

Odour Control in a Cold Climate

Pine Creek Wastewater Treatment Plant, Calgary, Alberta

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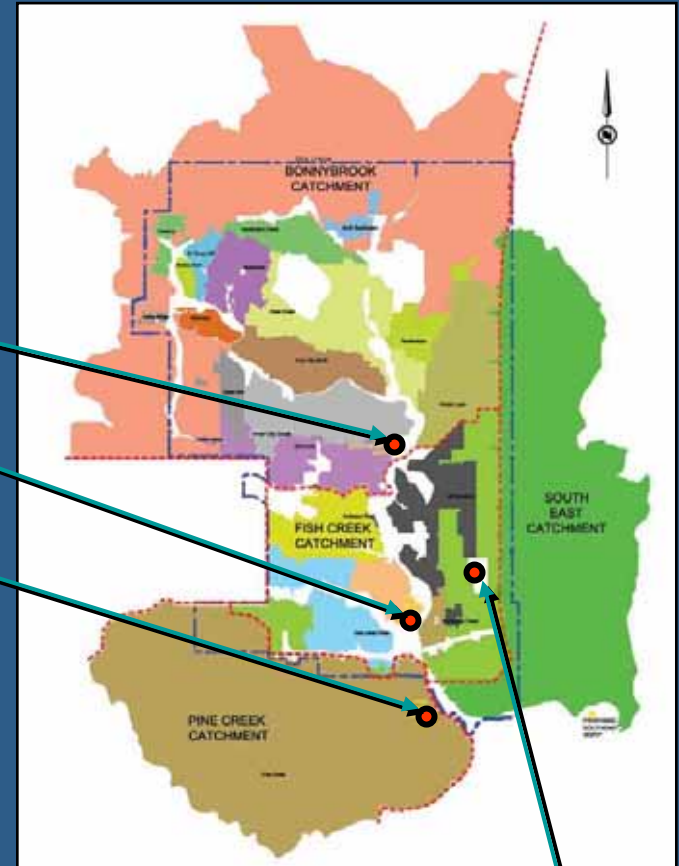
Location



Bonnybrook

Fish Creek

Pine Creek



Shepard Lagoons

Weather Statistics

- Mean Winter Temp: -6 °C (21 ° F)
- Min. Sustained Temp: -15 ° C (5 ° F)
- Extreme Min. Temp: -45 ° C (-49 ° F)
- Frost-days/year: 196

- Avg. Sum. Temp: 14 ° C (57 ° F)

Pine Creek WWTP

- Greenfield Plant
- Biological Nutrient Removal Plant
 - Effluent Total P: 0.50 mg/L
- Anaerobic Sludge Digestion
 - Off-site sludge disposal
- Highly Sensitive Site
 - Environment
 - Archaeological
 - Development

