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June 23, 2022

Melanie A. Bachman, Esq.
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Docket No. 508 - The United Illuminating Company Application for a Certificate of Environmental Compatibility and Public Need for the Milvon to West River Railroad Transmission Line 115-kV Rebuild Project

Dear Ms. Bachman:

Enclosed for filing with the Connecticut Siting Council ("Council") is The United Illuminating Company's Late Filed Exhibit, as requested by the Council in the memorandum dated June 15, 2022.

An original and fifteen (15) copies of this filing will be hand delivered to the Council.

Should you have any questions regarding this letter, please do not hesitate to contact me.

Very truly yours,

Bruce L. McDermott

Enclosures

cc: Service List

Murtha Cullina LLP
265 Church Street
New Haven, CT 06510
T 203.772.7700
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Late Filed Exhibit-6

Q-LF-6:: During the June 14, 2022 evidentiary hearing, the Council requested the Applicant submit the following information as late-filed exhibits:

a) Provide a description of Option J, as explained by UI witness, MeeNa Sazanowicz, during verification of UI's Late-Filed Exhibits that includes, but is not limited to, modifications to the respective structures and how Option J relates to City of Milford Interrogatory No. 11;

b) Update the June 8, 2022 Late-Filed Exhibit Cost Table to include an additional row for Option J and attach the associated maps, costs and assumptions.

c) Update the June 8, 2022 Late-Filed Exhibit Cost Table to include any material cost adjustments to the Underground Options (E through I) to take into account hand digging to approximately 4 feet per the DOT Comments (page 1, paragraph 6); and

d) Submit Revised Assumptions that correlate to Option C and Option D on pages 13 and 17 of the June 8, 2022 Late-Filed Exhibit.

A-LF-6:

a) See Option J section of Exhibit LF-6-1 which is a revised version of UI's Late Filed Exhibit that was filed with the Council on June 8, 2022 (Applicant Exhibit 17). Exhibit LF-6-1 supplements and replaces Applicant Exhibit 17.

b) See Exhibit LF-6-1.

c) See Exhibit LF-6-1. More efficient and approved methods of hand digging or soft digging were considered when updating the estimate. These include use of a vacuum truck or air knifing.

d) See Option C and D sections of Exhibit LF-6-1.

UI MILVON WEST RIVER TRANSMISSION LINE REBUILD PROJECT (D508) - COST TABLE

Option	Project Component	Section Length in Linear Miles	Transmission Line Costs (A)	Distribution Related Costs (B)	Substation Costs (C)	Transition Station Costs (D)	HDD Costs (E)	Jack & Bore Costs (F)	Misc. Costs (e.g. bonnet decommissioning) (G)	Total Cost Estimate (H)* =[A+B+C+D+E+F+G]	Proposed Project Cost for this Section or Alternative (I)	Cost Delta (H-I)
A	Overhead Transmission Line, north side of RR ROW (proposed)	9.5	$222,550,000	$1,250,000	$3,850,000	$0	$0	$0	$67,350,000	$295,000,000	$295,000,000	$0
B	Overhead Transmission Line, south side of RR ROW	9.5	$265,475,000	$3,125,000	$3,850,000	$0	$0	$0	$67,350,000	$339,800,000	$295,000,000	$44,800,000
C	Overhead Transmission Line, Milford Alternative (reduce structure heights from 905N to 914N)	9.5	$223,400,000	$1,400,000	$3,850,000	$0	$0	$0	$67,350,000	$296,000,000	$295,000,000	$1,000,000
D	Overhead Transmission Line, shifted to south side of RR ROW from 905N to 914N	9.5	$234,250,000	$1,250,000	$3,850,000	$0	$0	$0	$67,350,000	$306,700,000	$295,000,000	$11,700,000
E	Underground Transmission Line, north side of RR ROW	9.5	$1,458,630,000	$0	$21,388,000	$0	$19,871,000	$0	$67,350,000	$1,567,239,000	$295,000,000	$1,272,239,000
F	Underground Transmission Line, south side of RR ROW	11.5	$1,291,748,000	$0	$11,458,000	$0	$27,540,000	$6,328,000	$67,350,000	$1,404,424,000	$295,000,000	$1,109,424,000
G	Underground Transmission Line within streets	9.5	$289,822,000	$1,250,000	$3,850,000	$1,522,000	$0	$590,000	$67,350,000	$364,384,000	$295,000,000	$69,384,000
H	Underground Transmission Line, Milford Alternative (from 905N to 914N) – RR ROW	9.5	$300,423,000	$1,250,000	$3,850,000	$1,522,000	$1,492,000	$0	$67,350,000	$357,887,000	$295,000,000	$80,887,000
I	Underground Transmission Line, Morissette Alternative (from 900N to 914N)	9.5	$337,740,800	$1,250,000	$3,850,000	$1,522,000	$1,492,000	$0	$67,350,000	$413,205,000	$295,000,000	$118,205,000
J	Overhead Transmission Line, Milford Alternative (reduce structure heights from 904N to 916N)	9.5	$222,900,000	$1,250,000	$3,850,000	$0	$0	$0	$67,350,000	$295,350,000	$295,000,000	$350,000

*These costs are for the total Project, including the Option described.
Per ISO-NE PP4, Appendix D, these are "Project Initiation" type estimates (-50%/+200% accuracy)
Revision 1 Notes: 1) Option J added to the chart
2) Options E, H, and I have updated transmission costs to include soft digging (~4') with in the railroad corridor per DOT comments
3) Option F is characterized in the above chart as south side of RR tracks. However due to the limited railroad corridor on the south side of the tracks and other constraints, this option is south side of the tracks with public streets
Please see attached Notes and Assumptions documents for further details

UI Milvon West River Transmission Line Rebuild Project (D508)

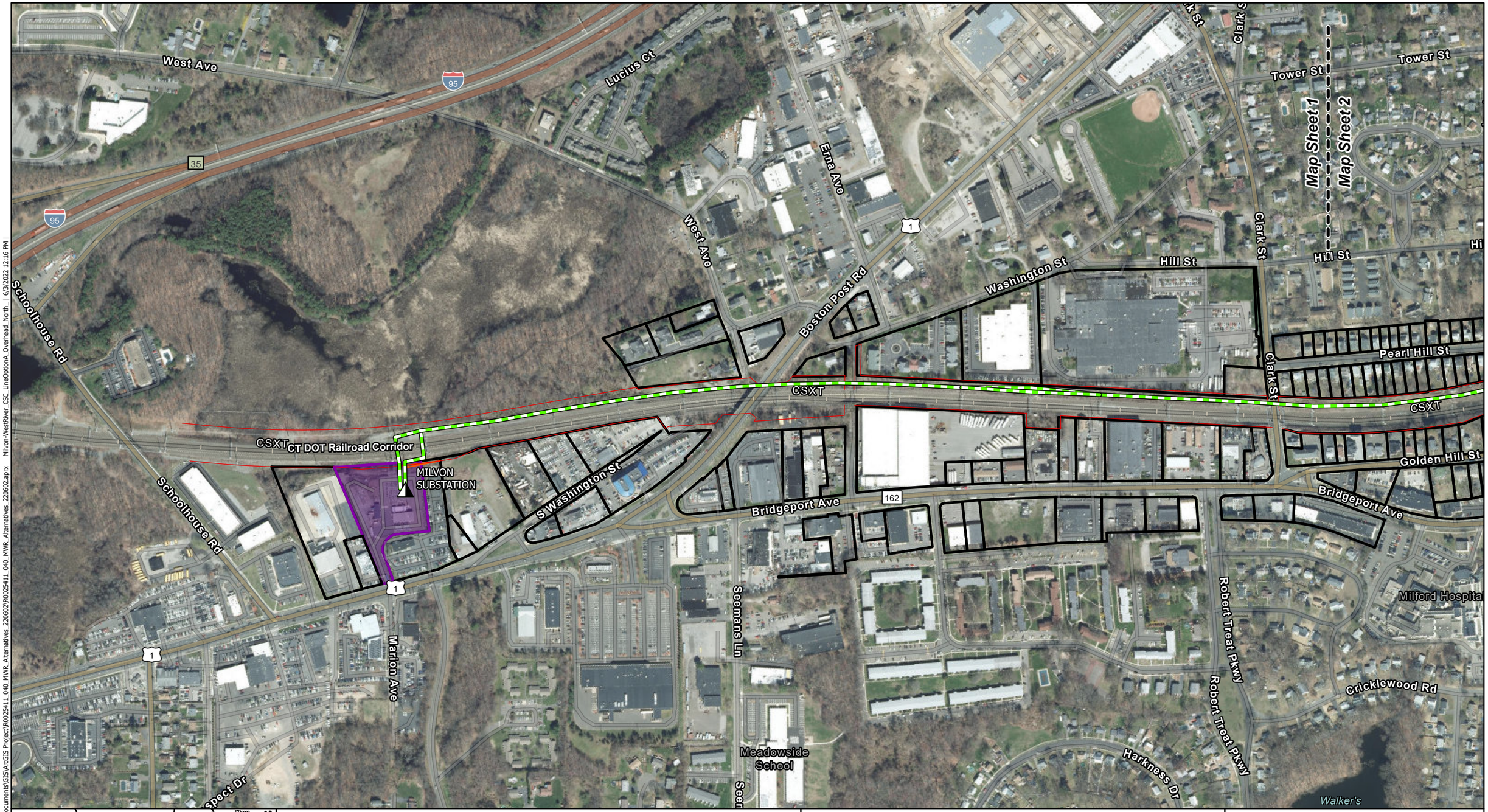
CSC LF-2 Cost Table Assumptions and Notes

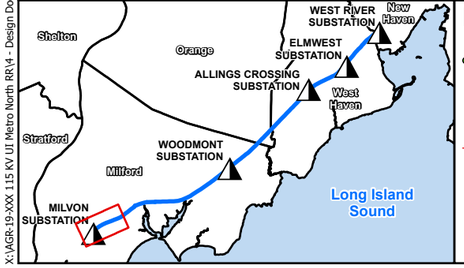
Revision 1

Option A

Overhead Transmission Line, north side of RR ROW (Proposed Project)

Proposed Project constructed completely overhead between Milvon Substation to West River Substation primarily on the north side of the tracks





Map Legend

- Option A -- Rebuilt 115-kV Overhead Lines -- North
- Substation
- CT DOT Corridor Boundary
- Proposed UI Permanent Easement
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option A

Proposed Project - North Side of RR ROW

N

0 400 US Feet

1" = 400'

Revised: 06/03/2022

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

UI AVANGRID

Westwood

OH Option A Map 1 of 9

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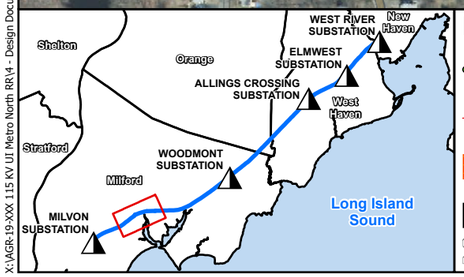

Map Legend

- Option A -- Rebuilt 115-kV Overhead Lines -- North
- CT DOT Corridor Boundary
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- Parcel Boundary
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option A

Proposed Project - North Side of RR ROW

N

0 400 US Feet

1" = 400'

