen soil to a depth of three inches (3") in lawn areas by approved method of scarification and grade to remove edges and depressions. Remove stones or foreign matter over one half inch (1/2") in diameter from the top two inches (2") of soil. Float lawn areas to finish grades as shown on civil plans.
- D. Lawn areas should be permitted to settle or should be firmed by rolling before seeding/hydromulching.
- E. Hydromulching shall not be performed in windy weather.
- F. Lawn areas shall be seeded by hydro-mulching evenly with an approved mechanical hydro-mulcher. Hydromulch mixture shall include a minimum of 3 lbs. seed, 45-50 lbs. of wood fiber mulch, 20 lbs. of fertilizer, and tackifier per 1000 sq. ft. Contractor shall add fresh annual rye grass seed if hydromulching between the months of November to April. In areas inaccessible to hydro-mulching equipment, the seeded ground shall be lightly raked with flexible rakes and rolled with a water ballast roller. After rolling, seeded areas are to be lightly mulched with wheat straw or approved erosion control material.
- G. Lawns shall be maintained by the Contractor for at least 90 days after substantial completion or as long as necessary to establish a uniform stand of the specified grasses, or until final acceptance of lawns, whichever is later.
- H. Water seeded/hydromulched areas twice the first week to a minimum depth of six inches (6") with a fine spray and once per week thereafter as necessary to supplement natural rain to the equivalent of one inch (1") or to a six-inch (6") depth.

## SECTION 02930 – LAWNS

- I. The surface layer of soil for seeded/hydromulched areas must be kept moist during the germination period. After first cutting, water as specified above.
- J. Make weekly inspections to determine the moisture content of the soil and adjust the watering schedule established by the irrigation system installer to fit conditions
- K. After grass growth has started, all areas or parts of areas, which fail to show a uniform stand of grass for any reason whatsoever shall be reseeded/hydromulched in accordance with the plans and as specified herein. Such areas and parts of areas shall be reseeded, hydromulched or sodded repeatedly until all area are covered with a satisfactory growth of grass at no additional cost to the Owner.
- L. Watering shall be done in such a manner and as frequently as is deemed necessary by SSP to assure continued growth of healthy grass. All areas of the site shall be watered in such a way as to prevent erosion due to excessive quantities applied over small areas and to avoid damage to the finished surface due to the watering equipment.
- M. Water for the execution and maintenance of this work shall be provided by the Owner at no expense to the Contractor. The Contractor shall, however, furnish his own portable tanks, pumps, hose, pipe, connections, nozzles, and any other equipment required to transport the water from the available outlets and apply it to the seeded area in an approved manner.
- N. Mowing of the seeded, hydromulched or sodded areas shall be initiated when the grass has attained a height of one and one-half to two inches (1-1/2" to 2"). Grass height shall be maintained between one and one-half inches (1' to 1½") at subsequent cutting depending on the time of year. Not more than one third (1/3) of the grass leaf shall be removed at any cutting and cutting shall not occur more than seven (7) days apart. Mowing of these general site areas can be completed using a rotary type mower. Sports and athletic fields shall be mowed at a height of one inch (1") and may require mowing more than once per week during the growing season and must be accomplished utilizing a reel type mower. Rotary mowers will not be accepted for cutting grass on sports and athletic fields.
- O. When the amount of grass is heavy, it shall be removed to prevent destruction of the underlying turf. If weeds or other undesirable vegetation threaten to smother the planted species, such vegetation shall be mowed or, in the case of rank growths, shall be uprooted, raked and removed from the area by methods approved by the SSP.
- P. Protect seeded/hydromulched areas against trespassing while the grass is germinating. Furnish and install fences, signs, barriers or any other necessary temporary protective devices. Damage resulting from trespass, erosion, washout, settlement or other causes shall be repaired by the Contractor at their expense.

## SECTION 02930 – LAWNS

- Q. Remove all fences, signs, barriers or other temporary protective devices after final acceptable.

### 3.04 INSTALLATION – SOD

- A. Sod shall be installed to all areas as indicated on plans.
- B. Sod Bed Preparation - Grade areas to finish grade, filling as needed or removing surplus dirt, stone, debris, etc. and floating areas to a smooth, uniform grade as indicated on grading plans. All lawn areas are to slope to drain.
- C. Sod shall be laid within 24 hrs of being cut. Only healthy vigorous growing sod is to be laid.
- D. Always lay sod across slope and tightly together so as to make a solid area.
- E. Roll all new sod with a 1 ton mechanical vibratory roller sufficiently to set or press sod into underlying soil and to level all seams and joints.
- F. Contractor to fill any gaps or seams in the sodded areas using clean top dressing sand.
- G. After sodding has been completed, clean up and thoroughly moisten by sprinkler newly sodded areas.

