OARS

Flow Diversion Structures

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May 14, 2015

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OARS - Level of Service

- WSST overflows will be eliminated during the typical year
- Discharges from 12 CSOs along OSIS will be eliminated for up to a 10-year flow event
- Overflows at the JPWWTP will be limited to no more than 4 during the typical year
- During the 10-year flow event, overflows still could occur at the WSST and JPWWTP

OARS System

- 23,300 Feet of 20’ Diameter Tunnel
- 6 Shafts – 4 receive flow with special drop structures
- 4 Relief Structures
- Deep Screening Structure
- Pumping System
- Treatment Plant Connection
- River Outfall Structure

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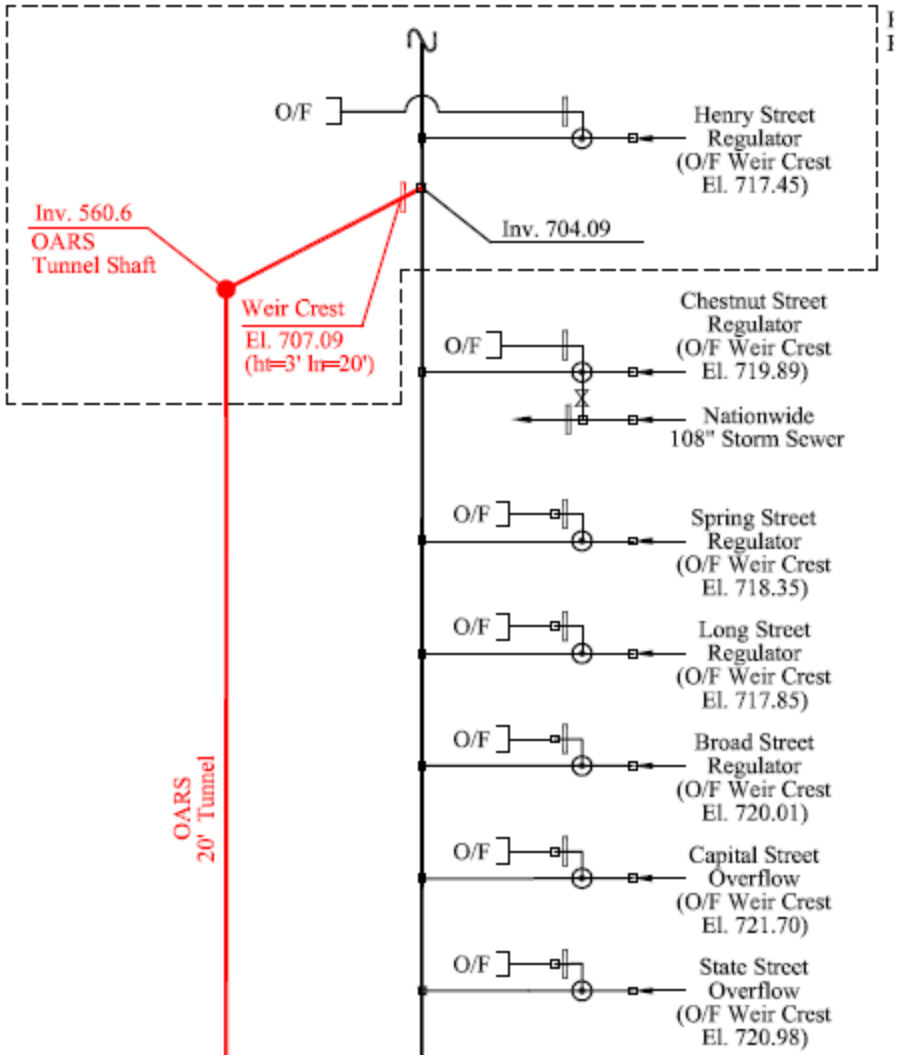
OARS Flow Control Structures

- Shaft 6 Relief Structure
- Shaft 1 – OARS Diversion Structure
- Scioto-Main Relief Structure

Shaft 6 Relief Structure

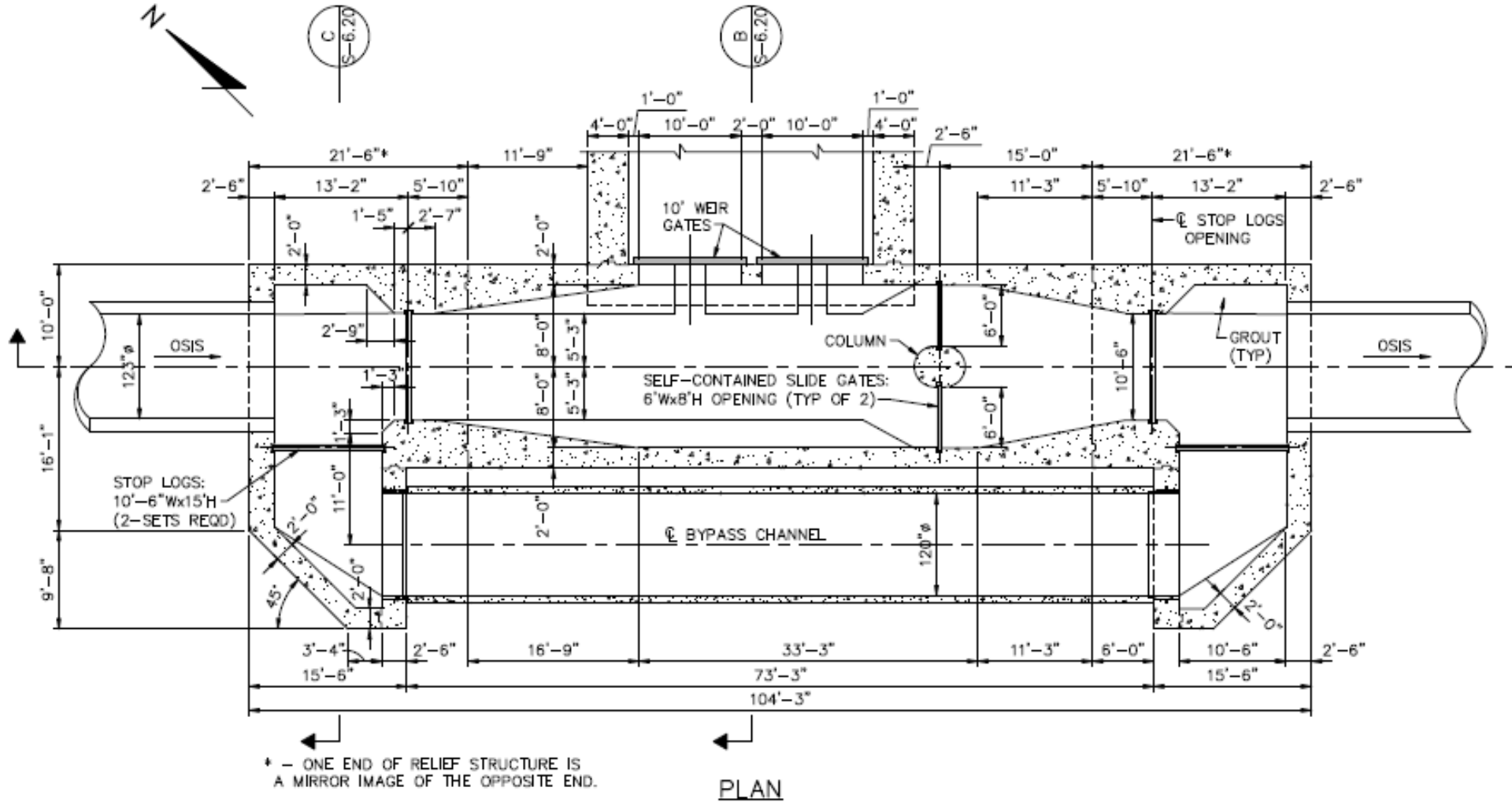
The relief structures serve 2 main purposes:

1. Divert wet weather flows from the OSIS to OARS to eliminate CSO activations.
2. Allow for complete bypass of flow to either the OSIS or to the OARS for future maintenance activities.



The model required 20’ of weir length at a height of 3’ above the OSIS invert at Shaft 6.

OSIS Relief Structures were required at 3 locations along the OSIS to successfully eliminate CSO activations.



* – ONE END OF RELIEF STRUCTURE IS A MIRROR IMAGE OF THE OPPOSITE END.

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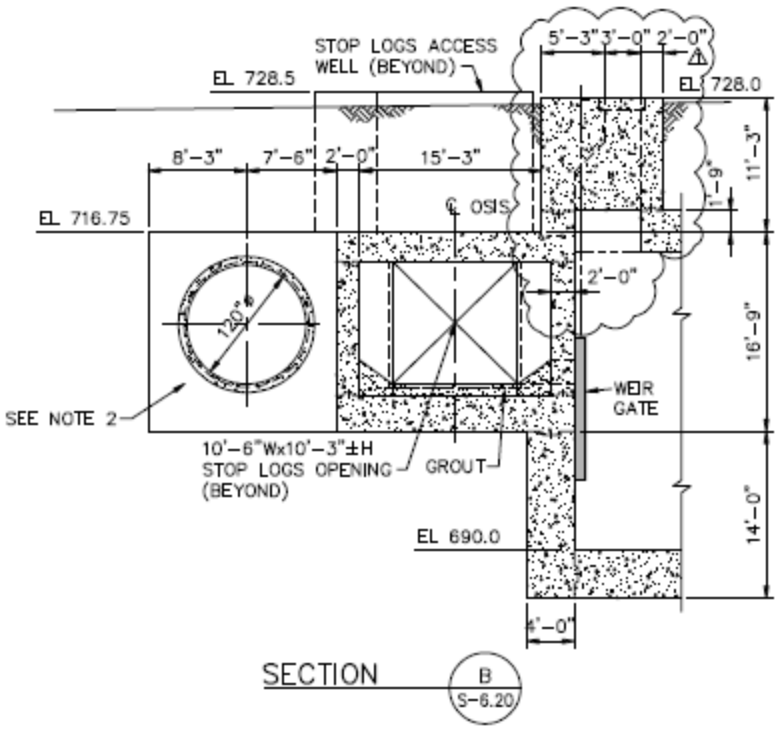

- The weirs will initially be set at 3’ above invert. Dry weather flow stays in OSIS.
- Peak flow over weirs to OARS = 1,146 cfs (or 741 MGD)
- Adjustable weirs can be connected to be controlled under RTC to perform as desired.

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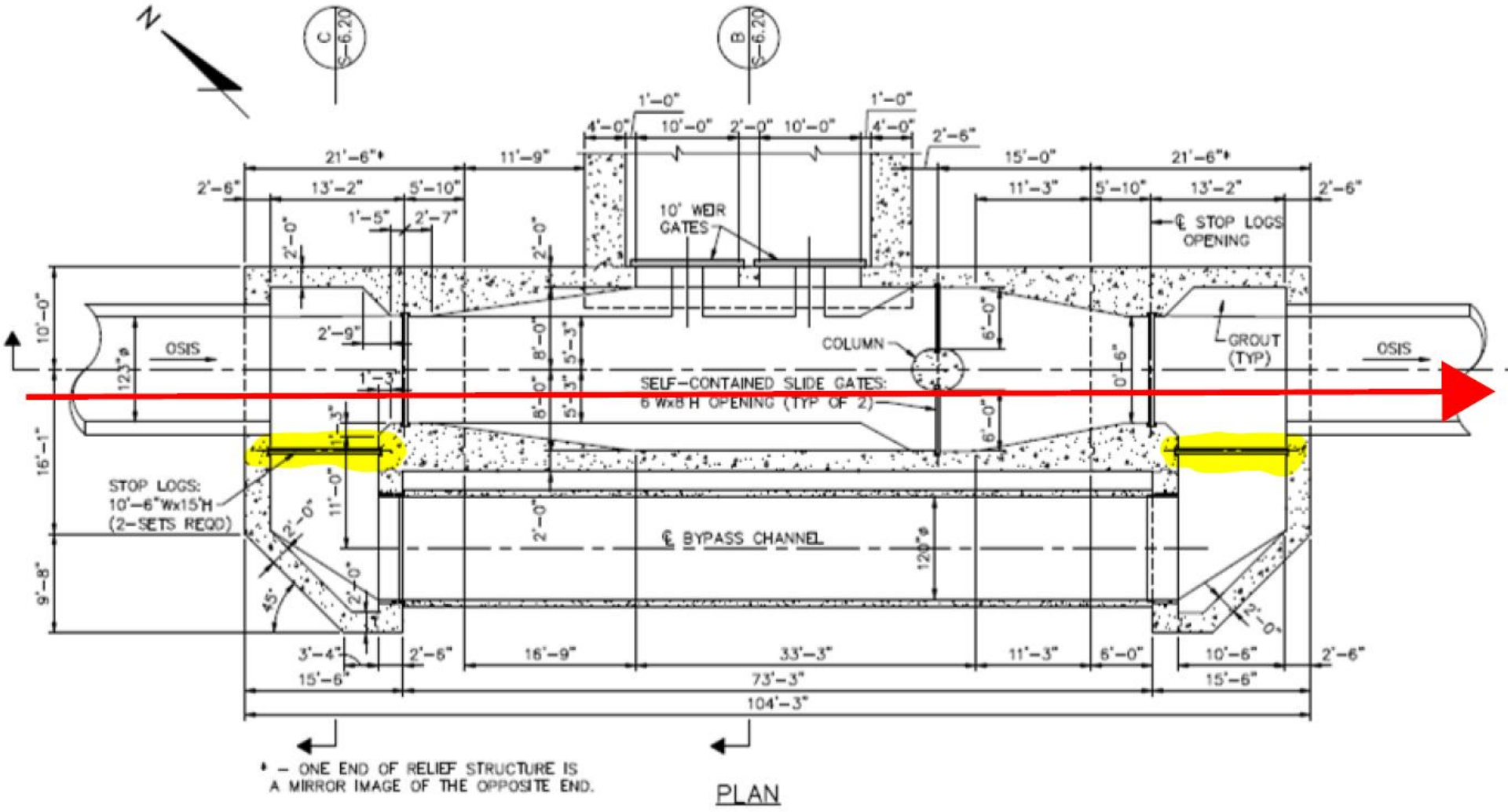

