Appendix A-3 Conceptual Staging

Appendix A-3 "Conceptual Staging"

The duration and general description of construction activities, and probable phasing and sequencing of the work for the Build Alternatives, are presented below. Likely traffic detours are described in **Appendix A-4**, "**Detour Routes**." The new replacement bridge would be constructed alongside the existing bridge. When it is complete and connecting tracks have been tied in to the existing Empire Corridor, train traffic would be shifted to the new bridge and the old bridge and its tracks would be removed. FRA and NYSDOT have based this information on past experience on similar projects. While construction means and methods for the Project would be ultimately determined by the contractor, the information below represents a reasonable worst-case scenario in order to identify potential environmental impacts during construction.

Construction Schedule

The entire construction period is expected to last approximately three years. More specifically, construction of Build Alternative 1 (Northern Alignment) would likely extend 3 to 3.5 years. Build Alternative 2 (Southern Alignment) would likely extend 2.75 to 3 years. The general construction schedule discussed herein is typical for a moveable rail bridge replacement project. To some extent, the nature of in-river work limits equipment access and feasible construction techniques. The actual Project schedule will require consideration of in-water work restrictions and other limitations intended to protect fish spawning, fish migration, birds, and/or other considerations. Such restrictions and construction work windows would be defined and formalized during the preliminary design and permitting stage.

Construction Sequence

This section describes likely construction sequencing for Build Alternatives 1 and 2, which is reflected in the conceptual staging drawings that follow in this appendix.

Build Alternative 1: Replacement on an Adjacent Alignment to the North

Phase N-1: (No impacts to rail operations. Two-day closure to navigation.)

- A Construct temporary earth support (TES) at the west abutment (needed to support the existing railroad embankment while foundations for new abutments are constructed).
- B Construct proposed first stage of the west abutment.
- C Retrofit existing swing span to swing in the opposite direction (swing through the northeast and southwest quadrants instead of the northwest and southeast quadrants).
- D Construct temporary falsework.
- E Construct all proposed piers and east abutment.
- F Reconstruct the beam seats on the Water and Centre Street bridges to allow for shifting girder pairs.

Phase N-2: (No impacts to rail or navigation.)

- A On the east approach construct the 2 mainline tracks and proposed wye track on grade to the extent possible while not encroaching within approximately 14' of the existing tracks—do not construct mainline tracks at intersection with existing "wye" track.
- B On the west approach construct mainline track 1 from the west abutment to the extent possible while not encroaching within approximately 14' of existing tracks.

Phase N-3: (36-hour closure to rail on wye track. No impacts to navigation)

A During a rail outage, realign existing hypotenuse track to proposed alignment including the existing turnout to the existing mainline track 1 to wye connection. Install panelized turnout to proposed wye track alignment. Proposed turnout will be locked/spiked and not in service at end of weekend outage.

Phase N-4: (No impacts to rail or navigation.)

- A Construct lift towers and counterweights.
- B Float in double-track-width deck girder spans on the east side of the river, and the lift truss span. Lift in/float in the mainline track 1 only deck girder spans on the west side of the river.
 - i Construct rail and proposed wye turnout on structure as it is placed and connect to track on grade.
- C Temporarily power lift span from the existing bridge.
- D Connect, balance, and test operation of the proposed lift span.

Phase N-5: (32-hour closure to rail on wye track and turning trains, through trains can operate on the existing mainline track 2. Two-day closure to navigation.)

