# Improvements to Hoboken Terminal Corridor: Engineering Services

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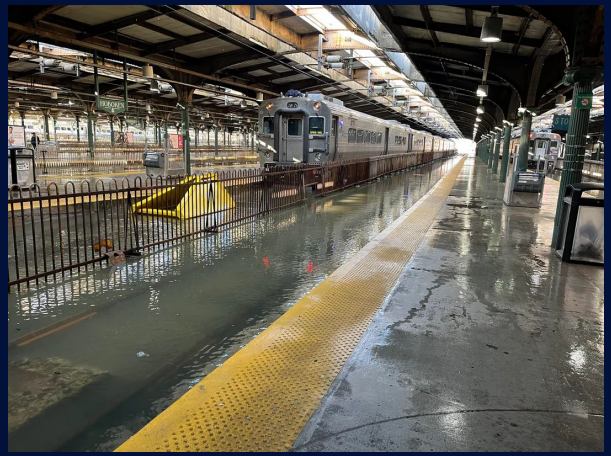
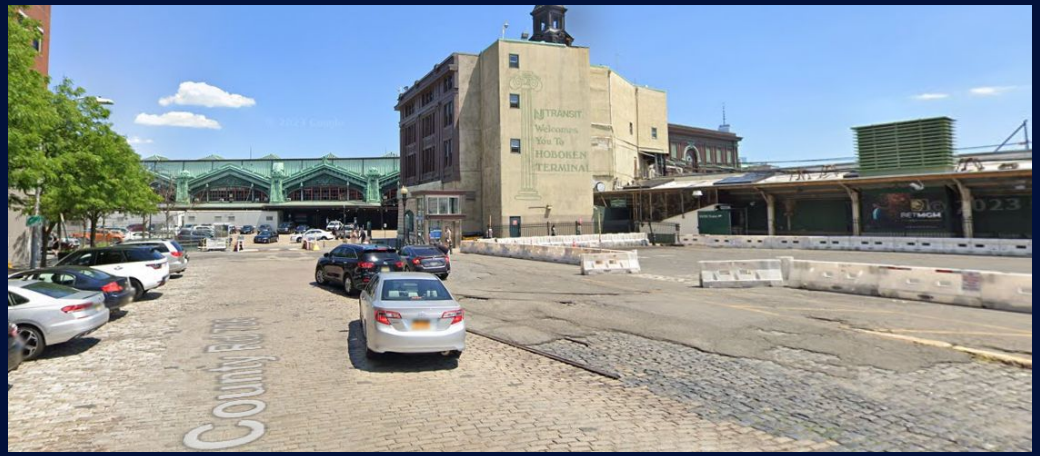
Advisors:
Dr. Michael Horst, Dr. Thomas Brennan

# Site Overview

# Problem Statement

- Inadequate service from aging infrastructure
- Frequent rainfall flooding and Hudson River overtopping
- High traffic congestion