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Normal Setting Dry Weather Flow

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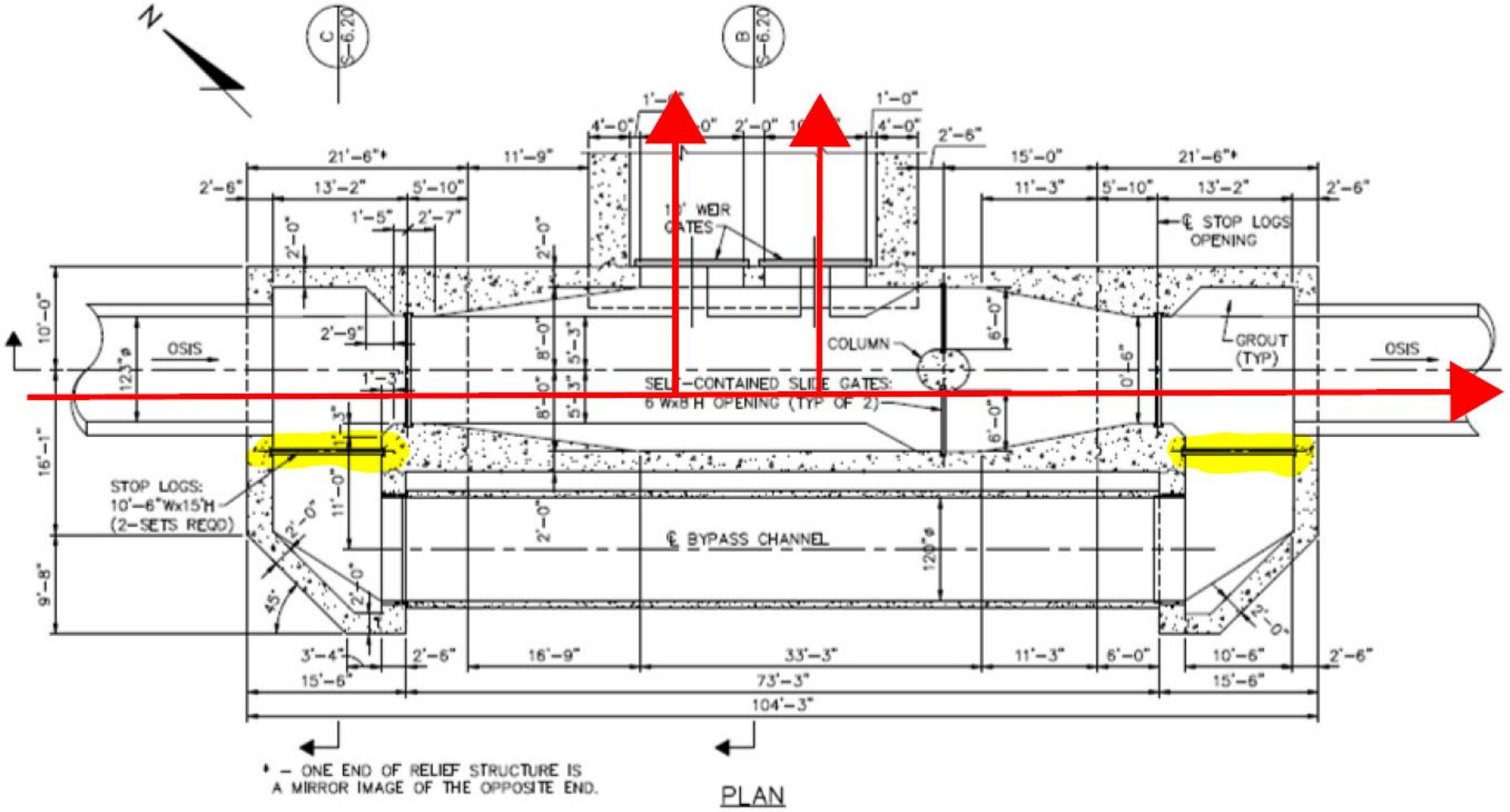

Normal Setting Wet Weather Flow

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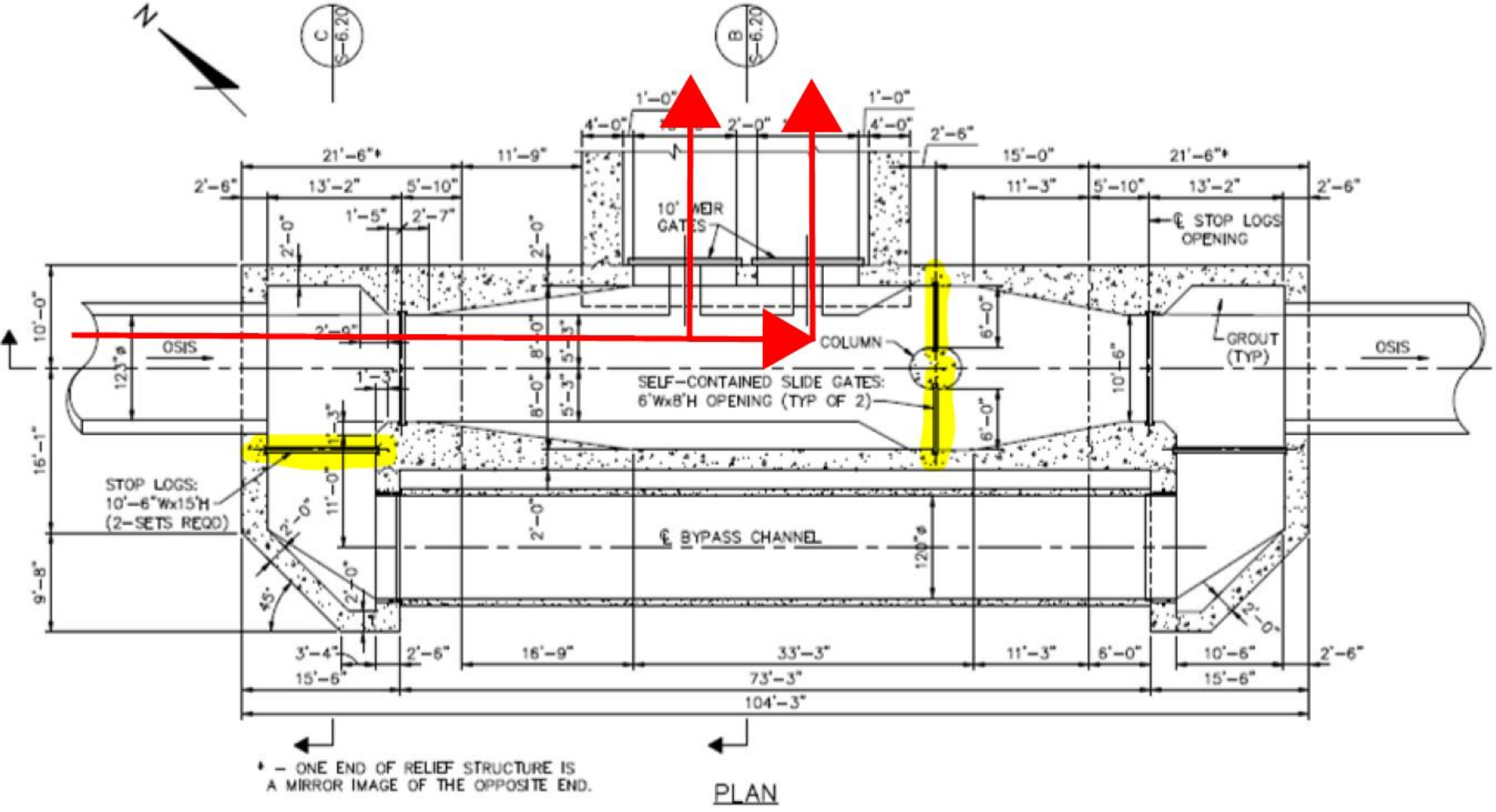

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Bypass Setting – 100% to OARS

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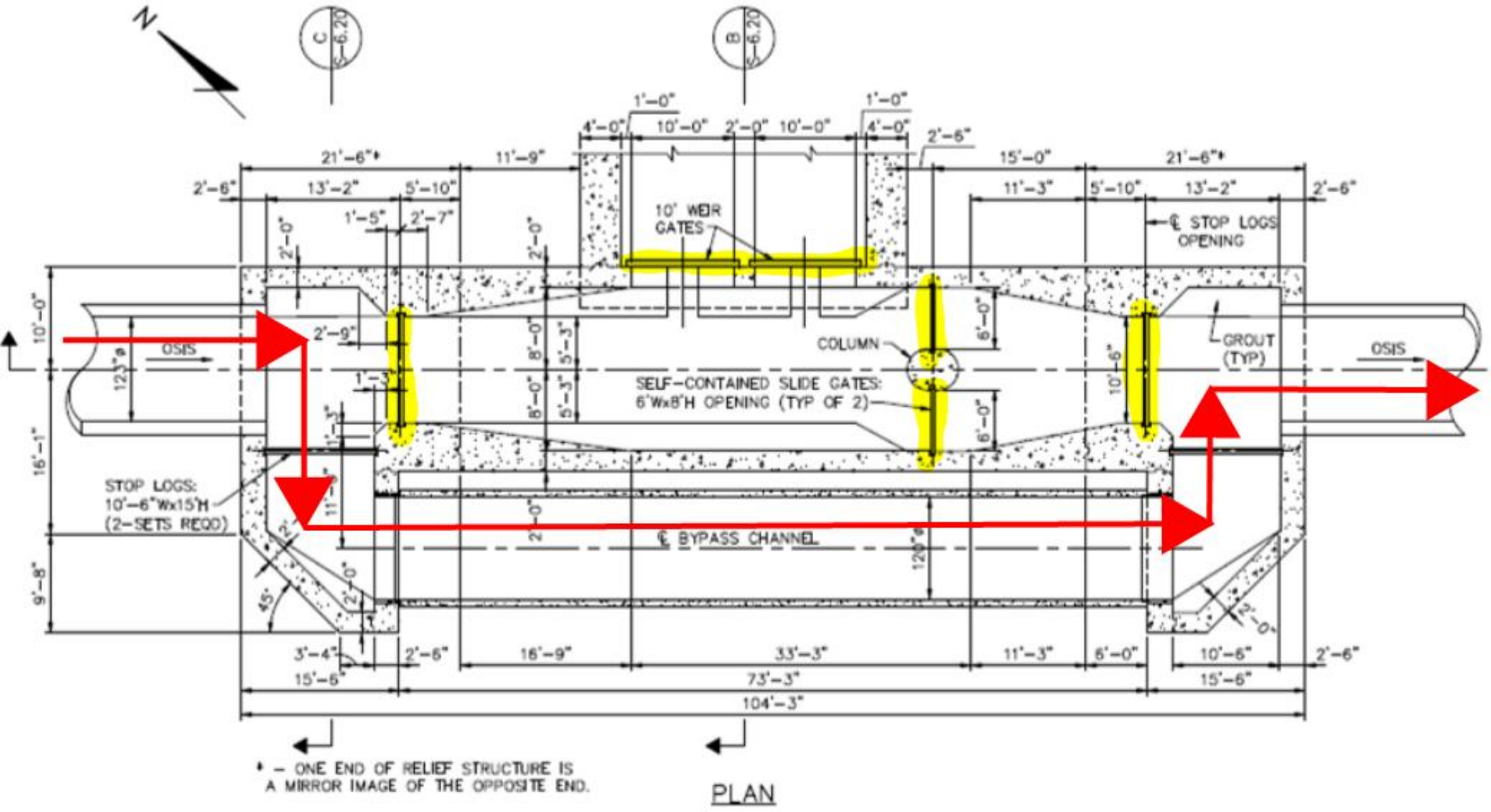

