Appendix A.1 - Below Deck Infrastructure Matrix
Appendix A.2 - Proposed Changes to Amtrak Yard
Appendix A.3 - Design Process & Methodology
Appendix A.4 - Mid Day Storage Yard Analysis
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APPENDIX A.1

Below Deck Infrastructure Matrix
The Sunnyside Yard Master Plan Below Deck Infrastructure Matrix provides the first step in a series of analyses to determine the potential deck coverage opportunity to support an overbuild development at Sunnyside Yard. The matrix documents limitations, constraints, opportunities, and parameters, setting the stage for an integrated design process between the below-deck and overbuild design teams.

The intent of the Below Deck Infrastructure Matrix is to review infrastructure, existing or planned, that must be accommodated below or within an overbuild structure (the “Improvements”), in order to record opportunities, limitations, and potential for flexibility. Planned projects reviewed in this matrix are the Amtrak Sunnyside Yard Master Plan, the Amtrak High Speed Rail Facility, the MTA East Side Access (ESA) project, and the LIRR Mid-Day Storage Yard. Updated information has been requested and is expected from Amtrak regarding their proposed Master Plan improvements, and from the MTA regarding ESA and Mid-Day Storage Yard improvements. The matrix also identifies current data limitations and the impact of those limitations.

Flexibility is documented in the matrix via color coding:

- **Red - “Not Flexible”**: Element cannot be moved for the foreseeable future. Must be accommodated below, within, or above the overbuild deck without disrupting the location and use of the improvements. A description of why the element cannot be moved within the foreseeable future is included in the “notes” column.
- **Yellow - “Moderately Flexible”**: Element has the potential to move or be altered to facilitate overbuild construction, but such accommodation poses challenges/impacts to the rest of the Yard. A description of this moderate potential flexibility is included in the “notes” column.
- **Green - “Flexible”**: Element can be moved or altered to facilitate overbuild construction. A description of this flexibility is included in the “notes” column.

The matrix is separated into nine zones of analysis based on an area’s function within the yard. A diagram of those zones is available in Attachment 1 to this memo. Attachments 2 and 3 provide further diagrams in support of the matrix analyses.

The matrix also begins to assess geotechnical and environmental conditions around improvements (where known) along with information on required utility relocation/impacts (where known) and identifies where information is lacking.
The following is a brief summary of the findings by zone:

- **Zone 1 LIRR Mid-Day Storage Yard/MTA Owned**
  o Current Use: Construction and staging area for ESA
  o Proposed/Future Use: "Mid-Day Storage Yard" providing maintenance and 24 storage tracks for LIRR trains.
  o Key Considerations: The new Mid-Day storage yard will be completed prior to any potential Yard overbuild construction activities. Most infrastructure will not be able to be modified except for lighting structures which can be relocated to avoid overbuild foundations.

- **Zone 2 Amtrak HSR Facility**
  o Current Use: Existing HSR Facility
  o Proposed/Future Use: Expanded HSR Facility
  o Key Considerations: Until the new HSR Facility is built the area will provide laydown space for deck construction; most utilities will be flexible except storm and sewer lines. Subsurface tunnels, and building and track infrastructure occupying most of the zone will provide the greatest limitations in determining locations for overbuild supports.

- **Zone 3 Amtrak/NJ Transit Off-Peak Storage**
  o Current Use: Amtrak/NJ Transit off-peak storage
  o Proposed/Future Use: Amtrak/NJ Transit off-peak storage (reconfigured)
  o Key Considerations: Overbuild and track reconfiguration will happen in tandem to prevent constructability concerns. Area will be fully occupied by track infrastructure; however, Q Tower and other facilities will be relocated providing some opportunity. Tunnels also run beneath this zone.

- **Zone 4 Amtrak S&I Facilities and Storage**
  o Current Use: Service and Inspection Facilities
  o Proposed/Future Use: Service and Inspection plus 10 new storage tracks
  o Key Considerations: Tracks, signals, and tunnels provide the greatest limitations; however, the facilities can incorporate overbuild structural elements.

- **Zone 5 Amtrak Maintenance Facilities**
  o Current Use: 4 repair tracks, commissary, substation, maintenance shed
  o Proposed/Future Use: 10 tracks serving maintenance facility, 3 storage tracks, conventional repair shop, new commissary building, focus building.
  o Key Considerations: The maintenance facility is fixed as it occupies the full width of Zone 5; the other facilities may have flexibility regarding their locations as long as the functionality is maintained. OCS can be incorporated onto the deck to provide flexibility, while signal and track have limited flexibility.
• **Zone 6 Amtrak MoW Yard**
  - Current Use: Loop tracks; substation, storage, ESA contractor area, parking
  - Proposed/Future Use: Electrified MoW tracks, engineering/MoW/Production shop, security gate.
  - Key Considerations: Future use may be less fully utilized by track, providing some flexibility for the relocation of the rail. OCS can be incorporated onto the deck to provide flexibility. The loop tracks are not able to be relocated.

• **Zone 7 Amtrak/LIRR Mainline**
  - Current Use: Under reconfiguration for ESA, substations, tower, signal room
  - Proposed/Future Use: Mainline tracks and facilities per ESA, final configuration not available at this time
  - Key Considerations: The Mainline is likely the busiest rail interlocking in North America. Changes to the track alignments to support the ESA project will be challenging as it will likely cause a ripple affect requiring changes to adjacent tracks and up and down the line. The proposed overbuild will likely need to accommodate the Mainline track alignments. Once conflicts are identified with the overbuild structure, specific changes to the Mainline tracks and facilities can be evaluated.

• **Zone 8 Loop Tracks**
  - Current Use: Loop tracks diverging from Mainline to bring trains to various facilities, car wash, substation
  - Proposed/Future Use: New car wash, new substation, loop tracks
  - Key Considerations: Loop tracks are in constant use and will have limited flexibility; other tracks in the zone will have some flexibility. Tunnel, power, and signal components will have limited flexibility. OCS height can be reduced.

• **Zone 9 GM Facility**
  - Current Use: GM Service Facility
  - Proposed/Future Use: GM Service Facility
  - Key Considerations: If this property was acquired it could provide additional contractor laydown area from which to stage the deck construction and to provide structural support for the overhead deck.

Following this analysis, the consultant team will begin to explore proposed changes to the Amtrak Master Plan in tandem with the Deck Coverage Evaluation. The intent was for this matrix to continue to evolve as more information is available and as more analyses are conducted.
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Below Deck Infrastructure Matrix

Appendix A.1.1 – Yard Zone Map

Appendix A.1.2 – 8.5’ Minimum Track Clearance Footprint

Appendix A.1.3 – Structures for Overhead OCS, Ancillary and Power Cables

  A.1.3.1 OCS Portal (K-Frame) Structure (TYP)
  A.1.3.2 OCS Cantilever Structure (TYP)
  A.1.3.3 Signal Bridge (TYP)
  A.1.3.4 Signal Power Monopoles (TYP)
  A.1.3.5 Aerial Utility Crossing Bridge
  A.1.3.6 Cross Catenary Structure
  A.1.3.7 Yard Cross-Catenary Lighting Structure

Acronyms:

  CIH – Central Instrument House
  ESA – East Side Access
  ET- Electric Traction
  GM – General Motors
  HSR – High Speed Rail
  HSRF – High Speed Rail Facility
  LIRR – Long Island Rail Road
  MTA - Metropolitan Transportation Authority
  NJT – New Jersey Transit
  OCS- Overhead Contact System
  RTU – Remote Terminal Unit
  S&I – Service and Inspection
  SSY – Sunnyside Yard
  SUB – Substation
  TP- Traction Power
  TT – Thornton Tomasetti
### Zone Elements

#### Track Infrastructure
- **Type**: All storage tracks at 12 car length.
- **Existing**: LightRail
- **Future**: LightRail

The proposed yard would be able to relocate the lights to the deck or wall as required.