### 3.05 FERTILIZING – GRASS

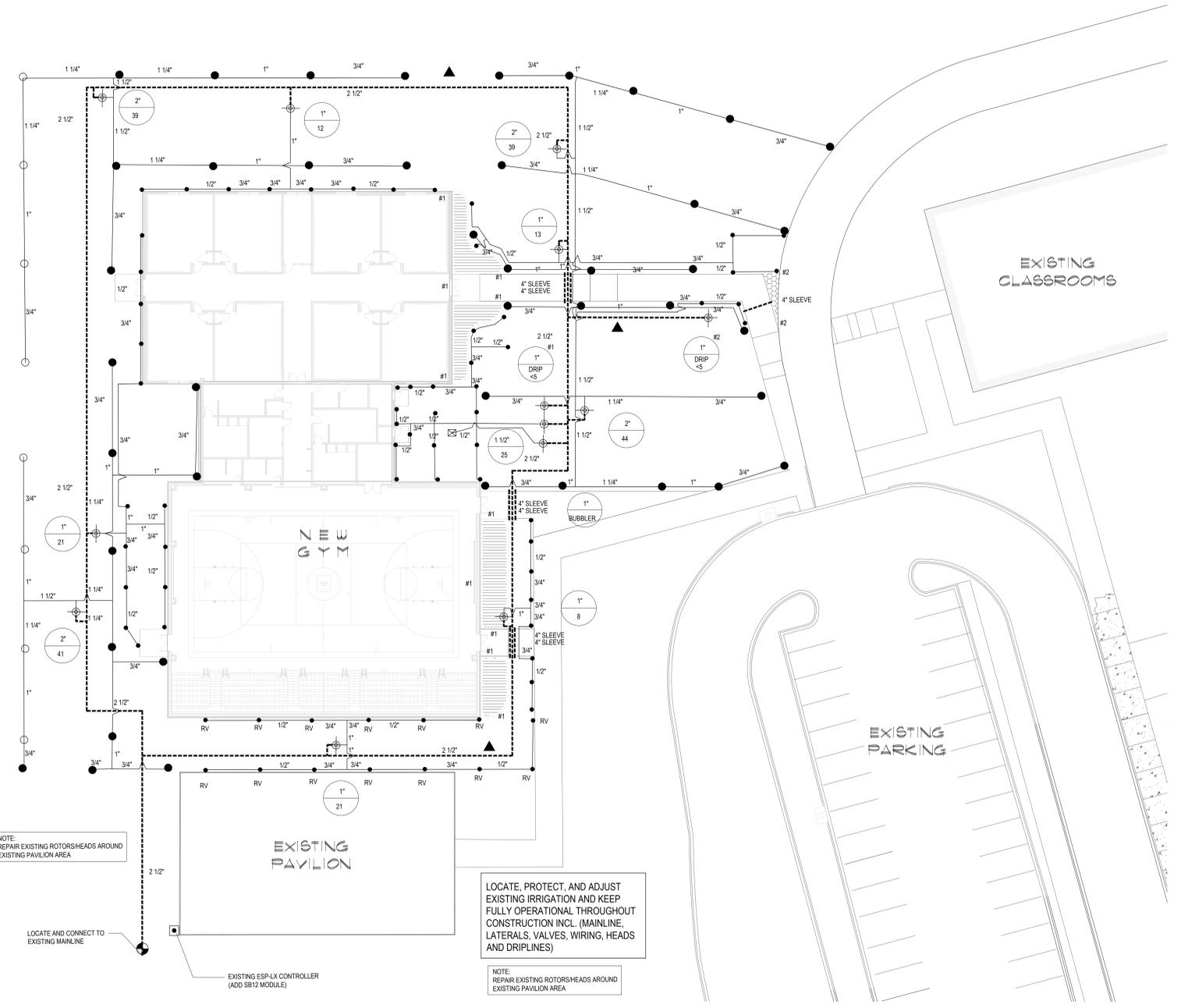
- A. General lawn areas shall have fertilizer applied in two (2) applications with a thorough watering immediately following each application. The first application shall be one (1) week after the hydro-seeding using a 'starter fertilizer' at manufacturer's recommended rates. The second application shall be done after 30-60 days with an approved turf builder fertilizer at manufacturer's recommended rates and as approved by SSP.
- B. Sports Field areas shall have a minimum of four (4) applications with a thorough watering immediately following each application. The first application shall be one (1) week after the hydro-seeding using a 'starter fertilizer' at manufacturer's recommended rates. Subsequent applications shall be done after 30 days, 60 days and 90 days with a balanced or higher nitrogen fertilizer at manufacturer's recommended rates and as approved by SSP.
- C. Soil analysis and time of year shall be considered with SSP to determine fertilizer type, composition and final application rates. Submit fertilizer type and analysis to SSP for approval before any application. Document fertilizer application with photos and receipts of fertilizer purchases.

