Including Operation and Maintenance in Design: Extending the Life of Stormwater Management Facilities

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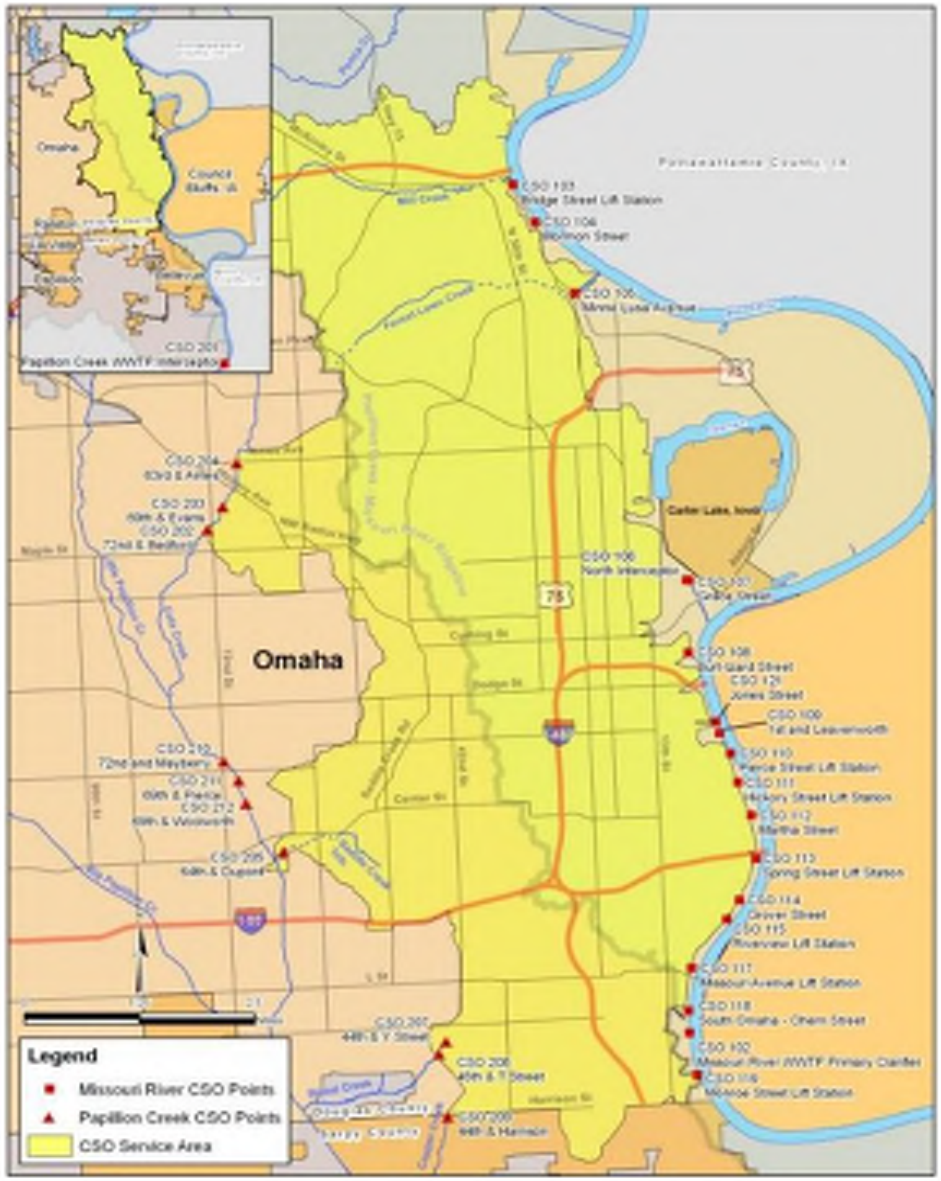
Outline

- Overview of Stormwater Program
- Hanscom Park Green Infrastructure
- Maintenance Review of Plan Set
- Design Change Recommendations
- Conclusions