#### Third rail
- **Type**: Third rail
- **Existing**: Third rail
- **Future**: Third rail

Duct banks may need to be temporarily and/or permanently rerouted depending on their locations.

#### Traction Power (TP)
- **Type**: 3 New Substations
- **Existing**: 3 New Substations
- **Future**: 3 New Substations

The third rail is tied to the track layout and is only as flexible as the track design permits.

#### Distribution Power
- **Type**: Power duct banks to feed lights and facilities.
- **Existing**: Power duct banks to feed lights and facilities.
- **Future**: Power duct banks to feed lights and facilities.

The new signal system is anticipated to be comprised of signal signal controls and computer systems, signal databases, and local controllers, as well as the data signals which will carry or light clearances.

### Operational Considerations

- **Location and Distribution of the Lighting Structures**: A new Mid-Day storage yard will be completed prior to any overbuild construction activities. The yard fully occupies the limits of the MTA owned property. It is assumed that if modifications are possible, they would be minimal in nature, meaning very slight shifts in the track geometry that would not amount to any material increase in the footprint available for overbuild foundation elements.

- **MoU/LIRR**: As per the Mid-Day Storage memo 6/27/17, LIRR agree to modified yard operations to accommodate 4’ wide foundation walls. LIRR also agree to modified yard operations to accommodate 4’ wide foundation walls. LIRR will also fund horizontal and vertical track geometry for the LIRR to adjust.

### Environmental Considerations

- **Unknowns**: Whether LIRR, as per the Mid-Day Storage memo 6/27/17, agree to modified yard operations to accommodate 4’ wide foundation walls. LIRR will also fund horizontal and vertical track geometry for the LIRR to adjust.

### Change to Amtrak Master Plan (Yes/No)

- **Assessed Flexibility Ranking**: Not Flexible

- **Notes**: This new Mid-Day storage yard will be completed prior to any overbuild construction activities. The yard fully occupies the limits of the MTA owned property. It is assumed that if modifications are possible, they would be minimal in nature, meaning very slight shifts in the track geometry that would not amount to any material increase in the footprint available for overbuild foundation elements.

### Task 3.a Below Deck Infrastructure Matrix

- **Type**: All storage tracks at 12 car length.
- **Existing**: LightRail
- **Future**: LightRail

- **Contractor would be able to relocate the lights to the deck or wall as required.**

### Considerations

- **Environmental Considerations**: Unknowns:

  - Will LIRR, as per the Mid-Day Storage memo 6/27/17, agree to modified yard operations to accommodate 4’ wide foundation walls?
  - Need official horizontal and vertical track geometry from LIRR to assess.

### Change to Amtrak Master Plan (Yes/No)

- **Assessed Flexibility Ranking**: Not Flexible

### Notes

- This new Mid-Day storage yard will be completed prior to any overbuild construction activities. The yard fully occupies the limits of the MTA owned property. It is assumed that if modifications are possible, they would be minimal in nature, meaning very slight shifts in the track geometry that would not amount to any material increase in the footprint available for overbuild foundation elements. Providing any additional footprint would likely require the removal of certain tracks, which is assumed to be not possible.
It is currently assumed that existing conditions encountered at the start of the overbuild construction will have to be restored. Reconstruction within or above the deck should be considered for elements that extend into the air rights, such as the personnel walkway. It is potentially feasible to relocate the building functions without restoring the buildings themselves; this possibility will be evaluated moving forward.

There are no force account implications due to the existing facilities. LIRR force account will be required to protect contractors for any deck related work.

Utilities supporting operations must be maintained. Tunnels cross under the yard: the ESA tunnels as well as the future, not to be precluded, Queens Super Express tunnels. The functionality of all buildings and the personnel bridge must be maintained throughout construction. It is not anticipated to be a problem.

The location of the tunnels may require relief structures or impact the available footprint of overbuild structural elements. Constructability of the overbuild foundations may be complicated if they are found to be in conflict with the structural elements of the overbuild bridge. The buildings are not anticipated to present additional constructability challenges. Whatever vehicle access will exist during construction will need to be maintained during and after construction is complete.

Whatever vehicle access will exist during construction will need to be maintained during and after construction is complete. Proposed site access will be required. The proposed future utility layout is unknown. There are no force account implications due to the existing facilities. Proposed site plan in CAD. No Not Flexible.

The proposed site plan will be required for the relocation of non-railroad systems. Proposed site access. Once we have a complete site plan, including access, we will have a better sense of what can be utilized by the contractor in order to minimize impacts to yard operations. Access to points within the yard for construction equipment will be limited; it is anticipated that the majority of construction equipment would enter on hirail vehicles. Because yard operations are likely to remain substantially unchanged throughout construction, it is anticipated that the approach to move construction equipment to the work site will not be significantly impacted. The use of possible relief structures should be explored.

Vehicle access to the yard will exist, but access to specific points within the yard is not known. It is likely that gaining access to these points for construction equipment will require some effort to adapt the tracks. The site owned property will be fully utilized, which will require the contractor to find a laydown area offshore. Proposed site access. Once we have a complete site plan, including access, we will have a better sense of what can be utilized by the contractor in order to minimize impacts to yard operations. Access to points within the yard for construction equipment will be limited; it is anticipated that the majority of construction equipment would enter on hirail vehicles. Because yard operations are likely to remain substantially unchanged throughout construction, it is anticipated that the approach to move construction equipment to the work site will not be significantly impacted. The use of possible relief structures should be explored.

The importance of all utilities may have to be relocated and/or protected due to the overbuild. Proposed utility plan in CAD. No Moderately Flexible. The proposed future utility layout is unknown. Proposed utility plan in CAD. No Not Flexible.

Proposed site access. Once we have a complete site plan, including access, we will have a better sense of what can be utilized by the contractor in order to minimize impacts to yard operations. The use of possible relief structures should be explored.

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Zone 2: Amtrak HSR Facility

<table>
<thead>
<tr>
<th>Type</th>
<th>Existing</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Track Infrastructure</td>
<td>6 ready tracks (12 tracks total) at each of 4 NYS DEC tracks</td>
<td>4 ready tracks (12 tracks total) at each of 4 NYS DEC tracks</td>
</tr>
<tr>
<td>b. Catenary</td>
<td>Electromechanical tracks (North)</td>
<td>Electromechanical tracks (South)</td>
</tr>
<tr>
<td>c. Power</td>
<td>New duct banks, cable and conduit runs for new connections, switch heaters, and RTUs</td>
<td>New duct banks, cable and conduit runs for new connections, switch heaters, and RTUs</td>
</tr>
<tr>
<td>d. Signal</td>
<td>Testing deadman signals</td>
<td>Testing deadman signals</td>
</tr>
<tr>
<td>e. Facilities/Structures</td>
<td>2 track-relay facility, Baker House (Building 1), 3 Trains, 3 Trains, 3 Trains, 2 Switch boxes</td>
<td>2 track-relay facility, Baker House (Building 1), 3 Trains, 3 Trains, 3 Trains, 2 Switch boxes</td>
</tr>
</tbody>
</table>

