



# Eastgate Yard Demonstration Rain Garden

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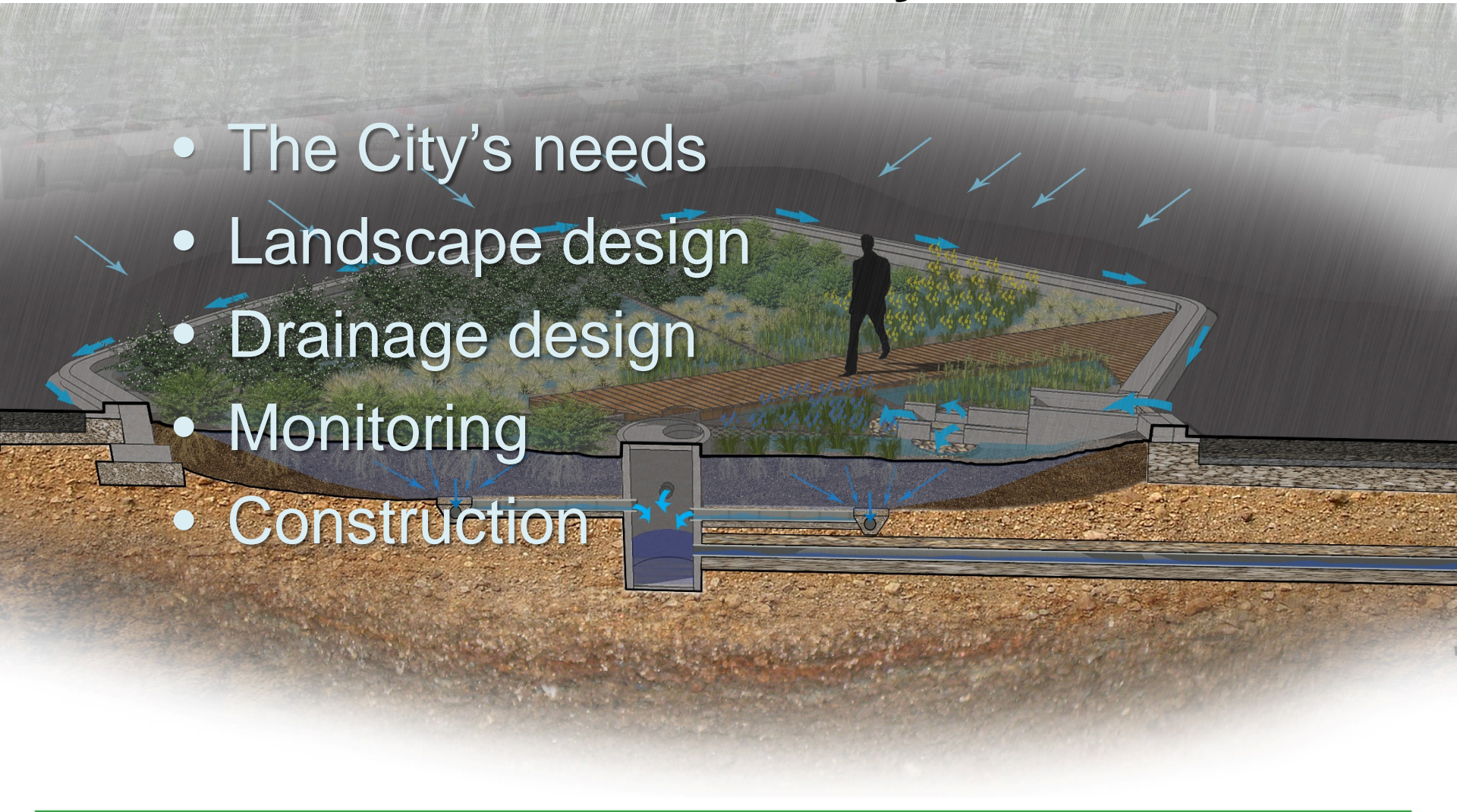
Designed by ISL Engineering  
for the City of Edmonton





# Today's Presentation

- The City's needs
- Landscape design
- Drainage design
- Monitoring
- Construction