# Realistic Constraints

-Environmental: Disturbance, Pollutants

-Sustainability: Maintenance, Durability

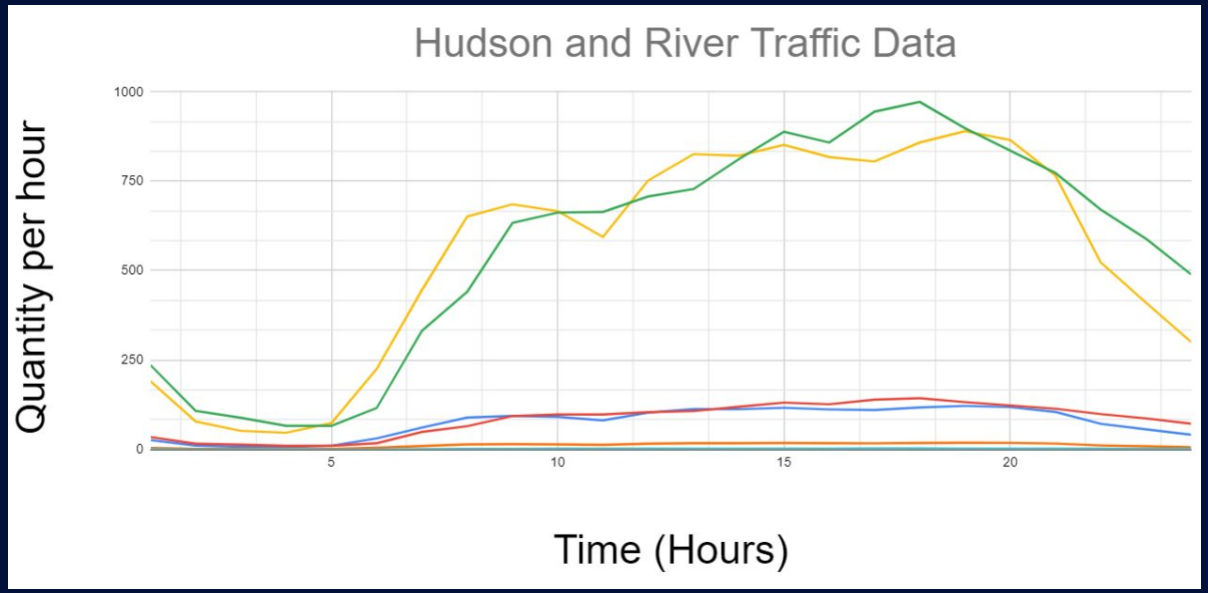
-Constructability: Dense Urban Area

-Health and Safety: Public Impact

-Political: Hoboken Zoning, Historic Landmarks

-Economic: Project Cost, Economic Impact

# Transportation Design Constraints

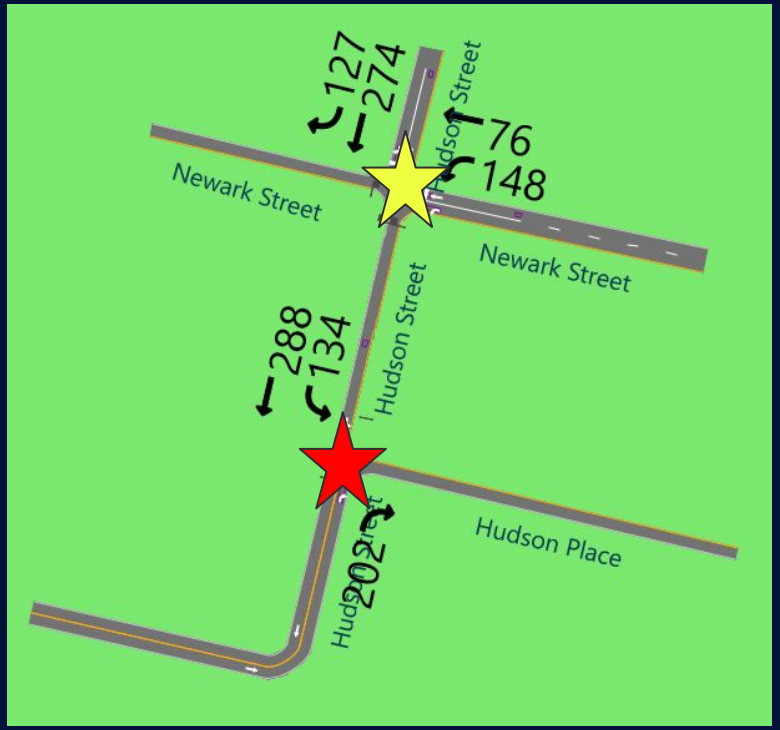




- Heavy traffic and high pedestrian congestion
- Existing NJ Transit infrastructure

Vehicle Ingress
Vehicle Egress
Pedestrian Ingress
Pedestrian egress
Bicycle Ingress
Bicycle Egress

# Transportation Analysis




# Hydrologic Design Constraints: Rainfall

Drainage Area: 0.1 sq mi

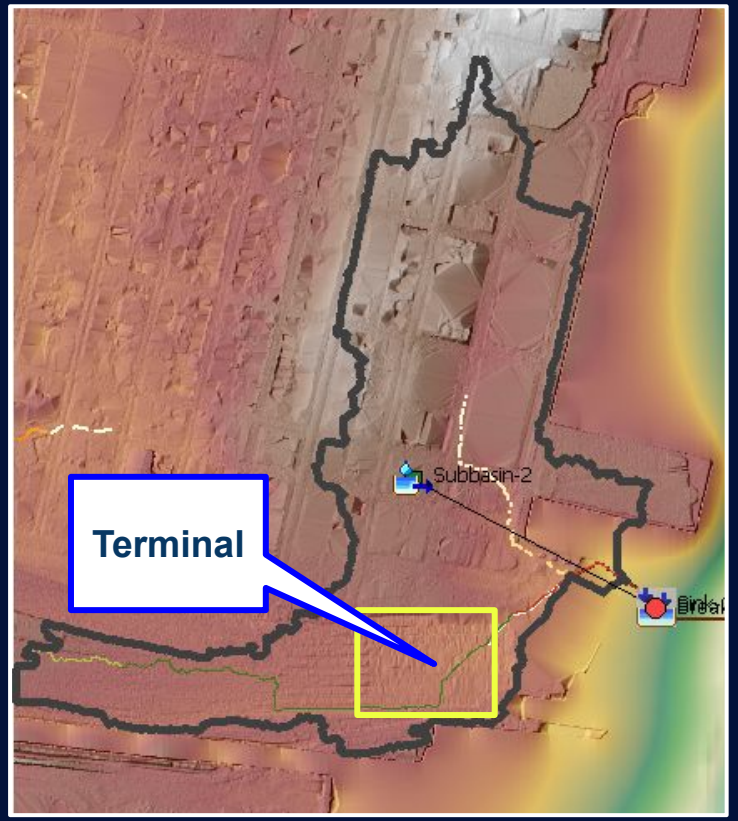
Curve Number: 98

Longest Flowpath Length: 3,562 ft

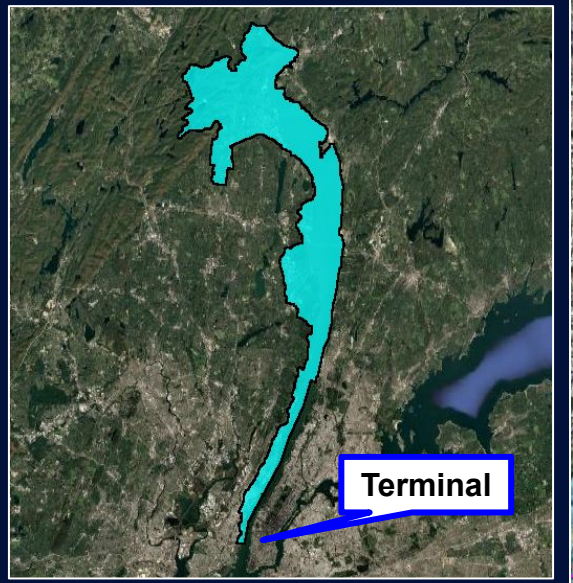
Basin Slope: 0.1672 ft/ft

Peak Discharge: 180.5 cfs

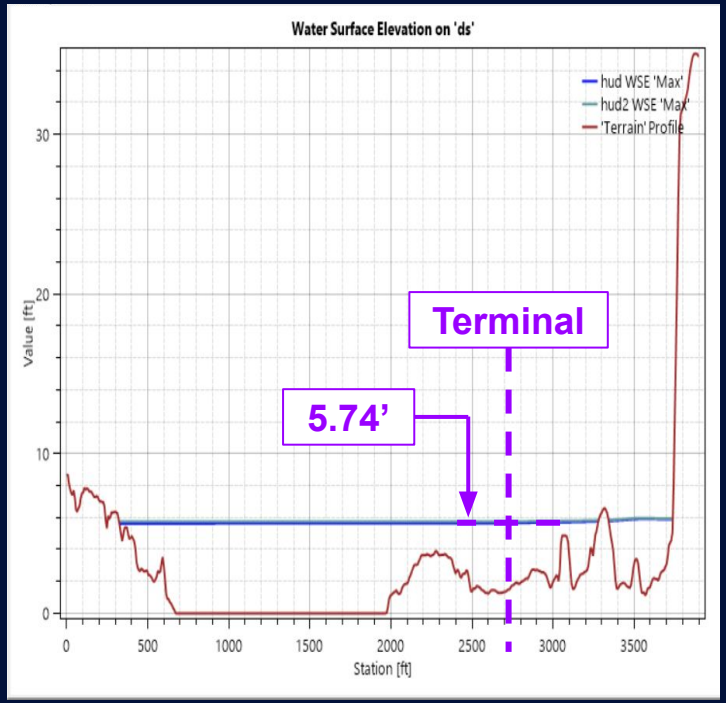
Direct Runoff Volume: 44.2 acre-ft



# Hydrologic Design Constraints: Riverine







# Applicable Standards

- NJDOT Roadway Design Manual
- NJ Complete Streets Design Guide
- NJ Transit Design Standards
- NJDEP (BMP Manual)
- FEMA Design Standards
- Hoboken Zoning Ordinances
- ADA Compliance