Notes:
- The location of actual signals will be fixed to the track alignment which is not considered to be flexible. In order to maintain the integrity of the signal system, it is not possible to determine the location of any actual signals.
- The location of signal work is fixed to the track alignment which is not considered to be flexible. In order to maintain the integrity of the signal system, it is not possible to determine the location of any signal work.
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<table>
<thead>
<tr>
<th>Type</th>
<th>Zone Elements</th>
<th>Constructability/ Staging Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Unknowns</th>
<th>Change to Amtrak Master Plan</th>
<th>Assessed Flexibility Ranking</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities</td>
<td>Existing</td>
<td>Existing, water, fire line, oil lines, as well as proposed utilities required to service the new HSRF. Relocated utilities, as well as proposed utilities required to service the new HSRF.</td>
<td>Utility relocation must be designed to maintain services critical to operations. Additional analysis and design is required.</td>
<td>Amtrak force account will be required to protect any contractor-facing</td>
<td>Site is an existing Amtrak State Facility for NYSDEC. The site was divided into six “Operable Units” (OU-1) each of which received its own Record of Decision (ROD) from NYSDEC. There is no specific remediation plan for the site. No specific environmental concerns or remediation efforts have historically been undertaken.</td>
<td>No</td>
<td>Moderate flexibility</td>
<td>Most utilities should be fairly flexible in terms of being able to be relocated. Larger utilities that are gravity driven, such as larger sanitary and storm sewer lines, will be more difficult to relocate and will likely require some sort of protection or relief structure in order to support overbuild structural elements.</td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td>Future</td>
<td>Existing, water, fire line, oil lines, as well as proposed utilities required to service the new HSRF. Relocated utilities, as well as proposed utilities required to service the new HSRF.</td>
<td>Utility relocation must be designed to maintain services critical to operations. Additional analysis and design is required.</td>
<td>Amtrak force account will be required to protect any contractor-facing</td>
<td>Site is an existing Amtrak State Facility for NYSDEC. The site was divided into six “Operable Units” (OU-1) each of which received its own Record of Decision (ROD) from NYSDEC. There is no specific remediation plan for the site. No specific environmental concerns or remediation efforts have historically been undertaken.</td>
<td>No</td>
<td>Moderate flexibility</td>
<td>Most utilities should be fairly flexible in terms of being able to be relocated. Larger utilities that are gravity driven, such as larger sanitary and storm sewer lines, will be more difficult to relocate and will likely require some sort of protection or relief structure in order to support overbuild structural elements.</td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td>Zone 2: Amtrak HSR Facility</td>
<td>Zone 2 overlaps with the NYSDEC State Superfund Site #241006. The site was divided into six “Operable Units” (OU-#) each of which received its own Record of Decision (ROD) from NYSDEC, containing the results of remedial investigations and the remedial method selection process. - Zone 2 overlaps with OU-1, OU-2, OU-3, OU-4, OU-5, and OU-6. - OU-1, OU-2, and OU-6 have undergone remedial measures and there is no currently required further action, although there is an environmental assessment associated with OU-6. OU-2 and OU-4 have ongoing remediation. - OU-5 involves groundwater in support of HSRF. - OU-6 involves groundwater in support of HSRF.</td>
<td>Operations through the existing tunnels must be maintained.</td>
<td>No force account required.</td>
<td>Existing ESA tunnel layout and proposed Queens Super Express layout in CAD.</td>
<td>No</td>
<td>Not flexible</td>
<td>Relocation of subsurface tunnels will not be possible. The use of possible relief structures should be explored.</td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td>Subsurface structures</td>
<td>Existing ESA tunnels GAF tunnels as well as the future, not to be precluded. Queens Super Express tunnels.</td>
<td>Operations through the existing tunnels must be maintained.</td>
<td>No force account required.</td>
<td>Existing ESA tunnel layout and proposed Queens Super Express layout in CAD.</td>
<td>No</td>
<td>Not flexible</td>
<td>Relocation of subsurface tunnels will not be possible. The use of possible relief structures should be explored.</td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td>Construction access/laydown</td>
<td>Space is available north of the existing HSRF. Access to the site is existing.</td>
<td>Access area must be thoughtful of maintaining current operations of the existing HSRF.</td>
<td>Contractor access must maintain existing access to the existing HSRF.</td>
<td>Proposed site plan showing vehicle access in CAD.</td>
<td>N/A</td>
<td>No flexible</td>
<td>The area within Zone 2 immediately north of the existing HSRF will be available for contractor access until the new HSRF is constructed. Once construction begins in this area, laydown area will need to be found outside of Zone 2, perhaps in Zone 6, offshore, or even on previously constructed deck. The existing access to the site will remain available for contractor access.</td>
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<tr>
<td>Utilities</td>
<td>Vehicle access</td>
<td>Vehicle access to the HSRF location is existing. Parking and vehicle access is maintained with the proposed design.</td>
<td>Contractor access must maintain existing access to the existing HSRF.</td>
<td>Contractor cannot impede existing operations of the existing HSRF.</td>
<td>Proposed site plan showing vehicle access in CAD.</td>
<td>N/A</td>
<td>No flexible</td>
<td>Vehicle access to the yard must be maintained at all times. It may be necessary to modify the locations of access roads to the yard to accommodate overbuild structural elements, but such modifications are assumed to be very limited due to the lack of unused real estate within the site.</td>
<td></td>
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</table>
## Zone 3: Amtrak/LIRR Transit Off-peak Storage

### Concurrency/Staging Considerations

<table>
<thead>
<tr>
<th>Track Infrastructure</th>
<th>Construction Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Change to Amtrak Master Plan (Y/N)</th>
<th>Assessed Flexibility Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 3 off-track</td>
<td>Within Zone 3 there are 26 tracks (can accommodate 12 car storage).</td>
<td>Within Zone 3 there are 27 tracks (can accommodate 12 car storage).</td>
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- All track work and non-track work associated with Amtrak's construction outside of the intermodal port and the Amtrak master plan will affect some of the rail work. Zone 3 is adjacent to the proposed track work and is likely to be affected.

### Notes

- The material to be removed is primarily ballast, and the work is expected to be completed within a week.

### Track Infrastructure

<table>
<thead>
<tr>
<th>Type</th>
<th>Existing</th>
<th>Future</th>
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<tbody>
<tr>
<td>1.</td>
<td>Track Infrastructure</td>
<td>New track infrastructure will be added to the existing rail yard to accommodate additional track storage.</td>
</tr>
</tbody>
</table>

### Concurrency/Staging Considerations

- The new track infrastructure will be added to the existing rail yard to accommodate additional track storage.

### Operational Considerations

- There are no operational considerations above and beyond what is required for the track reconfiguration.

### Force Account Considerations

- There is no force account work associated with the track reconfiguration.

### Environmental Considerations

- There are no environmental considerations associated with the track reconfiguration.

### Change to Amtrak Master Plan (Y/N)

- No

### Assessed Flexibility Ranking

- Flexible

### Notes

- The new track infrastructure will be added to the existing rail yard to accommodate additional track storage.

---

## Zone 2: Amtrak/LIRR Transit

### Concurrency/Staging Considerations

<table>
<thead>
<tr>
<th>Track Infrastructure</th>
<th>Construction Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Change to Amtrak Master Plan (Y/N)</th>
<th>Assessed Flexibility Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 2</td>
<td>Within Zone 2 there are 26 tracks (can accommodate up to 12 car storage).</td>
<td>Within Zone 2 there are 27 tracks (can accommodate up to 12 car storage).</td>
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- There are no operational considerations above and beyond what is required for the track reconfiguration.

### Notes

- The new track infrastructure will be added to the existing rail yard to accommodate additional track storage.

### Track Infrastructure

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<thead>
<tr>
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</tbody>
</table>

### Concurrency/Staging Considerations

- The new track infrastructure will be added to the existing rail yard to accommodate additional track storage.

### Operational Considerations

- There are no operational considerations above and beyond what is required for the track reconfiguration.

### Force Account Considerations

- There is no force account work associated with the track reconfiguration.

### Environmental Considerations

- There are no environmental considerations associated with the track reconfiguration.