## SECTION 02930 – LAWNS

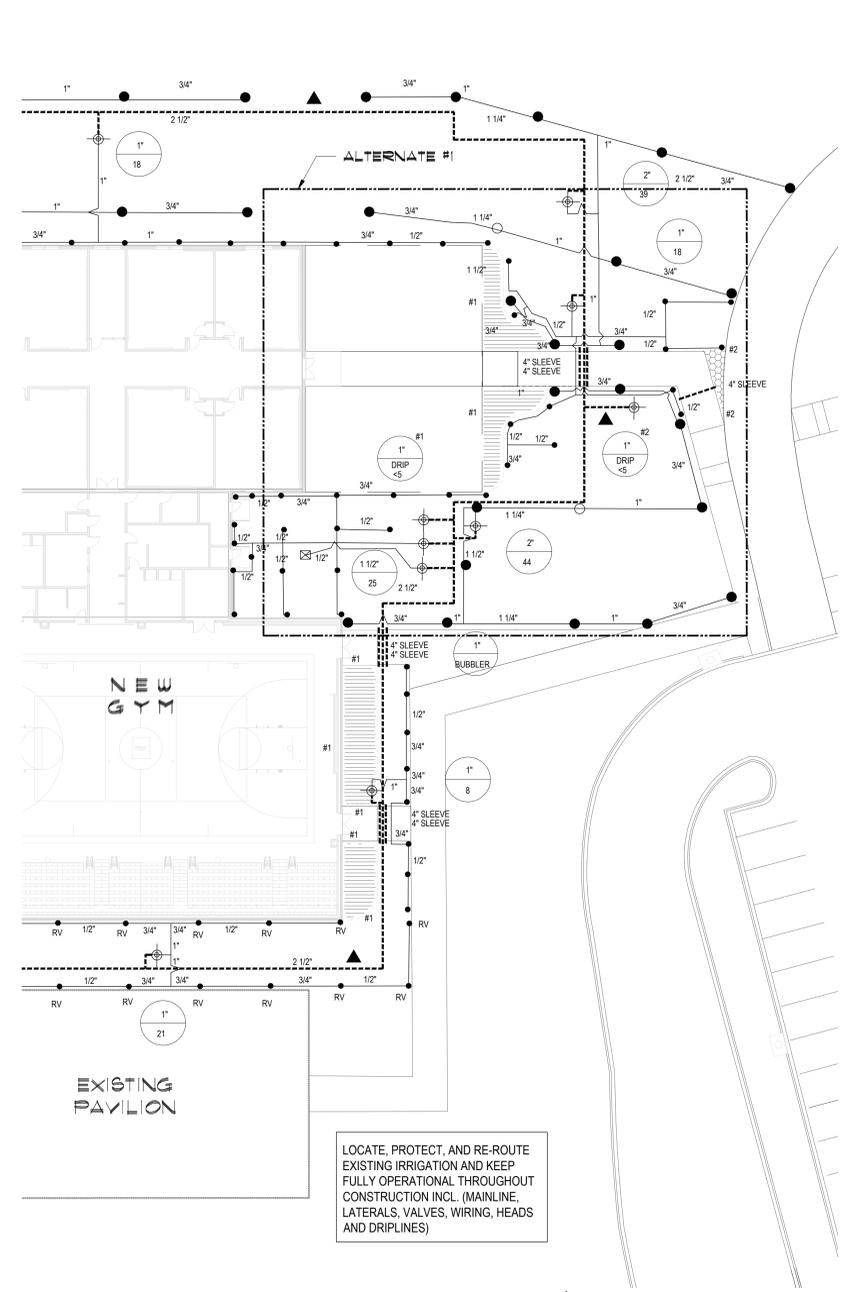
### 3.06 CLEANUP AND PROTECTION

- A. Remove debris from landscaped areas daily and sweep clean adjacent pavements, if soiled by landscape activities.
- B. Protect lawns from damage, theft or vandalism until final acceptance. Install stakes and flagging or temporary fencing if required to keep traffic off newly established lawn areas until final acceptance.

END OF SECTION



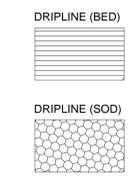
**1 IRRIGATION PLAN - BASE BID**  
 SCALE: 1"=20'-0"



**2 IRRIGATION PLAN - ALTERNATE # 1**  
 SCALE: 1"=20'-0"

**IRRIGATION LEGEND**

- RV RAINBIRD R-VAN SERIES ROTARY NOZZLE
- ⊠ RAINBIRD 1404 BUBBLER HEAD
- RAINBIRD 5000 PC - ROTORS
- RAINBIRD 5000 FC - ROTORS
- ▲ RAINBIRD QUICK COUPLER VALVE (33-DLRC)  
 QUICK COUPLERS SHALL BE CONNECTED TO MAINLINE  
 ADD ONE ZONE THAT ACTIVATES MASTER VALVE  
 AND ACTIVATES THE QUICK COUPLERS, LABEL ON  
 COLORED ZONING DIAGRAM
- ⊕ RAINBIRD PEB SERIES ELECTRIC VALVE
- CONTROLLER ESP-LX (ADD SB12 MODULE)
- WATER METER (EXISTING)
- ⊠ BACKFLOW PREVENTER (EXISTING)
- CLASS 200 PVC LATERAL PIPING
- CLASS 200 PVC MAINLINE
- SCH. 40 PVC SLEEVING (AS SIZED)
- VALVE SIZE
- GPM



**RAINBIRD DRIPLINE XFS**  
 (18" LATERAL SPACING, 12" EMITTER SPACING)  
 XF SERIES TIE DOWN STAKES (TDS-050) @ 36" O.C. & TWO ON EACH  
 TEE/ELBOW PVC LATERAL PIPING SIZED AS REQUIRED  
 RAINBIRD DRIP CONTROL ZONE KIT XCZ-100-PRB-COM (EACH DRIP ZONE)  
 1" BALL VALVE WITH REGULATED PRESSURE AND 200 MESH FILTRATION  
 (1) DRIP SYSTEM OPERATION INDICATOR (OPERIND) PER IRRIGATION ZONE  
 ALL VALVE BOXES SHALL BE RAINBIRD VB-STD OR APPROVED EQUAL  
 ALL VALVE BOXES SHALL HAVE FILTER FABRIC AND 4" OF GRAVEL AT BASE  
 INSTALL ALL EQUIPMENT ACCORDING TO  
 MANUFACTURERS SPECIFICATIONS

**NOTE:**

Irrigation Contractor to coordinate with Landscape Contractor on layout of all beds. Adjust drip line location per installed edging.

**BUBBLER PIPING CHART**

NUMBER OF BUBBLERS	SIZE OF PIPE
1 - 5	3/4"
6 - 10	1"
11 - 20	1 1/4"
21 - 30	1 1/2"
31 - 40	1 3/4"

**SLEEVING NOTES:**

- Irrigation Contractor shall supply and install sleeves and conduits at twenty-four (24") inches below finish grade of the top of pavement. Bore as required.
- Irrigation Contractor shall extend sleeves one (1') foot beyond edge of all pavement.
- Irrigation Contractor shall cap pipe ends using PVC caps.
- All sleeves shall be Schedule 40 PVC pipe.



