

El Paso County MS4 Post Construction Detention / Water Quality Facility Documentation Form

This document **must be completed and submitted** with required attachments to the County for projects requiring a detention and/or a water quality facility. A separate completed form must be submitted for each facility.

Project name:

Owner name:

Location Address:

Latitude and Longitude:

Assessor's Parcel #: Section: Township: Range:

Expected Completion date:

Project acreage: Design Ponding Acres: Design Storm:

Design Engineer Email Address:

To ensure compliance with C.R.S. 37-92-602(8), the completed Stormwater Detention and Infiltration Design Data Sheet **must be attached**. The form can be found here: <https://maperture.digitaldataservices.com/gvh/?viewer=cswdif#> (click on Download SDI Design Data Sheet)

List all permanent water quality control measure(s) (EDBs, rain gardens, etc):

For all projects for which the constrained redevelopment sites standard is applied, provide an explanation of why it is not practicable to meet the full design standards.

Attach Operations and Maintenance (O&M) Plan describing the operation and maintenance procedures that ensure the long-term observation, maintenance, and operation of control measure(s), including routine inspection frequencies and maintenance activities. If multiple, different water quality control measures are used at the same location, a separate O & M Plan must be provided for each facility.

Attach Private Detention Basin / Stormwater Quality Best Management Practice Maintenance Agreement and Easement addressing maintenance of BMPs that shall be binding on all subsequent owners of the permanent BMPs.

Attachments:
Stormwater Detention and Infiltration Design Data Sheet
O & M Plan

Review Engineer
EPC Project File No.



El Paso County MS4 Post Construction Detention / Water Quality Facility Documentation Form

Maintenance and Access Agreement

**El Paso County, Colorado
Stormwater Management Facility Operation and Maintenance
Manual**

**Liberty Tree Academy
Detention Pond**

Project # PPR-18-023

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This manual is adapted from Town of Parker, Colorado, *STORMWATER PERMANENT BEST MANAGEMENT PRACTICES (PBMP) LONG-TERM OPERATION AND MAINTENANCE MANUAL*, October 2004

Stormwater Management Facility Operation and Maintenance (O&M) Manual

Liberty Tree Academy Detention Pond

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I. Reasons for Stormwater Facility Maintenance

A. Compliance with the Stormwater Management Facility Operating Permit

Owners or managers of property located within the unincorporated limits of El Paso County are required to obtain a Stormwater Management Facility Operating Permit on a yearly basis. The purpose of this annual permit is to ensure property owners follow proper operation and maintenance procedures for stormwater management facilities located on their sites. Requirements for inspection and maintenance, as well as reporting requirements are located in this Stormwater Management Facility Operation and Maintenance (O&M) Guidance Document.

B. Preventive Measures to Reduce Maintenance Costs

The most effective way to maintain your water quality facility is to prevent the pollutants from entering the facility in the first place. Common pollutants include sediment, trash and debris, chemicals, pet wastes, runoff from stored materials, illicit discharges into the storm drainage system and many others. A through maintenance program will include measures to address these potential contaminants, and will save money and time in the long run. Key points to consider in your maintenance program include:

- Educate property owners/residents to be aware of how their actions impact water quality, and how they can help reduce maintenance costs.
- Keep properties, streets and curb & gutters, and parking lots free of trash, debris, and lawn clippings.
- Ensure the proper disposal of hazardous wastes and chemicals.
- Plan lawn care to minimize the use of chemicals and pesticides.
- Sweep paved surfaces and put the sweepings in a compost pile or back on the lawn.
- Be aware of automobiles leaking fluids. Use absorbents such as cat litter to soak up drippings – dispose of properly.
- Re-vegetate disturbed and bare areas to maintain vegetative stabilization.
- Clean out the upstream components of the storm drainage system, including inlets, storm sewers and outfalls.
- Do not store materials outdoors (including landscaping materials) unless they are properly protected from stormwater runoff.

II. General Location and Description of Stormwater Management Facilities

A. General Site Description

The detention and water quality pond is located on the northeast corner of the site. Inflows are generated through surface runoff from the site. The pond discharges into a proposed 18" RCP which discharges into Bennette Ranch Drainageway.

Inspection or maintenance personnel may utilize the stormwater facility site plan located in Appendix B containing the locations of the Stormwater Management Facilities within this development.

III. Stormwater Management Facilities

A. Volume Reduction Facilities

Not applicable to this project.

B. Treatment Facilities

Detention and Water quality is provided in the pond and has been designed in accordance with the *El Paso County Storm Drainage Design and Technical Criterial Manual* and *UDFCD Urban Storm Drainage Criteria Manual*.

C. Storage Facilities

Not applicable to this project.

D. Nonstructural Best Management Practices

The Nonstructural BMP's used in the proposed design are surface roughening, seeding and mulching, erosion control blankets, and hydraulically applied erosion control tackifier.

F. Open Channels

Not applicable to this project.

IV. Access and Easements

All stormwater management facilities located on the site have both a designated access location as well as a maintenance easement.

V. Safety

Keep safety considerations at the forefront of inspection procedures at all times. Likely hazards should be anticipated and avoided. Never enter a confined space (outlet structure, manhole, etc) without proper training or equipment. A confined space should never be entered without at least one additional person present.

If a highly toxic or flammable substance is discovered, the inspector(s) should leave the immediate area and contact the **El Paso County Sheriff at 911**. If there is any question about a substance, leave the area immediately and contact the **El Paso County Sheriff at (719) 520-7100**. Also, never open a sealed container to check the contents.

Potentially dangerous (e.g., fuel, chemicals, hazardous materials) substances found in the areas **must be** referred to the **El Paso County Sheriffs Office immediately** for response by the Hazardous Materials Unit. The emergency contact number is **911**.

Vertical drops may be encountered in areas located within and around the facility. Avoid walking on top of retaining walls or other structures that have a significant vertical drop. If a vertical drop is identified within the stormwater management facility that is greater than 48" in height, make the appropriate note/comment on the maintenance inspection form.

If any hazard is found within the facility area that poses an immediate threat to public safety, contact the El Paso County Sheriff's Office immediately!

VI. Field Inspection Equipment

It is imperative that the appropriate equipment is taken to the field with the inspector(s). This is to ensure the safety of the inspector and allow the inspections to be performed as efficiently as possible. Below is a list of the equipment that may be necessary to perform the inspections of a Stormwater Management Facilities:

- Protective clothing and boots.
- Safety equipment (vest, hard hat, confined space entry equipment).
- Communication equipment.
- El Paso County Approved Operation and Maintenance Manual for the site including stormwater management facility location maps.

- Clipboard.
- Stormwater Maintenance Facility Maintenance Inspection Forms (See Appendix D).
- Manhole Lid Remover.
- Shovel.
- First Aid Kit

Some of the items identified above need not be carried by the inspector (manhole lid remover, shovel, and confined space entry equipment). However, this equipment should be available in the vehicle driven to the site.

VII. Inspecting and Maintaining Stormwater Management Facilities

The quality of stormwater entering the waters of the state within the County relies heavily on the proper operation and maintenance of permanent best management practices.

This section contains a general overview of stormwater management facility O&M guidelines and documentation procedures. Appendix A contains the Standard Operating Procedures (SOP) for each of the stormwater management facilities located on site.

A. Inspection Procedures

All stormwater management facilities shall be inspected by a qualified individual at a minimum of one time per year. Inspection should follow the inspection guidance found in the SOP located in Appendix A of this manual. The person(s) conducting the inspection activities shall complete the appropriate inspection report located in Appendix D. Each form shall be review and submitted by the property owner or property manager to the El Paso County Operating Permit Program. Inspection and reporting shall be conducted and submitted to El Paso County on a biannual basis. The first inspection report shall be submitted no later than May 31 with the second report being submitted no later than September 30, in accordance with the Operating Permit. A copy of each inspection form shall be kept indefinitely and provided to El Paso County upon request.

B. Maintenance Procedures

Stormwater Management Facility Maintenance Programs are separated into three broad categories of work. These categories were based largely on the Urban Drainage and Flood Control District's

1. Routine Work

The majority of this work consists of regularly scheduled mowings and trash and debris pickups for stormwater management facilities during the growing season. This includes items such as the removal of debris/material that may be clogging the outlet structure well screens and trash racks. It also activities such as includes weed control, mosquito treatment, and algae treatment. These activities normally will be performed numerous times during the year. These items can be completed without any prior correspondence with El Paso County, however completed inspection and maintenance forms shall be submitted to the County for each inspection and maintenance period.

2. Minor Work

This work consists of a variety of isolated or small-scale maintenance/operational problems. Most of this work can be completed by a small crew, hand tools, and small equipment. These items require prior correspondence with El Paso County and require completed inspection and maintenance forms shall be submitted to the County for each inspection and maintenance period.

3. Major Work

This work consists of larger maintenance/operational problems and failures within the stormwater management facilities. Most of this work requires consultation with the El Paso County Engineering Department to ensure the proper maintenance is performed. Some of this work requires that the engineering staff review the original design and construction drawings to assess the situation and assign the necessary maintenance. This work may also require more specialized maintenance equipment, design/details, surveying, or assistance through private contractors and consultants.

C. Maintenance Personnel

Maintenance personnel must be qualified to properly maintain stormwater management facilities. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

D.Maintenance Inspection Forms

The Stormwater Management Facility specific Maintenance Inspection Form provides a record of each inspection. A separate form shall be filled out in the field for all stormwater management facilities inspected. If a stormwater management facility cannot be inspected, the inspector shall record an explanation of the circumstances on the form. The stormwater management facility specific inspection form(s) is/are located in Appendix D. A description of each part of the form follows:

1. General Information

This section identifies the facility number, location, person conducting the inspection, the date and time the facility was inspected, and approximate days since the last rainfall. Property classification is identified as residential, commercial, or other.

The reason for the inspection is also identified on the form depending on the nature of the inspection. All facilities should be inspected on a bi-annual basis (routine) at a minimum. Also, all facilities should be inspected after a significant precipitation event to ensure the facility is draining appropriately and to identify any damage that occurred as a result of the increased runoff.

2. Inspection Scoring

For each inspection item, a score must be given to identify the urgency of required maintenance. The scoring is as follows:
0 = No deficiencies identified.

1 = Monitor – Although maintenance may not be required at this time, a potential problem exists that will most likely need to be addressed in the future. This can include items like minor erosion, concrete cracks/spalling, or minor sediment accumulation. This item should be revisited at the next inspection.

2 = Routine Maintenance Required – Some inspection items can be addressed through the routine maintenance program (See SOP in appendix A. This can include items like vegetation management or debris/trash removal.

3 = Immediate Repair Necessary – This item needs immediate attention because failure is imminent or has already occurred. This could include items such as structural failure of a feature (outlet works, forebay, etc), significant erosion, or significant sediment accumulation. This score should be given to an item that can significantly impact the function of the facility.

N/A=This score is given to an item that may not exist in a facility. Not all facilities have all of the features (forebay, micro-pool, etc.)

identified on the form.

3. Inspection Summary/Additional Comments

Additional explanations to inspection items, and observations about the facility not covered by the form, are recorded in this section.

4. Overall Facility Rating

An overall rating must be given for each facility inspected. The overall facility rating should correspond with the highest score (0, 1, 2, 3) given to any feature on the inspection form.

5. Comments/Additional Information

Additional explanations to maintenance activities, and observations about the facility not covered by the form, are recorded in this section.

E. Completed Maintenance Forms

Completed maintenance forms shall be completed by contractor completing the required maintenance items. The form shall then be review by an authorized agent of the property owner and submitted to El Paso County to the attention.

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ACRONYMS

| | |
|----------------|---|
| PBMP | Permanent Best Management Practice |
| GIS | Geographic Information System |
| O&M | Operation and Maintenance |
| MS4 | Municipal Separate Storm Sewer System |
| NPDES | National Pollutant Discharge Elimination System |
| SOP | Standard Operating Procedure |

| | |
|--------------|--|
| EPA | U.S. Environmental Protection Agency |
| CDPHE | Colorado Department of Public Health and Environment |
| COPS | Colorado Discharge Permit System |
| WQCD | Water Quality Control Division of the CDPHE |
| CWA | Clean Water Act |
| EDB | Extended Detention Basin |
| PLD | Porous Landscape Detention |
| GS | Grass Swale |
| SDECM | Storm Drainage & Environmental Criteria Manual |
| WQCV | Water Quality Capture Volume |

EDB-1 Background

Extended Detention Basins (EDBs) are one of the most common types of Stormwater Management Facilities utilized within the Front Range of Colorado. EDBs are an adaptation of a detention basin used for flood control, with the primary difference in the addition of forebays, micropools and a slow release outlet design. Forebays are shallow concrete "pans" located at the inflow point to the basin. These forebays collect and briefly hold stormwater runoff resulting in a process called sedimentation, dropping sediment out of the stormwater. The stormwater is then released into the concrete trickle channel and upper basin, the large grassy portion of the basin. The EDB uses a much smaller outlet that extends the emptying time of the more frequently occurring runoff events to facilitate pollutant removal. An EDB is a sedimentation basin designed to completely drain sometime after stormwater runoff ends. The EDB's drain time for the water quality portion of the facility is typically 40 hours. The basins are considered to be "dry" because the majority of the basin is designed not to have a significant permanent pool of water remaining between runoff events. However, all EDBs should have a small micropool just below the outlet. This micropool is designed to hold water and keep sediment from blocking the outlet.

EDB-2 Inspecting Extended Detention Basins (EDBs)

EOB-2.1 Access and Easements

Inspection or maintenance personnel may utilize the stormwater facility map, located in Appendix B of the Operation and Maintenance Manual, containing the locations of the access points and maintenance easements of the EDBs within this development.

EDB-2.2 Stormwater Management Facilities Locations

Inspection or maintenance personnel may utilize the stormwater facility map, located in Appendix 8 of the Operation and Maintenance Manual, containing the locations of the EDBs within this development.

EDB-2.3 Extended Detention Basin (EDB) Features

EDBs have a number of features that are designed to serve a particular function. Many times the proper function of one feature depends on another. For example, if a forebay is not properly maintained, it could negatively impact the performance of a feature downstream (trickle channel, micropool, etc.). Therefore, it is critical that each feature of the EDS is properly inspected and maintained to ensure that the overall facility functions as it was intended. Below is a list and description of the most common features within an EDB and the corresponding maintenance inspection items that can be anticipated:

**Table EDB-1
Typical Inspection & Maintenance Requirements Matrix**

| EDB Features | Sediment Removal | Mowing/ Weed control | Trash & Debris Removal | Erosion | Overgrown Vegetation Removal | Standing Water (mosquito/ algae control) | Structure Repair |
|--------------------------|------------------|----------------------|------------------------|---------|------------------------------|--|------------------|
| Inflow Points (outfalls) | X | | X | | | X | X |
| Forebay | X | | X | | | | X |
| Low-flow channel | X | | X | X | X | | X |
| Bottom Stage | X | X | X | X | X | X | |
| Micropool | X | | X | | X | X | X |
| Outlet Works | X | | X | | | | X |
| Emergency Spillway | | | X | X | X | | X |
| Upper Stage | X | X | X | X | X | | |
| Embankment | | X | | X | X | | |

EDB-2.3.1 Inflow Points

Inflow Points or Outfalls into EDBs are the point source of the stormwater discharge into the facility. An inflow point is commonly a storm sewer pipe with a flared end section that discharges into the EDB. In some instances an inflow point could be a drainage channel or ditch that flows into the facility.

An energy dissipater (riprap or hard armor protection) is typically immediately downstream of the discharge point into the EDB to protect from erosion. In some cases, the storm sewer outfall can have a toe-wall or cut-off wall immediately below the structure to prevent undercutting of the outfall from erosion.

The most typical maintenance items that are found with inflow points are as follows:

a. *Riprap Displaced* - Many times, because the repeated impact/force of water, the riprap can shift and settle. If any portion of the riprap apron appears to have settled, soil is present between the riprap, or the riprap has shifted, maintenance may be required to ensure future erosion is prevented.

b. *Erosion Present/Outfall Undercut*- In some situations, the energy dissipater may not have been sized, constructed, or

maintained appropriately and erosion has occurred. Any erosion within the vicinity of the inflow point will require maintenance to prevent damage to the structure(s) and sediment transport within the facility.

c. *Sediment Accumulation* - Because of the turbulence in the water created by the energy dissipater, sediment often deposits immediately downstream of the inflow point. To prevent a loss in hydraulic performance of the upstream infrastructure, sediment that accumulates in this area must be removed in a timely manner.

d. *Structural Damage* - Structural damage can occur at anytime during the life of the facility. Typically for an inflow, the structural damage occurs to the pipe flared end section (concrete or steel). Structural damage can lead to additional operating problems with the facility, including loss of hydraulic performance.

e. *Woody Growth/Weeds Present* - Undesirable vegetation can grow in and around the inflow area to an EDB that can significantly impact the performance of the drainage facilities discharging into the facility. This type of vegetation includes trees {typically cottonwoods) and dense areas of shrubs (willows). If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, resulting in blockage of the discharge. Also, tree roots can cause damage to the structural components of the inflow. Routine maintenance is essential for trees (removing a small tree/sapling is much cheaper and "quieter" than a mature tree). Also, noxious weeds growing in the facility can result in the loss of desirable native vegetation and impact adjacent open spaces/land.

EDB-2.3.2 Forebay

A forebay is a solid surface (pad), typically constructed of concrete, immediately downstream of the inflow point. The forebay is designed to capture larger particles and trash, to prevent them from entering the main portion of the EDB. The solid surface is designed to facilitate mechanical sediment removal (skid steer). The forebay typically includes a small diameter discharge pipe or v-notch weir on the downstream end and designed to drain the forebay in a specified period of time to promote sedimentation. The forebays vary in size and depth depending on the design and site constraints.