Revised: 06/03/2022

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

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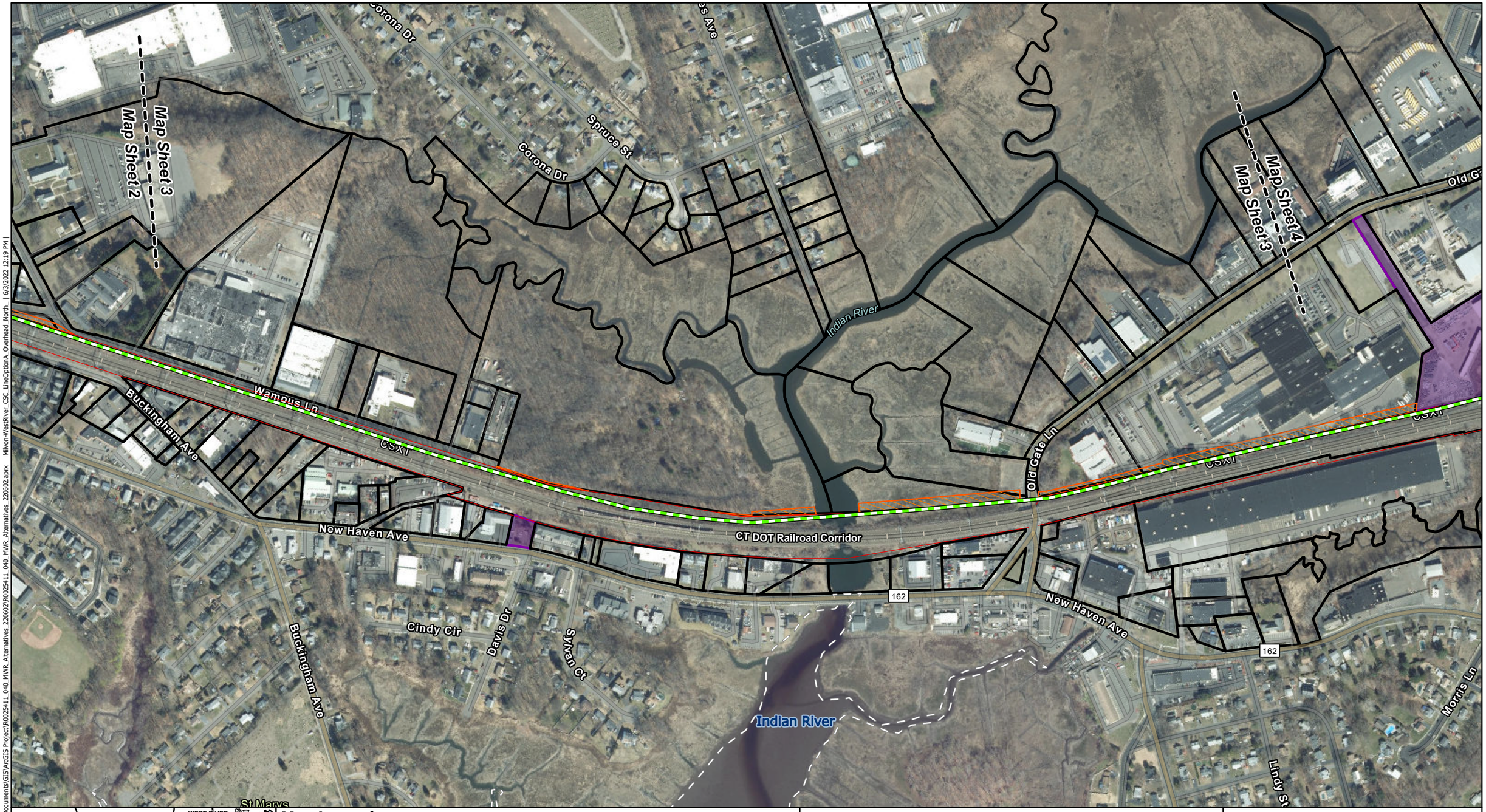
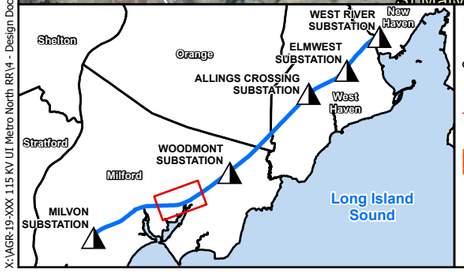
OH Option A Map 2 of 9





Map Legend

- Option A -- Rebuilt 115-kV Overhead Lines -- North
- CT DOT Corridor Boundary
- Proposed UI Permanent Easement
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option A

Proposed Project - North Side of RR ROW

N

0 400 US Feet

1" = 400'

Revised: 06/03/2022

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

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OH Option A Map 3 of 9

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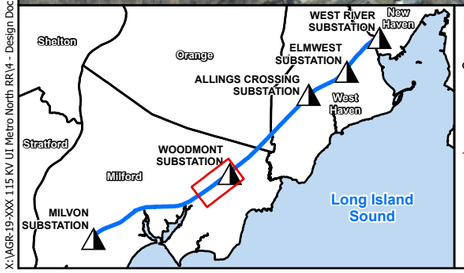

Map Legend

- Option A -- Rebuilt 115-kV Overhead Lines -- North
- Substation
- CT DOT Corridor Boundary
- Proposed UI Permanent Easement
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option A

Proposed Project - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400' Revised: 06/03/2022

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OH Option A Map 4 of 9

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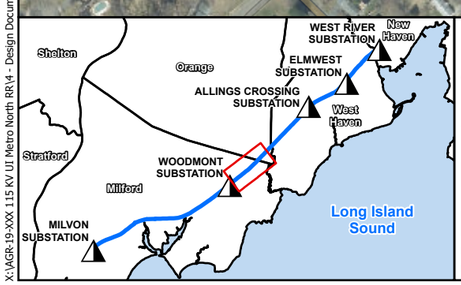
Map Sheet 4
Map Sheet 5
Map Sheet 6
Map Sheet 5

Quarry Rd
Research Dr
McQuillan Dr
Marble Ln
Cascade Blvd
Executive Blvd
Marsh Hill Rd
Orange
Heenan Dr
CSX I
CT DOT Railroad Corridor
Connair Rd
Oxford Rd
Quirks Pond
Alternative Education
Quirk Rd
Rock Ln
Londonderry Ln
Saley Rd
Lyda Dr
Anderson Ave
Depot Rd
Wendy Rd
West Haven
Orange
West Haven



Map Legend

- Option A -- Rebuilt 115-kV Overhead Lines -- North
- CT DOT Corridor Boundary
- Proposed UI Permanent Easement
- Parcel Boundary
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option A

Proposed Project - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/03/2022

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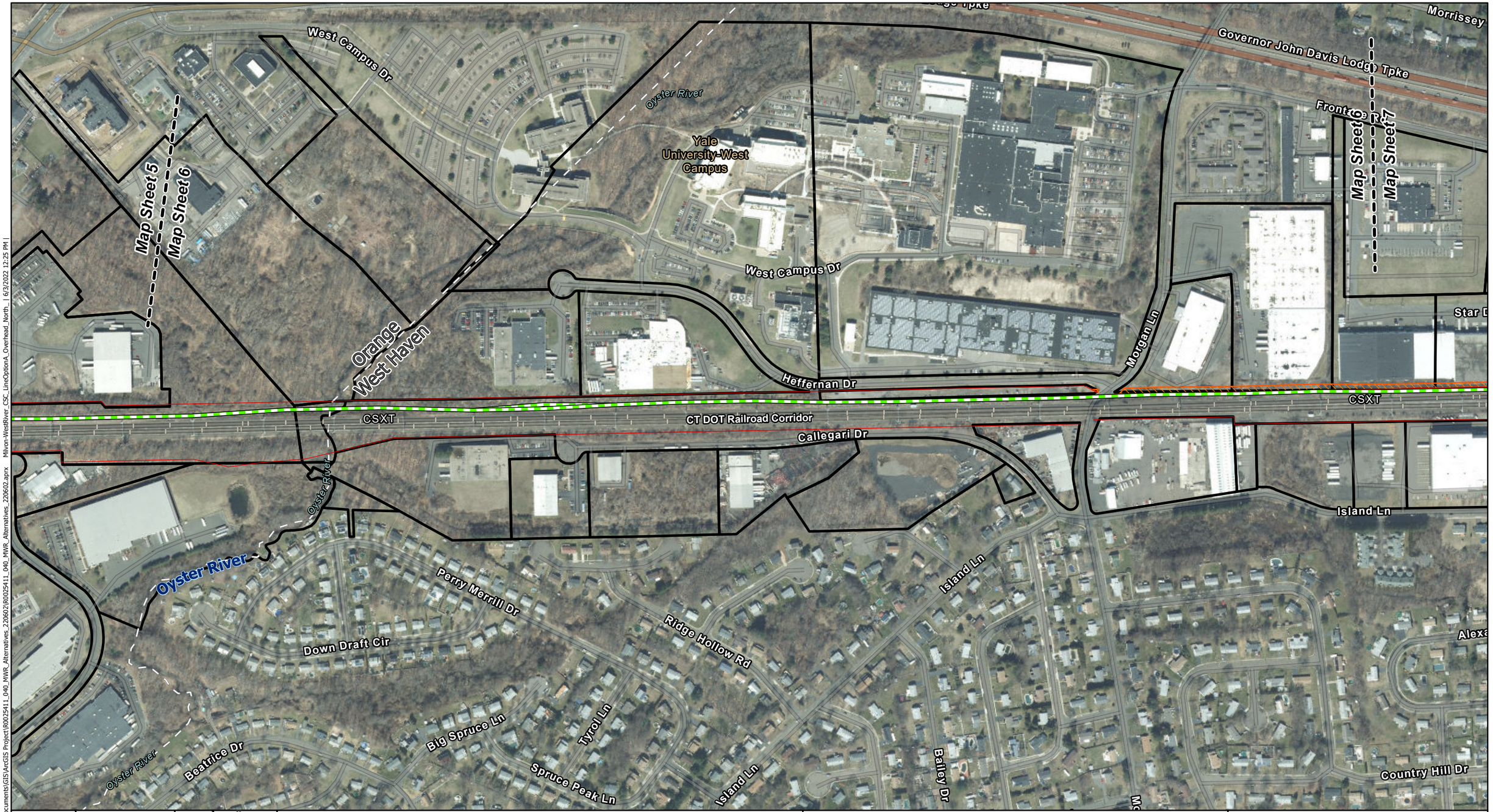
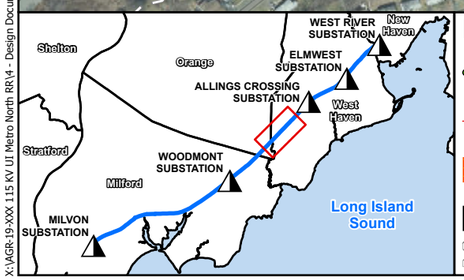
OH Option A Map 5 of 9





Map Legend

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- CT DOT Corridor Boundary
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UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option A

Proposed Project - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

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Revised: 06/03/2022

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OH Option A Map 6 of 9

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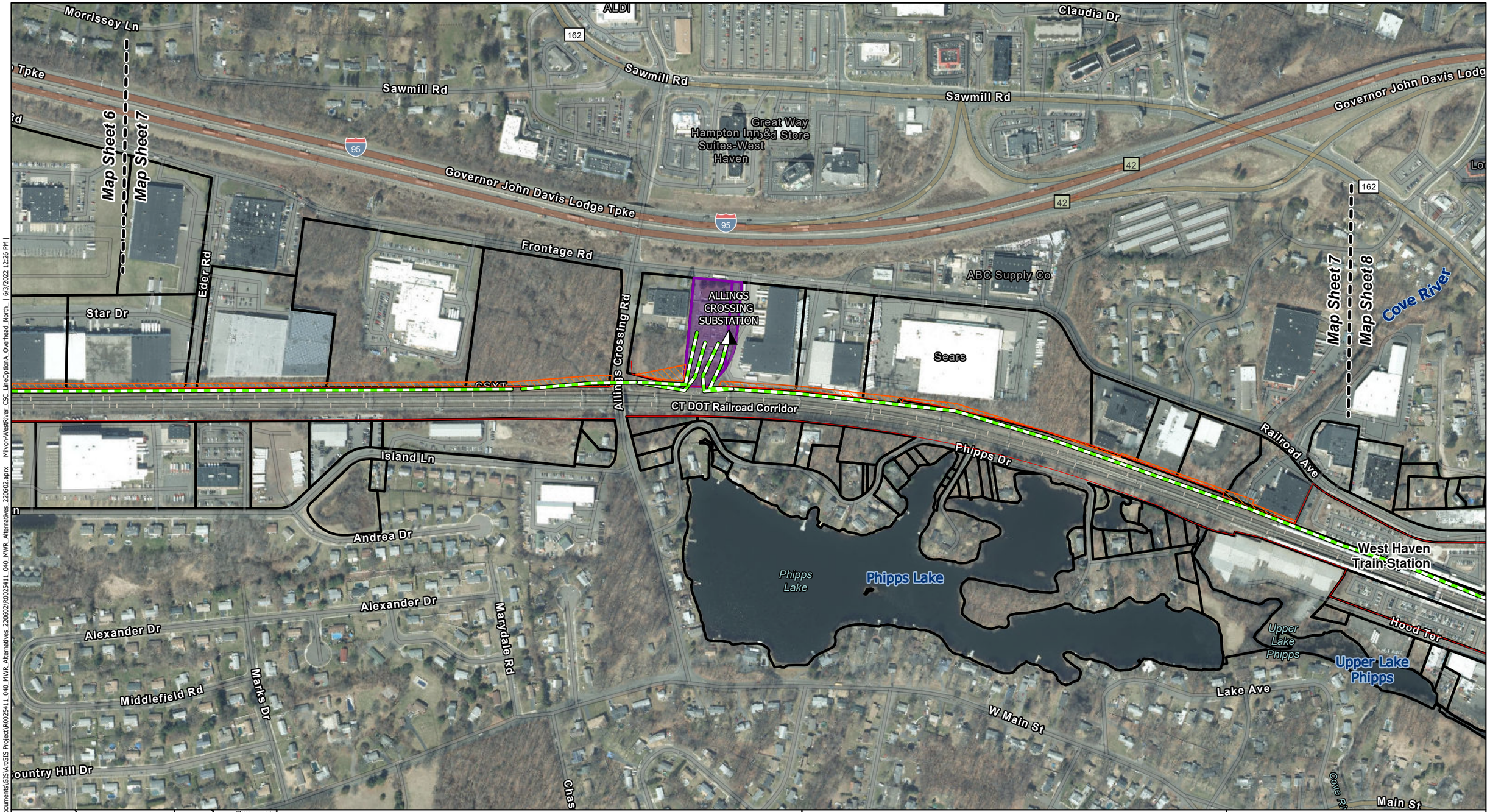

