



Florida Department of Transportation

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PRODUCTION SUPPORT BULLETIN 21-01

ROADWAY DESIGN BULLETIN 21-02

(FHWA Approved: February 8, 2021)

DATE: **April 5, 2021**

TO: District Directors of Transportation Operations, District Directors of Transportation Development, District Design Engineers, District Structures Design Engineers, District Roadway Design Engineers, District Traffic Operations Engineers, District Consultant Project Management Engineers, District Project Development Engineers, District CADD Managers

FROM: Paul Hiers, P.E., Manager, Production Support Office

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SUBJECT: **FDM 117 (Monitor Existing Structures) and FDM 917 (Stormwater Facilities)**

This bulletin implements two FDM chapters as follows:

FDM 117 (Monitor Existing Structures)

This chapter has been revised to be consistent with the new Estimated Quantities (EQ) Report. This revised chapter also contains minor changes and clarification to the existing procedure. The revised chapter is included as Attachment A.

An instructional webinar for this revised chapter will be available by the end of April.

FDM 917 (Stormwater Facilities)

This chapter is the last remaining drainage related FDM 900 series chapters to be posted. **FDM 916** (Drainage Structures) and **FDM 918** (Drainage Map) were posted with the **2021 FDM** last November. The Department's transition to Bentley's OpenRoads Designer (ORD), and away from GEOPAK related software, required a new workflow to create drainage related plan sheets. The new chapter is included as Attachment B.

IMPLEMENTATION

The revised **FDM 117** is implemented immediately for projects providing an EQ Report. Current projects that are not providing an EQ Report should follow the instructions for Monitor Existing Structures provided in **FDM 307** of the **2020 FDOT Design Manual**.

The new **FDM 917** is implemented immediately for projects being produced in ORD.

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ATTACHMENT A

FDM 117 - Monitor Existing Structures

117 Monitor Existing Structures

117.1 General

Monitor Existing Structures includes settlement, vibration, and groundwater monitoring of existing structures during construction as described in **Section 108** of the [Standard Specifications](#).

For Department (in-house) design projects, the Department PM should work with appropriate district staff to identify and determine the structures that are to be monitored.

For Consultant design projects, the Consultant PM is to provide to the Department PM a list of structures that warrant consideration for monitoring. The Department PM will work with appropriate district staff to make a final determination of the structures that are to be included.

117.2 Inspection and Settlement Monitoring

Inspection and settlement monitoring (pay item 108-1) is primarily used to mitigate the risk for damage occurring to an existing structure due to settlement of the foundation. Structures considered for settlement monitoring typically include buildings, bridges, retaining walls, and other facilities such as historic features or swimming pools. This pay item is typically not used for Department owned structures.

If a determination is made to monitor an existing structure, include pay item 108-1 in the Estimated Quantities (EQ) Report in accordance with the [Basis of Estimates Manual](#).

117.2.1 Miscellaneous Structures

Activities that may cause harm to existing structures include the construction of foundations for mast arm signal poles, strain poles, cantilever signs, overhead truss signs, high mast lighting, and ITS poles.

Because **108-2.1** of the [Standard Specifications](#) does not provide prescribed distances for Miscellaneous Structures, all structures that are to be monitored must be listed in a pay item note on the General Notes sheet; see **FDM 117.5**.

117.2.2 Structures Other Than Miscellaneous Structures

Activities that may cause harm to existing structures include the excavation of deep foundations, extraction of existing piles, and pile driving operations associated with bridge or retaining wall construction.

Structures that are to be monitored that are beyond the distances specified in **108-2.1** in the [Standard Specifications](#), must be listed in a pay item note on the General Notes sheet; see *FDM 117.5*.

117.2.3 Roadway Compaction Operations

Activities that may cause harm to existing structures include embankment and asphalt vibratory compaction.

Do not include inspection and settlement monitoring (pay item 108-1) for roadway compaction operations when a note is included in the plans requiring non-vibratory compaction mode near any structure recommended for monitoring.

Structures that are to be monitored that are beyond the distances specified in **108-2.1** in the [Standard Specifications](#), must be listed in a pay item note on the General Notes sheet; see *FDM 117.5*.