# The Site

City of Edmonton  
Eastgate Building –  
Rear Yard

Home to CoE  
Drainage  
Services –  
Regulatory  
Services





# Demonstration Rain Garden Objectives

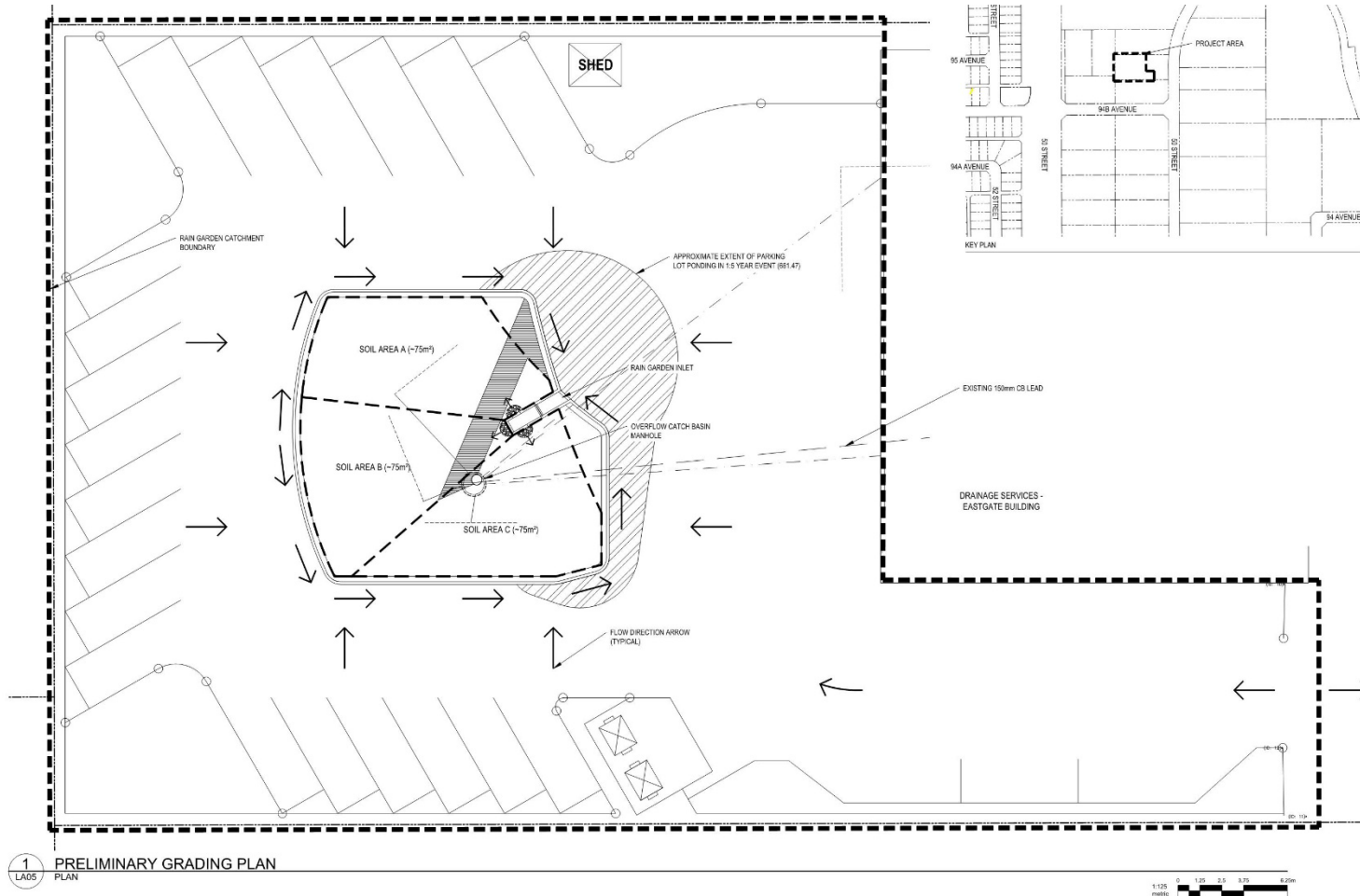
- Example for the community (light industrial site)
- Research and monitoring of LID in Edmonton
- Amenity for Building Occupants
- Drainage improvements







