

Upper Road
Over Deerfield River
Deerfield, Massachusetts

Bridge No. D-06-001 (0PP)



Prepared for



Massachusetts Department of Transportation

December 7, 2020

Prepared by


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1.0 PROJECT LOCATION

- 1.1 City or Town: Deerfield
- 1.2 District: 2
- 1.3 Bridge Number: D-06-001
- 1.4 BIN: OPP
- 1.5 Structure Number: D06001-OPP-MUN-NBI
- 1.6 Roadway on Bridge: Upper Road
- 1.7 Feature Intersected: Deerfield River

2.0 DESCRIPTION OF EXISTING SITE CONDITIONS

2.1 Description of Existing Bridge Structure:

- Bridge was constructed in 1949
- Bridge is oriented north to south
- Four (4) simple span structure with an overall bridge length of approximately 371'-0" and overall width of approximately 27'-6"
- Span 1 through 4 each have a length of 90'-9 $\frac{3}{4}$ ", center-to-center of the bearings
- Bridge has a curb-to-curb width of 24'-0"
- Bridge carries two (2) 11'-0" travel lanes and a 1'-0" shoulder on each side
- There is a steel channel rail on steel H-posts mounted on a 19" concrete parapet on each side
- Superstructure consists of combination of five (5) steel beams spaced at approximately 5'-4 $\frac{1}{2}$ " for all spans
- Deck consists of a 7 $\frac{1}{2}$ " thick composite reinforced concrete slab with no overlay
- Bridge has no skew
- Substructure consists of a pair of concrete stub abutments built on the original stone foundations, three solid wall concrete piers and four concrete gravity u-wingwalls
- Existing plans indicate that existing Pier No. 2 is founded on rock, existing Pier No. 3 is on soil, and existing Pier No. 1 is founded on a rock obstruction, and some repairs have been performed for undermining and scour with permanent steel sheeting visible at existing Pier 1
- Bridge is load posted for 17 tons, 21 tons, and 25 tons for the H20, Type 3, and Type 3S2 vehicles, respectively

- Bridge is less than 75 years old and of common construction, therefore it is not anticipated to be eligible for individual listing in the National Register of Historic Places by Massachusetts Historical Commission (MHC)

2.2 Description of Approach Roadway:

- Upper Road is classified as a rural minor collector under Town jurisdiction and is not part of the National Highway System
- 2018 average weekday daily traffic is approximately 1,220 vehicles per day, with 8.7% truck traffic.
- 2018 average pedestrian volumes (from data collected in June) is 4 pedestrians during the four-hour PM peak hour period from 2:00-6:00 PM. No pedestrians were recorded between 7:00-9:00 AM.
- 2018 average bicyclist volumes (from data collected in June) is 3 bicyclists on the bridge during the four-hour PM peak hour period from 2:00-6:00 PM. No bicyclists were recorded between 7:00-9:00 AM.
- Northern and southern roadway approaches carry two (2) 12' travel lanes (one for each direction) and no sidewalks on either side of the road
- Horizontal and vertical roadway alignments on the south side of the bridge are on tangents
- Southern alignment is a short tangent leading to a 'T' intersection with Stillwater Road
- Horizontal alignment on the north side is on a tangent and the vertical alignment is on a curve
- Southern approach is on the same horizontal tangent alignment as the bridge, however the vertical alignment is sloping up to the bridge at 3.00%
- Northern approach is also on the same horizontal tangent alignment as the bridge, however the road curves to the east after Lower Road
- Roadway vertical alignment on the northern approach is sloping down from the bridge at roughly 2.5% into a sag curve that has a low point located approximately 25' north of the northern bridge abutment
- Profile slopes up at approximately 5.9% from the low point which increases to approximately 10% near Lower Road
- Stillwater Road intersects with Upper Road approximately 50' south of the bridge
- Lower Road intersects with Upper Road approximately 275' north of the bridge
- Posted speed limit on Upper Road is 40 MPH in both directions

2.3 Description of Feature Under the Bridge Structure:

- Bridge No. D-01-006 crosses the Deerfield River
- Deerfield River flows west to east in the vicinity of the project
- Deerfield River is a tributary to the Connecticut River which discharges to Long Island Sound
- Deerfield River is approximately 220-feet wide at the bridge crossing
- Channel is aligned approximately 51°37'30" south of east
- Based on a field survey performed October 26, 2018 the observed water elevation was approximately 146.5 ft
- No known beaver activity within the project area
- Deerfield River is a state navigable waterway allowing recreational use of the river for boating, fishing, swimming, and other recreational activities with restrictions on motorized craft
- Deerfield River is not classified as a State or Federal Wild and Scenic River
- Existing bankfull width is approximately 211 feet with the ordinary high-water depth at approximately 6'-7"
- Existing bridge spans over the Deerfield River's effective National Flood Insurance Program (NFIP) Special Flood Hazard Area (SFHA) Zone A11 and floodplain delineations. The regulatory floodway width just upstream of the Bridge is 230 ft and the mean velocity is 15 ft/sec

2.4 Description of Existing Hydraulics at the Bridge Sites

- Hydraulic report prepared by Green International Affiliates, Inc. dated August 2020, revised November 2020
- Existing low chord elevation is approximately 172.44 ft (NAVD 88)
- Existing hydraulic opening at Cross Section AA, per effective FIS, just upstream of bridge has section area approximately 6,288 square feet
- River's drainage area at the crossing site is about 562 square miles
- River's effective NFIP base flood discharge and base flood elevation at the crossing site are 68,280 cfs and 158.05 feet, NAVD 88, respectively

2.5 Description of All Utilities Within the Bridge Site:

A. Utilities on Bridge

- There is an 8" fiber optic line attached to the western parapet in addition to a geologic survey box attached to the western rail which may no longer be in use

B. Utilities Buried in Vicinity of Bridge

- To the immediate north of the bridge abutments, there are catch basins. Pipe sizes could not be determined as the structures are filled with sediment
- Catch basins are located approximately 25' north of the northerly bridge abutment
- There is underground telephone fiber optic conduit on the west side of both approaches which is attached to the bridge. There are markers indicating the location of the conduit

C. Overhead Utilities

- On the western side of Upper Road, there are overhead wires (OHW) that run parallel with the bridge and roadway approaches and cross over Upper Road just south of the bridge. There are larger overhead wires that run parallel to the bridge farther downstream, east of the bridge
- Overhead wires consist of electric and telecommunications facilities

2.6 Description of Environmentally Sensitive or Cultural Resource Areas Affecting the Bridge Site:

- Review of the Massachusetts Cultural Resource Information System (MACRIS) database indicates that this bridge is not listed as any type of historic or cultural asset. There are no other listed historically/culturally significant sites or artifacts nearby that could be impacted by construction
- We will coordinate with the Deerfield Historical Commission whether there are any nearby historic sites that would be adversely affected by proposed construction
- Project is a footprint bridge project and is therefore exempt from the Wetlands Protection Act. Wetland resource areas are located in all four quadrants of this river crossing. The field delineation of these resource areas was completed by Green on July 13, 2018. Resource areas on site consist of Land Under Water and Waterways, Inland Bank, Riverfront Area, and Bordering Vegetated Wetlands
- Existing bridge spans over a regulatory floodway and is located near the 100-year flood plain associated with Deerfield River with base flood elevations and flood hazard factors determined, based on FEMA Flood Insurance Rate Map 2501150003B, dated July 2, 1980
- Natural Heritage and Endangered Species Program (NHESP) Natural Heritage Atlas (14th Ed.) indicates that the project area is located within

Priority Habitat of Rare Species (PH2064) and Estimated Habitat of Rare Wildlife (EH1359)

- According to the Federally Listed Endangered and Threatened Species in Massachusetts, the Northern Long-eared Bat (*Myotis septentrionalis*) (NLEB) is a proposed Endangered Species located Statewide. This species is protected by the Massachusetts Natural Heritage and Endangered Species Program (NHESP). Based on online information on the U.S. Fisheries and Wildlife Service no critical habitat for any Federally-listed endangered/threatened species of concerns were found to be associated with this site
- Work at project's south bridge approach will take place within Zone II wellhead protection area
- Project will be required to obtain a Section 401 Water Quality Certification for Fill, Excavation and/or Dredging within the Waterways associated with the proposed substructure work
- Project will be required to obtain coverage under U.S. Army Corps of Engineers Massachusetts General Permit for work within the Waters of the United States associated with the proposed substructure work
- USEPA EJSCREEN Online Tool shows that the project area is not located within or adjacent to any 2010 Census Environmental Justice Population areas based on income or minorities

2.7 Hazardous Materials:

- Sediments cleaned from storm drains, storm drain structures, and waterways/ditches must be treated as a hazardous material
- Massachusetts Department of Environmental Protection Waste Site Releases searchable sites list does not identify any hazardous releases within or adjacent to the project area. The closest site is located at 59 Hawks Road approximately a mile north of the project site west of the tributary to Deerfield River. The RTN for this site is RTN 1-0016949 and the spill occurred in 2008. The site is currently classified as RAO Class A2 and no further action is required
- Lead paint on bridge superstructure is likely to be encountered

3.0 DESCRIPTION OF PROJECT PARAMETERS AND CONSTRAINTS

3.1 Description of Proposed Roadway Cross Section:

- Projected 2038 average daily traffic is 1,490 vehicles per day based on 1.0% growth rate per year
- Upper Road will have a curb-to-curb width of 32'-0", consisting of an 11'-0" travel lane and 5'-0" shoulder for each direction of travel

- Proposed horizontal alignment will be offset 8'-6" from the existing roadway centerline in the bridge area but follow the same bearing
- Vertical alignment will be lowered to allow the bridge to be on a tangent
- Design speed is 30 MPH through the project site
- Proposed work includes full depth reconstruction of approximately 50' of the south approach and 300' of the north approach
- Approximately 300' of additional roadway work will be required on Stillwater Road and approximately 50' of work on Lower Road. The final configuration is still under design
- A new alignment west of and parallel to the existing bridge was considered to maintain two travel lanes on the existing bridge during construction. This option was not pursued further since the low traffic volumes did not justify the increased cost and environmental impacts
- Shifts centerline of roadway approximately 38.5 feet to the west
- Shifts utility poles and overhead wires approximately 36.5 feet to the west. This results in additional poles needing relocation along Stillwater Road
- Results in approximately 150 feet of additional roadway work along Upper Road
- Significant land acquisitions would be required on west side of roadway

3.2 Proposed Traffic Management:

- Upper Road will remain open to traffic during the construction
- One lane of vehicular traffic will be maintained during construction via multi-stage construction
- Bridge construction will be completed in two stages
- In Stage 1, traffic will be moved to the eastern portion of the existing bridge as the western half is demolished
- In Stage 2, traffic will be rerouted to the newly constructed western portion of the proposed bridge as the remaining eastern portion of the existing bridge is demolished
- One 11'-0" travel lane with a 4'-0" shoulder will be provided during both stages
- Temporary traffic signals will be used during staged construction to control one-lane alternating traffic on the bridge
- A rolling stop and/or limited short-term detour is expected for certain construction operations

3.3 Proposed Clearances:

- Main Channel Span will be increased from 90'-9 ³/₄" to 145'

- Existing low chord elevation (172.44) will be lowered 2.44' to 170.0 ft NAVD 88
- Overall hydraulic opening will be 6102 square feet

3.4 Hydraulic Data:

- Hydraulic report prepared by Green International Affiliates, Inc. dated August 2020, revised November 2020
- Hydraulic Design Data
- Drainage Area: 562 Square Miles
Design Flood Discharge: 33,500 Cubic Feet Per Second
Design Flood Frequency: 10 Years
Design Flood Stage: 156.33Feet, NAVD

Design Flood Velocity: 9.50 Feet Per Second

- Base (100-Year) Flood Data
- Base Flood Discharge: 73,000 Cubic Feet Per Second
- Base Flood Elevation: 162.53Feet, NAVD
- Design and Check Scour Data
- Design Scour Event Return Frequency: 25 Years
- Design Flood Abutment Scour Depth: 15.0 Feet
- Design Floor Pier Scour Depth: 14.9 Feet
- Scour Check Flood Event Return Frequency: 50 Years
- Check Flood Abutment Scour Depth: 16.7 Feet
- Check Floor Pier Scour Depth: 15.1 Feet
- Flood of Record
- Discharge: 89,800 CFS
- Elevation: 180.51 Feet (At USGS Gage 01170000 Deerfield near West Deerfield, MA)
- Date: August 28, 2011 (Tropical Storm Irene)

- History of Ice Floes: None Documented
- Evidence of Scour or Erosion: The latest MassDOT Underwater Inspection Report dated June 2017 provides evidence of erosion and scour at both Piers 2 and 3. At Pier 2 the footing and steel sheeting have been exposed along the entire left side, and the exposed heights have been increasing each inspection cycle since 1995. At Pier 3 the footing and steel sheeting are exposed for the entire perimeter and a repair for an undermining condition on the upstream and right side was performed prior to the 2017 inspection. The left side and upstream nose, which were not included in the repair, have voids between the steel sheeting and ledge profile that the pier footing is founded on which has contributed to loss of material and undermining of the pier.