Bypass Setting – 100% to OSIS

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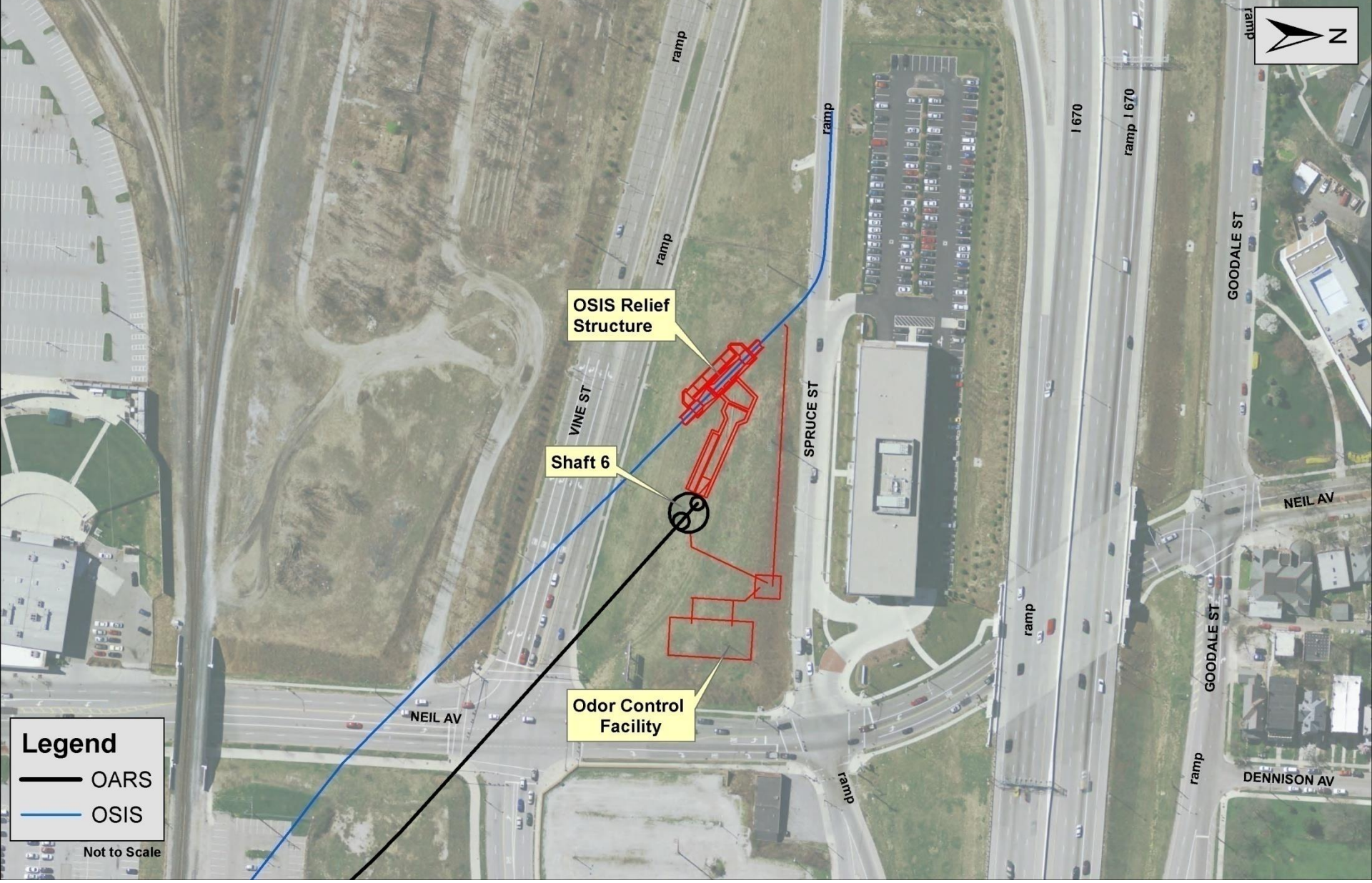

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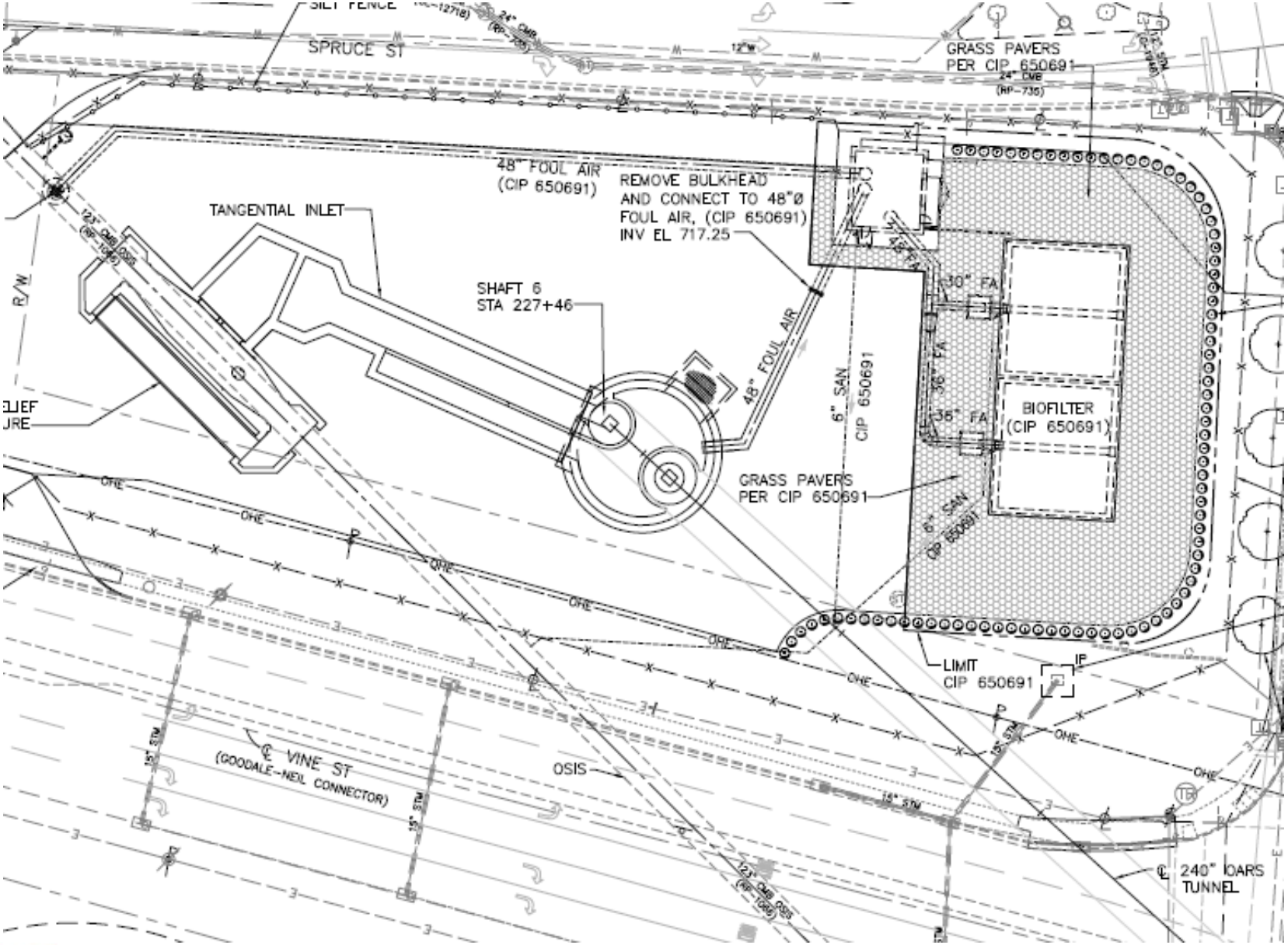

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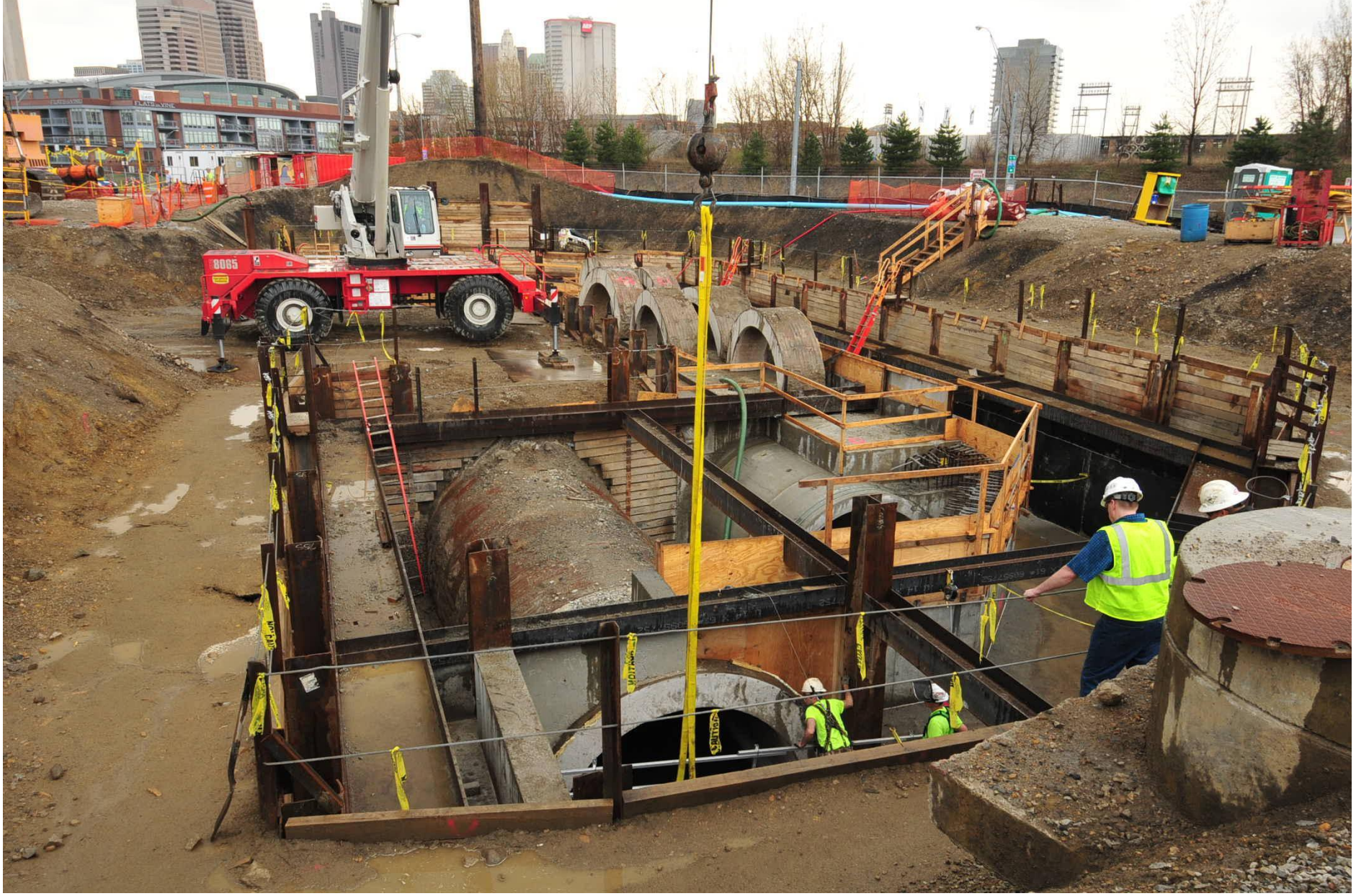

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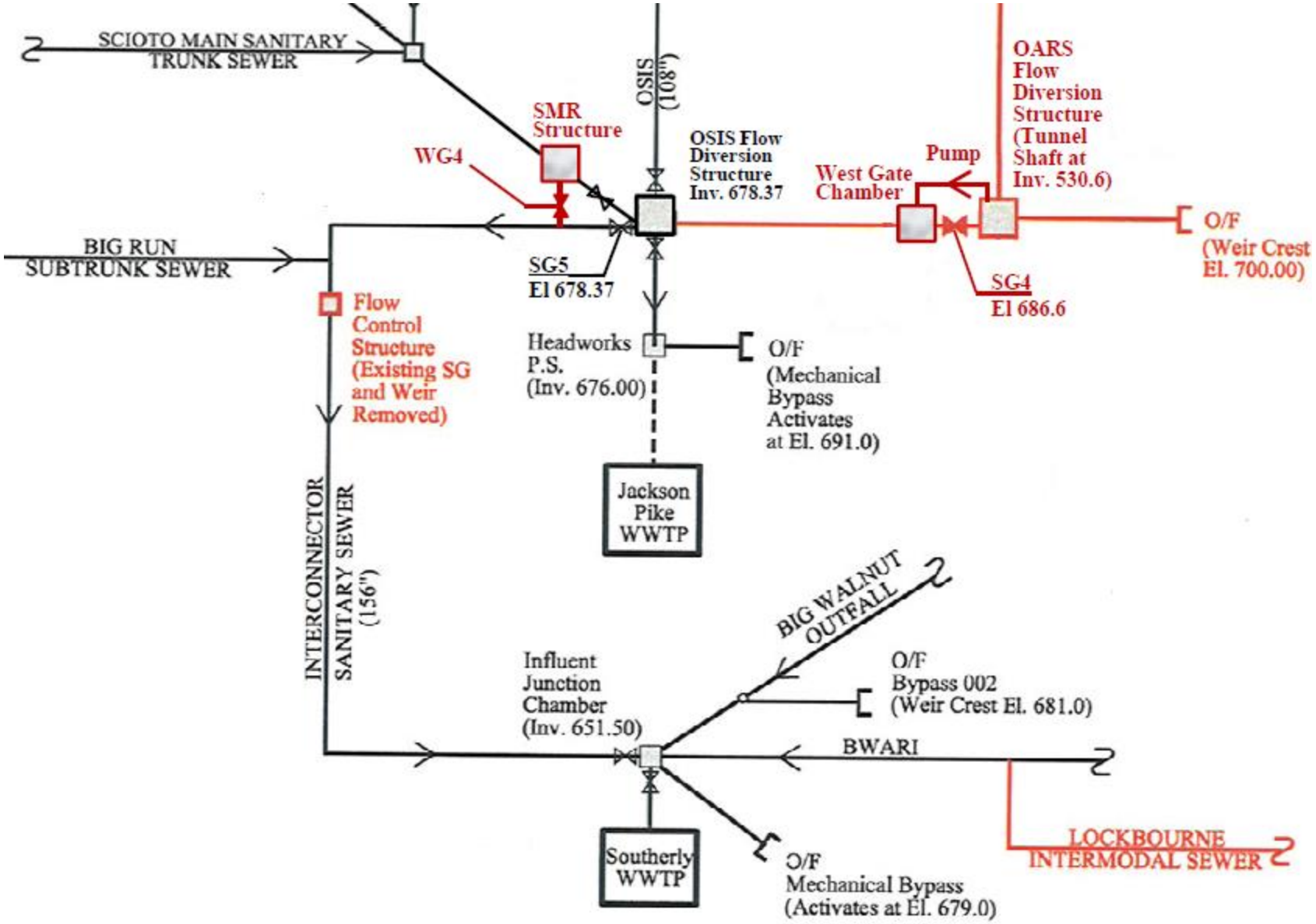
Shaft 1 – OARS Diversion Structure (ODS)