### Change to Amtrak Master Plan (Y/N)

- No

### Assessed Flexibility Ranking

- Flexible

### Notes

- The new track infrastructure will be added to the existing rail yard to accommodate additional track storage.

---

## Zone 1: Amtrak/LIRR Transit

### Concurrency/Staging Considerations

<table>
<thead>
<tr>
<th>Track Infrastructure</th>
<th>Construction Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Change to Amtrak Master Plan (Y/N)</th>
<th>Assessed Flexibility Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td>Within Zone 1 there are 26 tracks (can accommodate up to 12 car storage).</td>
<td>Within Zone 1 there are 27 tracks (can accommodate up to 12 car storage).</td>
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</tr>
</tbody>
</table>

- There are no operational considerations above and beyond what is required for the track reconfiguration.

### Notes

- The new track infrastructure will be added to the existing rail yard to accommodate additional track storage.

### Track Infrastructure

<table>
<thead>
<tr>
<th>Type</th>
<th>Existing</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Track Infrastructure</td>
<td>New track infrastructure will be added to the existing rail yard to accommodate additional track storage.</td>
</tr>
</tbody>
</table>

### Concurrency/Staging Considerations

- The new track infrastructure will be added to the existing rail yard to accommodate additional track storage.

### Operational Considerations

- There are no operational considerations above and beyond what is required for the track reconfiguration.

### Force Account Considerations

- There is no force account work associated with the track reconfiguration.

### Environmental Considerations

- There are no environmental considerations associated with the track reconfiguration.

### Change to Amtrak Master Plan (Y/N)

- No

### Assessed Flexibility Ranking

- Flexible

### Notes

- The new track infrastructure will be added to the existing rail yard to accommodate additional track storage.

---

## Power

### Concurrency/Staging Considerations

<table>
<thead>
<tr>
<th>Track Infrastructure</th>
<th>Construction Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Change to Amtrak Master Plan (Y/N)</th>
<th>Assessed Flexibility Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td>Existing transit power duct banks, cable and conductors run by new linesmen, existing wires, and switches in the area.</td>
<td>New transit power duct banks, cable and conductors run by new linesmen, existing wires, and switches in the area.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

- There are no operational considerations above and beyond what is required for the track reconfiguration.

### Notes

- The new transit power duct banks, cable and conductors run by new linesmen, existing wires, and switches in the area.

### Track Infrastructure

<table>
<thead>
<tr>
<th>Type</th>
<th>Existing</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Power</td>
<td>Existing transit power duct banks, cable and conductors run by new linesmen, existing wires, and switches in the area.</td>
</tr>
</tbody>
</table>

### Concurrency/Staging Considerations

- The new transit power duct banks, cable and conductors run by new linesmen, existing wires, and switches in the area.

### Operational Considerations

- There are no operational considerations above and beyond what is required for the track reconfiguration.

### Force Account Considerations

- There is no force account work associated with the track reconfiguration.

### Environmental Considerations

- There are no environmental considerations associated with the track reconfiguration.

### Change to Amtrak Master Plan (Y/N)

- No

### Assessed Flexibility Ranking

- Flexible

### Notes

- The new transit power duct banks, cable and conductors run by new linesmen, existing wires, and switches in the area.

---

## Signal

### Concurrency/Staging Considerations

<table>
<thead>
<tr>
<th>Track Infrastructure</th>
<th>Construction Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Change to Amtrak Master Plan (Y/N)</th>
<th>Assessed Flexibility Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td>Existing signal system will maintain the current signal system.</td>
<td>Existing signal system will maintain the current signal system.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- There are no operational considerations above and beyond what is required for the track reconfiguration.

### Notes

- The new signal system will maintain the current signal system.

### Track Infrastructure

<table>
<thead>
<tr>
<th>Type</th>
<th>Existing</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Signal</td>
<td>Existing signal system will maintain the current signal system.</td>
</tr>
</tbody>
</table>

### Concurrency/Staging Considerations

- The new signal system will maintain the current signal system.

### Operational Considerations

- There are no operational considerations above and beyond what is required for the track reconfiguration.

### Force Account Considerations

- There is no force account work associated with the track reconfiguration.

### Environmental Considerations

- There are no environmental considerations associated with the track reconfiguration.

### Change to Amtrak Master Plan (Y/N)

- No

### Assessed Flexibility Ranking

- Not Flexible

### Notes

- The new signal system will maintain the current signal system.
<table>
<thead>
<tr>
<th>Zone Elements</th>
<th>Contractability/ Staging Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Unknowns</th>
<th>Change to Amtrak Master Plan (Yes/No)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1: Facilities</td>
<td>There are a number of sheds within the zone but the large major facility is LIRR Tower. Amtrak utility towers near Honeywell Street.</td>
<td>The reconfigured train tracks will be relocated to the relocation of Q Tower. There will be no impact to the existing infrastructure.</td>
<td>Force account will be required to complete all final system installations.</td>
<td>This functionality was part of the relocation of Q Tower. The functionality will be replaced with a new facility.</td>
<td>N/A</td>
<td>N/A</td>
<td>Flexible</td>
</tr>
<tr>
<td>Zone 2: Utilities</td>
<td>Gas, water, electric, as well as various utilities servicing the wheels, turning, and engine repair facility in Zone A.</td>
<td>Utilities required to service the construction of the work stations.</td>
<td>Force account is not required for non-rail system utilities.</td>
<td>The layout of the existing ESA tunnels and the proposed layout of the future Queens Super Express tunnels, in CAD.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Zone 3: Subsurface structures</td>
<td>Rail tunnels. Rail tunnels as well as the future can be placed. Dreams are super tunnels.</td>
<td>Subsurface structural elements are critical in order to ensure the functionality of the yard and the construction of the overbuild structural elements.</td>
<td>Force account is not required for non-rail system utilities.</td>
<td>The layout of the existing ESA tunnels and the proposed layout of the future Queens Super Express tunnels, in CAD.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Zone 4: Construction access/Laydown</td>
<td>Access to the existing track is limited. Possible laydown areas include 5 and 6 as well as previously constructed deck on adjacent rails. Construction access to both sides on existing tracks will be provided with the addition of tunnels.</td>
<td>There are no operational accessibility issues other than what is described in the constructability/staging column.</td>
<td>N/A</td>
<td>This cannot be determined with design of the overbuild structure.</td>
<td>N/A</td>
<td>N/A</td>
<td>Moderately Flexible</td>
</tr>
<tr>
<td>Zone 5: Vehicle access</td>
<td>Vehicle access is existing. The proposed Amtrak Master plan provides for critical vehicle access through the yard.</td>
<td>Vehicle access for construction and yard operations must be maintained at all times.</td>
<td>N/A</td>
<td>Vehicle access to the yard must be maintained at all times. It may be possible to modify the location of access roads in the future and accommodate constructability issues, but such modifications are assumed to be any blocked due to the lack of current real estate within the site.</td>
<td>N/A</td>
<td>N/A</td>
<td>Moderately Flexible</td>
</tr>
</tbody>
</table>
Zone 4 overlaps with the NYSDEC State Superfund Site #241006. The site was divided into six “Operable Units” (OU-#) for the remedial method selection process. Zone 4 overlaps with OU-4, OU-5, and OU-6. OU-6 has undergone remedial measures and there is no environmental easement associated with OU-6. OU-4 and OU-5 have ongoing remedial action OU-4: Soil above groundwater throughout the site excepting the areas under and around the HSRF OU-5: Sewer system beneath the site

This cannot be determined until structure has been advanced and problems are identified. Amtrak force account would be required for all final track installations and surfacing. Contractor would be able to perform a bulk of the civil/track bed work.

