



Battery Park City Ballfields & Community Center Resilience Project

Flood Resilience Selection

BPCA Meeting
July 25, 2019



Battery Park
City Authority

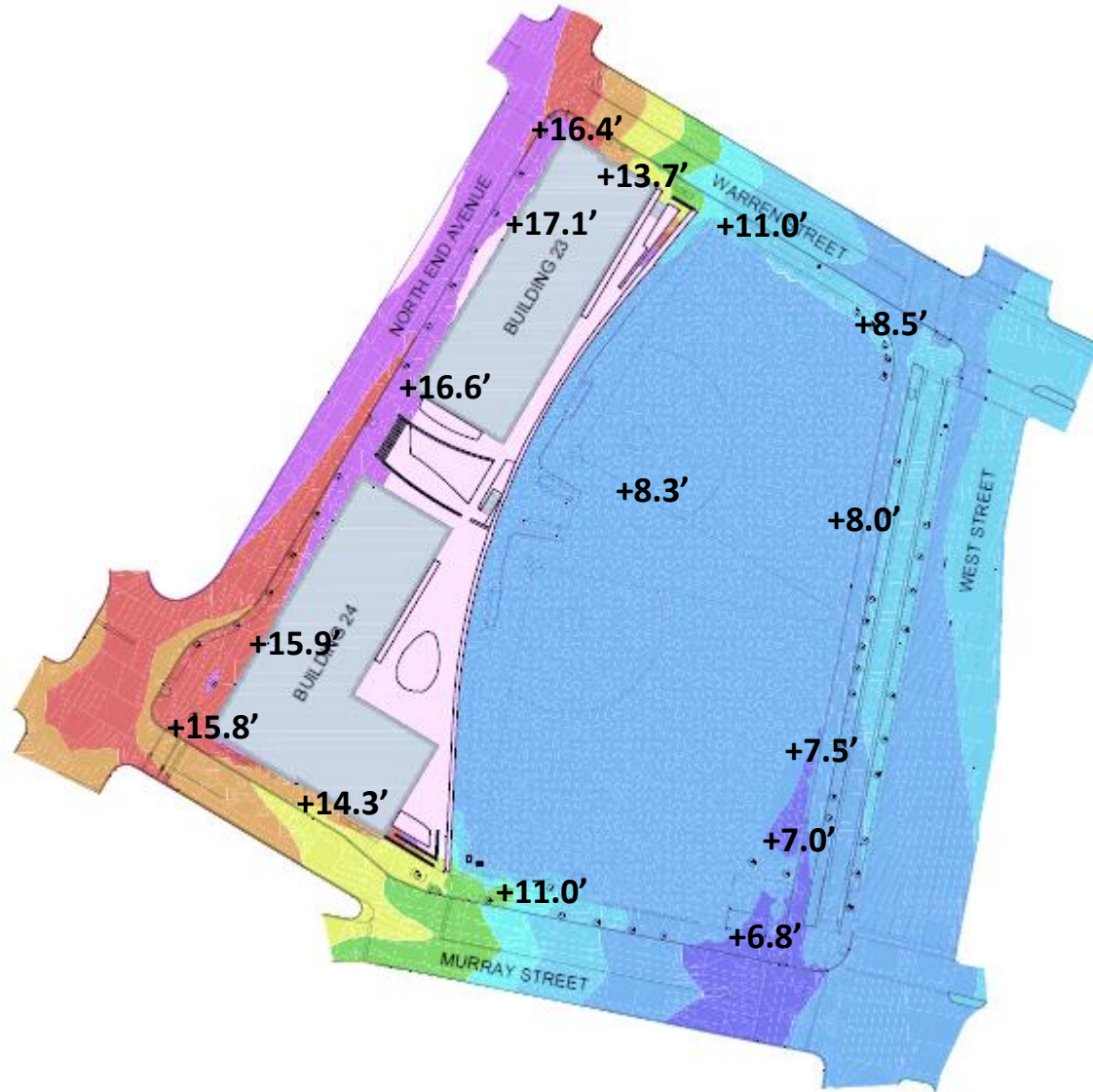


Agenda

- Site Review
- Permanent Solution: Reinforced Concrete Wall (DFE 14.5')
- Interim Solution: Steel Plate Wall (DFE 11')
- Guiding Objectives Review
- Next Steps



Topography



Elevation Legend	
Color	Elevation Range
Dark Purple	≤7 FT
Blue	7 - 9 FT
Light Blue	9 - 11 FT
Cyan	11 - 12 FT
Green	12 - 13 FT
Yellow-Green	13 - 14 FT
Orange	14 - 15 FT
Red	15 - 16 FT
Purple	16 - 17 FT
Pink	>17 FT

Guiding Objectives



- Flood risk
- Integration with landscape and built environment
- Minimize loss of field use and duration of construction
- Cost
- Schedule