- A Rail closure to construct and demolish the following:
 - i Close existing mainline track 1.
 - Move/reposition existing girders on Water Street and Centre Street bridges to realign existing mainline track 1 track and timbers to approximate new alignment.
 12-hour closure to mainline track 1 only, slow condition on mainline track 2.
 - iii When Centre Street girders are reset, unspike, realign, and re-spike mainline track 1 on existing bridge timbers to proposed alignment. 12-hour closure to mainline track 1 only, after step ii.
 - iv When Water Street girders are reset, unspike, realign, and re-spike mainline track 1 on existing bridge timbers to proposed alignment. 12-hour closure to mainline track 1 only, concurrent with step iii.
 - Construct mainline track 1 section from the proposed west abutment and tie into the existing alignment. 16- to 20-hour closure–assumes track construction distance of approximately 50' concurrent with other work.
- B Close river to navigational traffic.
- C Float in truss span at existing swing span
 - i Cut/Throw south end of proposed mainline track 1 to existing mainline track 1 alignment. 20- to 24-hour rail closure concurrent with other work.
 - ii Remove existing northern leg of wye track and construct remaining section of 2 proposed mainline tracks. 12-hour closure–assumes approximately 40' of construction per track (80' total) concurrent with other work.
 - iii Construct rail on proposed structure as structure is placed and connect to track on adjacent spans.
 - iv Unspike/unlock proposed turnout to proposed wye track.
 - v Switch rail traffic onto proposed mainline track 1.
 - vi Float out one or both of the existing truss spans in line with the proposed lift span.
- D Open river to navigational traffic.
- E Demolish remaining existing bridge superstructure and substructure in proposed navigation span and remove temporary falsework.

Phase N-6: (Slow condition on mainline rail. No impacts to navigation)

- A Demolish existing west abutment and existing west truss span.
- B Construct proposed second stage of the west abutment
- C Lift in/float in the mainline track 2 portion of the west deck girder spans. i Construct remaining track sections and connect to proposed alignment.
- D Unspike, realign, and re-spike mainline track 2 on existing Centre Street bridge timbers to proposed alignment.
- E Unspike, realign, and re-spike mainline track 2 on existing Water Street bridge timbers to proposed alignment.
- F Cut/Throw south end of proposed mainline track 2 to existing mainline track 2 alignment.
- G Open mainline track 2 to rail service.

Phase N-7: (Slow condition on mainline rail. No impacts to navigation)

- A Demolish remaining existing bridge structures and remove remaining existing track sections.
- B Construct proposed navigation span pier protection.

Phase N-8: (Slow condition on mainline rail. No impacts to navigation) A Line, surface and superelevate finished tracks as required.

Build Alternative 2 (Preferred Alternative): Replacement on an Adjacent Alignment to the South

Phase S-0: (36-hour closure to rail on wye track in Step A, no impacts to navigation).

- A During a rail outage, realign existing hypotenuse and wye tracks to proposed alignment including the existing turnout to the existing north wye connection.
 - i Realign Amtrak yard track to the south to avoid impacts from East Abutment construction
- B Install panelized turnout to proposed wye track alignment. Proposed turnout will be locked/spiked and not in service at end of weekend outage.
- C Construct 1st (south) stage of the proposed west abutment with TES along the south side of the existing west abutment.
- D Construct 1st (south) stage of the proposed east abutment with TES along the south side of the existing mainline track 2.
- E Construct temporary falsework.
- F Construct all proposed piers.
- G Reconstruct the beam seats on the Water and Centre Street bridges to allow for shifting girder pairs.
- H Construct lift tower and counterweights.
- Lift in/float in deck girder spans on both sides of the river, the lift truss span and the east fixed truss span. Where it is possible full double track width spans should be installed, at a minimum the mainline track 2 only deck girder spans should be installed.
 i Construct rail on structure as it is placed.
- J Temporarily power lift span from the existing bridge.
- K Connect, balance and test operation of the proposed lift span.

Phase S-1: (12-hour closure to rail on north mainline and wye tracks. No impacts to navigation.)

- A Close the existing mainline track 1 to both through trains and turning trains. Through trains will use the existing mainline track 2 until switch over to the proposed bridge is completed.
- B Remove existing wye turnout at east abutment. Install temporary straight track from existing wye track to existing mainline track 1 on the bridge. 12-hour closure to mainline track 1 only, slow condition on mainline track 2.
- C Open the existing mainline track 1 to trains accessing the wye track. Turning trains from Rensselaer Station will use the crossover at CP145 on the west approach to access the mainline track 2 from the wye track.
- D Remove remaining existing mainline track 1 from the east abutment to the crossover at CP 144.

Phase S-2: (No impacts to rail or navigation.)

- A Construct proposed wye track, parallel to existing wye track to the extent possible while not encroaching within 14' of existing track.
- B Construct proposed mainline track 2 to the extent possible while not encroaching within 14' of existing track.