The most typical maintenance items that are found with forebays are as follows:

a. *Sediment/Debris Accumulation* - Because this feature of the EDB is designed to provide the initial sedimentation, debris and sediment frequently accumulate in this area. If the sediment and debris is not removed from the forebay on a regular basis, it can significantly impact the function of other features within the EDB. Routine sediment removal from the forebay can **significantly** reduce the need for dredging of the main portion of the EDB using specialized equipment (long reach excavators). Routine removal of sediment from the forebay can **substantially** decrease the long-term sediment removal costs of an EDB.

b. *Concrete Cracking/Failing* - The forebay is primarily constructed of concrete which cracks, spalls, and settles. Damage to the forebay can result in decreased performance and impact maintenance efforts.

c. *Drain Pipe/Weir Clogged* - Many times the drain pipe or weir can get clogged with debris, and prevent the forebay from draining properly. If standing water is present in the forebay (and there is not a base flow), the forebay is most likely not draining properly. This can result in a decrease in performance and create potential nuisances with stagnant water (mosquitoes).

d. *Weir/Drain Pipe Damaged* - Routine maintenance activities, vandalism, or age may cause the weir or drain pipe in the forebay to become damaged. Weirs are typically constructed of concrete which cracks and spalls. The drain pipe is typically smaller in diameter and plastic which can fracture.

EDB-2.3.3 Trickle Channel (Low-Flow)

The trickle channel conveys stormwater from the forebay to the micro-pool of the EDB. The trickle channel is typically made of concrete. However, grass lined (riprap sides protected) is also common and can provide for an additional means of water quality within the EDB. The trickle channel is typically 6-9 inches in depth and can vary in width.

a. *Sediment/Debris Accumulation* - Trickle channels are typically designed with a relatively flat slope that can promote sedimentation and the collection of debris. Also, if a trickle channel is grass lined it can accumulate sediment and debris at a much quicker rate. Routine removal of accumulated sediment and debris is essential in

preventing flows from circumventing the trickle channel and impacting the dry storage portion of the pond.

b. *Concrete/Riprap Damage* - Concrete can crack, spall, and settle and must be repaired to ensure proper function of the trickle channel. Riprap can also shift over time and must be replaced/repared as necessary.

c. *Woody Growth/Weeds Present* - Because of the constant moisture in the area surrounding the trickle channel, woody growth (cottonwoods/willows) can become a problem. Trees and dense shrub type vegetation can impact the capacity of the trickle channel and can allow flows to circumvent the feature.

d. *Erosion Outside of Channel* - In larger precipitation events, the trickle channel capacity will likely be exceeded. This can result in erosion immediately adjacent to the trickle channel and must be repaired to prevent further damage to the structural components of the EDB.

EDB-2.3.4 Bottom Stage

The bottom stage is at least 1.0 to 2.0 feet deeper than the upper stage and is located in front of the outlet works structure. The bottom stage is designed to store the smaller runoff events and assists in keeping the majority of the basin bottom dry resulting in easier maintenance operations and enhances the facilities pollutant removal capabilities. This area of the EDB may develop wetland vegetation.

a. *Sediment/Debris Accumulation* - The bottom stage can frequently accumulate sediment and debris. This material must be removed to maintain pond volume and proper function of the outlet structure.

b. *Woody Growth/Weeds Present* - Because of the constant moisture in the soil surrounding the bottom stage, woody growth (cottonwoods/willows) can create operational problems for the EDB. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate outside of the micro-pool, which can cause problems with other EDB features. Also, tree roots can cause damage to the structural components of the outlet works. Routine management is essential for trees (removing a small tree/sapling is much cheaper and "quieter" than a mature tree).

c. *Bank Erosion* - The bottom stage is usually a couple feet deeper than the other areas of the ponds. Erosion can be caused by water dropping into the micro-pool, if adequate protection/armor is not present. Erosion in this area must be mitigated to prevent sediment transport and other EDB feature damage.

d. *Mosquitoes/Algae Treatment* - Nuisance created by stagnant water can result from improper maintenance/treatment of the micro-pool. Mosquito larvae can be laid by adult mosquitoes within the permanent pool. Also, aquatic vegetation that grows in shallow pools of water can decompose causing foul odors. Chemical/mechanical treatment of the micro-pool may be necessary to reduce these impacts to adjacent homeowners.

e. *Petroleum/Chemical Sheen* - Many indicators of illicit discharges into the storm sewer systems will be present in the micro-pool area of the EDB. These indicators can include sheens, odors, discolored soil, and dead vegetation. If it is suspected that an illicit discharge has occurred, contact El Paso County immediately. Proper removal/mitigation of contaminated soils and water in the EDB is necessary to minimize any environmental impacts downstream.

EDB-2.3.5 Micropool

The micropool is a concrete or grouted boulder walled structure directly in front of the outlet works. At a minimum the micropool is 2.5 feet deep and is designed to hold water. The micropool is critical in the proper function of the EDB, it allows suspended sediment to be deposited at the bottom of the micropool and prevents these sediments from being deposited in front of the outlet works causing clogging of the outlet structure, which results in marshy areas within the top and bottom stages.

a. *Sediment/Debris Accumulation* - The micro-pool can frequently accumulate sediment and debris. This material must be removed to maintain pond volume and proper function of the outlet structure.

b. *Woody Growth/Weeds Present* - Because of the constant moisture in the soil surrounding the micro-pool, woody growth (cottonwoods/willows) can create operational problems for the EDB. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate outside of the micro-pool, which can cause problems with other EDB features. Also, tree roots can cause damage to the structural components of the outlet works. Routine management is essential for trees

(removing a small tree/sapling is much cheaper and "quieter" than a mature tree).

c. *Mosquitoes/Algae Treatment* - Nuisance created by stagnant water can result from improper maintenance/treatment of the micro-pool. Mosquito larvae can be laid by adult mosquitoes within the permanent pool. Also, aquatic vegetation that grows in shallow pools of water can decompose causing foul odors. Chemical/mechanical treatment of the micro-pool may be necessary to reduce these impacts to adjacent homeowners.

d. *Petroleum/Chemical Sheen* - Many indicators of illicit discharges into the storm sewer systems will be present in the micro-pool area of the EDB. These indicators can include sheens, odors, discolored soil, and dead vegetation. If it is suspected that an illicit discharge has occurred, contact El Paso County immediately. Proper removal/mitigation of contaminated soils *and* water in the EDB is necessary to minimize any environmental impacts downstream.

EDB-2.3.6 Outlet Works

The outlet works is the feature that drains the EDB in specified quantities and periods of time. The outlet works is typically constructed of reinforced concrete into the embankment of the EDB. The concrete structure typically has steel orifice plates anchored/embedded into it to control stormwater release rates. The larger openings (flood control) on the outlet structure typically have trash racks over them to prevent clogging. The water quality orifice plate (smaller diameter holes) will typically have a well screen covering it to prevent smaller materials from clogging it. The outlet structure is the single most important feature in the EDB operation. Proper inspection and maintenance of the outlet works is essential in ensuring the long-term operation of the EDB.

a. *Trash Rack/Well Screen Clogged* - Floatable material that enters the EDB will most likely make its way to the outlet structure. This material gets trapped against the trash racks and well screens on the outlet structure (which is why they are there). This material must be removed on a routine basis to ensure the outlet structure drains in the specified design period.

b. *Structural Damage* - The outlet structure is primarily constructed of concrete, which can crack, spall, and settle. The steel trash racks and well screens are also susceptible to damage.

c. *Orifice Plate Missing/Not Secure* - Many times residents, property owners, or maintenance personnel will remove or loosen orifice plates if they believe the pond is not draining properly. Any modification to the orifice plate(s) will significantly impact the designed discharge rates for water quality and/or flood control. Modification of the orifice plates is not allowed without approval from the County. When maintaining the orifice plate be sure that the neoprene gasket installed between the concrete structure and the orifice plate is replaced during the maintenance activity. If no neoprene gasket is found during the inspection or maintenance of the orifice plate, one will need to be installed as part of the maintenance activities.

d. *Manhole Access* - Access to the outlet structure is necessary to properly inspect and maintain the facility. If access is difficult or not available to inspect the structure, chances are it will be difficult to maintain as well.

e. *Woody Growth/Weeds Present* - Because of the constant moisture in the soil surrounding the outlet works, woody growth (cottonwoods/willows) can create operational problems for the EDB. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate around the outlet works, which can cause problems with other EDB features. Also, tree roots can cause damage to the structural components of the outlet works. Routine management is essential for trees (removing a small tree/sapling is much cheaper and "quieter" than a mature tree).

EDB-2.3.7 Emergency Spillway

An emergency spillway is typical of all EDBs and designed to serve as the overflow in the event the volume of the pond is exceeded. The emergency spillway is typically armored with riprap (or other hard armor) and is sometimes buried with soil. The emergency spillway is typically a weir (notch) in the pond embankment. Proper function of the emergency spillway is essential to ensure flooding does not impact adjacent properties.

a. *Riprap Displaced* - As mentioned before, the emergency spillway is typically armored with riprap to provide erosion protection. Over the life of an EDB, the riprap may shift or become dislodged due to flow.

b. *Erosion Present*- Although the spillway is typically armored, stormwater flowing through the spillway can cause erosion

damage. Erosion must be repaired to ensure the integrity of the basin embankment, and proper function of the spillway.

c. Woody Growth/Weeds Present - Management of woody vegetation is essential in the proper long-term function of the spillway. Larger trees or dense shrubs can capture larger debris entering the EDB and reduce the capacity of the spillway.

d. Obstruction Debris - The spillway must be cleared of any obstruction (manmade or natural) to ensure the proper design capacity.

EDB-2.3.8 Upper Stage (Dry Storage)

The upper stage of the EDB provides the majority of the water quality flood detention volume. This area of the EDB is higher than the micro-pool and typically stays dry, except during storm events. The upper stage is the largest feature/area of the basin. Sometimes, the upper stage can be utilized for park space and other uses in larger EDBs. With proper maintenance of the micro-pool and forebay(s), the upper stage should not experience much sedimentation, however bottom elevations should be monitored to ensure adequate volume.

a. Vegetation Sparse - The upper basin is the most visible part of the EDB, and therefore aesthetics is important. Adequate and properly maintained vegetation can greatly increase the overall appearance and acceptance of the EDB by the public. Also, vegetation can reduce the potential for erosion and subsequent sediment transport to the other areas of the pond.

b. Woody Growth/Undesirable Vegetation - Although some trees and woody vegetation may be acceptable in the upper basin, some thinning of cottonwoods and willows may be necessary. Remember, the basin will have to be dredged as to ensure volume, and large trees and shrubs will be difficult to protect during that operation (public perception).

c. Standing Water/Boggy Areas - Standing water or boggy areas in the upper stage is typically a sign that some other feature in the pond is not functioning properly. Routine maintenance (mowing, trash removal, etc) can be extremely difficult for the upper stage if the ground is saturated. If this inspection item is checked, make sure you have identified the root cause of the problem.

d. Sediment Accumulation - Although other features within the EDB are designed to capture sediment, the upper storage area will collect sediment over time. Excessive amounts of sedimentation will result in a loss of storage volume. It may be more difficult to determine if this area has accumulated sediment without conducting a field survey. However, there are some indicators that sedimentation has occurred in the upperstage.

Below is a list of indicators:

1. Ground adjacent to the trickle channel appears to be several inches higher than concrete/riprap
2. Standing water or boggy areas in upperstage
3. Uneven grades or mounds
4. Micro-pool or Forebay has excessive amounts of sediment

e. Erosion (banks and bottom) - The bottom grades of the dry storage are typically flat enough that erosion should not occur. However, inadequate vegetative cover may result in erosion of the upper stage. Erosion that occurs in the upper stage can result in increased dredging/maintenance of the micro-pool.

f. Trash Debris - Trash and debris can accumulate in the upper area after large events, or from illegal dumping. Over time, this material can accumulate and clog the EDB outlet works.

g. Maintenance Access - Most EDBs typically have a gravel/concrete maintenance access path to either the upper stage or forebay. This access path should be inspected to ensure the surface is still drivable. Some of the smaller EOBs may not have maintenance access paths, however, the inspector should verify that access is available from adjacent properties.

EDB-2.3.9 Miscellaneous

There are a variety of inspection/maintenance issues that may not be attributed to a single feature within the EDB. This category on the inspection form is for maintenance items that are commonly found in the EDB, but may not be attributed to an individual feature.

a. Encroachment in Easement Area - Private lots/property can sometimes be located very close to the EDBs, even though the County requires that they be located in tracts with drainage easements. Property owners may place landscaping, trash, fencing, or other items within the easement area that may impact maintenance or the operation of the facility.

b. Graffiti/Vandalism - Damage to the EDB infrastructure can be caused by vandals. If criminal mischief is evident, the inspector should forward this information to the El Paso County Sheriffs Office

c. Public Hazards - Public hazards include items such as vertical drops of greater than 4-feet, containers of unknown/suspicious substances, exposed metal/jagged concrete on structures. **If any hazard is found within the facility area that poses an immediate threat to public safety, contact the El Paso County Sheriff at 911 immediately!**

d. Burrowing Animals/Pests- Prairie dogs and other burrowing rodents may cause damage to the EDB features and negatively impact the vegetation within the EDB.

e. Other- Any miscellaneous inspection/maintenance items not contained on the form should be entered here.

EDB-3 MAINTAINING EXTENDED DETENTION BASINS (EDBS)

EDB-3.1 Maintenance Personnel

Maintenance personnel must be qualified to properly maintain EDBs. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

EDB-3.2 Equipment

It is imperative that the appropriate equipment and tools are taken to the field with the operations crew. The types of equipment/tools will vary depending on the task at hand. Below is a list of tools, equipment, and material(s) that may be necessary to perform maintenance on an EDB:

- 1.) Loppers/Tree Trimming Tools
- 2.) Mowing Tractors
- 3.) Trimmers (extra string)
- 4.) Shovels
- 5.) Rakes
- 6.) All Surface Vehicle (ASVs)
- 7.) Skid Steer
- 8.) Back Hoe

- 9.) Track Hoe/Long Reach Excavator
- 10.) Dump Truck
- 11.) Jet-Vac Machine
- 12.) Engineers Level (laser)
- 13.) Riprap (Minimum - Type M)
- 14.) Filter Fabric
- 15.) Erosion Control Blanket(s)
- 16.) Seed Mix (Native - Foothills)
- 17.) Illicit Discharge Cleanup Kits
- 18.) Trash Bags
- 19.) Tools (wrenches, screw drivers, hammers, etc)
- 20.) Chain Saw
- 21.) Confined Space Entry Equipment
- 22.) Approved Stormwater Facility Operation and Maintenance Manual

Some of the items identified above may not be needed for every maintenance operation. However, this equipment should be available to the maintenance operations crews should the need arise.

EDB-3.3 Safety

Vertical drops may be encountered in areas located within and around the facility. Avoid walking on top of retaining walls or other structures that have a significant vertical drop. If a vertical drop is identified within the EDB that is greater than 48" in height, make the appropriate note/comment on the maintenance inspection form.

EDB-3.4 EDB Maintenance Categories and Activities

A typical EDB Maintenance Program will consist of three broad categories of work. Within each category of work, a variety of maintenance activities can be performed on an EDB. A maintenance activity can be specific to each feature within the EDB, or general to the overall facility. This section of the SOP explains each of the categories and briefly describes the typical maintenance activities for an EDB.

The El Paso County PBMP Maintenance Program has identified a variety of maintenance activities that are typical of EDBs. The maintenance activities range in magnitude from routine trash pickup to the reconstruction of drainage infrastructure. Below is a description of each maintenance activity, the objectives, and frequency of actions:

EDB-3.5 Routine Maintenance Activities

The majority of this work consists of regularly scheduled mowings and trash and debris pickups for stormwater management facilities during the growing season. This includes items such as the removal of debris/material that may be clogging the outlet structure well screens and trash racks. It also includes activities such as weed control, mosquito treatment, and algae treatment. These activities normally will be performed numerous times during the year. These items can be completed without any prior correspondence with El Paso County.

The Maintenance Activities are summarized below, and further described in the following sections.

**TABLE - EDB-2
Summary of Routine Maintenance Activities**

| MAINTENANCE ACTIVITY | MINIMUM FREQUENCY | LOOK FOR: | MAINTENANCE ACTION |
|------------------------------|---|--|--|
| Mowing | Twice annually | Excessive grass height/aesthetics | 4" to 6" grass height |
| Trash/Debris Removal | Twice annually | Trash & debris in EDB | Remove and dispose of trash and debris |
| Outlet Works Cleaning | As needed - after significant rain events - twice annually min. | Clogged outlet structure; ponding water | Remove and dispose of debris/trash/sediment to allow outlet to function properly |
| Weed control | Minimum twice annually | Noxious weeds; Unwanted vegetation | Treat w/ herbicide or hand pull; Consult El Paso Co weed specialist |
| Mosquito Treatment | As needed | Standing water/mosquito habitat | Treat w/ EPA approved chemicals |
| Algae Treatment | As needed | Standing water/ Algal growth/green color | Treat w/ EPA approved chemicals |

EDB-3.5.1 Mowing

Occasional mowing is necessary to limit unwanted vegetation and to improve the overall appearance of the EDB. Native vegetation should be mowed to a height of 4-to-6 inches tall.

Frequency- Routine - Minimum of twice annually or depending on aesthetics.

EDB-3.5.2 Trash/Debris Removal

Trash and debris must be removed from the entire EDB area to minimize outlet clogging and to improve aesthetics. This activity must be performed prior to mowing operations.

Frequency- Routine - Prior to mowing operations and minimum of twice annually.

EDB-3.5.3 Outlet Works Cleaning

Debris and other materials can clog the outlet work's well screen, orifice plate(s) and trash rack. This activity must be performed anytime other maintenance activities are conducted to ensure proper operation.

Frequency- Routine - After significant rainfall event or concurrently with other maintenance activities.

EDB-3.5.4 Weed Control

Noxious weeds and other unwanted vegetation must be treated as needed throughout the EDB. This activity can be performed either through mechanical means (mowing/pulling) or with herbicide. Consultation with the El Paso County Weed Inspector is highly recommended prior to the use of herbicide.

Frequency- Routine - As needed based on inspections.

EDB-3.5.5 Mosquito/Algae Treatment

Treatment of permanent pools is necessary to control mosquitoes and undesirable aquatic vegetation that can create nuisances. Only EPA approved chemicals/materials can be used in areas that are warranted.

Frequency- As needed.