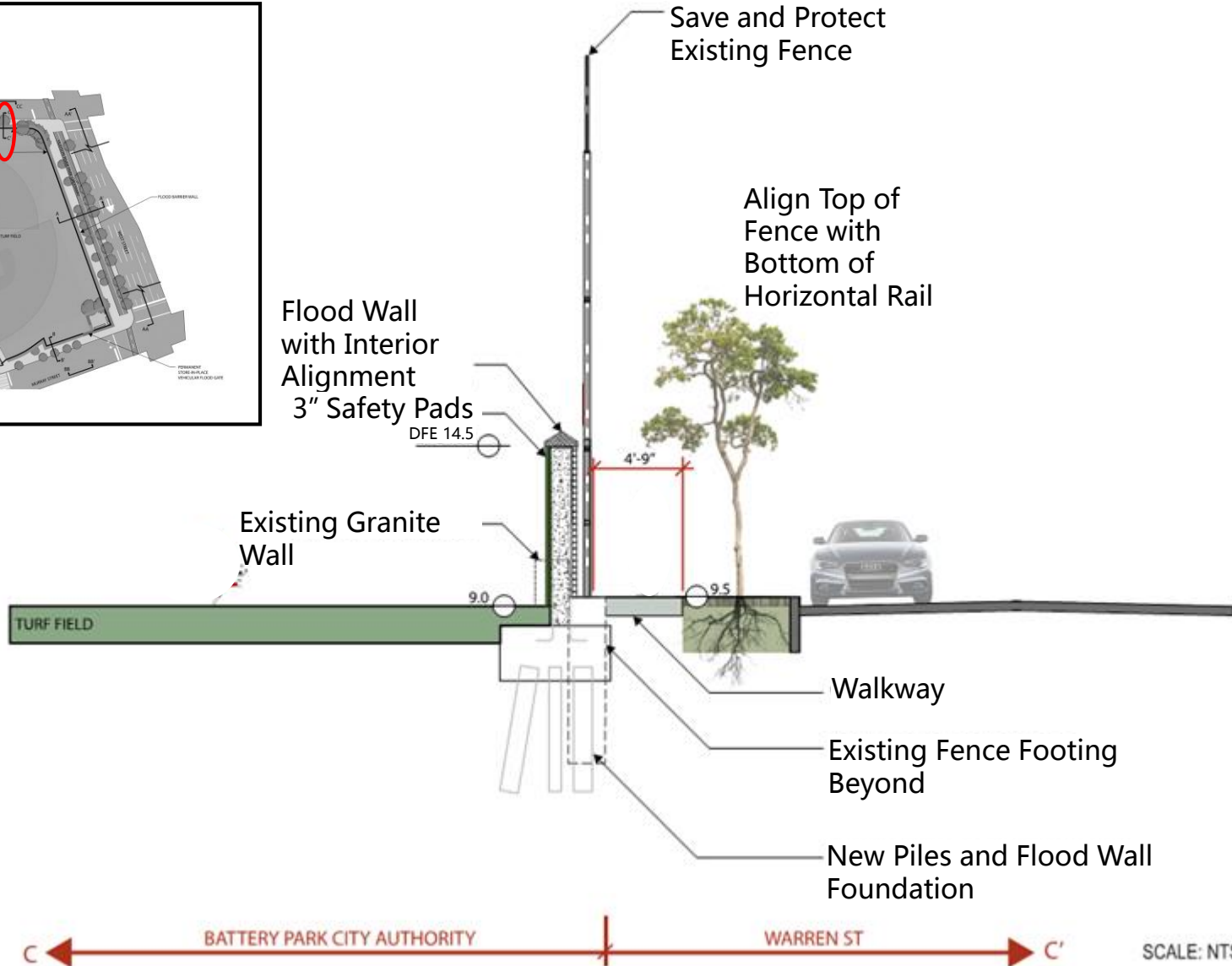
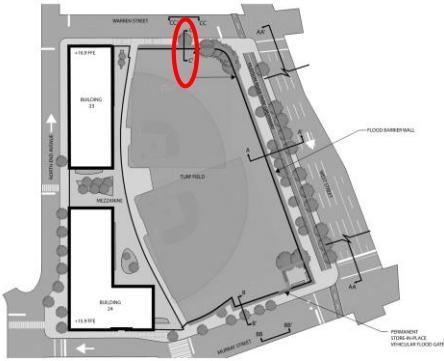
Permanent Solution: Reinforced Concrete Wall (DFE 14.5')

- Reinforced Concrete Wall to DFE 14.5' (NAVD88)
- Hybrid Alignment of Wall (Interior and Exterior)
- 6 Deployable Flood Barriers, 8 ConEd Grates
- Level of Protection
 - $DFE\ 14.5' = BFE\ 11' + 2.5'\ SLR + 1'\ Freeboard$
 - Wall at lowest grade = 7.7'
 - Full seepage cutoff