117.3 Vibration Monitoring

Vibration monitoring (pay item 108-2) is primarily used to mitigate the risk for interfering with the intended use of an existing structure. Structures considered for vibration monitoring typically include buildings in which sensitive business operations are conducted: e.g., eye surgery, medical treatments, rehabilitation operations, recording and broadcasting operations, places of worship, antique shops, or museums.

This pay item is not typically used for residential properties, storage facilities, retail and grocery stores, warehouse and distribution centers, or other similar structures where sensitive business operations are not conducted. This pay item should not be used for Department-owned structures.

Activities that may warrant vibration monitoring include pile driving, sheet pile and casing installation, and embankment and asphalt vibratory compaction.

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Do not include vibration monitoring (pay item 108-2) for embankment and asphalt compaction operations when the risk of interfering with the intended use of a structure is mitigated by including a note in the plans that:

- (1) Restricts hours of construction activities (to non-business hours).
- (2) Requires non-vibratory compaction mode.

If a determination is made to monitor an existing structure, include pay item 108-2 in the EQ Report in accordance with the [Basis of Estimates Manual](#). Because **108-2.2** of the [Standard Specifications](#) does not provide prescribed distances for Vibration Monitoring, all structures that are to be monitored must be listed in a pay item note on the General Notes sheet; see **FDM 117.5**.

117.4 Groundwater Monitoring

Dewatering operations has the potential for lowering the groundwater elevation in or above compressible soils supporting a structure which can cause that structure to settle. Groundwater monitoring for this purpose is not common and is to be used only when concurred with by the District Geotechnical Engineer.

If a determination is made to monitor an existing structure, include pay item 108-3 in the EQ Report in accordance with the [Basis of Estimates Manual](#). Because **108-2.3** of the [Standard Specifications](#) does not provide prescribed distances for Groundwater Monitoring, structures that are to be monitored must be listed in a pay item note on the General Notes sheet; see **FDM 117.5**.

117.5 Pay Item Notes

The following are examples of pay item notes. Notes are included in the plans only when **108.2.1** of the [Standard Specifications](#) does not provide prescribed distances, or when a structure is beyond the prescribed distances.

- 108-1 In addition to the requirements of Section 108-2.1 of the Standard Specifications, provide Inspection and Settlement Monitoring for the following structures:
- Church located at 3750 County Road 220 during pile driving operations.
 - Historic cemetery stone archway entrance located at Sta. 1327+60 Lt. during foundation construction for mast arm signal pole.
- 108-2 Provide Vibration Monitoring for the Walk-in Medical Clinic located at 3326 Byron Road during pile driving operations.
- 108-3 Provide Groundwater Monitoring for the commercial building located at Sta. 840+25 Rt. during dewatering operations.

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ATTACHMENT B

FDM 917 – Stormwater Facilities

917 Stormwater Facilities

917.1 General

A stormwater facility is often located at the downstream end of the drainage system for the purpose of treatment and attenuation of stormwater runoff. The Stormwater Facilities sheet provides data and information for proposed stormwater facilities, including:

- (1) Stormwater Facility Plan View
- (2) Stormwater Facility Sectional Views
- (3) Outlet Structure Details

This sheet may be produced on a standard-format sheet (11"x17") or a large-format sheet (36"x48" or 36"x72"). Use landscape orientation regardless of sheet size selected.

See **Exhibit 917-1** for an example of a Stormwater Facilities sheet.

917.2 Stormwater Facility Plan View

The stormwater facility plan view is typically located in the upper left area of the sheet. It is preferable to display a stormwater facility in its entirety on a single plan sheet. A common horizontal scale for the plan view is 1" = 50' and should not be larger than 1" = 20'.