- Shaft 1 is the end of the line
- Peak flow coming in is 1,700 MGD
- Pump to WWTP(s)
- High level gravity flow to WWTP(s)
- Stubs for potential future HRT
- Final overflow weir to Scioto River



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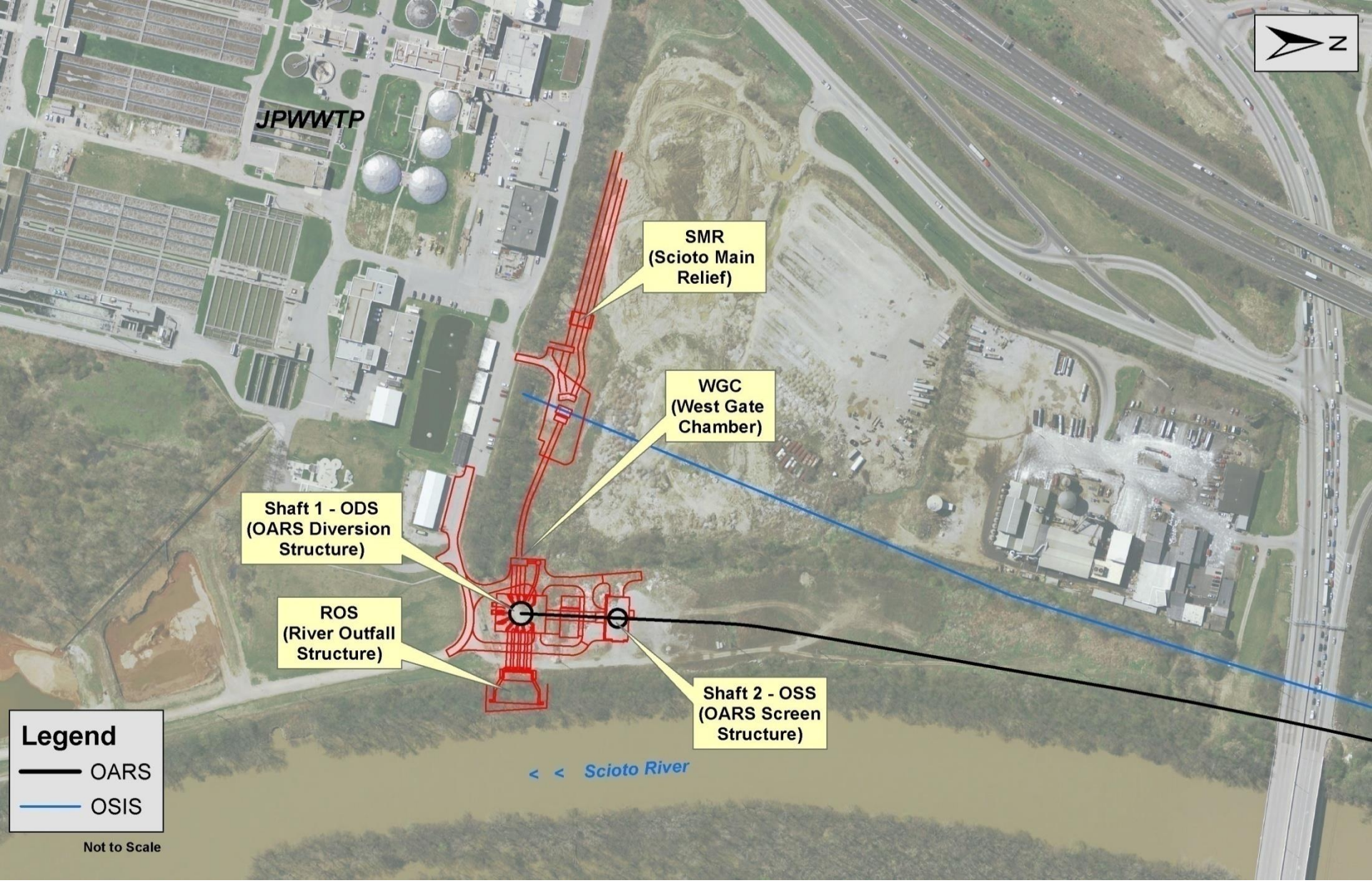

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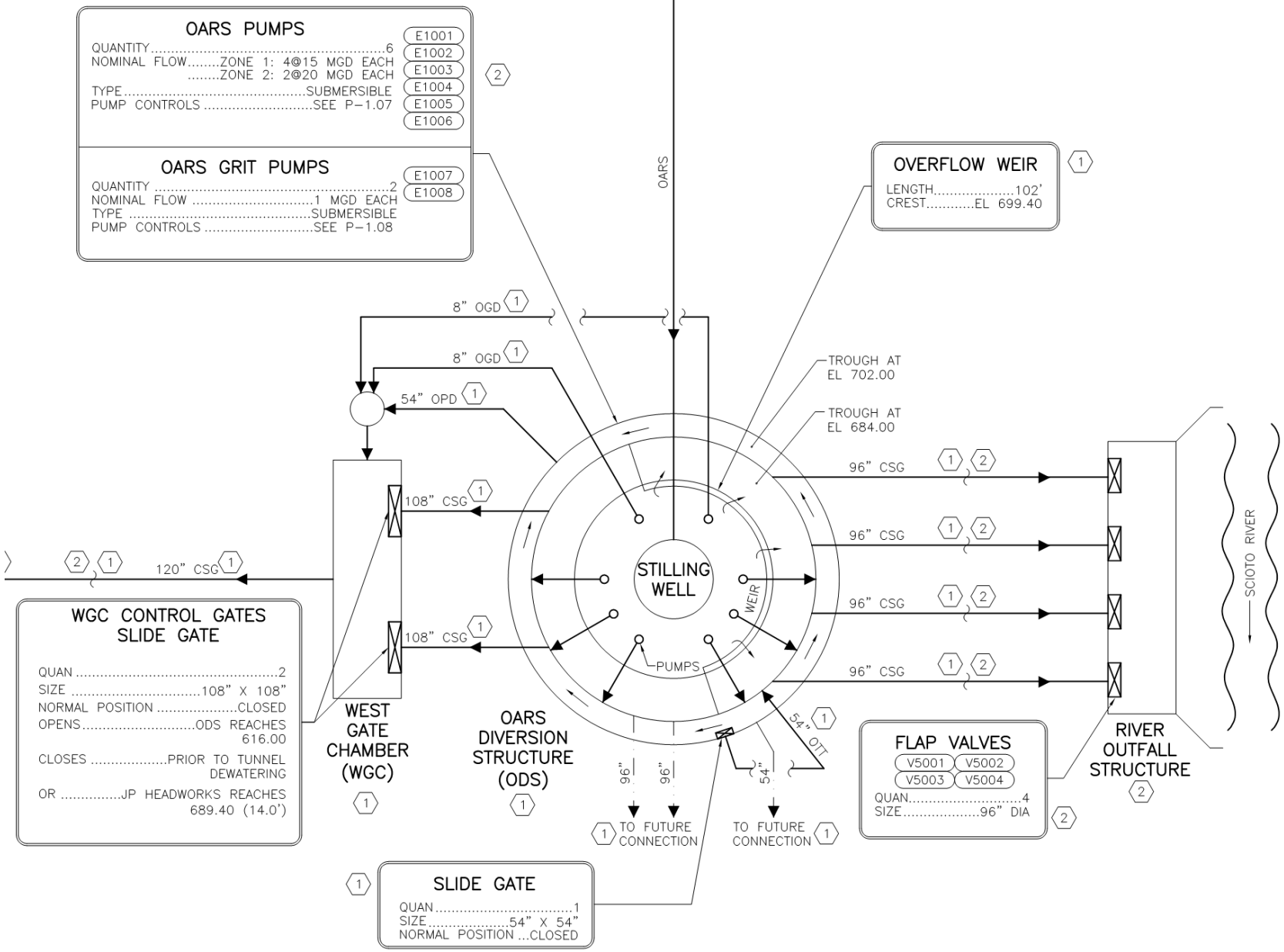

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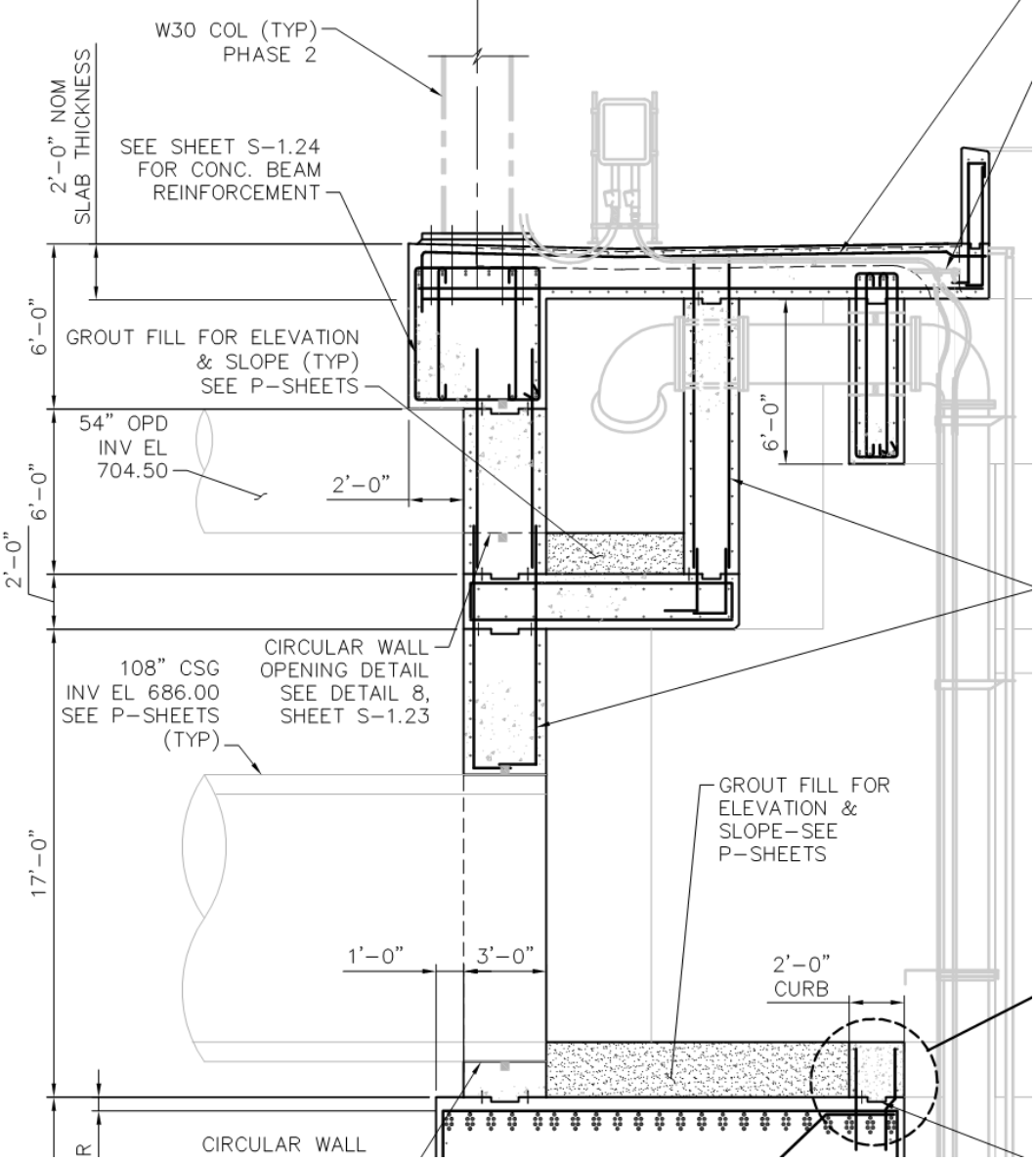
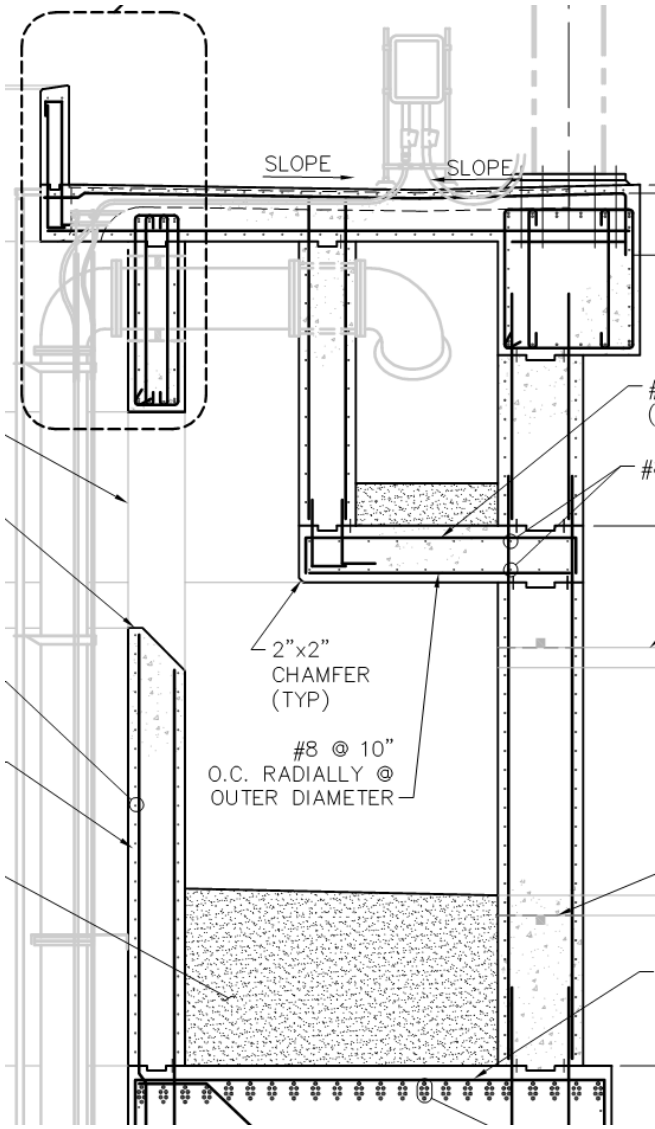
Shaft 1 – ODS Stats