Permanent Solution: Reinforced Concrete Wall Warren Street

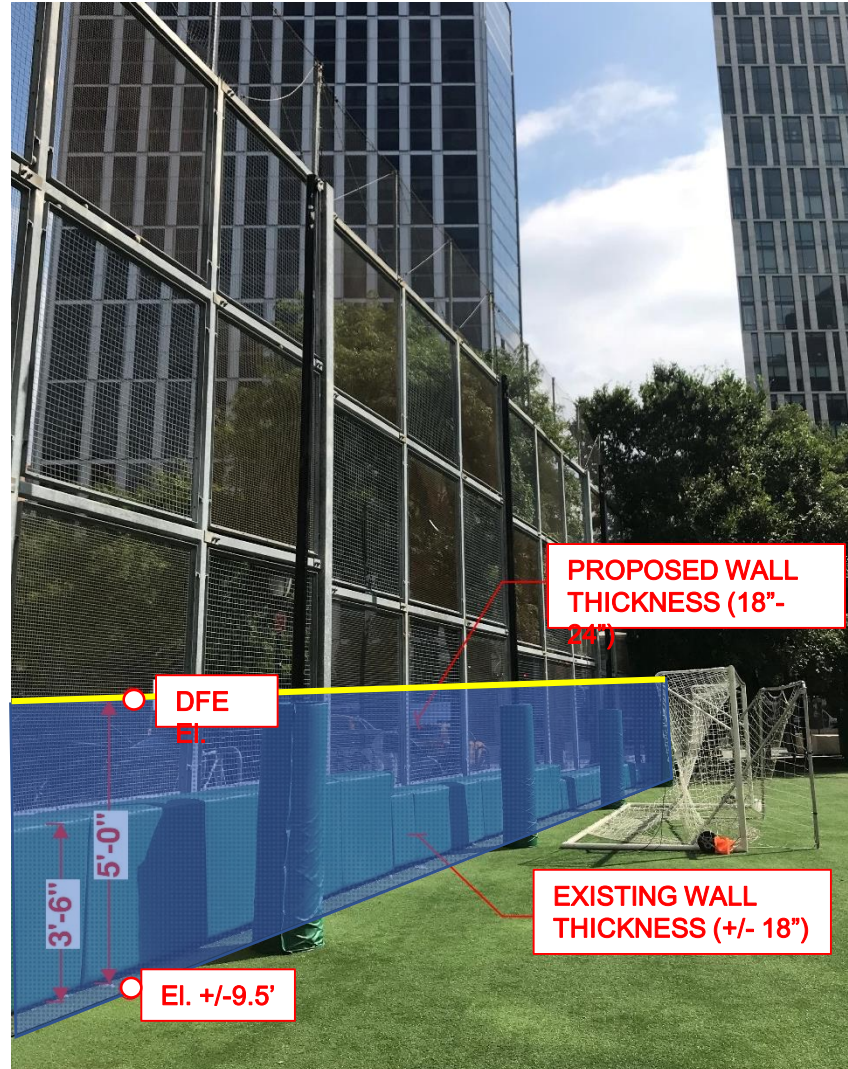
KEY PLAN



Permanent Solution: Reinforced Concrete Wall Alignment



Permanent Solution: Reinforced Concrete Wall Warren Street



Looking Northeast along Warren St.

Potential Materials for Reinforced Concrete Wall

PERFORATED METAL



POWDER COATED STEEL SCREENS



STAINLESS STEEL SCREENS

MURAL



PAINTED



PAINTED

PRECAST CONCRETE



TEXTURED PRECAST CONCRETE PANELS

BRICK

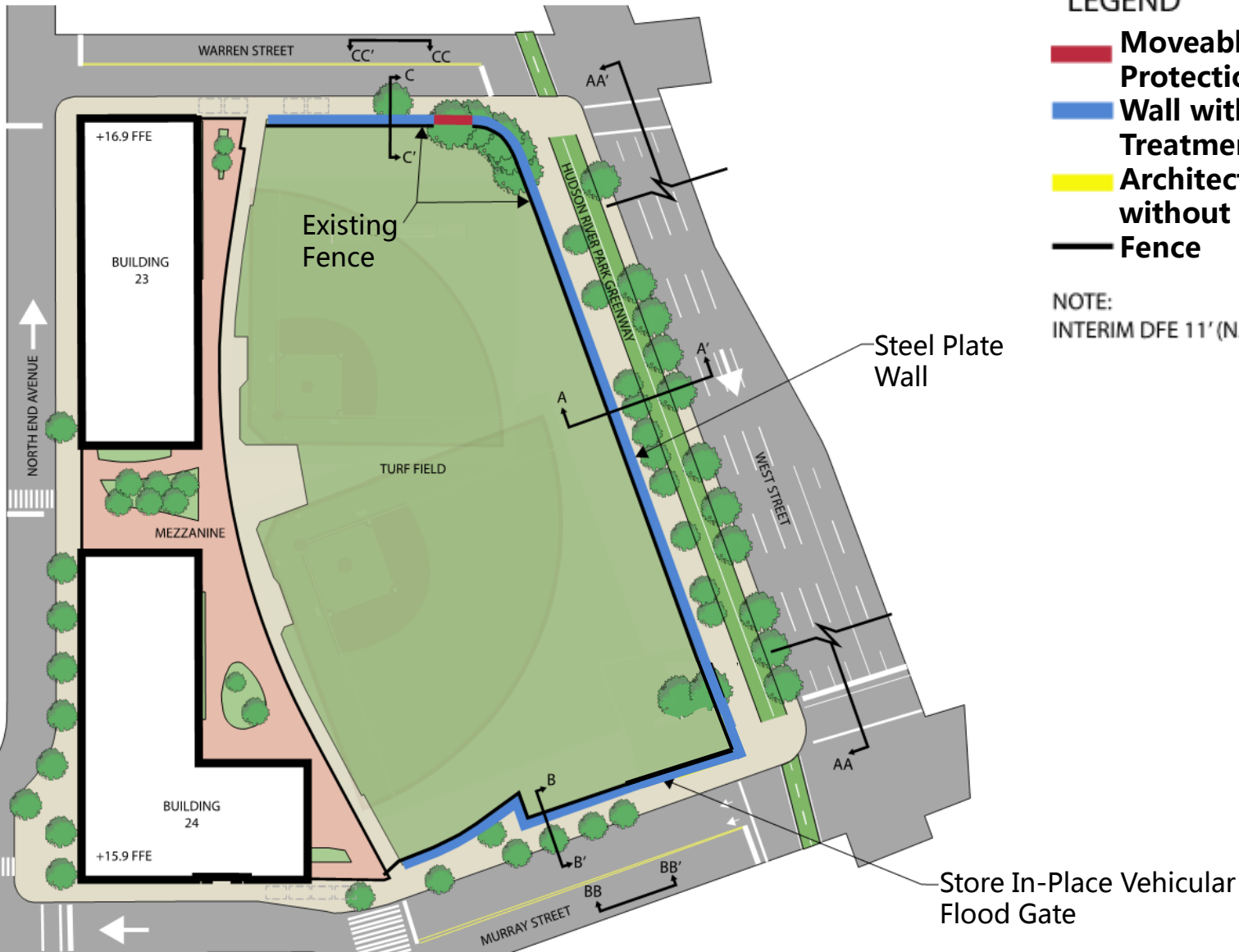


UNDULATING BRICK PATTERN

Interim Solution: Steel Plate Wall (DFE 11')