Project Location - Omaha, NE

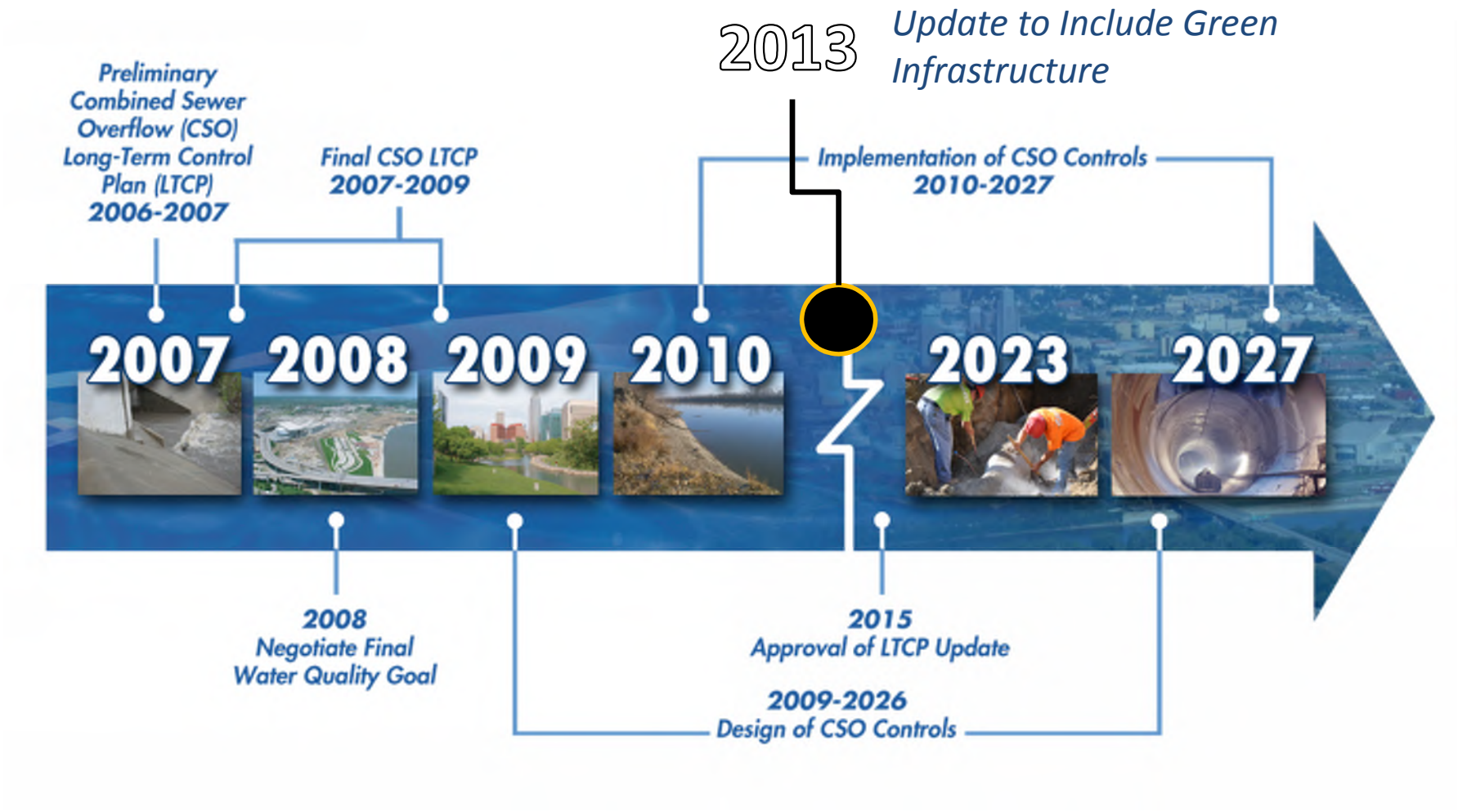
Omaha's Combined Sewer System



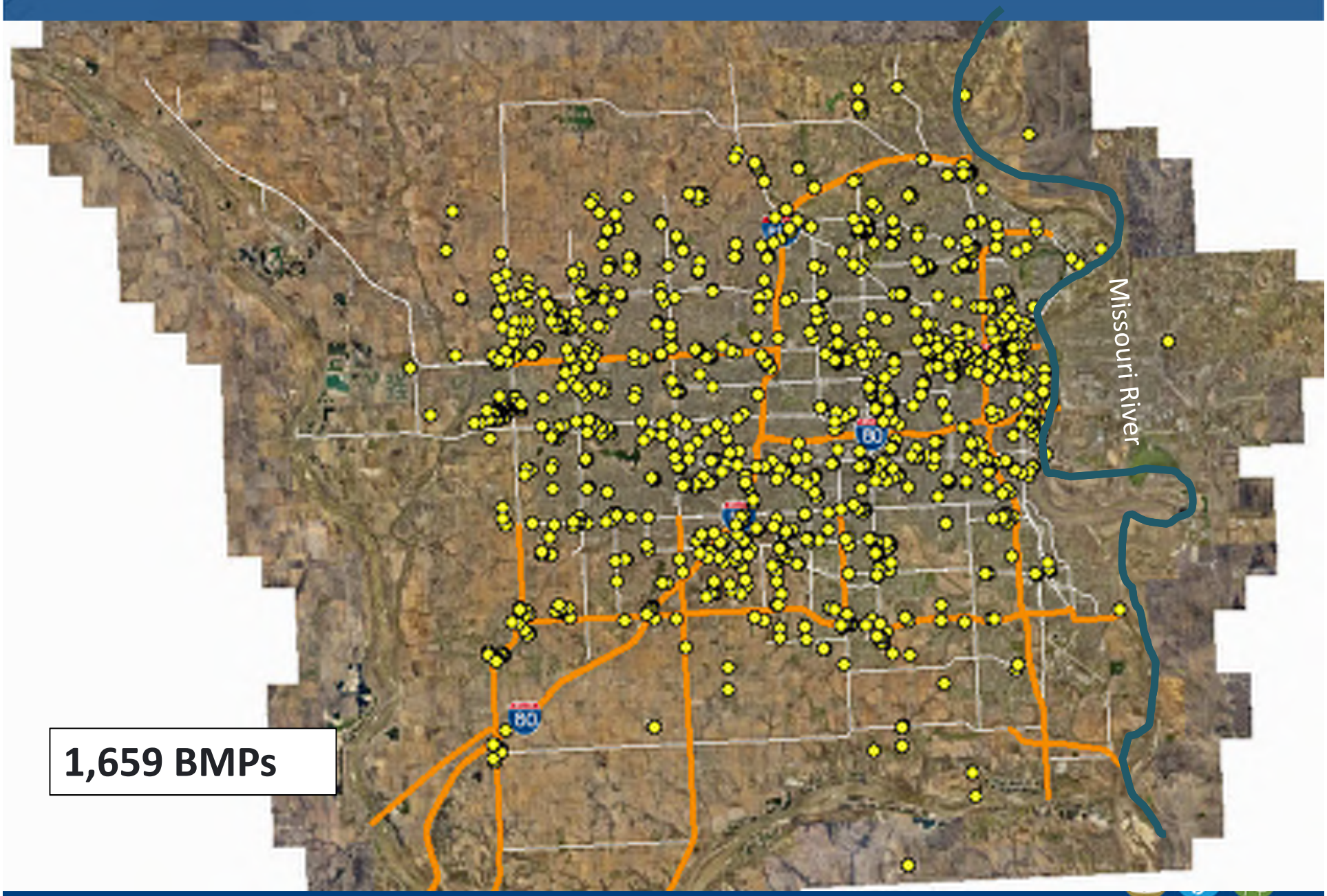
Challenges Facing Omaha

- Meeting the requirements of the Clean Water Act for NPDES Permit compliance and CSO Control
- Must balance:
  - Regulatory Compliance
  - Economic Affordability
  - Community Acceptance