3.5 Preliminary Geotechnical Data:

- Original fieldstone foundations for the existing abutments appear to pre-date the 1949 construction, no plans exist for these substructure elements
- Existing substructure consists of reinforced concrete piers and abutments, with the abutments resting on the above-mentioned fieldstone masonry portions and the piers resting on spread footings on bedrock
- Based on probe results, the older fieldstone portions of the abutments appear to relatively thin, U-shaped structures
- According to the DOT Structures Inspection Report, the Substructure Item 60.1.k, 'Abutment Settlement', was rated at 6 (Satisfactory) and minor settlement was observed at both abutments
- Test pits were not excavated at the existing abutments
- Based on the boring logs shown in the Preliminary Structures Report, the soils at the site consist of fine to medium sand with traces of gravel and inorganic silt. Actual soil information for the site will not be known until completion of the proposed subsurface soil exploration program
- Foundation type will be confirmed upon completion of the Geotechnical Report based on the subsurface investigation performed, which will most likely include a boring plan and geophysical survey

3.6 Constraints Imposed by Approach Roadway Features:

- Profile changes are limited by the adjacent Stillwater Road and Lower Road
- In order to avoid and minimize right-of-way impacts and cost, the proposed alignment will keep the proposed roadway within the existing

right-of-way. There may be a minor land acquisition on the northeast corner of Lower Road as the existing road is outside the Town layout

3.7 Constraints Imposed by Feature Crossed:

- The roadway profile will be lowered; thus, reducing the overall bridge hydraulic opening. However, because the new bridge low chord is approximately 8.5 ft above the 500-year flood elevation, there will be no adverse impact to the “effective capacity” of the bridge hydraulic opening.
- NFIP regulations require that bridge construction results in neither any increases in the river’s Base Flood Elevation (BFE) profile, nor unapproved increases in the river’s regulatory floodway delineation width, at any location in the Town of Deerfield

3.8 Constraints Imposed by Utilities:

- There is a fiber optic cable that is supported by the existing bridge. The conduit must be transferred to and supported by the new bridge upon completion of the project
- Overhead wires located parallel to west side of the bridge must be protected and/or relocated as necessary during construction and may limit the bridge demolition or erection procedure
- It is anticipated utility poles and overhead wires will be relocated to the west to accommodate the new bridge and roadway alignment. It is not anticipated these utilities will be carried on the new bridge, but this will be discussed with the utility owner’s during the early coordination meeting

3.9 Constraints Imposed by Environmentally Sensitive Areas:

- Wetland resource area impacts by the proposed structure shall be minimized to the greatest extent possible
- Any Bordering Vegetated Wetlands (BVW) in the vicinity of the bridge temporarily disturbed by construction shall be restored
- Any areas of BVW permanently disturbed by construction shall be replicated, at a 1:1 ratio of lost areas to replicated areas
- Any flood storage volume removed either temporarily or permanently by the construction of the proposed bridge shall be compensated
- No Environmental Justice concerns are anticipated because no areas with minority or income Environmental Justice populations are located in or near the project area

3.10 Constraints Imposed by Cultural Resource Areas:

- No constraints are anticipated to be imposed by cultural resource areas

3.11 Hazardous Material Disposition:

- All materials generated during demolition of superstructure containing lead or other hazardous materials and any sediments cleaned out of storm drain structures, storm drains, or open channels for stormwater conveyance must comply with all Federal, State and Local Regulations for the proper containment, handling, disposal and/or recycling of hazardous materials

3.12 Other Project Constraints:

- No other constraints

4.0 APPROPRIATE BRIDGE STRUCTURE TYPES

4.1 Multiple Span Arrangements:

- Due to overall length of the bridge only a multiple span arrangement is viable at this site
- Can easily accommodate the required length
- Can be designed to take full advantage of moment distribution resulting from continuity and thus reduce the girder depth
- Three-span and four-span continuous configurations can be used to eliminate deck joints and reduce impacts on vertical profile and hydraulic opening
- Conventional construction method will be used since the preliminary decision value is less than 7

5.0 PROPOSED SUBSTRUCTURE ARRANGEMENT, SPAN AND FOUNDATION TYPE

5.1 Three-Span Arrangement with Piers in New Locations and Cantilever Abutments in at the Existing Location:

- Multiple span continuous structure with a span configuration of 111'-0" / 145'-0" / 111'-0", matching the recommended ratio of 0.75 : 1.0 : 0.75 for center-to-center of bearing
- Allows for raising the vertical profile on the north end to improve the sight distances on the north approach roadway

- Different pier locations allow for easier staged construction, as the proposed piers can be built without conflicting with the demolition of the existing piers
- Re-building abutments in same location as existing requires precautions so that the existing footing does not become undermined during staging
- Minimizes elements in the substructure to be constructed in the waterway, reducing permanent impacts to the river and increasing the hydraulic opening in the final condition
- Lower cost than the four-span option due to less substructure elements; however, this option will require more cofferdams in the temporary condition for construction and demolition
- Minimizes elements in the substructure to be constructed in the waterway, reducing permanent impacts to the river and increasing the hydraulic opening in the final condition

5.2 Four-Span Arrangement with Piers at Existing Location and Cantilever Abutments at the Existing Location:

- Multiple span continuous structure with four span lengths of 91'-4 1/4", 92'-0 3/4", 92'-0 3/4", and 91'-4 1/4" center-to-center of bearings from south to north
- Allows for raising the vertical profile on the north end to improve the sight distances on the north approach roadway clearance
- Steel plate girders are viable superstructure types for this span arrangement
- Creates many difficulties during staged construction for building the proposed piers at the same location as the existing piers while demolishing half of the existing piers and not undermining them. This is of the utmost concern due to the documented scour issues at two of the existing piers per the latest inspection reports
- Re-building abutments in same location as existing requires precautions so that the existing footing does not become undermined during staging
- Costlier than three span option because of more substructure elements; however, there is potential for less temporary impacts from cofferdams since they can be shared for the demolition and construction of the piers in the same locations

5.3 Viable Foundation Types:

- Existing substructures are founded shallow spread footings, with the existing East Abutment and existing Pier No. 2 founded on ledge, existing Pier No. 1 founded on a rock obstruction, and existing Pier No. 3 and West Abutment on soil

- Proposed footings are assumed to also be spread footings founded on bedrock where the profile is shallow on the north half of the Deerfield River, and deep foundations where the rock profile drops off on the south half of the Deerfield River
- These assumptions will be confirmed upon completion of the subsurface investigation and Geotechnical Report, as well as the results of the structural and hydraulic analysis

6.0 PROPOSED SUPERSTRUCTURE TYPE

6.1 Three-Span Steel Plate Girder with a Composite Concrete Deck – Alternative A:

- Six (6) welded steel plate girders composite with an 8-inch full depth cast-in-place deck and a 3" superpave wearing surface
- Girders will be approximately 42" deep and spaced 6'-3" apart
- Can be easily fabricated from local manufacturers and shipped in smaller pieces on site since they can be spliced at the contraflexure points
- Steel girders have a lower weight than their concrete counterpart which reduces loading on the substructure
- Steel beams can also be spliced to allow the beams to be shipped and installed using smaller equipment
- Additional higher loads are anticipated at the piers due to longer and continuous span lengths
- Steel girders have a higher life cycle cost, since they are subject to more deterioration from corrosion and require more maintenance to preserve them
- Provides the most room for utilities between girders
- Can be cambered to better follow profile of the road
- Structure is less expensive than the four-span steel plate girder alternative
- Minimizes elements in the substructure to minimize permanent impacts within the river and increases the hydraulic opening.

6.2 Four-Span Steel Plate Girder with a Composite Concrete Deck – Alternative B:

- Six (6) welded steel plate girders composite with an 8-inch full depth cast-in-place deck and a 3" superpave wearing surface
- Girders will be approximately 36" deep and spaced 6'-3" apart
- Can be easily fabricated from local manufacturers
- Steel girders have a lower weight than their concrete counterpart which reduces footing sizes and allows the use of smaller equipment to ship and erect

- Requires longer end spans in order to balance middle and end spans to reduce uplift impact at the abutments
- Steel beams have a higher life cycle cost, since they are subject to more deterioration from corrosion and require more maintenance to preserve them
- Provides the most room for utilities between girders
- Can be cambered to better follow profile of the road
- Structure is more expensive than the three-span steel plate girder alternative
- Presents staged construction difficulties for maintaining the structural integrity of the existing piers as they would need to be partially demolished to accommodate building of the new piers in the same locations
- Requires more elements in the substructure that increases impacts to the river and requires more maintenance life cycle cost due to more elements to maintain

7.0 PRELIMINARY PROJECT COST ESTIMATE

7.1 Preliminary Cost Estimates:

- Prices used in the cost estimate were obtained using the “Construction Project Estimator” and the “Weighted Average Bid Applications” found on the Massachusetts Department of Transportation Highway Division webpage and the “2006-2008 MHD Bridge Section Weighted Average Unit Prices”
- All prices were adjusted for inflation due to future construction date (estimated 2022 construction)
- Any items for which a cost was not available from either of the sources listed previously was estimated based on prior job experience or a manufacturer’s cost

7.2 Alternative A (Three-Span Steel Plate Girder with a Composite Concrete Deck):

- Cost of bridge structure itself: \$ 19,200,000
- Cost of approach work: \$700,000
- Cost of traffic management: \$ 400,000
- Total project cost: \$ 20,300,000

7.3 Alternative B (Four-Span Steel Plate Girder with a Composite Concrete Deck):

- Cost of bridge structure itself: \$ 20,600,000
- Cost of approach work: \$700,000
- Cost of traffic management: \$ 400,000

- Total project cost: \$ 21,700,000

8.0 RECOMMENDATION OF PROPOSED BRIDGE STRUCTURE TYPE

8.1 Three-Span Steel Plate Girder with a Composite Concrete Deck – Alternative A:

- Provides the most constructible structure given the project constraints, staged construction approach, and existing scour issues at two of the three existing piers
- Steel plate girders can be cambered to accommodate the vertical profile
- Steel plate girders are the lightest alternative and can be spliced so that smaller equipment is required for shipping and installation
- Minimizes the number of substructure elements that need to be constructed within the waterway, therefore decreasing impacts to the river and increasing the hydraulic opening
- Reduces the life cycle cost of the structure with the reduced number of substructure elements to maintain over the life cycle of the bridge
- Reduces the number of joints on the bridge which will require less maintenance

9.0 APPENDICES

9.1 Project Location Map

9.2 Preliminary Decision Value Form and Preliminary Decision-Making Flowchart

9.3 Plan, Profile, Elevation and Cross Section of Recommended Alternative A

9.4 Off-Alignment Alternative Layout

9.5 Typical Approach Roadway Cross Section

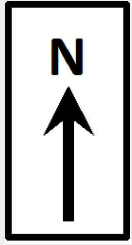
9.6 Clearance Diagram for Deerfield River

9.7 Channel Cross Section

9.8 Stage Construction Diagrams

9.9 Backup Calculations

9.1 PROJECT LOCATION MAP



WEST DEERFIELD

BR. D-06-001

Upper Road

Interstate 91



Interstate 91

DEERFIELD



Interstate 91

Deerfield River

Stillwater Road

Mill Village



GREEN INTERNATIONAL
AFFILIATES, INC.
Civil and Structural Engineers

GREEN PROJ. NO.: 13033.21XX
DATE: AUGUST 2020
DESIGNED BY: TC
DRAWN BY: CH
CHECKED BY: MAC

PROJECT TITLE:

DEERFIELD
UPPER ROAD OVER
DEERFIELD RIVER

DRAWING TITLE:

PROJECT LOCATION MAP

APPENDIX NO.