- Reuse Existing Fence Foundations
- $\frac{3}{4}$ -inch Thick Steel Plate
- Alignment Exterior to Fence
- 3 Moveable Flood Protection Device, 6 Community Center Flood-Rated Doors + Flood-Rated Glass
- Level of Protection
 - DFE 11' = BFE 11' (no SLR, no Freeboard)
 - Max wall height 4' due to structural capacity
 - Limited seepage protection

Interim Solution: Steel Plate Wall



LEGEND

- Moveable Flood Protection Device
- Wall with Architectural Treatment
- Architectural Treatment without Flood Barrier
- Fence

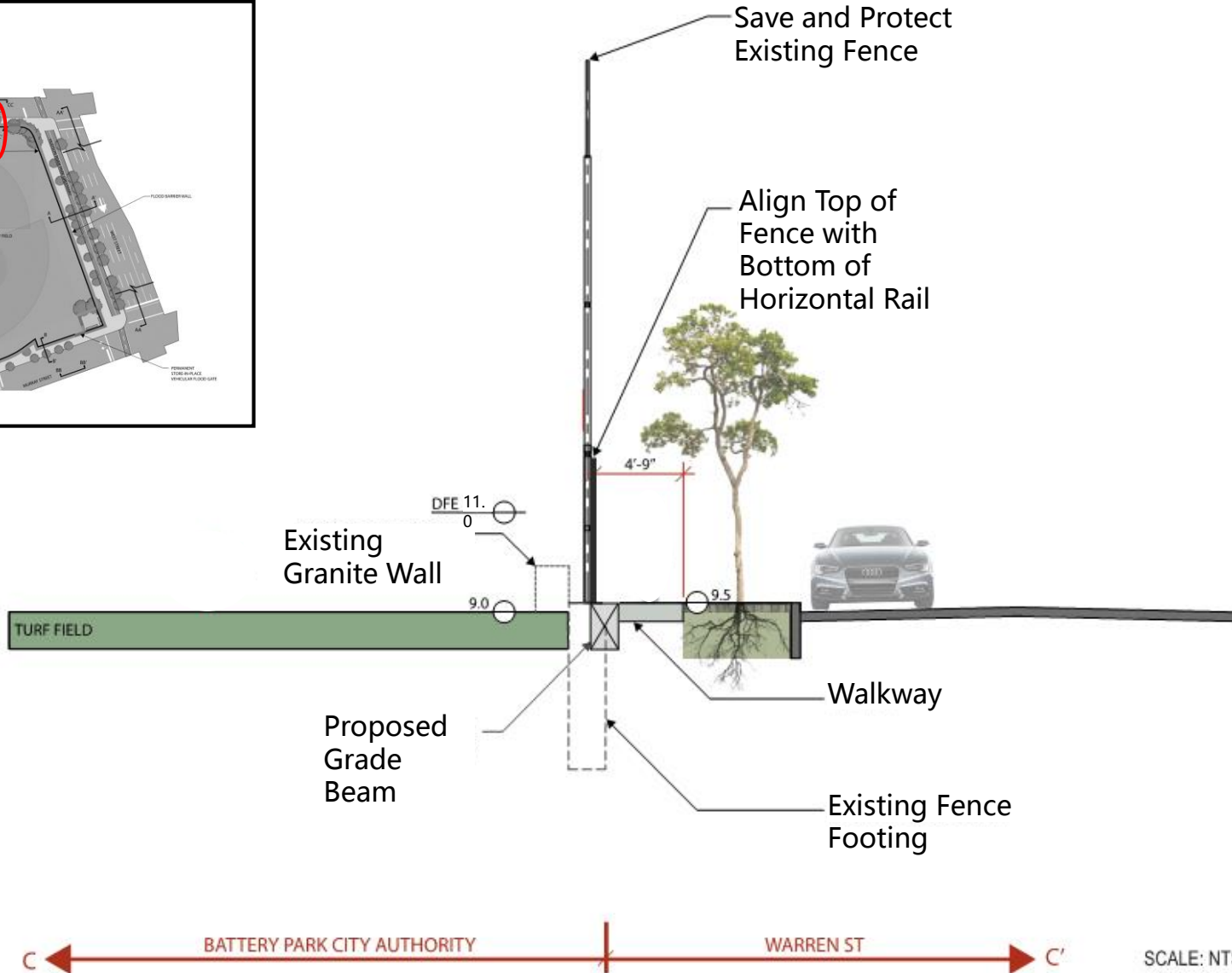
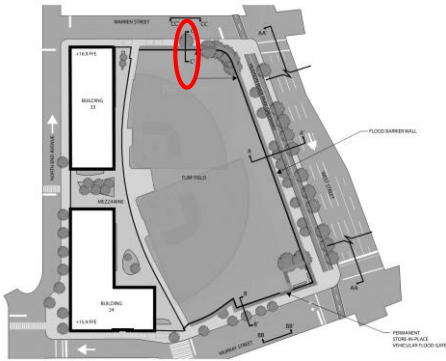
NOTE:
INTERIM DFE 11' (NAVD88)

Steel Plate Wall

Store In-Place Vehicular Flood Gate

Interim Solution: Steel Plate Wall Warren Street

KEY PLAN



SCALE: NTS

Community Center Hardening



Protect the Community Center with Flood-Rated Glass and Flood Doors

Potential Materials for Interim Solution

PERFORATED STEEL SCREENS



POWDER COATED STEEL SCREENS



STAINLESS STEEL SCREENS



INCREASED CORROSION RESISTANCE

STEEL FLOOD BARRIER WALL



UNPAINTED STEEL WALL PANEL



PAINT, ANODIZE, OR POWDER COAT METAL

Interim Solution: Steel Plate Wall Murray Street



4' tall steel plate wall is "stepped-down" to match slope in grade surface NTS

Interim Solution: Steel Plate Wall Warren Street



NTS

Interim Solution: Steel Plate Wall Corner of West St. and Murray St.