Map Legend

- Option A -- Rebuilt 115-kV Overhead Lines -- North
- Substation
- CT DOT Corridor Boundary
- Proposed UI Permanent Easement
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option A

Proposed Project - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

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OH Option A Map 7 of 9

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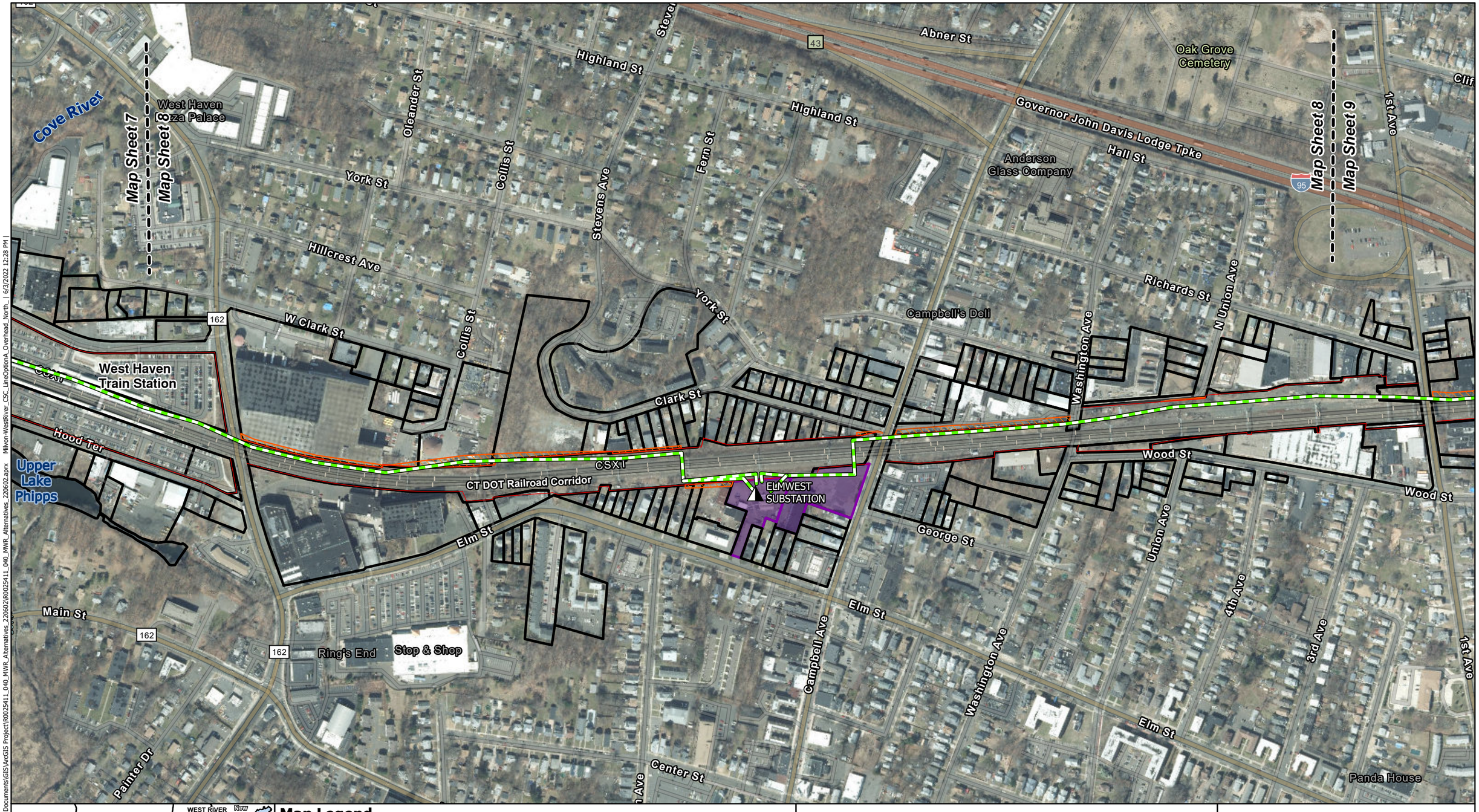

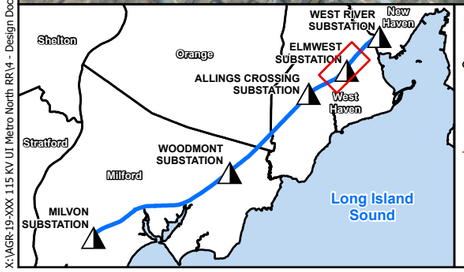

Map Legend

- Option A -- Rebuilt 115-kV Overhead Lines -- North
- Substation
- CT DOT Corridor Boundary
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UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option A

Proposed Project - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400' Revised: 06/03/2022

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Option A Map 8 of 9

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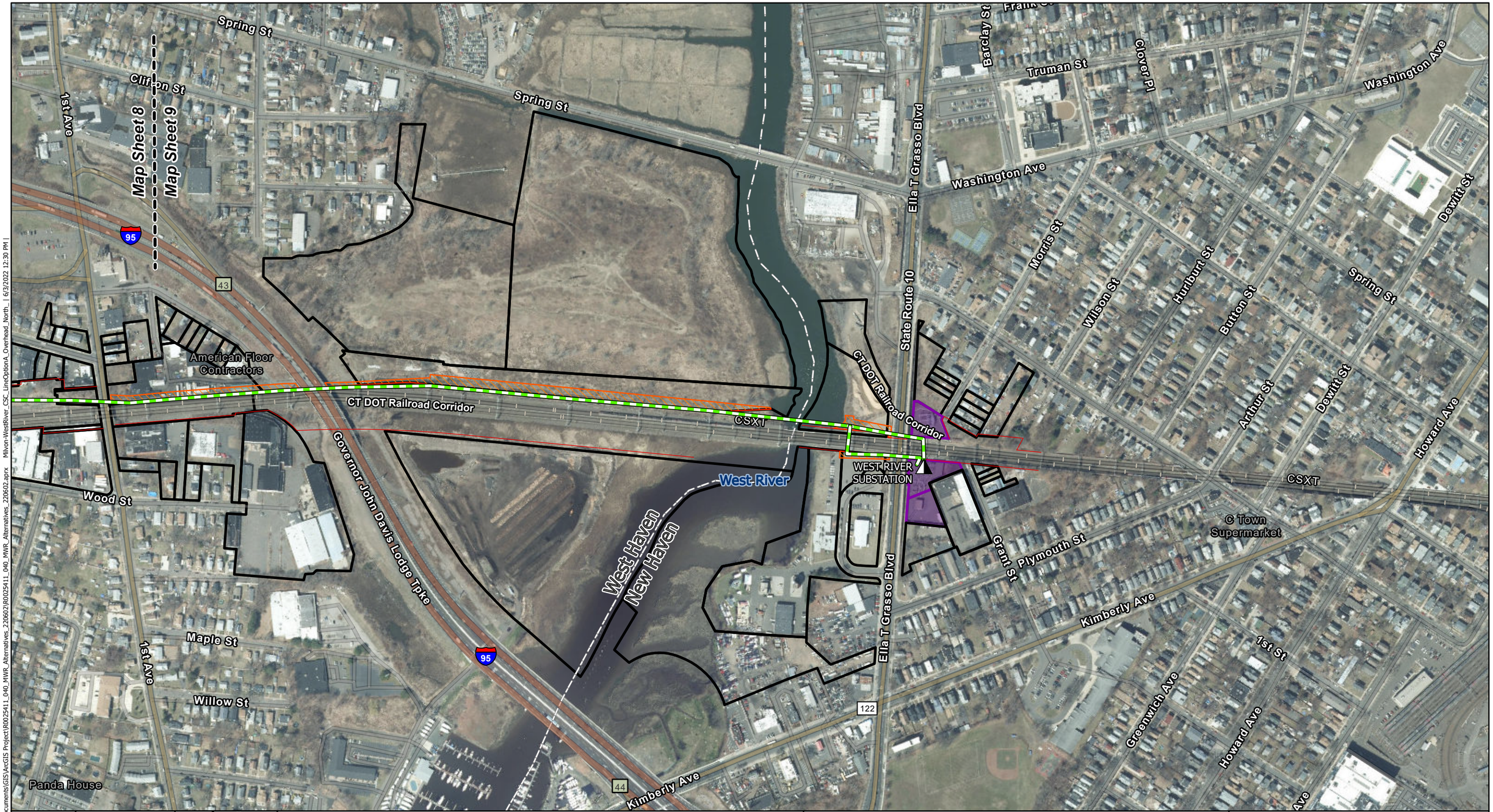

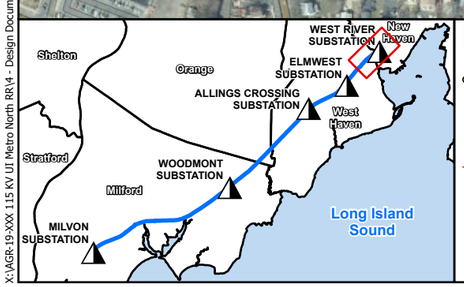

Map Legend

- Option A -- Rebuilt 115-kV Overhead Lines -- North
- Substation
- CT DOT Corridor Boundary
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UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option A

Proposed Project - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
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0 400 US Feet

1" = 400'

Revised: 06/03/2022

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OH Option A Map 9 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionA_Overhead_North_ | 6/3/2022 12:30 PM |

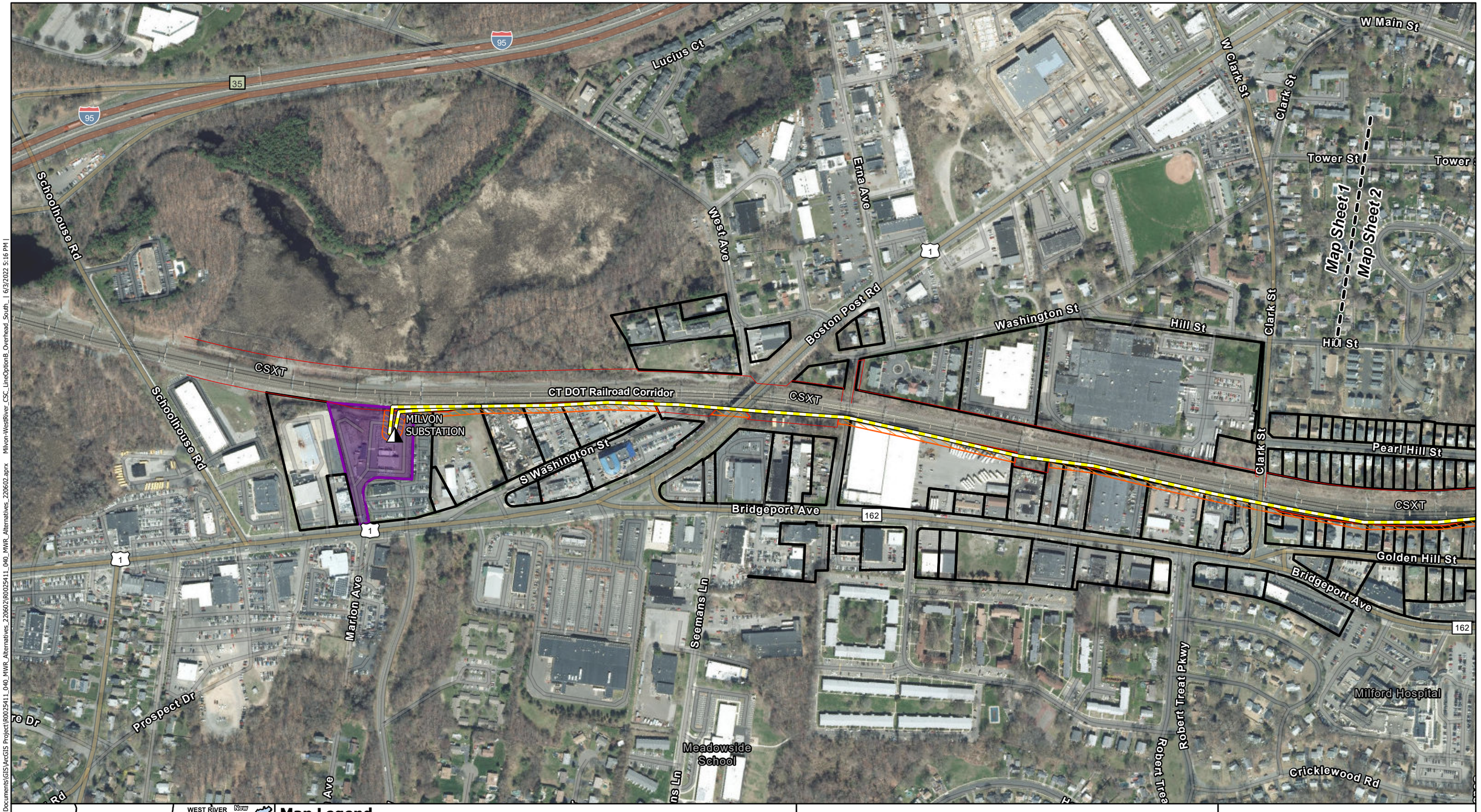
Cost Estimate – Furnish and Install

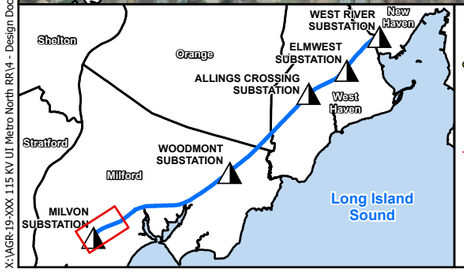
Item	Quantity	Estimate
Engineering & Indirects		$43,400,000
Steel Poles, Foundations, and Attachment Hardware	158	$46,250,000
OPGW and Conductors		$28,500,000
Removals		$17,500,000
Other Construction Requirements (Mobilization, Laydown Yards, Commissioning of Line, etc)		$10,900,000
Distribution Work		$400,000
Substation Work	-	$1,200,000
Land Rights	18 acres	$12,950,000
Environmental Controls (Matting, Clearing, etc)		$35,450,000
Flagmen/Police Support		$13,400,000
AFUDC		$40,650,000
Contingency (30%)		$44,400,000
Option A Total Cost		$295,000,000