Long Term Control Plan and Update



Post-Construction BMPs as of September 2017



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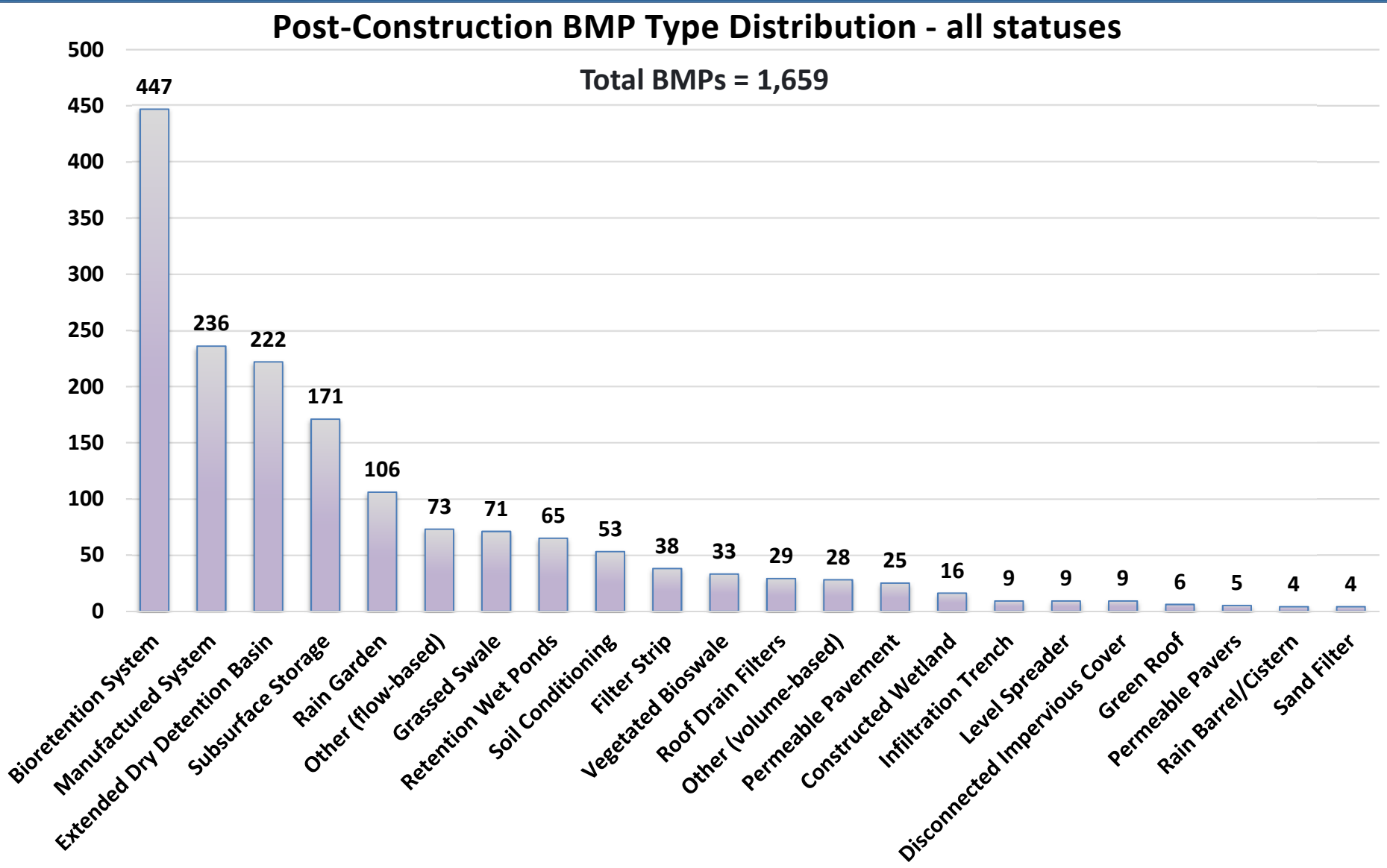


Hanscom Park Project

Contributing drainage areas

- Park – 58 acres
- North neighborhood – 33 acres
- West neighborhood – 52 acres
- Use Green Infrastructure to:
  - Reduce CSO discharges
  - Achieve multiple benefits such as:
    - Park's biodiversity,
    - Urban wildlife habitat, and
    - Aesthetic beauty