917.2.1 Required Information

Display and label the following information in the plan view:

- Baseline of construction stationing (typically increasing from left to right) with station and offset ties to the project centerline of construction. Include a north arrow and scale above and near the drainage plan view.
- Elements of the proposed roadway, including drainage pipes and structures.
- Location of stormwater facility sectional views (i.e., A-A, B-B).
- Location of soil borings

- Stormwater facility delineations:
 - a) Facility bottom and top (often referred to as Top of Bank). Provide Station/Offset callouts and radiuses along the Top of Bank delineation.
 - b) Change of side slope (e.g., 1:2 to 1:4)
 - c) Maintenance berm limits
- Maintenance access road, fence and gates, and R/W lines
- Stormwater facility drainage structures and pipes with location of outlet structure sectional views (i.e., C-C, D-D)

917.3 Stormwater Facility Sectional Views

The stormwater facility sectional views are typically located below or adjacent to the plan view. Include a minimum of two sectional views, taken in directions perpendicular to each other (as shown on **Exhibit 917-1**). The horizontal scale should be the same as used for the stormwater facility plan view. The vertical scale is typically 4 to 5 times larger than the horizontal scale; e.g., 1" = 20' horizontal and 1" = 4' vertical.

917.3.1 Required Information

Display and label the following information in the sectional views:

- Stormwater facility bottom and top (often referred to as Top of Bank) with elevations, side slopes, and maintenance berm.
- Existing groundline, limits of clearing and grubbing, limits of sod or vegetation, and location of R/W and fence
- Symbols and elevation for Normal Highwater and Peak Design Stage.
- Soil borings

Dimension the maintenance berm, and horizontal distance between stormwater facility delineations.

917.3.2 Cross Sections

Showing cross sections of the stormwater facility in the plans is typically not necessary. However, if it is determined that the sectional views do not adequately show the design intent, cross sections may be included. Place cross sections anywhere within available space on the Stormwater Facilities sheet and include required information specified in **FDM 917.3.1**.

917.4 Outlet Structure Details

The stormwater facility outlet structure details are typically shown adjacent to the plan view. Outlet structure information, elevations, and dimensions may be placed in a data table (as shown on **Exhibit 917-1**) or shown and labeled directly on the outlet structure sectional views. Information, elevation, and dimensions should clearly indicate the fabrication requirement of the modified inlet and skimmers.