Guiding Objectives

- Flood risk
- Integration with landscape and built environment
- Minimize loss of field use and duration of construction
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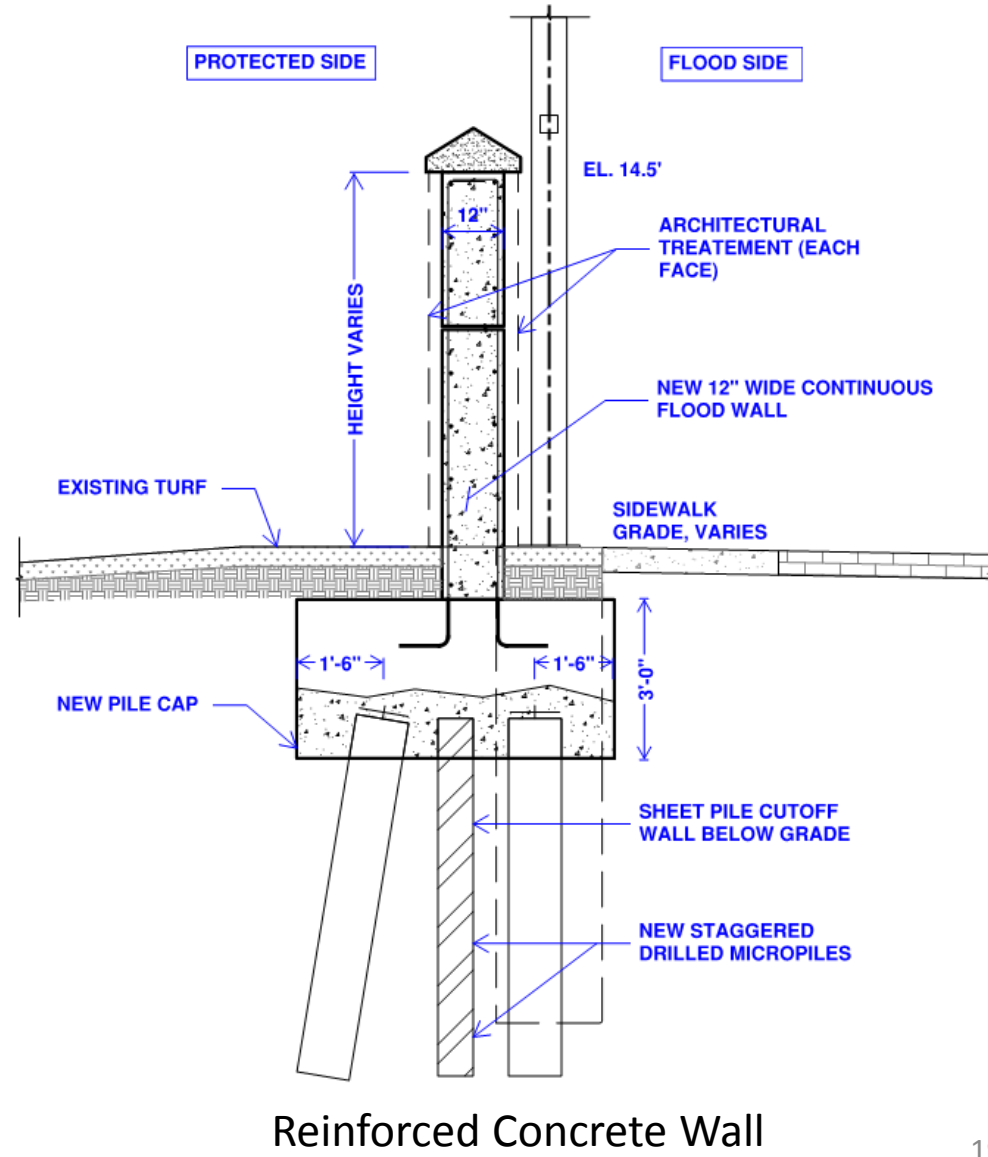
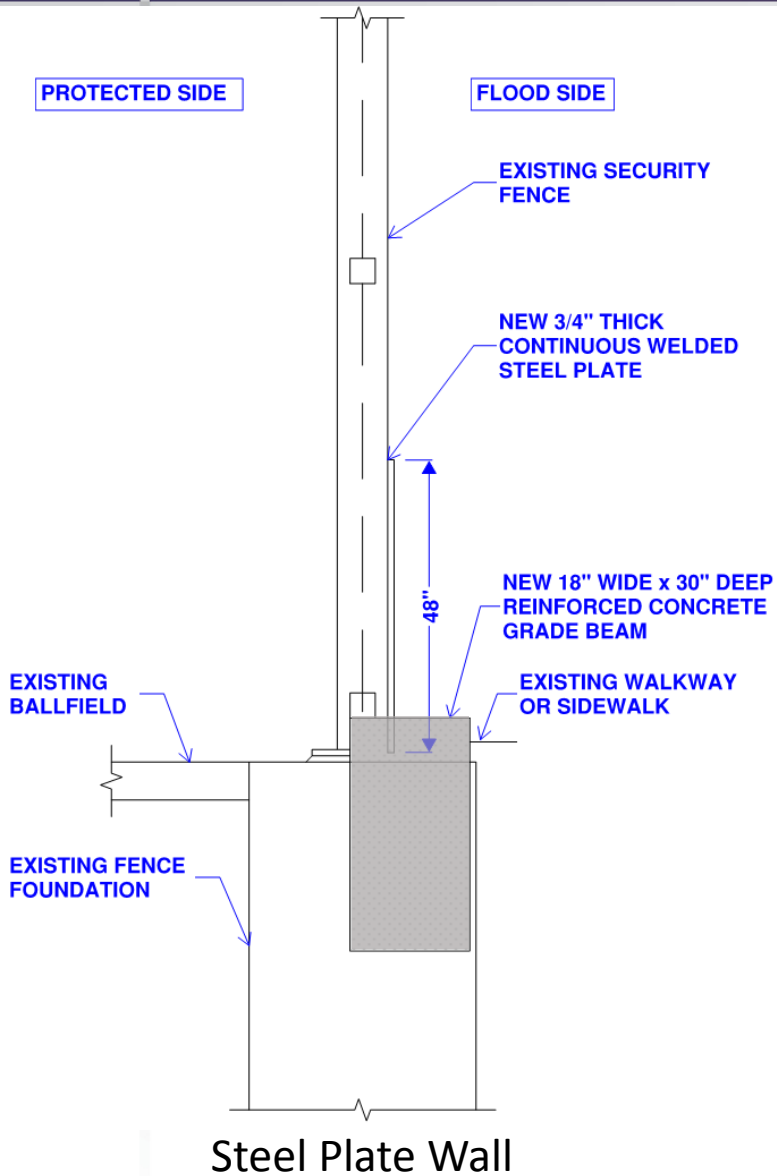
**Permanent Solution
(DFE 14.5')**