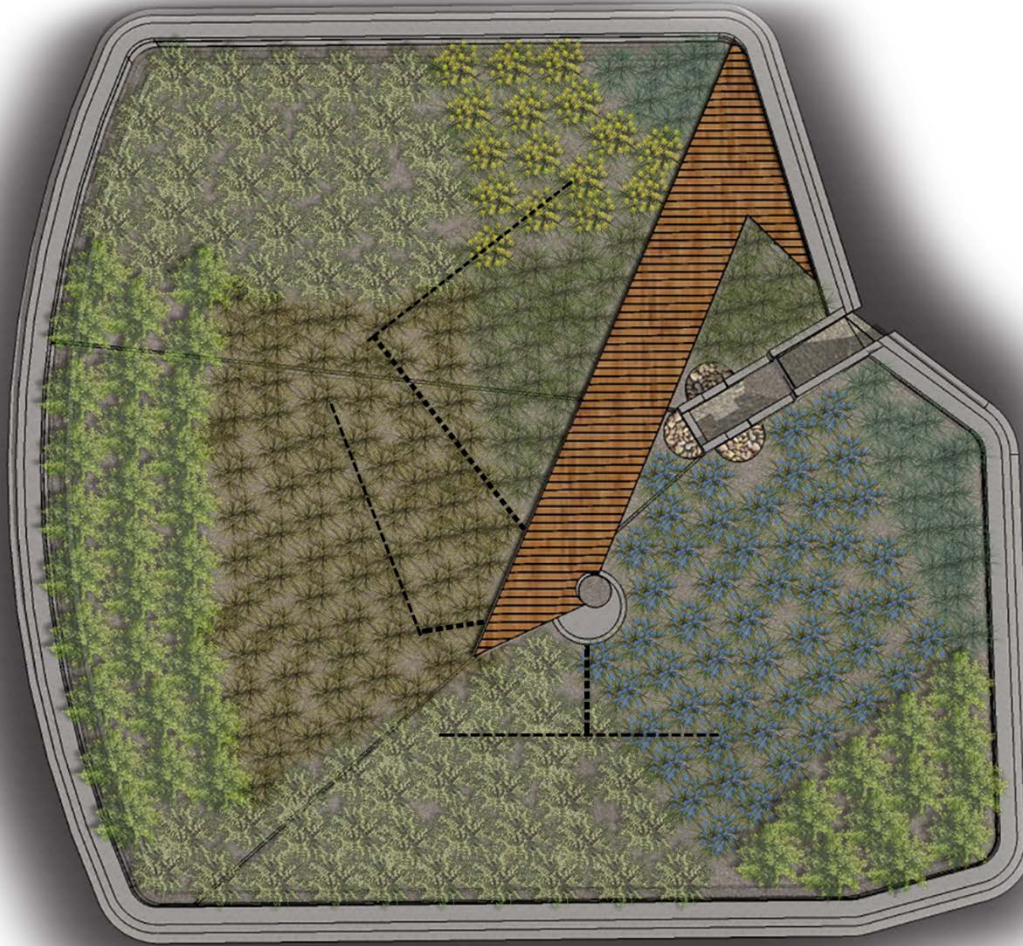
# Site Plan







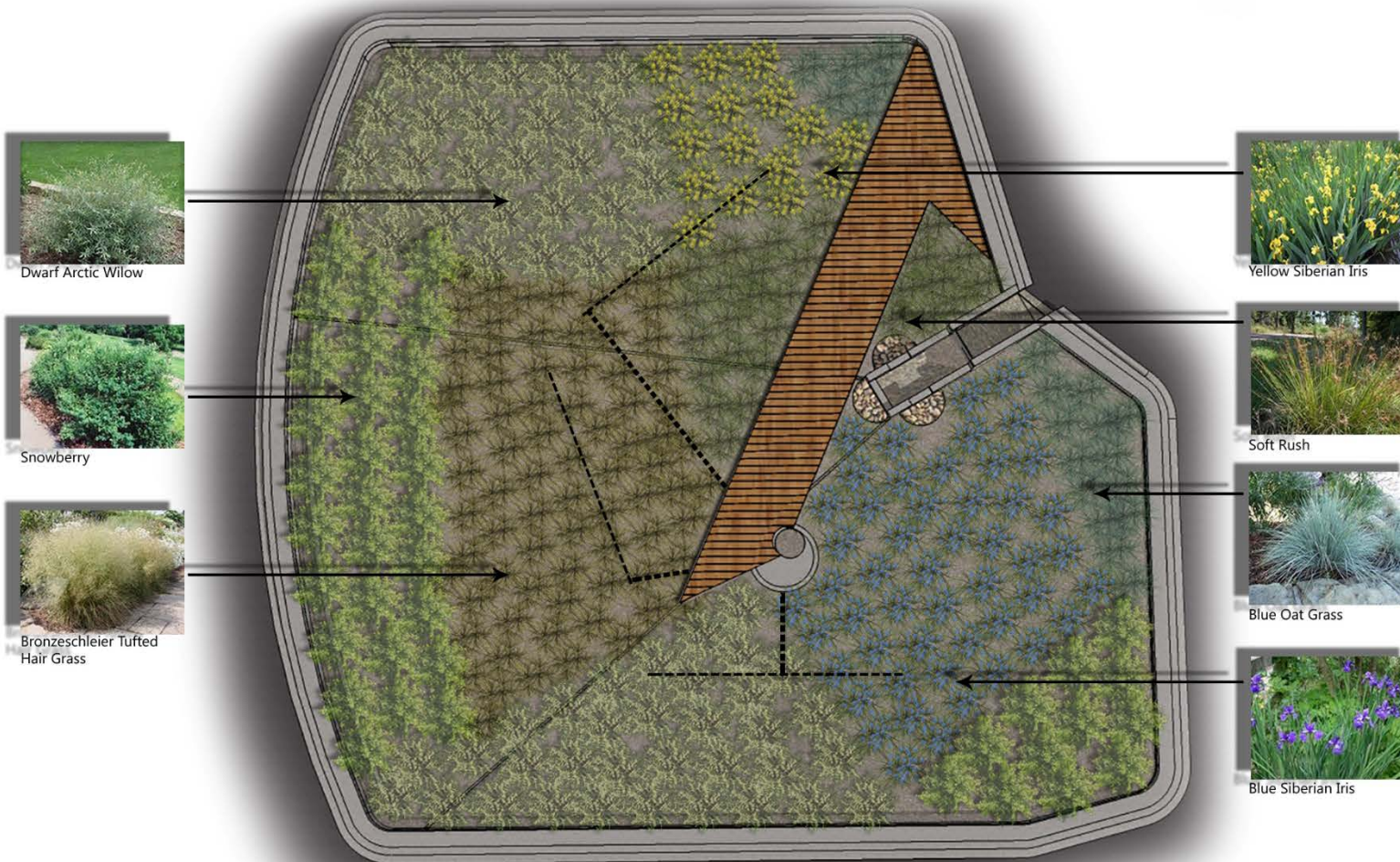
# Landscape Concept







# Vegetation



Dwarf Arctic Willow



Snowberry



Bronzeschleier Tufted Hair Grass



Yellow Siberian Iris



Soft Rush



Blue Oat Grass



Blue Siberian Iris





# Vegetation



Snowberry



Bronzeschleier  
Tuffed Hair Grass



Blue Oat Grass



Dwarf Arctic Willow