- Shaft 1 is 215’ deep and 52’ in diameter
- Surface elevation is 715
- Tunnel invert is at 530;
- Shaft invert elevation is 500
- Various outlet structures at the top of the shaft allow for diverting flow by gravity
- Special baffling at the bottom for the wet well for pump performance





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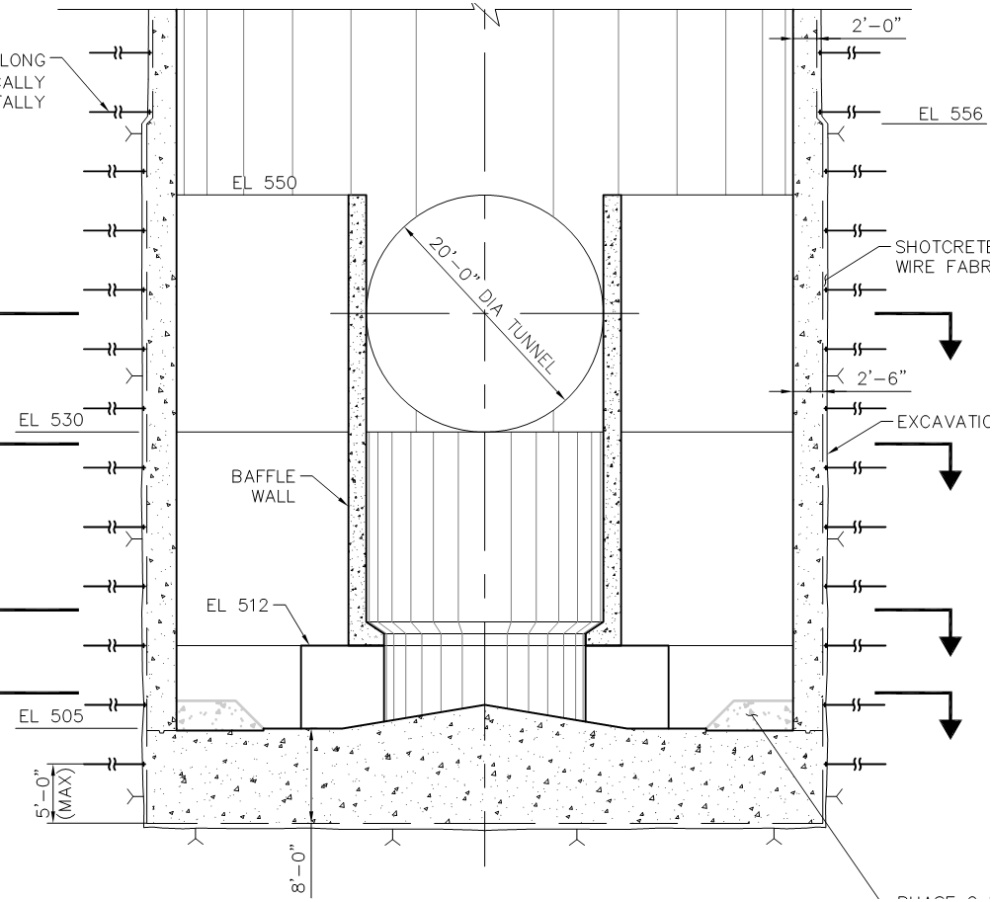

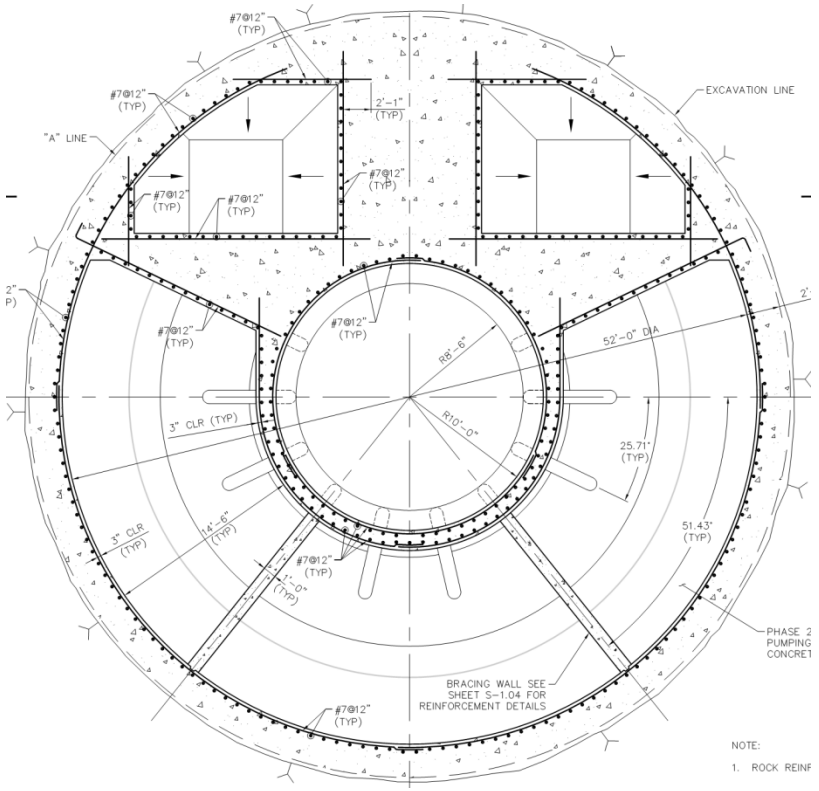

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Shaft 1 (ODS) Pumping System

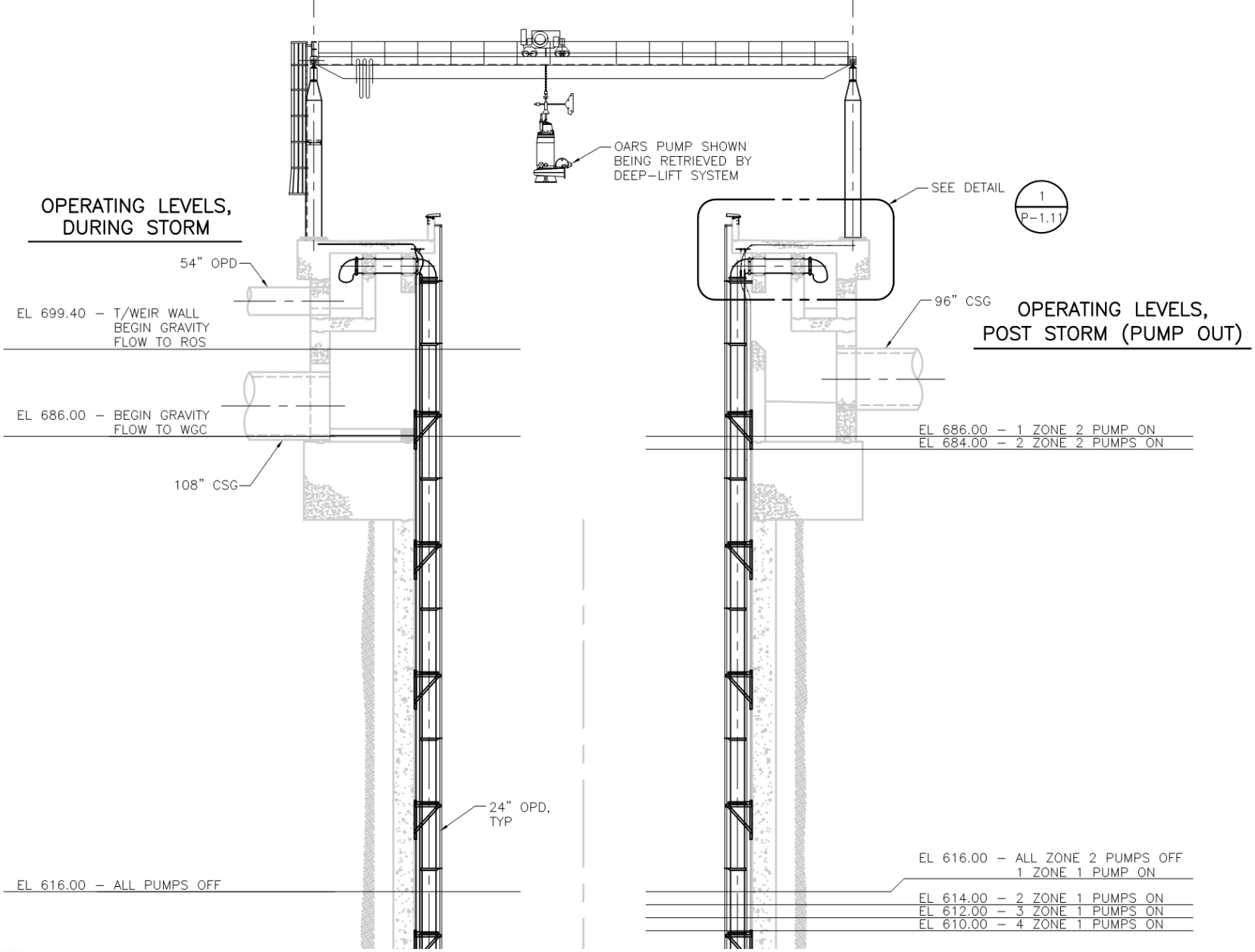
- 1st Requirement was to be able to dewater the OARS shafts and tunnel within 2 days
- Volume of OARS Tunnel = 55 MG
- Volume of Shafts = 5 MG
- 30 MGD minimum pump rate
- Variable Gravity Head (686 – 530 = 156’)

Shaft 1 (ODS) Pumping System

- 2nd Requirement is to maximize treatment and storage when a high flow event occurs
- Pump up to 60 MGD as the tunnel fills up
- Variable Gravity Head (580 – 530 = 50’)

Shaft 1 (ODS) Pumping System

- 2 Pumps for the shaft level (20 MGD each)
- 4 Pumps for the tunnel level (15 MGD each)
- 2 Grit Pumps (1 MGD each)
- All 8 pumps have VFDs to operate efficiently
- 1 Shaft Mixing System



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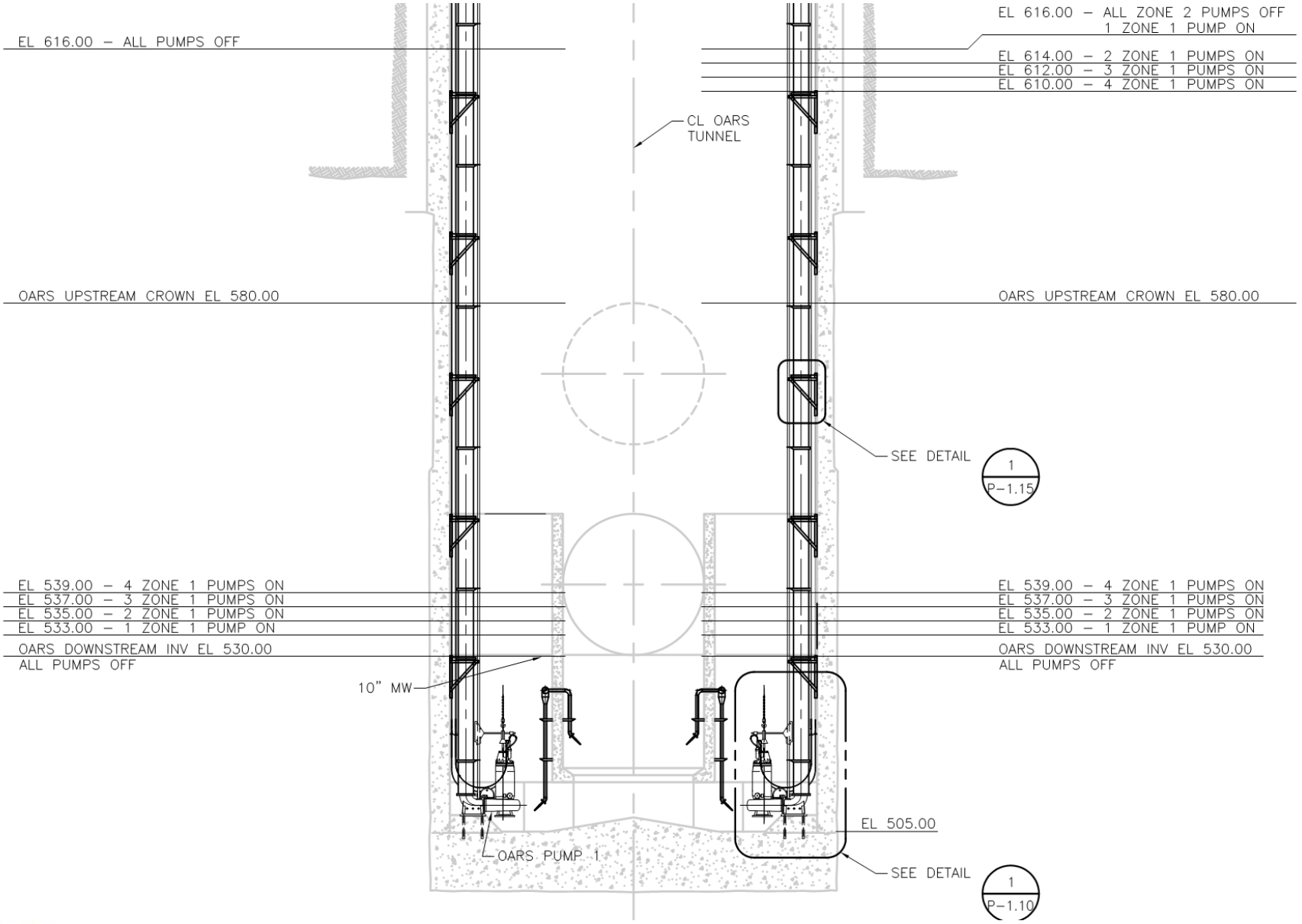