# Modern Engineering Tools

AutoCAD

- Design Plan Drafting

SYNCHRO 12

- Traffic Volume Analysis

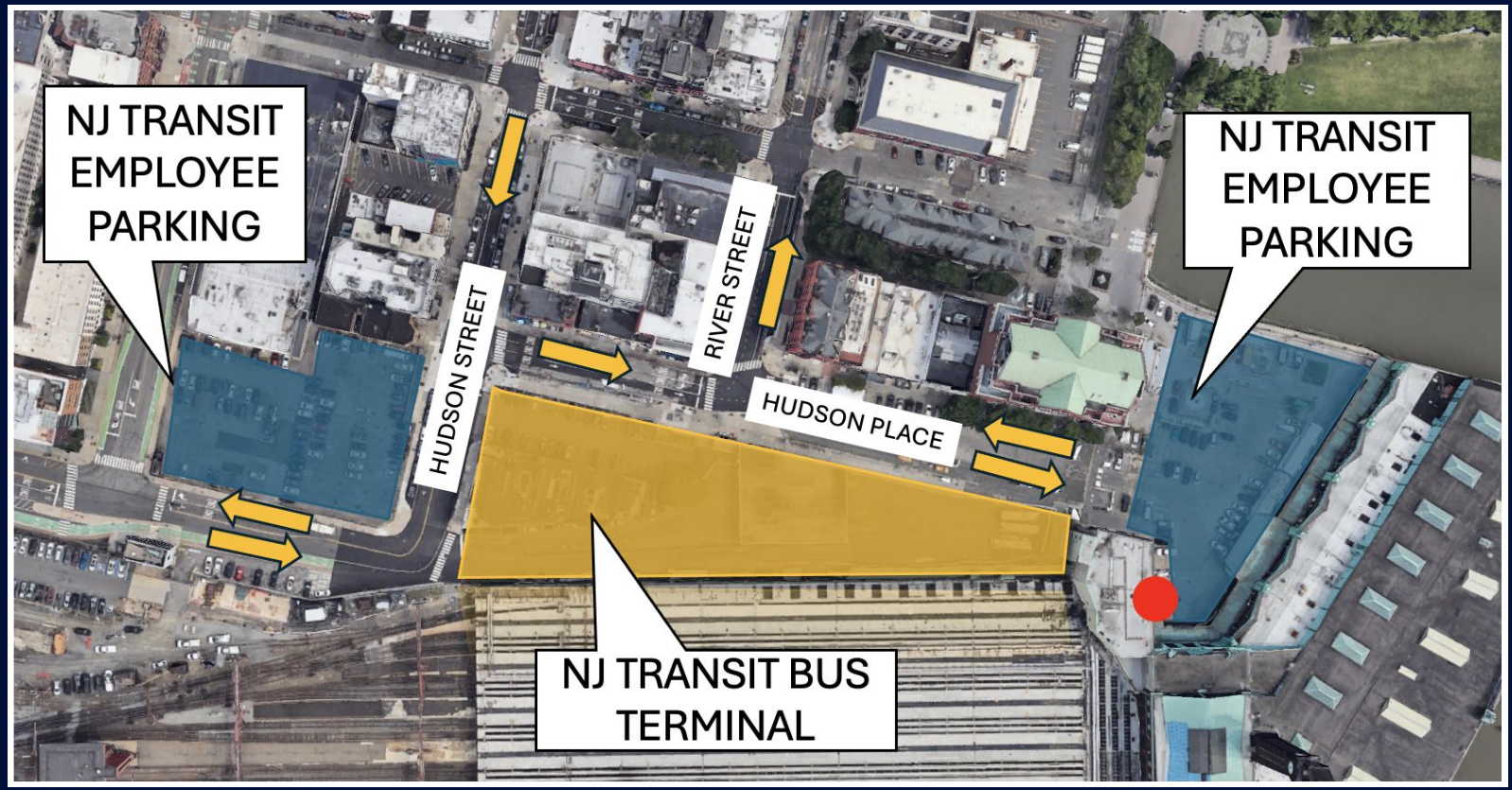
HEC-HMS