# Vegetation



Soft Rush



Yellow Siberian Iris

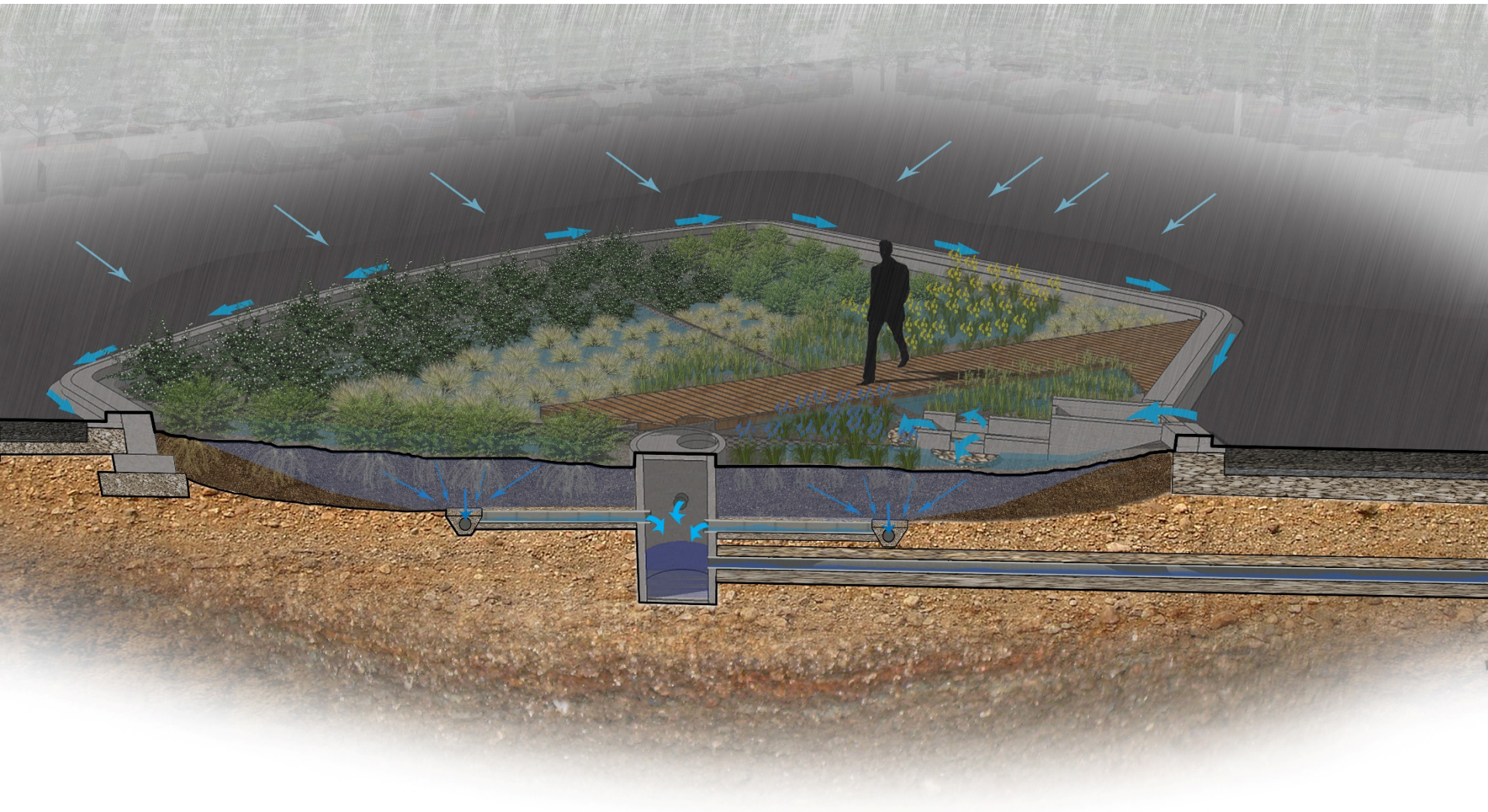


Blue Siberian Iris





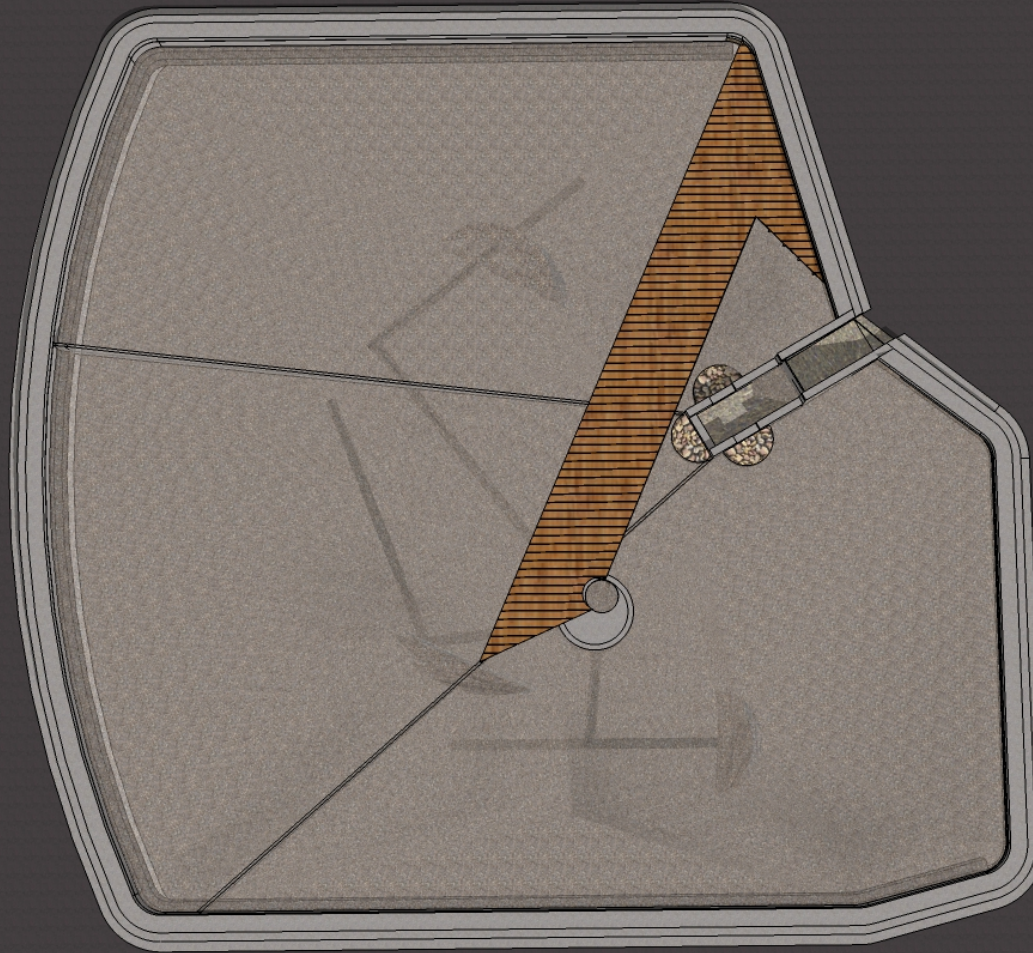
# Rain Garden In Action







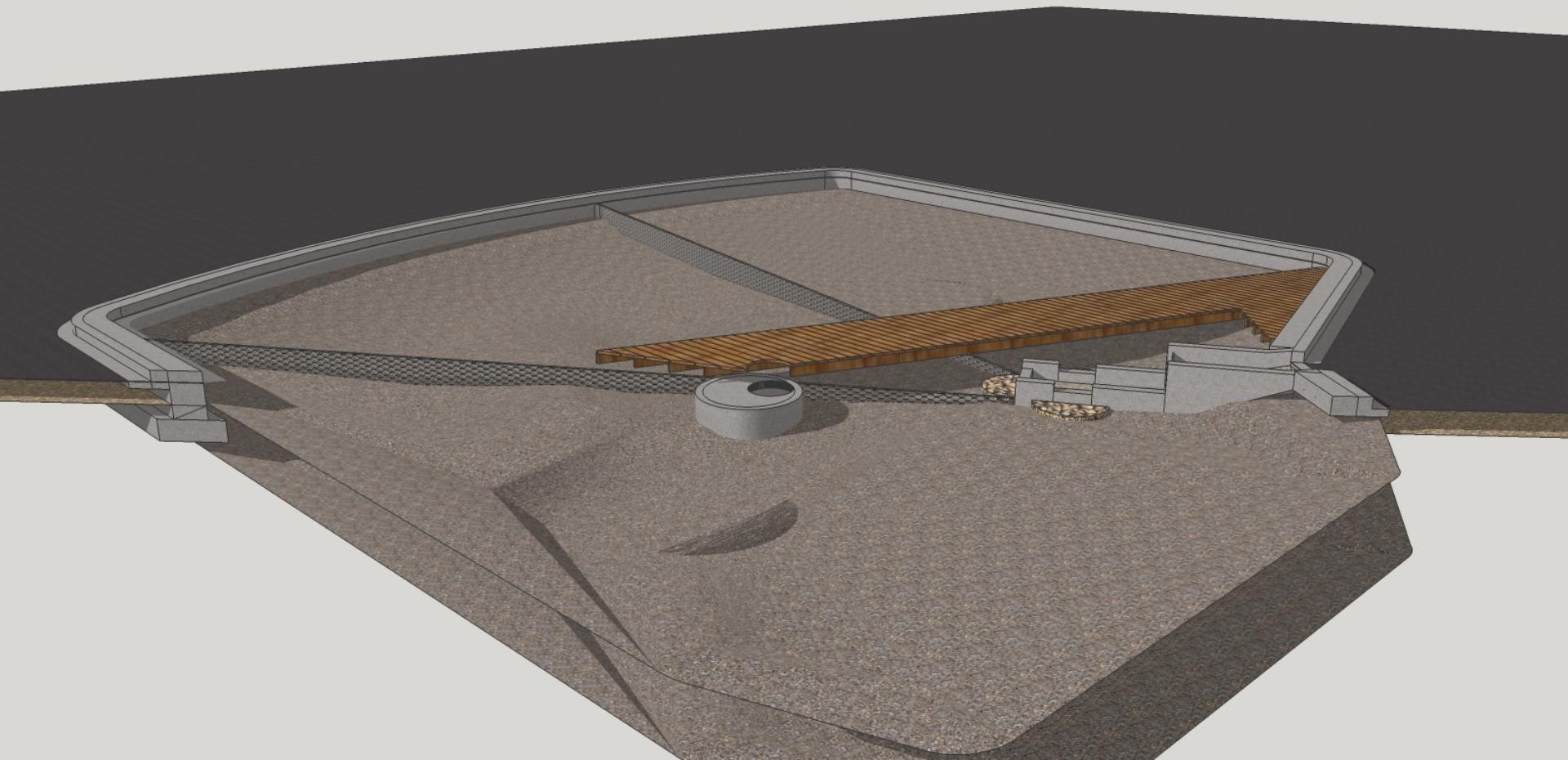
# Dissecting the Rain Garden







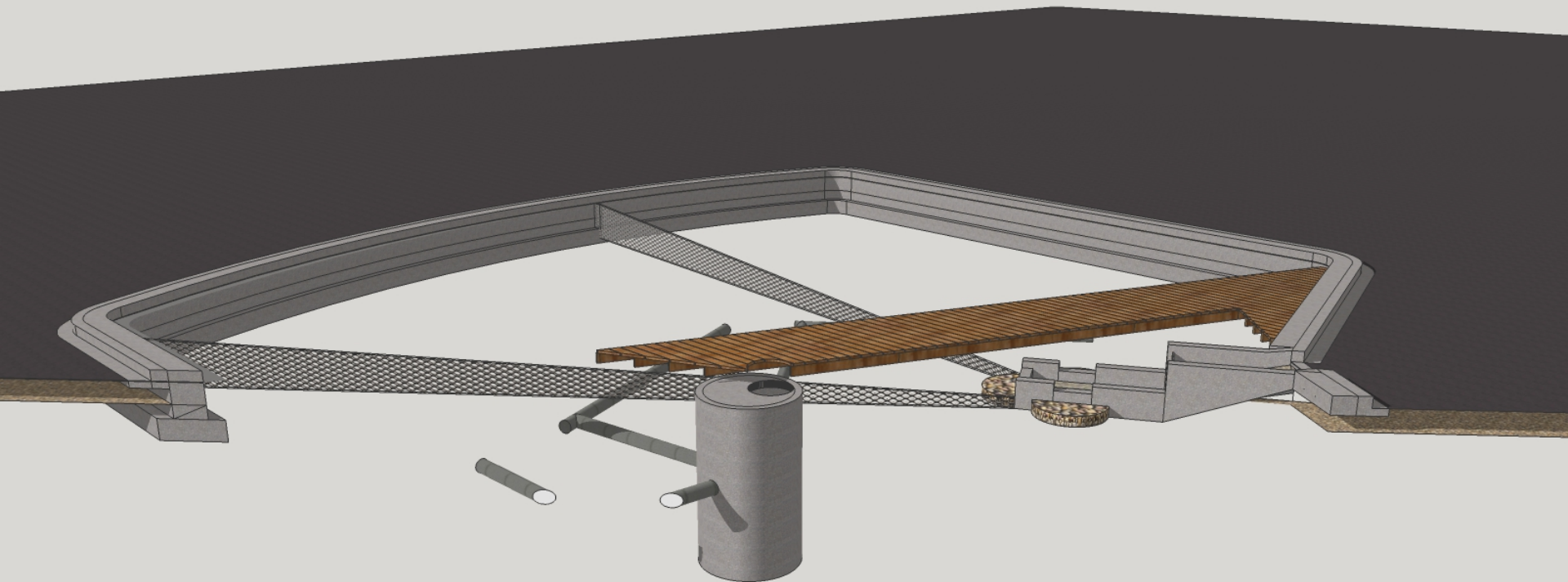
# Dissecting the Rain Garden







# Dissecting the Rain Garden







# Soil Media

- ❑ Research opportunity for the City – 3 Cell Design:
  - Soil A – sandy loam (CoE Topsoil A)
  - Soil B –sandy loam plus compost
  - Soil C – sandy loam plus sand and compost
  
- ❑ Lab infiltration testing done by contractor for baseline





# Rain Garden Sizing

Table 5.1: Parking Lot Subcatchment Runoff Results

Event	Rainfall Depth (mm)	SWMM Model Runoff Depth (mm)	SWMM Model Peak Flow (L/s)	Rational Method Peak Flow (L/s)
1:2 year, 4hr Event	25.6	23.6	27	27
1:5 year, 4hr Event	37.3	35.3	41	40
1:10 year, 4hr Event	45.0	43.0	50	49
1:25 year, 4hr Event	54.8	52.9	62	59
1:100 year, 4hr Event	69.2	67.2	79	76
1:100 year, 24hr Event	126.6	124.6	11	-





# Rain Garden Sizing

- Footprint surface area (TRCA, 2010):

$$A_f = WQ_v / (d_c * V_r) = 63.8 \text{ m}^3 / (0.7 \text{ m} * 0.4) = \pm 228 \text{ m}^2$$

Where:

$A_f$  = footprint surface area ( $\text{m}^2$ )

$WQ_v$  = water quality volume ( $\text{m}^3$ )

$d_c$  = bioretention cell depth (m)

$V_r$  = void space ratio for the filter bed (assume 0.4)

- Also considered ratio of impervious to pervious area



# Performance Analysis

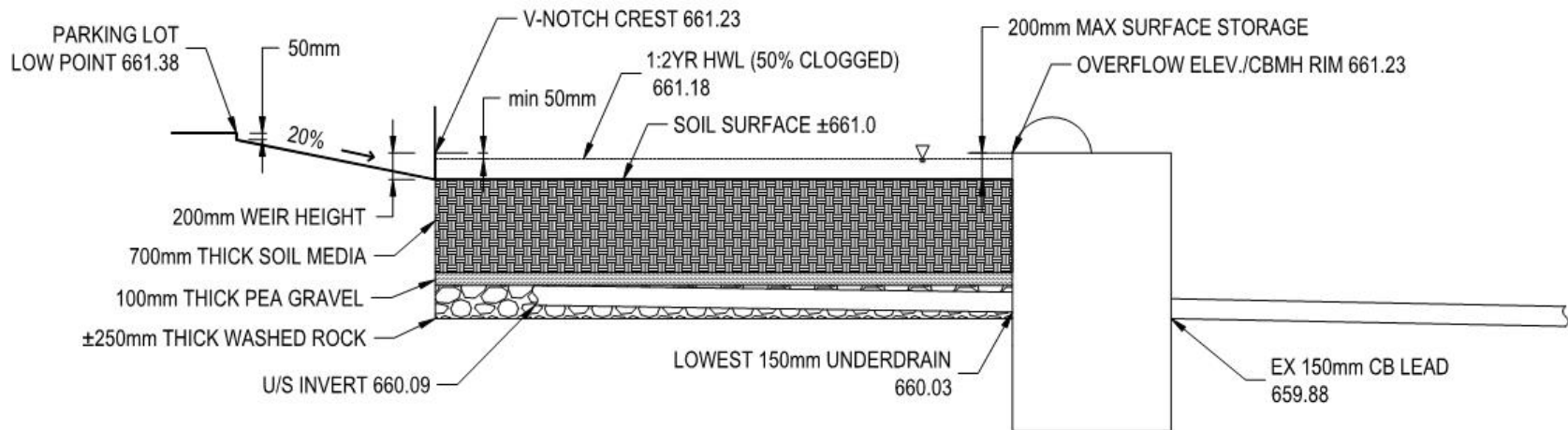
Table 5.3: Comparison of Site Discharge - Before and After Construction of the Rain Garden and Parking Lot Paving