EDB-3.6 Minor Maintenance Activities

This work consists of a variety of isolated or small-scale maintenance/operational problems. Most of this work can be completed by a small crew, tools, and small equipment. **All of this work requires notification, at least 7 days prior to the start of work, to the El Paso County Stormwater Management Facility Operation and Maintenance Program at 303-660-7490**

**Table - EDB-3
Summary of Minor Maintenance Activities**

| MAINTENANCE ACTIVITY | MINIMUM FREQUENCY | LOOK FOR: | MAINTENANCE ACTION |
|---|--|---|--|
| Sediment Removal | As needed; typically every 1 - 2 years | Sediment build-up; decrease in pond volume | Remove and dispose of sediment |
| Erosion Repair | As needed, based upon inspection | Rillying/gullyng of side slopes, trickle channel, other areas | Repair eroded areas Revegetate; Address cause |
| Vegetation Removal/Tree Thinning | As needed, based upon inspection | Large trees/wood vegetation in lower chamber of pond | Remove vegetation; restore grade and surface |
| Drain Cleaning/Jet Vac | As needed, based upon inspection | Sediment build-up /non draining system | Clean drains; Jet Vac if needed |

EDB-3.6.1 Sediment Removal

Sediment removal is necessary to maintain the original design volume of the EDB and to ensure proper function of the infrastructure. Regular sediment removal (minor) from the forebay, inflow(s), and trickle channel can significantly reduce the frequency of major sediment removal activities (dredging) in the upper and lower stages. The minor sediment removal activities can typically be addressed with shovels and smaller equipment. Major sediment removal activities will require larger and more specialized equipment. The major sediment activities will also require surveying with an engineer's level, and consultation with the El Paso County Engineering Staff to ensure design volumes/grades are achieved.

Stormwater sediments removed from EDBs do not meet the criteria of "hazardous waste". However, these sediments are contaminated

with a wide array of organic and inorganic pollutants and handling must be done with care. Sediments from permanent pools must be carefully removed to minimize turbidity, further sedimentation, or other adverse water quality impacts. Sediments should be transported by motor vehicle only after they are dewatered. All sediments must be taken to a landfill for proper disposal. Should a spill occur during transportation, prompt and thorough cleanup is important.

Frequency- Nonroutine - As necessary based upon inspections. Sediment removal in the forebay and trickle channel may be necessary as frequently as every 1-2 years.

EDB-3.6.2 Erosion Repair

The repair of eroded areas is necessary to ensure the proper function of the EDB, minimize sediment transport, and to reduce potential impacts to other features. Erosion can vary in magnitude from minor repairs to trickle channels, energy dissipaters, and rilling to major gullies in the embankments and spillways. The repair of eroded areas may require the use of excavators, earthmoving equipment, riprap, concrete, erosion control blankets, and turf reinforcement mats. Major erosion repair to the pond embankments, spillways, and adjacent to structures will require consultation with the engineering staff.

Frequency - Nonroutine - As necessary based upon inspections.

EDB-3.6.3 Vegetation Removal/Tree Thinning

Dense stands of woody vegetation (willows, shrubs, etc) or trees can create maintenance problems for the infrastructure within an EDB. Tree roots can damage structures and invade pipes/channels thereby blocking flows. Also, trees growing in the upper and lower stages of the EDB will most likely have to be removed when sediment/dredging operations occur. A small tree is easier to remove than a large tree, therefore, regular removal/thinning is imperative. All trees and woody vegetation should be removed that is growing in the bottom of the EDB or near structures (inflows, trickle channels, outlet works, emergency spillways, etc). Any trees or woody vegetation in the EDB should be limited to the upper portions of the pond banks.

Frequency- Nonroutine - As necessary based upon inspections.

EDB-3.6.4 Clearing Drains/Jet-Vac

An EDB contains many structures, openings, and pipes that can be frequently clogged with debris. These blockages can result in a decrease of hydraulic capacity and also create standing water (nuisances) in areas outside of the micro-pool. Many times the blockage to this infrastructure can be difficult to access and/or clean. Specialized equipment (jet-vac machines) may be necessary to clear debris from these difficult areas.

Frequency- Nonroutine - As necessary based upon inspections.

EDB-3.7 Major Maintenance Activities

This work consists of larger maintenance/operational problems and failures within the stormwater management facilities. **All of this work requires notification, at least 14 days prior to the start of work, to El Paso County.** This work requires that the engineering staff review the original design and construction drawings to assess the situation and assign the necessary maintenance. This work may also require more specialized maintenance equipment, design/details, surveying, or assistance through private contractors and consultants.

**Table - EDB-4
Summary of Major Maintenance Activities**

| MAINTENANCE ACTIVITY | MINIMUM FREQUENCY | LOOK FOR: | MAINTENANCE ACTION |
|-----------------------------|--|---|--|
| Major Sediment Removal | As needed - based upon scheduled inspections | Large quantities of sediment; reduced pond capacity | Remove and dispose of sediment. Repair vegetation as needed |
| Major Erosion Repair | As needed based upon scheduled inspections | Severe erosion including gullying, excessive soil displacement, areas of settlement, holes | Repair erosion - find cause of problem and address to avoid future erosion |
| Structural Repair | As needed-based upon scheduled inspections | Deterioration and/or damage to structural components - broken concrete, damaged pipes, outlet works | Structural repair to restore the structure to its original design |

EDB-3.7.1 Major Sediment Removal

Major sediment removal consists of removal of large quantities of sediment or removal of sediment from vegetated areas. Care shall be given when removing large quantities of sediment and sediment deposited in vegetated areas. Large quantities of sediment need to be carefully removed, transported and disposed of. Vegetated areas need special care to ensure design volumes and grades are preserved.

Frequency- Nonroutine - Repair as needed based upon inspections.

EDB-3.7.2 Major Erosion Repair

Major erosion repair consists of filling and revegetating areas of severe erosion. Determining the cause of the erosion as well as correcting the condition that caused the erosion should also be part of the erosion repair. Care should be given to ensure design grades and volumes are preserved.

Frequency- Nonroutine - Repair as needed based upon inspections.

EDB-3.7.3 Structural Repair

An EDB includes a variety of structures that can deteriorate or be damaged during the course of routine maintenance. These structures are constructed of steel and concrete that can degrade or be damaged and may need to be repaired or re-constructed from time to time. These structures include items like outlet works, trickle channels, forebays, inflows and other features. Some of the minor structural repairs can be performed by in-house operations staff. Major repairs to structures may require input from a structural engineer and specialized contractors. Consultation with the El Paso County Engineering Staff should take place prior to all structural repairs.

Frequency- Nonroutine - Repair as needed based upon inspections.

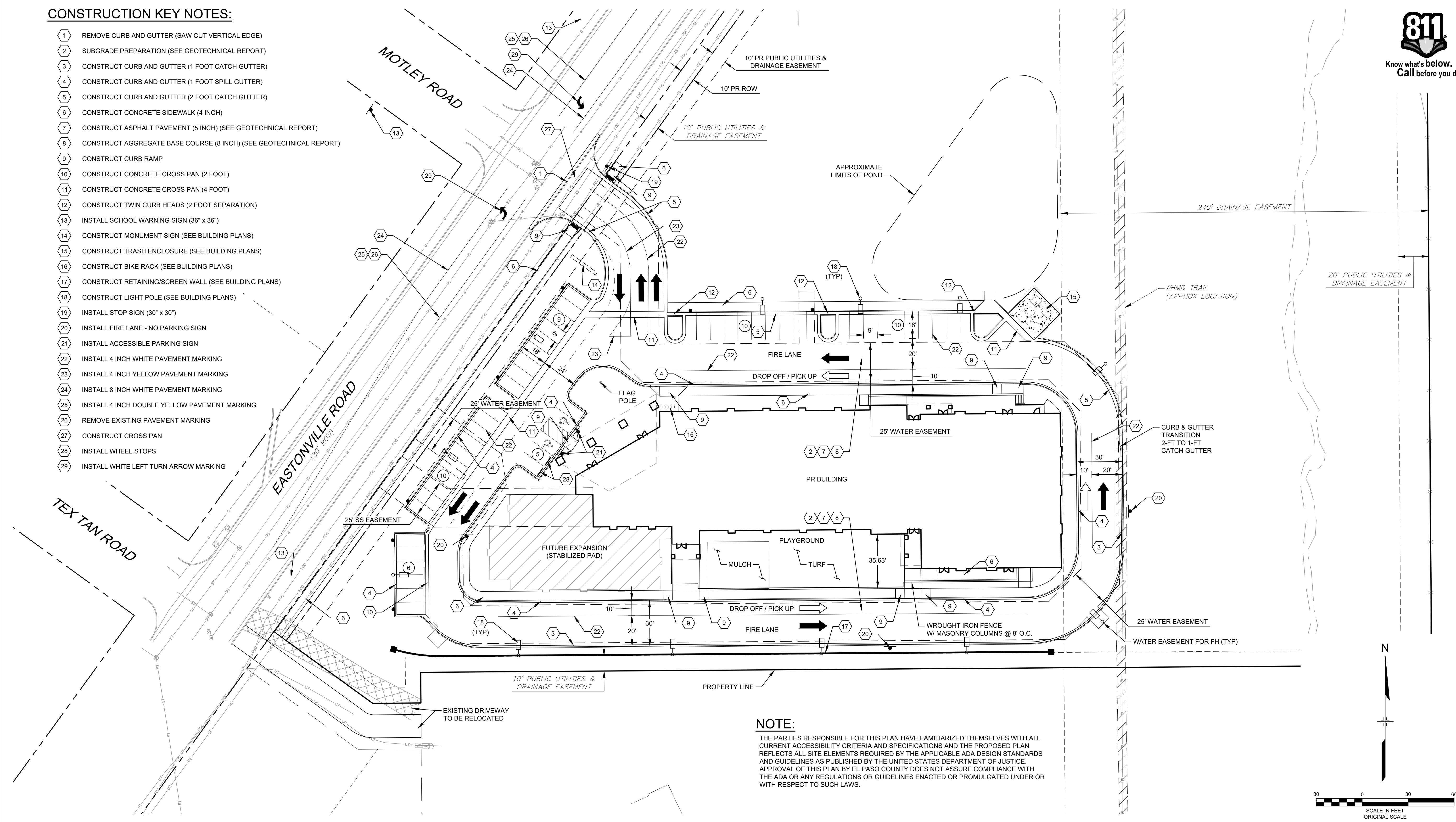
Reference:

This manual is adapted from Town of Parker, Colorado, *STORMWATER PERMANENT BEST MANAGEMENT PRACTICES (PBMP) LONG-TERM OPERATION AND MAINTENANCE MANUAL*, October 2004

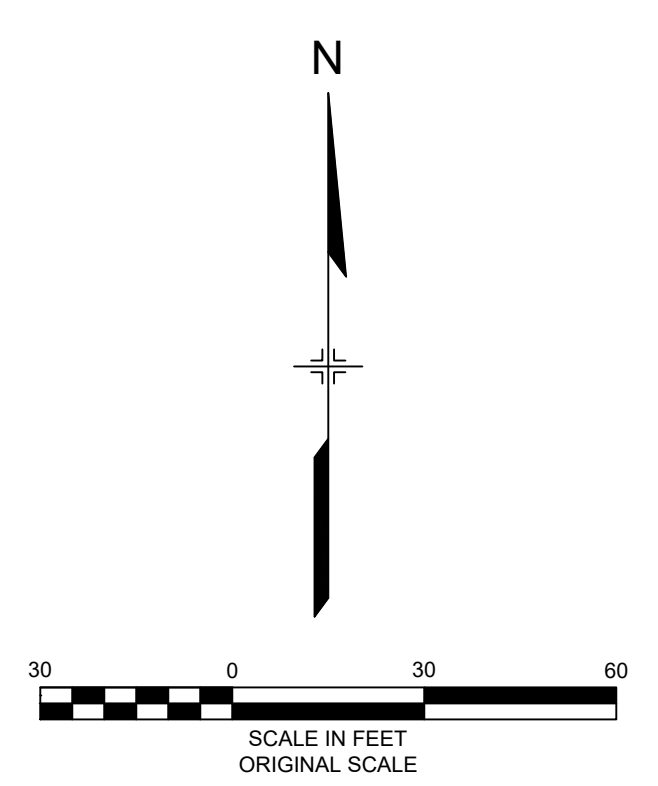


CONSTRUCTION KEY NOTES:

- 1 REMOVE CURB AND GUTTER (SAW CUT VERTICAL EDGE)
- 2 SUBGRADE PREPARATION (SEE GEOTECHNICAL REPORT)
- 3 CONSTRUCT CURB AND GUTTER (1 FOOT CATCH GUTTER)
- 4 CONSTRUCT CURB AND GUTTER (1 FOOT SPILL GUTTER)
- 5 CONSTRUCT CURB AND GUTTER (2 FOOT CATCH GUTTER)
- 6 CONSTRUCT CONCRETE SIDEWALK (4 INCH)
- 7 CONSTRUCT ASPHALT PAVEMENT (5 INCH) (SEE GEOTECHNICAL REPORT)
- 8 CONSTRUCT AGGREGATE BASE COURSE (8 INCH) (SEE GEOTECHNICAL REPORT)
- 9 CONSTRUCT CURB RAMP
- 10 CONSTRUCT CONCRETE CROSS PAN (2 FOOT)
- 11 CONSTRUCT CONCRETE CROSS PAN (4 FOOT)
- 12 CONSTRUCT TWIN CURB HEADS (2 FOOT SEPARATION)
- 13 INSTALL SCHOOL WARNING SIGN (36" x 36")
- 14 CONSTRUCT MONUMENT SIGN (SEE BUILDING PLANS)
- 15 CONSTRUCT TRASH ENCLOSURE (SEE BUILDING PLANS)
- 16 CONSTRUCT BIKE RACK (SEE BUILDING PLANS)
- 17 CONSTRUCT RETAINING/SCREEN WALL (SEE BUILDING PLANS)
- 18 CONSTRUCT LIGHT POLE (SEE BUILDING PLANS)
- 19 INSTALL STOP SIGN (30" x 30")
- 20 INSTALL FIRE LANE - NO PARKING SIGN
- 21 INSTALL ACCESSIBLE PARKING SIGN
- 22 INSTALL 4 INCH WHITE PAVEMENT MARKING
- 23 INSTALL 4 INCH YELLOW PAVEMENT MARKING
- 24 INSTALL 8 INCH WHITE PAVEMENT MARKING
- 25 INSTALL 4 INCH DOUBLE YELLOW PAVEMENT MARKING
- 26 REMOVE EXISTING PAVEMENT MARKING
- 27 CONSTRUCT CROSS PAN
- 28 INSTALL WHEEL STOPS
- 29 INSTALL WHITE LEFT TURN ARROW MARKING



NOTE:
 THE PARTIES RESPONSIBLE FOR THIS PLAN HAVE FAMILIARIZED THEMSELVES WITH ALL CURRENT ACCESSIBILITY CRITERIA AND SPECIFICATIONS AND THE PROPOSED PLAN REFLECTS ALL SITE ELEMENTS REQUIRED BY THE APPLICABLE ADA DESIGN STANDARDS AND GUIDELINES AS PUBLISHED BY THE UNITED STATES DEPARTMENT OF JUSTICE. APPROVAL OF THIS PLAN BY EL PASO COUNTY DOES NOT ASSURE COMPLIANCE WITH THE ADA OR ANY REGULATIONS OR GUIDELINES ENACTED OR PROMULGATED UNDER OR WITH RESPECT TO SUCH LAWS.



| REFERENCE DRAWINGS | | | |
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| X-995-MD-022x34 | | | |
| X-995-PR-BASE | | | |
| X-995-EX-BASE | | | |
| X-995-EX-MAP | | | |
| X-995-PR-UTIL | | | |
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| REVISIONS | | | |
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LIBERTY TREE ACADEMY