1150 poroles line rd.  
Brownsville  
Texas 78526  
(956) 546-0110  
fax (956) 546-0196

IDEA PUBLIC SCHOOLS  
IDEA - MISSION GYMNASIUM  
MISSION, TEXAS



7/11/19  
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Gomez Mendez Sants Inc.  
Architects-Planners  
Interior Designers

Date: July 2019  
Scale: As Noted  
Project Architect: R. Gomez, AIA  
Drawn By: Rn  
Job No: IDEA Mission Gym  
Sheet: L1.02

**IRRIGATION LEGEND**

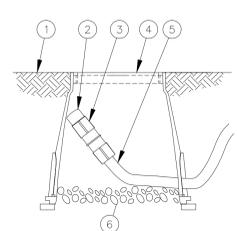
- RV RAINBIRD R-VAN SERIES ROTARY NOZZLE
- ⊗ RAINBIRD 1404 BUBBLER HEAD
- RAINBIRD 5000 PC - ROTORS
- RAINBIRD 5000 FC - ROTORS
- ▲ RAINBIRD QUICK COUPLER VALVE (33-DLRC) QUICK COUPLERS SHALL BE CONNECTED TO MAINLINE ADD ONE ZONE THAT ACTIVATES MASTER VALVE AND ACTIVATES THE QUICK COUPLERS, LABEL ON COLORED ZONING DIAGRAM
- ⊕ RAINBIRD PEB SERIES ELECTRIC VALVE
- CONTROLLER ESP-LX (ADD SB12 MODULE)
- WATER METER (EXISTING)
- ⊕ BACKFLOW PREVENTER (EXISTING)
- CLASS 200 PVC LATERAL PIPING
- CLASS 200 PVC MAINLINE
- SCH. 40 PVC SLEEVING (AS SIZED)
- VALVE SIZE
- GPM
- DRIPLINE (BED)**
- RAINBIRD DRIP XFS-P (.049" THICKNESS) SUBSURFACE DRIPLINE WITH COPPER SHIELD (18" LATERAL SPACING, 12" EMITTER SPACING) ALL DRIPLINE TO BE BURIED 2" DEPTH MIN. 6" SOIL STAPLE (TDS-050 BEND) @ 36" O.C. & TWO ON EACH TEE/ELBOW
- PVC LATERAL PIPING SIZED AS REQUIRED
- DRIPLINE (SOD)**
- RAINBIRD DRIP CONTROL ZONE KIT XCZ-100-PRB-R-COM (EACH DRIP ZONE)
- 1" BALL VALVE WITH REGULATED PRESSURE AND 200 MESH FILTRATION (75 MICRON SS)
- INSTALL ALL EQUIPMENT ACCORDING TO MANUFACTURERS SPECIFICATIONS OR APPROVED EQUAL
- \* DRIP SYSTEM OPERATION INDICATOR (OPERIND) PER DRIP IRRIGATION ZONE

DESIGN PRESSURE 60 PSI  
ELECTRICAL SPLICES AT EACH VALVE AND CONTROLLER ONLY.

IRRIGATION IN TEXAS IS REGULATED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) MC-178/ P.O. BOX 13087, AUSTIN, TX 78711-3087. TCEQ'S WEBSITE IS: www.tceq.state.tx.us

**BUBBLER PIPING CHART**

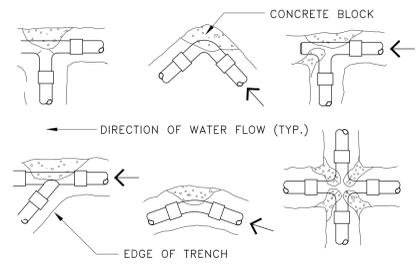
NUMBER OF BUBBLERS	SIZE OF PIPE
1 - 5	3/2"
6 - 10	3/4"
11 - 20	1"
21 - 30	1 1/4"
31 - 40	1 1/2"



- 1 FINISH GRADE
- 2 FLUSH CAP FOR EASY FIT CORVERSION FITTINGS:  
POTABLE: RAIN BIRD MDCFCAP  
NON-POTABLE: RAIN BIRD MDCFCAP
- 3 EASY FIT COUPLING:  
RAIN BIRD MDCFCOUP
- 4 SUBTERRANEAN EMITTER BOX:  
RAIN BIRD SEB 7X8
- 5 SUB-SURFACE DRIPLINE:  
RAIN BIRD XF SERIES DRIPLINE  
POTABLE: XFS DRIPLINE  
NON-POTABLE: XFS DRIPLINE
- 6 3-INCH MINIMUM DEPTH OF 3/4-INCH WASHED GRAVEL WITH FILTER FABRIC AT BASE

NOTE:  
1. ALLOW A MINIMUM OF 6-INCHES OF DRIPLINE TUBING IN VALVE BOX IN ORDER TO DIRECT FLUSHED WATER OUTSIDE VALVE BOX.