Pine Creek WWTP

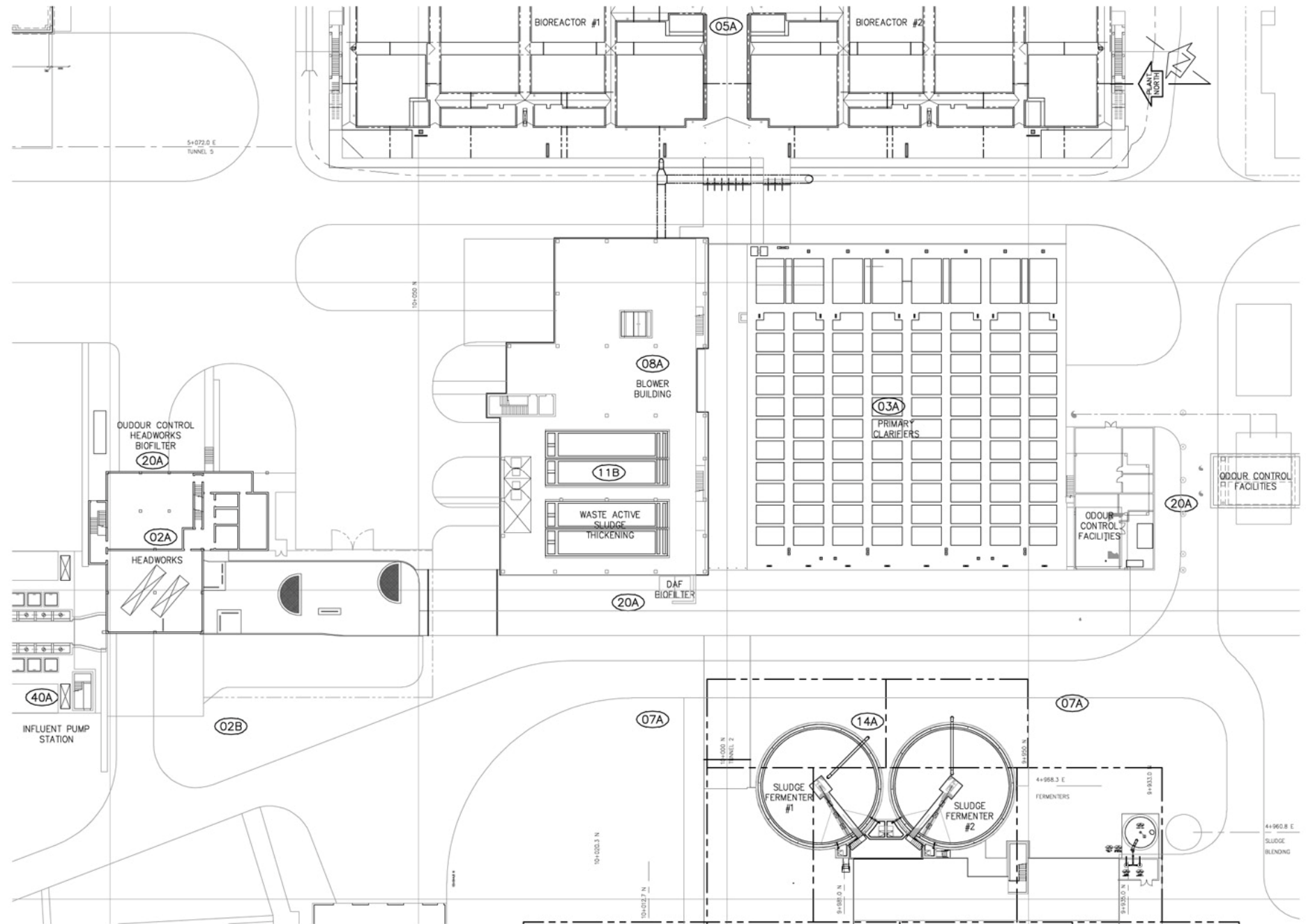
- Stage 1 (Under Design)
 - Population: 250,000
 - Flow: 100 MLD (27 mgd)
 - Plant Handover: August, 2007
- Stage 3 (Ultimate)
 - Population: 1,750,000
 - Flow: 700 MLD (185 mgd)

Facility Costs

- WWTP - Stage I Construction
 - Flow: 100 MLD (27 mgd)
 - Value: \$220 CDN (\$175 US)
- Odour Control - Stage I
 - Systems:
 - *Headworks*
 - *DAF*
 - *Primaries, Fermenter, Bioreactor*
 - Treatment Value: \$3.6M CDN (\$2.9M US)

Treatment Plant Staging





Public Consideration

- Significant Public Input to Planning Process
- High End Residential Development
- Golf Course
- Major Traffic Route
- ACWA Research Facilities - Public Use
- High Environmental Sensitivity
- No Definitive Regulatory Framework for Odours

Owner Commitments

- Odour Criteria
 - Maximum Fenceline: 25 OU/m³
 - Maximum at Nearest Receptor: 10 OU/m³

OU's based on EN13725 - more repeatable than ASTM Standard.