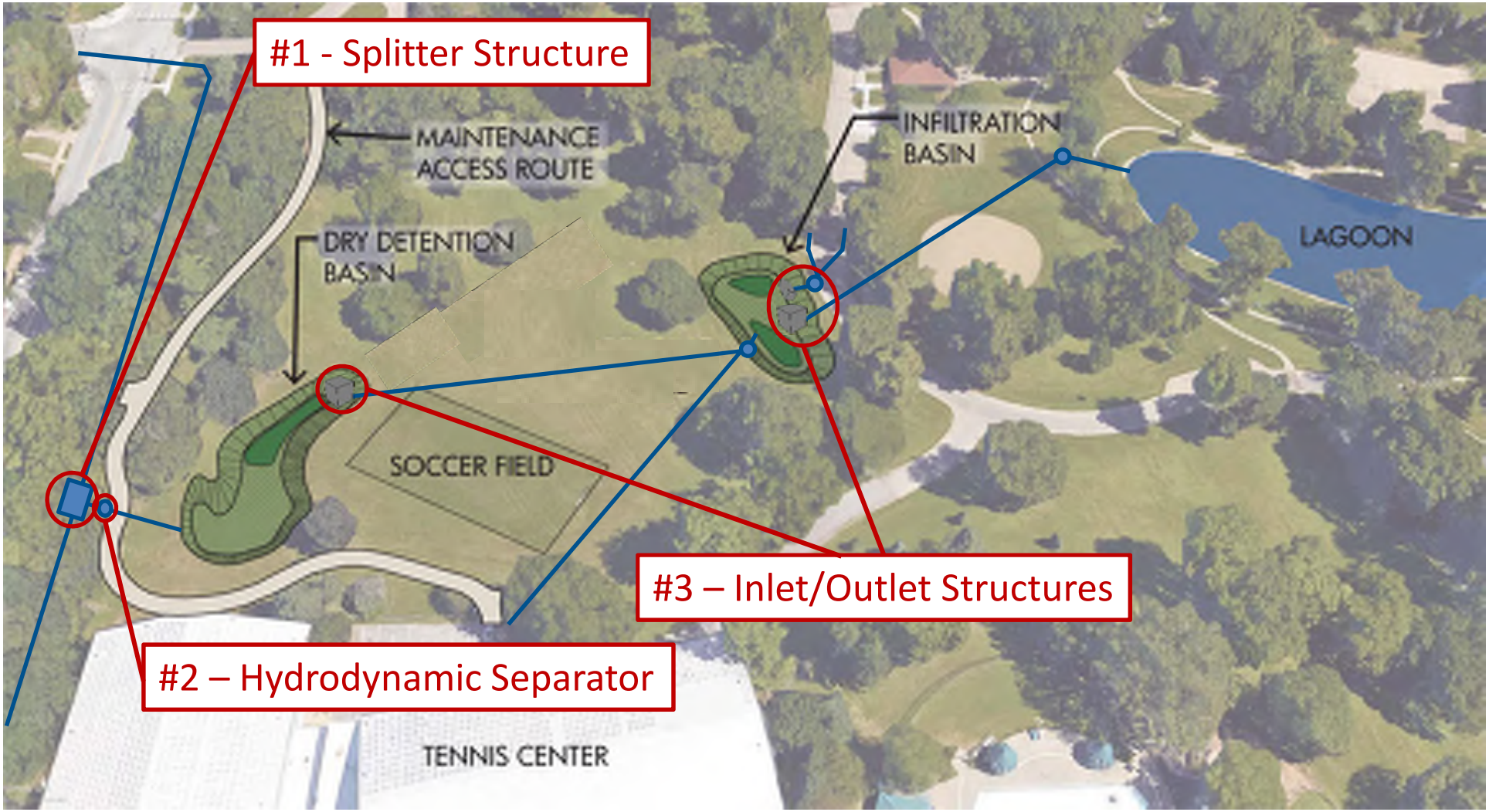
Hanscom Park Project

Opportunities for Strategic Stormwater Separation

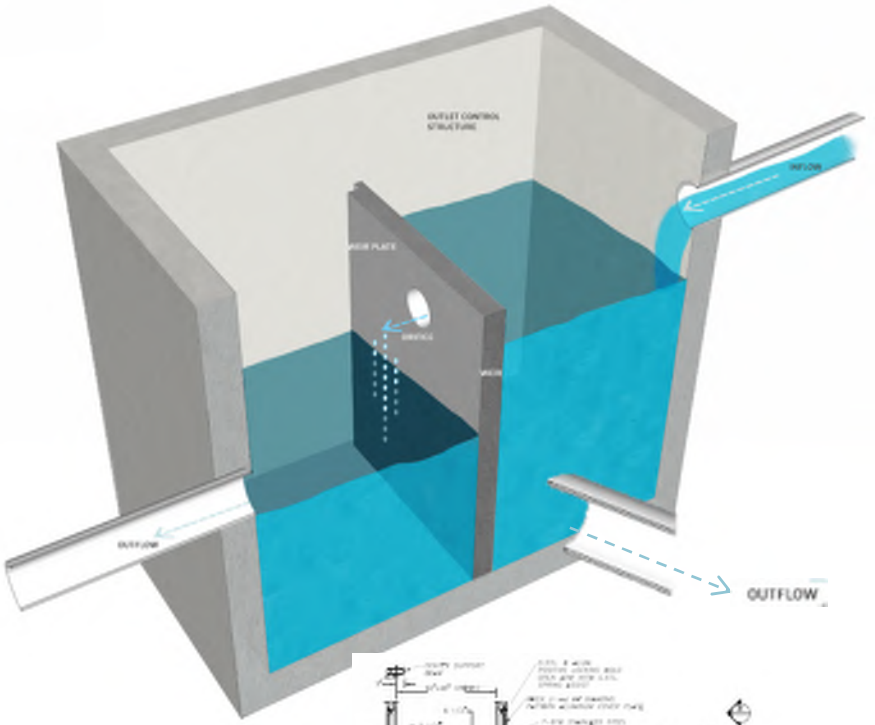
O & M Inclusion Process

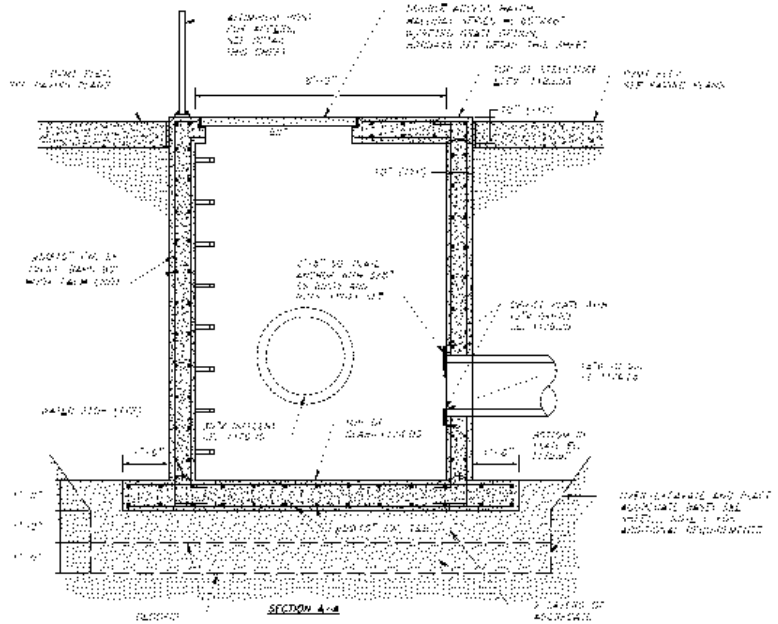
- At 60% Design Plan Set
  - Meet with facility maintenance staff
- Meeting included design team and O&M staff
- Review details and anticipated functions in plan set
  - Review all structures and facilities
  - Discuss potential changes
- Designers to inspect maintenance equipment
- Complete site visit