4% chance of
exceedance in 10 years

**Interim Solution
(DFE 11')**

10% chance of
exceedance in 10 years

Foundation Comparison



Guiding Objectives

- Flood risk
- Integration with landscape and built environment
- Minimize loss of field use and duration of construction
- Cost
- Schedule



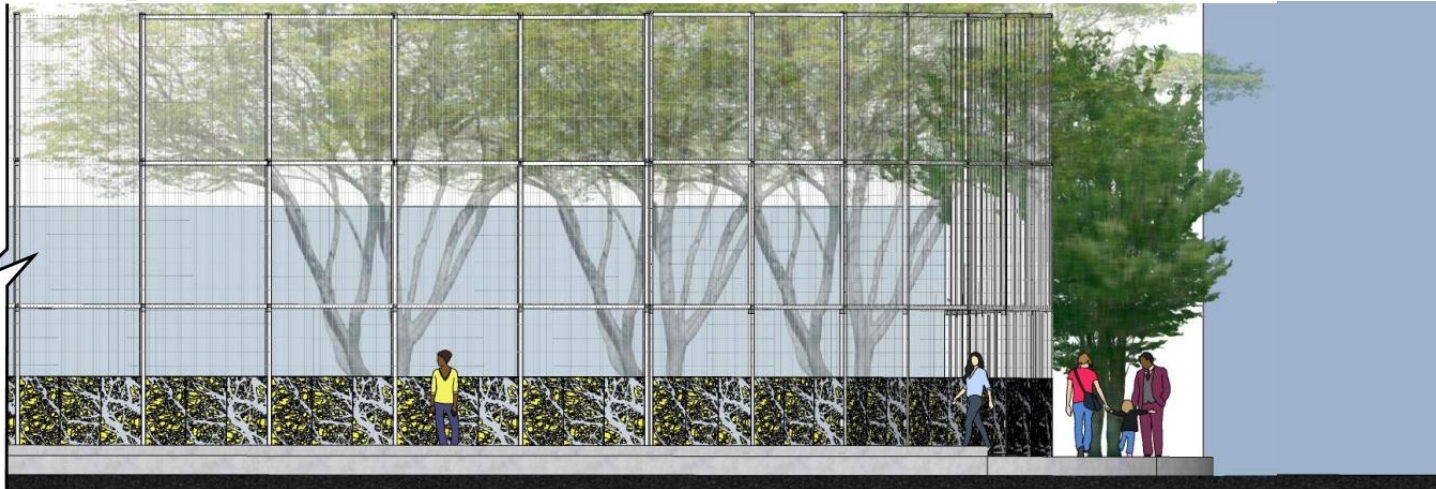
Permanent Solution (DFE 14.5')