9.1

BRIDGE NO.

D-06-001

SKETCH/PAGE NO.

9.1.1



9.2 PRELIMINARY DECISION VALUE FORM AND PRELIMINARY DECISION MAKING FLOWCHART



PRELIMINARY DECISION VALUE FORM

Highway Evaluation Value

ADT Value	
ADT (I-29)	Value
< 1000	1
1000 - 4999	2
5000 - 9999	3
10000 - 20000	4
≥ 20000	5

Detour Value	
Detour (I-29)	Value
0-1 KM	1
2-3 KM	2
4-5 KM	3
6-9 KM	4
10+ KM	5

Classification Value	
Class (I-26)	Value
09, 19	1
08	2
07, 17	3
06, 16	4
01, 02, 11, 12, 14	5

Note: Items 29, 19 and 26 shall be taken from the SIA.

$$\text{Highway Evaluation Value} = (\text{ADT value} + \text{Detour value} + \text{Classification value}) / 3.0$$

$$\text{Highway Evaluation Value (A)} = \boxed{3.0}$$

Other Factors Value

- | | | |
|-----|--|--|
| a). | Is it an Emergency Replacement? (2 Points if YES; 0 Points if NO) | <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;">0</div> |
| b). | Is the Bridge over an active and busy RR or Navigation Channel?
(2 Points if YES; 0 Points if NO) | <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;">0</div> |
| c). | Is the Bridge on Evacuation Route? (1 Point if YES; 0 Points if NO) | <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;">0</div> |

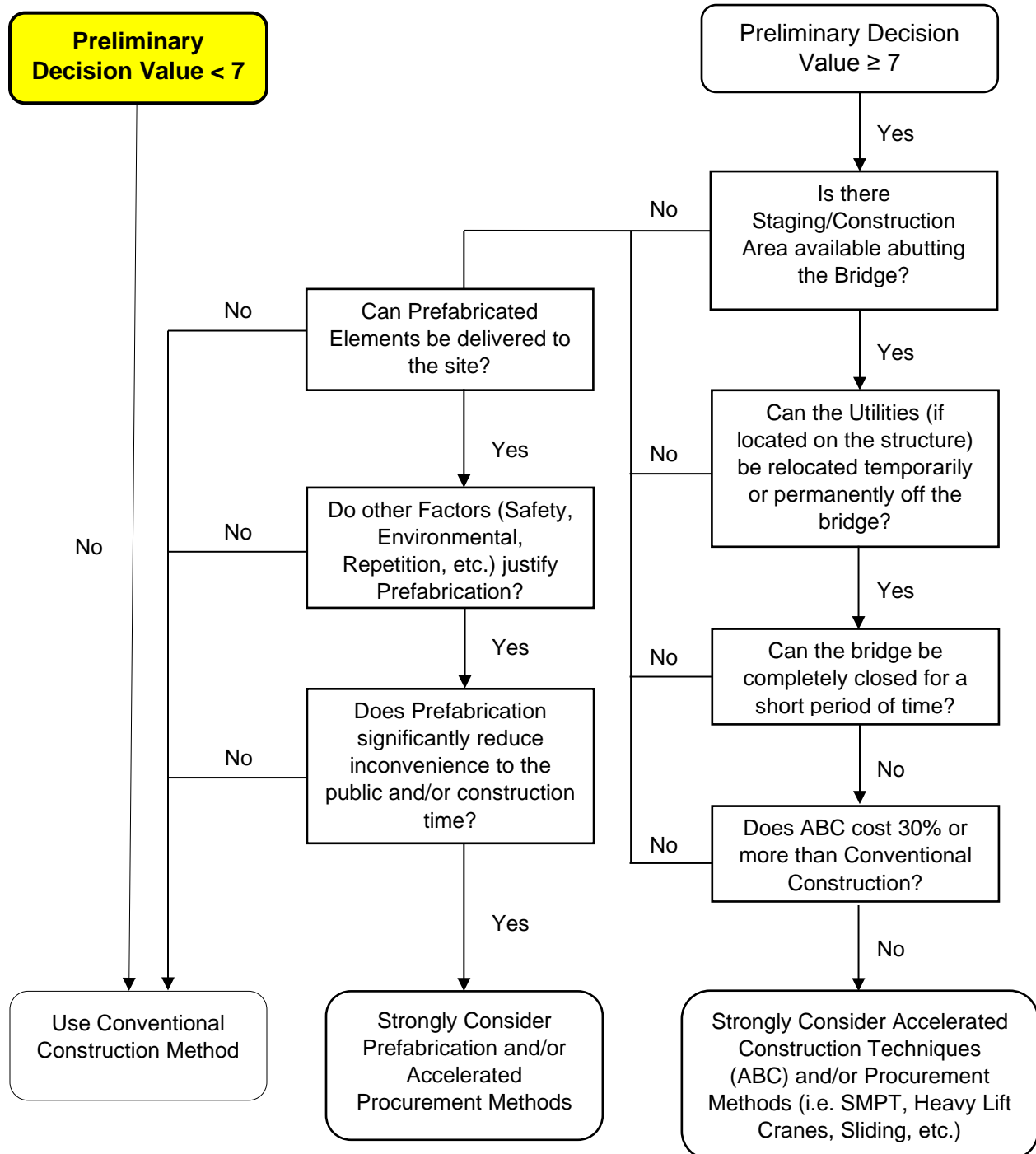
$$\text{Other Factors Value} = (a + b + c)$$

$$\text{Other Factors Value (B)} = \boxed{0}$$

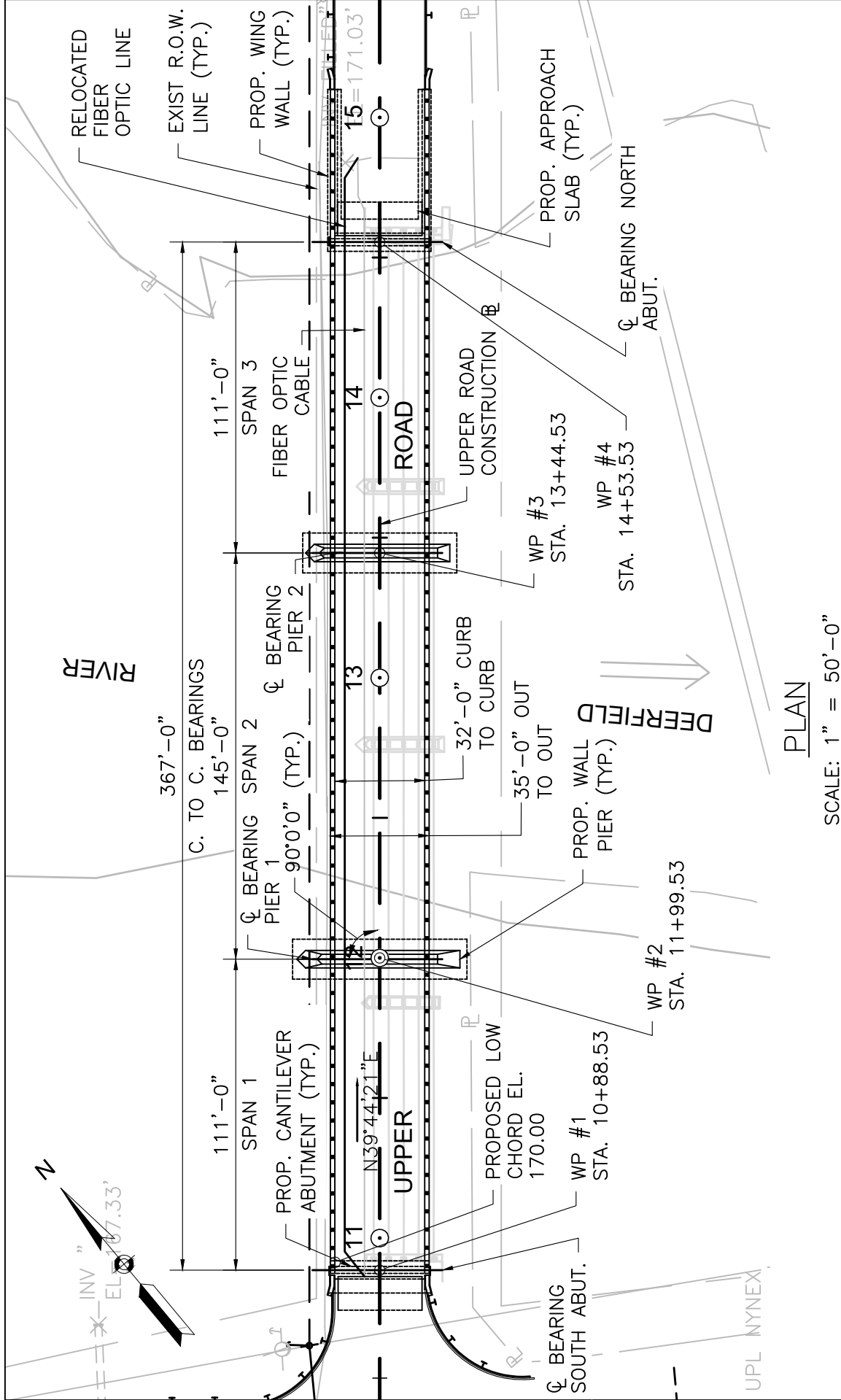
$$\text{PRELIMINARY DECISION VALUE} = 2 \times [0.6(A) + 0.4(B)]$$