PREPARED BY:
Matrix DESIGN GROUP
 AN EMPLOYEE-OWNED COMPANY

SEAL

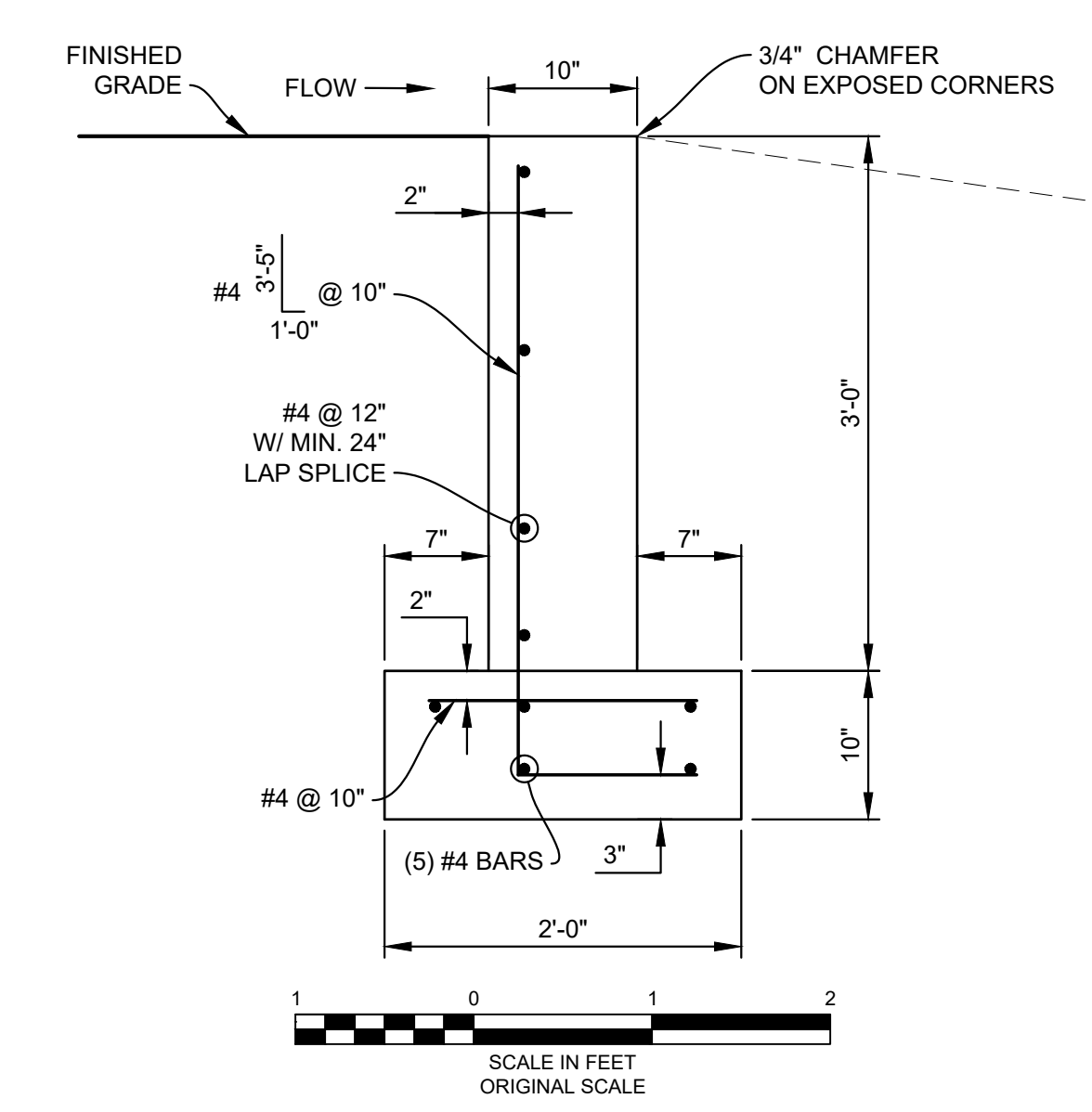
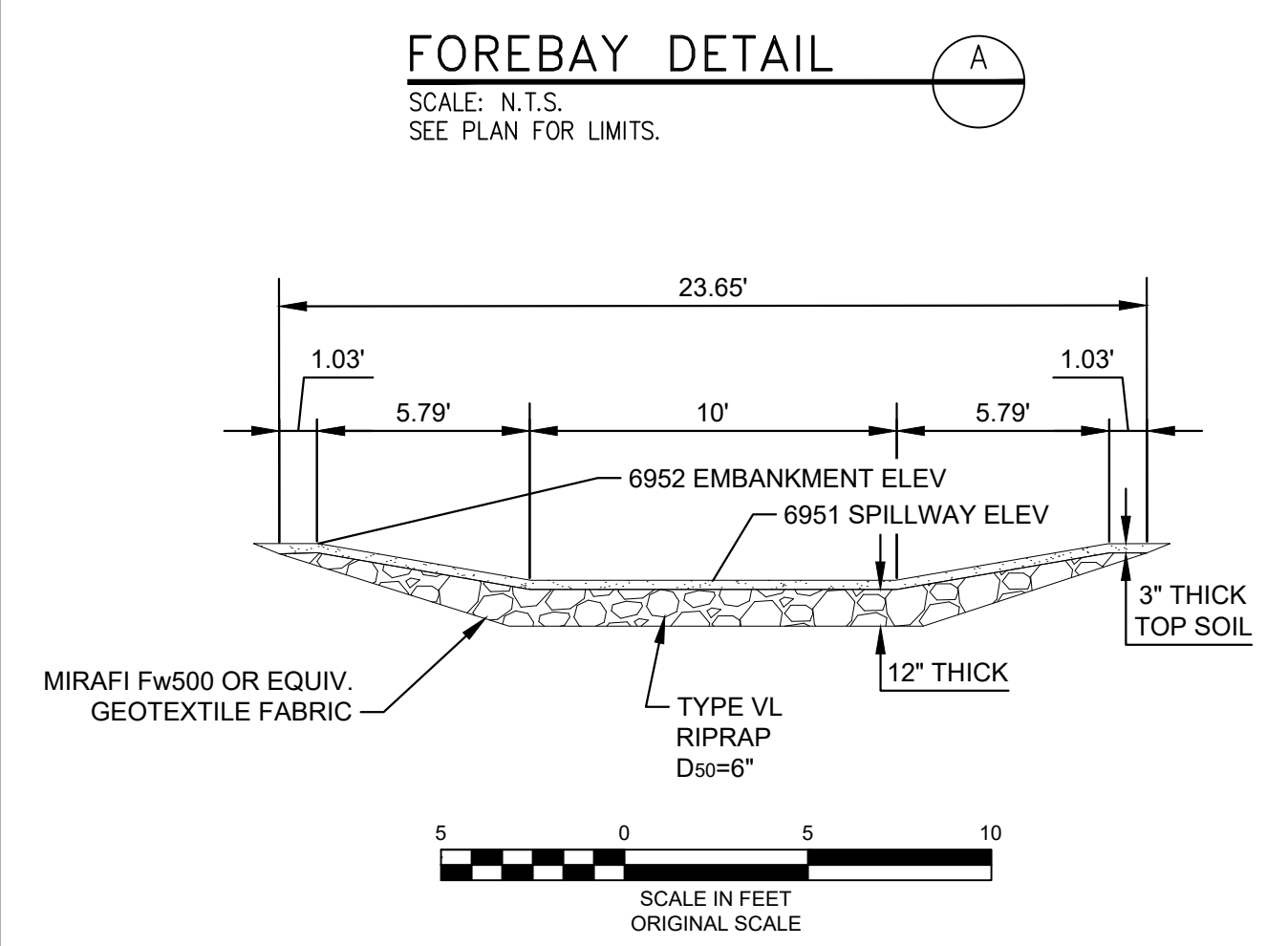
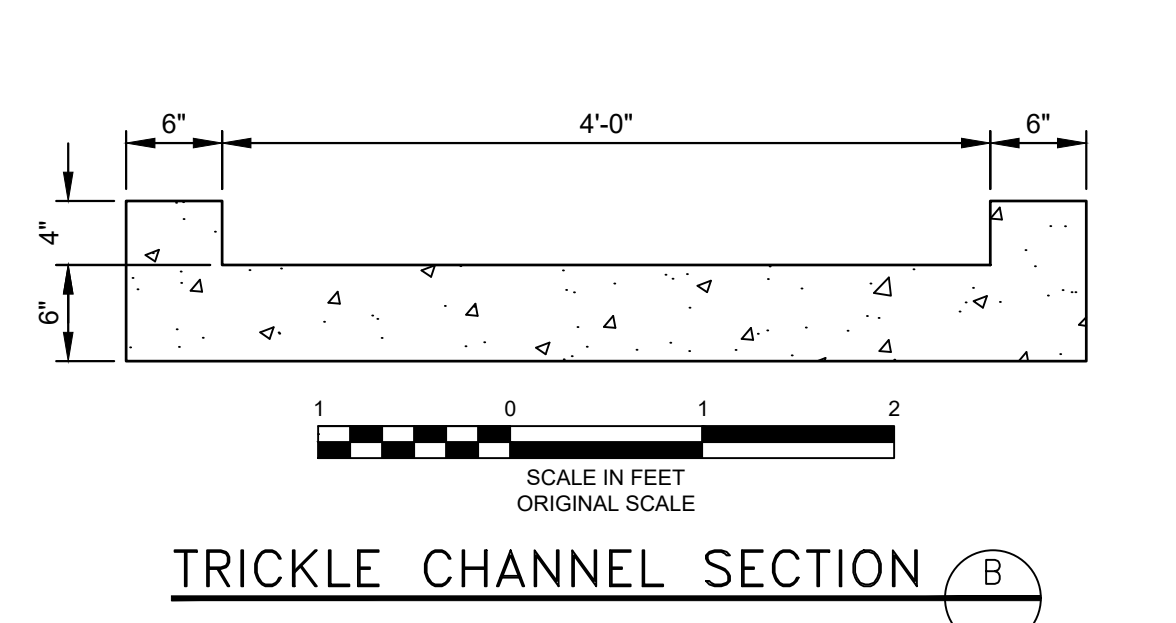
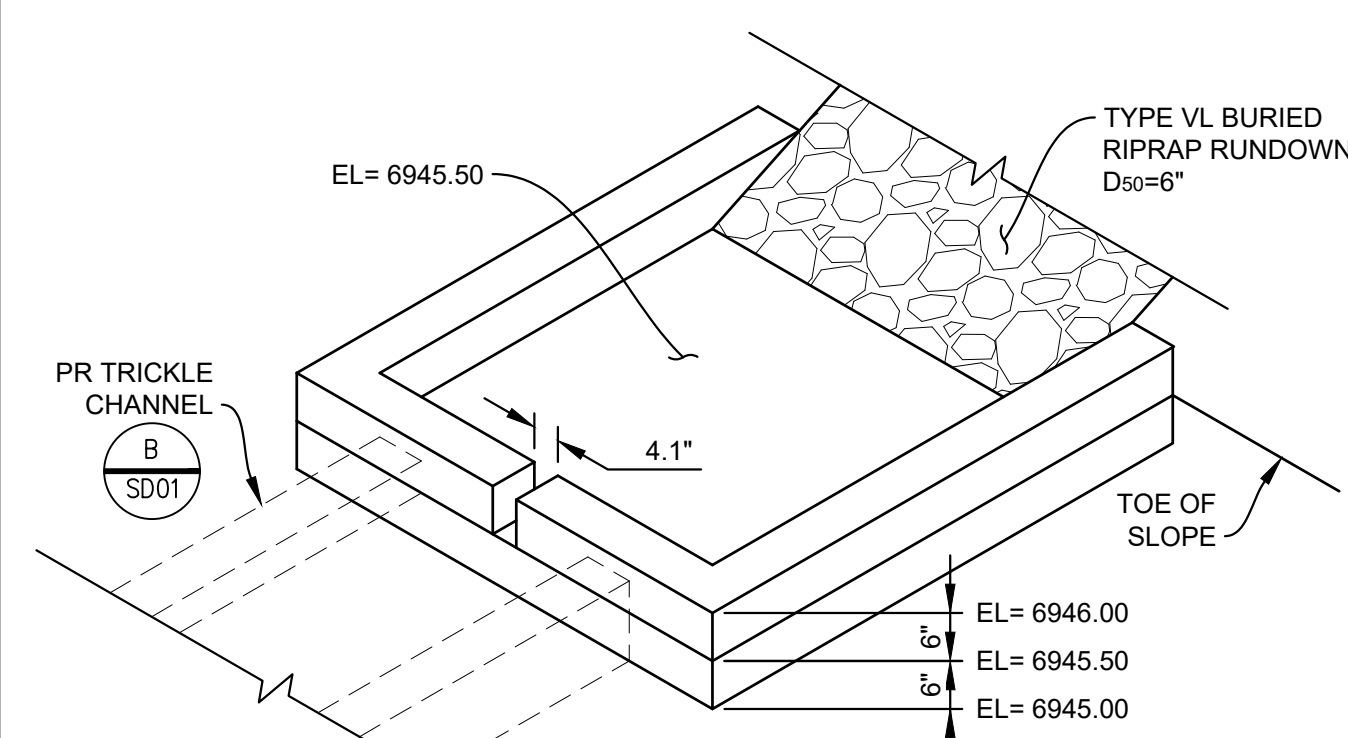
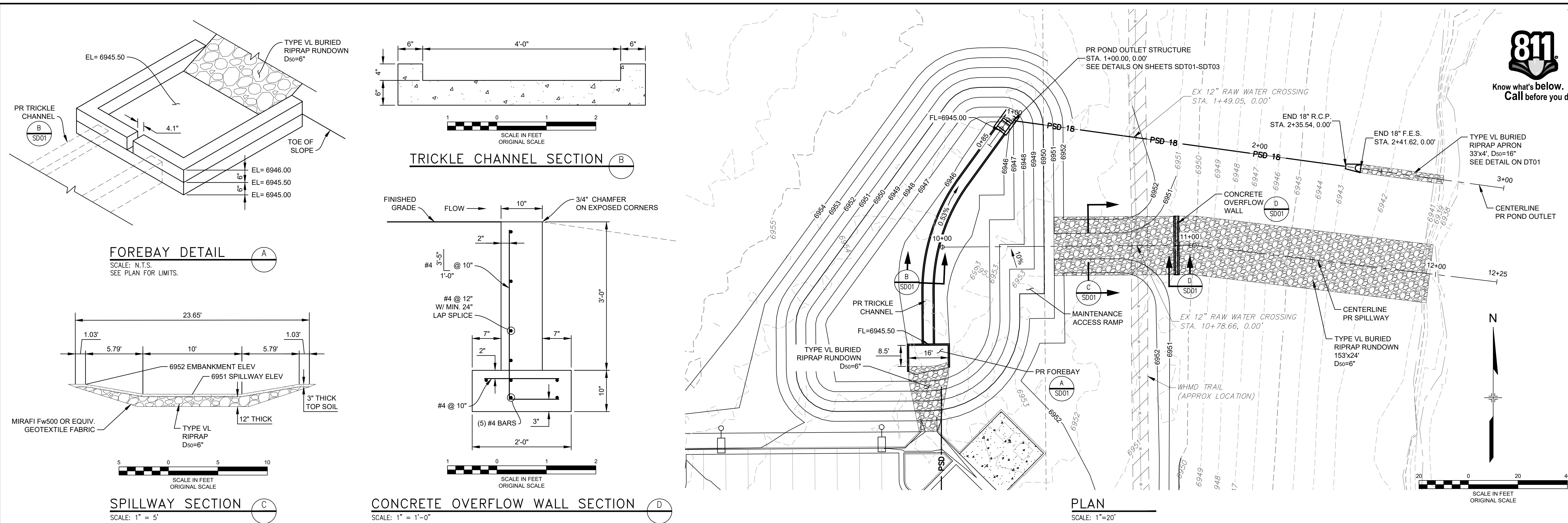
FOR AND ON BEHALF OF
 MATRIX DESIGN GROUP, INC.
 PROJECT No. 18.995.001

LIBERTY TREE ACADEMY

TOWN OF PEYTON, EL PASO COUNTY
 CONSTRUCTION DOCUMENTS, PCD FILE NO. PPR-18-023

SITE PLAN

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| DRAWN BY: ACR | HORIZ. NA | SHEET 4 OF 29 | |
| CHECKED BY: DRK | VERT. NA | | |



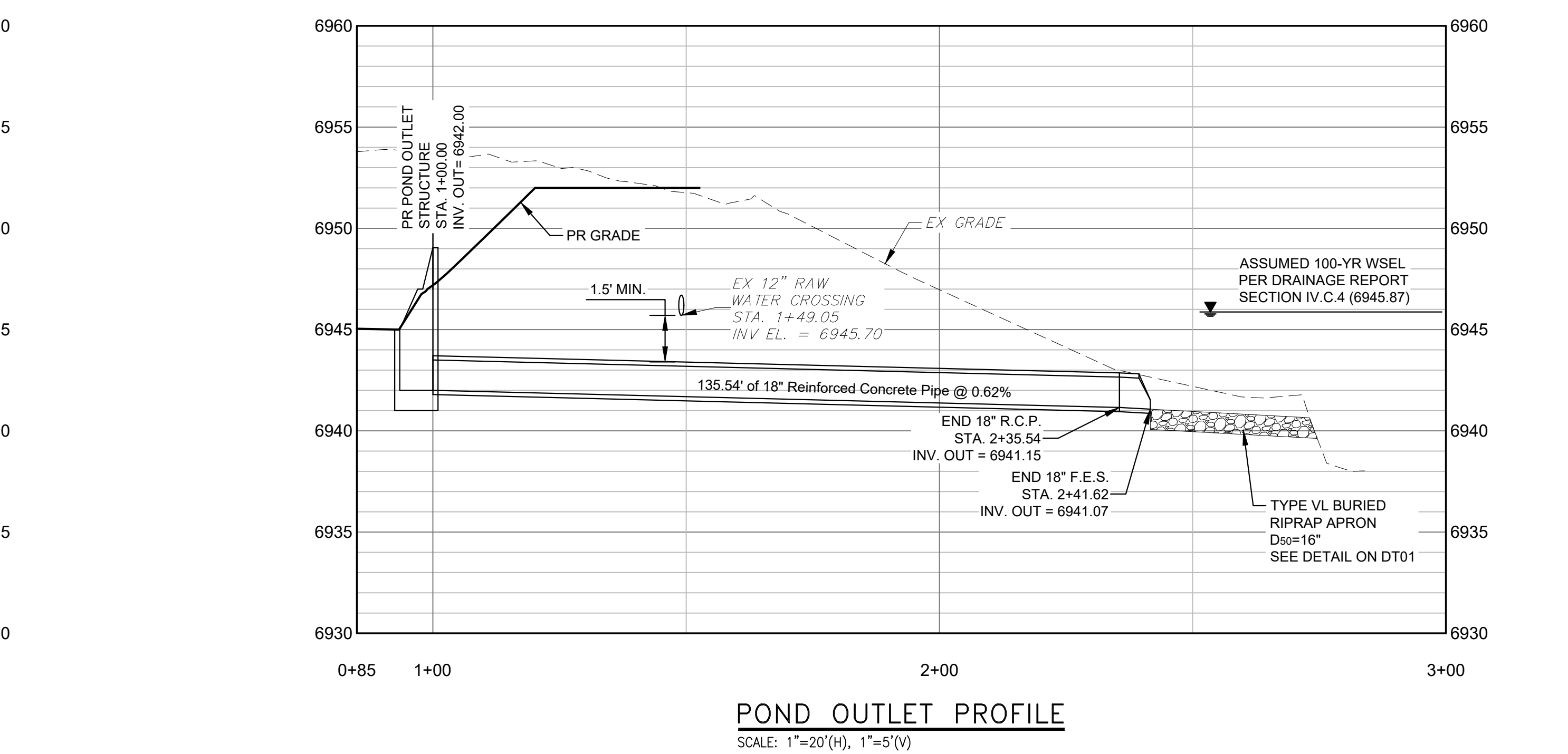
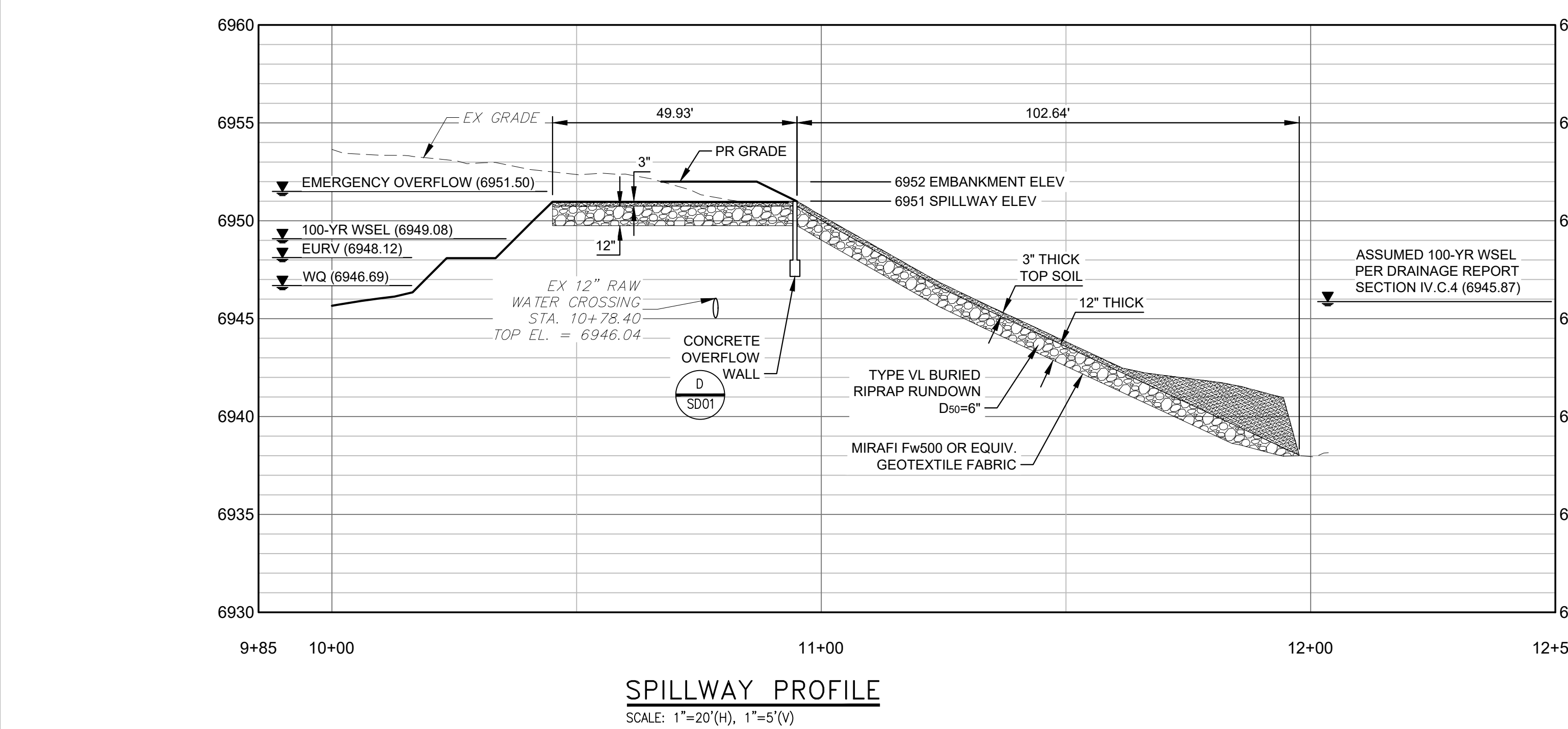
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SCALE: N.T.S. SEE PLAN FOR LIMITS.