- Stormwater Runoff Analysis

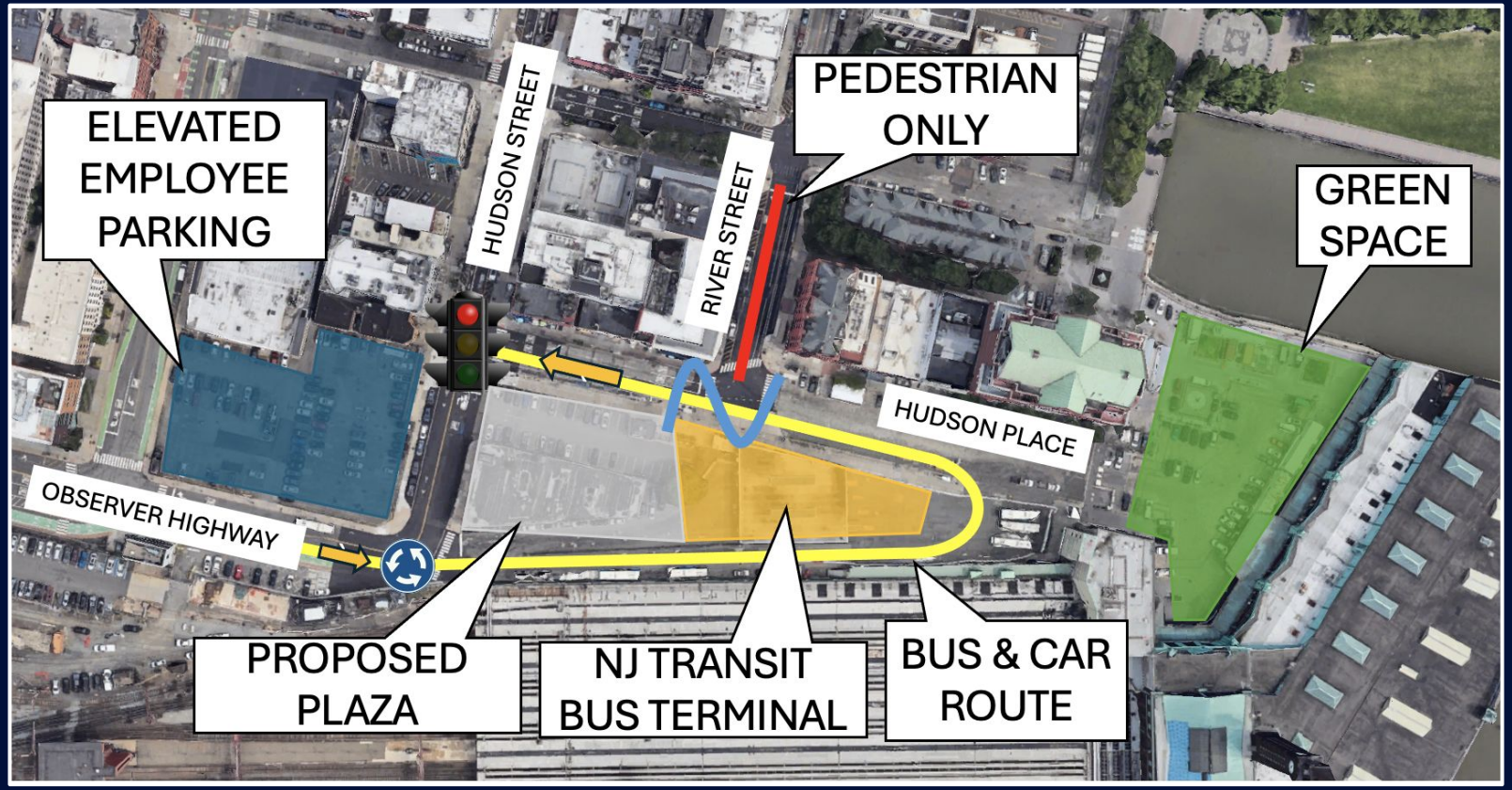
HEC-RAS

- River Hydraulic Modeling

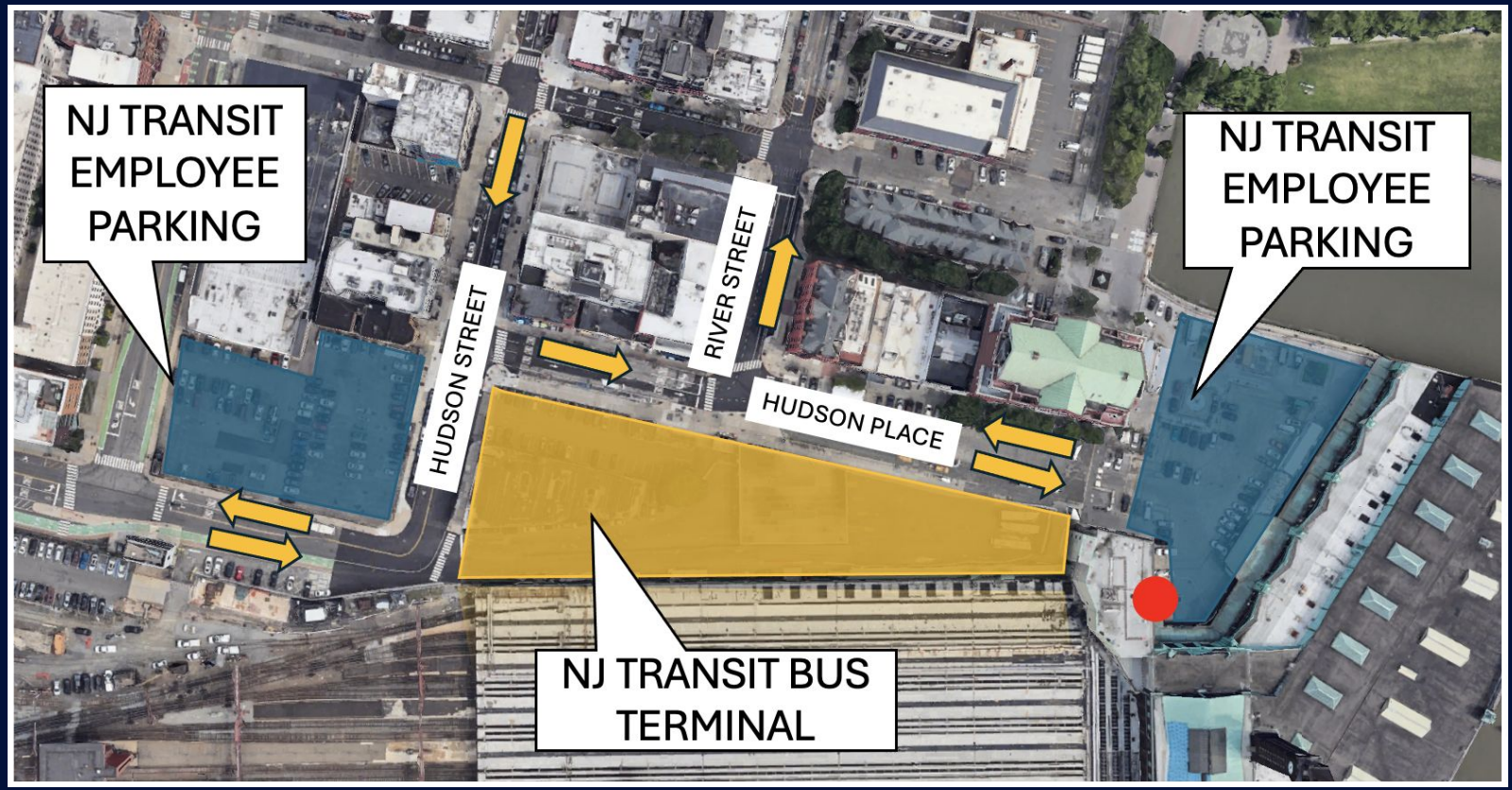