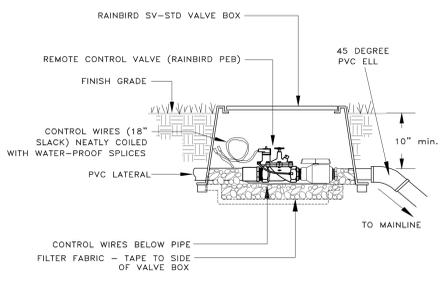
**1 DRIPLINE**  
NOT TO SCALE



**2 THRUST BLOCK DETAIL**  
NOT TO SCALE

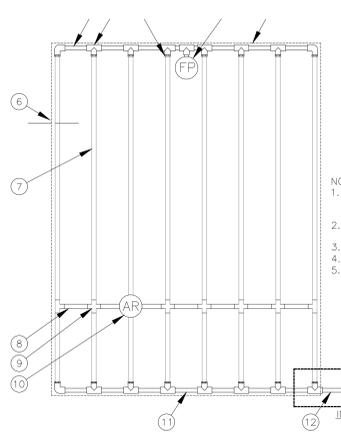
**IRRIGATION NOTES**

1. All equipment numbers reference Rainbird equipment catalog unless otherwise indicated.
2. LAWN SPRAY HEADS are RVAN installed as per detail.
3. SHRUB SPRAY HEADS are RVAN installed as per detail.
4. ELECTRIC CONTROL VALVES shall be PEB installed as per detail shown. Size valves as shown on plans. Valves shall be installed in valve boxes large enough to permit manual operation, removal of solenoid and/or valve cover without any earth excavation. (Refer to Specifications)
5. AUTOMATIC CONTROLLER shall be installed at location shown. Power (120V) shall be located in a junction box within five feet (5') of controller location. Power supply and junction box to be provided by General Contractor.
6. All 24 volt valve wiring is to be UF 14 single conductor. All wire splices are to be permanent and waterproof. (Refer to Specifications)
7. SLEEVES shall be supplied and installed by Irrigation Contractor. Sleeve material shall be Schedule 40. Bore under paving shall have a minimum of 18 inches of cover. (Refer to Specifications).
8. Ten days prior to start of construction, contractor shall verify static water pressure. If static pressure is less than 50 PSI, do not start work until notified to do so by SSP Design.
9. All mainline and lateral piping shall have a minimum of 12 inches of cover. All piping under paving shall have a minimum of 18 inches of cover. (Refer to Specifications).
10. The irrigation contractor shall coordinate installation of the system with the landscape contractor so that all plant material will be watered in accordance with the intent of the plans and specifications.
11. The irrigation contractor shall select the proper arc and radius for each nozzle to insure 100% and proper coverage of all lawn areas and plant material. All nozzles in parking lots and planting beds shall be low angle to minimize overspray on pavement surfaces. No water will be allowed to spray on building.
12. The irrigation contractor shall warranty all system components for a period of one year plus 20 days. (Refer to Specifications).
13. See specifications for further instructions and project requirements. Contractor shall follow specification section 328000 - Site Irrigation for any discrepancies between plans and specifications.



ALL VALVE BOXES SHALL HAVE FILTER FABRIC AND 4" OF GRAVEL AT BASE

**3 REMOTE CONTROL VALVE**  
NOT TO SCALE

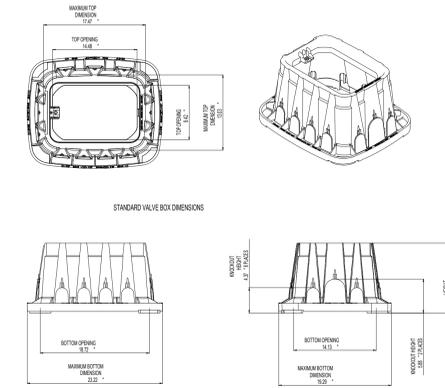


- NOTES:
1. DISTANCE BETWEEN LATERAL ROWS AND EMITTER SPACING TO BE BASED ON SOIL TYPE, PLANT MATERIALS AND CHANGES IN ELEVATION. SEE RAIN BIRD XFS DRIPLINE INSTALLATION GUIDE FOR SUGGESTED SPACINGS.
  2. LENGTH OF LONGEST DRIPLINE LATERAL SHOULD NOT EXCEED THE MAXIMUM LENGTH SHOWN IN THE ACCOMPANYING TABLE.
  3. AIR RELIEF VALVE TO BE INSTALLED AT HIGH POINT OF AREA.
  4. BURY DRIP LINE MIN. 1" BELOW SOIL LEVEL THAN ADD 2" MULCH.
  5. WHEN USING 1/2" INSERT FITTINGS WITH DESIGN PRESSURE OVER 50PSI, IT IS RECOMMENDED THAT STAINLESS STEEL CLARVS BE INSTALLED ON EACH FITTING

**XFS Dripline Maximum Lateral Lengths (Feet)**

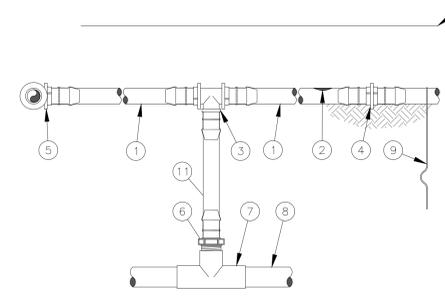
Inlet Pressure psi	12" Spacing		18" Spacing		24" Spacing	
	Nominal Flow (GPH)					
15	255	194	357	273	448	343
20	291	220	408	313	514	394
30	350	266	494	378	622	478
40	396	302	560	428	705	541
50	434	333	614	470	775	594

**4 XFS SUB-SURFACE DRIPLINE**  
END FEED LAYOUT INST. N.T.S.



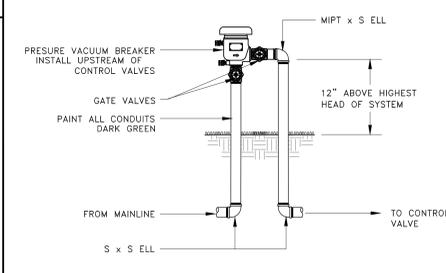
ALL VALVE BOXES SHALL BE RAINBIRD VB-STD OR APPROVED EQUAL  
ALL VALVE BOXES SHALL HAVE FILTER FABRIC AND 4" OF GRAVEL AT BASE

**5 VALVE BOX (VB-STD)**  
NOT TO SCALE

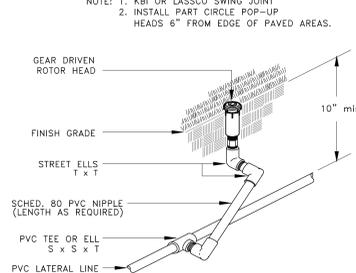


- NOTES:
1. PLACE TIE DOWN STAKES EVERY THREE FEET IN SAND, FOUR FEET IN LOAM, AND FIVE FEET IN CLAY.
  2. AT FITTINGS WHERE THERE IS A CHANGE OF DIRECTION SUCH AS TEES OR ELBOWS, USE TIE-DOWN STAKES ON EACH LEG OF THE CHANGE OF DIRECTION.
  3. SAVE YOUR HANDS. USE THE RAIN BIRD FITTINGS-TOOL XF INSERTION TOOL FOR FITTING ASSEMBLY.