917.4.1 3D Isometric View

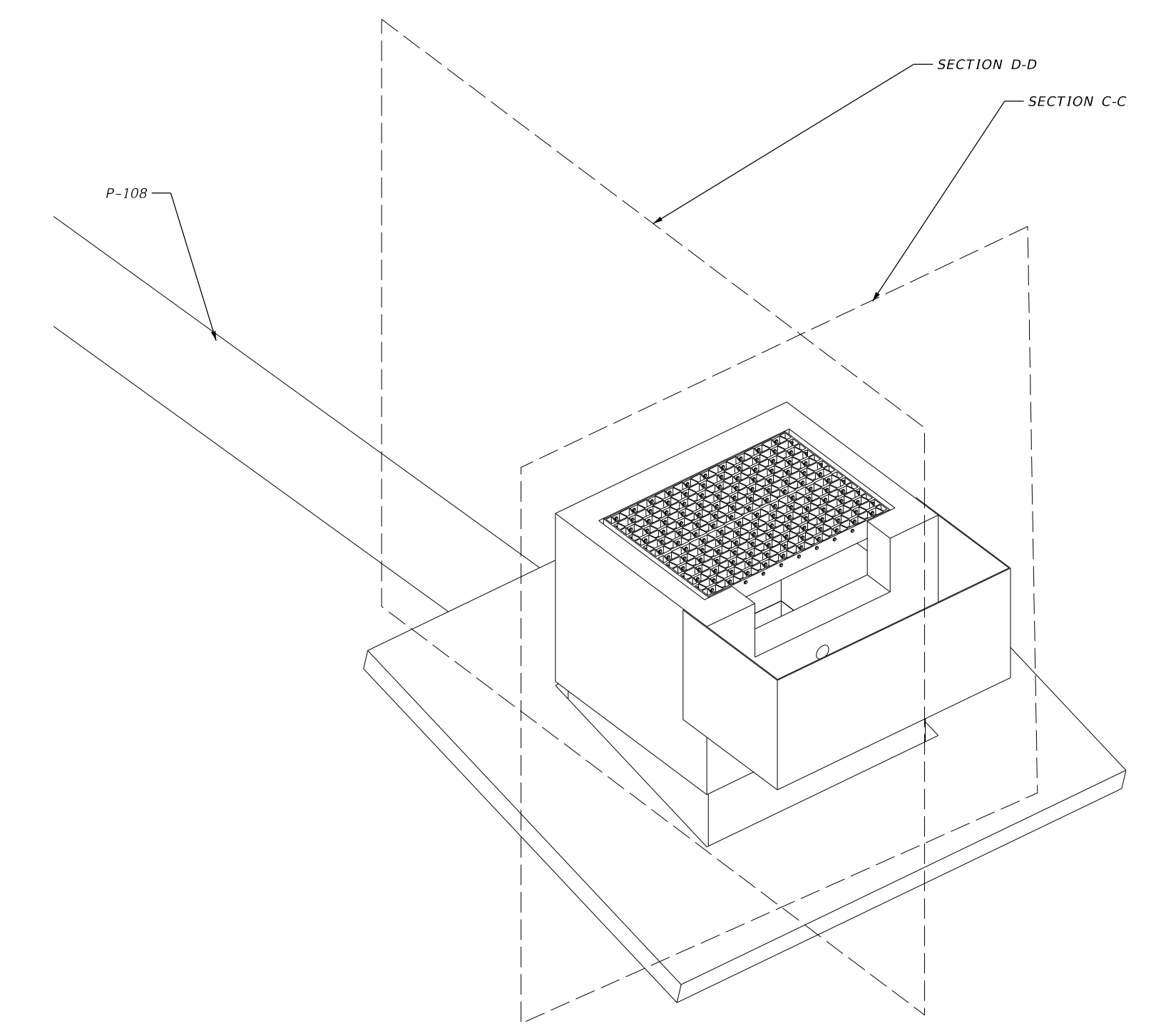
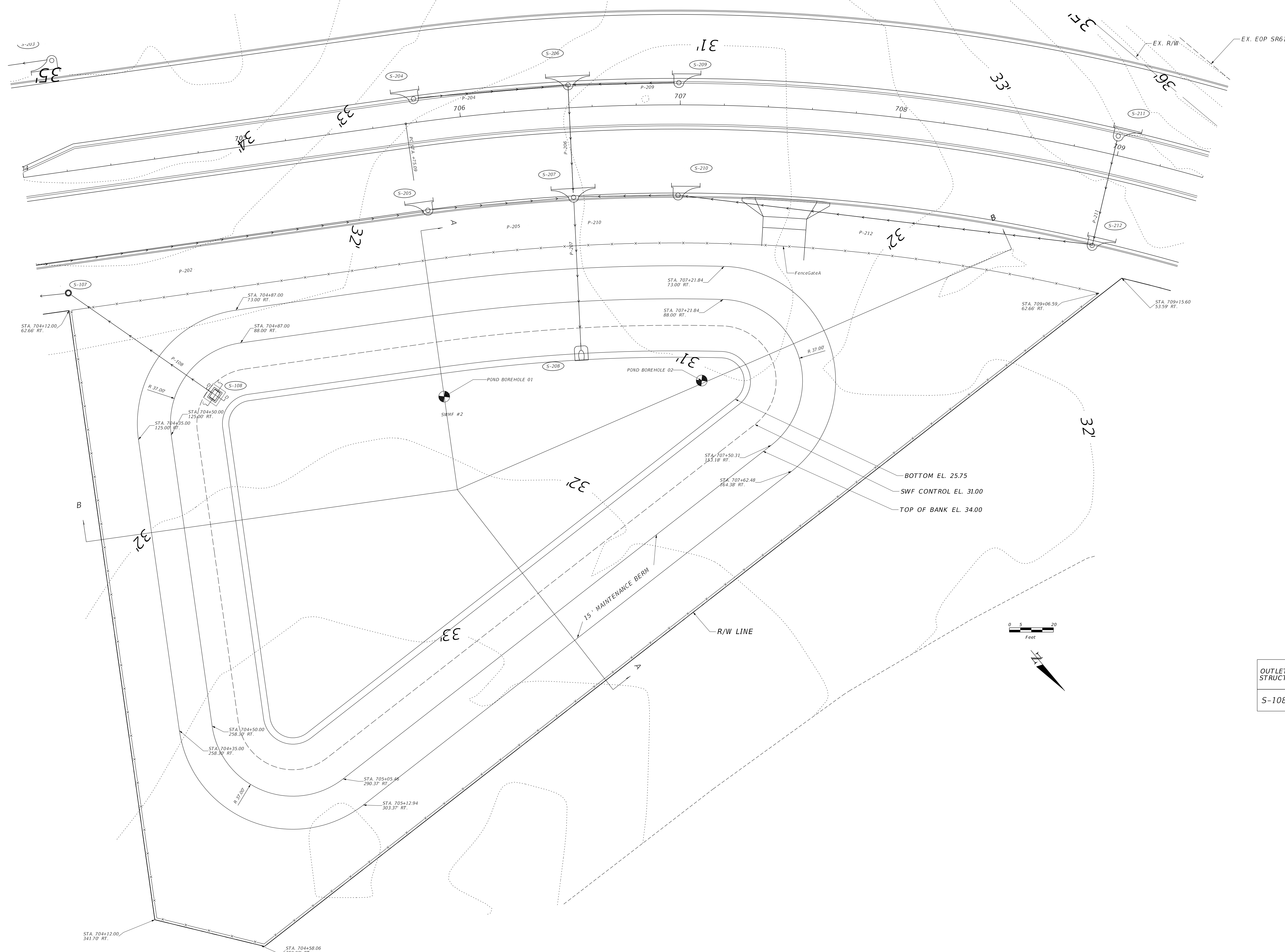
Provide a 3D isometric view of the stormwater facility outlet structure that illustrates:

- Inlet with weir and drawdown. Provide outlet structure drainage structure number.
- Outlet pipe(s), with pipe number
- Skimmer(s)
- Concrete apron

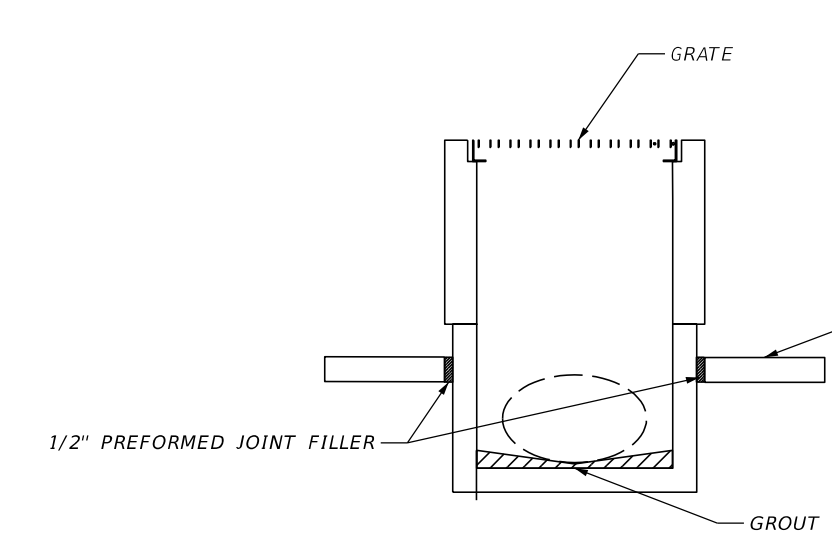
Placement of the 3D isometric view may use any scale and angle that best displays the various components of the outlet structure.