# Existing Site Layout



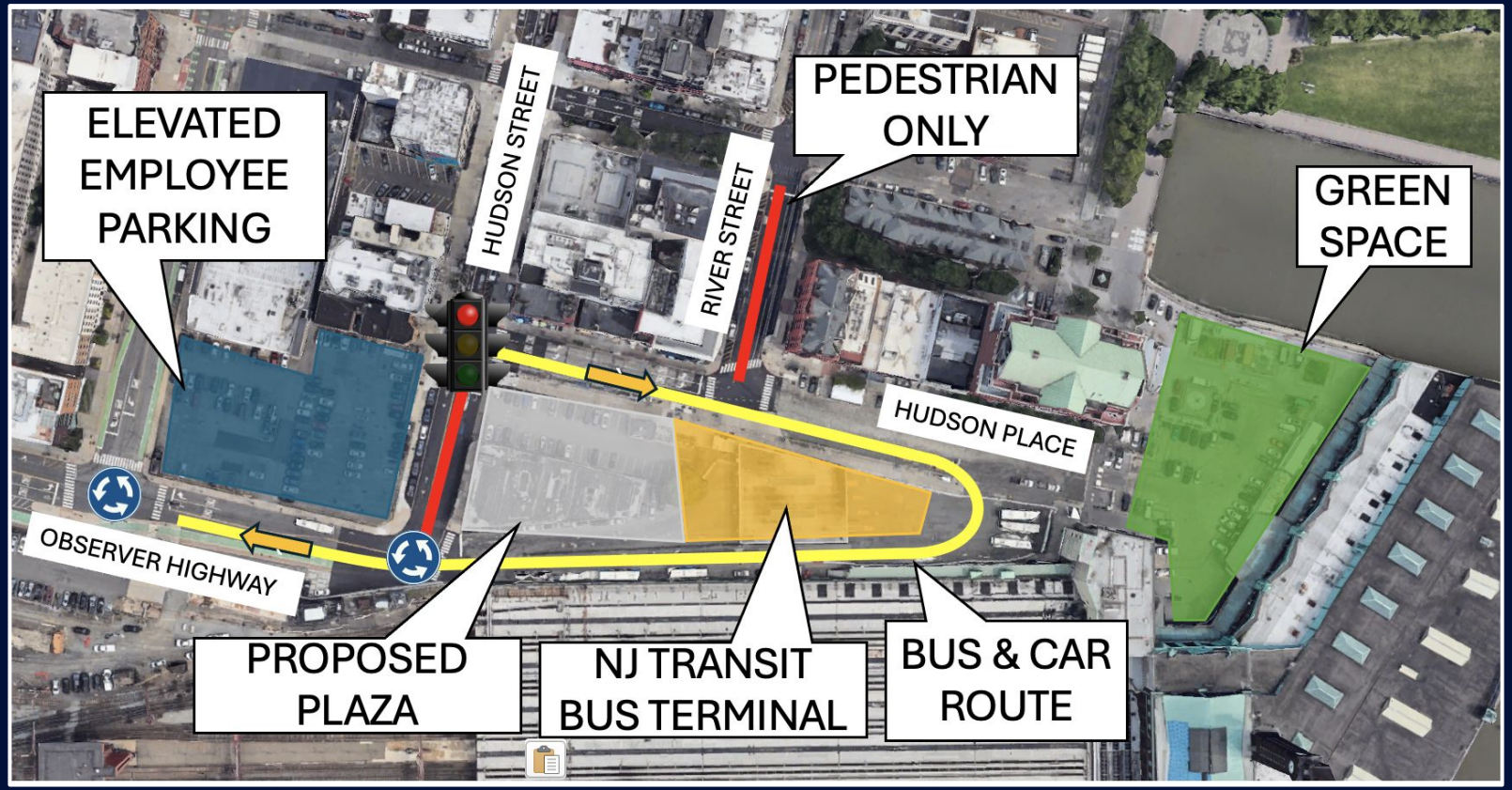
# Alternative 1



# Existing Site Layout



# Alternative 2