Considerations

Amtrak would need a special agreement with their union to allow the contractor to install OCS structures and steel parts. At existing signal locations, some reconfiguration may be possible to shift the available footprint for overbuild structures. It is unlikely that the footprint itself can be increased. It is assumed that overbuild activities will happen in tandem with the construction of the overbuild rail lines.

Contractor at site would need a special agreement with their union to allow the contract to install OCS structures and steel parts. At existing signal locations, reconfiguration may be possible to shift the available footprint for overbuild structures. It is unlikely that the footprint itself can be increased. It is assumed that overbuild activities will happen in tandem with the construction of the overbuild rail lines.

Zone 4: Amtrak S&I Facilities and Storage

- Flexibility
  - Amtrak Force account will be required to perform all the traction power work without special agreement with their union.
  - The new signal system will be designed to limit the number of deadhead signals; no signal bridges.
  - The new signal system will be designed to limit the number of deadhead signals; no signal bridges.

- Coordination with
  - Existing S&I facilities (cross catenary, cardan, and parallel structures) are not designed to take these loads. The location of every OCS wire supported on the cross catenary structure depends on the other wires supported on the same span. Removing or relocating any OCS wire will affect the other wires on the same span and the cross catenary wires will have to be relocated.

- Notes
  - Large cross catenary structures with/or contact of a buddy span and a buddy span on a buddy span withstanding multiple OCS wires at every span with columns up to 30 ft tall. Most of these structures span on multiple columns across the entire storage yard and have to be relocated. Some areas are also supported on partial structures. Any OCS removal or relocation will have to be coordinated with the electrical/grounding issues to electrically isolate the same.

- Existing S&I and ancillary cable supported on each structure erection diagram for each OCS structure. Structure erection diagrams for each OCS structure.

- Change to
  - Supporting multiple OCS wires at every span with columns up to 60ft tall. Cross catenary structures are supporting 20+ OCS wires.

- Considerations
  - Disconnectors, switch heaters, CIH and RTU houses, etc. can be designed to work with the signal locations. It should be noted that the locations of the signals themselves are not anticipated to be in conflict with overhead structural elements if no signals are anticipated to be in conflict with overhead structural elements. The locations of signals themselves are not anticipated to be in conflict with overhead structural elements. The locations of signals themselves are not anticipated to be in conflict with overhead structural elements. The locations of signals themselves are not anticipated to be in conflict with overhead structural elements. The locations of signals themselves are not anticipated to be in conflict with overhead structural elements. The locations of signals themselves are not anticipated to be in conflict with overhead structural elements. The locations of signals themselves are not anticipated to be in conflict with overhead structural elements. The locations of signals themselves are not anticipated to be in conflict with overhead structural elements. The locations of signals themselves are not anticipated to be in conflict with overhead structural elements.

- Zone Elements
  - Functional: the middle workday/dawn peak track activity and peak storage yard activity.
  - Timeframe: 6am-10pm.
  - Functional: the middle workday/dawn peak track activity and peak storage yard activity.
  - Timeframe: 6am-10pm.
### Zone Elements

<table>
<thead>
<tr>
<th>Zone &amp; Amtrak SKI Facilities and Storage</th>
<th>Constructability/ Staging Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Unknowns</th>
<th>Change to Amtrak Master Plan (Yes/No)</th>
<th>Assessed Flexibility Ranking</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle access</td>
<td>The proposed Amtrak Master Plan provides for critical vehicle access throughout the yard.</td>
<td>Vehicle access for construction and yard operations must be maintained at all times.</td>
<td>N/A</td>
<td>The layout of the existing ESA tunnels and the proposed layout of the future Queens Station Repair Facilities tunnels.</td>
<td>N/A</td>
<td>This cannot be determined until design of the overbuild structural elements has been advanced and problems with the proposed work layout are identified.</td>
<td>Moderately Flexible</td>
<td></td>
</tr>
<tr>
<td>Subsurface structures</td>
<td>Access to the existing tunnels is existing. Possible subsurface access is adjacent to the existing HSRF and subsurface areas in Zones 5 and 6.</td>
<td>Subsurface structural elements may be limited in order to not conflict with the existing or future tunnels. Tunnel access may be required.</td>
<td>N/A</td>
<td>The layout of the existing ESA tunnels and the proposed layout of the future Queens Station Repair Facilities tunnels.</td>
<td>N/A</td>
<td>No</td>
<td>Not Flexible</td>
<td></td>
</tr>
<tr>
<td>Construction access/laydown</td>
<td>Access is existing. Possible laydown areas are adjacent to the existing HSRF and construction areas in Zones 5 and 6.</td>
<td>Construction access/laydown areas may be limited in order to not conflict with the existing or future tunnels. Tunnel access may be required.</td>
<td>N/A</td>
<td>The layout of the existing ESA tunnels and the proposed layout of the future Queens Station Repair Facilities tunnels.</td>
<td>N/A</td>
<td>No</td>
<td>Moderately Flexible</td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td>Utilities required to service the Amtrak Master Plan. Yard design and layout would be assisted by detailed design of this facility.</td>
<td>Utilities critical to yard operations must be maintained at all times.</td>
<td>Force account is not required for non critical system utilities.</td>
<td>Confirmation that the utilities shown in the CAD file (Existing Utilities 2016.dwg) are current, complete, and accurate. Detailed review of the utility plans of the yard.</td>
<td>No</td>
<td>No</td>
<td>Very Flexible</td>
<td></td>
</tr>
<tr>
<td>Facilities</td>
<td>Future facilities include a new wheel truing and drop table facility.</td>
<td>There are no operational considerations above and beyond what is described in the constructability/staging column.</td>
<td>N/A</td>
<td>This cannot be determined until design of the overbuild structural elements has been advanced and problems with the proposed work layout are identified.</td>
<td>Moderately Flexible</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infrastructural elements must be coordinated with Amtrak to ensure current operations at the yard are maintained. The design of the new wheel truing facility and related works must be coordinated with Amtrak to ensure current operations at the yard are maintained.</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tasks: Below Deck Infrastructure Matrix

06/29/18
Page 12 of 30
<table>
<thead>
<tr>
<th>Zone Elements</th>
<th>Contractability/ Staging Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Unknowns</th>
<th>Change to Amtrak Master Plan (Yes/No)</th>
<th>Assessed Flexibility Ranking</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Track Infrastructure</td>
<td>10 tracks serving the maintenance facility, 4 runway/ground storage tracks</td>
<td>All tracks serving the maintenance facility, 4 runway/ground storage tracks</td>
<td>Track force account would be required for all track work associated with the construction of the new facility, and the contractor would be able to perform tasks in the right-of-way</td>
<td>All environmental reviews associated with the project would be required.</td>
<td>N/A</td>
<td>Not Flexible</td>
<td>Not Flexible</td>
<td>Reclassification of the trackage is dependent on the availability of the facility, and it could affect the overall layout.</td>
</tr>
<tr>
<td>2. Civil</td>
<td>Non-operational Construction</td>
<td>All future work will be critical to operations</td>
<td>Track force account would be required for all track work associated with the construction of the new facility, and the contractor would be able to perform tasks in the right-of-way</td>
<td>All environmental reviews associated with the project would be required.</td>
<td>N/A</td>
<td>Not Flexible</td>
<td>Not Flexible</td>
<td>The ability to access the site will depend on the availability of the facility.</td>
</tr>
<tr>
<td>3. Power</td>
<td>Creation of new facilities for new disconnectors, switch heaters, CIH and RTU houses</td>
<td>Signal power cable relocations must be designed to maintain service.</td>
<td>Track force account would be required for all track work associated with the construction of the new facility, and the contractor would be able to perform tasks in the right-of-way</td>
<td>All environmental reviews associated with the project would be required.</td>
<td>N/A</td>
<td>Not Flexible</td>
<td>Not Flexible</td>
<td>The power configurations and selectivity would not impact the construction of the new facility.</td>
</tr>
<tr>
<td>4. Signal</td>
<td>Existing/doubt signals on signal bridges</td>
<td>Signal works would be performed in cooperation with the track force account.</td>
<td>Track force account would be required for all track work associated with the construction of the new facility, and the contractor would be able to perform tasks in the right-of-way</td>
<td>All environmental reviews associated with the project would be required.</td>
<td>N/A</td>
<td>Not Flexible</td>
<td>Not Flexible</td>
<td>The signal systems on signal bridges must be coordinated with the track force account.</td>
</tr>
<tr>
<td>5. Utilities</td>
<td>Service to electric, water, air, and various utilities serving the maintenance facility</td>
<td>All utilities required to serve the facility would be critical to operations.</td>
<td>Force account is not required for non-railroad system utilities.</td>
<td>Confirmation that the utilities shown in the As-Built drawings are current, complete, and accurate.</td>
<td>No</td>
<td>No Flexible</td>
<td>No Flexible</td>
<td>Utilities should be fairly flexible in terms of being able to be relocated. Larger utilities that are gravity driven, such as sanitary and storm sewers, are more difficult to relocate and will likely require some sort of protection or relief structure in order to support overbuild structural elements.</td>
</tr>
</tbody>
</table>