Option B

Overhead Transmission Line, south side of RR ROW

Proposed Project constructed completely overhead between Milvon Substation to West River Substation primarily on the south side of the tracks





Map Legend

- Option B -- Rebuilt 115-kV Overhead Lines -- South
- Substation
- CT DOT Corridor Boundary
- Proposed UI Permanent Easement
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option B

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/03/2022

UI AVANGRID

Westwood

OH Option B Map 1 of 9

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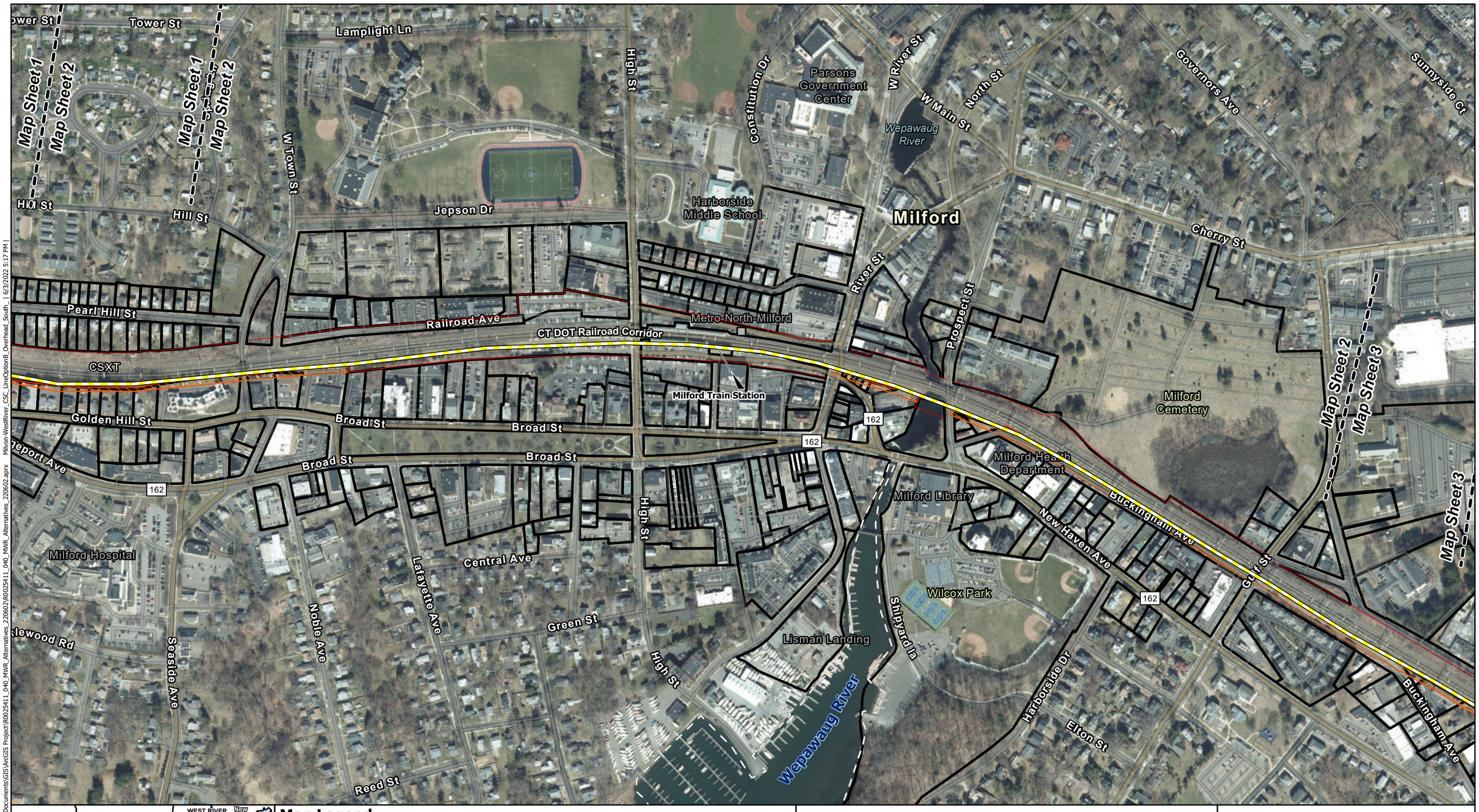

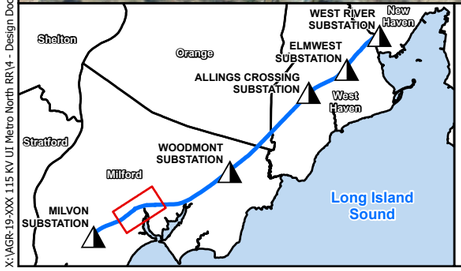

Map Legend

- Option B -- Rebuilt 115-kV Overhead Lines -- South
- Substation
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- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option B

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
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1" = 400' Revised: 06/03/2022

UI AVANGRID

Westwood

OH Option B Map 2 of 9

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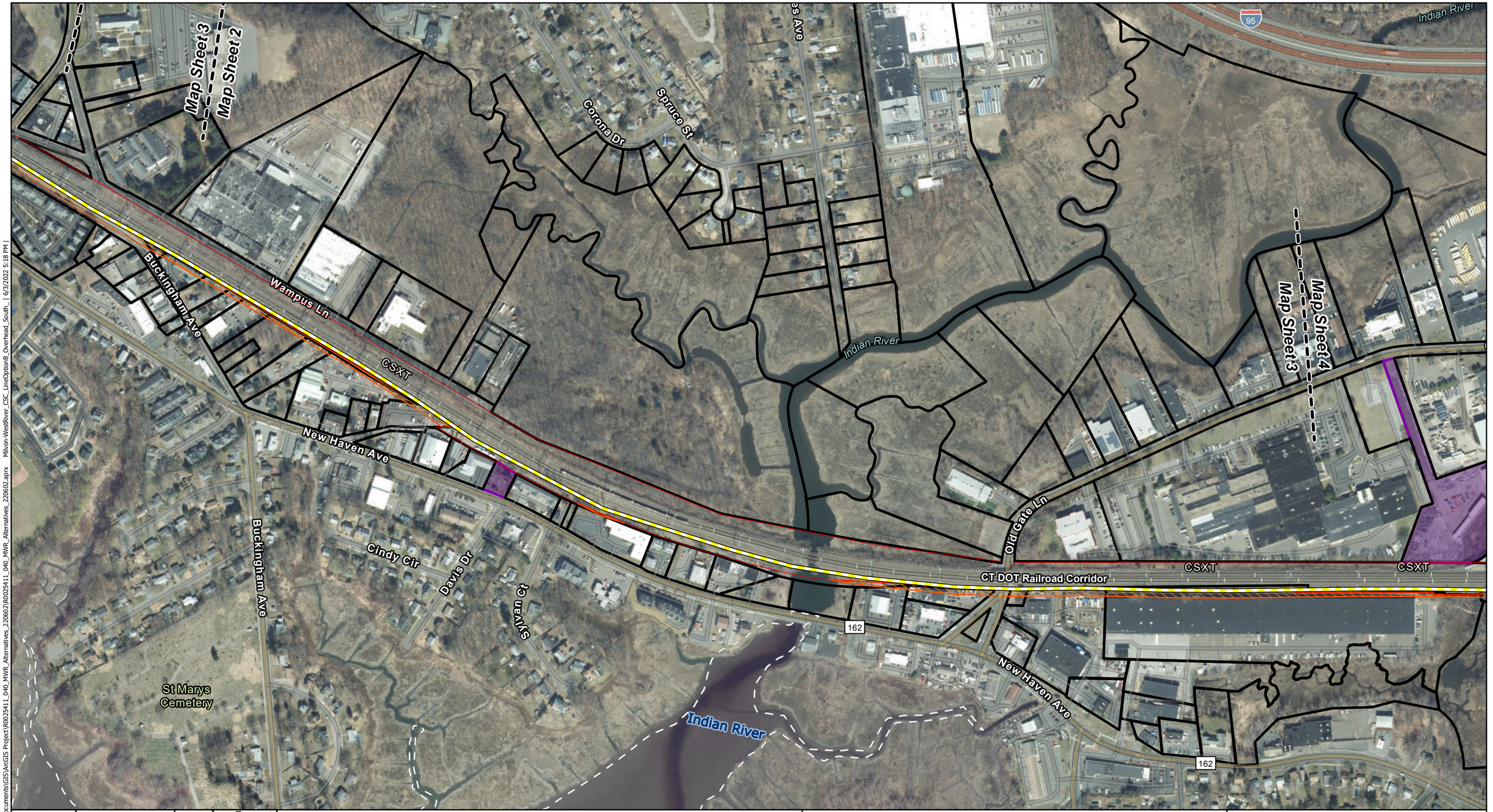

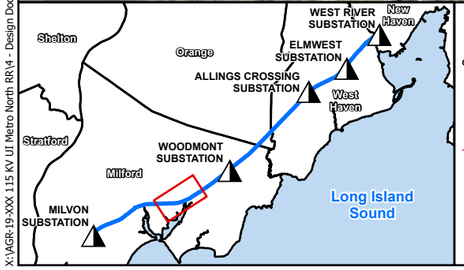

Map Legend

- Option B -- Rebuilt 115-kV Overhead Lines -- South
- Substation
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- Proposed UI Permanent Easement
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option B

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400' Revised: 06/03/2022

UI AVANGRID

Westwood

OH Option B Map 3 of 9

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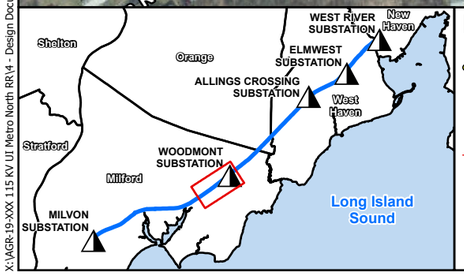


Map Legend

- Option B -- Rebuilt 115-kV Overhead Lines -- South
- Substation
- CT DOT Corridor Boundary
- Proposed UI Permanent Easement
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option B