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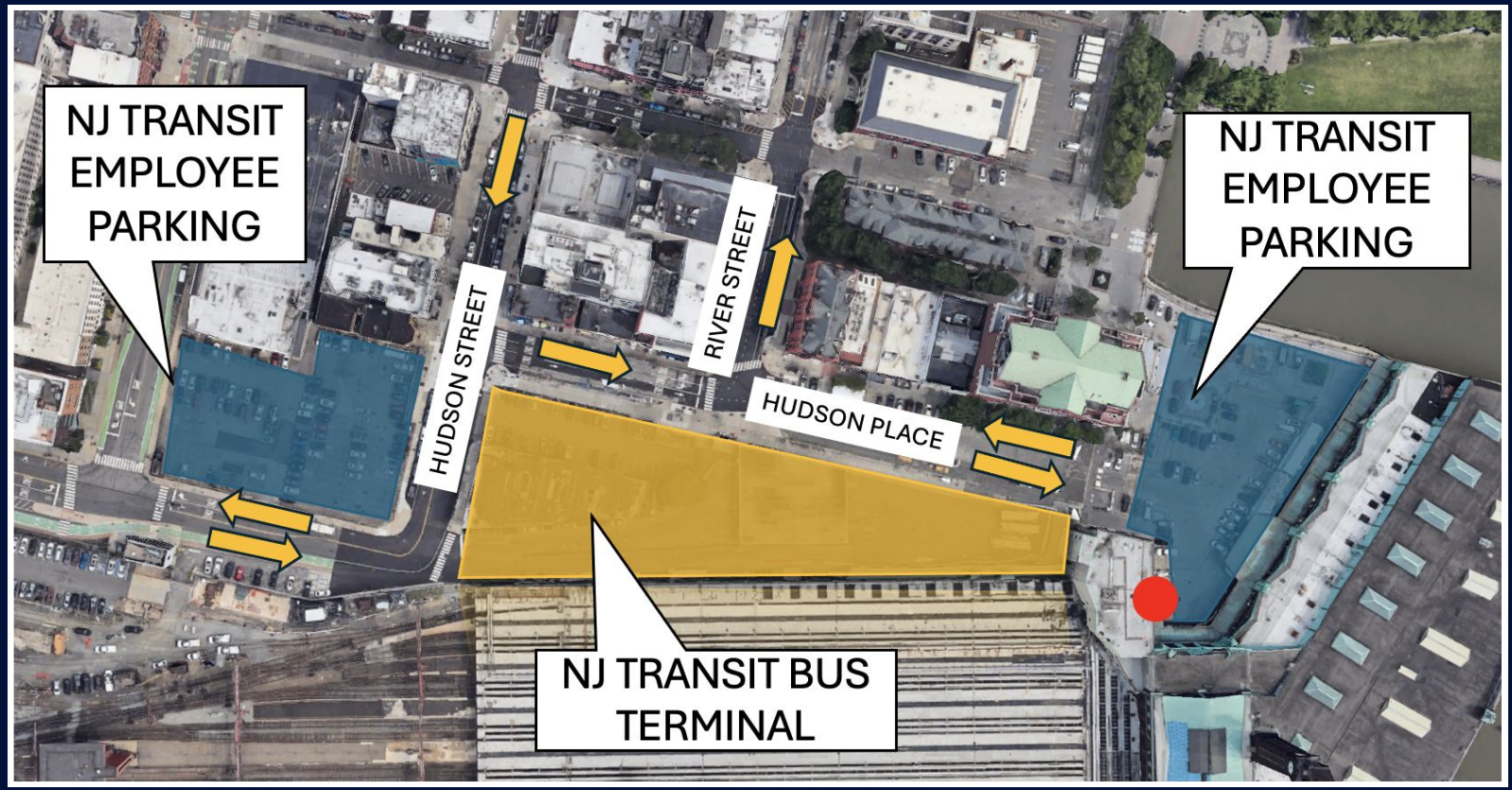
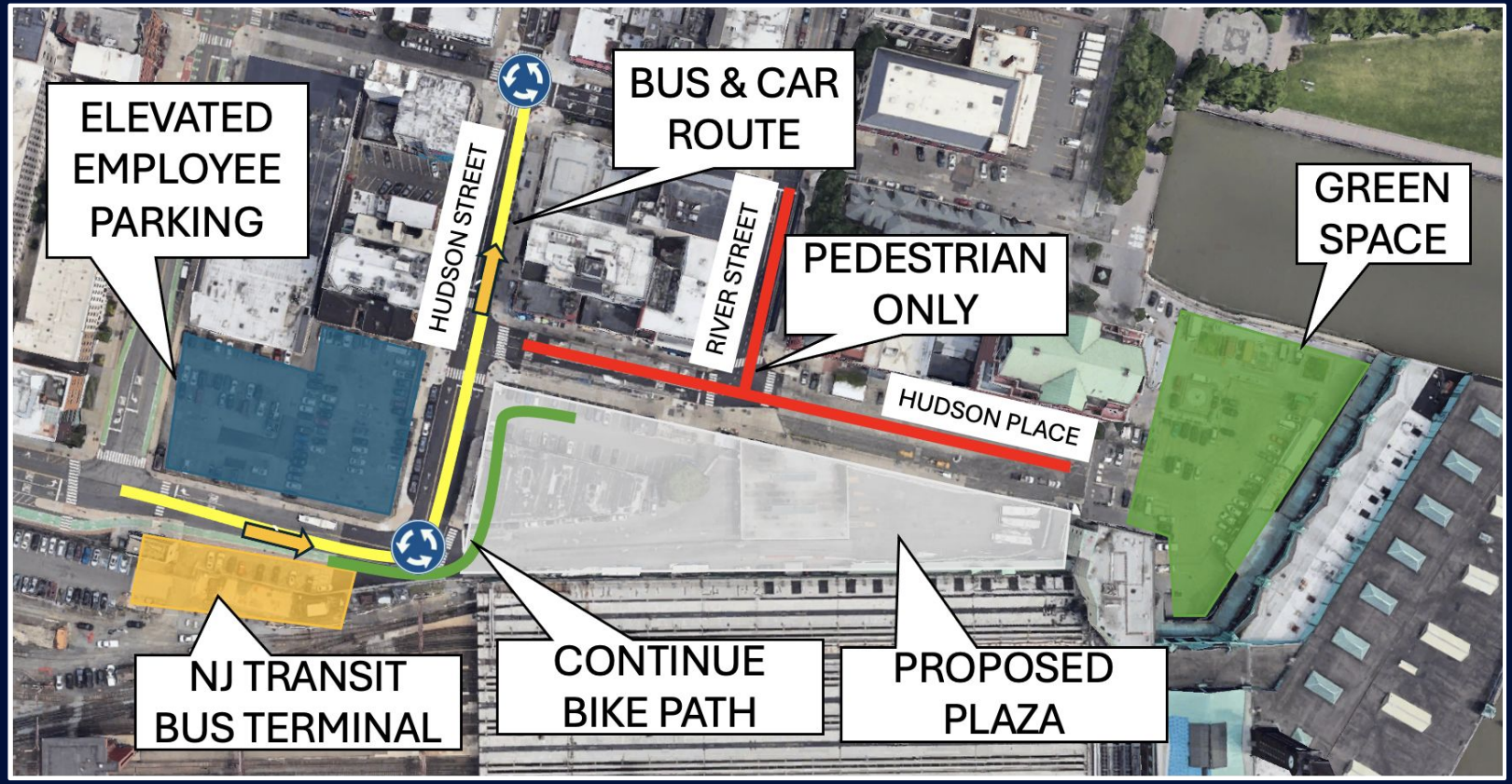
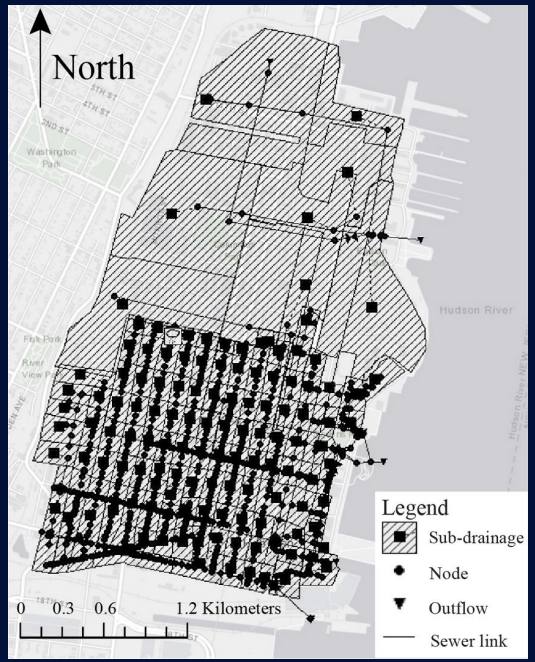