917.4.2 Sectional Views

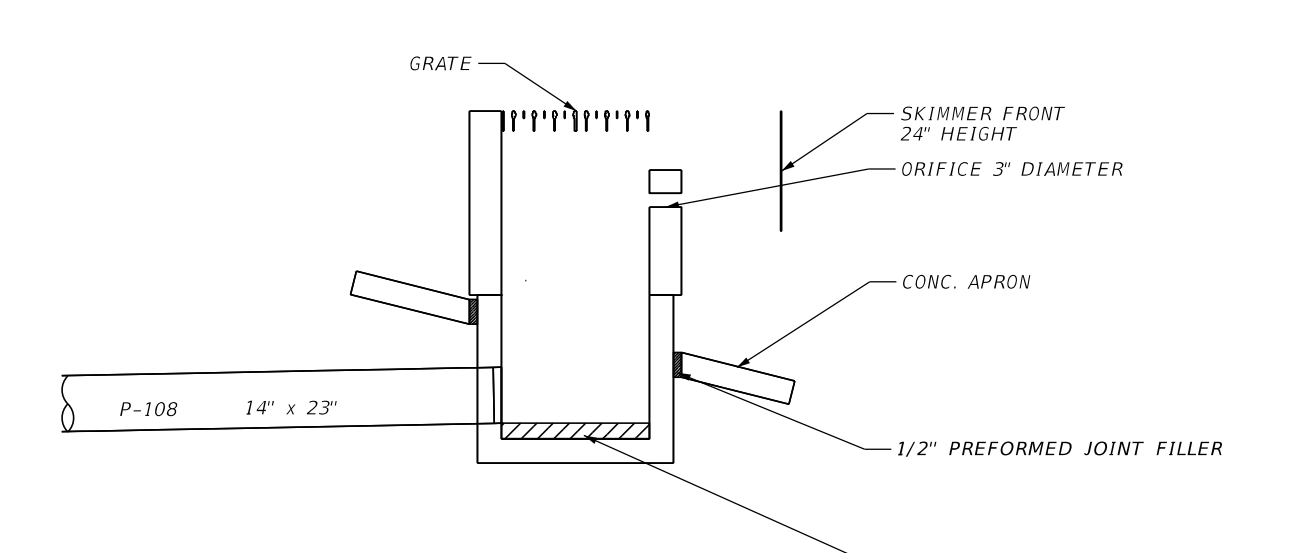
Provide a sectional view across each outlet structure side that contains a weir or drawdown. Sectional views must provide all pertinent dimensions and elevations needed to fabricate the outlet structure and at a minimum illustrate the same elements required for the 3D isometric view. Any scale may be used that clearly conveys the requirements of the outlet structure. Elevation data may be provided in table format as shown in **Exhibit 917-1**.