NYCEDC Sunnyside Yard Master Plan
Below Deck Infrastructure Mitigations
<table>
<thead>
<tr>
<th>Zone Elements</th>
<th>Constructability/ Staging Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Unknowns</th>
<th>Change to Amtrak Master Plan (Yes/No)</th>
<th>Assessed Flexibility Ranking</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Subsurface structures</td>
<td>Not affected.</td>
<td>Slack tunnels as well as the future, not to be prechased.</td>
<td>Slack tunnels as well as the future, not to be prechased.</td>
<td>Slack tunnels as well as the future, not to be prechased.</td>
<td>N/A</td>
<td>N/A</td>
<td>Not Flexible</td>
<td>Relay of existing tunnels will not be possible. The use of possible relief structures should be explored.</td>
</tr>
<tr>
<td>b. Construction access/laydown</td>
<td>Can be located in Zone 5 and adjacent Zone 6.</td>
<td>Storage area currently used within Zone 5, but the railroad would have to be relocated.</td>
<td>Contractor access and laydown area would have to be coordinated with Amtrak to ensure there is no conflict with critical yard operations.</td>
<td>N/A</td>
<td>N/A</td>
<td>No</td>
<td>Moderately Flexible</td>
<td>Access exists in both the existing and proposed conditions. Construction access and laydown area can likely be located in Zone 5 until the Amtrak master plan is implemented and the final reconfiguration fully utilizes Zone 5. Laydown areas would have to shift to Zone 6, previously constructed deck, or offsite.</td>
</tr>
<tr>
<td>c. Vehicle access</td>
<td>Vehicle access is existing.</td>
<td>Vehicle access for construction and yard operations must be maintained at all times.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Moderately Flexible</td>
<td>Vehicle access to the yard must be maintained at all times. It may be possible to modify the locations of access roads in the yard to accommodate overbuild structural elements, but such modifications are assumed to be any avoided due to the lack of unused real estate within the yard.</td>
</tr>
</tbody>
</table>

**Zone 5: Amtrak Maintenance Facilities**

- Amtrak Maintenance Facilities
- Vehicle access
- Vehicle access is existing.

**Notes:**
- Zone 5 overlaps with the NYSDEC State Superfund Site #24106. The site was divided into six "Operable Units" (OU-#) each of which received its own Record of Decision (ROD) from NYCDEC, containing the results of remedial investigations and the remedial action selection process.
- Zone 5 overlaps with OU-4, OU-5, and OU-6.
- OU-6 has undergone remedial measures and there is no currently required further action, although there is an environmental assessment associated with OU-6.
- OU-4 and OU-5 have ongoing remedial action.
- OU-5 has a sewer system beneath the site excepting the areas under and around the HSRF.
- OU-5 is a groundwater system beneath the site excepting the areas under and around the HSRF.
<table>
<thead>
<tr>
<th>Zone 6: Amtrak Moos Yard</th>
<th>Task 3.a  Below Deck Infrastructure Matrix DRAFT</th>
<th>Not Flexible</th>
<th>Assessed</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td><strong>Existing Elements</strong></td>
<td><strong>Future Elements</strong></td>
<td><strong>Contractability/ Staging Considerations</strong></td>
<td><strong>Operational Considerations</strong></td>
</tr>
<tr>
<td><strong>Track Infrastructure</strong></td>
<td>Heavy track at western limits of SSY</td>
<td>Heavy track at eastern limits of SSY</td>
<td>There are no significant constructability concerns. Coordination with Amtrak is required to ensure the contractor does not interfere with normal yard operations.</td>
<td>The as-operational condition is described in the constructability/staging column.</td>
</tr>
<tr>
<td><strong>Existing Facilities</strong></td>
<td>Existing facilities impacted by the work are in coordination with Amtrak to maintain critical yard operations.</td>
<td>Existing facilities impacted by the work are in coordination with Amtrak to maintain critical yard operations.</td>
<td>There are no operational considerations above and beyond what is described in the constructability/staging column.</td>
<td>There are no operational considerations above and beyond what is described in the constructability/staging column.</td>
</tr>
</tbody>
</table>

**Signal**

- No existing signal system in this area.

- The new signal system will use dwarf signals, no signal bridges.

- Signal work would be performed in tandem with the track reconfiguration with no significant constructability concerns above and beyond what is required for the track reconfiguration.

- There are no operational considerations above and beyond what is described in the constructability/staging column.

- The contractor would be able to install signal foundations and connections as required to maintain services critical to operations. More detailed analysis and design is required.

- Traction force account would be required to perform all of the traction power work without special agreement with their union.

| **Power** | Frequency convertor and traction power substations (Operating power capacity in each substations proposed to be reduced). | New dual tracks for new PROS, track relief | There are no significant constructability concerns. | Traction power transfers or relocations must be designed to maintain services critical to operations. | Traction force account would be required to perform the work. | A confirmation that the current signal layout for the tracks and facilities conforms to the latest Amtrak master plan. | This cannot be determined until the final design determination of the overbuild structural elements. | Not Flexible | No existing signals in this area. New design should incorporate the OCS wires to be installed on the deck. |