- 8-foot max wall height
- More finish options
- Permanent wall

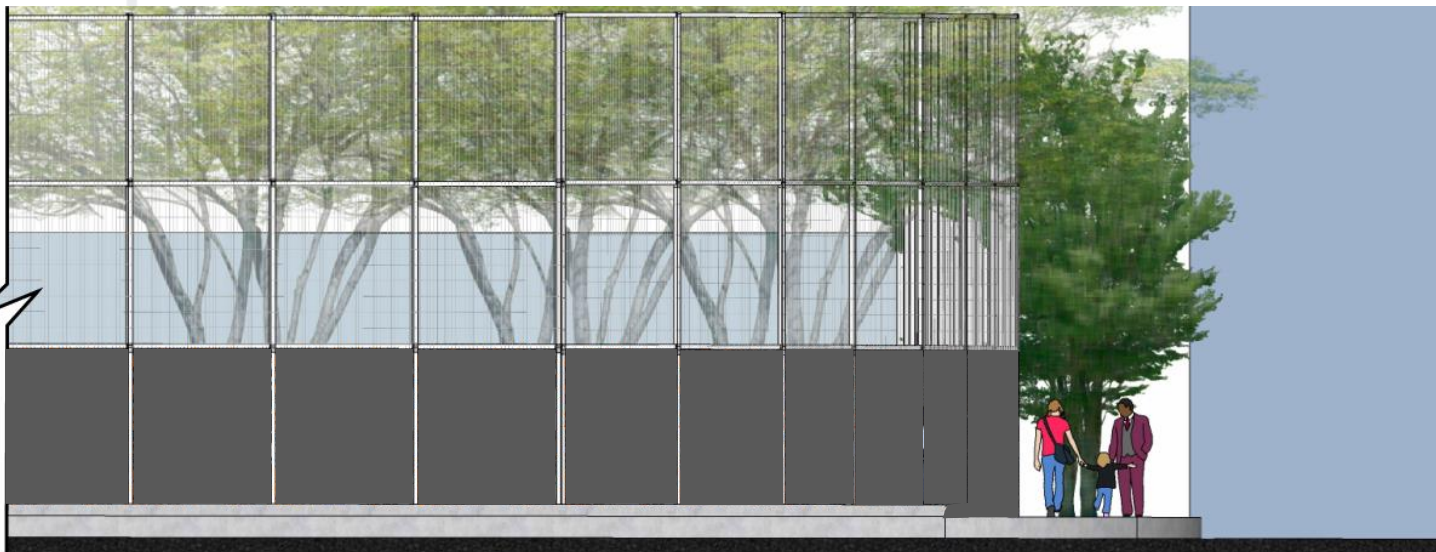
Interim Solution (DFE 11')

- 4-foot max wall height
- Fewer finish options
- Removable wall

Integration with Landscape



4-foot max wall height



8-foot max wall height

Guiding Objectives

- Flood risk
- Integration with landscape and built environment
- Minimize loss of field use and duration of construction
- Cost
- Schedule

**Permanent Solution
(DFE 14.5')**





**Interim Solution
(DFE 11')**

30' field width for pile operation total duration approx. 15 months

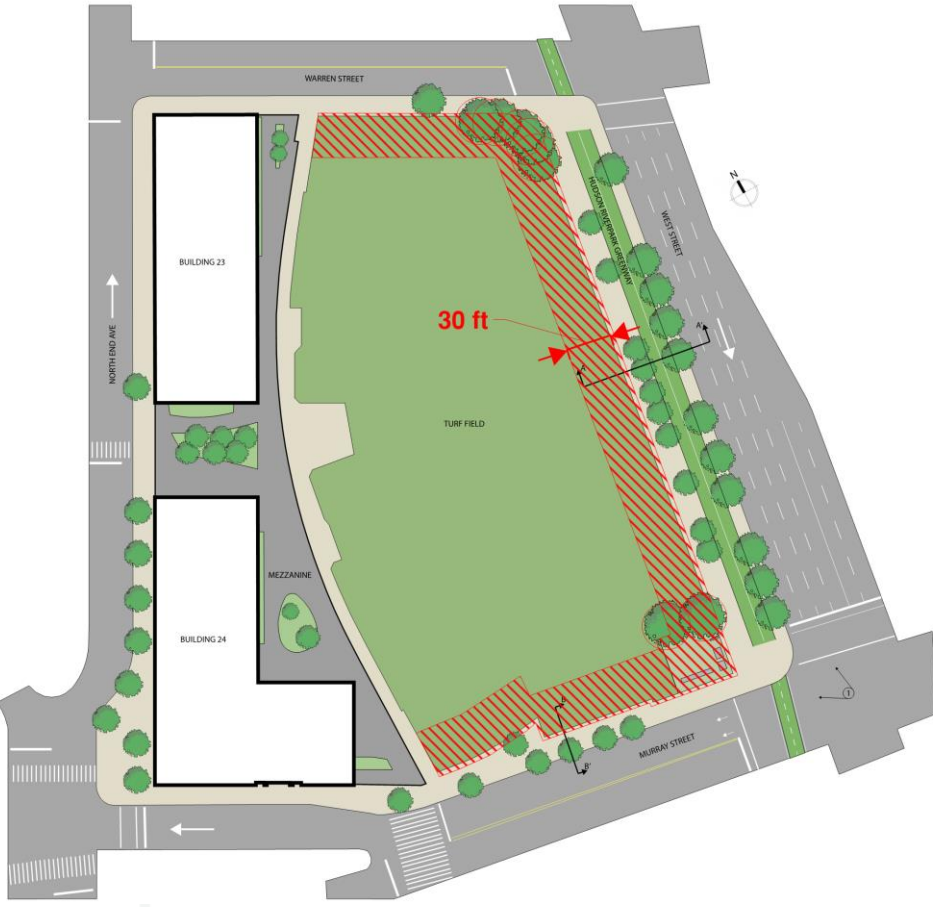
6' field width for grade beam operation total duration approx. 6 months

Minimize Construction

LEGEND

-  EXISTING TREE
-  EXISTING TREE TO REMAIN SAVE AND PROTECT
-  EXISTING TREE TO BE REMOVED
-  CONSTRUCTION IMPACT AREA

Steel Plate Wall



Reinforced Concrete Wall



Guiding Objectives

- Flood risk
- Integration with landscape and built environment
- Minimize loss of field use and duration of construction
- Cost
- Schedule

**Permanent Solution
(DFE 14.5')**

**Interim Solution
(DFE 11')**

Est. \$9.5-10.5M

Est. \$4-5M

Guiding Objectives

- Flood risk
- Integration with landscape and built environment
- Minimize loss of field use and duration of construction
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- Schedule