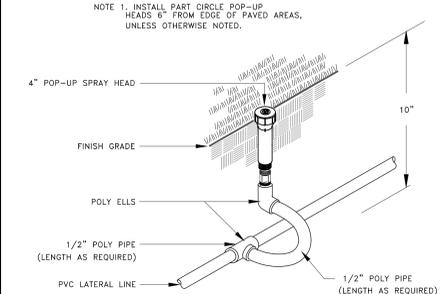
**6 IRRIGATION SYSTEMS**  
SUB-HEADER INST. N.T.S.



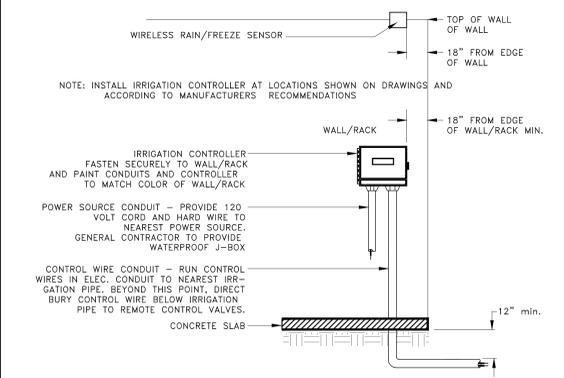
**7 PRESSURE VACUUM BREAKER**  
NOT TO SCALE



**8 ROTOR POP-UP**  
NOT TO SCALE



**9 LAWN POP-UP HEAD**  
NOT TO SCALE



**10 WALL/RACK MOUNTED CONTROLLER**  
NOT TO SCALE



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LANDSCAPE DESIGN  
180 E. AUSTIN ST.  
BROWNSVILLE, TX 78520  
TX (956) 541-4388  
TX (956) 541-9875  
www.sspdesign.com



**PLANT SCHEDULE - BASE BID**

CODE	BOTANICAL NAME	COMMON NAME	TYPE	SIZE	SPACING	QTY
CABB	SABAL PALMETTO	FLORIDA SABAL PALM	B/B	18-20" TRUNK	A.S.	2
SABL	SABAL TEXANA	TEXAS SABAL PALM	B/B	6-8" TRUNK	A.S.	6
TREES						
CEDR	ULMUS CRASSIFOLIA	CEDAR ELM (CONT. GROWN)	24" BOX	2-3" CAL. 10' H X 6" W	A.S.	3
LAUR	SOPHORA SECUNDIFLORA	MOUNTAIN LAUREL (CONT. GRN)	24" BOX	MULTI-TRUNK - 6'-10" HT	A.S.	4
LIVE	QUERCUS VIRGINIANA	LIVE OAK (CONT. GROWN)	24" BOX	3-4" CAL. 10' HT X 8" W	A.S.	1
BYCA	PLATANUS MEXICANA	MEXICAN SYCAMORE	B/B	3" CAL. - 10' H X 6" W	A.S.	2
SHRUBS						
CABB	CAEBALPINIA FULCHERRIMA	PRIDE OF BARBADOES	5 GAL	36" HT-BUSHY	A.S.	2
WEDL	WEDDELIA TRILOBATA	WEDDELIA	4" POTS		12" O.C.	300
WOOV	STEMODIA LANATA	WOOLY STEMODIA	4" POTS		12" O.C.	375
GRASS						
BOD	CYNODON DACTYLON	#1 CERTIFIED 418 HYBRID BERMUDA BOD				1800 S.F.
HYDRO	CYNODON DACTYLON	COMMON BERMUDA HYDROMULCH				2100 S.F.

NOTE: CONTAINER GROWN MATERIAL SHALL BE GLEN FLORA FARMS OR APPROVED EQUAL.

**MATERIAL SCHEDULE - BASE BID**

DESCRIPTION	NOTES	QUANTITY
PREMIUM COMPOST	2" LAYER PREMIUM COMPOST (5 KIDS COMPOST MIX #)	7 CY.
SCREENED TOP SOIL	8" FOR ALL PLANTING BEDS	78 CY.
MULCH (HARDWOOD)	2" MIN. FOR ALL PLANTING BEDS AND WATERING BASINS (TEXAS NATIVES HARDWOOD)	110 (2 OF BAGS)
HERBICIDE	ALL PLANTING BED AREAS AS SPECIFIED	175 S.F.
FERTILIZER	ALL PLANT MATERIAL PER DETAILS	175 S.F.
PLANTING TABLETS	PER DETAILS / AS SPECIFIED	-
PRE-EMERGENT	ALL PLANTING BED AREAS AS SPECIFIED	-
GUYING / STAKING	ALL TREES/PALMS PER DETAILS	-
CONCRETE EDGE	4 X 6" EXTRUDED COLORED CONCRETE EDGING PER PLANS/DETAILS	160 L.F.
TREE RINGS	(36" DIA.) 4x6" EXTRUDED COLORED CONCRETE EDGING PER PLANS/DETAILS	6
IRRIGATION SYSTEM	CORVLETE AUTOMATIC IRRIGATION SYSTEM/ADJUSTMENTS BY LICENSED CONTR.	-

NOTE: CONTRACTORS MUST REVIEW TECHNICAL SPECIFICATIONS FOR ADDITIONAL PRODUCT INFORMATION AND PROJECT REQUIREMENTS.  
\* NINE KIDS COMPOST (565) 432-4993 OR CITY OF McALLEN COMPOST (565) 681-4000

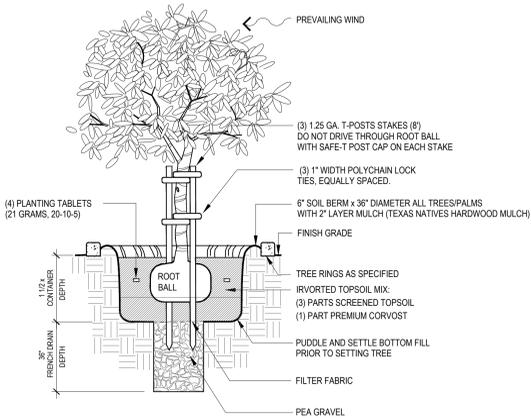
**PLANT SCHEDULE - ALTERNATE #1**

CODE	BOTANICAL NAME	COMMON NAME	TYPE	SIZE	SPACING	QTY
PALMS						
SABL	SABAL TEXANA	TEXAS SABAL PALM (CREDIT)	B/B	6-8" TRUNK	A.S.	4 CR.
GRASS						
HYDRO	CYNODON DACTYLON	COMMON BERMUDA HYDROMULCH (CREDIT)				2,840 S.F. CR.