<p>| <strong>Facilities</strong> | Radiation, storage, ESA contractor area, parking, Engineering/Shop, Production shop, security gate | Existing facility impacted by the new facility would be relocated in close coordination with Amtrak to ensure critical yard operations. | There are no operational considerations above and beyond what is described in the constructability/staging column. | There are no operational considerations above and beyond what is described in the constructability/staging column. | There are no operational considerations above and beyond what is described in the constructability/staging column. | A confirmation that the current signal layout for the tracks and facilities conforms to the latest Amtrak master plan. | Not Flexible | Radiation, storage, ESA contractor area, parking, Engineering/Shop, Production shop, security gate. A confirmation that the current signal layout for the tracks and facilities conforms to the latest Amtrak master plan. | Moderately Flexible | It is assumed that the design and construction of the maintenance facility will be integrated into the overbuild structural elements, and will be constructed in tandem. The location of new facilities appears to have some flexibility regarding their locations, as long as the functionality that is provided in the Amtrak master plan is maintained. |</p>
<table>
<thead>
<tr>
<th>Zone Elements</th>
<th>Constructability/ Staging Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Unknowns</th>
<th>Change to Amtrak Master Plan (Yes/No)</th>
<th>Assessed Flexibility Ranking</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Utilities</strong></td>
<td>Sanitary, storm, water, electrical, as well as the lubrication.</td>
<td>Utilities required to service the Amtrak Master Plan. The design and layout would be included in the design and construction documents.</td>
<td>Assign account is not required by non-critical system utilities.</td>
<td>Assign account is not required for the critical structural elements.</td>
<td>Yes</td>
<td>No</td>
<td>Moderately Flexible</td>
<td>Most utilities should be fairly flexible in terms of being able to be relocated. Larger utilities that are gravity driven, such as sanitary and storm sewer lines, will be difficult to relocate and may require some sort of protection or relief structure in order to support overbuild structural elements.</td>
</tr>
<tr>
<td>g. subsurface structures</td>
<td>The ESA tunnels.</td>
<td>The ESA tunnels, as well as the HSRF, not to be precluded, Queens Super Express Tunnels.</td>
<td>Overbuild structural elements that are required in order to not conflict with the existing or future tunnels.</td>
<td>ESA tunnel is expected to be maintained at all times.</td>
<td>N/A</td>
<td>No</td>
<td>Not Flexible</td>
<td>Relaxation of existing tunnels will not be possible. The use of possible relief structures should be explored.</td>
</tr>
<tr>
<td>h. Construction access/laydown</td>
<td>Currently there is an ESA contractor area being used for laydown.</td>
<td>No outdoor facilities impacted by the ESA, would need to be modified in close coordination with Amtrak to maintain critical operations.</td>
<td>There are no operational considerations above and beyond what is described in the constructability staging plan.</td>
<td>N/A</td>
<td>No</td>
<td>Moderately Flexible</td>
<td>Access is available in both the existing and proposed conditions. There appears to be some real estate available within the laydown area or even in Zone 6. Zones outside the ESA contractor area are limited. If Amtrak route plan and overbuild activities take place after the completion of the ESA project, this space is anticipated to be available.</td>
<td></td>
</tr>
<tr>
<td>i. Vehicle access</td>
<td>Vehicle access is existing.</td>
<td>The proposed Amtrak Master Plan provides for critical vehicle access through the yard.</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Moderately Flexible</td>
<td>Vehicle access to the yard must be maintained at all times. It may be possible to modify the location of access roads in the portals to accommodate overbuild structural elements, but such modifications are assumed to be very costly due to the lack of unused real estate within the yard.</td>
</tr>
</tbody>
</table>
The signal system along the Mainline utilizes signal bridges that cross the entire Mainline. The footprint available for overbuild elements is extremely difficult to achieve making construction over the Mainline time consuming and extremely challenging.

The signal system along the Mainline contains what is likely the busiest rail interlocking in North America. The final ESA track configuration is anticipated to be completed prior to any overbuild construction over the Mainline. Track outages along the Mainline are extremely difficult to achieve making construction over the Mainline time consuming and extremely challenging. The final future conditions of the ESA project.

The initial future conditions of the track project.

The initial future conditions of the signal project.

The initial future conditions of the electrical project.

The initial future conditions of the signals project.

The initial future conditions of the bridges project.

The initial future conditions of the track project.

The initial future conditions of the power project.

The initial future conditions of the electrical project.

The initial future conditions of the signal project.

The initial future conditions of the power project.

The initial future conditions of the signal project.

The initial future conditions of the electrical project.

The initial future conditions of the bridges project.

The initial future conditions of the track project.
### NYCEDC Sunnyside Yard Master Plan

#### Below Deck Infrastructure Matrix

<table>
<thead>
<tr>
<th>Zone Elements</th>
<th>Operability/ Staging Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Unknowns</th>
<th>Change to Amtrak Master Plan (Yes/No)</th>
<th>Assessed Flexibility Ranking</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 7: Amtrak/LIRR Mainline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Utilities</td>
<td>Pile-supported storm sewer, sanitary sewer, electric, air lines, lighting</td>
<td>Future existing conditions after the ESA project complete will be unknown.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Not Flexible</td>
<td>Modifications to the non-railroad system utilities may be possible. Changes to utilities that do not require track outages will be significantly easier to achieve.</td>
</tr>
<tr>
<td>5. Subsurface Structures</td>
<td>ESA tunnels</td>
<td>Tunnels as well as the future NYSDEC tunnels are the primary structural elements that will be impacted by the project.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Not Flexible</td>
<td>Relocation of existing tunnels will not be possible. The use of possible relief structures should be explored.</td>
</tr>
<tr>
<td>6. Construction access</td>
<td>Virtually nonexistent</td>
<td>Virtually nonexistent</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Not Flexible</td>
<td>A laydown area the size required to support overbuild construction activities within Zone 7 is unlikely. Laydown areas will be required offsite. Access for construction equipment will likely require the use of hirail equipment.</td>
</tr>
<tr>
<td>7. Vehicle access</td>
<td>Access exists to the perimeter of the site with hirail access required to points within the tunnel.</td>
<td>Access exists to the perimeter of the site with hirail access required to points within the tunnel.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Not Flexible</td>
<td>It is feels that access to the site requires the use of hirail equipment; other site access modifications are unlikely.</td>
</tr>
</tbody>
</table>

### Zone 7: Amtrak/LIRR Mainline

The site was divided into two "Operable Units" (OU) each of which received its own Record of Decision (ROD) from NYCDEC, containing the results of remedial investigations and the remedial method selection process. Zone 7 overlaps with OU-6 and OU-6 has undergone remedial measures and there is no currently required further action, although there is an environmental assessment associated with OU-6 (O6-4) and OU-6 has ongoing remedial actions. OU-6 is below groundwater throughout the site excepting to the areas under and around the HSRF. OU-6 is below the site. OU-6: Groundwater and soil vapor.
**NYCEDC Sunnyside Yard Master Plan**