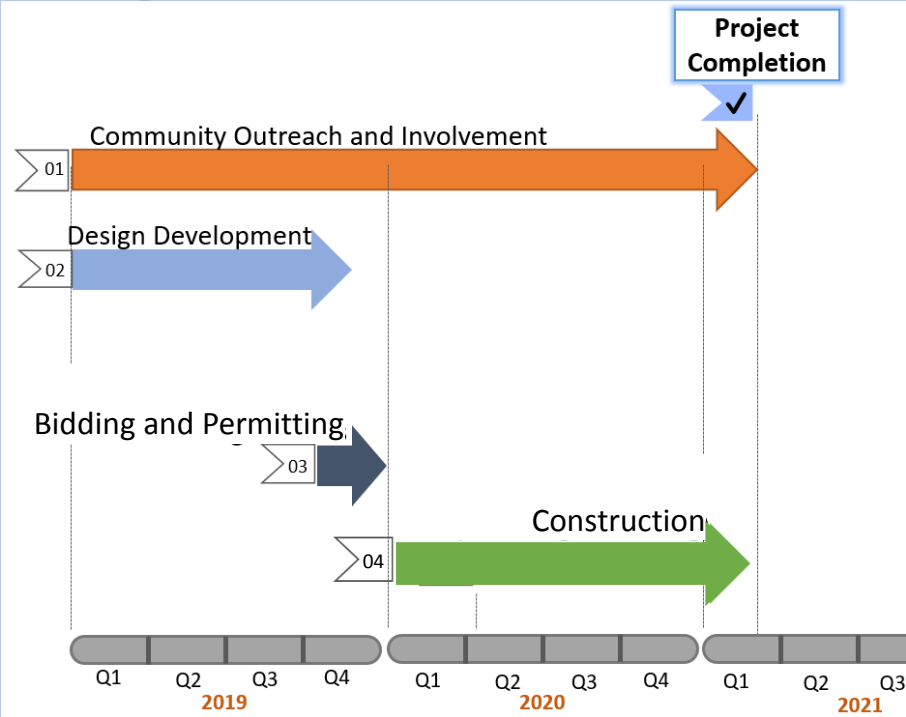
**Permanent Solution
(DFE 14.5')**

**Interim Solution
(DFE 11')**

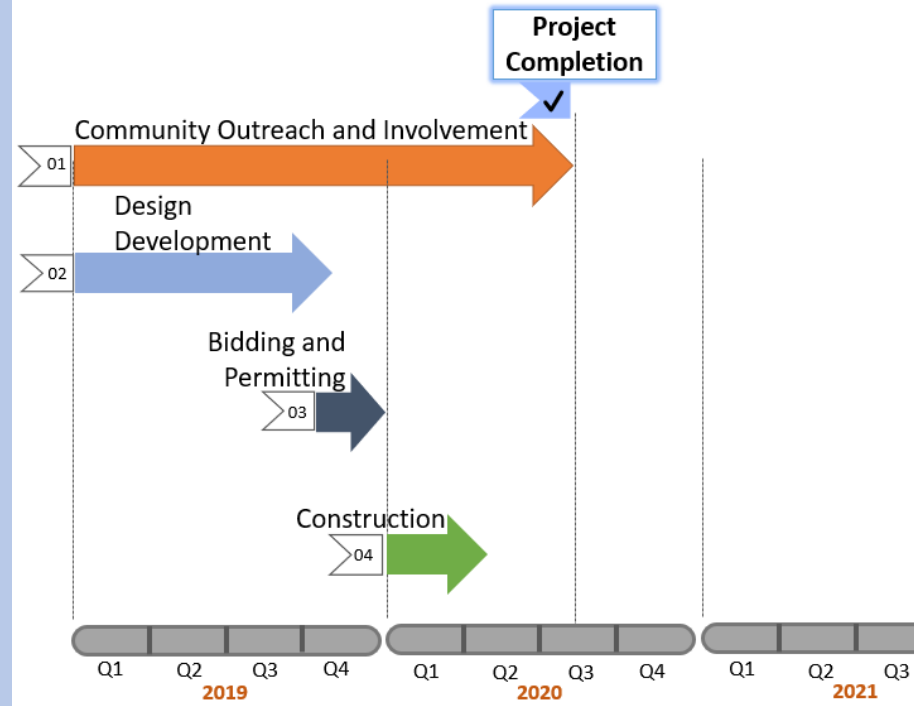
End Date:
Q2 2021

End Date:
Q2 2020

Schedule



**Reinforced
Concrete Wall**



Steel Plate Wall

Guiding Objectives - Summary

- Flood risk
- Integration with landscape and built environment
- Minimize loss of field use and duration of construction
- Cost
- Schedule

Permanent Solution (DFE 14.5')

4% chance of exceedance in 10 years

- 8-foot max wall height
- More finish options
- Permanent Wall

30' field width for pile operation total duration approx. 15 months

Est. \$9.5-10.5M

End Date:
Q2 2021

Interim Solution (DFE 11')

10% chance of exceedance in 10 years

- 4-foot max wall height
- Fewer Finish Options
- Removable wall

6' field width for grade beam operation total duration approx. 6 months

Est. \$4-5M

End Date:
Q2 2020

Next Steps

- Decision between Interim Solution and Permanent Solution
- Alignment Decision (only permanent solution)
- Pre-Application Agency Meetings
- 30% Design Development
- Continued Community Input
- Next Public Meeting (Approximately September 2019)

Discussion



Questions and Comments