- C Construct proposed mainline track 1 between CP144 and the point where the new track would encroach within 14' of existing wye track.
- D Prepare and stage proposed track panels to be installed in future phases.

Phase S-3: (12-hour closure to rail on mainline track 2. No impacts to navigation.)

- A During a rail outage, cut and throw existing mainline track 2 on existing structure to proposed mainline track 1 constructed in Phase S-2C.
- B Remove mainline track 2 from the east abutment to the crossover at CP 144.

Phase S-4: (No impacts to rail or navigation.)

- A Construct proposed mainline track 2 from west abutment to the extent possible while not encroaching within 14' of existing track.
- B Connect proposed mainline track 2 on structure to proposed mainline track 2 constructed in Phase S-2B, with temporary turnout.
- C Construct proposed mainline track 2 to connect to existing track at CP144.

Phase S-5: (12-hour closure to through rail, 32-hour closure on wye track and turning trains. Two-day closure to navigation continues to Phase S-6.)

- A Rail closure to construct and demolish the following:
 - i Cut and Throw the existing mainline track 2 to the existing mainline track 1 between the west abutment and the Water Street bridge. 12-hour closure to all rail traffic.
 - ii Move/reposition existing girders on Water Street bridge to realign existing mainline track 2 track and timbers to approximate new alignment.
 - iii Unspike, realign, and re-spike mainline track 2 on existing Centre Street bridge timbers to proposed alignment.
 - iv When Water Street girders are reset, unspike, realign, and re-spike mainline track 2 on existing bridge timbers to proposed alignment.
- B Close river to navigational traffic.
- C Float in truss span at existing swing span.
 - i Construct rail on proposed structure as structure is placed and connect to track on adjacent spans.
 - ii Cut and throw existing mainline track 2 at the Water Street bridge to proposed mainline track 2 at west abutment.
 - iii Remove remaining existing track sections from existing east abutment.
 - iv Construct temporary track from temporary mainline track 2 turnout at the east abutment to the existing wye track.
 - v Unlock temporary wye track turnout. The existing wye track is accessed using the temporary turnout at the east abutment.

Phase S-6: (No impacts to rail. Two-day closure to navigation continued from Phase S-5)

- A Float out one or both of the existing truss spans in line with the proposed lift span.
- B Open river to navigational traffic.
- C Remove existing west truss span and east through girder spans and abutment sections.
- D Construct 2nd (north) stage of the proposed west abutment and remove TES along the north side of the 1st stage.
- E Construct 2nd (north) stage of the proposed east abutment and remove TES along the north side of the 1st stage.
- F Move/reposition existing girders on Water and Centre Street bridges to realign existing mainline track 1 track and timbers to approximate new alignment.
- G Unspike, realign, and re-spike mainline track 1 on existing Water and Centre Street bridge timbers to proposed alignment.
- H Construct or realign proposed mainline track 1 from Water Street bridge to west project limit and to the west abutment.

Phase S-7: (12-hour closure to rail except wye track. No impacts to navigation.)

- A Construct the proposed mainline track girder 1 spans at the west abutment.
 - i Construct rail on proposed structure as structure is placed and connect to track on adjacent spans.
- B Construct the proposed mainline track 1 and wye track girder spans at the east abutment.
 - i Construct rail on proposed structure as structure is placed and connect to track on adjacent spans.
- C Spike and lock open the wye track turnout at mainline track 1.
- D Connect the mainline track 1 to the proposed wye track on grade.
- E During rail closure remove temporary turnout and track connecting the proposed mainline track 2 and the existing wye track. Straight line the proposed mainline track 2 from the east abutment to the proposed mainline track 2 on grade.
- F Utilize the crossover at CP 145 to crossover to the wye track from the mainline track 2.
- G Demolish all remaining portions of the existing bridge superstructure and piers.

Phase S-8: (No Impacts to rail or navigation.)

- A Complete mainline track 1
- B Unspike and unlock the wye track turnout and open mainline track 1.
- C Remove remaining existing track and turnout.

Phase S-9: (Slow condition on mainline rail. No impacts to navigation.)

A Line, surface and superelevate finished tracks as required.

Alternative 1 – Replacement on an Adjacent Alignment to the North



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