# Alternative 3



# Hydrologic Design Alternatives

## Modify Pipes




## Install Basin(s)

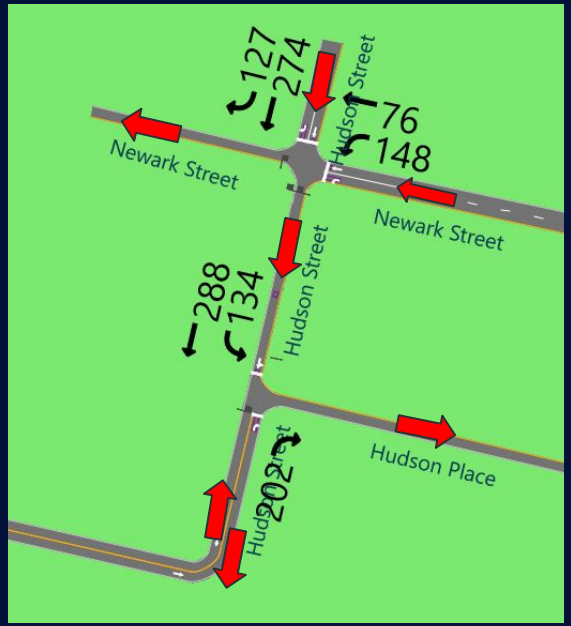
## Install Floodwall

# Design Selection Matrix

| Criteria | Weight | Alternative 1 | Alternative 2 | Alternative 3 |
|---|---|---|---|---|
| Traffic Flow Improvements | 5 | 3 | 2 | 1 |
| Sustainability | 4 | 1 | 2 | 3 |
| Pedestrian Accessibility | 3 | 1 | 2 | 3 |
| Vehicular Accessibility | 2 | 3 | 2 | 1 |
| Constructability | 1 | 2 | 1 | 3 |
| **Total Score** | | **30** | **29** | **31** |