- LEED™ - Silver Standing



**Future
Pine Creek
Site**

HERITAGE POINTE

HIGHWAY 2

FUTURE
DEERFOOT
TRAIL

M.D. OF
FOOTHILLS

BOW
RIVER

CITY LIMITS

CITY OF
CALGARY

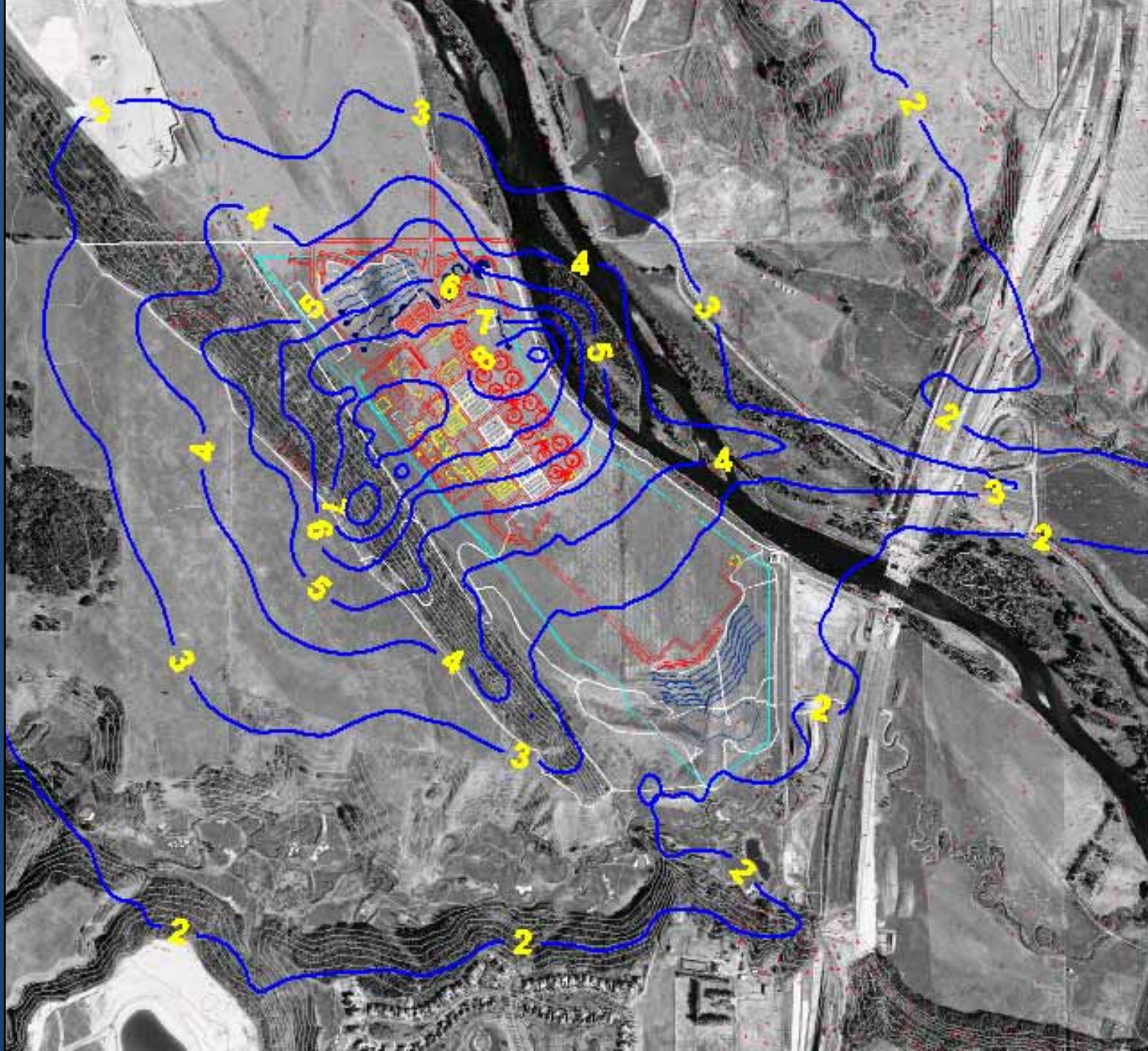
CRANSTON
STAGE I

FUTURE DEERFOOT TRAIL

MARQUIS OF LORNE (HIGHWAY 22X)

Design Approach

- Sampling at Existing Plants
- Odour Modelling - ISCST
 - Four Scenarios Considered
- Scenario Selected
 - Single Stage Biofiltration for IPS, Headworks, and WAS Thickening
 - Two Stage Caustic Scrubbers for Primary Clarifiers, Bioreactor Influent, and Fermenters



Implementation

- LEED™
- Design Components
 - Collection System Odour Control
 - Containment Systems
 - Collection System
 - Treatment Systems
 - *Biofilters - Pre-qual*
 - *Scrubbers*
 - Ancillaries - Digesters/SBT

Collection System

- Long Gravity Interceptor
- Small Interceptor Siphons
- Control Approach
 - Iron Salts Addition