$$\text{PRELIMINARY DECISION VALUE} = \boxed{3.6}$$

PRELIMINARY DECISION MAKING FLOWCHART




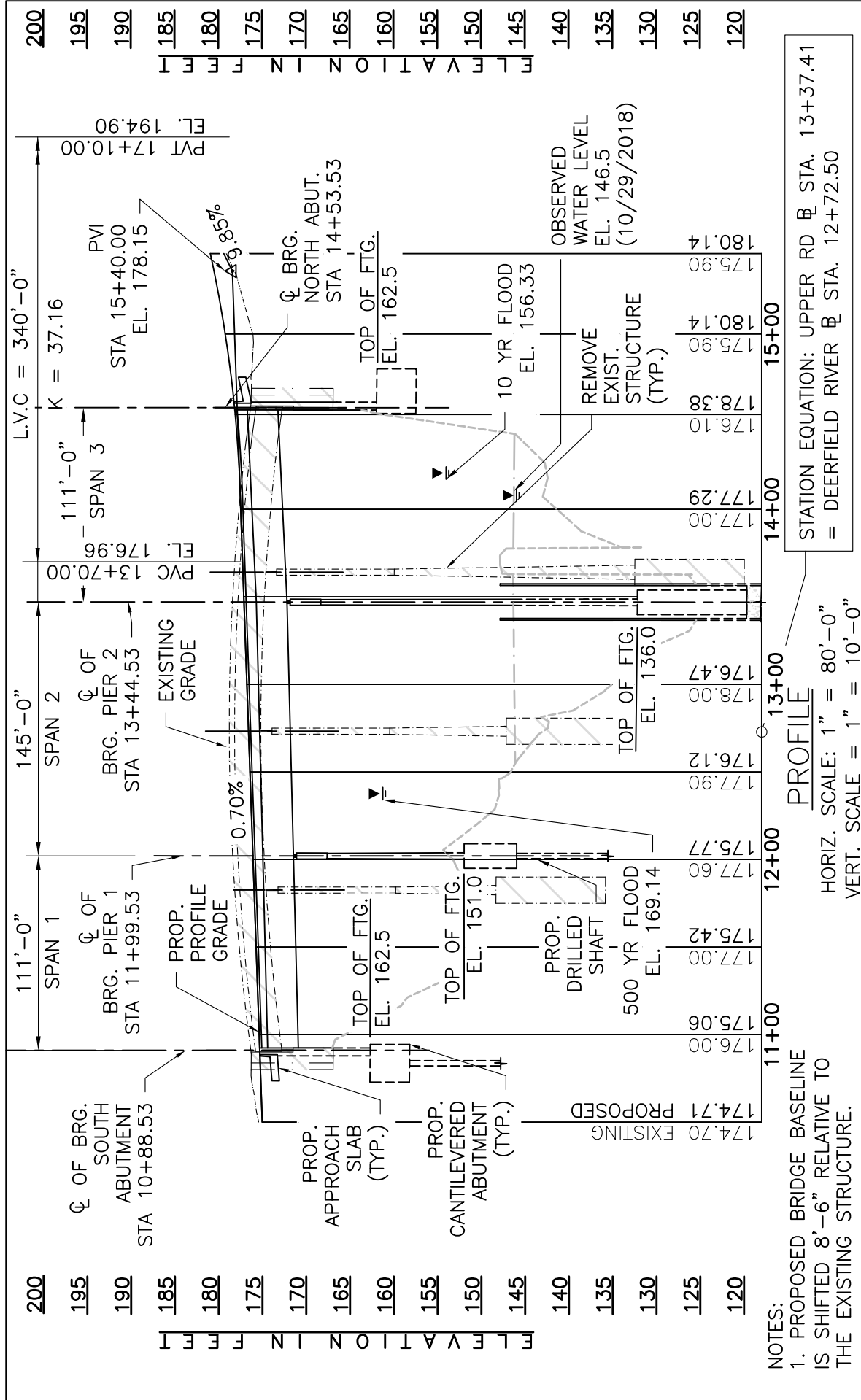
9.3 PLAN, PROFILE, ELEVATION AND CROSS SECTION OF RECOMMENDED ALTERNATIVE A



PLAN


SCALE: 1" = 50'-0"

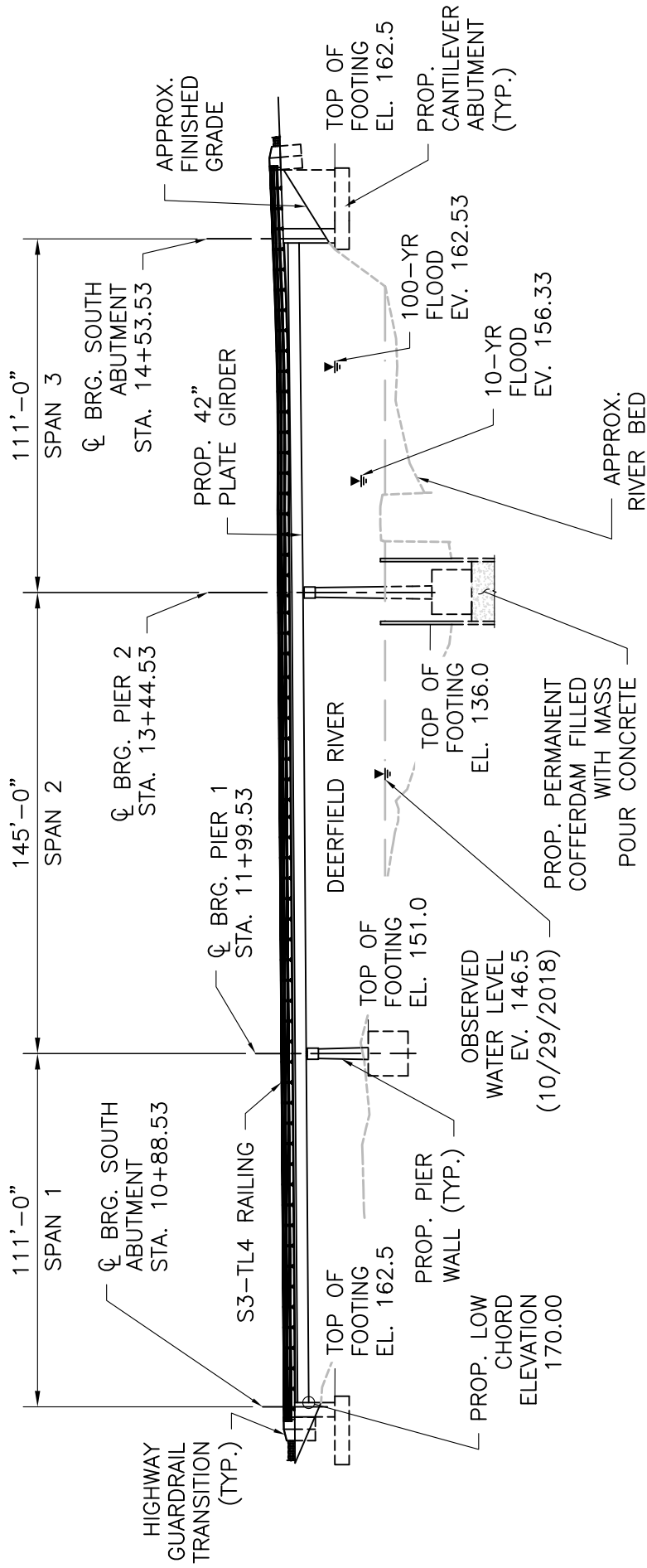
 GREEN INTERNATIONAL AFFILIATES, INC. <i>Civil and Structural Engineers</i>	PROJECT TITLE: DEERFIELD UPPER ROAD OVER DEERFIELD RIVER		APPENDIX NO. 9.3
	DRAWING TITLE: ALTERNATIVE A - GENERAL PLAN		BRIDGE NO. D-06-001
	GREEN PROJ. NO.: 13033.21XX DATE: AUGUST, 2020 DESIGNED BY: TC DRAWN BY: NA CHECKED BY: MAC		SKETCH/PAGE NO. 9.3.1



NOTES:


1. PROPOSED BRIDGE BASELINE IS SHIFTED 8'-6" RELATIVE TO THE EXISTING STRUCTURE.
2. PROPOSED PROFILE REVISED FROM EXISTING CREST CURVE TO A TANGENT AND SAG CURVE TO MEET DESIGN SPEED REQUIREMENTS.

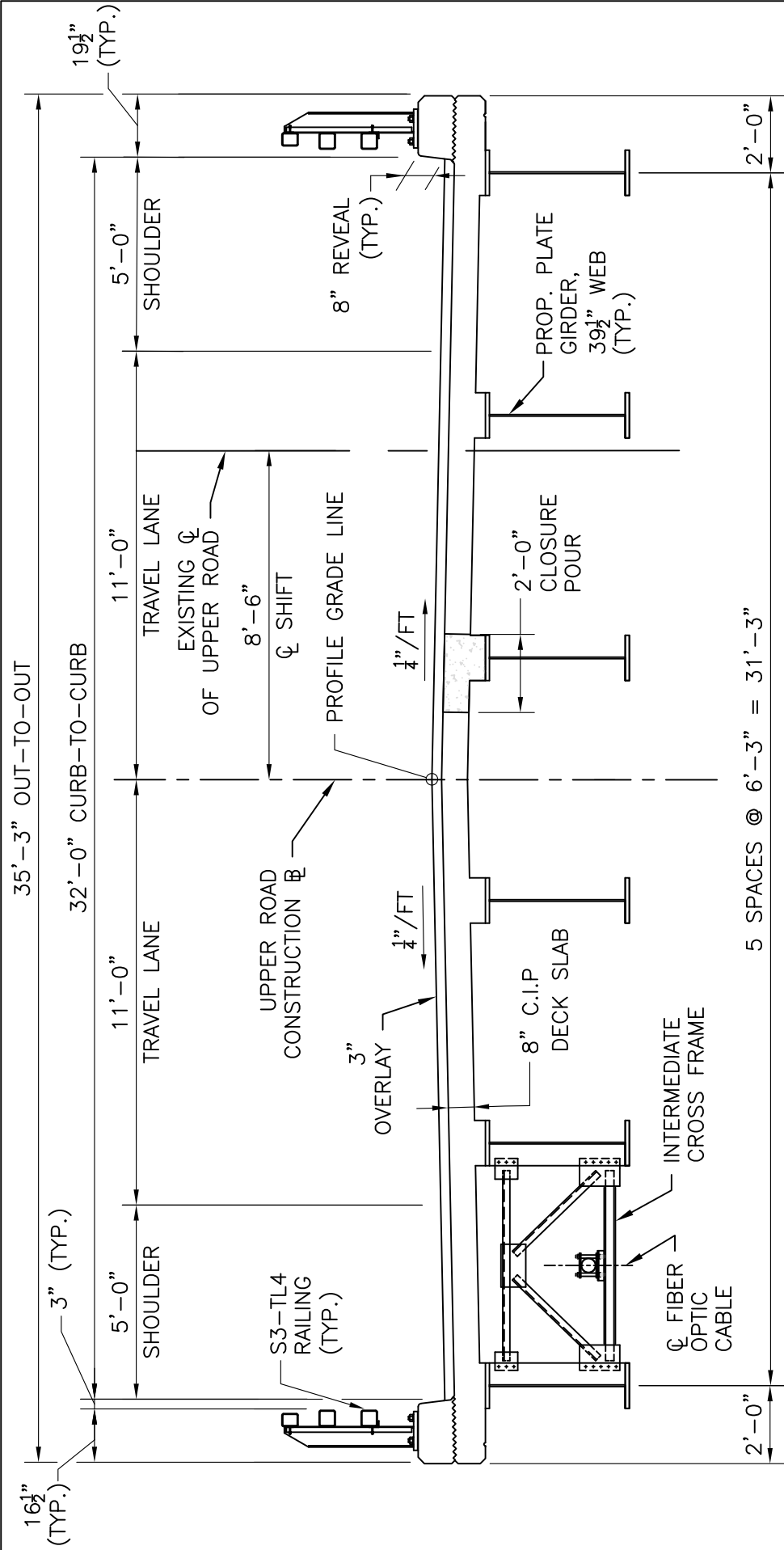
 GREEN INTERNATIONAL AFFILIATES, INC. <i>Civil and Structural Engineers</i>	PROJECT TITLE: DEERFIELD UPPER ROAD OVER DEERFIELD RIVER		APPENDIX NO. 9.3
	DRAWING TITLE: PROFILE		BRIDGE NO. D-06-001
GREEN PROJ. NO.: 13033.21XX DATE: AUGUST, 2020 DESIGNED BY: TC DRAWN BY: NA CHECKED BY: MAC			SKETCH/PAGE NO. 9.3.2



ELEVATION


SCALE: 1" = 50'-0"

 GREEN INTERNATIONAL AFFILIATES, INC. <i>Civil and Structural Engineers</i>	PROJECT TITLE: DEERFIELD UPPER ROAD OVER DEERFIELD RIVER		APPENDIX NO. 9.3
	DRAWING TITLE: ELEVATION VIEW		BRIDGE NO. D-06-001
GREEN PROJ. NO.: 13033.21XX DATE: AUGUST, 2020 DESIGNED BY: TC DRAWN BY: NA CHECKED BY: MAC			SKETCH/PAGE NO. 9.3.3