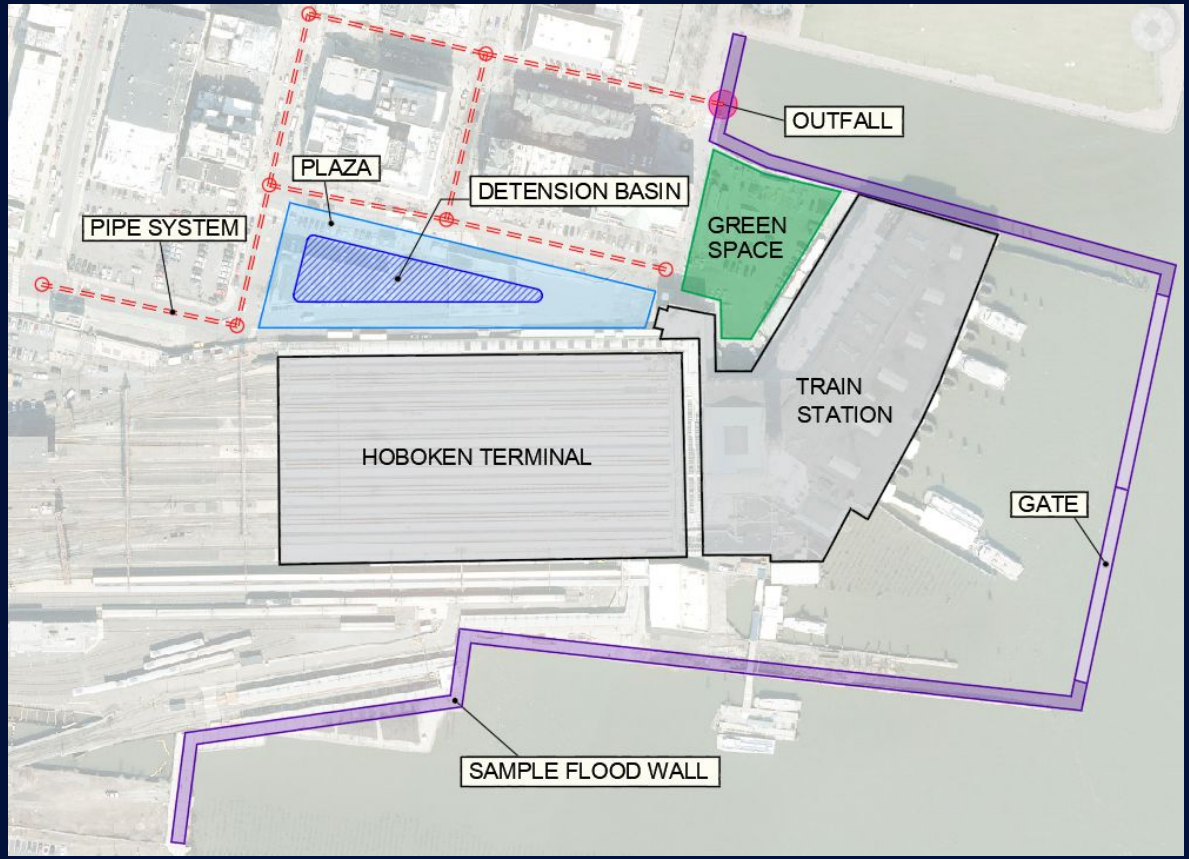
# Final Design Selection

## Existing Conditions

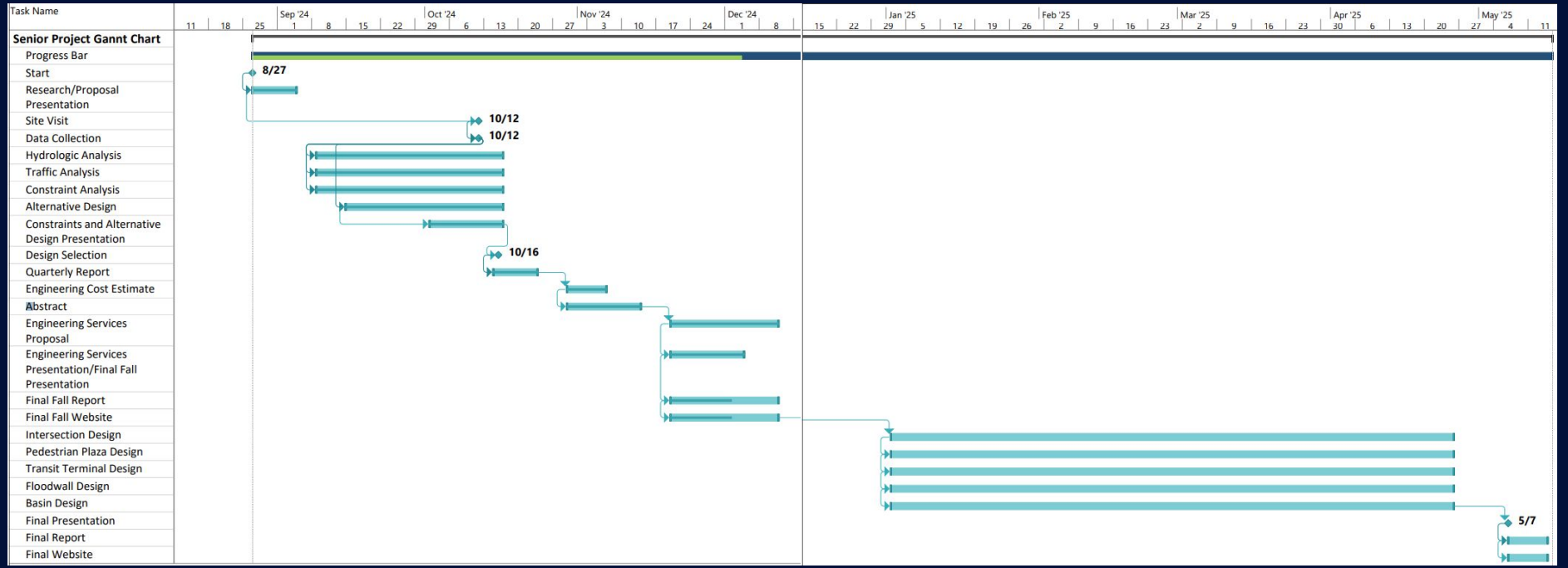



## Proposed Geometry


# Hydrologic Alternative Selection



# Schedule


Task Name
Sep '24
Oct '24
Nov '24
Dec '24
Jan '25
Feb '25
Mar '25
Apr '25
May '25
Senior Project Gannt Chart
Progress Bar
Start
Research/Proposal Presentation
Site Visit
Data Collection
Hydrologic Analysis
Traffic Analysis
Constraint Analysis
Alternative Design
Constraints and Alternative Design Presentation
Design Selection
Quarterly Report
Engineering Cost Estimate
Abstract
Engineering Services Proposal
Engineering Services Presentation/Final Fall Presentation
Final Fall Report
Final Fall Website
Intersection Design
Pedestrian Plaza Design
Transit Terminal Design
Floodwall Design
Basin Design
Final Presentation
Final Report
Final Website
8/27
10/12
10/12
10/16
5/7

# Engineering Cost - Fall Semester

| Task | Dr. Thomas Brennan | Dr. Michael Horst | Kate Neal | Daniel Schiariti | Peter Solomine | Jalissa Colon |
|---|---|---|---|---|---|---|
| | Engineering Dir. | Engineering Dir. | Project Engineer | Design Engineer | Design Engineer | Design Engineer |
| **Fall** | | | | | | |
| **Site Visit** | 0 | 0 | 5 | 5 | 5 | 5 |
| **Research** | 1 | 0 | 2 | 2 | 2 | 2 |
| **Proposal Presentation** | 0 | 0 | 3 | 3 | 3 | 3 |
| **Hydrologic Analysis** | 0 | 2 | 0 | 15 | 0 | 16 |
| **Traffic Analysis** | 1 | 0 | 6 | 0 | 8 | 0 |
| **Constraint Analysis** | 0 | 0 | 3 | 1 | 2 | 2 |
| **Alternative Design** | 1 | 1 | 12 | 0 | 10 | 0 |
| **Constraints and Alternative Design Presentation** | 1 | 1 | 6 | 6 | 6 | 6 |
| **Design Selection** | 0 | 0 | 2 | 1 | 2 | 0 |
| **Quarterly Report** | 0 | 0 | 5 | 3 | 3 | 3 |
| **Estimate of Engineering Cost and Schedule** | 0 | 0 | 1 | 1 | 1 | 1 |
| **Engineering Services Proposal** | 2 | 2 | 8 | 8 | 8 | 8 |
| **Engineeering Services Proposal Presentation** | 2 | 1 | 10 | 10 | 10 | 10 |
| **Total** | | | | | | |
| Total Hours | 8 | 7 | 63 | 55 | 60 | 56 |
| Hourly Rate | $95.00 | $95.00 | $35.00 | $31.00 | $31.00 | $31.00 |
| Total Individual Cost | $760.00 | $665.00 | $2,205.00 | $1,705.00 | $1,860.00 | $1,736.00 |
| | | | | **Total Cost** | | $8,931.00 |
| | | | | | | |
| | | | | **Overhead** | 150% | $13,397.00 |
| | | | | **Fixed Fee** | 10% | $2,233.00 |
| | | | | | | |
| | | | | **Total** | | $24,600.00 |

# Engineering Cost - Spring Semester

| Task | Dr. Thomas Brennan | Dr. Michael Horst | Kate Neal | Daniel Schiariti | Peter Solomine | Jalissa Colon |
|---|---|---|---|---|---|---|
| | Engineering Dir. | Engineering Dir. | Project Engineer | Design Engineer | Design Engineer | Design Engineer |
| **Spring (Projected)** | | | | | | |
| **Intersection Design** | 0 | 5 | 8 | 0 | 8 | 0 |
| **Transit Terminal Desi** | 0 | 5 | 6 | 0 | 6 | 0 |
| **Corridor Design** | 0 | 5 | 6 | 0 | 6 | 0 |
| **Stormwater Design** | 10 | 0 | 0 | 10 | 0 | 10 |
| **Final Report** | 3 | 1 | 10 | 10 | 10 | 10 |
| **Final Presentation** | 2 | 1 | 5 | 5 | 5 | 5 |
| **Total** | | | | | | |
| Total Hours | 15 | 17 | 35 | 25 | 35 | 25 |
| Hourly Rate | $95.00 | $95.00 | $35.00 | $31.00 | $31.00 | $31.00 |
| Total Individual Cost | $1,425.00 | $1,615.00 | $1,225.00 | $775.00 | $1,085.00 | $775.00 |
| | | | | **Total Cost** | | $6,900.00 |
| | | | | | | |
| | | | | **Overhead** | 150% | $10,350.00 |
| | | | | **Fixed Fee** | 10% | $1,725.00 |
| | | | | | | |
| | | | | **Total** | | $19,000.00 |

# Questions?