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

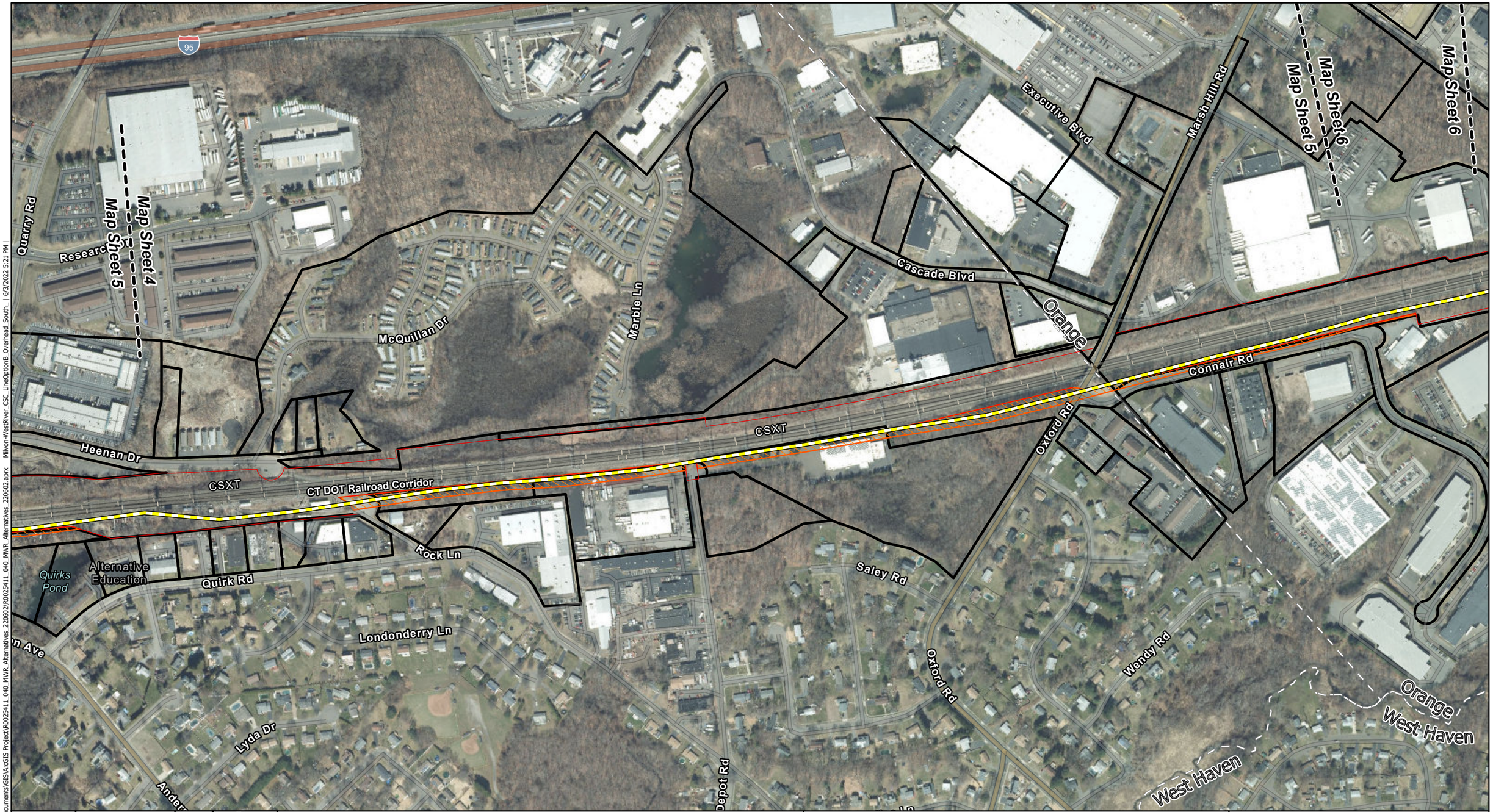
Revised: 06/03/2022

UI AVANGRID

Westwood

OH Option B Map 4 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionB_Overhead_South_ | 6/3/2022 5:19 PM |



Map Legend

- Option B -- Rebuilt 115-kV Overhead Lines -- South
- Substation
- CT DOT Corridor Boundary
- Proposed UI Permanent Easement
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option B

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/03/2022

UI AVANGRID

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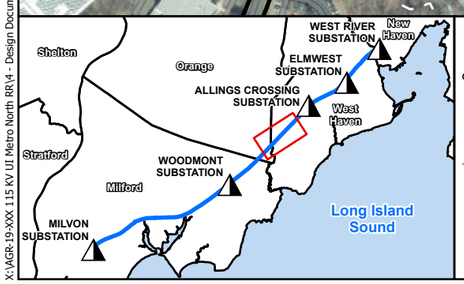
OH Option B Map 5 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionB_Overhead_South_ | 6/3/2022 5:21 PM |



Map Legend

- Option B -- Rebuilt 115-kV Overhead Lines -- South
- Substation
- CT DOT Corridor Boundary
- Proposed UI Permanent Easement
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option B

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400' Revised: 06/03/2022

UI AVANGRID

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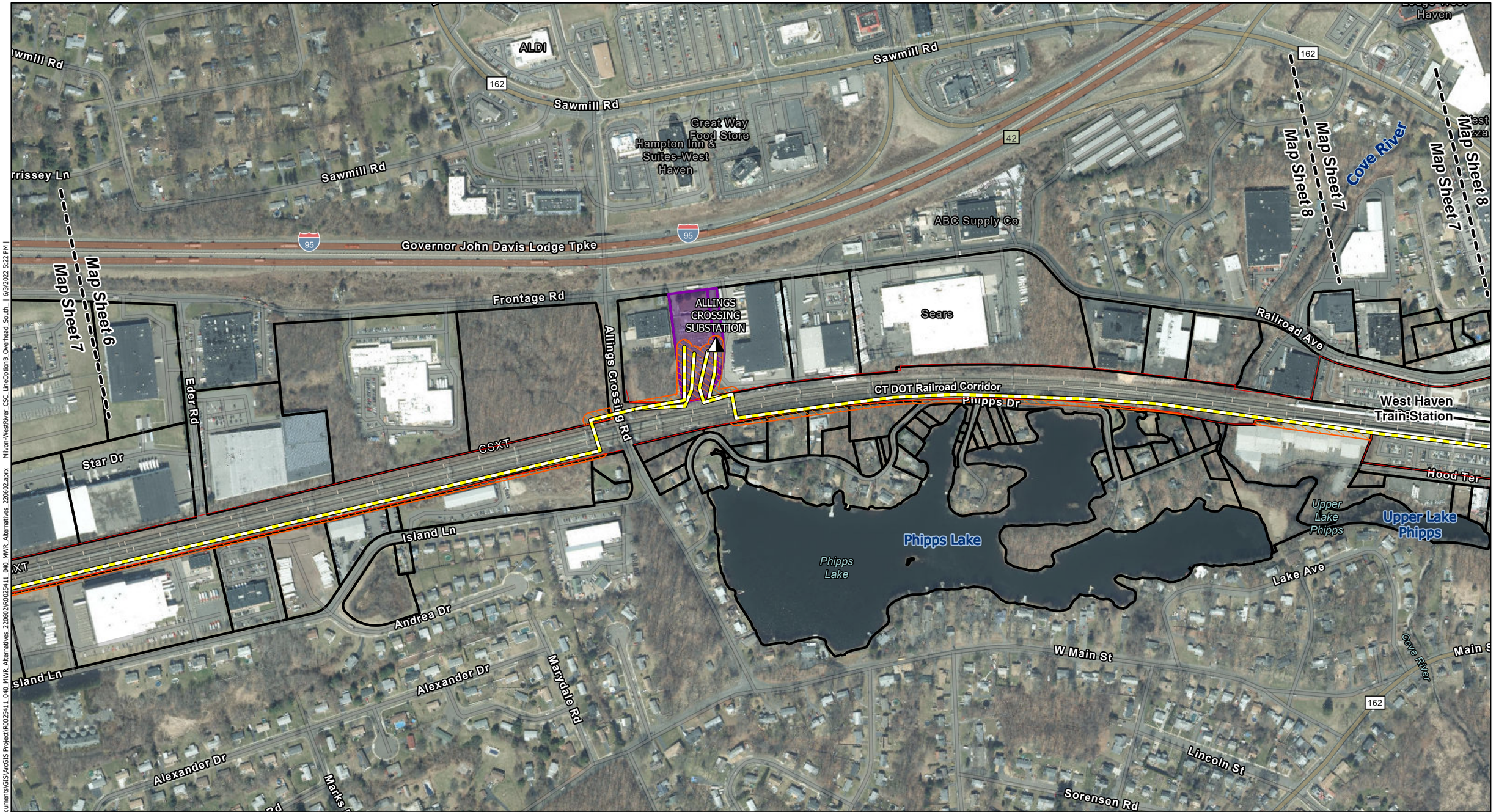
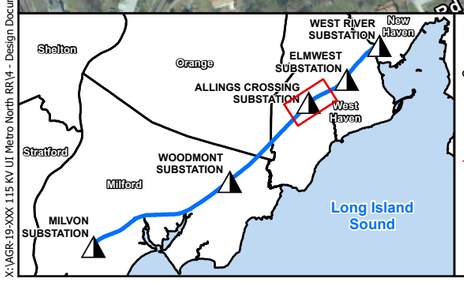
OH Option B Map 6 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionB_Overhead_South_ | 6/3/2022 5:21 PM |





Map Legend

- Option B -- Rebuilt 115-kV Overhead Lines -- South
- Substation
- CT DOT Corridor Boundary
- Proposed UI Permanent Easement
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option B

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/03/2022

UI AVANGRID

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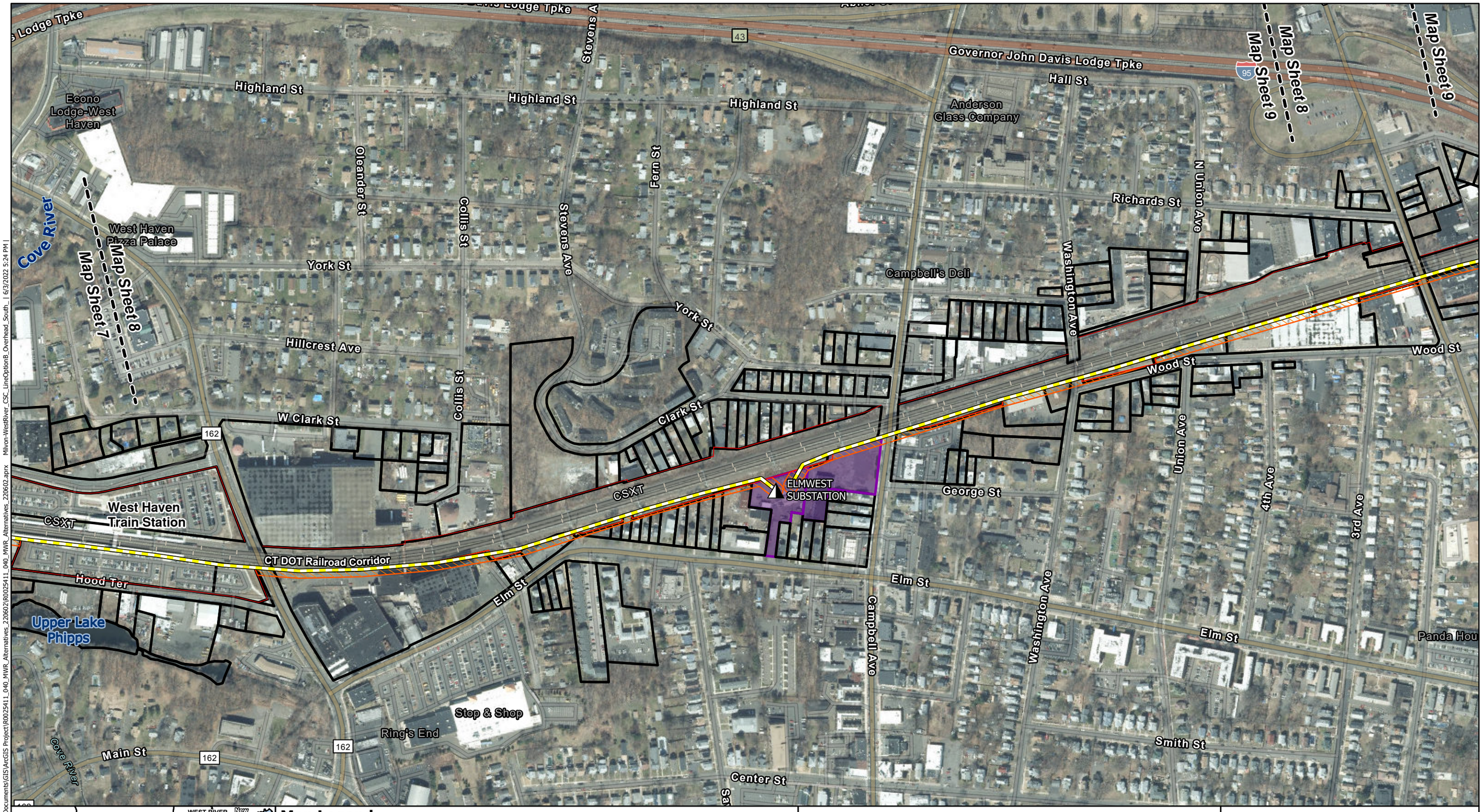
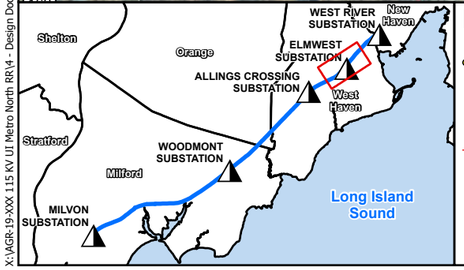
OH Option B Map 7 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionB_Overhead_South_ | 6/3/2022 5:22 PM |





Map Legend

- Option B -- Rebuilt 115-kV Overhead Lines -- South
- Substation
- CT DOT Corridor Boundary
- Proposed UI Permanent Easement
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option B