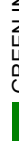


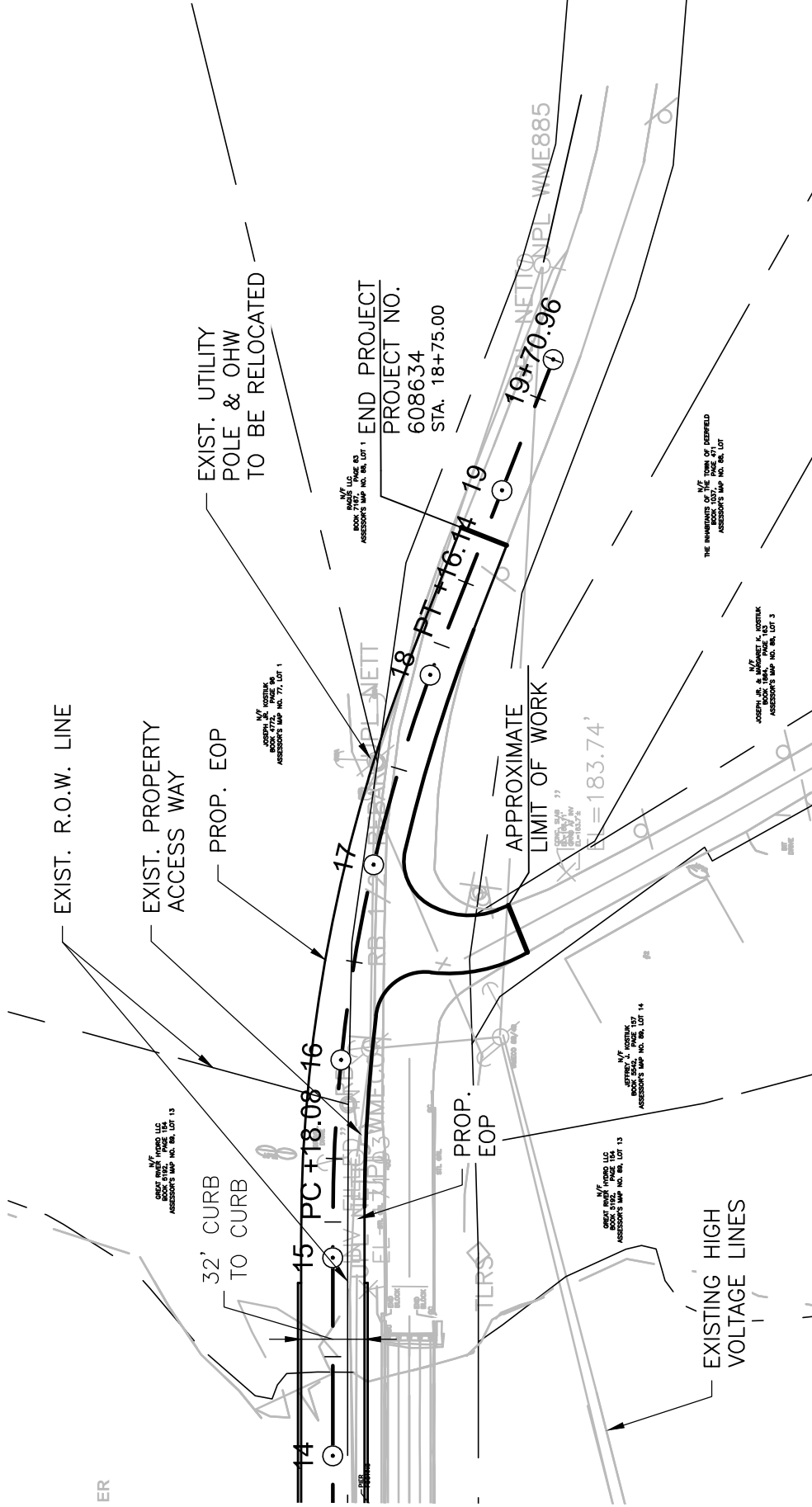
PROPOSED TRANSVERSE SECTION

SCALE: 1/4" = 1'-0"

 GREEN INTERNATIONAL AFFILIATES, INC. <i>Civil and Structural Engineers</i>	PROJECT TITLE: DEERFIELD UPPER ROAD OVER DEERFIELD RIVER		APPENDIX NO. 9.3
	DRAWING TITLE: ALTERNATIVE A – BRIDGE TYPICAL SECTION		BRIDGE NO. D-06-001
GREEN PROJ. NO.: 13033.21XX DATE: AUGUST, 2020 DESIGNED BY: TC DRAWN BY: NA CHECKED BY: MAC			SKETCH/PAGE NO. 9.3.4


9.4 OFF-ALIGNMENT ALTERNATIVE LAYOUT

 GREEN INTERNATIONAL AFFILIATES, INC. <i>Civil and Structural Engineers</i>	PROJECT TITLE: <u>DEERFIELD</u> UPPER ROAD OVER DEERFIELD RIVER		APPENDIX NO. 9.4
	DRAWING TITLE: OFF-ALIGNMENT ALT. - PLAN VIEW 1 OF 2		BRIDGE NO. D-06-001
	GREEN PROJ. NO.: 13033.21XX DATE: AUGUST, 2020 DESIGNED BY: TC DRAWN BY: NA CHECKED BY: MAC		SKETCH/PAGE NO. 9.4.1



OFF-ALIGNMENT ALTERNATIVE - PLAN VIEW 2 OF 2

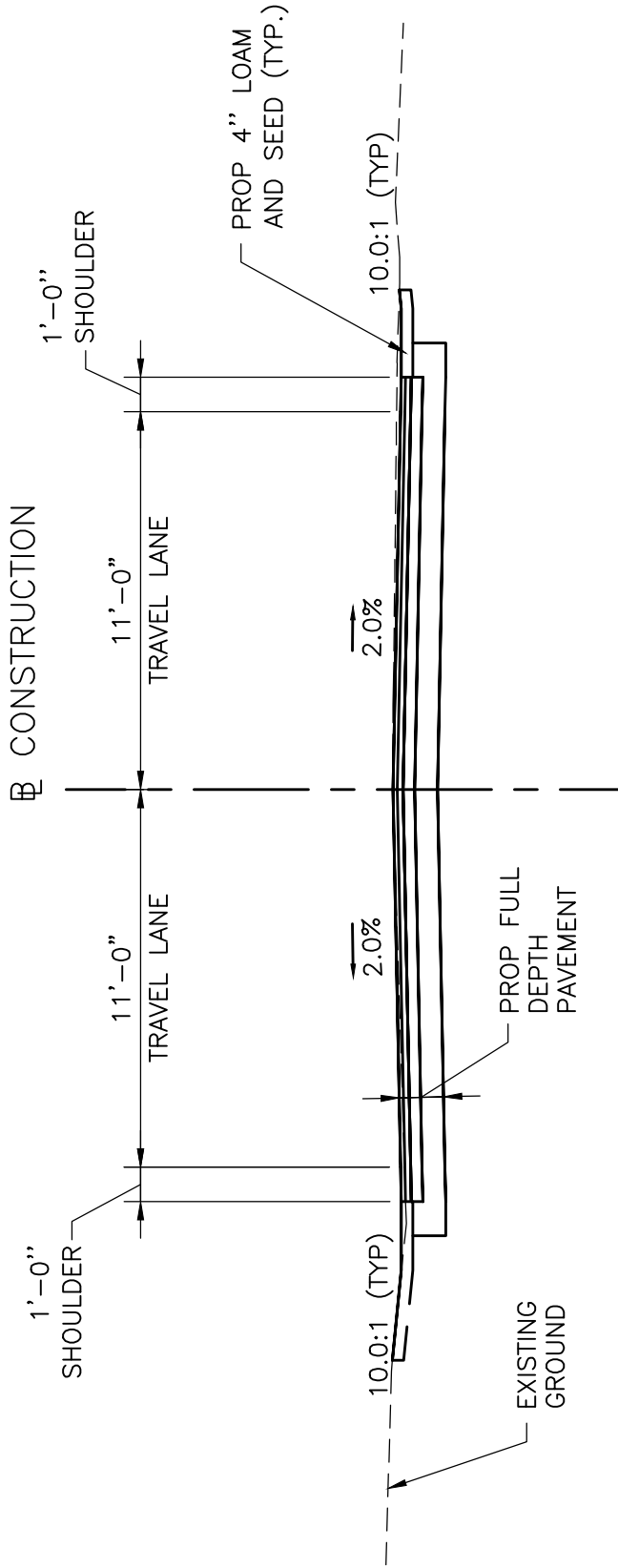
SCALE: 1" = 80'-0"

 GREEN INTERNATIONAL AFFILIATES, INC. <i>Civil and Structural Engineers</i>	PROJECT TITLE: <u>DEERFIELD</u> UPPER ROAD OVER DEERFIELD RIVER		APPENDIX NO. 9.4
	DRAWING TITLE: OFF-ALIGNMENT ALT. - PLAN VIEW 2 OF 2		BRIDGE NO. D-06-001
GREEN PROJ. NO.: 13033.21XX DATE: AUGUST, 2020 DESIGNED BY: TC DRAWN BY: NA CHECKED BY: MAC			SKETCH/PAGE NO. 9.4.2




9.5 TYPICAL APPROACH ROADWAY CROSS SECTION

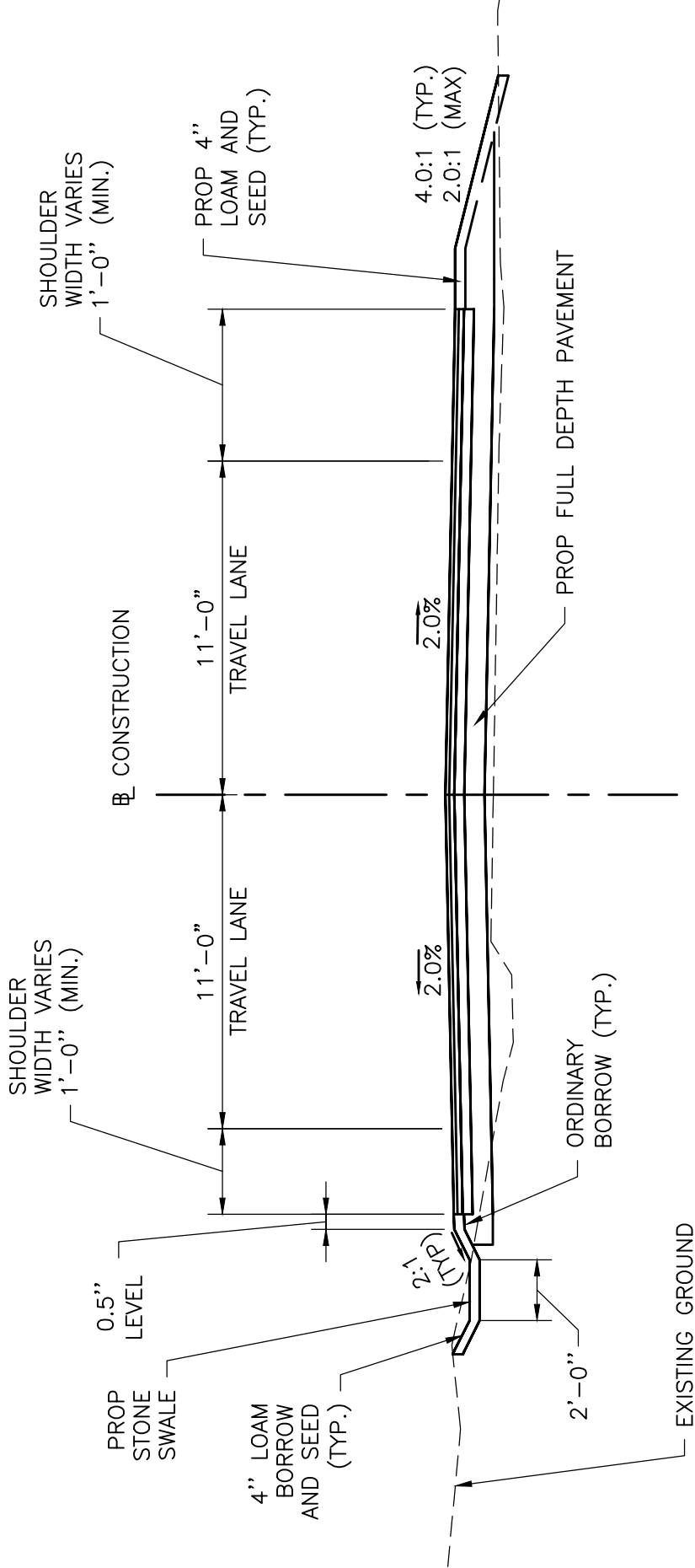




STILLWATER ROAD APPROACH SECTION


SCALE: 3/16" = 1'-0"