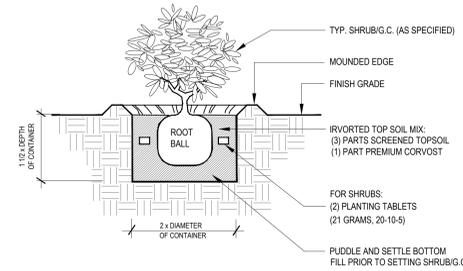
NOTE: CONTAINER GROWN MATERIAL SHALL BE GLEN FLORA FARMS OR APPROVED EQUAL.

**LANDSCAPE CONSTRUCTION NOTES**

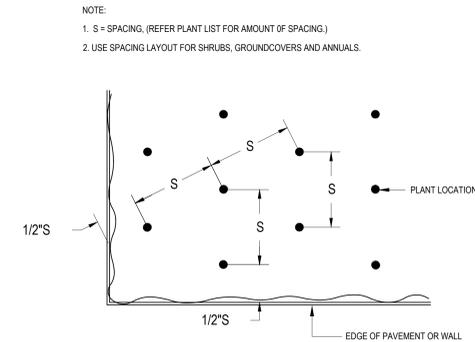
1. WORK UNDER THIS CONTRACT INCLUDES SITE REVIEW AND COORDINATION WITH EXISTING CONDITIONS, SITE CLEANUP, EXCAVATION, BED PREP, TILLING, EDGING, SPORTS FIELD, LASER GRADING, PLANTING, STAKING, MAINTENANCE, AND GUARANTEE.
2. LANDSCAPE CONTRACTOR SHALL FIELD VERIFY ALL QUANTITIES AND DIMENSIONS PRIOR TO BIDDING. QUANTITIES SHOWN IN SCHEDULE ARE FOR CONVENIENCE ONLY.
3. NOTIFY S&P DESIGN PRIOR TO BID OF ANY DISCREPANCIES IN DRAWINGS/DETAILS OR INSUFFICIENT QUANTITIES DUE TO DIFFERENCES IN PLAN AND ACTUAL FIELD CONDITIONS.
4. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITIES. SPOTTING OF ALL UTILITIES IS REQUIRED.
5. NOTIFY AND MEET WITH S&P DESIGN PRIOR TO ANY CONSTRUCTION FOR VERIFICATION/INTERPRETATION OF PLANS.
6. LANDSCAPE CONTRACTOR SHALL VERIFY ALL PROPERTY BOUNDARIES AND LIMITS OF WORK WITH GENERAL CONTRACTOR/CIVIL ENGINEER. DO NOT BEGIN LANDSCAPE CONSTRUCTION UNTIL ALL BOUNDARIES, EASEMENTS AND RIGHTS-OF-WAY HAVE BEEN VERIFIED IN THE FIELD.
7. LANDSCAPE CONTRACTOR SHALL STAKE OUT ALL BEDS, TREES, PALM LOCATIONS PRIOR TO INSTALLATION FOR APPROVAL BY S&P DESIGN.
8. LANDSCAPE CONTRACTOR TO COORDINATE WITH S&P DESIGN TO ENSURE PROPER PLACEMENT OF PLANT MATERIAL AND IRRIGATION EQUIPMENT.
9. LANDSCAPE CONTRACTOR TO INSTALL EXTRUDED CONCRETE EDGING AS SHOWN ON PLANS.
10. LANDSCAPE CONTRACTOR TO SUPPLY/INSTALL 36" DIA. TREE RINGS AS SHOWN ON PLANS/DETAILS.
11. NOTIFY S&P DESIGN PRIOR TO PLANTING OPERATIONS FOR APPROVAL OF ALL PLANT MATERIAL ON SITE. ANY PLANT MATERIAL NOT APPROVED BY S&P DESIGN WILL BE SUBJECT TO REJECTION.
12. IRRIGATION CONTRACTOR SHALL SUPPLY AND INSTALL CORVLETE AUTOMATIC IRRIGATION SYSTEM MAINLINE SLEEVES, LATERALS AND POP-UP HEADS AND ADJUSTMENTS TO COVER ALL LANDSCAPE AREAS AS PER PLANS/DETAILS. IRRIGATION SYSTEM SHALL BE INSTALLED BY A TEXAS LICENSED IRRIGATOR ONLY.
13. LANDSCAPE CONTRACTOR SHALL REMOVE ALL EXISTING GRASS/WEEDS BY HERBICIDING PRIOR TO BED PREP AND SOIL REPLACEMENT.
14. LANDSCAPE CONTRACTOR SHALL REMOVE 1" OF EXIST'G SOIL WITH ALL BED AREAS AND REPLACE WITH IRVORTED TOP SOIL/PREMIUM CORVOST MIX.
15. LANDSCAPE CONTRACTOR SHALL CONSTRUCT 6"x36" WATERING BASINS AROUND ALL TREES/PALMS WITH A MIN. 2" LAYER OF CYPRESS MULCH.
16. LANDSCAPE CONTRACTOR SHALL LOOSEN / GRADE ALL LAWN AREAS PRIOR TO HYDRO-MULCHING/EDGING TO ENSURE PROPER DRAINAGE AND UNIFORM SURFACE.
17. LANDSCAPE CONTRACTOR SHALL REMOVE ALL EXISTING GRASS AND WEEDS BY HERBICIDING, DIXING, FLOATING AND LIGHT GRADING OR ENTIRE PROJECT AREA PRIOR TO BODDING/HYDROMULCHING.
18. LANDSCAPE CONTRACTOR SHALL ESTABLISH AND MAINTAIN ALL PLANT MATERIAL FOR 90 DAYS AFTER SUBSTANTIAL CORVLETION AND SHALL GUARANTEE ALL TREES/PALMS FOR A PERIOD OF ONE YEAR.
19. IRRIGATION CONTRACTOR SHALL GUARANTEE ALL SYSTEM COMPONENTS FOR A PERIOD OF ONE YEAR.
20. SEE SPECIFICATIONS FOR FURTHER INSTRUCTIONS/REQUIREMENTS.