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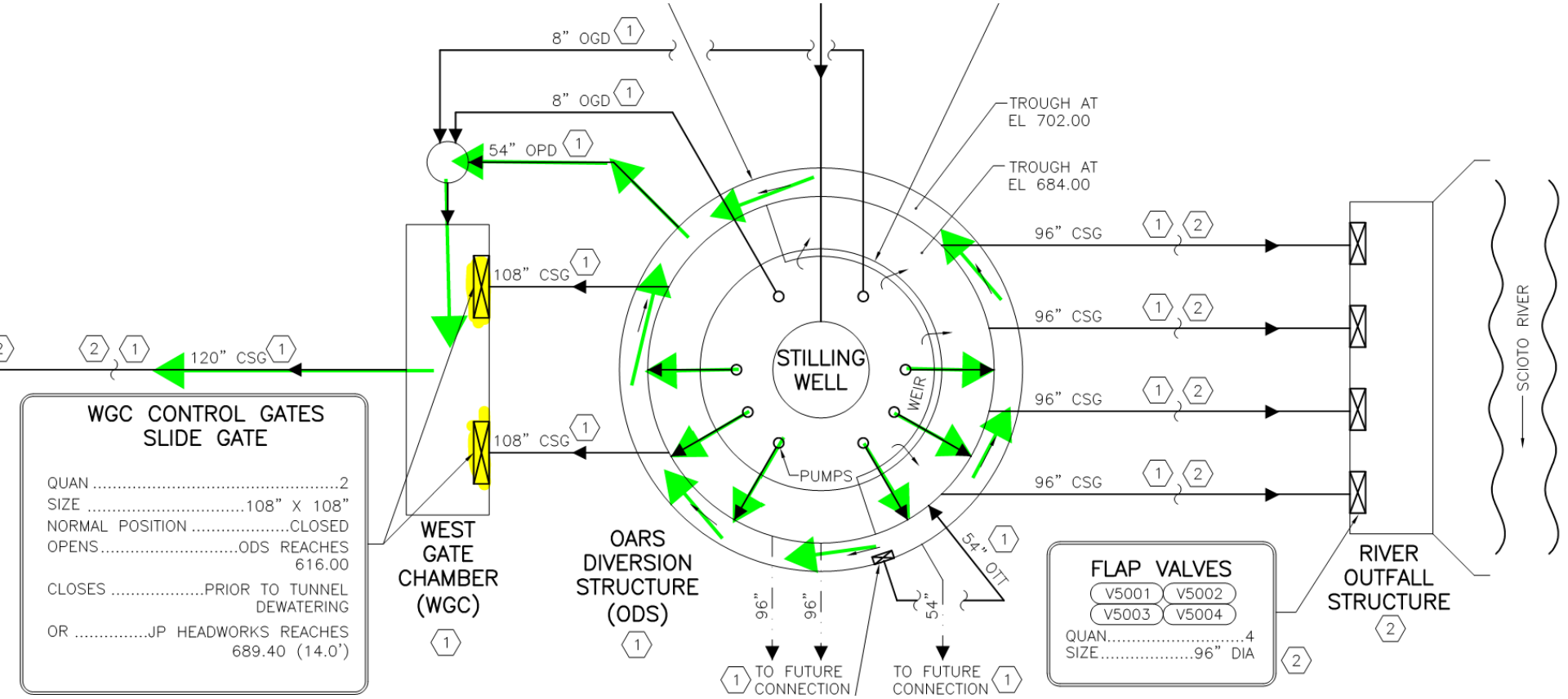

OARS starts to fill – pump to WWTP

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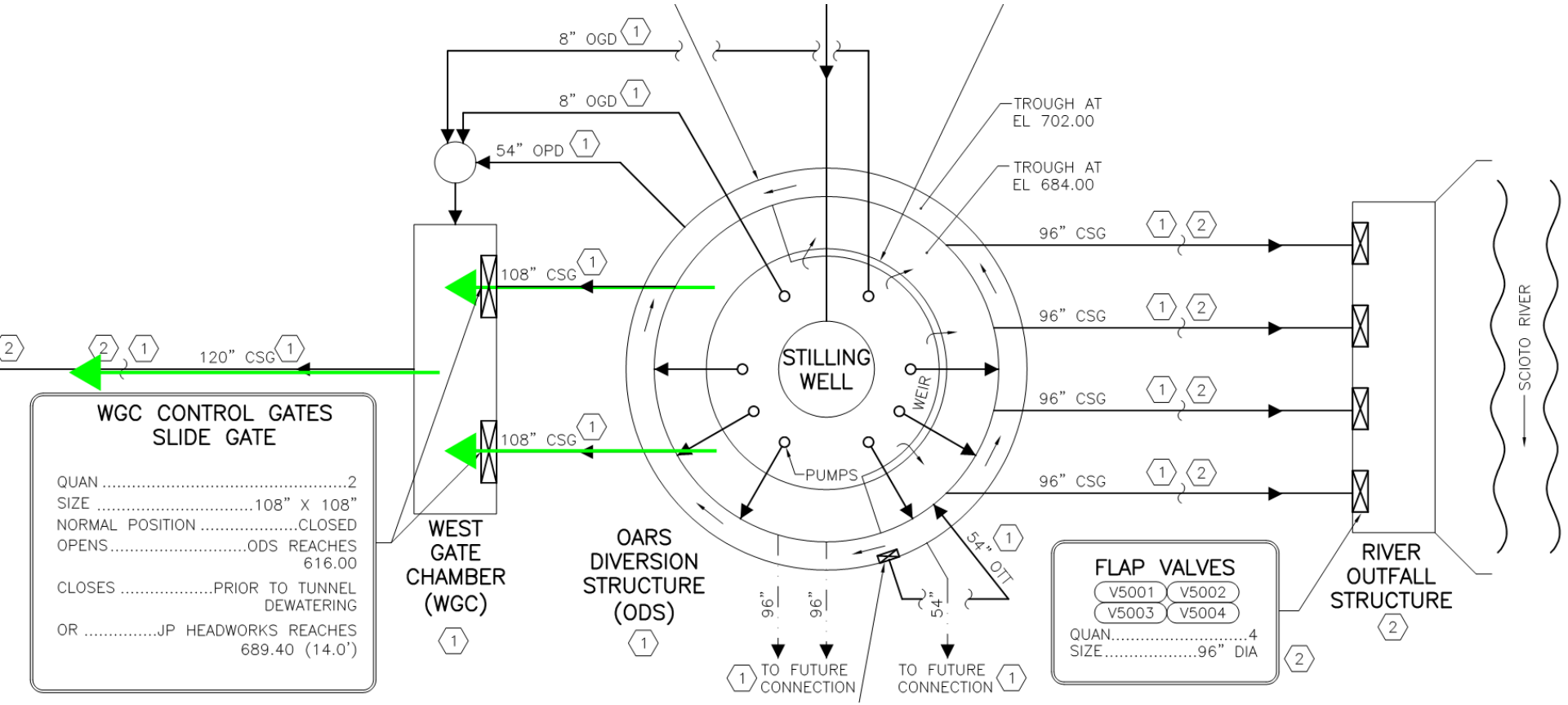

OARS Tunnel is full & shafts are filling – gravity flow to WWTP

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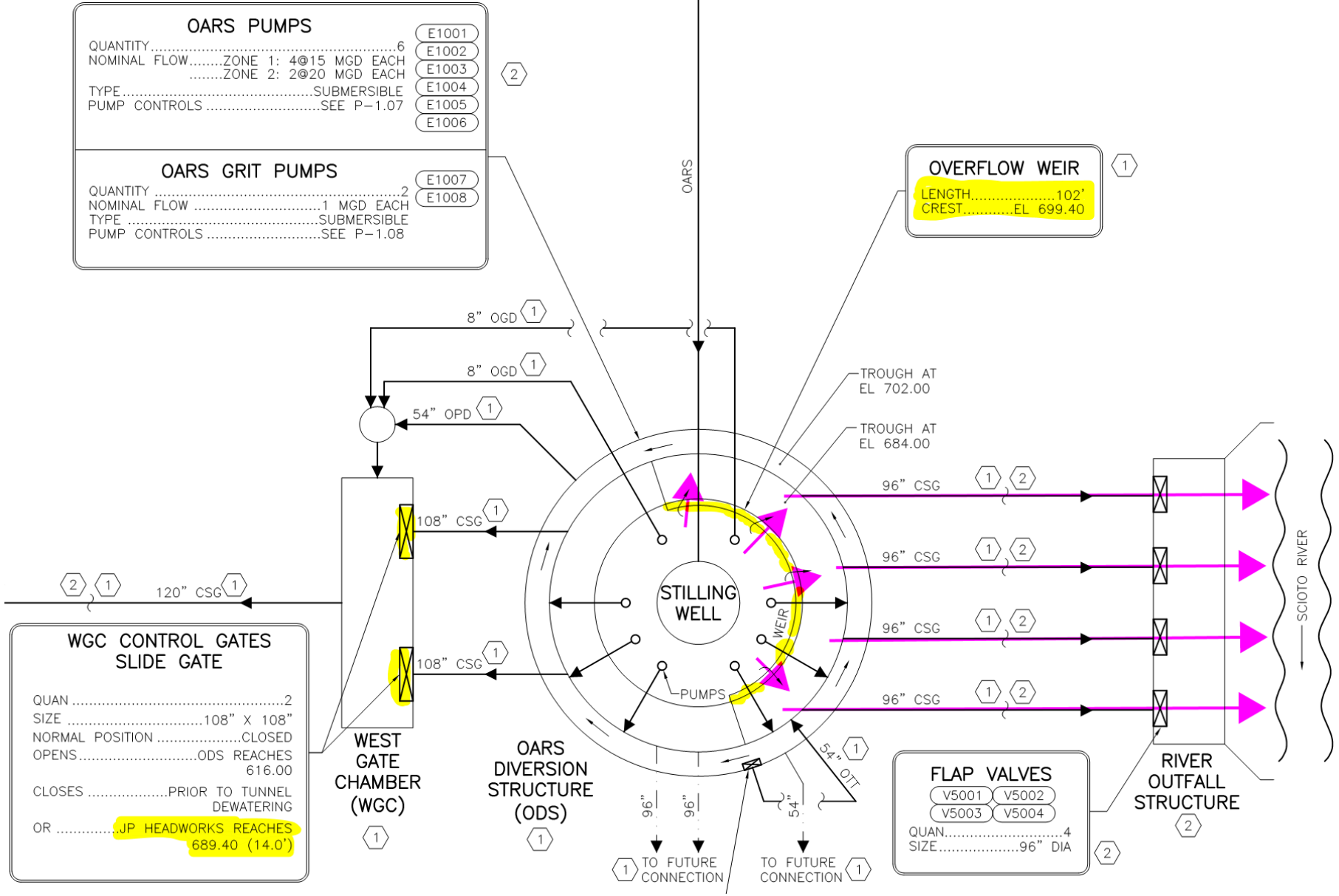

OARS Tunnel & shafts are full and WWTP(s) are at capacity

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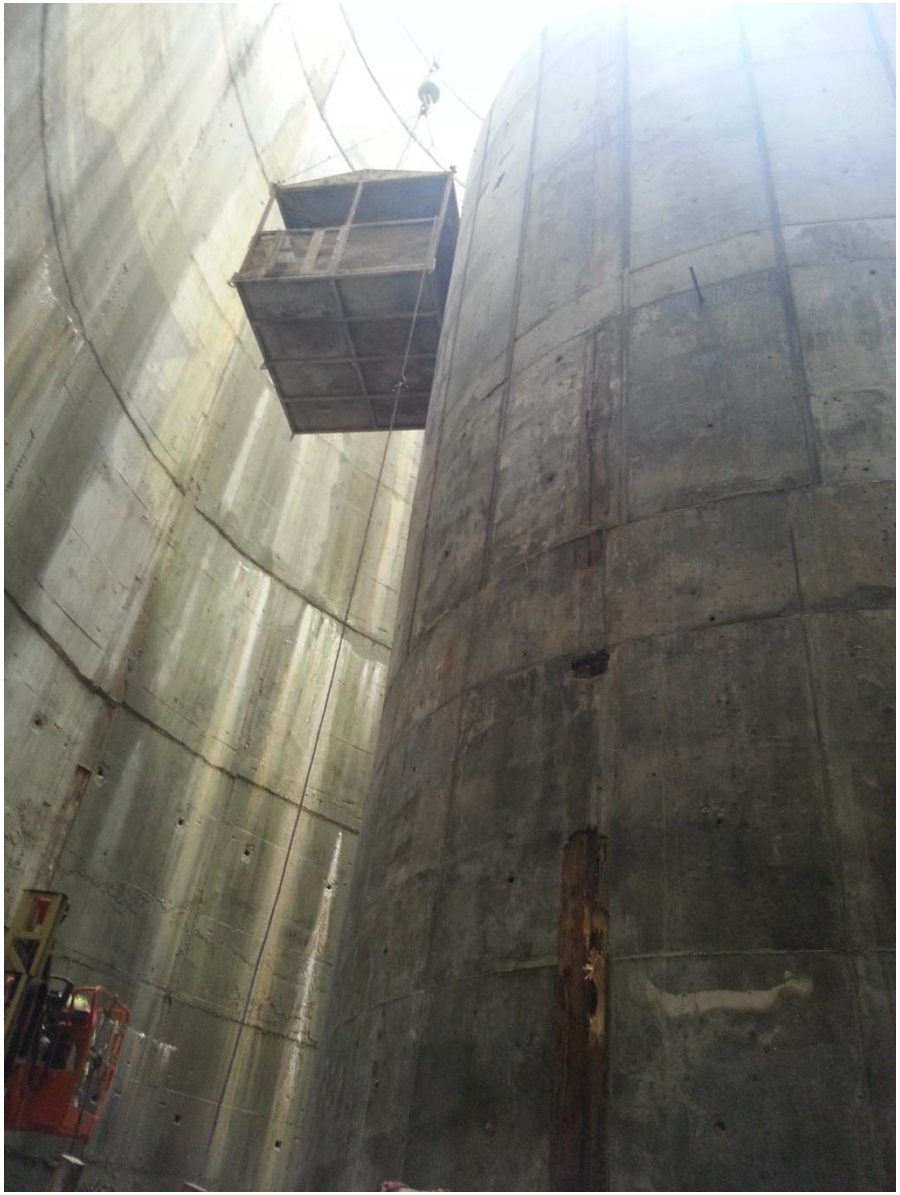