Event	Peak Runoff (Rational Method)		Max CB Lead Capacity (Surcharged) (L/s)	Total Peak Discharge through CB Lead	
	Gravel Lot (L/s)	Paved Lot (L/s)		Pre-Construction (L/s)	Post-Construction (based on modeling, Table 5.3) (L/s)
1:2 year	21	27	~30	21	1
1:5 year	33	40	~30	~30	3
1:10 year	44	49	~30	~30	12
1:25 year	54	59	~30	~30	~30
1:100 year	78	76	~30	~30	~30





# Schematic Hydraulic Profile





# Other Design Considerations

- Salt loading calculations (Appendix D)
- Underdrain (perforated pipe) capacity
- Existing CB lead capacity
- Native subsoil infiltration capacity
- Gravel storage layer depth





# Under Construction







# Under Construction





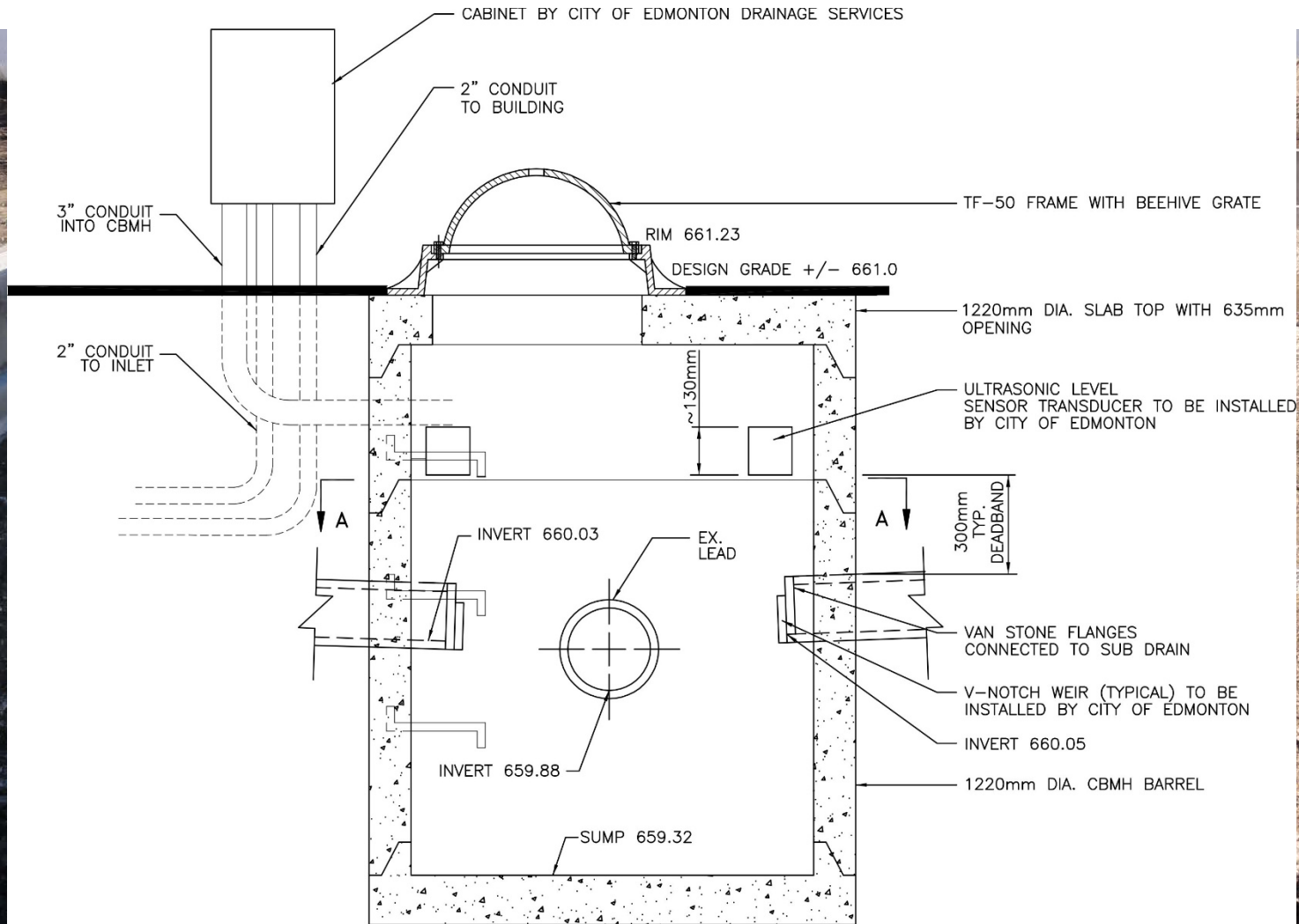


# Inlet Monitoring





# Outlet Monitoring







# Questions?

Thanks to:

Jeff Schurek – ISL Landscape Architect

Barry Raynard – ISL Project Manager

Xiangfei Li and Ross Bulat – CoE Drainage Planning

Max Mao – CoE Drainage D&C Project Manager

Larry Chzyk – CoE Eastgate Building Rep

and everyone else involved