Containment

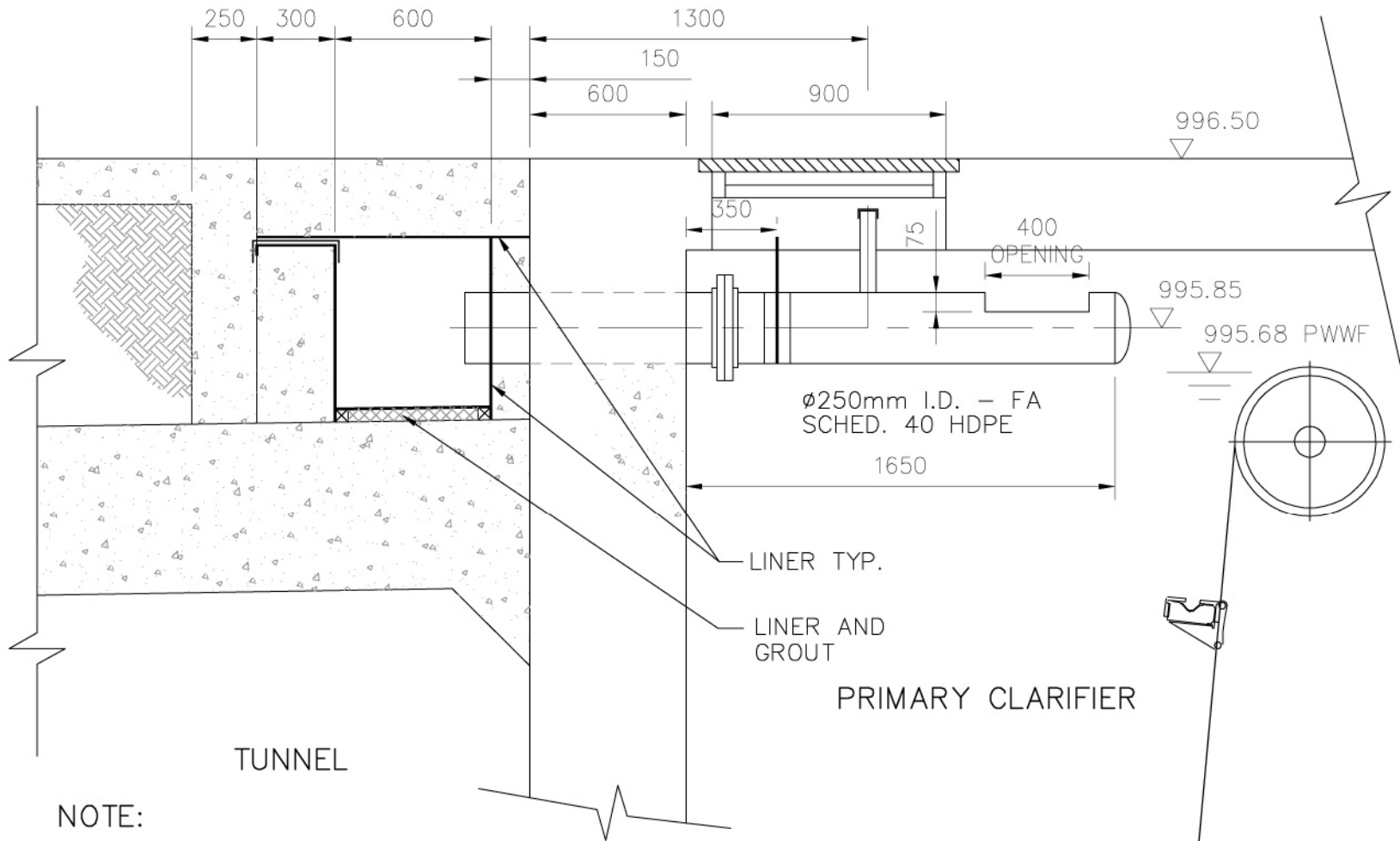
- Channels
 - Concrete Covers
 - Access Hatches
 - Liners
- Tanks
 - Aluminum Covers
 - Insulation
 - Operator Access
- LEED™ Consideration
 - Low Profile
 - Green Roof Style
 - Visual Aesthetics
- Impacts
 - Operator Access
 - Ductwork

Examples



Collection System

- Ductwork
 - Profile
 - Insulation
 - Below Grade
 - *Min 1.8 m (6 ft) bury*
 - *Condensate Control*
 - *Road/Structure Crossings*