TRICKLE CHANNEL SECTION (B)
SCALE IN FEET ORIGINAL SCALE

SPILLWAY SECTION (C)
SCALE: 1" = 5'

CONCRETE OVERFLOW WALL SECTION (D)
SCALE: 1" = 1'-0"

PLAN
SCALE: 1" = 20'



SPILLWAY PROFILE
SCALE: 1"=20'(H), 1"=5'(V)

POND OUTLET PROFILE
SCALE: 1"=20'(H), 1"=5'(V)

REFERENCE DRAWINGS

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| X:995-EX-BASE |
| X:995-EX-MAP |
| X:995-PR-BASE |

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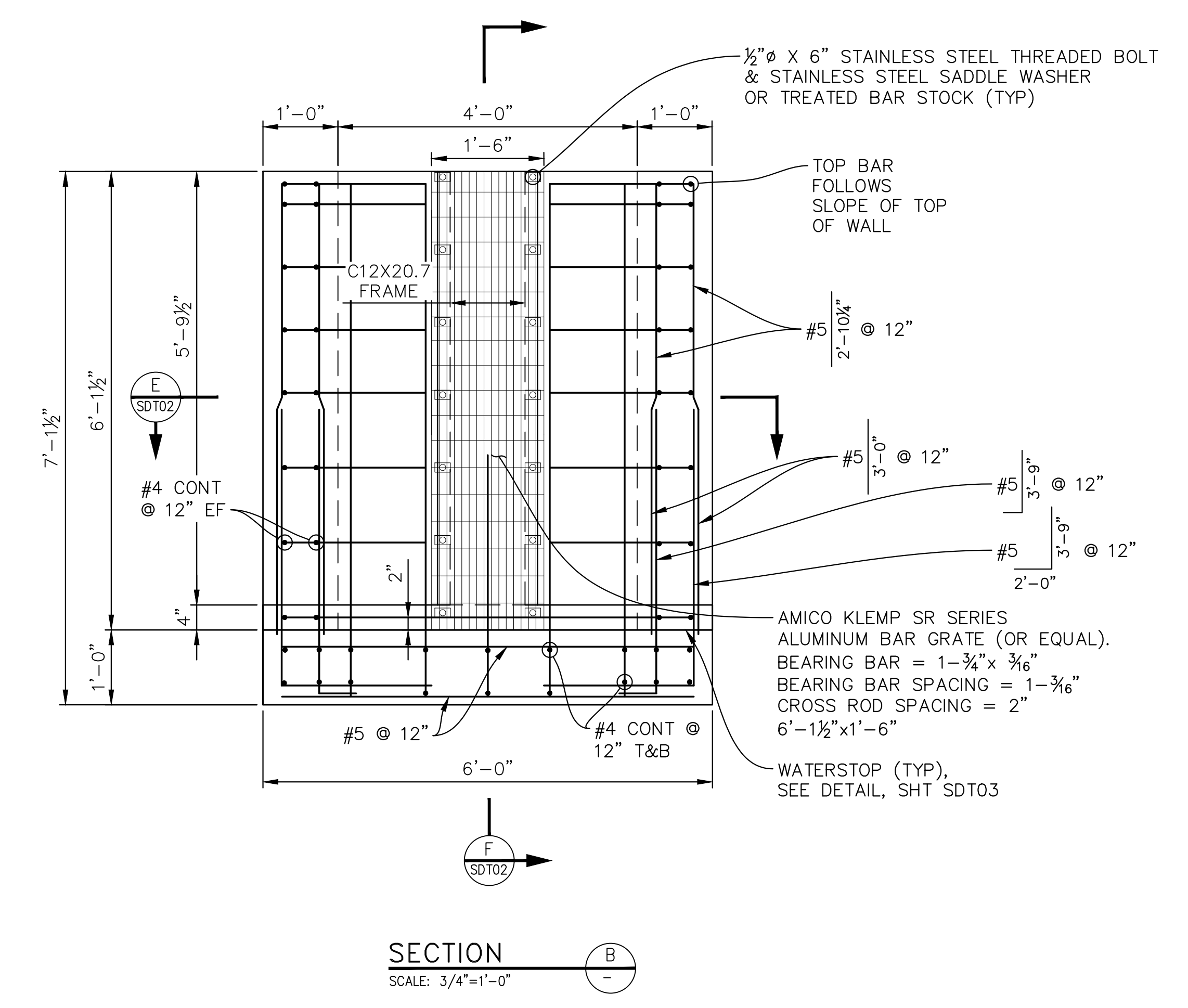
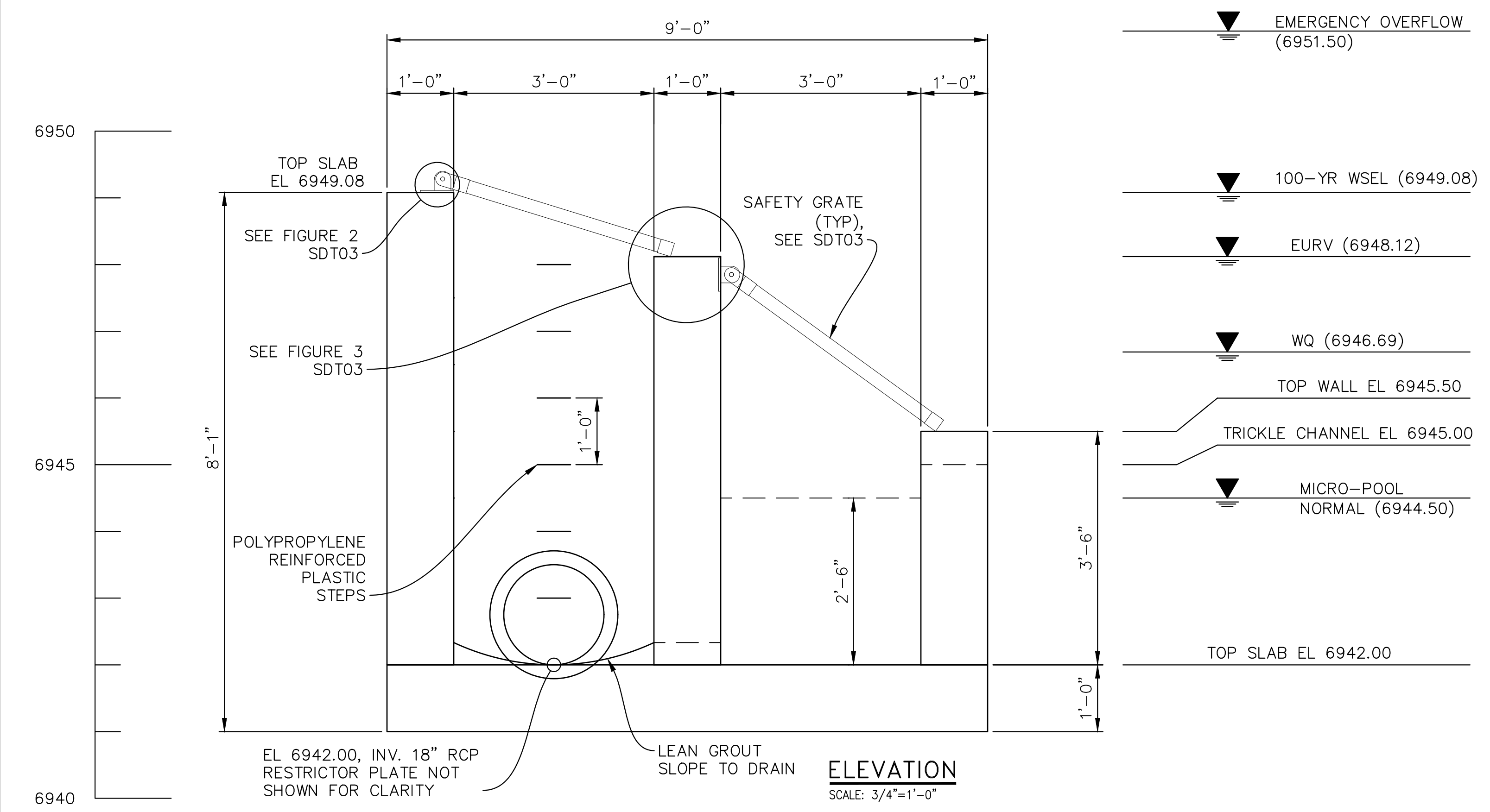
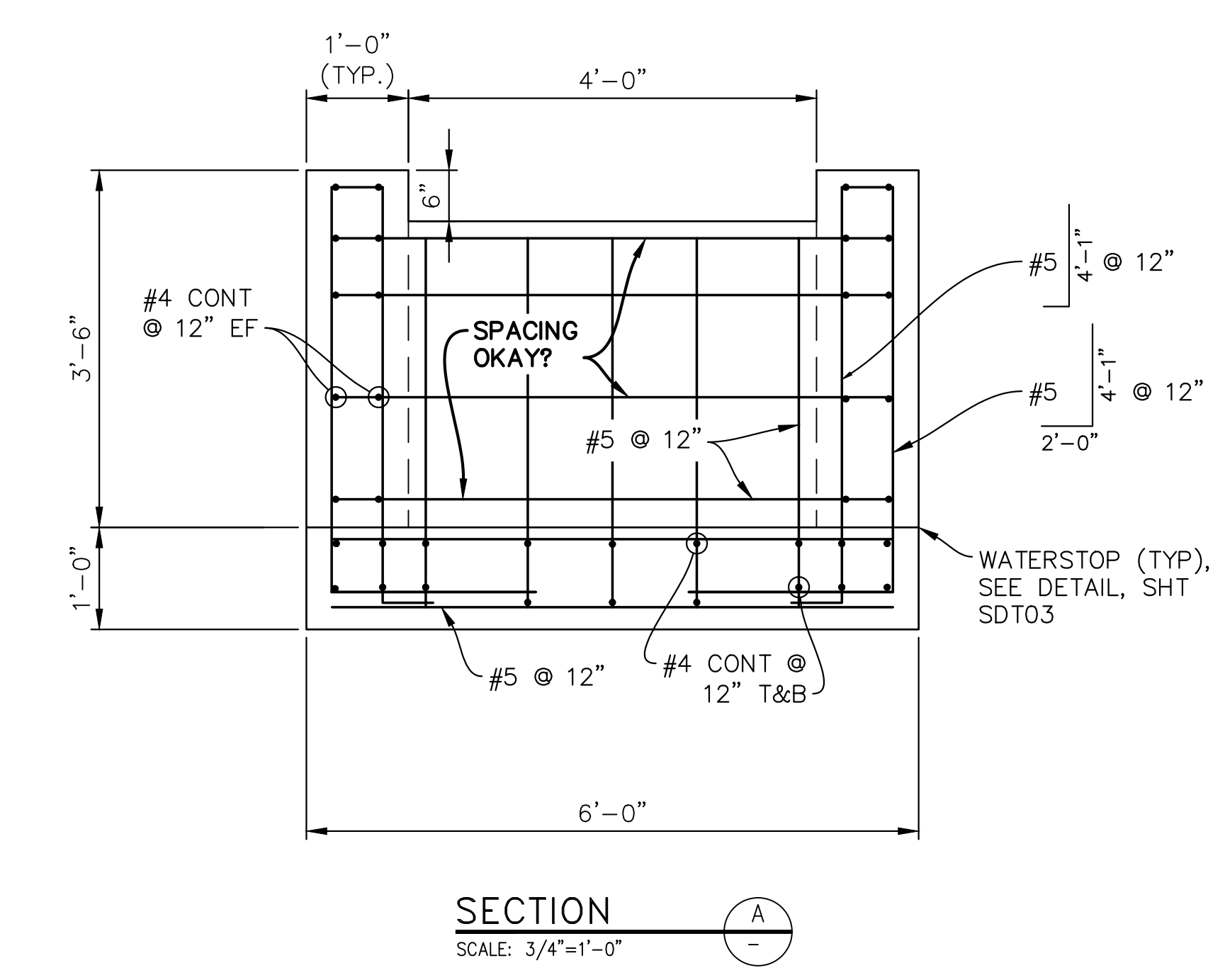
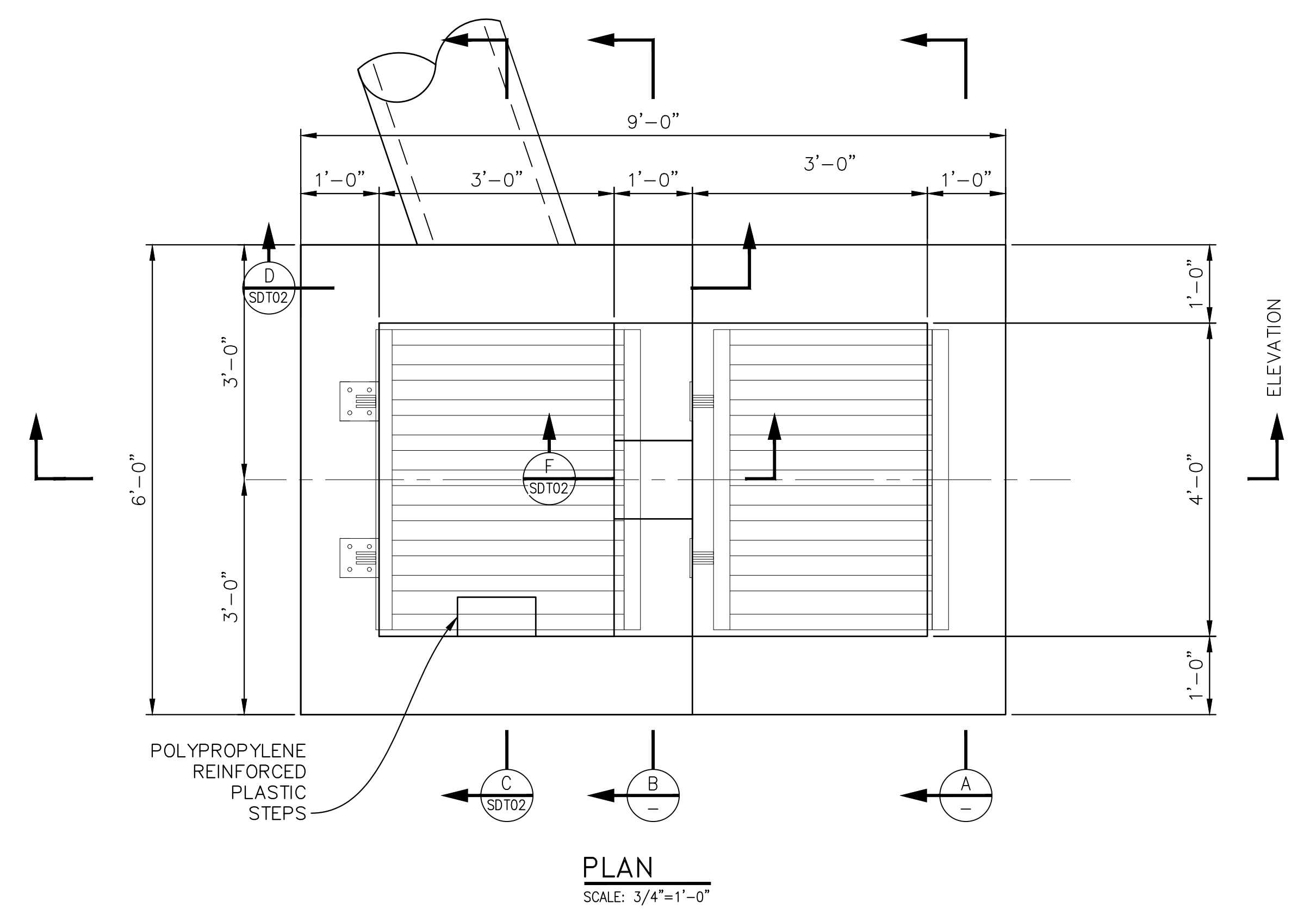
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TOWN OF PEYTON, EL PASO COUNTY
CONSTRUCTION DOCUMENTS, PCD FILE NO. PPR-18-023