 GREEN INTERNATIONAL AFFILIATES, INC. <i>Civil and Structural Engineers</i>	PROJECT TITLE: DEERFIELD UPPER ROAD OVER DEERFIELD RIVER		APPENDIX NO. 9.5
	DRAWING TITLE: TYPICAL APPROACH SECTIONS 1 OF 2		BRIDGE NO. D-06-001
GREEN PROJ. NO.: 13033.21XX DATE: AUGUST, 2020 DESIGNED BY: TC DRAWN BY: NA CHECKED BY: MAC			SKETCH/PAGE NO. 9.5.1

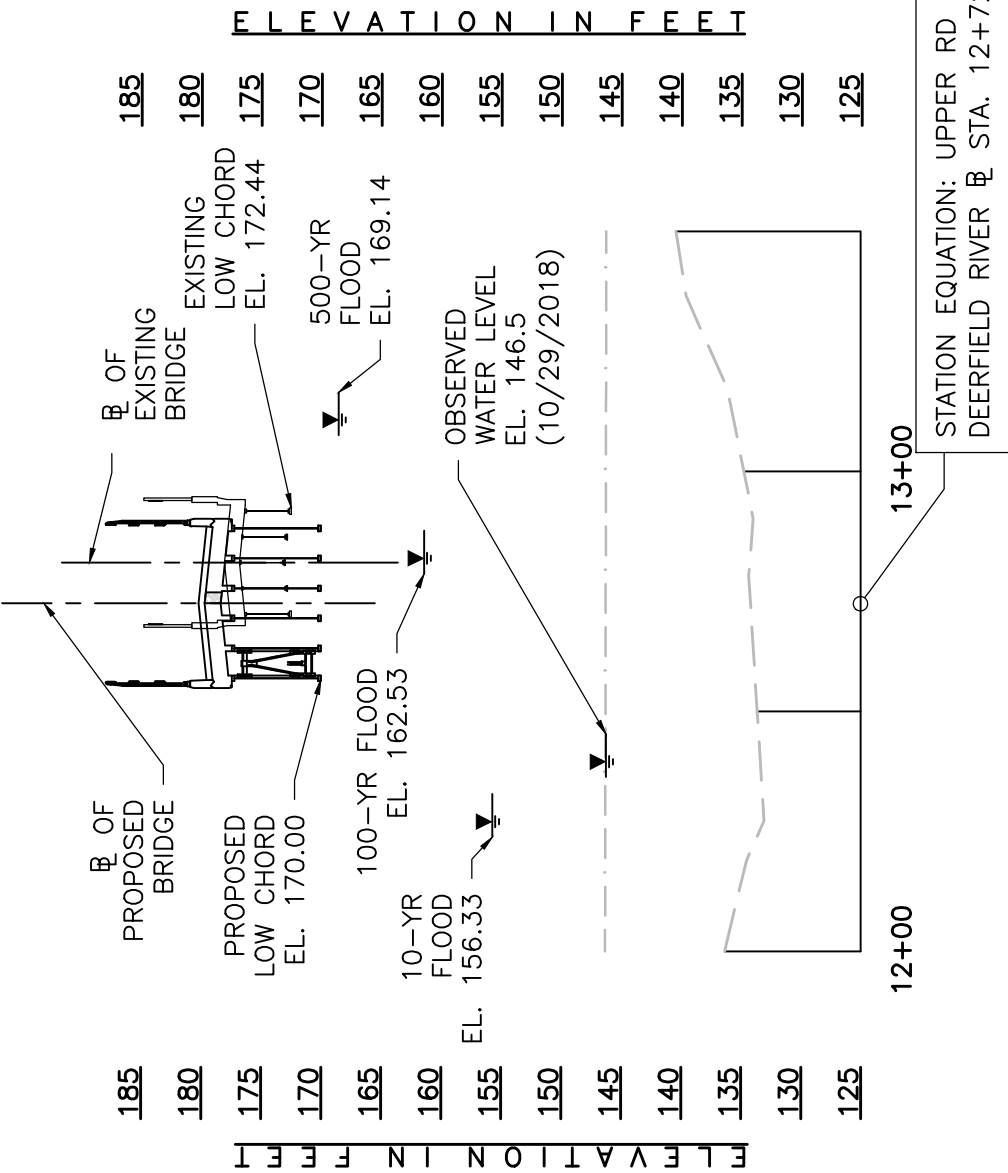


UPPER ROAD APPROACH SECTION

SCALE: 3/16" = 1'-0"


 GREEN INTERNATIONAL AFFILIATES, INC. <i>Civil and Structural Engineers</i>	PROJECT TITLE: DEERFIELD UPPER ROAD OVER DEERFIELD RIVER		APPENDIX NO. 9.5
	DRAWING TITLE: TYPICAL APPROACH SECTIONS 2 OF 2		BRIDGE NO. D-06-001
GREEN PROJ. NO.: 13033.21XX DATE: AUGUST, 2020 DESIGNED BY: TC DRAWN BY: NA CHECKED BY: MAC			SKETCH/PAGE NO. 9.5.2

9.6 CLEARANCE DIAGRAM

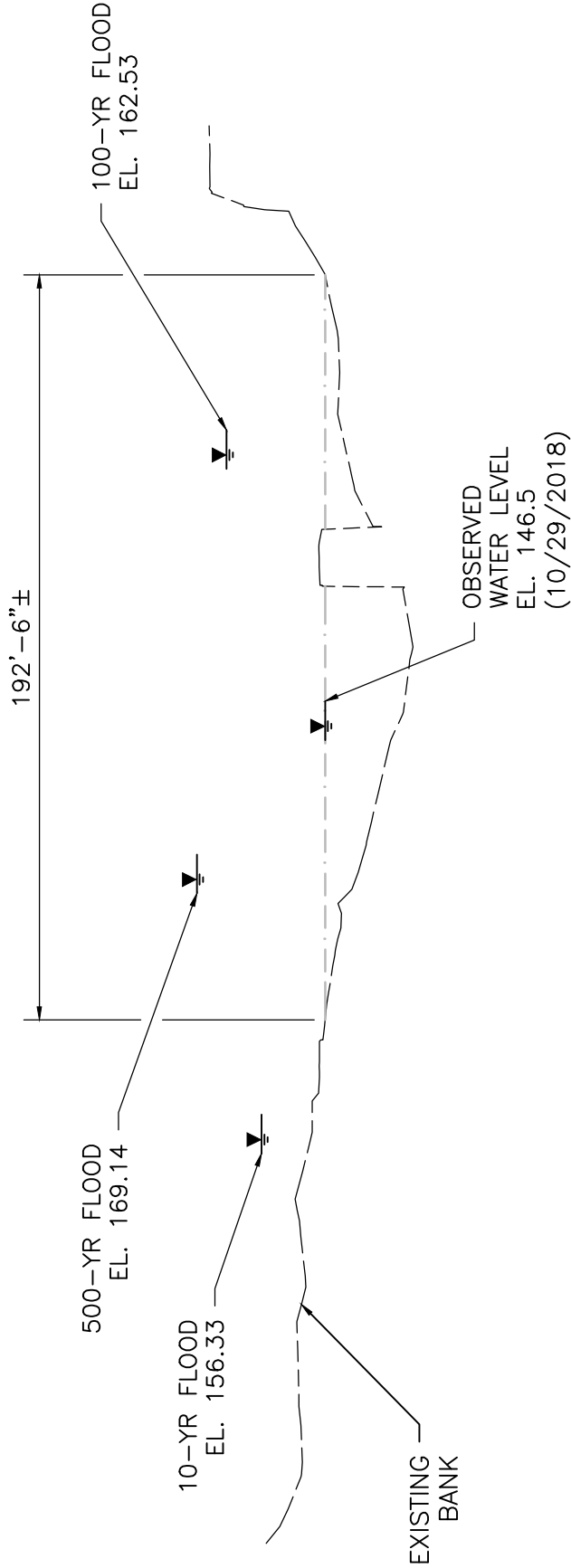


CHANNEL CLEARANCE DIAGRAM

HORIZ. SCALE: 1" = 40'-0"
VERT. SCALE: 1" = 16' -0"


 GREEN INT'L PROJ. NO.: 13033.021XX DATE: AUGUST, 2020 DESIGNED BY: TC DRAWN BY: CH CHECKED BY: MAC	PROJECT TITLE: DEERFIELD UPPER ROAD OVER DEERFIELD RIVER		APPENDIX NO. 9.6
	DRAWING TITLE: CLEARANCE DIAGRAM		BRIDGE NO. D-06-001
			SKETCH/PAGE NO. 9.6.1

9.7 CHANNEL CROSS SECTION

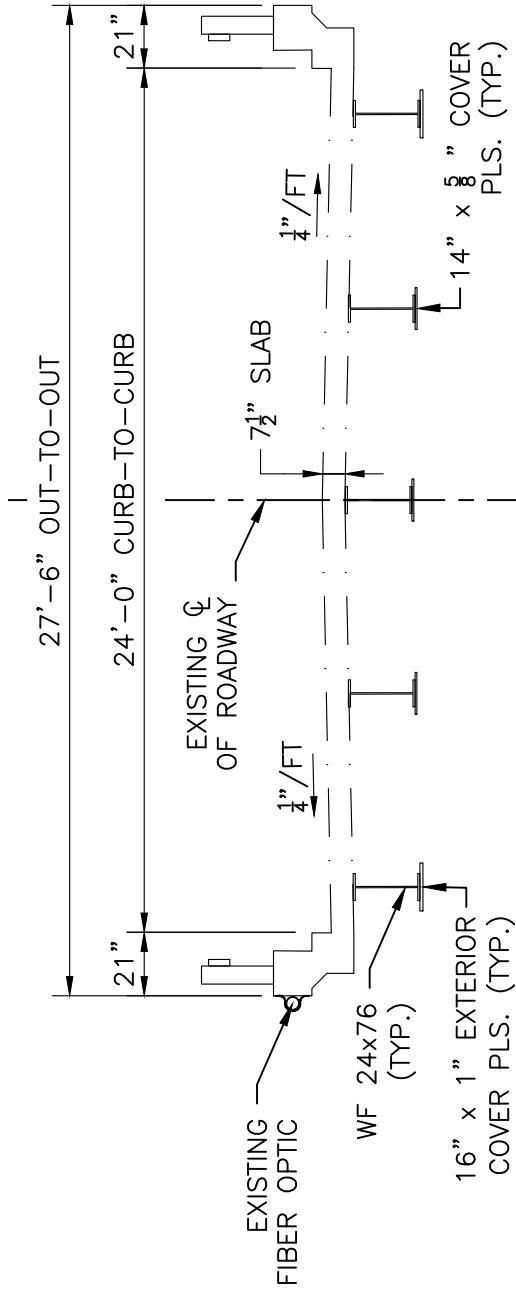


CHANNEL CROSS SECTION

SCALE: 1" = 20'-0"