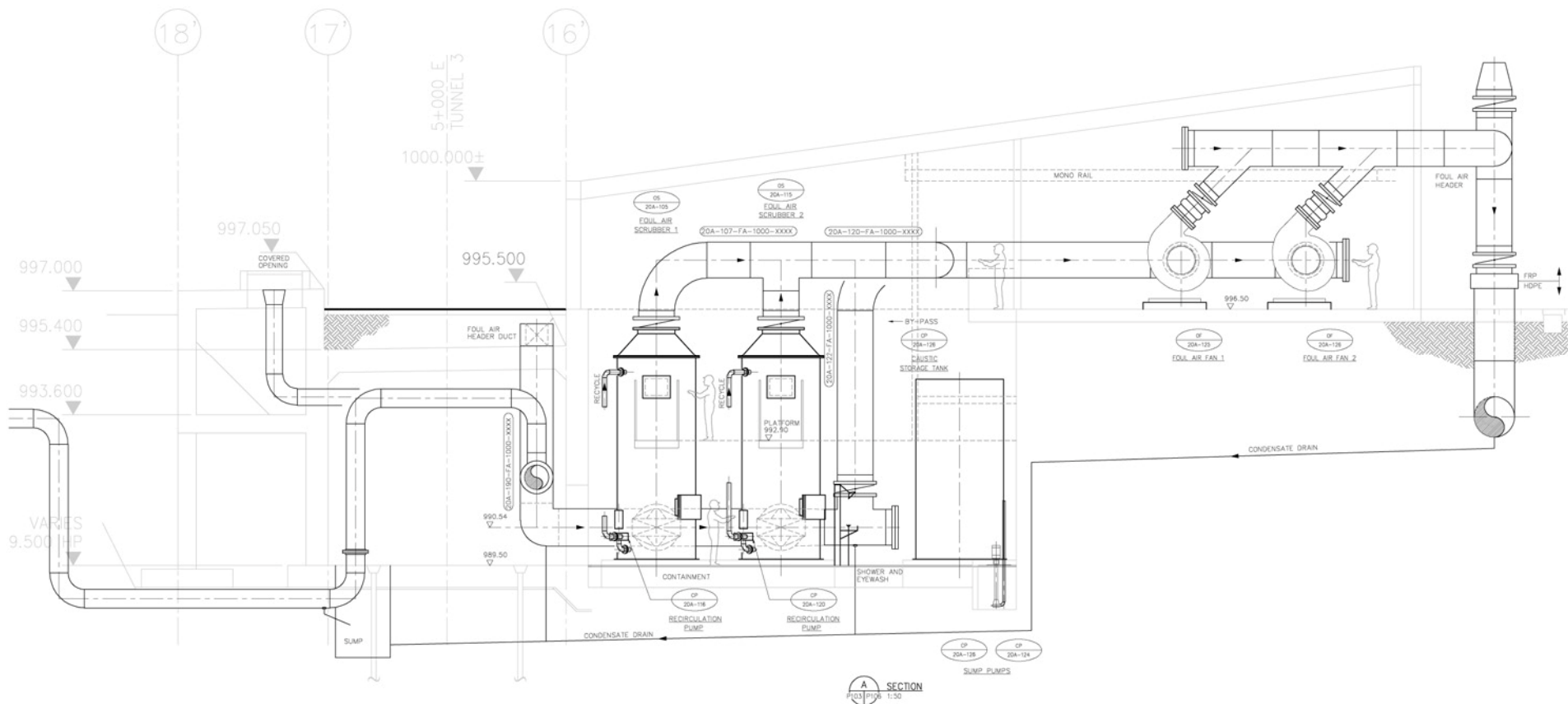


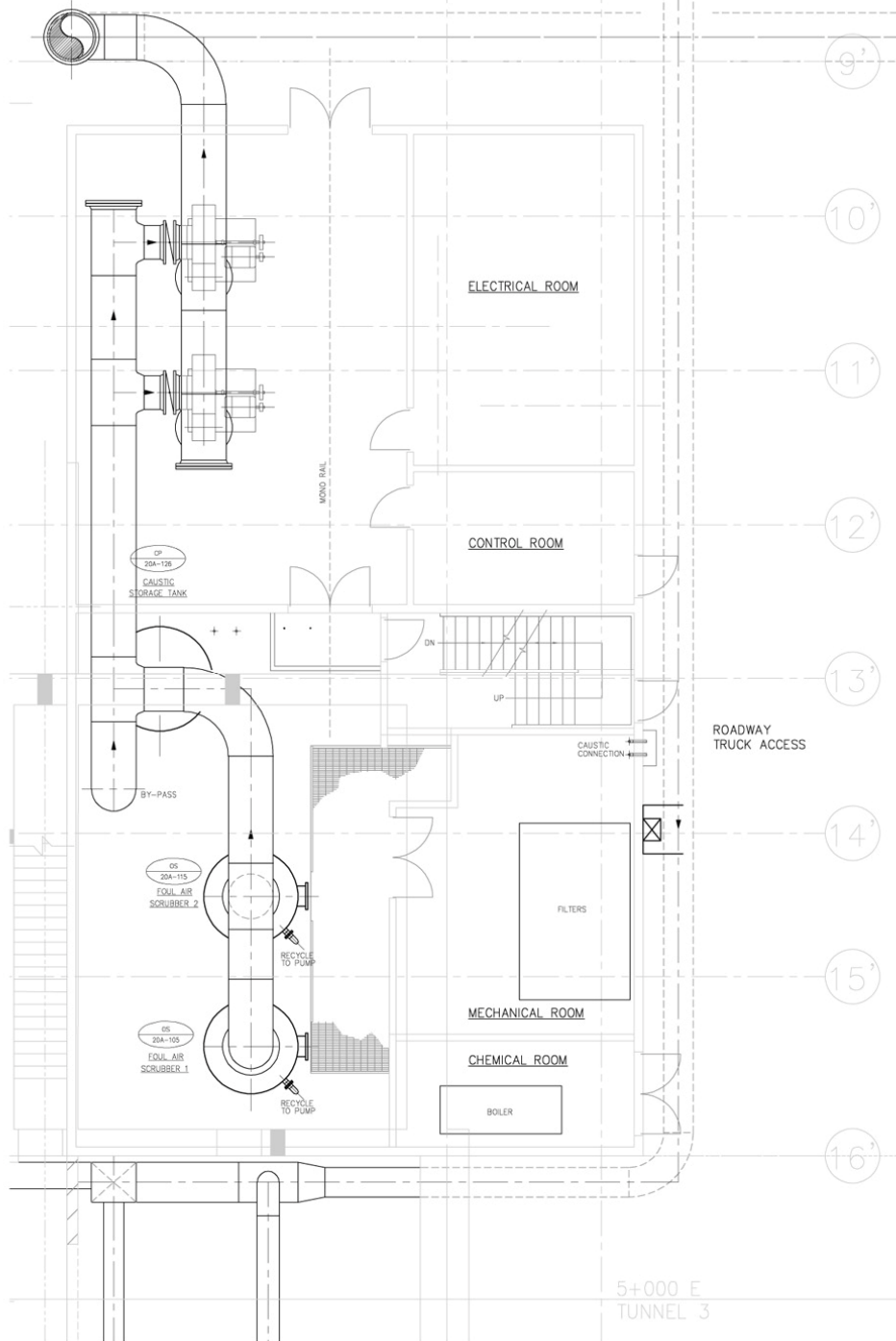
NOTE:
4 REQUIRED PER CLARIFIER

1 SECTION DETAIL
P111 | P111 1:25

Caustic Scrubbers

- Interior Installation
 - NFPA Code
 - LEED™ - low profile
 - Noise
- Chemical Handling
 - Delivery
 - Spill Control
 - *Line of Sight*
 - *Eye Wash / Shower*
 - *CDACS*
- Winterization Systems
 - Natural Gas - Code Issues
 - Steam - Operator Certification Issues
- Ancillary Chemicals
 - Water Softening
 - Scale Removal





5+000 E
TUNNEL 3

Biofilter - Prequal

- Pre-select a vendor with experience
- Performance Guaranties
 - Temperature
 - Odour Levels - OU/m³
 - *Inlet*
 - *Outlet*
- Cold Weather Performance
 - Winterization System

Biofilter Components

- Pre-Humidification
 - Interior heated space
 - Condensate recovery
- Winterization
 - Air heating
 - Electrical/natural gas
 - *NFPA, etc*
- Temperature Control
 - Inlet air
 - Media temperature
- Leachate Recovery

Biofilter Example



Conclusions

- Good Neighbour
- LEED™ Considerations
- Major Treatment Site
 - Long term future development planned
 - Highly Sensitive Site
- Odour Control Essential
- Cold Weather Cost Implication