**Below Deck Infrastructure Matrix**

**Zone Elements**

<table>
<thead>
<tr>
<th>Type</th>
<th>Existing Future</th>
<th>Constructability/ Staging Considerations</th>
<th>Operational Considerations</th>
<th>Force Account Considerations</th>
<th>Environmental Considerations</th>
<th>Change to Amtrak Master Plan (Yes/No)</th>
<th>Assessed Flexibility Ranking</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Track Infrastructure</td>
<td>Tracks diverge from the Mainline to provide access to the car wash facility and the loop tracks.</td>
<td>Tracks diverge from the Mainline to provide access to the car wash facility and the loop tracks.</td>
<td>Reconstruction of the loop tracks will be challenging as they are in near constant use. Only limited access to track outages along the loop tracks would have significant impacts to operations.</td>
<td>Force account would be required at final track installations and operations.</td>
<td>The final future conditions of this project.</td>
<td>Potential modifications to the car wash tracks.</td>
<td>Not Flexible</td>
<td>It will be extremely difficult to reconstruct the loop tracks because they are in near constant use and are adjacent to the car wash loop tracks. Track outages associated with the loop tracks have severe operational impacts.</td>
</tr>
<tr>
<td>b) Catenary</td>
<td>Outfitting cable crossings (signal power monopoles) are critical.</td>
<td>Outfitting cable crossings (signal power monopoles) are critical.</td>
<td>Any limited track outages necessary to reposition trains, ensure space between tracks, maintain operational services, and outfitting signal power cables are critical.</td>
<td>OCS transfers or relocations must be designed to maintain services critical to operations.</td>
<td>The final future conditions of this project.</td>
<td>Not the Amtrak master plan does not impact the loop tracks.</td>
<td>Very Limited Flexibility</td>
<td>OCS wires are supported on different types of structures (portals, cross catenary, cantilever, pull-offs) and at different elevations. Message wire transfers range between 35’ and the existing catenary structure, which is a critical component of the electrical system.</td>
</tr>
<tr>
<td>Zone Elements</td>
<td>Constructability/ Staging Considerations</td>
<td>Operational Considerations</td>
<td>Force Account Considerations</td>
<td>Environmental Considerations</td>
<td>Unknowns</td>
<td>Change to Amtrak Master Plan (Yes/No)</td>
<td>Assessed Flexibility Ranking</td>
<td>Notes</td>
</tr>
<tr>
<td>---------------</td>
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<td>-----------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>a. Subsurface structures</td>
<td>Not built</td>
<td>Not built as well as the future, not to be precluded. Requires design for tunnels</td>
<td>- Vertical structural elements may be needed in order to not conflict with the existing or future tunnels. Trench side structure may be required. - It may be necessary to avoid structuring structural elements above the tunnels altogether.</td>
<td>- Construction activities that take place close proximity to the tunnel may potentially require work time outages of the tunnels.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>b. Construction access/laydown</td>
<td>Some areas are potentially available for laydown.</td>
<td>Depending on the size of laydown area required, laydown and staging areas may be required to be off site or on a previously constructed deck.</td>
<td>- Various operational considerations above and below ground need to be considered for constructability/staging column.</td>
<td>- Rail equipment driven on main line tracks would potentially require force account support in the form of a pilot or work gang and foreman.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>c. Vehicle access</td>
<td>Access needs to the perimeter of the site with local access to points within the perimeter.</td>
<td>Access needs to the perimeter of the site with local access to points within the perimeter.</td>
<td>- Getting hirail access to various points within the yard will require short term use of the Mainline tracks, requiring close coordination with Amtrak and LIRR in order to maintain operations.</td>
<td>- There are no operational considerations above and below ground that need to be considered for constructability/staging column.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>d. GM Facility</td>
<td>GM Service Facility</td>
<td>GM Service Facility</td>
<td>- If the property were acquired it would provide additional control yard capacity to support the deck construction.</td>
<td>- If the property is not acquired, construction activities would need to be coordinated with the owners of the facility to avoid conflict.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Part of Zone 9 overlaps with the NYSDEC State Superfund Site #241006. The site was divided into six “Operable Units” (OU-#), each of which received its own Record of Decision (ROD) from NYCDEC, containing the results of remedial investigations and the remedial method selection process.

- Zone 8 overlaps with OU-4, OU-5, and OU-6.
- OU-6 has undergone remedial measures and there is no currently required further action, although there is an environmental assessment associated with OU-4 and OU-5 that is ongoing remedial action.
- OU-6 has undergone groundwater remediation, and there is no currently required further action, although there is an environmental assessment associated with OU-4 and OU-5 that is ongoing remedial action.
- OU-4 has ongoing remedial action.
- OU-4: Soil above groundwater throughout the site excepting the areas under and around the HSRF. OU-6: Groundwater and soil vapor.

- N/A: The Amtrak master plan does not impact the facility. Not Flexible: Limitations of existing tunnels will not be possible. The use of possible relief structures should be avoided.
- N/A: The final future conditions of the ESA project. Not Flexible: A laydown area the size required to support overbuild construction activities within Zone 8 is unlikely. Some areas will be required to be offsite. Access for construction equipment will likely require the use of hirail equipment.
- N/A: The final future conditions of the ESA project. Not Flexible: It is likely that access to the site requires the use of hirail equipment; other site access modifications are unlikely.
- N/A: The Amtrak master plan does not impact the facility. Not Flexible: Coordination with the property owner may improve the flexibility status.
APPENDIX A.1.1

Yard Zone Map
LEGEND:
- NEW LIRR MID-DAY STORAGE YARD TRACKS
- NEW AMTRAK MASTER PLAN TRACKS
- NEW AMTRAK MASTER PLAN FACILITIES
- EXISTING TRACKS TO REMAIN

ZONE MAP

1. LIRR STORAGE YARD
2. AMTRAK HSR FACILITIES
3. AMTRAK/NJ TRANSIT OFF PEAK STORAGE
4. AMTRAK S&I FACILITIES AND STORAGE
5. AMTRAK MAINTENANCE FACILITIES
6. AMTRAK MoW YARD
7. AMTRAK/LIRR MAINLINE
8. LOOP TRACKS
9. GM PROPERTY
APPENDIX A.1.2

8.5’ Minimum Track Clearance Footprint
APPENDIX A.1.3

Structures for Overhead OCS, Ancillary and Power Cables
LEGEND:
- EXISTING CROSS-CATENARY, CANTILEVER AND PORTAL STRUCTURES
- EXISTING CROSS-CATENARY STRUCTURES
- EXISTING CANTILEVER AND PORTAL STRUCTURES
- EXISTING TRANSMISSION TOWERS
- EXISTING SIGNAL BRIDGES
- EXISTING AERIAL UTILITY CROSSING BRIDGES
- NO EXISTING RAIL POWER OVERHEAD WIRES
- NO EXISTING RAIL POWER OVERHEAD WIRES

ZONE 1:
- NO EXISTING OCS STRUCTURES
- FUTURE LIGHTING CROSS-CATENARY STRUCTURES AND TRUSSES

ZONE 2:
- EXISTING CROSS-CATENARY STRUCTURES

ZONE 3:
- EXISTING CROSS-CATENARY STRUCTURES

ZONE 4:
- EXISTING CROSS-CATENARY, CANTILEVER AND PORTAL STRUCTURES

ZONE 5:
- NEW AMTRAK MASTER PLAN FACILITIES
- NEW AMTRAK MASTER PLAN TRACKS
- NEW LIRR MID-DAY STORAGE YARD TRACKS

ZONE 6:
- GM PROPERTY

ZONE 7:
- EXISTING CROSS-CATENARY, CANTILEVER AND PORTAL STRUCTURES
- EXISTING TRANSMISSION TOWERS
- EXISTING SIGNAL BRIDGES
- EXISTING AERIAL UTILITY CROSSING BRIDGES

ZONE 8:
- EXISTING CROSS-CATENARY, CANTILEVER AND PORTAL STRUCTURES
- EXISTING TRANSMISSION TOWERS

ZONE 9:
- NO EXISTING RAIL POWER OVERHEAD WIRES

STRUCTURES FOR OVERHEAD CONTACT SYSTEM (OCS), ANCILLARY AND POWER CABLES
Contact wire: 16’ to 18’ from TOR (TYP.)

Messenger Wire 20’ to 25’ from TOR (TYP.)

Cross-track feeders

<65ft from TOR

OCS registration assembly

OCS power feeders

Contact wire: 16’ to 18’ from TOR (TYP.)

Messenger Wire 20’ to 25’ from TOR (TYP.)
Attachment 3.2 - OCS Cantilever Structure (Typ)

Contact Wire:
16' to 18' from TOR (Typ.)

Messenger Wire
20' to 25' from TOR (Typ.)

OCS Power Feeders
<65ft from TOR

OCS Registration Assembly

<65ft from TOR

OCS Power Feeders

Messenger Wire 20' to 25' from TOR (Typ.)

Contact Wire:
16' to 18' from TOR (Typ.)
Contact wire:
16’ to 18’ from TOR (TYP.)

Messenger Wire
20’ to 22’ from TOR

Signal cage

Signal Aspects

35ft from TOR

25ft from TOR
Cable drops for underground relocation

<55ft from TOF

Power cables across tracks in conduit racks

Cable drops for underground relocation

OCS Wires
Contact wire:
16' to 18' from TOR (TYP.)

Messenger Wire
20' to 25' from TOR (TYP.)

Cross-catenary suspension cable

Body span cable

<88ft from TOF