POND OUTLET & SPILLWAY PLAN & PROFILE

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| CHECKED BY: DRK | VERT. 1" = 5' | SHEET 10 OF 20 | |



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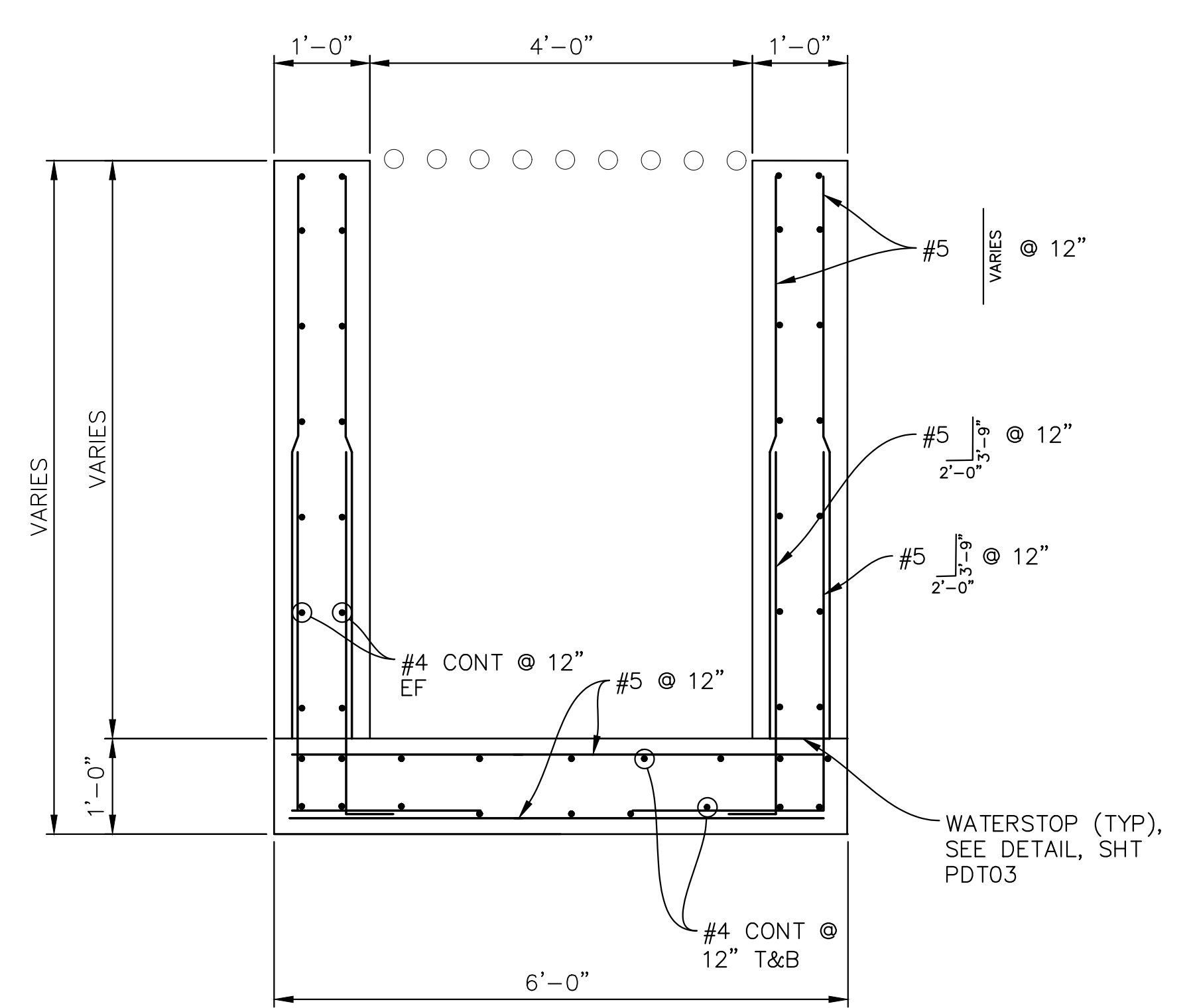
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PROJECT No. 18.995.001

LIBERTY TREE ACADEMY

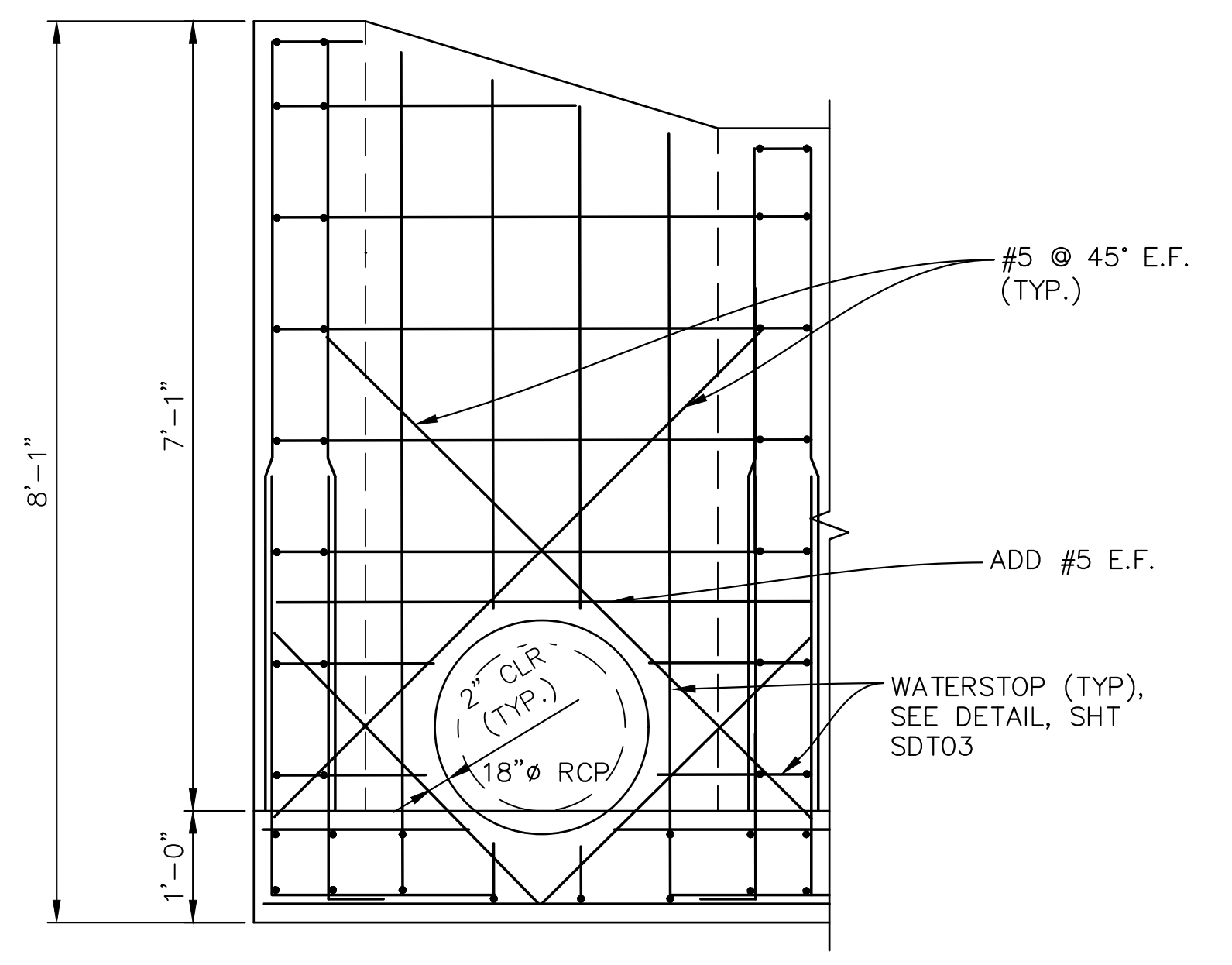
TOWN OF PEYTON, EL PASO COUNTY
CONSTRUCTION DOCUMENTS, PCD FILE NO. PPR-18-023

POND OUTLET STRUCTURE DETAILS

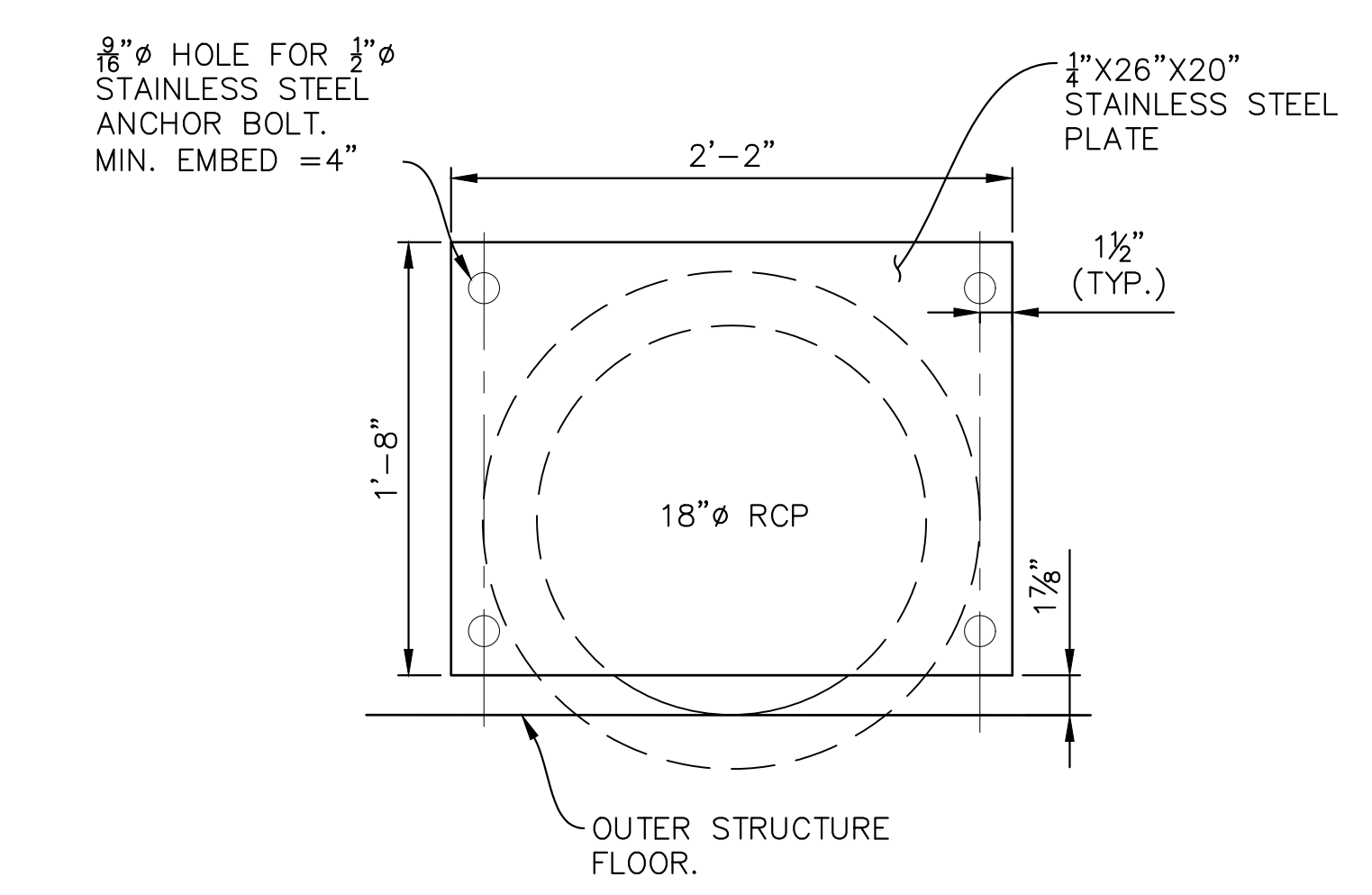
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|------------------|--------------------------|--------------------------|-------------------|
| DESIGNED BY: ACR | SCALE: HORIZ. 3/8"=1'-0" | DATE ISSUED: AUGUST 2018 | DRAWING No. SDT01 |
| DRAWN BY: ACR | VERT. 3/8"=1'-0" | SHEET 20 OF 29 | |
| CHECKED BY: DRK | | | |



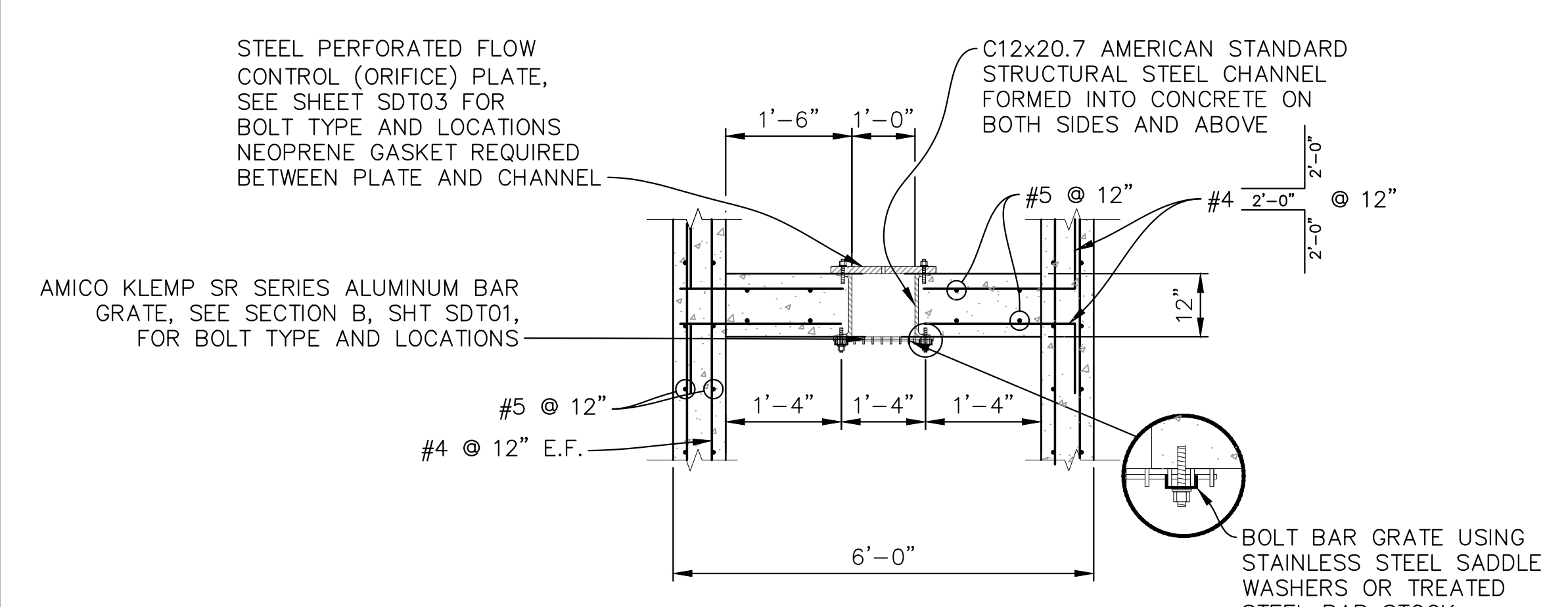
SECTION C
SCALE: 3/4"=1'-0"



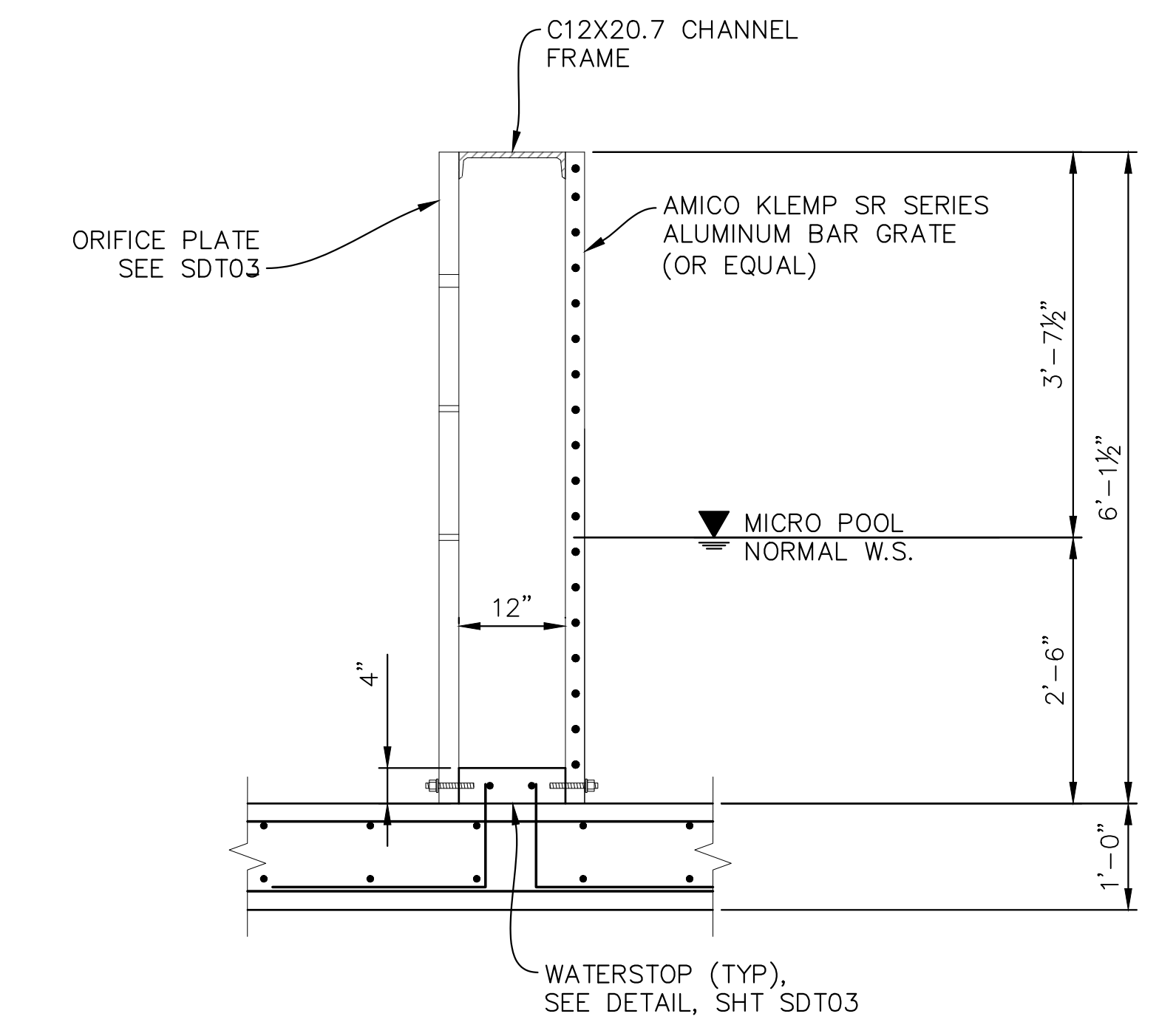
SECTION D
SCALE: 3/4"=1'-0"