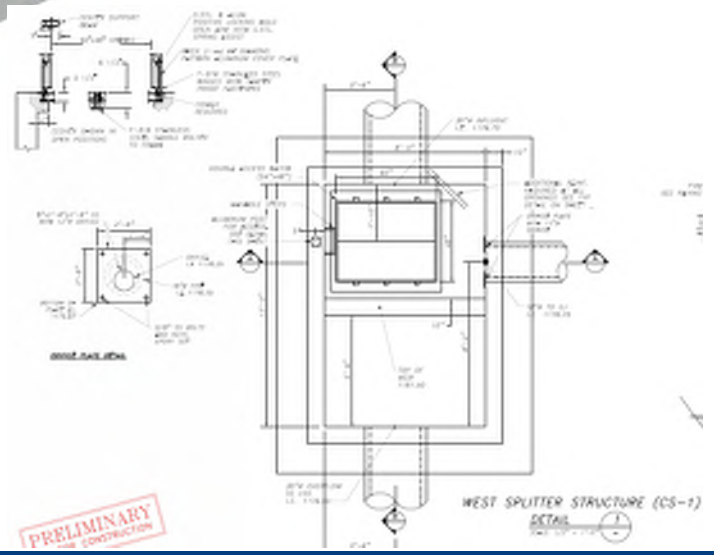
Stormwater Management In the Park

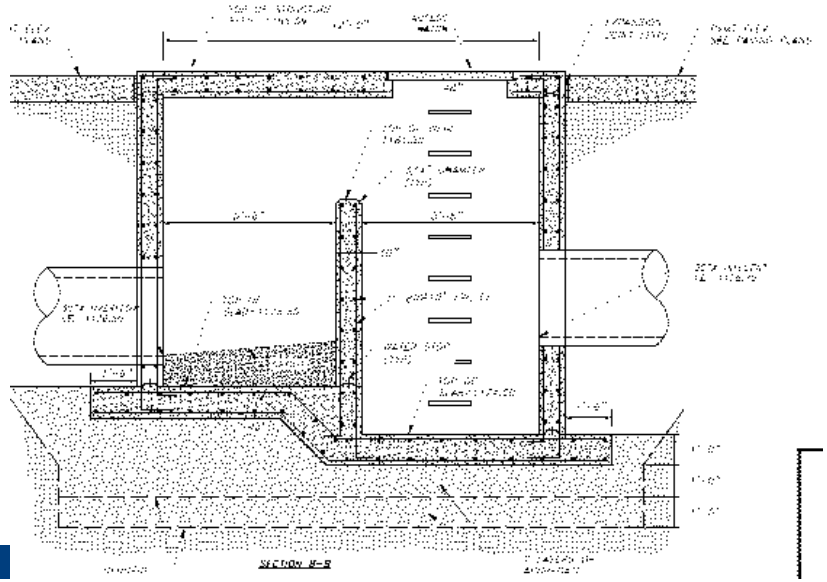


#1 Flow Splitter Structure

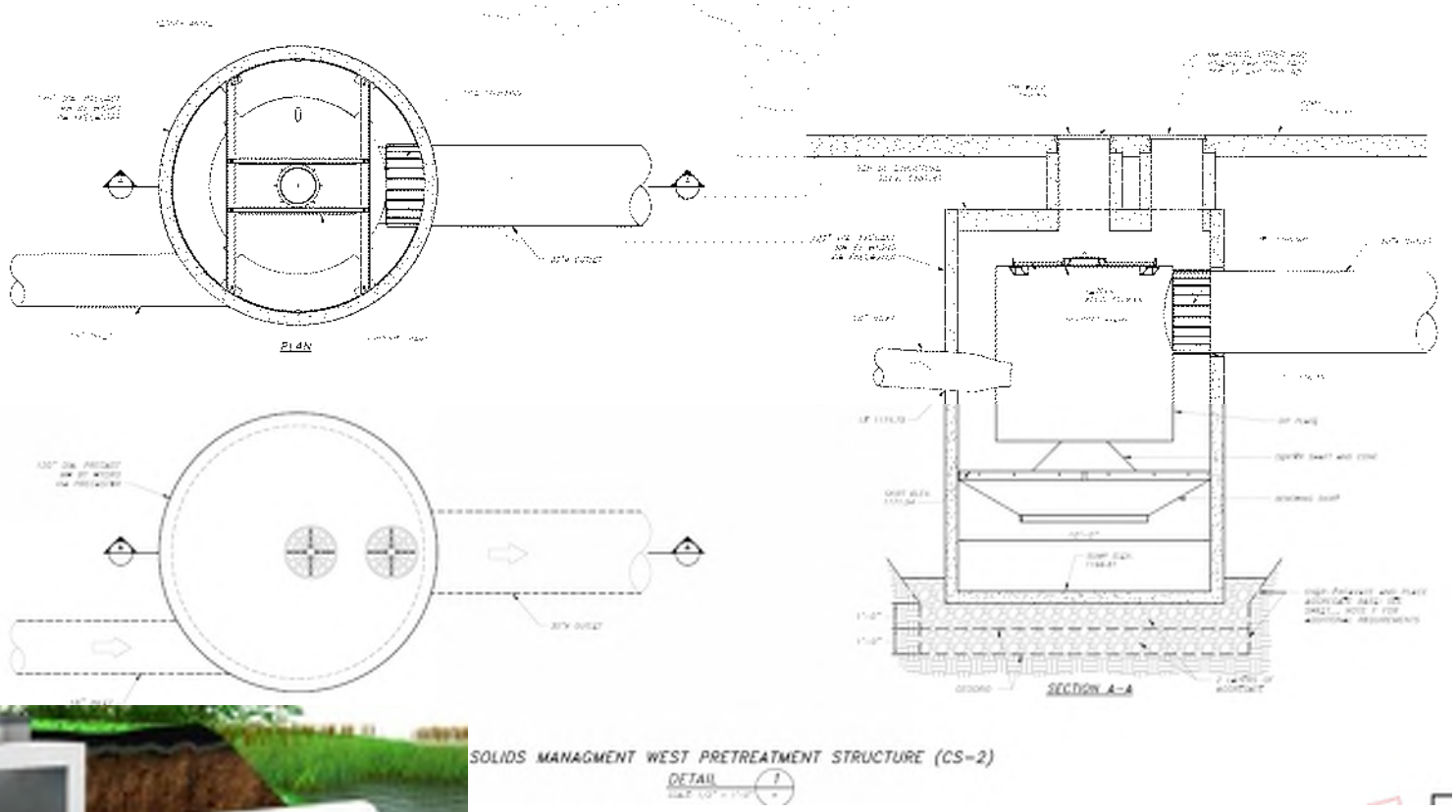




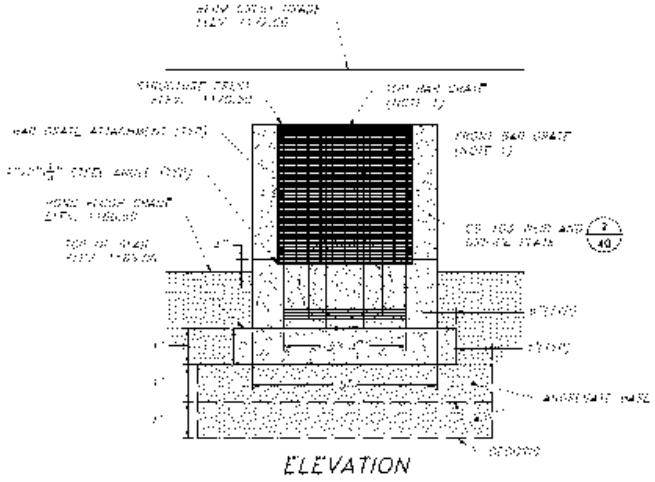