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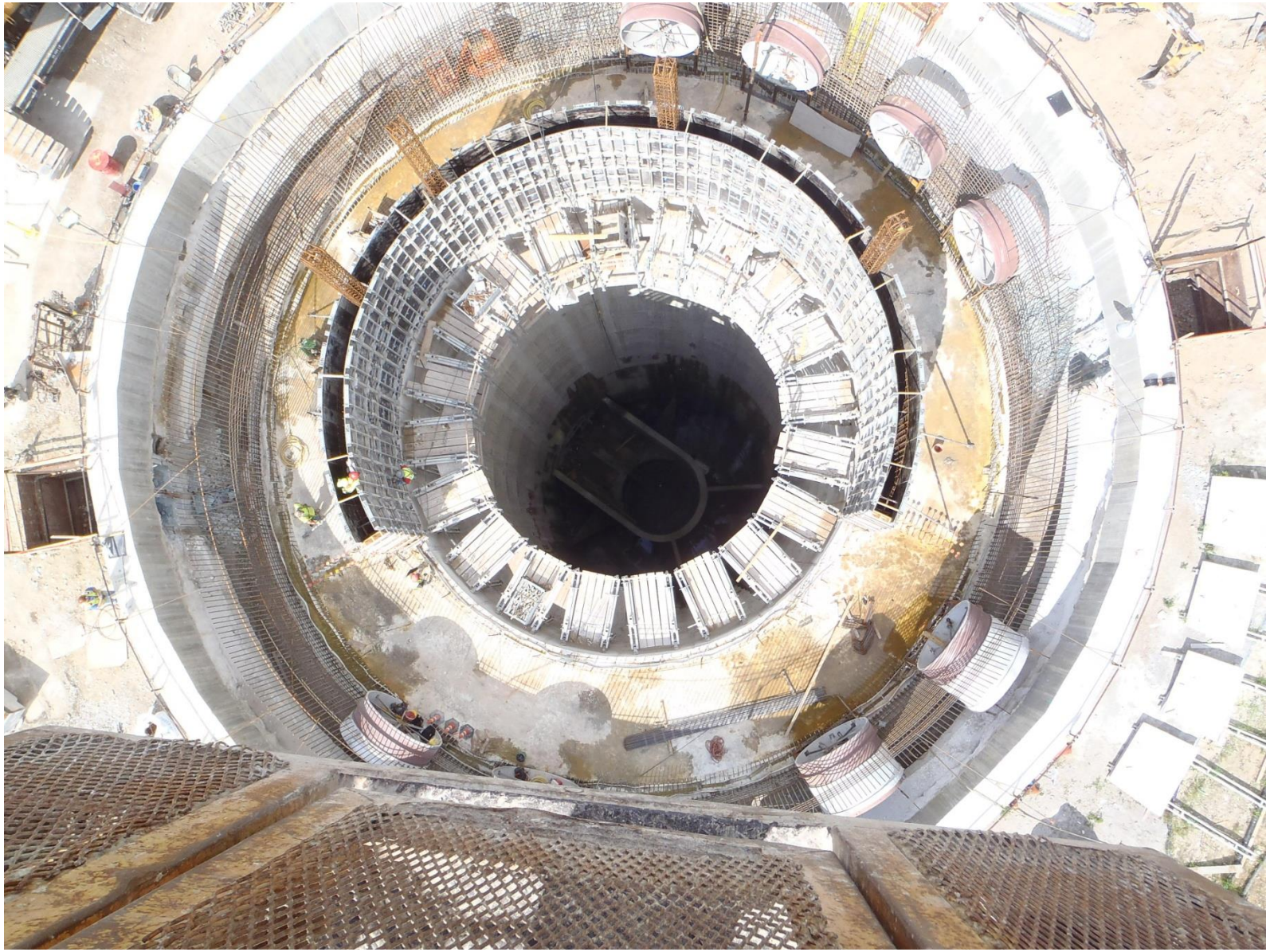

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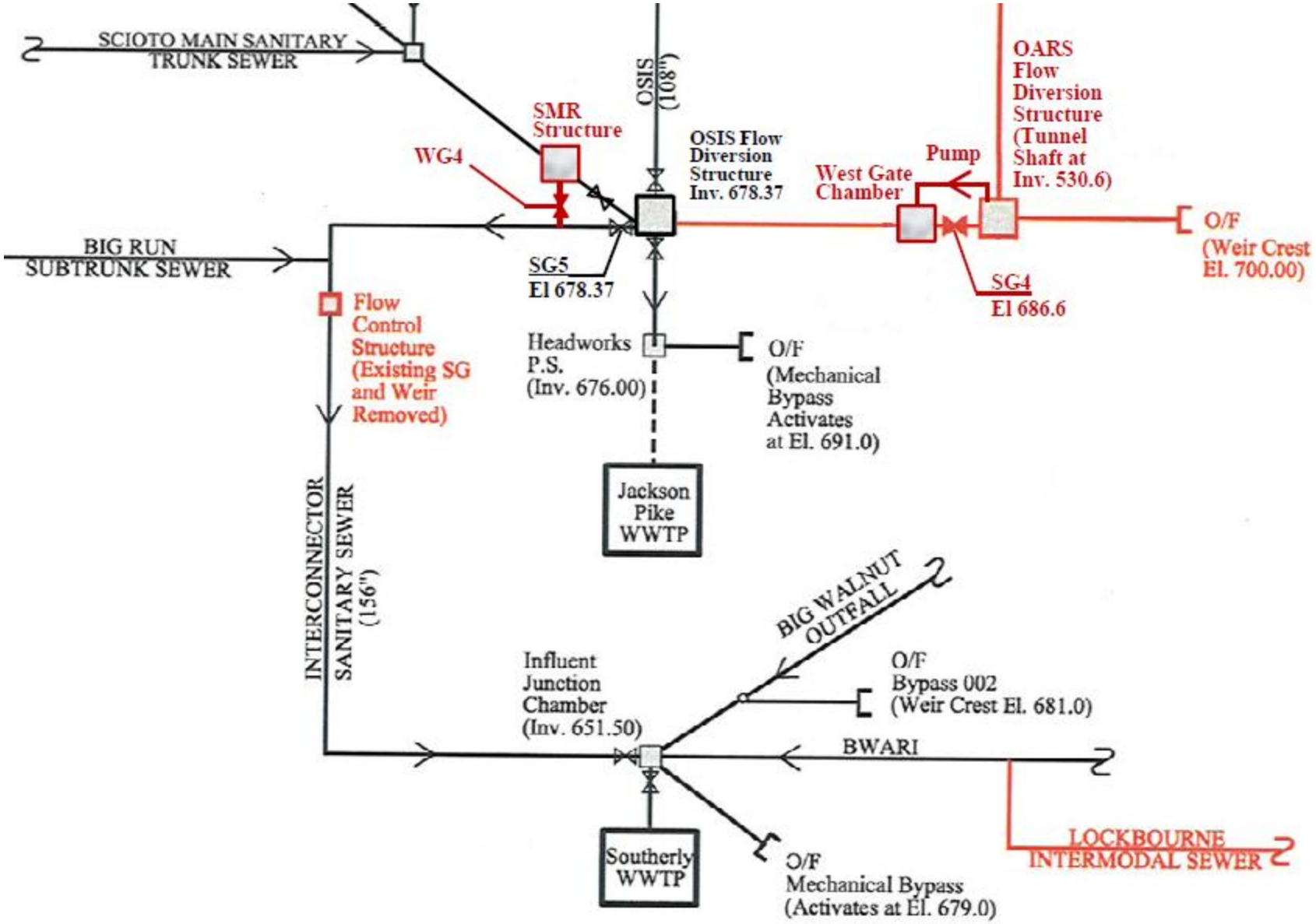
Scioto-Main Relief Structure (SMR)

The SMR serves 2 main design functions:

1. Relieve flow to the interconnect sewer when OARS is sending flow to the Jackson Pike WWTP.

2. Maintains the optimal level in the FDS, which improves influent pump performance. The weir gate provides “self-leveling” of the FDS.



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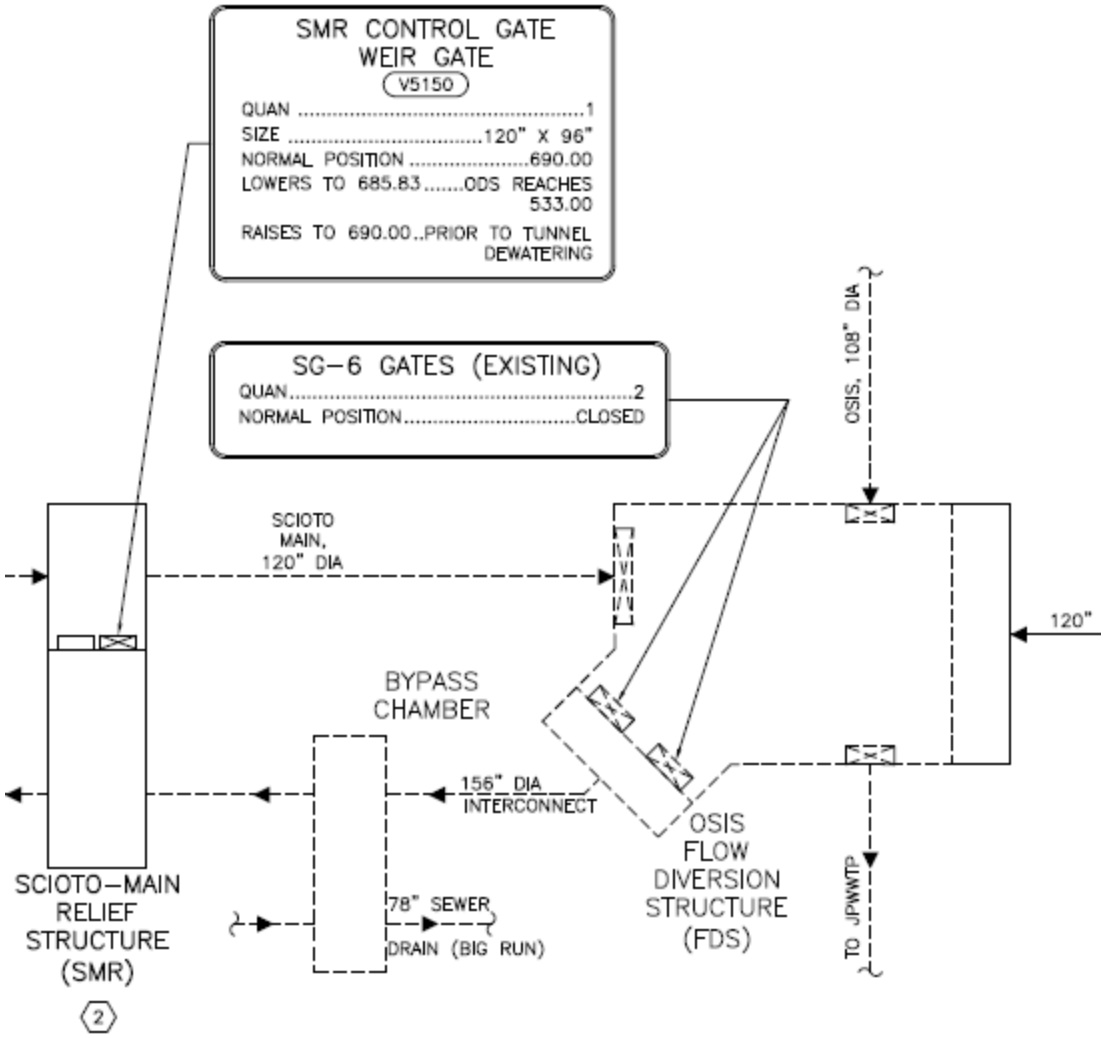