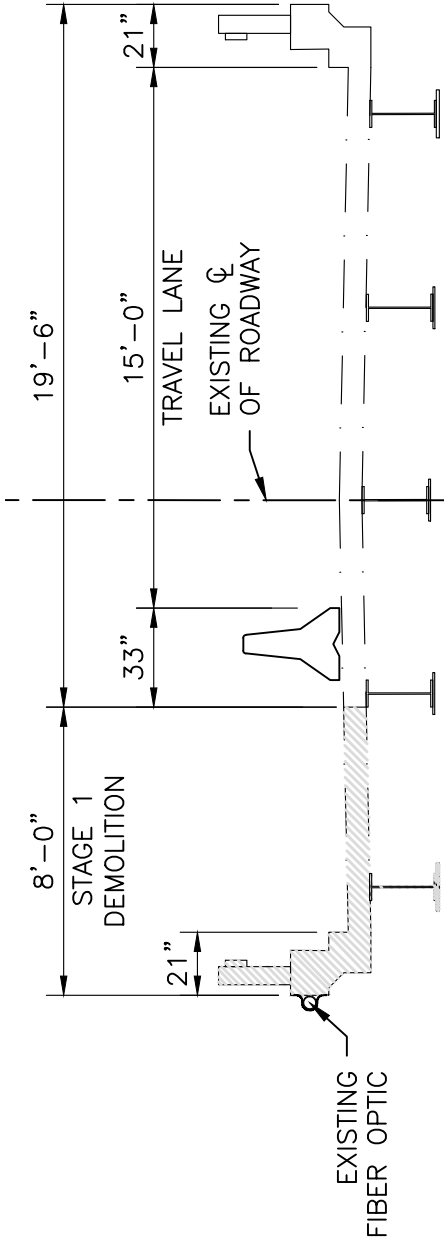
 GREEN INTERNATIONAL AFFILIATES, INC. <i>Civil and Structural Engineers</i>	PROJECT TITLE: <u>DEERFIELD</u> UPPER ROAD OVER DEERFIELD RIVER		APPENDIX NO. 9.7
	DRAWING TITLE: CHANNEL CROSS SECTION		BRIDGE NO. D-06-001
	GREEN PROJ. NO.: 13033.021XX DATE: AUGUST, 2020 DESIGNED BY: TC DRAWN BY: CH CHECKED BY: MAC		SKETCH/PAGE NO. 9.7.1

9.8 STAGE CONSTRUCTION DIAGRAMS




EXISTING STRUCTURE

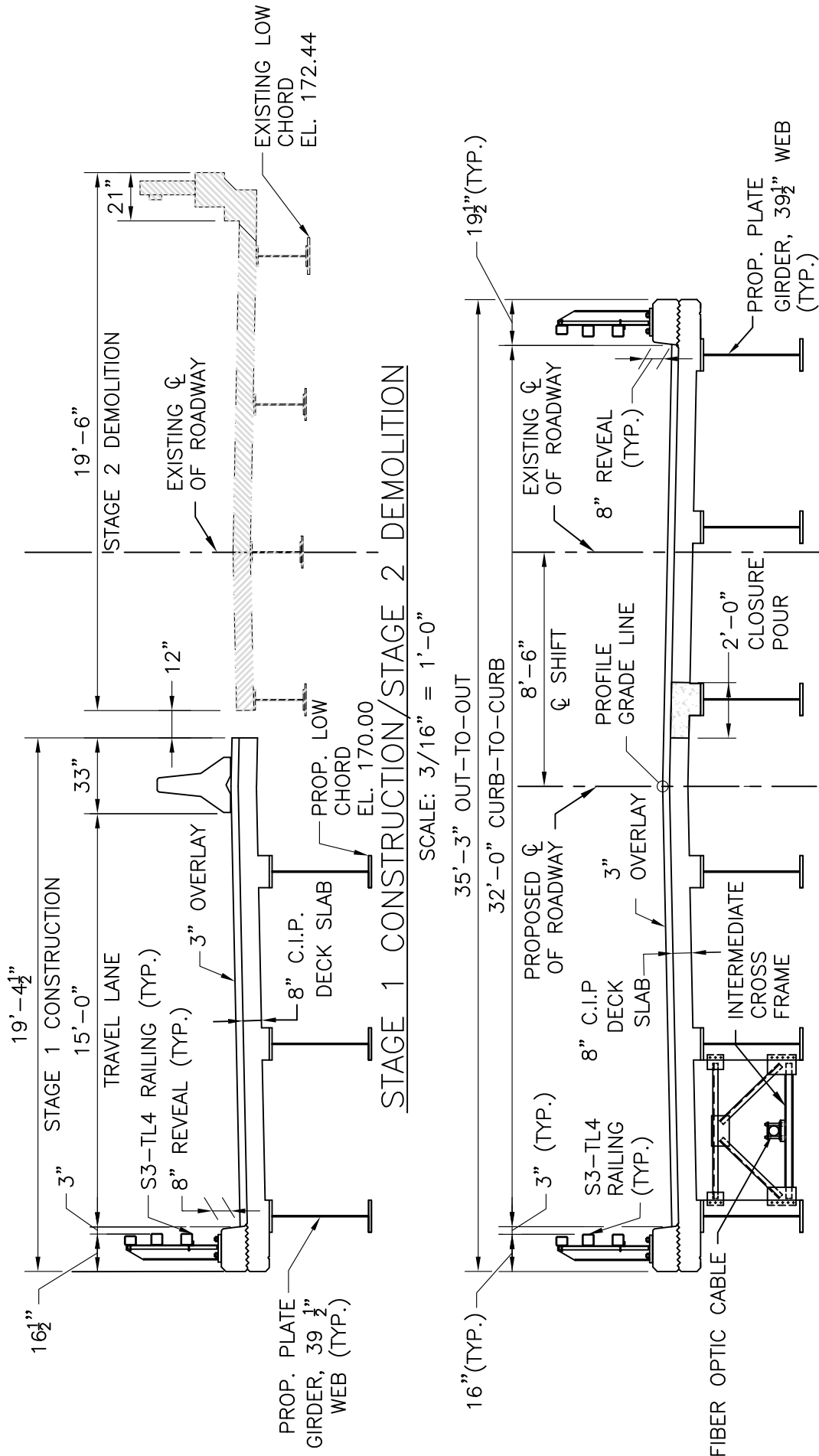
SCALE: 3/16" = 1'-0"



STAGE 1 DEMOLITION


SCALE: 3/16" = 1'-0"

 GREEN INTERNATIONAL AFFILIATES, INC. <i>Civil and Structural Engineers</i>	PROJECT TITLE: <u>DEERFIELD</u> UPPER ROAD OVER DEERFIELD RIVER		APPENDIX NO. 9.8
	DRAWING TITLE: STAGING SECTIONS 1 OF 2		BRIDGE NO. D-06-001
	GREEN PROJ. NO.: 13033.21XX DATE: AUGUST, 2020 DESIGNED BY: TC DRAWN BY: NA CHECKED BY: MAC		SKETCH/PAGE NO. 9.8.1



STAGE 2 CONSTRUCTION

SCALE: 3/16" = 1'-0"

 GREEN INTERNATIONAL AFFILIATES, INC. <i>Civil and Structural Engineers</i>	PROJECT TITLE: DEERFIELD UPPER ROAD OVER DEERFIELD RIVER		APPENDIX NO. 9.8
	DRAWING TITLE: STAGING SECTIONS 2 OF 2		BRIDGE NO. D-06-001
GREEN PROJ. NO.: 13033.21XX DATE: AUGUST, 2020 DESIGNED BY: TC DRAWN BY: NA CHECKED BY: MAC			SKETCH/PAGE NO. 9.8.2

9.9 BACKUP CALCULATIONS

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

BRIDGE NO. D-06-001 - UPPER ROAD OVER DEERFIELD RIVER, DEERFIELD, MA

SUPERSTRUCTURE TYPE: Steel Plate Girder Composite with Concrete Deck

SUBSTRUCTURE TYPE: Stub Abutments on Micropiles behind Existing

SPAN (S): 3 at 111'-0", 145'-0", and 111'-0"

ALTERNATIVE A

***** PRELIMINARY ESTIMATE OF QUANTITIES AND COST OF BRIDGE *****

STEEL PLATE GIRDERS WITH COMPOSITE DECK

ITEM NO.	QUANTITY	UNITS	ITEM	UNIT PRICE	AMOUNT
114.1	1	LS	Demolition of Superstructure No. D-06-001	\$940,000.00	\$940,000.00
127.1	2050	CY	Reinforced Concrete Excavation	\$150.00	\$307,440.00
140.	1024	CY	Bridge Excavation	\$60.00	\$61,440.00
140.1.	392	CY	Bridge Excavation within Cofferdam	\$60.00	\$23,520.00
144.	512	CY	Class B Rock Excavation	\$175.00	\$89,600.00
151.1	121	CY	Gravel Borrow for Bridge Foundation	\$60.00	\$7,260.00
156.	44	TON	Crushed Stone	\$70.00	\$3,080.00
455.60	120	TON	Superpave Bridge Surface Course - 9.5 (SPC-B - 9.5)	\$225.00	\$27,000.00
456.70	120	TON	Superpave Bridge Protective Course - 9.5 (SPC-B - 9.5)	\$225.00	\$27,000.00
698.4	90	SY	Geotextile Fabric for Permanent Erosion Control	\$15.00	\$1,350.00
853.33	870	FT	Temporary Barrier - Limited Deflection (TL-3)	\$80.00	\$69,600.00
901.	789	CY	4000, 1.5 in, 565 Cement Concrete	\$1,000.00	\$789,000.00
903.	520	CY	3000 psi, 1.5 in, 470 Cement Concrete	\$350.00	\$182,000.00
904.	12	CY	4000 psi, 3/4in., 610 Cement Concrete	\$1,300.00	\$15,600.00
904.3	8	CY	5000 psi, 3/4 in., 685 Cement Concrete	\$2,700.00	\$21,600.00
904.4	643	CY	4000 psi, 3/4 in., 585 HP Cement Concrete	\$1,500.00	\$964,500.00
910.1	690200	LB	Steel Reinforcement for Structures - Epoxy Coated	\$2.75	\$1,898,050.00
910.4	87	EA	Mechanical Reinforcing Bar Splicers	\$90.00	\$7,830.00
911.1	6606	EA	Shear Connectors	\$15.00	\$99,090.00
922.4	24	EA	Laminated Elastomeric Bearings w/o Anchor Botls (151-200)	\$500.00	\$12,000.00
945.101	430	LF	Drilled Shaft Excavation 3 Foot Diameter	\$575.00	\$247,250.00
945.201	40	LF	Rock Socket Excavation 3 Foot Diameter	\$2,500.00	\$100,000.00
945.501	430	LF	Drilled Shaft 3 Foot Diameter	\$800.00	\$344,000.00
945.601	40	LF	Permanent Casing 3 Foot Diameter	\$450.00	\$18,000.00
945.71	1710	LF	Cross Hole Sonic Testing Access Pipes	\$6.25	\$10,687.50
945.72	6	EA	Cross Hole Sonic Test	\$2,900.00	\$17,400.00
945.81	1	EA	Osterberg Load Cell Axial Test	\$290,000.00	\$290,000.00
950.5	1	LS	Temporary Earth Support System	\$1,924,200.00	\$1,924,200.00
960.1	868600	LB	Structural Steel - Coated	\$3.25	\$2,822,950.00
965.	1410	SY	Membrane Waterproofing for Bridge Decks	\$60.00	\$84,600.00
968.	4	EA	Scupper	\$3,472.88	\$13,891.50
968.1.	2	EA	Scupper and Downspout	\$9,000.00	\$18,000.00
970.	560	SY	Damp Proofing	\$20.00	\$11,200.00
972.	70	FT	Strip Seal Bridge Joint System	\$25.00	\$1,750.00
975.1	870	FT	Metal Bridge Railing (3-Rail), Steel (Type S3-TL4)	\$850.00	\$739,500.00
983.	104	TON	Dumped Riprap	\$90.00	\$9,360.00
990.2	1	LS	Cofferdam - Pier No. 2	\$1,160,920.00	\$1,160,920.00
991.1	1	LS	Control of Water - Structure No. D-06-001	\$650,000.00	\$650,000.00
994.01	1	LS	Temporary Protective Shielding Bridge No. D-06-001	\$204,900.00	\$204,900.00