S-108
SWF OUTLET STRUCTURE DETAIL
NTS

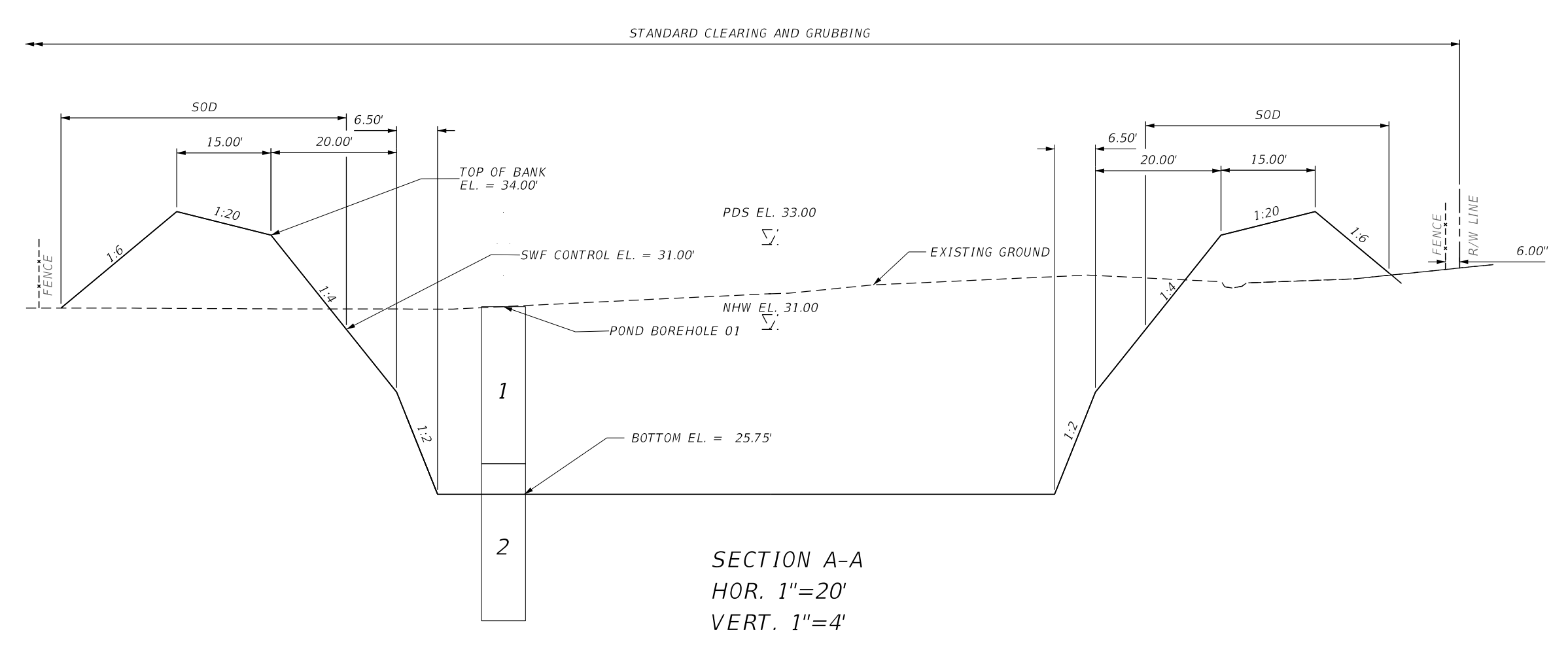


S-108
SECTION C-C
NTS

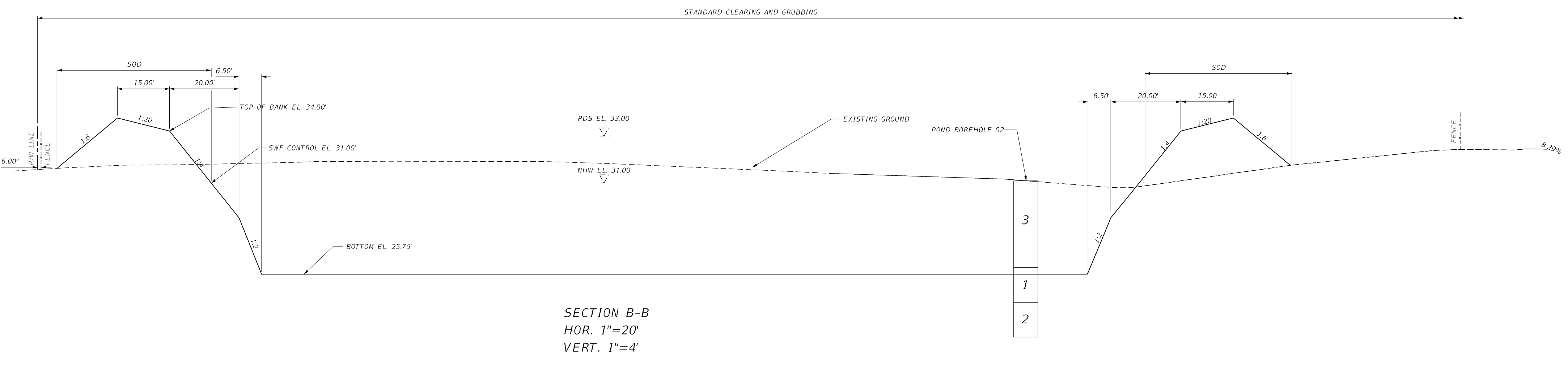


S-108
SECTION D-D
NTS

OUTLET STRUCT.	SWF	STATION	OFFSET	REF.	INLET TYPE	INDEX NO.	GRATE EL. (FT NAVD)	WEIR EL. (FT NAVD)	OUTFALL PIPE EL. (FT NAVD)	ORIFICE EL. (FT NAVD)	CONC. DITCH PAVT. (FT NAVD)	TOP OF SKIMMER EL. (FT NAVD)
S-108	#2	704+72	109.75	SR61	D	425-052 425-070	33.00	32.00	29.20	31.00	10.91	33.00



SECTION A-A
HOR. 1"=20'
VERT. 1"=4'



SECTION B-B
HOR. 1"=20'
VERT. 1"=4'