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

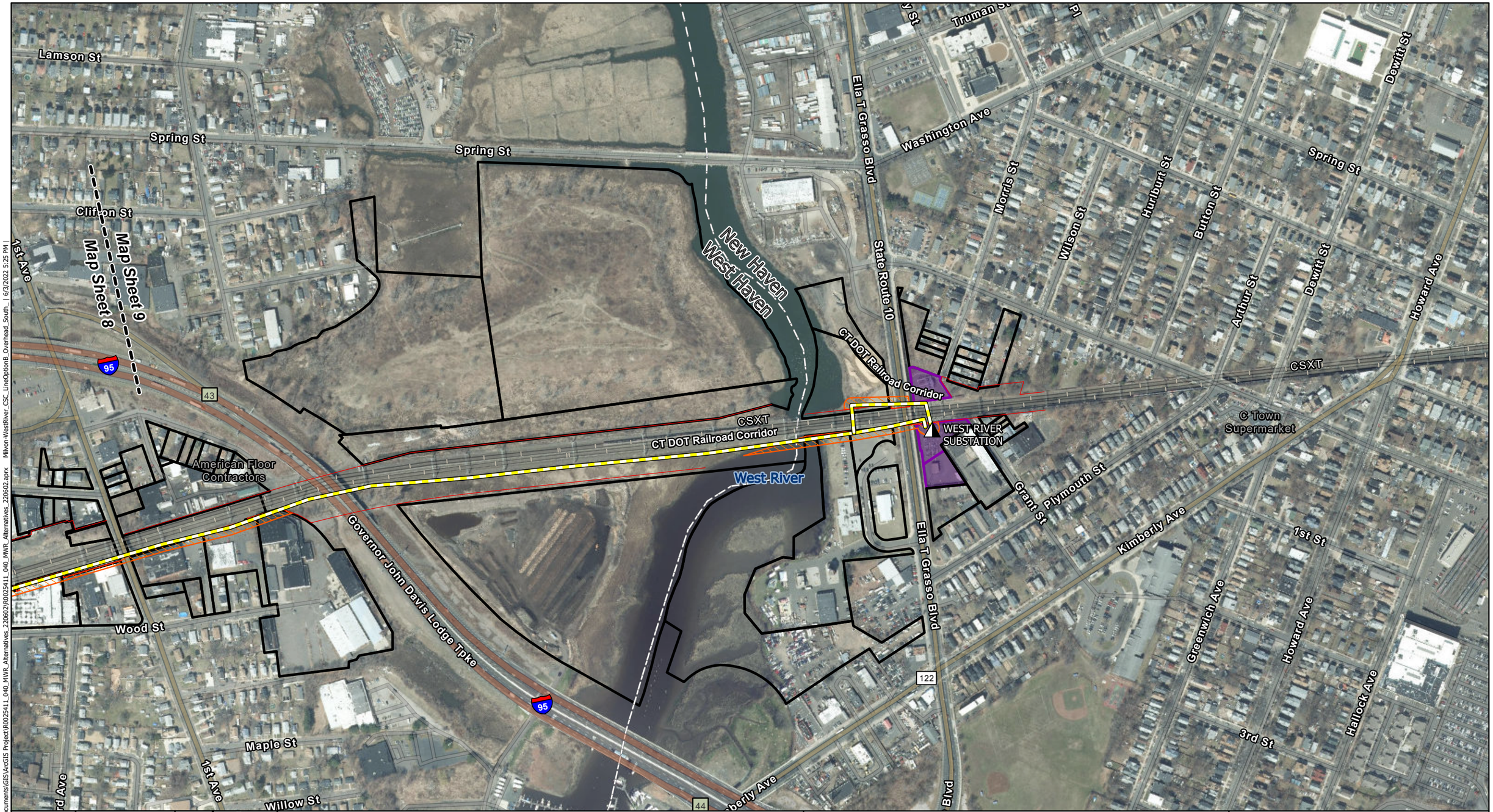
1" = 400' Revised: 06/03/2022

UI AVANGRID

Westwood

OH Option B Map 8 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionB_Overhead_South_ | 6/3/2022 5:24 PM |



Map Legend

- Option B -- Rebuilt 115-kV Overhead Lines -- South
- Substation
- CT DOT Corridor Boundary
- Proposed UI Permanent Easement
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Overhead Route Option B

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/03/2022

UI AVANGRID

Westwood

OH Option B Map 9 of 9

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Cost Estimate – Furnish and Install

Item	Quantity	Estimate
Engineering & Indirects		$70,600,000
Steel Poles, Foundations, and Attachment Hardware	155	$46,250,000
OPGW and Conductors		$28,600,000
Removals		$17,500,000
Other Construction Requirements (Mobilization, Laydown Yards, Commissioning of Line, etc)		$10,900,000
Distribution Work		$1,000,000
Substation Work	-	$1,200,000
Land Rights	24 acres	$17,850,000
Environmental Controls (Matting, Clearing, etc)		$39,650,000
Flagmen/Police Support		$13,400,000
AFUDC		$46,650,000
Contingency (30%)		$46,200,000
Option B Total Cost		$339,800,000

General Overall Design Constraints

The following items were considered in the design of the proposed project.

- The rebuilt line should be parallel and adjacent to the RR tracks.
- Conductors shall not cross over buildings.
- Site grading shall be limited to the maximum extent possible.
    - Structures shall be spotted at the bottom of the slope up to the RR tracks or at the top of the slope down to the RR tracks, to the maximum extent possible.
- Poles shall be placed within the CTDOT Railroad Corridor to the maximum extent possible.
- Pole shall be placed in locations to minimize to support MNR signal and/or feeder wires.
- Minimize all construction impacts to private residential properties to the maximum extent possible.
- Pole placement and wire pulling sites should be located in locations of sufficient size for the work required.
- Impacts from pole placement in wetlands, watercourses and the cemetery shall be minimized to the maximum extent possible

Assumptions Option B

Design/Engineering/Scope

- No underground subsurface utility survey has been performed
- No geotechnical investigations have been performed, which dictate pole foundation sizing in addition to soil and groundwater environmental characterization and disposal volume estimates
- Pole heights have not been determined
- No field verification of pole placement or wire pulling locations has been performed
- Pole placement was based on what has been investigated for the proposed project in terms of the work pads for removal activities.
- Poles are placed within the CTDOT Railroad Corridor to the maximum extent possible.
    - However, approximately 30 poles may have to be located on private property for this option while, while only 13 poles are located on private property for the proposed project.
    - This results in more permanent easements required
- Where possible, poles are located a sufficient distance away from the existing catenary structures to not have to support MNR signal and/or feeder wires.

    - However, up to 20 poles may have to support MNR signal and/or feeder wires
- The line is parallel and adjacent to the RR tracks, primarily on the south side of tracks, except for where the line must connect to Woodmont, Allings Crossing, and West River Substations.
- Due to the tight corridor and the proximity of existing buildings to the existing catenary structures, this option will require conductors to span across buildings.
    - In some locations, this can be mitigated by placing poles on the top of the slope up to the RR tracks. Required site grading, matting, and necessary environmental controls will be significantly increased in these locations.
- Due to constructability concerns, two spans of over 1,000' are proposed. Spans of this length require the use of a special conductor type, and significantly taller poles
- Significant Impacts can and will happen on private residential properties (either poles on private property or significant vegetation clearing and conductor overhang)
- EMF impacts have not been assessed
- Potential archeological impacts have not been assessed on the south side of the corridor
- The extent of wetland and watercourse impacts have not been reviewed, specifically with respect to permanent impacts and permitting.

Access routes for construction have not been fully vetted

Cost Estimate

- ISO-PP4 Appendix D assumptions:
    - This is a "Project Initiation" type estimate (-50%/+200% accuracy)
    - Contingency for this type of estimate is 30%-50%
    - This estimate used 30% contingency
- Per Acreage Costs for Land Rights are assumed to be $750,000/acre
- Escalation is calculated at 1.75% per year
- Four flagmen per day (2 crews) have been allocated for the duration of the construction schedule

Option C

Overhead Transmission Line, north side of RR ROW (Proposed Project with Reduced Structure Heights from P905N to P914N)

Proposed Project constructed completely overhead between Milvon Substation to West River Substation primarily on the north side of the tracks with Reduced Structure Heights from P905N to P914N

PLAN		
NOTEBOOK NO.	SURVEYED	BY
	REVIEWED	
	ROW CHKD	

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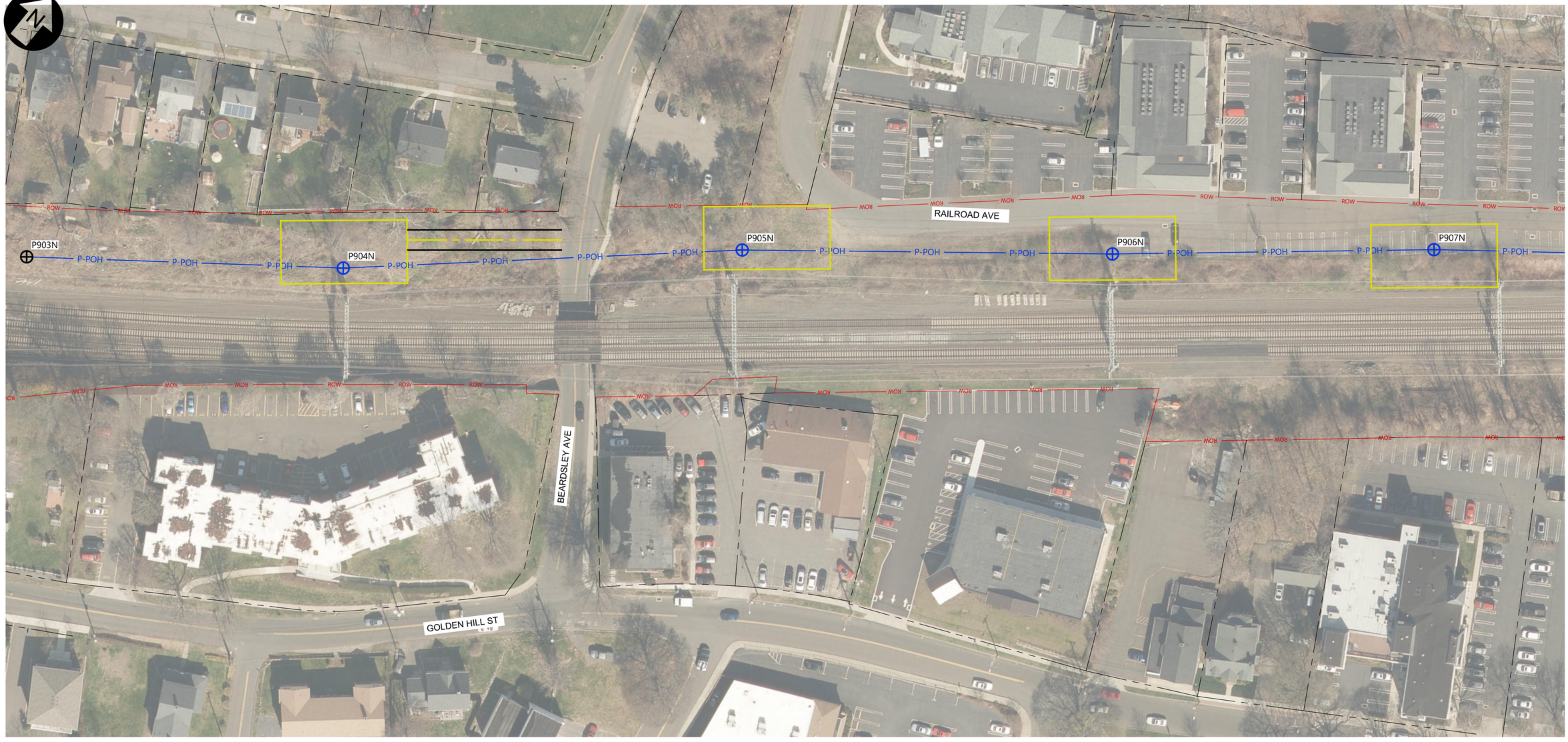

PROFILE		
NOTEBOOK NO.	SURVEYED	BY
	REVIEWED	
	NOTES REDUCED	

LEGEND

- OPTION C CONCEPT STRUCTURE LOCATIONS
- UI PROPOSED 115-KV TRANSMISSION LINE STRUCTURE
- P-POH — OPTION C CONCEPT OVERHEAD ALIGNMENT
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- ACCESS ROAD
- WORK PAD

DOWNTOWN MILFORD CONCEPT PLAN

0' 40 80 120

UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

NOTES:
1. PRELIMINARY, NOT FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION	APP.

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UI AVANGRID

REV.	DATE	BY	DESCRIPTION	APP.

UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION C - OH REDUCED STR. HEIGHTS
1 OF 3

DR.	SFB	SCALE AS SHOWN	FILE:
CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

CADD Drawing, DO NOT REVISE MANUALLY.
ANSI D

LEGEND

- OPTION C CONCEPT STRUCTURE LOCATIONS
- UI PROPOSED 115-KV TRANSMISSION LINE STRUCTURE
- P-POH — OPTION C CONCEPT OVERHEAD ALIGNMENT
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- ACCESS ROAD
- WORK PAD

DOWNTOWN MILFORD CONCEPT PLAN

0' 20 40 60

PLAN		BY	DATE
	SURVEYED		
NOTEBOOK NO.	REVIEWED		
PROFILE	NOTES REDUCED		

PLAN		BY	DATE
	SURVEYED		
NOTEBOOK NO.	REVIEWED		
	ROW CHKD		

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UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

NOTES:
1. PRELIMINARY, NOT FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION	APP.