RESTRICTOR PLATE DETAIL
SCALE: 1-1/2"=1'-0"



SECTION E
SCALE: 1/2"=1'-0"



SECTION F
SCALE: 3/4"=1'-0"

| No. | DATE | DESCRIPTION | BY |
|--|------|-------------|----|
| REVISIONS | | | |
| COMPUTER FILE MANAGEMENT | | | |
| FILE NAME: R:118.995.001 (Liberty Tree Academy)\Dwg\Construction Plans\Structures\SDT01-03.dwg | | | |
| CTB FILE: --- | | | |
| PLOT DATE: 8/10/2018 11:40 AM | | | |
| THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE. | | | |

| NO. | DATE | DESCRIPTION | BY |
|-----------|------|-------------|----|
| REVISIONS | | | |

PREPARED FOR:
LIBERTY TREE ACADEMY

PREPARED BY:
Matrix DESIGN GROUP
AN EMPLOYEE-OWNED COMPANY

SEAL

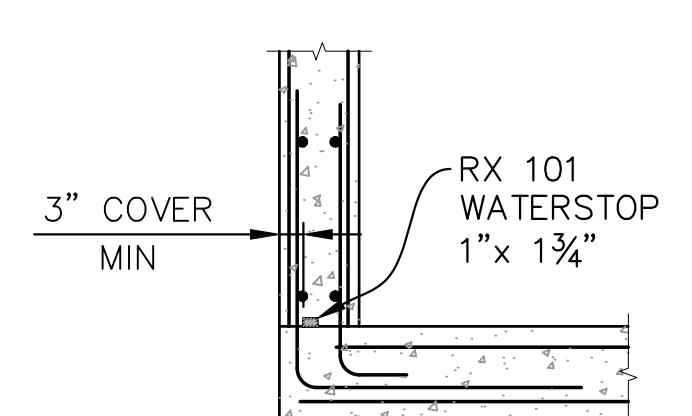
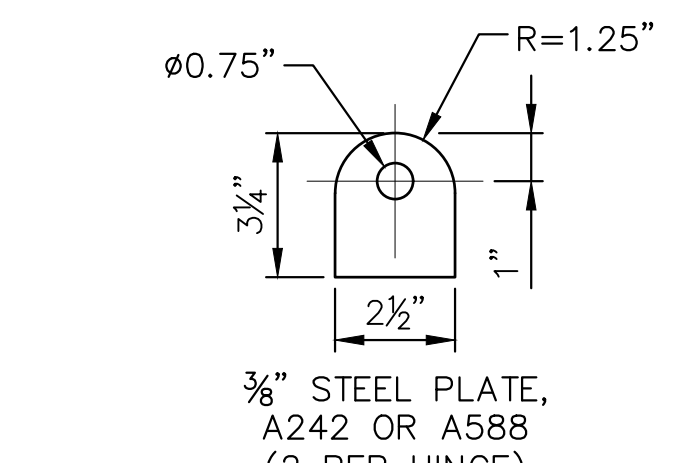
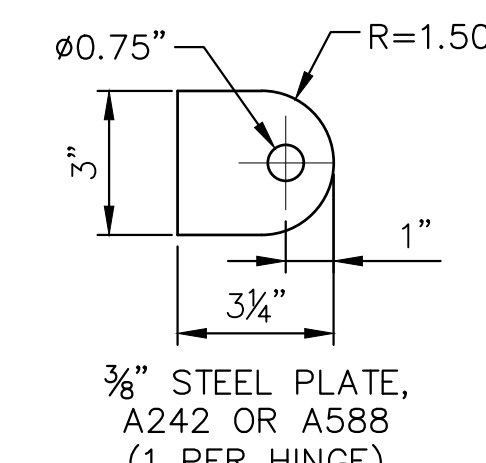
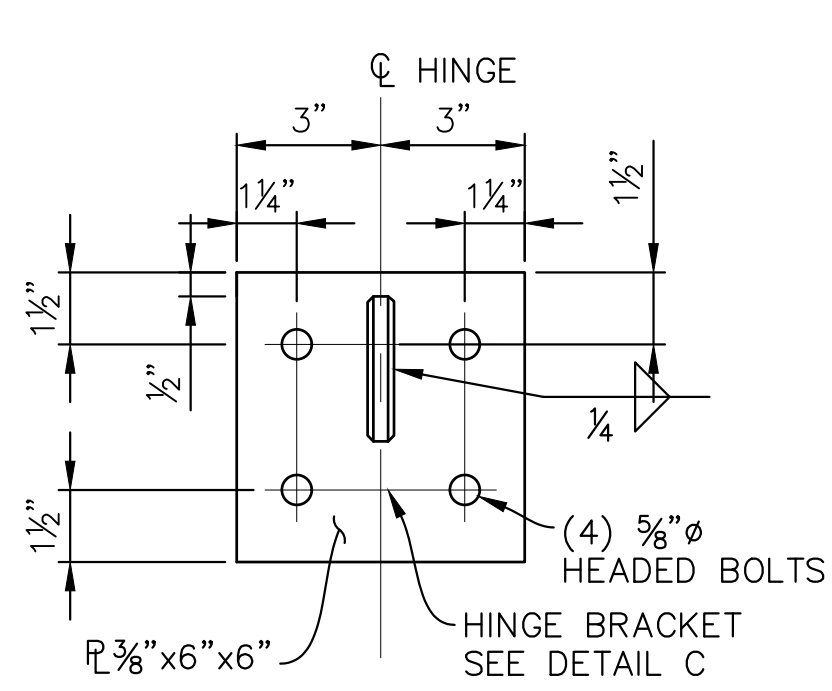
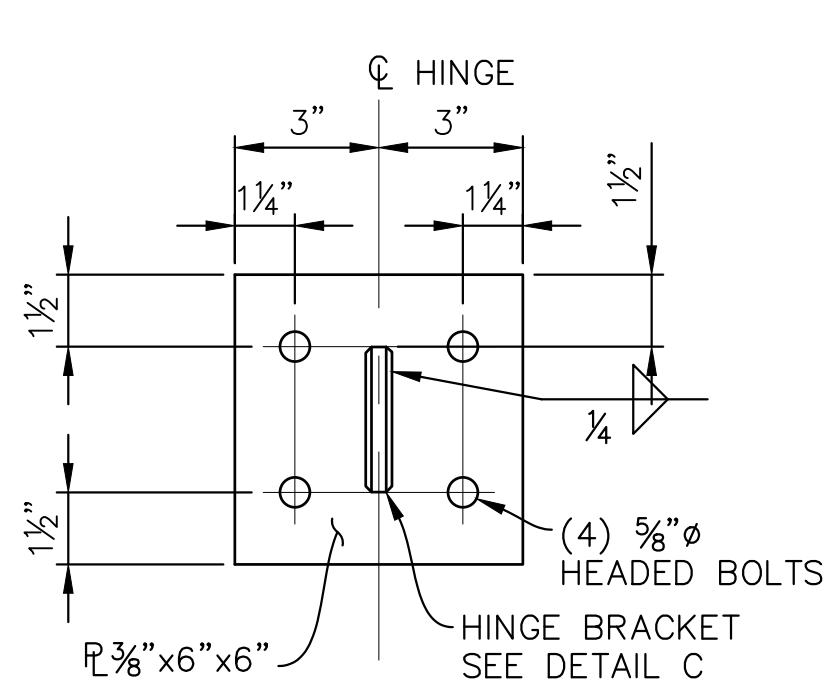
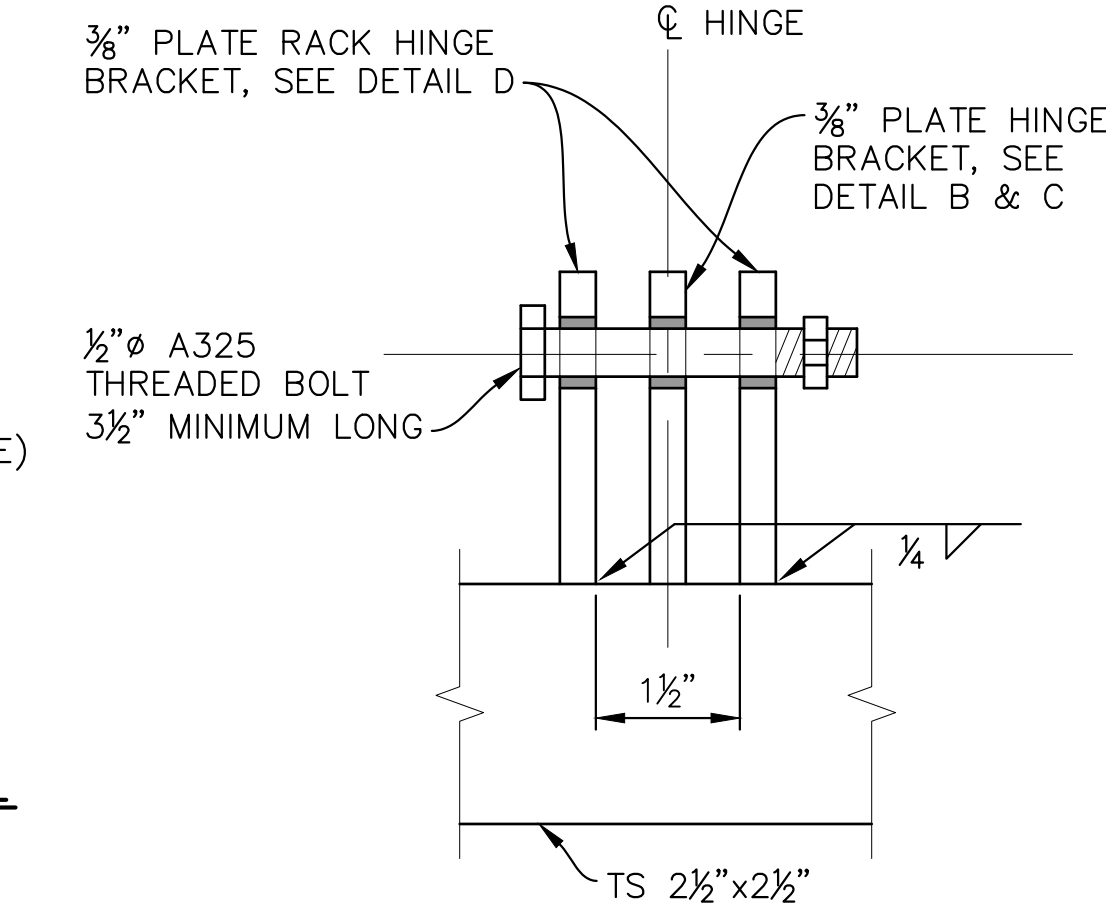
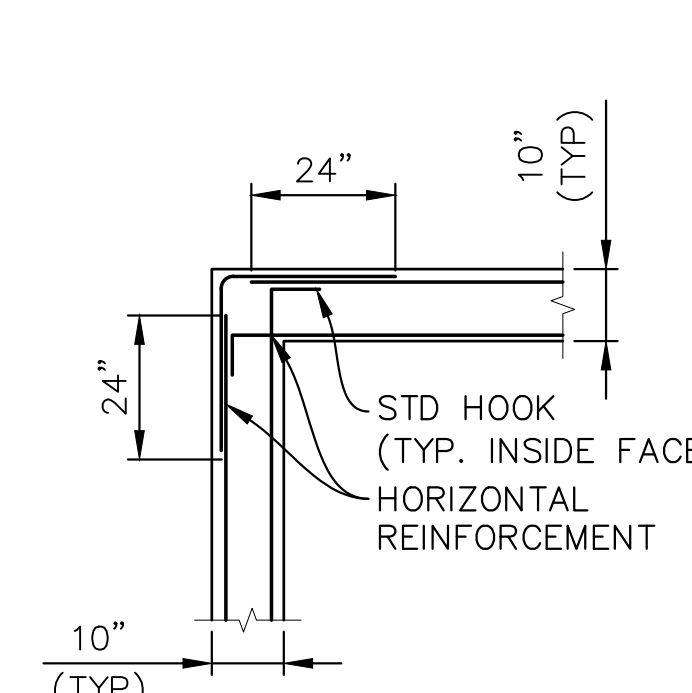
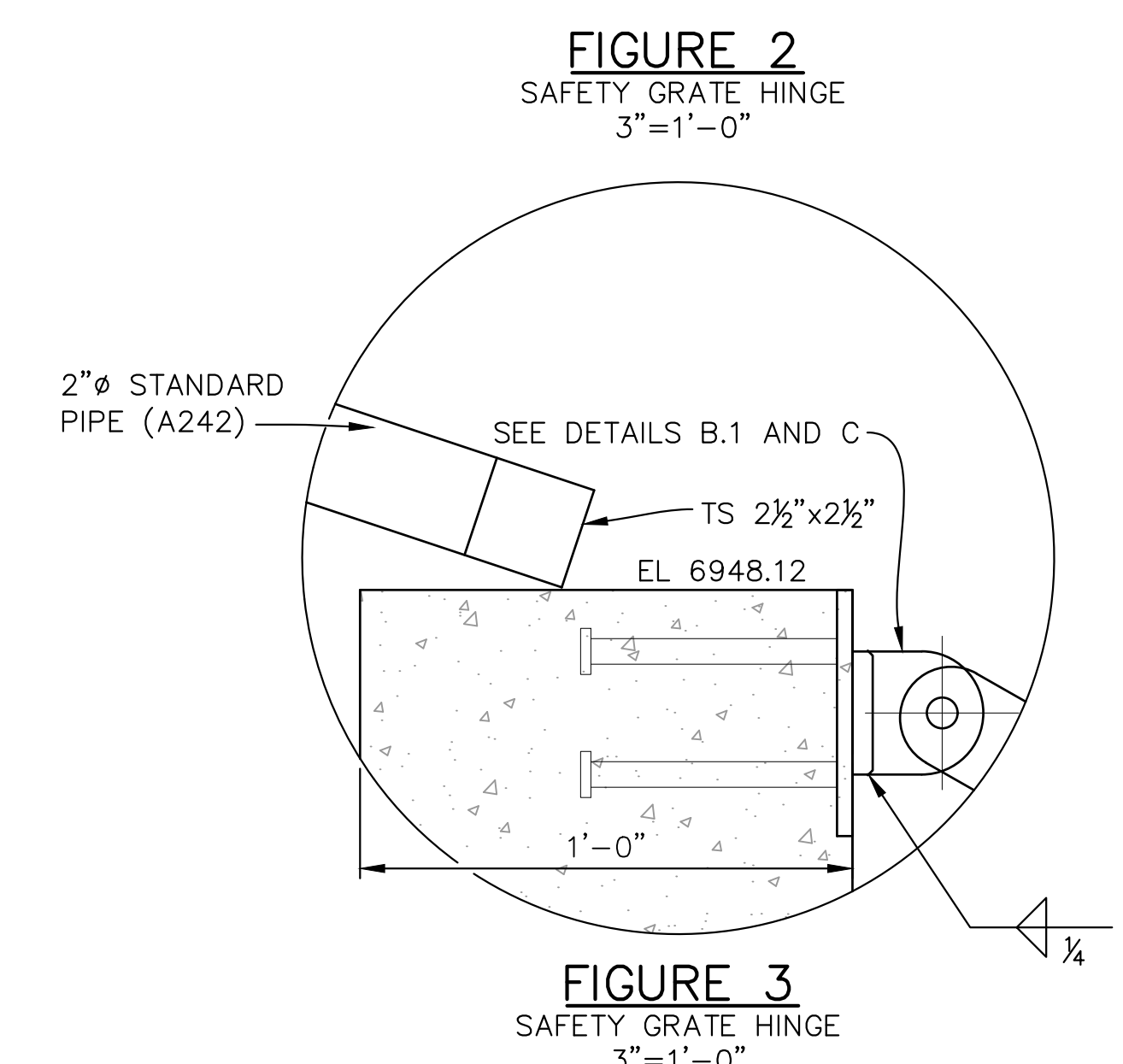
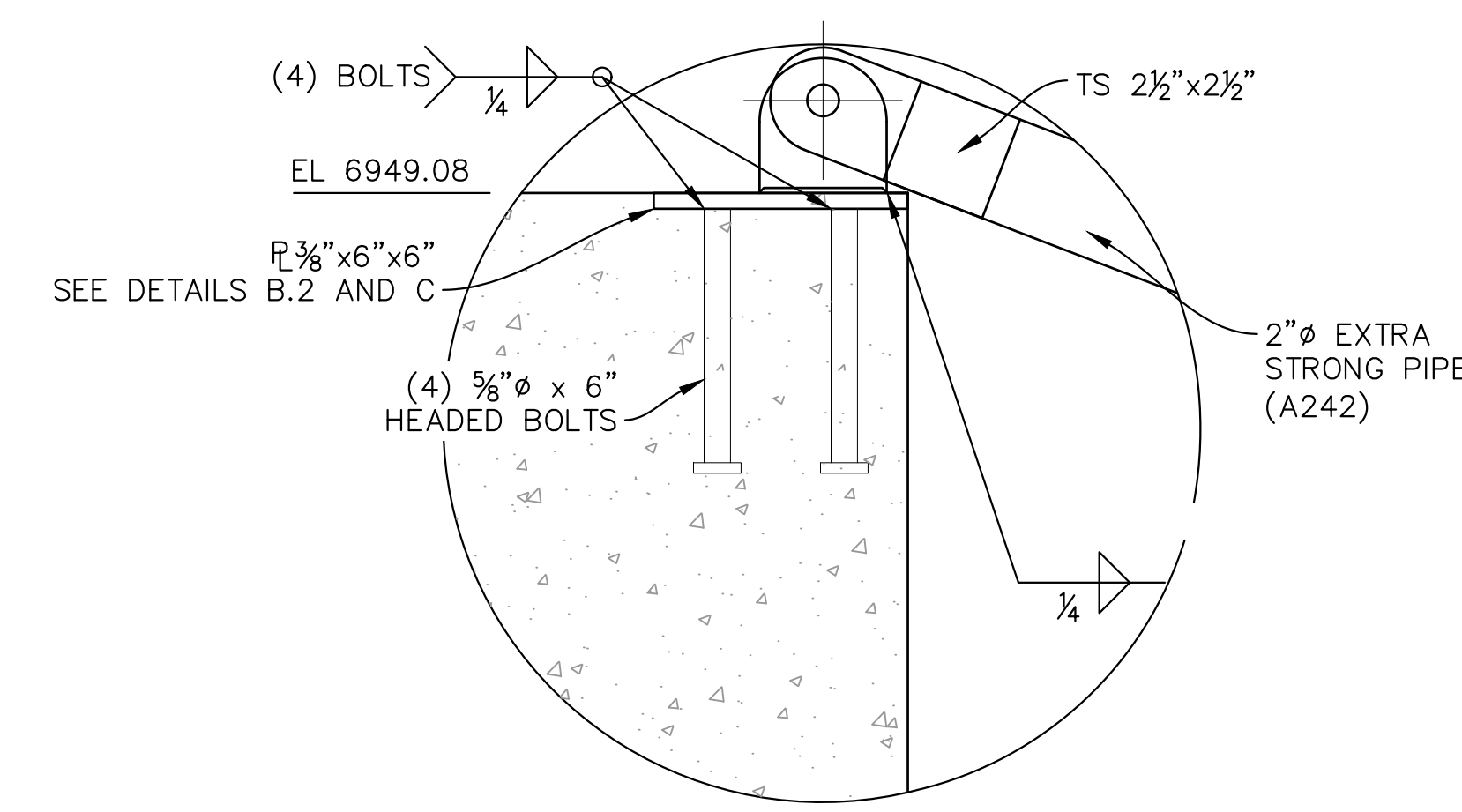
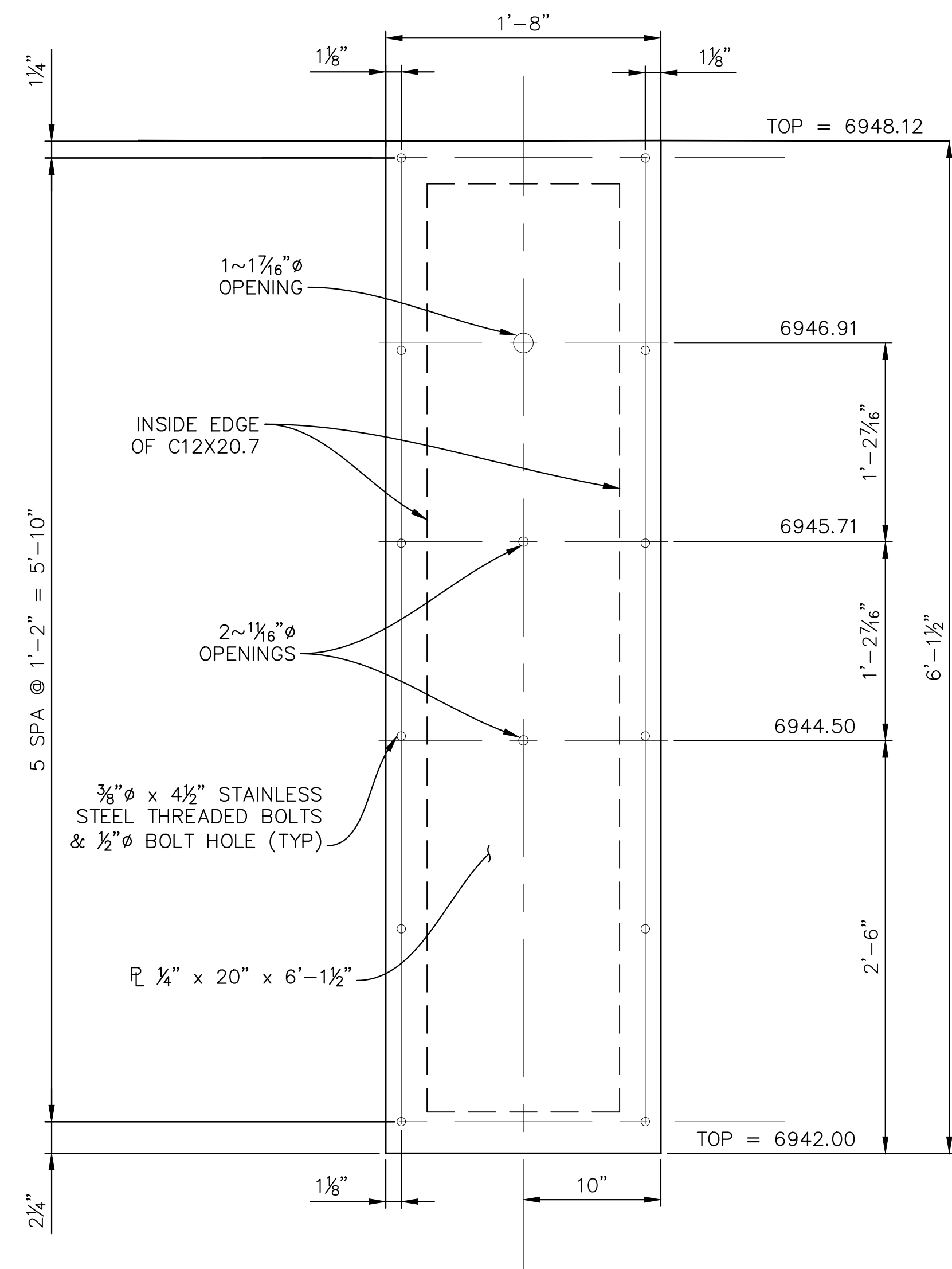
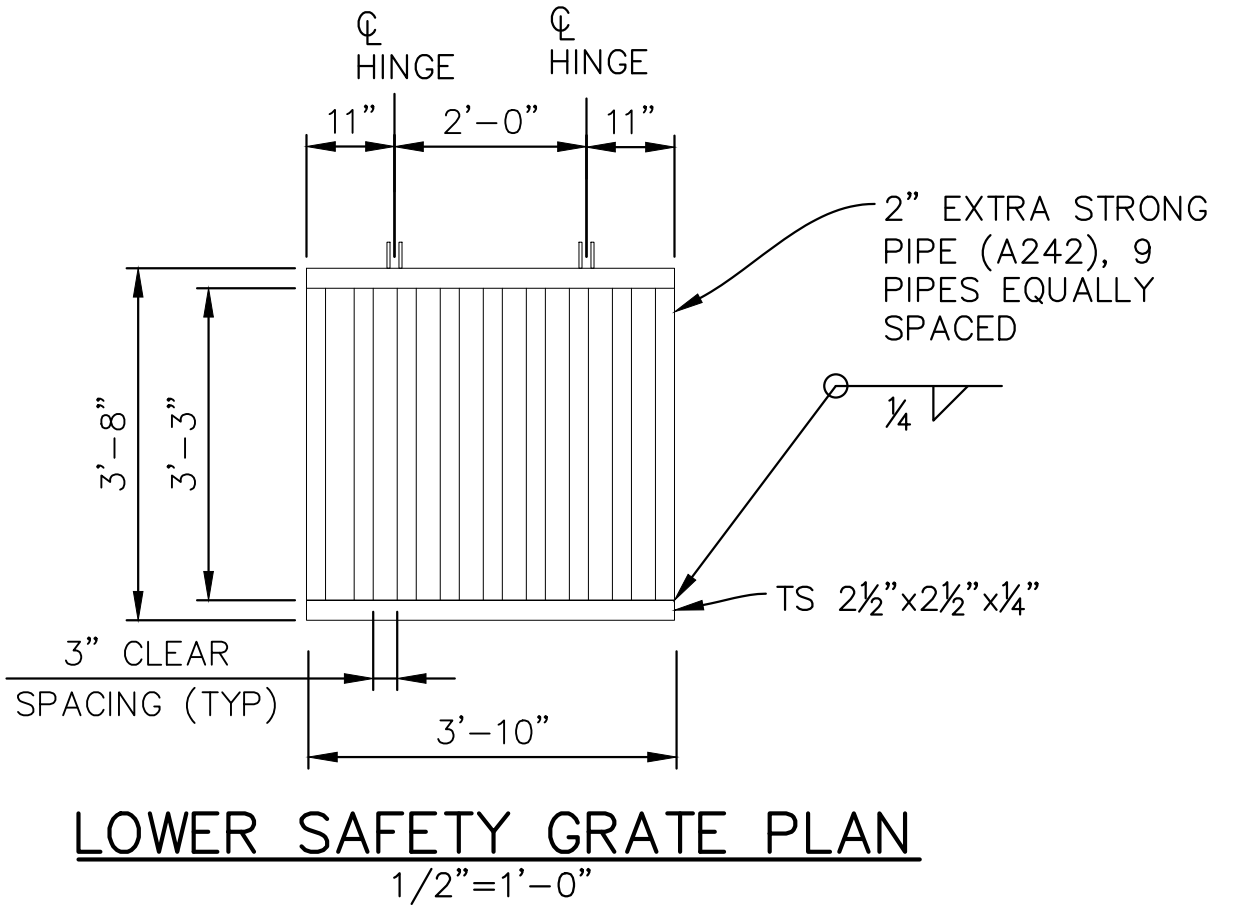
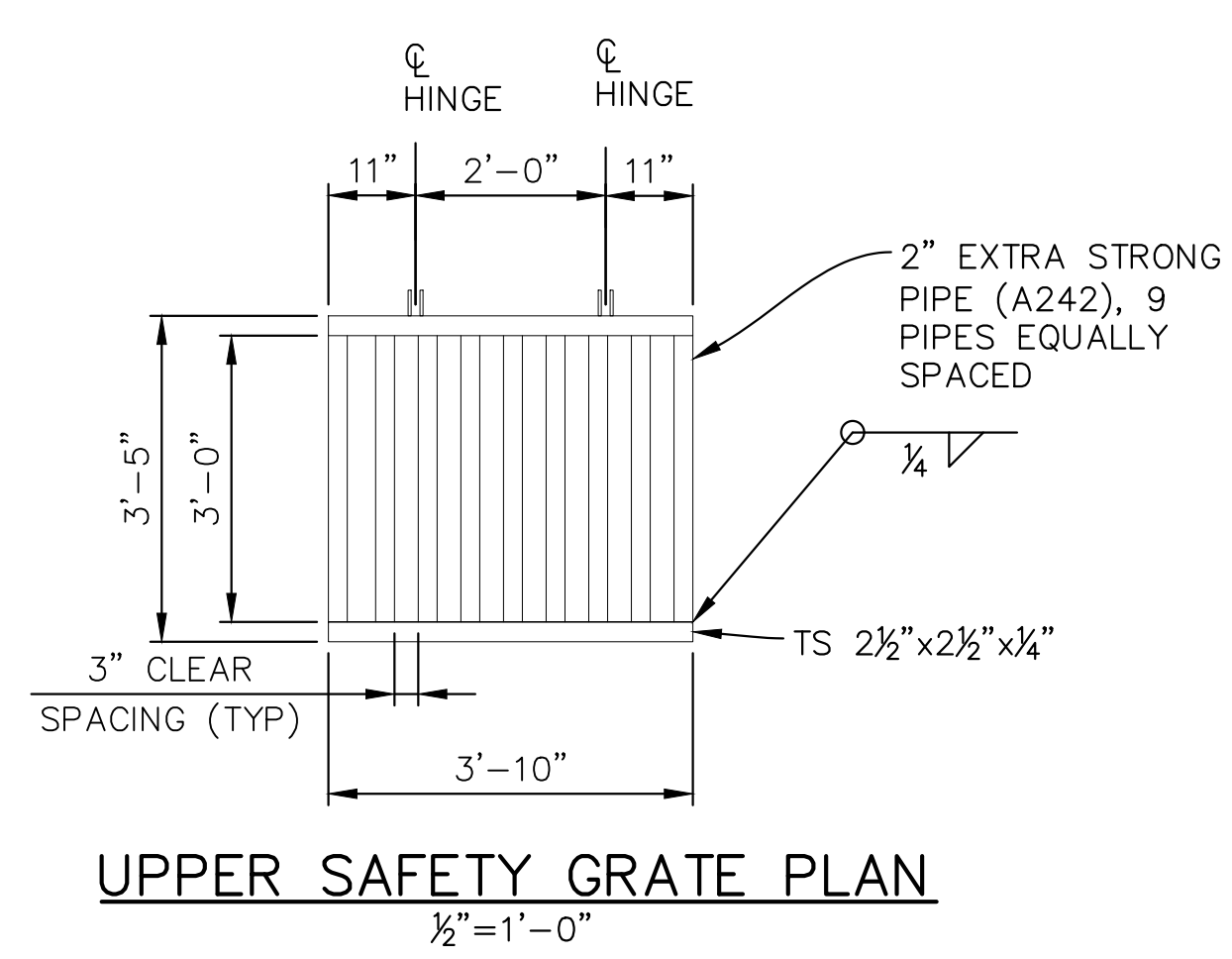
FOR AND ON BEHALF OF
MATRIX DESIGN GROUP, INC.
PROJECT No. 18.995.001