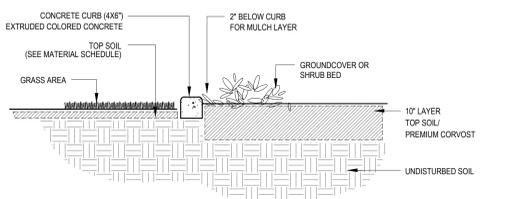
**1 TREE PLANTING DETAIL**  
NOT TO SCALE



**2 SHRUB/G.C. PLANTING DETAIL**  
NOT TO SCALE

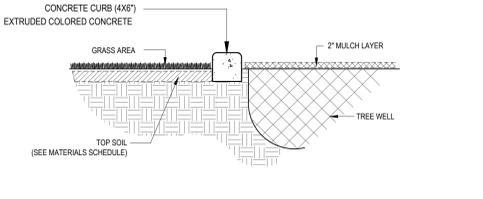


**3 TRIANGULAR PLANT SPACING DIAGRAM**  
NOT TO SCALE



NOTES:  
1. CONCRETE CURBING TO HAVE 1 1/2" DEEP CONTRACTION JOINTS @ 5'-0" SPACING.  
2. CONCRETE CURBING TO HAVE TAPERED DRAINAGE POINTS AT 10' O.C.  
3. 2500-3000 PSI COMPRESSIVE STRENGTH, 490 PSI FLEXURAL STRENGTH.  
4. USE HALF-INCH POLYPROPYLENE FIBER REINFORCEMENT.  
5. NATURAL FINISH AND COLOR.  
6. EQUAL TO CURB APPEAL EDGING (556-967-8350).

**1 CONCRETE EDGE DETAIL**  
NOT TO SCALE



NOTES:  
1. CONCRETE CURBING TO HAVE 1 1/2" DEEP CONTRACTION JOINTS @ 5'-0" SPACING.  
2. CONCRETE CURBING TO HAVE TAPERED DRAINAGE POINTS AT 10' O.C.  
3. 2500-3000 PSI COMPRESSIVE STRENGTH, 490 PSI FLEXURAL STRENGTH.  
4. USE HALF-INCH POLYPROPYLENE FIBER REINFORCEMENT.  
5. NATURAL FINISH AND TEXAS BUFF COLOR.  
6. EQUAL TO CURB APPEAL EDGING (556-967-8350).

**5 TREE RING DETAIL**  
NOT TO SCALE

**SPORTS FIELD NOTES**

1. APPLY HERBICIDE/ROUNDUP TO ENTIRE FIELD AREA UNTIL ALL VEGETATED MATTER IS ERADICATED.
2. CLEAR AND GRUB (REMOVE ALL DEBRIS) FROM FIELD AREA.
3. RIP/TILL SOIL WITH AN AGRICULTURAL CULTIVATOR TO A DEPTH OF 3' ON FIELD.
4. ROUGH GRADE FIELDS TO PREPARE FOR SAND/TOPSOIL/CORVOST.
5. APPLY SAND/TOPSOIL/CORVOST MIX TO AND FINE GRADE TO FINISHED ELEVATIONS.
6. CONTRACTOR TO GRADE FIELD WITH SPECIFIED CROWN/SLOPES UTILIZING FULLY AUTOMATED CORVETERIZED DUAL GPS SYSTEM WITH LASER AUGMENTATION TO ACHIEVE GRADES WITHIN 1/4" TOLERANCE. FIELD MUST DRAIN SMOOTHLY WITH NO BIRD BATHS OR LOW SPOTS.
7. INSTALL IRRIGATION PER PLANS/SPECS THOROUGHLY WATER IN WITH MULTIPLE WATERINGS.
8. FIELD DRAINAGE WILL BE TESTED AND REVIEWED BY S&P PRIOR TO BOD OR HYDROMULCH.
9. INSTALL BOD ROLLS OR HYDROMULCH AS PER PLANS AND SPECIFICATIONS.
10. ROLL FIELDS WITH 2 TON MECHANICAL ROLLER/VIBRATOR. TOP DRESS WITH CLEAN SAND ALL LOW SPOTS OR DIVOTS.
11. MONITOR WATERING FOR CONTINUOUS MOISTURE ON HYDROMULCH UNTIL FULL GERMINATION.
12. COMMENCE MOWING USING A REEL TYPE MOWER ONLY. MOWING SHALL BE AT LEAST ONCE PER WEEK AND MUST BE REVIEWED, CHECKED AND APPROVED BY S&P ON OR ABOUT 45 DAYS AFTER INSTALLATION/GERMINATION. FERTILIZE WITH N-15-P-0-0 WITH WOLFRAX OR APPROVED EQUAL AT MANUFACTURERS RATES.