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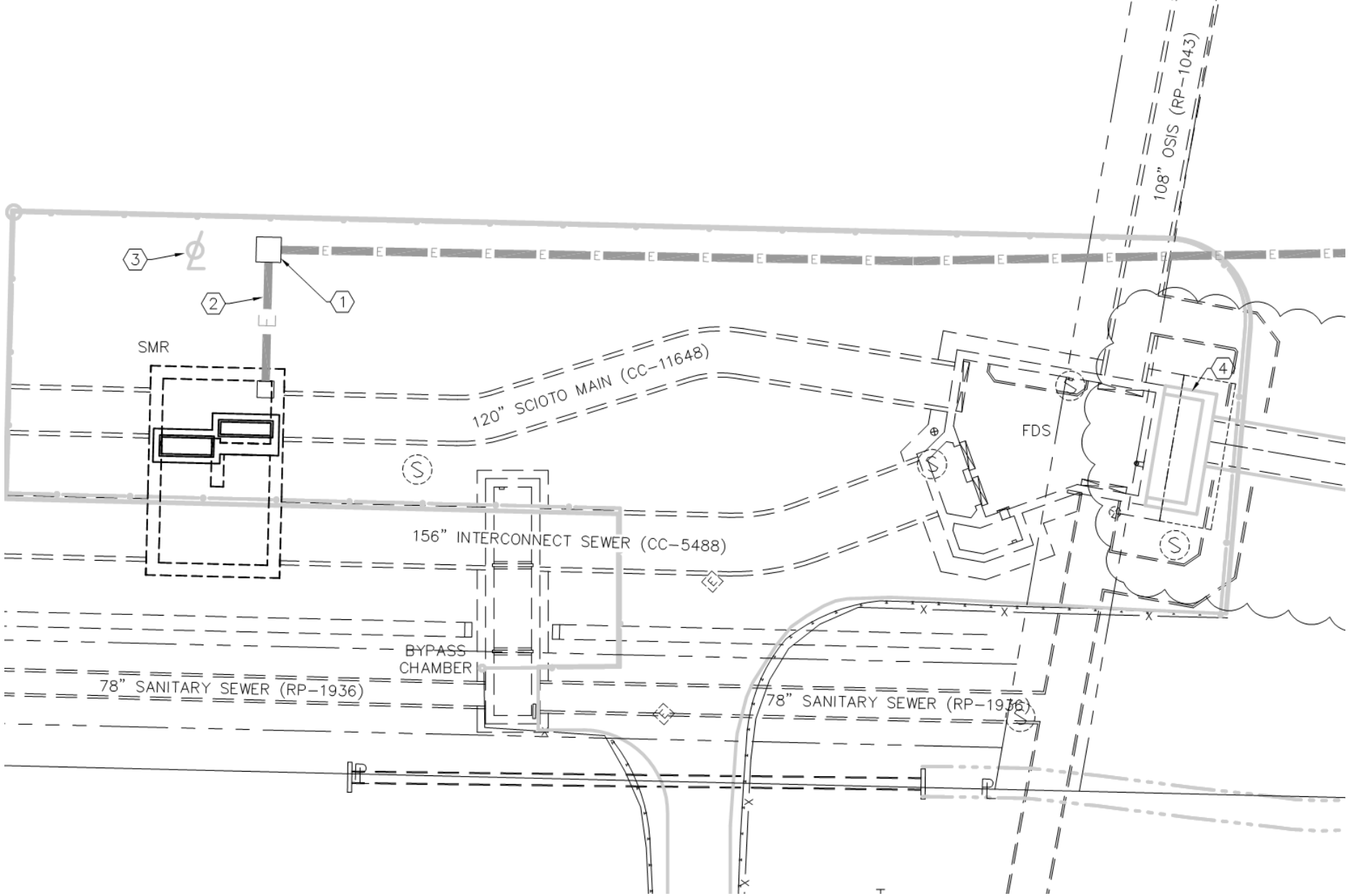

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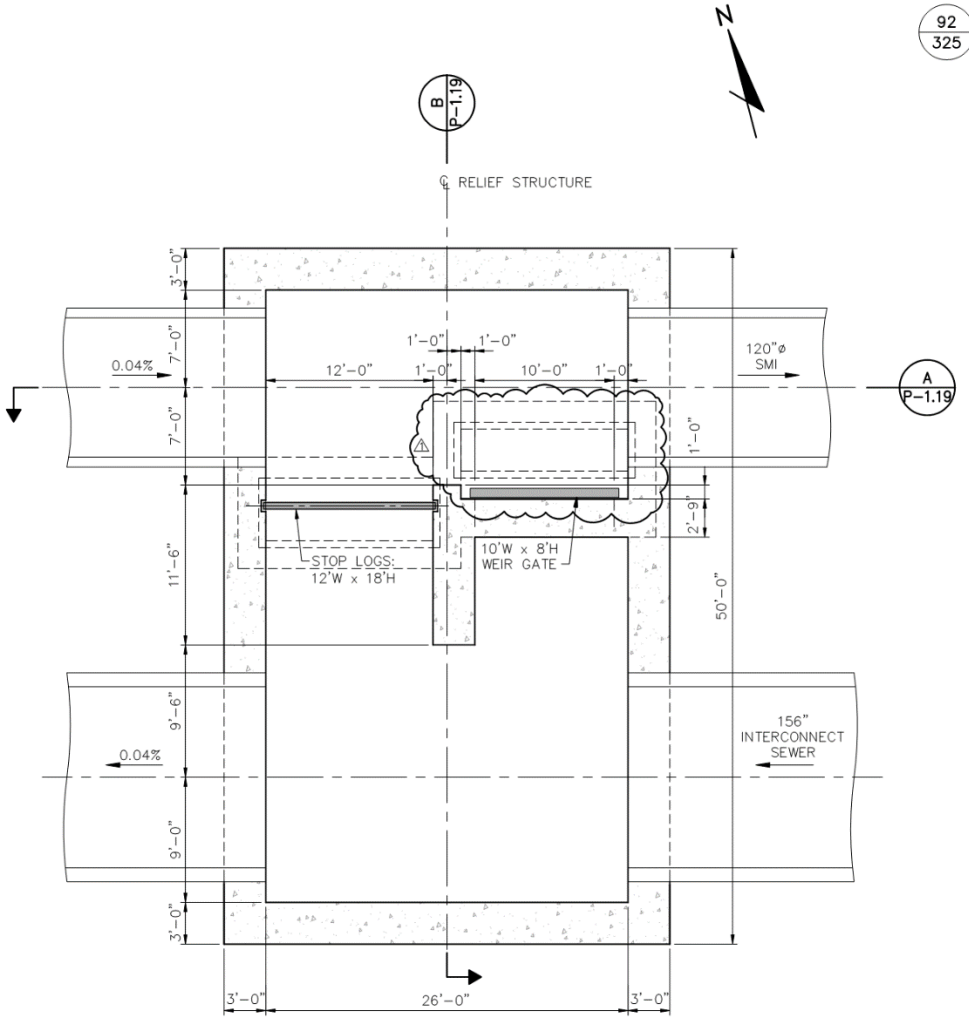

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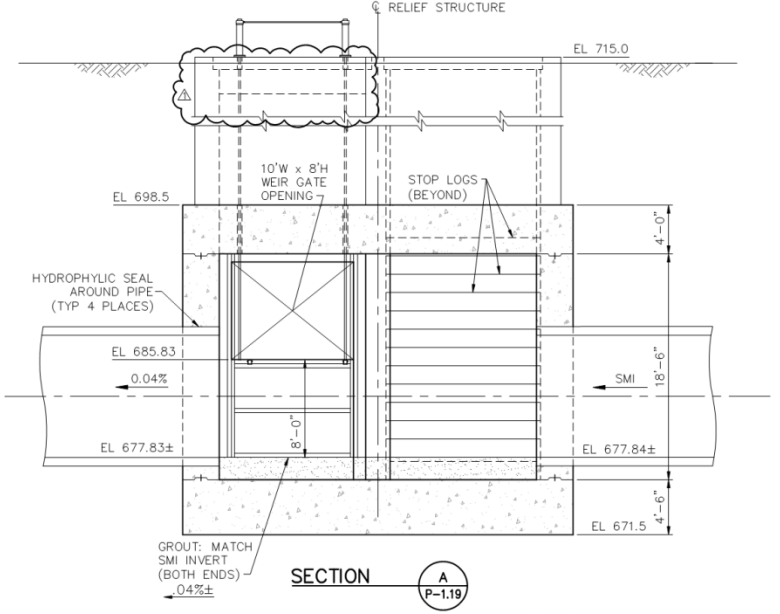

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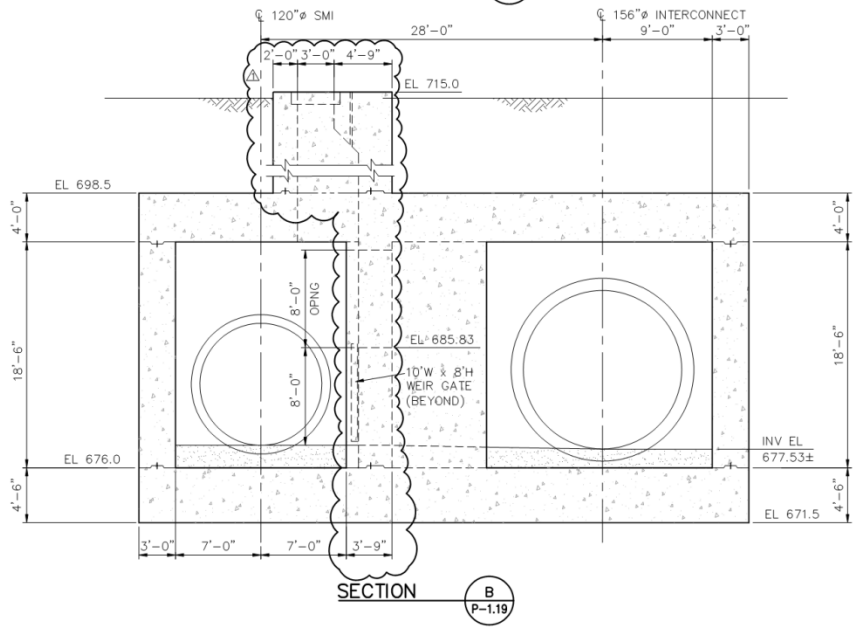

SECTION B P-1.19

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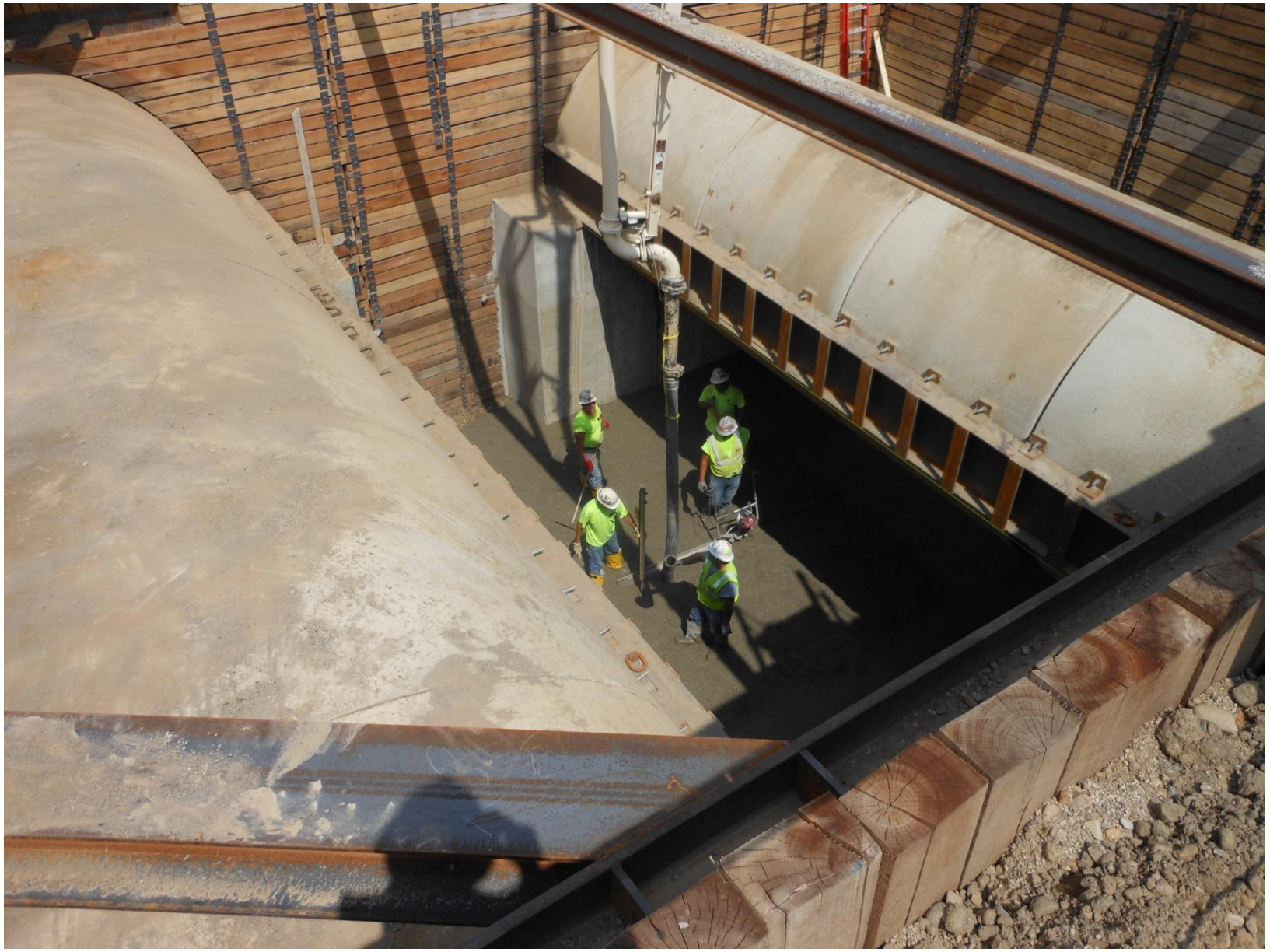

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- CH2M Hill
- Jenny Engineering
- Prime AE
- EMH&T
- Dynotec
- Eagon & Associates
- Multivista
- CDM Smith

- Black & Veatch
- HR Gray
- Smoot
- Aldea Services

Phase 1 – Kenny / Obayashi

Phase 2 – Trumbull

Igel

Capital Tunneling

Miles McClellan

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