LIBERTY TREE ACADEMY

TOWN OF PEYTON, EL PASO COUNTY
CONSTRUCTION DOCUMENTS, PCD FILE NO. PPR-18-023

POND OUTLET STRUCTURE DETAILS

| | | | |
|------------------|--------|--------------------------|-------------------|
| DESIGNED BY: ACR | SCALE: | DATE ISSUED: AUGUST 2018 | DRAWING No. SDT02 |
| DRAWN BY: ACR | HORIZ. | SHEET 21 OF 29 | |
| CHECKED BY: DRK | VERT. | | |



NOTES:
 WATERSTOP SHALL BE VOLCLAY WATERSTOP RX 101 OR EARTHSHIELD JP 648 OR APPROVED EQUAL.
 PLACE WATERSTOP FOR ENTIRETY OF EACH HORIZONTAL & VERTICAL CONSTRUCTION JOINT.
 FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS.

| No. | DATE | DESCRIPTION | BY |
|--|------|-------------|----|
| COMPUTER FILE MANAGEMENT | | | |
| FILE NAME: R:118.995.001 (Liberty Tree Academy)\Dwg\Construction Plans\Structures\SDT01-03.dwg | | | |
| CTB FILE: --- | | | |
| PLOT DATE: 8/10/2018 11:40 AM | | | |
| THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE. | | | |

| NO. | DATE | DESCRIPTION | BY |
|-----|------|-------------|----|
| | | | |

| NO. | DATE | DESCRIPTION | BY |
|-----|------|-------------|----|
| | | | |

PREPARED FOR:
LIBERTY TREE ACADEMY

PREPARED BY:
Matrix DESIGN GROUP
 AN EMPLOYEE-OWNED COMPANY

SEAL

FOR AND ON BEHALF OF
 MATRIX DESIGN GROUP, INC.
 PROJECT No. 18.995.001

LIBERTY TREE ACADEMY
 TOWN OF PEYTON, EL PASO COUNTY
 CONSTRUCTION DOCUMENTS, PCD FILE NO. PPR-18-023

POND OUTLET STRUCTURE DETAILS

| | | | |
|------------------|-----------------------|--------------------------|-------------------|
| DESIGNED BY: ACR | SCALE: HORIZ AS SHOWN | DATE ISSUED: AUGUST 2018 | DRAWING No. STD03 |
| CHECKED BY: DRK | VERT. AS SHOWN | SHEET 22 OF 29 | |

Stormwater Management Facility Maintenance and Inspection Form

General Information:

Contractor Name: _____

Contractor Email: _____

Contractor Address: _____

Project Name: _____

Contractor Phone: _____

Project Location: _____

Maintenance Required from Inspection based on Standard Operating Procedure (SOP):

| Routine Work | Minor Work | Major Work |
|-----------------------------|----------------------------------|------------------------|
| Mowing | Sediment Removal | Major Sediment Removal |
| Trash/Debris Removal | Forebay | Main Basin |
| Outlet Works Cleaning | Trickle Channel | Filter Media |
| Weed Control | Inflow (s) | Major Erosion Repair |
| Mosquito Treatment | Filter Media | Outlet Works |
| Algae Treatment | Erosion Repair | Main Basin |
| | Inflow Point | Spillway |
| | Trickle Channel | Structural Repair |
| | Filter Media | Inflow (s) |
| | Vegetation Removal/Tree Thinning | Outlet Works |
| | Inflow (s) | Forebay |
| | Trickle Channel | Trickle channel |
| BMP Type | Main Basin | Facility Rebuild |
| Extended Detention Basin | Filter Media | OTHER: _____ |
| Porous Landscape Detention | Revegetation | _____ |
| Sand Filter Basin | Jet-Vac/Clearing Drains | _____ |
| Grass Swale | Forebay | |
| Grass Buffer | Outlet Works | |
| Open Channel | Inflow (s) | |
| Constructed Wetland Basin | Underdrain (s) | |
| Constructed Wetland Channel | | |

Inspection Notes:

Attach any inspection photos from the inspection.

Inspector Sign Off: _____

Date: _____

Markup Summary

dsdlaforce (1)

UNTY Upload the EPC MS4 Post Construction Form as a separate document item.

Quality Facility Documentation Form

ments to the County for projects requiring a
ust be submitted for each facility.

Subject: Text Box
Page Label: 1
Author: dsdlaforce
Date: 8/29/2018 6:44:30 PM
Color: ■

Upload the EPC MS4 Post Construction Form as a separate document item.