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UI AVANGRID

REV.	DATE	BY	DESCRIPTION	APP.

UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION C - OH REDUCED STR. HEIGHTS
2 OF 3

DR.	SFB	SCALE AS SHOWN	FILE:
CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

LEGEND

- OPTION C CONCEPT STRUCTURE LOCATIONS
- UI PROPOSED 115-KV TRANSMISSION LINE STRUCTURE
- P-POH — OPTION C CONCEPT OVERHEAD ALIGNMENT
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- ACCESS ROAD
- WORK PAD

DOWNTOWN MILFORD CONCEPT PLAN

0' 20 40 60

PLAN		BY	DATE
NOTEBOOK NO.	SURVEYED		
	REVIEWED		
	ROW CHKD		

PROFILE		BY	DATE
NOTEBOOK NO.	SURVEYED		
	REVIEWED		
	NOTES REDUCED		

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ANSI D

UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

NOTES:
1. PRELIMINARY, NOT FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION	APP.

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UI AVANGRID

REV.	DATE	BY	DESCRIPTION	APP.

UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION C - OH REDUCED STR. HEIGHTS
3 OF 3

DR.	SFB	SCALE AS SHOWN	FILE:
CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

Cost Estimate – Furnish and Install

Item	Quantity	Estimate
Engineering & Indirects		$43,650,000
Steel Poles, Foundations, and Attachment Hardware	161	$46,650,000
OPGW and Conductors		$28,500,000
Removals		$17,500,000
Other Construction Requirements (Mobilization, Laydown Yards, Commissioning of Line, etc)		$10,900,000
Distribution Work		$450,000
Substation Work	-	$1,200,000
Land Rights	18 acres	$13,000,000
Environmental Controls (Matting, Clearing, etc)		$35,475,000
Flagmen/Police Support		$13,400,000
AFUDC		$40,775,000
Contingency (30%)		$44,500,000
Option C Total Cost		$296,000,000

Assumptions

Design/Engineering/Scope

- No underground subsurface utility survey has been performed at either new structure locations or relocated structure locations
- No geotechnical investigation has been performed at either new structure locations or relocated structure locations which dictate pole foundation sizing in addition to soil and groundwater environmental characterization and disposal volume estimates
- 3 Additional Steel Poles and Foundations Needed in Comparison to the Proposed Project, increasing viewshed impacts and likelihood of impacting archaeological resources due to more foundations
- 6 Poles of 158 with Lowered Pole Heights in Comparison to the Proposed Project
- Additional Vegetation Clearing and Land Rights Needed in Comparison to the Proposed Project

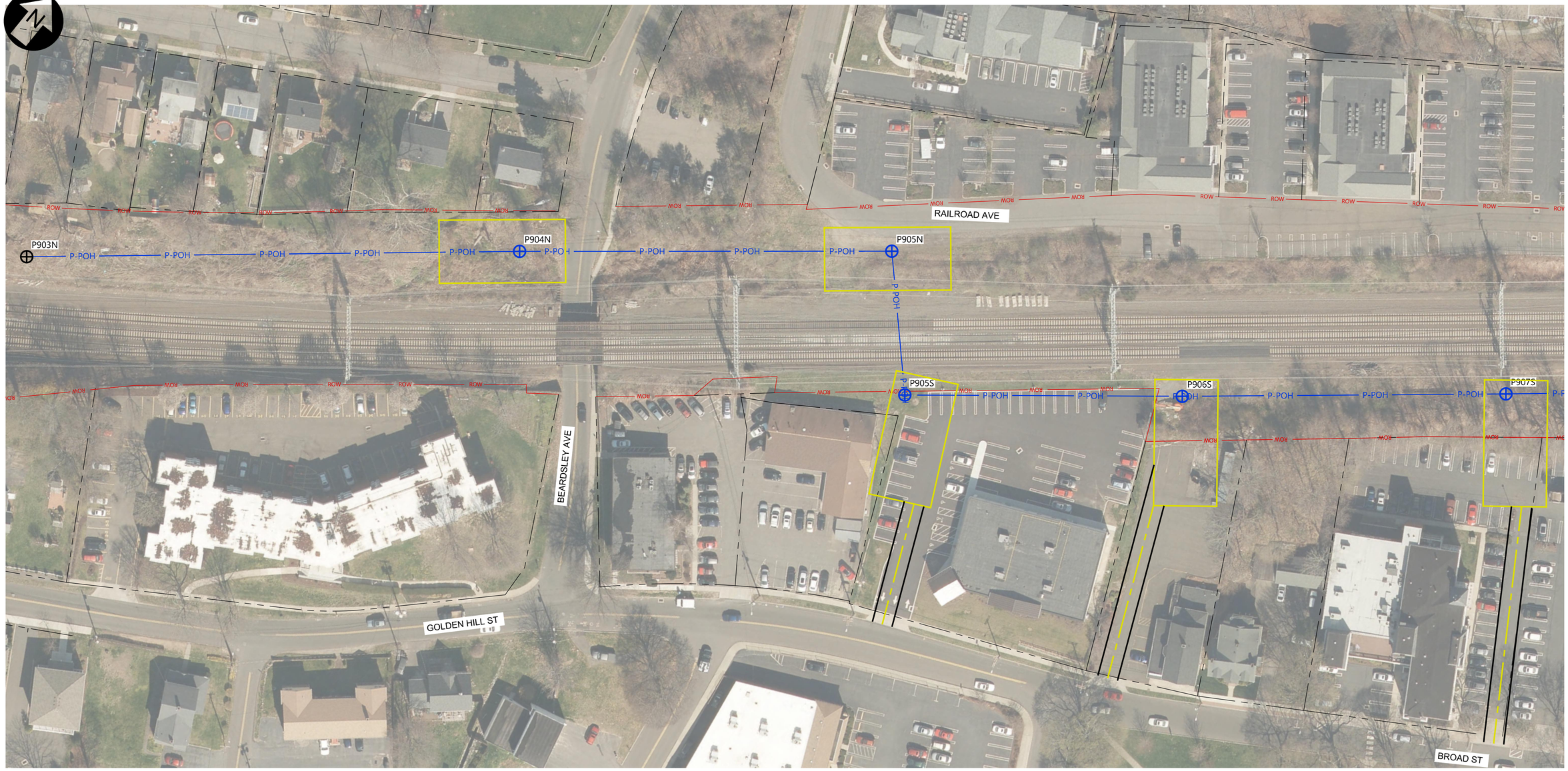
Cost Estimate

- ISO-PP4 Appendix D assumptions:
    - This is a "Project Initiation" type estimate (-50%/+200% accuracy)
    - Contingency for this type of estimate is 30%-50%
    - This estimate used 30% contingency
- Escalation is calculated at 1.75% per year
- Four flagmen per day (2 crews) have been allocated for the duration of the construction schedule

Option D

Overhead Transmission Line, north side of RR ROW (Proposed Project Shifted to South Side from P905N to P914N)

Proposed Project constructed completely overhead between Milvon Substation to West River Substation primarily on the north side of the tracks with the line routed to the south side of the tracks between P905N to P914N



LEGEND

- OPTION D CONCEPT STRUCTURE LOCATIONS
- UI PROPOSED 115-KV TRANSMISSION LINE STRUCTURE
- P-POH — OPTION D CONCEPT OVERHEAD ALIGNMENT
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- ACCESS ROAD
- WORK PAD

DOWNTOWN MILFORD CONCEPT PLAN

0' 40 80 120

PLAN	BY	DATE
NOTEBOOK NO.		
SURVEYED		
REVIEWED		
ROW CHKD		

PROFILE	BY	DATE
NOTEBOOK NO.		
SURVEYED		
REVIEWED		
NOTES REDUCED		

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UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

NOTES:
1. PRELIMINARY, NOT FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION	APP.

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UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION D - OVERHEAD SOUTH OF RR TRACKS
1 OF 3

DR.	SFB	SCALE AS SHOWN	FILE:
CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

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PLAN		BY	DATE
	SURVEYED		
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PROFILE		BY	DATE
	SURVEYED		
NOTEBOOK NO.	REVIEWED		
	NOTES REDUCED		

LEGEND

- OPTION D CONCEPT STRUCTURE LOCATIONS
- UI PROPOSED 115-KV TRANSMISSION LINE STRUCTURE
- P-POH — OPTION D CONCEPT OVERHEAD ALIGNMENT
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- ACCESS ROAD
- WORK PAD

DOWNTOWN MILFORD CONCEPT PLAN

0' 20 40 60

UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

NOTES:
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REV.	DATE	BY	DESCRIPTION	APP.

UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION D - OVERHEAD SOUTH OF RR TRACKS
2 OF 3

DR.	SFB	SCALE AS SHOWN	FILE:
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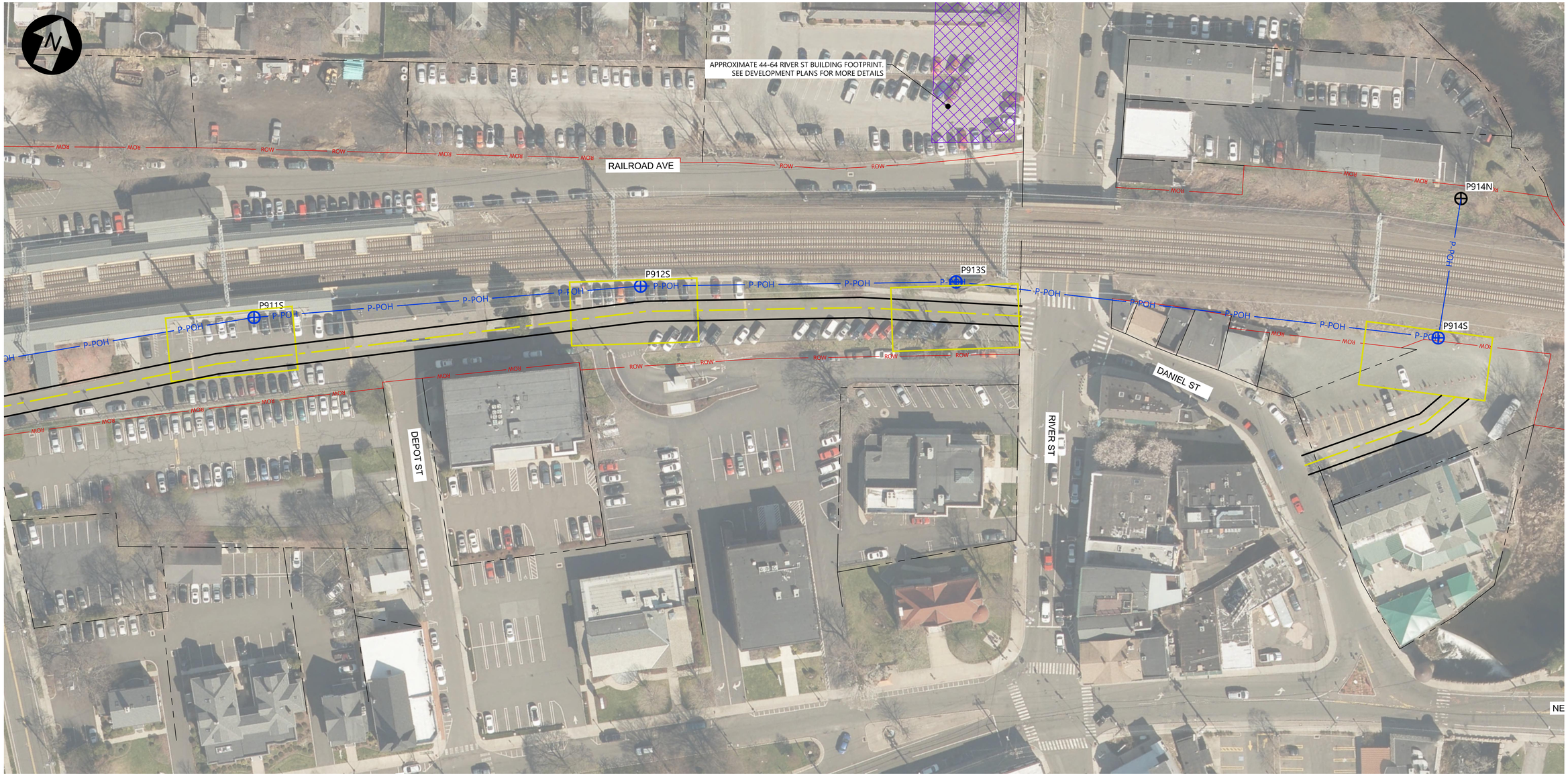

LEGEND

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- UI PROPOSED 115-KV TRANSMISSION LINE STRUCTURE
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- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- ACCESS ROAD
- WORK PAD

DOWNTOWN MILFORD CONCEPT PLAN

0' 20 40 60

PLAN	SURVEYED	BY	DATE
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	ROW CHKD		

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UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

NOTES:
1. PRELIMINARY, NOT FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION	APP.