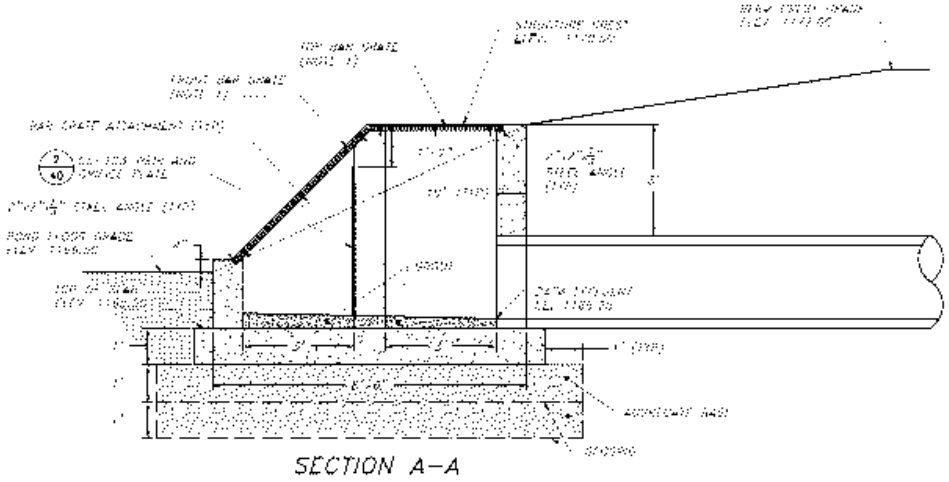


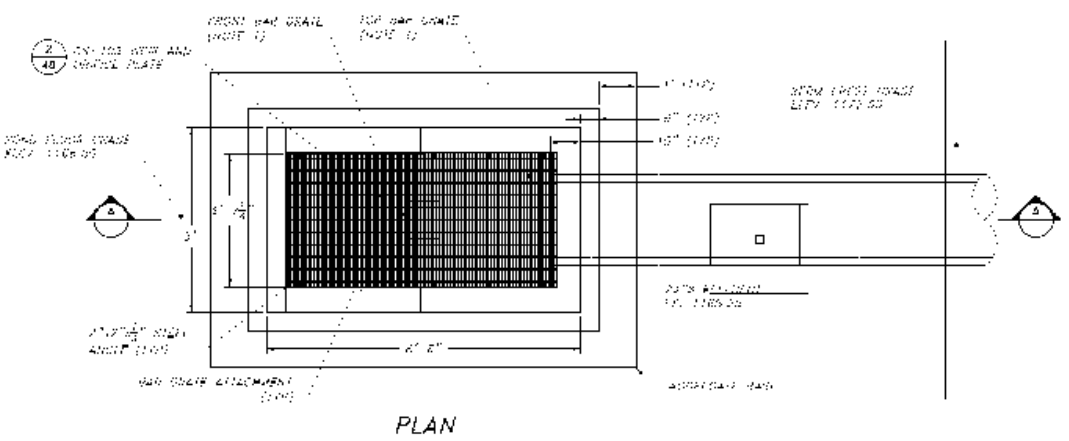
#2 Hydrodynamic Separator



#3 Outlet Structures



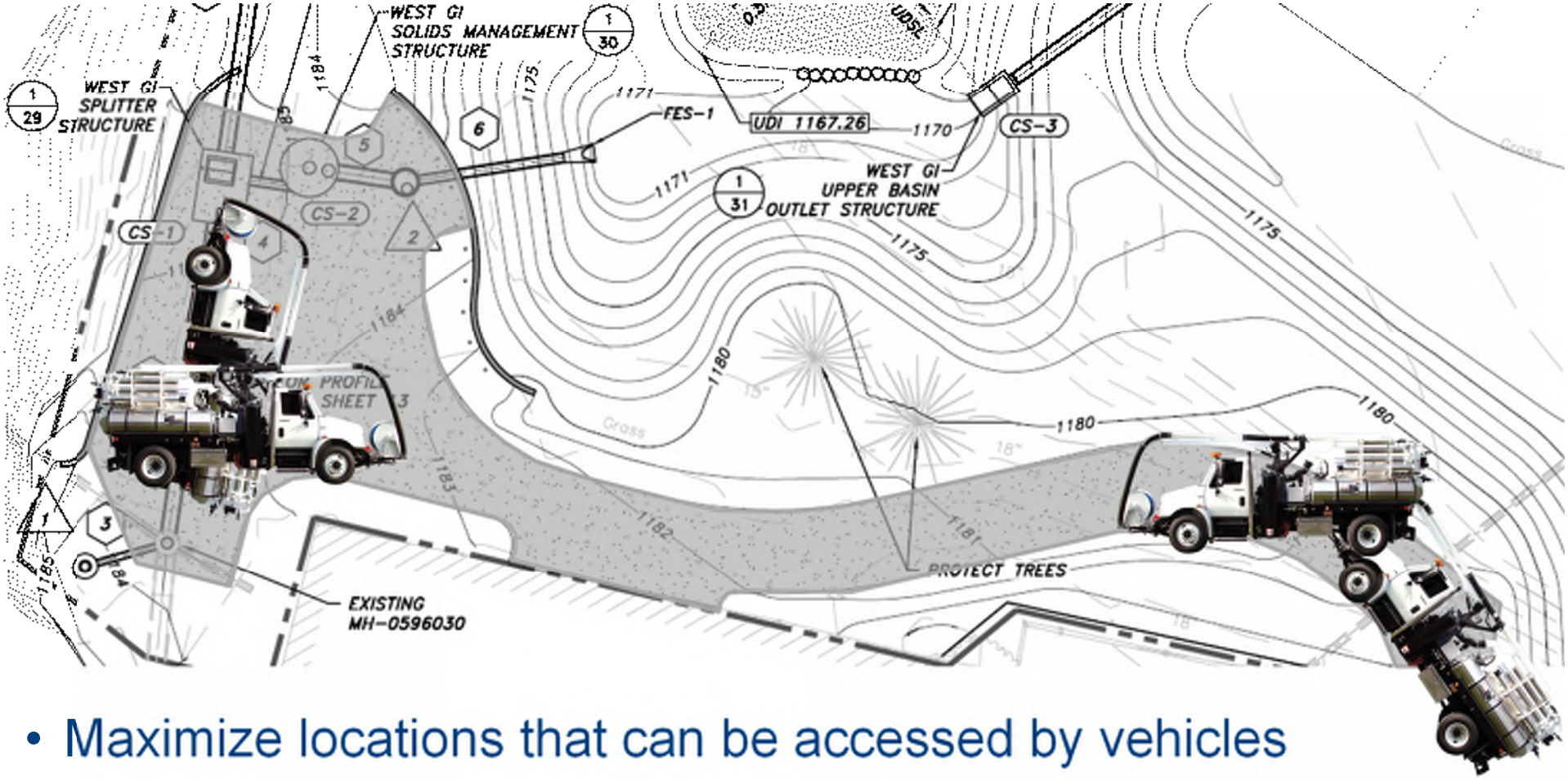




WATER QUALITY BASIN OUTLET STRUCTURE (CS–103)