Total =

\$14,216,000.00

10% Mobilization \$1,422,000.00

25% Contingency \$3,554,000.00

Subtotal =

\$19,192,000.00

SAY

\$19,200,000.00

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

BRIDGE NO. D-06-001 - UPPER ROAD OVER DEERFIELD RIVER, DEERFIELD, MA

SUPERSTRUCTURE TYPE: Steel Plate Girder Composite with Concrete Deck

SUBSTRUCTURE TYPE: Canitlever Abutments & Pier Walls on Spread Footings

SPAN (S): 4 equal spans at 90'-9 3/4"each

ALTERNATIVE B

***** PRELIMINARY ESTIMATE OF QUANTITIES AND COST OF BRIDGE *****

STEEL PLATE GIRDERS WITH COMPOSITE DECK

ITEM NO.	QUANTITY	UNITS	ITEM	UNIT PRICE	AMOUNT
114.1	1	LS	Demolition of Superstructure No. D-06-001	\$940,000.00	\$940,000.00
127.1	2050	CY	Reinforced Concrete Excavation	\$150.00	\$307,440.00
140.	1416	CY	Bridge Excavation	\$60.00	\$84,960.00
140.1.	1176	CY	Bridge Excavation within Cofferdam	\$60.00	\$70,560.00
144.	708	CY	Class B Rock Excavation	\$175.00	\$123,900.00
151.1	121	CY	Gravel Borrow for Bridge Foundation	\$60.00	\$7,260.00
156.	44	TON	Crushed Stone	\$70.00	\$3,080.00
455.60	120	TON	Superpave Bridge Surface Course - 9.5 (SPC-B - 9.5)	\$225.00	\$27,000.00
456.70	120	TON	Superpave Bridge Protective Course - 9.5 (SPC-B - 9.5)	\$225.00	\$27,000.00
698.4	90	SY	Geotextile Fabric for Permanent Erosion Control	\$15.00	\$1,350.00
853.33	870	FT	Temporary Barrier - Limited Deflection (TL-3)	\$80.00	\$69,600.00
901.	872	CY	4000, 1.5 in, 565 Cement Concrete	\$1,000.00	\$872,000.00
903.	520	CY	3000 psi, 1.5 in, 470 Cement Concrete	\$350.00	\$182,000.00
904.	23	CY	4000 psi, 3/4in., 610 Cement Concrete	\$1,300.00	\$29,900.00
904.3	15	CY	5000 psi, 3/4 in., 685 Cement Concrete	\$2,700.00	\$40,500.00
904.4	926	CY	4000 psi, 3/4 in., 585 HP Cement Concrete	\$1,500.00	\$1,389,000.00
910.1	824600	LB	Steel Reinforcement for Structures - Epoxy Coated	\$2.75	\$2,267,650.00
910.4	499	EA	Mechanical Reinforcing Bar Splicers	\$90.00	\$44,910.00
911.1	6606	EA	Shear Connectors	\$15.00	\$99,090.00
922.4	30	EA	Laminated Elastomeric Bearings w/o Anchor Botls (151-200)	\$500.00	\$15,000.00
945.101	600	LF	Drilled Shaft Excavation 3 Foot Diameter	\$575.00	\$345,000.00
945.201	70	LF	Rock Socket Excavation 3 Foot Diameter	\$2,500.00	\$175,000.00
945.501	600	LF	Drilled Shaft 3 Foot Diameter	\$800.00	\$480,000.00
945.601	60	LF	Permanent Casing 3 Foot Diameter	\$450.00	\$27,000.00
945.71	2370	LF	Cross Hole Sonic Testing Access Pipes	\$6.25	\$14,812.50
945.72	9	EA	Cross Hole Sonic Test	\$2,900.00	\$26,100.00
945.81	2	EA	Osterberg Load Cell Axial Test	\$290,000.00	\$580,000.00
950.5	1	LS	Temporary Earth Support System	\$915,700.00	\$915,700.00
960.1	775550	LB	Structural Steel - Coated	\$3.25	\$2,520,537.50
965.	1410	SY	Membrane Waterproofing for Bridge Decks	\$60.00	\$84,600.00
968.	4	EA	Scupper	\$3,472.88	\$13,891.50
968.1.	2	EA	Scupper and Downspout	\$9,000.00	\$18,000.00
970.	770	SY	Damp Proofing	\$20.00	\$15,400.00
972.	70	FT	Strip Seal Bridge Joint System	\$25.00	\$1,750.00
975.1	870	FT	Metal Bridge Railing (3-Rail), Steel (Type S3-TL4)	\$850.00	\$739,500.00
983.	104	TON	Dumped Riprap	\$90.00	\$9,360.00
990.2	1	LS	Cofferdam - Pier No. 3	\$1,160,920.00	\$1,160,920.00
991.1	1	LS	Control of Water - Structure No. D-06-001	\$650,000.00	\$650,000.00
994.01	1	LS	Temporary Protective Shielding Bridge No. D-06-001	\$204,900.00	\$204,900.00

Total =

\$14,585,000.00

6% Difficulty with Staging at Pier Demo/Construction \$876,000.00

10% Mobilization \$1,459,000.00

25% Contingency \$3,647,000.00

Subtotal = \$20,567,000.00

SAY \$20,600,000.00

**Upper Road Bridge Replacement
Deerfield**

ENGINEER'S ESTIMATE - BSW Highway/Traffic

Prepared by:



Date: 3/18/2016

Green Project No: SHEET NO.

ITEM NO.	QUANTITY	UNIT	ITEM DESCRIPTION	UNIT PRICE	AMOUNT
101.	0.25	A	CLEARING AND GRUBBING	\$35,000.00	\$8,750.00
102.511	20	EA	TREE PROTECTION – ARMORING & PRUNING	\$400.00	\$8,000.00
120.	280	CY	EARTH EXCAVATION	\$36.00	\$10,080.00
146.	2	EA	DRAINAGE STRUCTURE REMOVED	\$800.00	\$1,600.00
150.	550	CY	ORDINARY BORROW	\$40.00	\$22,000.00
151.	700	CY	GRAVEL BORROW	\$45.00	\$31,500.00
170.	1800	SY	FINE GRADING AND COMPACTING - SUBGRADE AREA	\$8.00	\$14,400.00
201.3	4	EA	SPECIAL CATCH BASIN	\$5,000.00	\$20,000.00
202.	3	EA	MANHOLE	\$5,500.00	\$16,500.00
221.	3	EA	FRAME AND COVER	\$900.00	\$2,700.00
222.1	4	EA	FRAME AND GRATE - MASSDOT CASCADE TYPE	\$900.00	\$3,600.00
227.3	5	CY	REMOVAL OF DRAINAGE STRUCTURE SEDIMENT	\$250.00	\$1,250.00
241.12	130	FT	12 INCH REINFORCED CONCRETE PIPE	\$110.00	\$14,300.00
258.	10	SY	STONE FOR PIPE ENDS	\$75.00	\$750.00
402.	200	CY	DENSE GRADED CRUSHED STONE FOR SUB-BASE	\$75.00	\$15,000.00
415.3	300	SY	PAVEMENT MICRO MILLING	\$10.00	\$3,000.00
440.	8100	LB	CALCIUM CHLORIDE FOR ROADWAY DUST CONTROL	\$0.50	\$4,050.00
443.	9	MGL	WATER FOR ROADWAY DUST CONTROL	\$75.00	\$675.00
450.23	180	TON	SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5)	\$140.00	\$25,200.00
450.32	210	TON	SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC - 19.0)	\$140.00	\$29,400.00
450.42	420	TON	SUPERPAVE BASE COURSE - 37.5 (SBC - 37.5)	\$150.00	\$63,000.00
452.	110	GAL	ASPHALT EMULSION FOR TACK COAT	\$10.00	\$1,100.00
453.	160	FT	HMA JOINT SEALANT	\$1.00	\$160.00
470.	300	TON	HOT MIX ASPHALT BERM	\$182.50	\$54,750.00
482.3	500	FT	SAWCUTTING ASPHALT PAVEMENT	\$3.00	\$1,500.00
504.	70	FT	GRANITE CURB TYPE VA4 - STRAIGHT	\$51.50	\$3,605.00
504.1	110	FT	GRANITE CURB TYPE VA4 - CURVED	\$60.00	\$6,600.00
580.	150	FT	CURB REMOVED AND RESET	\$30.00	\$4,500.00
627.1	3	EA	TRAILING ANCHORAGE	\$1,820.00	\$5,460.00
628.21	1	EA	TRANSITION TO NCHRP 350 GUARDRAIL	\$1,900.00	\$1,900.00
628.24	4	EA	TRANSITION TO BRIDGE RAIL	\$4,500.00	\$17,000.00
630.2	290	FT	HIGHWAY GUARD REMOVED AND DISCARDED	\$7.00	\$2,030.00
697.1	2	EA	SILT SACK	\$170.00	\$340.00
740.	30	MO	ENGINEERS FIELD OFFICE AND EQUIPMENT (TYPE A)	\$3,000.00	\$90,000.00
748.	1	LS	MOBILIZATION	\$18,000.00	\$18,000.00
751.	80	CY	LOAM BORROW	\$60.00	\$4,800.00
756.	1	LS	NPDES STORMWATER POLLUTION PREVENTION PLAN	\$5,000.00	\$5,000.00
765.	750	SY	SEEDING	\$2.50	\$1,875.00
767.121	1300	FT	SEDIMENT CONTROL BARRIER	\$8.00	\$10,400.00
769.	210	FT	PAVEMENT MILLING MULCH UNDER GUARD RAIL	\$10.00	\$2,100.00
804.3	1150	FT	3 INCH ELECTRICAL CONDUIT TYPE NM - PLASTIC -(UL)	\$50.00	\$57,500.00
811.31	5	EA	PULL BOX 12 X 12 INCHES - SD2.031	\$1,000.00	\$5,000.00
816.81	1	LS	TEMPORARY TRAFFIC CONTROL SIGNAL	\$95,000.00	\$95,000.00
832.	20	SF	WARNING-REGULATORY AND ROUTE MARKER - ALUMINUM PANEL (TYPE A)	\$15.00	\$300.00
833.5	1100	EA	DEMOUNTABLE REFLECTORIZED DELINEATOR - GUARD RAIL	\$7.00	\$7,700.00
833.7	4	EA	DELINEATION FOR GUARD RAIL TERMINI	\$50.00	\$200.00
847.1	4	EA	SIGN SUP (N/GUIDE)+RTE MKR W/1 BRKWAY POST ASSEMBLY - STEEL	\$135.00	\$540.00
851.1	1095	DAY	TRAFFIC CONES FOR TRAFFIC MANAGEMENT	\$5.10	\$5,584.50
853.1	2	EA	PORTABLE BREAKAWAY BARRICADE TYPE III	\$150.00	\$300.00
853.2	170	FT	TEMPORARY BARRIER (TL-2)	\$50.00	\$8,500.00
853.21	170	FT	TEMPORARY BARRIER REMOVED AND RESET	\$13.50	\$2,295.00
853.501	2	EA	TEMPORARY IMPACT ATTENUATOR REMOVED AND RESET	\$1,800.00	\$3,600.00
853.53	2	EA	TEMPORARY IMPACT ATTENUATOR UNIDIRECTIONAL, NON-REDIRECTIVE (TL-3)	\$5,950.00	\$11,900.00
856.12	1092	DAY	PORTABLE CHANGEABLE MESSAGE SIGN	\$25.00	\$27,300.00
859.	1095	DAY	REFLECTORIZED DRUM	\$0.25	\$273.75

SUBTOTAL:	\$852,868.25
25% Contingency & Inflation:	\$213,217.00
TOTAL:	\$1,066,085.25
Say \$1,100,000.00	