DETAIL 1

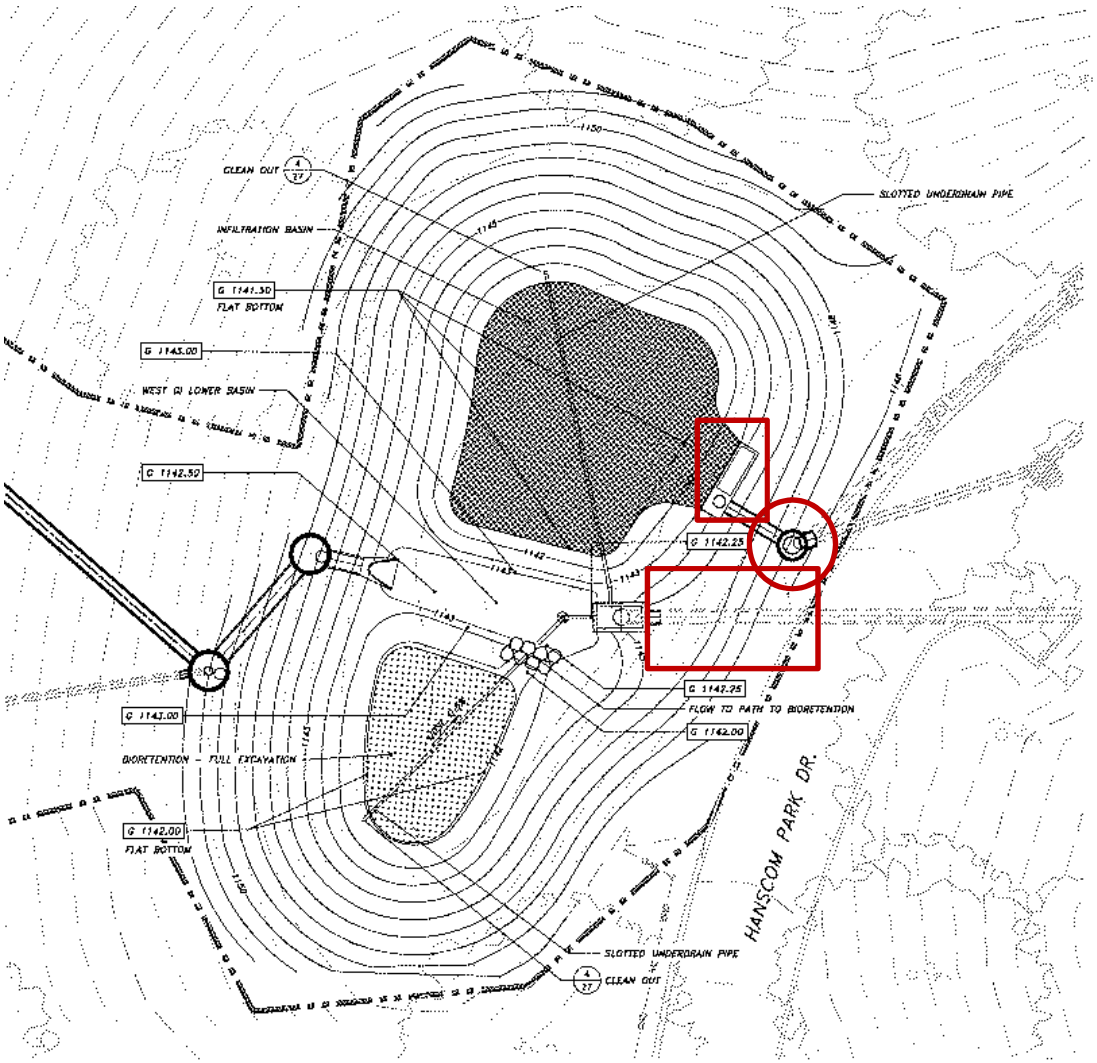
Access by Maintenance Vehicles



- Maximize locations that can be accessed by vehicles
- Consider vehicle constraints
  - Removable bollards, vehicle width, turning radius, vactor hose length, distance, suction depth

Access by Maintenance Vehicles

- Changes for vehicle access
  - Added MH
  - Moved inlet structure closer to road
  - Included concrete block matting in several areas to accommodate truck approach



Access By Maintenance Staff

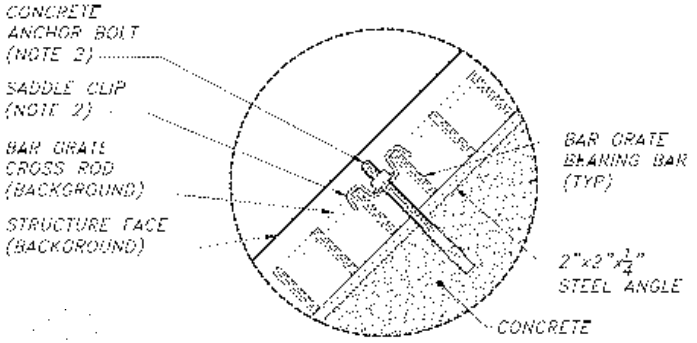
- Consider maintenance vehicle access
- Consider ease of and frequency of access
- Consider access into asset
  - Manhole, hatch, confined space considerations
  - Maneuverability of needed equipment
- Consider safety of access

Access by Maintenance Staff

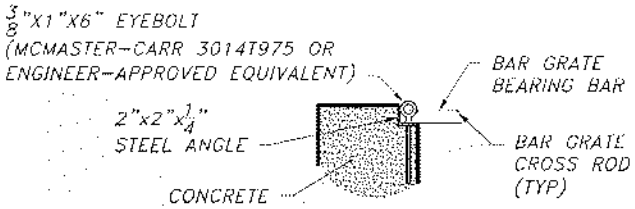
- Changes in design
  - Flush mount of grates
  - Locking aluminum hatches with safety grating
  - Positive locking hydraulic open arms

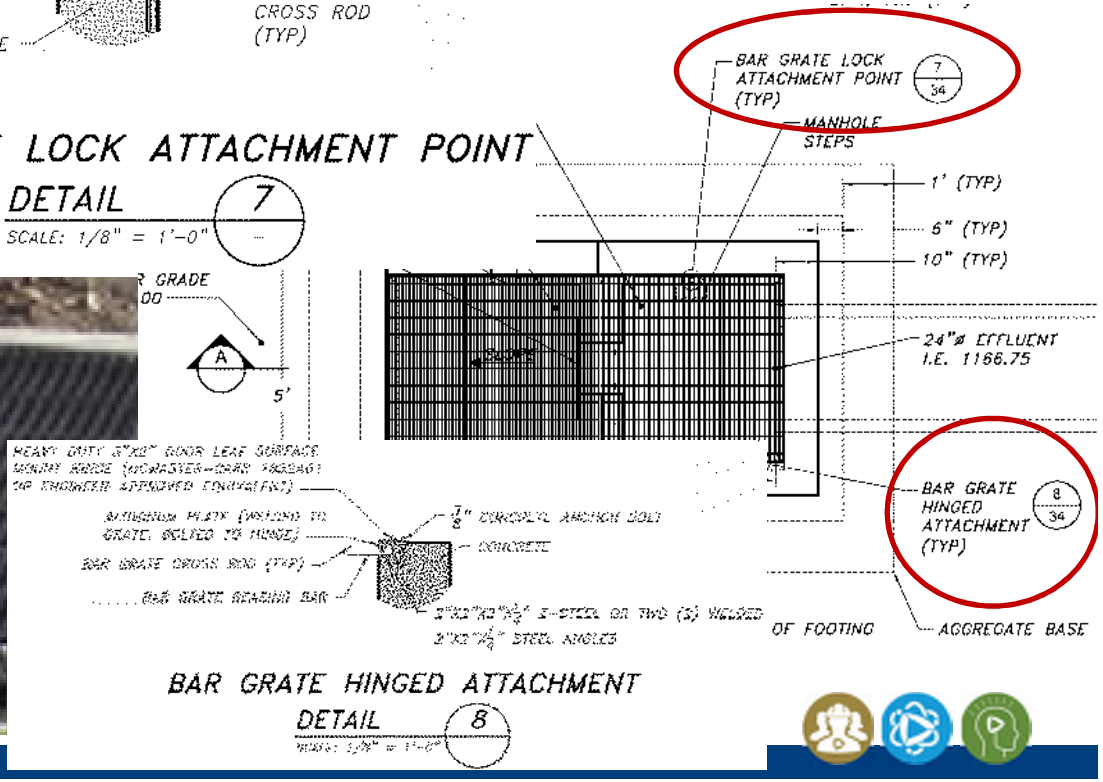
Access by Maintenance Staff

- Changes in design
  - Security of system access
  - Longevity of “attachments”



BAR GRATE ATTACHMENT



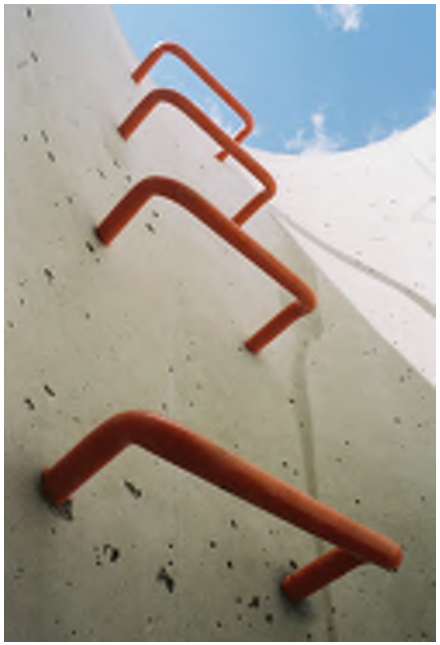


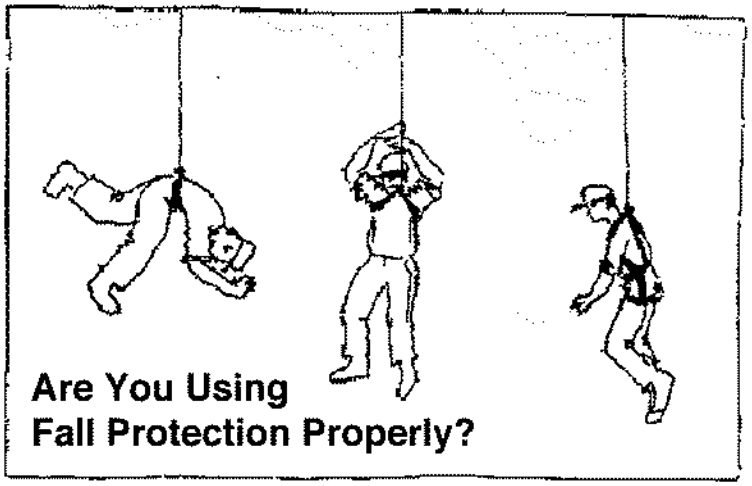
BAR GRATE LOCK ATTACHMENT POINT DETAIL 7
SCALE: 1/8" = 1'-0"

BAR GRATE HINGED ATTACHMENT DETAIL 8

Safety of Access

- Consider ladders at access points
- Consider fall protection
  - Capable and regularly perform confined space entry
  - Make easier and quicker for entry and maintenance activities





Safety for Maintenance Staff

- Changes to design
  - Added removable fall safety and protection
  - Added internal tie off points

Conclusion

- Meetings with O & M Staff resulted in a change in design plan set
  - Access by vehicles
  - Access by maintenance crew
  - Safety of maintenance crew
- Required more time and effort (beyond what was budgeted)
- However, result is that maintenance will be more likely to occur (and) at the frequency recommended because of the design plan changes.

"We appreciate the changes and think this will make us safer and more comfortable in maintaining these systems"

-Mike Mertz, Sewer Maintenance Division City of Omaha Public Works Department

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