PE Stamp

AVANGRID ENGINEERING
CONFIDENTIAL, PROPRIETARY and TRADE SECRET INFORMATION
Property of AVANGRID

UI AVANGRID

REV.	DATE	BY	DESCRIPTION	APP.

UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION D - OVERHEAD SOUTH OF RR TRACKS
3 OF 3

DR.	SFB	SCALE AS SHOWN	FILE:
CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

Cost Estimate – Furnish and Install

Item	Quantity	Estimate
Engineering & Indirects		$44,500,000
Steel Poles, Foundations, and Attachment Hardware	163	$47,600,000
OPGW and Conductors		$32,550,000
Removals		$17,500,000
Other Construction Requirements (Mobilization, Laydown Yards, Commissioning of Line, etc)		$11,250,000
Distribution Work		$400,000
Substation Work	-	$1,200,000
Land Rights	18 acres	$13,250,000
Environmental Controls (Matting, Clearing, etc)		$35,700,000
Flagmen/Police Support		$13,400,000
AFUDC		$42,450,000
Contingency (30%)		$46,900,000
Option D Total Cost		$306,700,000

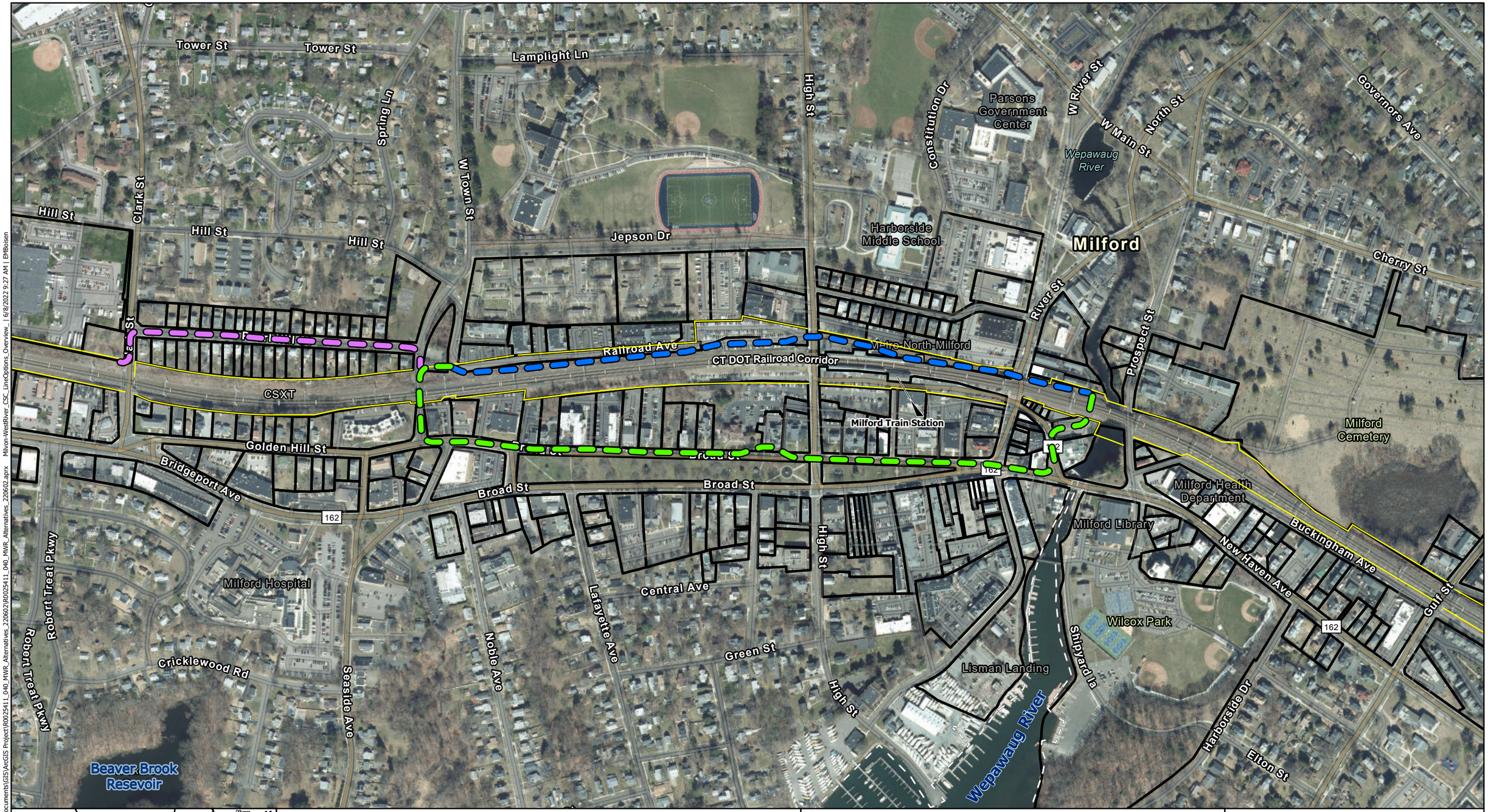
Assumptions

Design/Engineering/Scope

- No underground subsurface utility survey has been performed on the south side of the railroad tracks or at relocated structure locations
- No geotechnical investigation has been performed on the south side of the railroad tracks or at relocated structure locations which dictate pole foundation sizing in addition to soil and groundwater environmental characterization and disposal volume estimates
- 5 Additional Steel Poles and Foundations Needed in Comparison to the Proposed Project, increasing viewshed impacts and likelihood of impacting archaeological resources due to more foundations
- Additional Vegetation Clearing and Land Rights Needed in Comparison to the Proposed Project
- No field verification of pole placement or wire pulling locations has been performed
- Due to the tight corridor and the proximity of existing buildings to the existing catenary structures, this option will require conductors to span across buildings.
- Two additional track crossings will be required which will require more track outages and delay construction
- Both 115kV Lines can be out of service at the same time for 3 to 4 weeks
- Heights for the poles located on the south side of the tracks have not been determined but are assumed to range between 100’ and 120’ in height.
- The billboard by Catenary B913S can be removed.

Cost Estimate

- ISO-PP4 Appendix D assumptions:
    - This is a “Project Initiation” type estimate (-50%/+200% accuracy)
    - Contingency for this type of estimate is 30%-50%
    - This estimate used 30% contingency
- Escalation is calculated at 1.75% per year
- Four flagmen per day (2 crews) have been allocated for the duration of the construction schedule



Map Legend

- Substation
- CT DOT Corridor Boundary
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

Route Options

- Option G
- Option H
- Option I

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, CT

Downtown Milford Underground Concept Routes

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/08/2022

UI AVANGRID

Westwood

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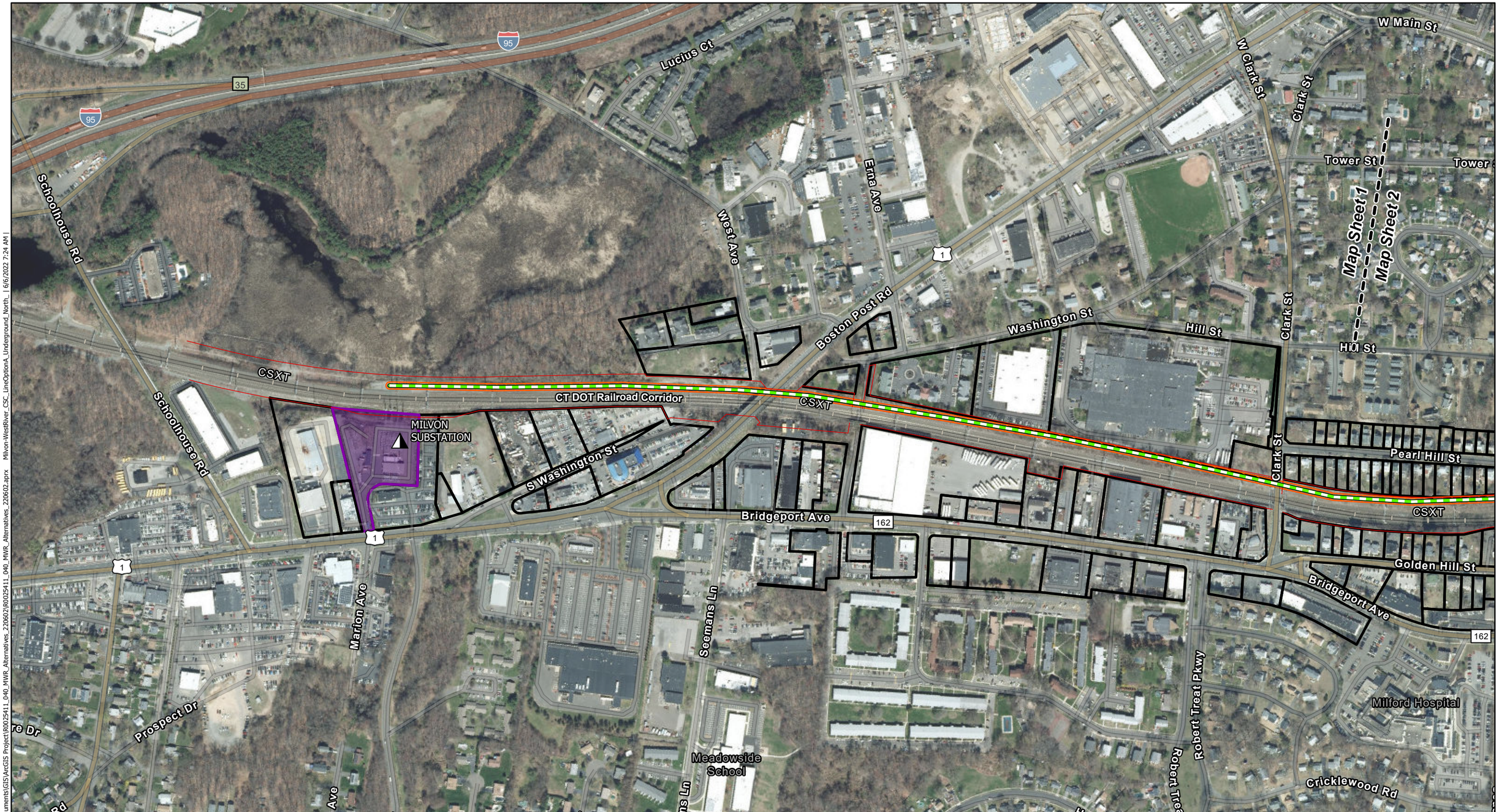
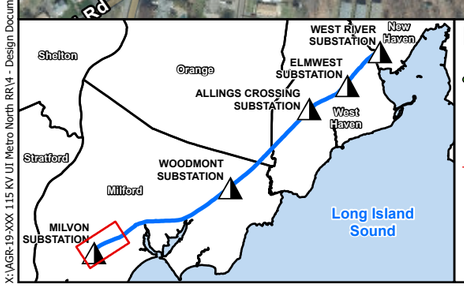
Option E

Underground Transmission Line, north side of RR ROW

Proposed Project area constructed completely underground between Milvon Substation to West River Substation, within the RR ROW (where feasible) on the north side of the tracks





Map Legend

- Option E -- Rebuilt 115-kV Underground Lines -- North
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option E

CONCEPT ROUTE - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/06/2022

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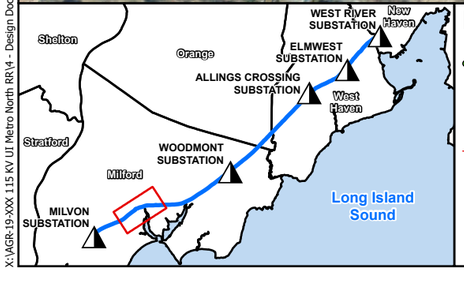
UG Option E Map 1 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionA_Underground_North_ | 6/6/2022 7:24 AM |

HORIZONTAL DIRECTIONAL DRILL

Tower St
Lamplight Ln
High St
Constitution Dr
Parsons Government Center
W River St
W Main St
North St
Governors Ave
Sunnyside Ct
Map Sheet 1
Map Sheet 2
W Town St
Hill St
Jepson Dr
Harborside Middle School
Milford
Wepawaug River
Cherry St
River St
Prospect St
Pearl Hill St
Railroad Ave
Metro-North-Milford
CT DOT Railroad Corridor
CSXT
Milford Train Station
Milford Cemetery
Map Sheet 3
Golden Hill St
Broad St
162
Milford Health Department
Milford Library
Buckingham Ave
Gulf St
Milford Hospital
Central Ave
Lafayette Ave
Noble Ave
Seaside Ave
Green St
Wilcox Park
Shipyard la
Lisman Landing
Harborside Dr
Elton St
Reed St
Wepawaug River



Map Legend

- Option E -- Rebuilt 115-kV Underground Lines -- North
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
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- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option E

CONCEPT ROUTE - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400' Revised: 06/06/2022

UI AVANGRID

Westwood

UG Option E Map 2 of 9

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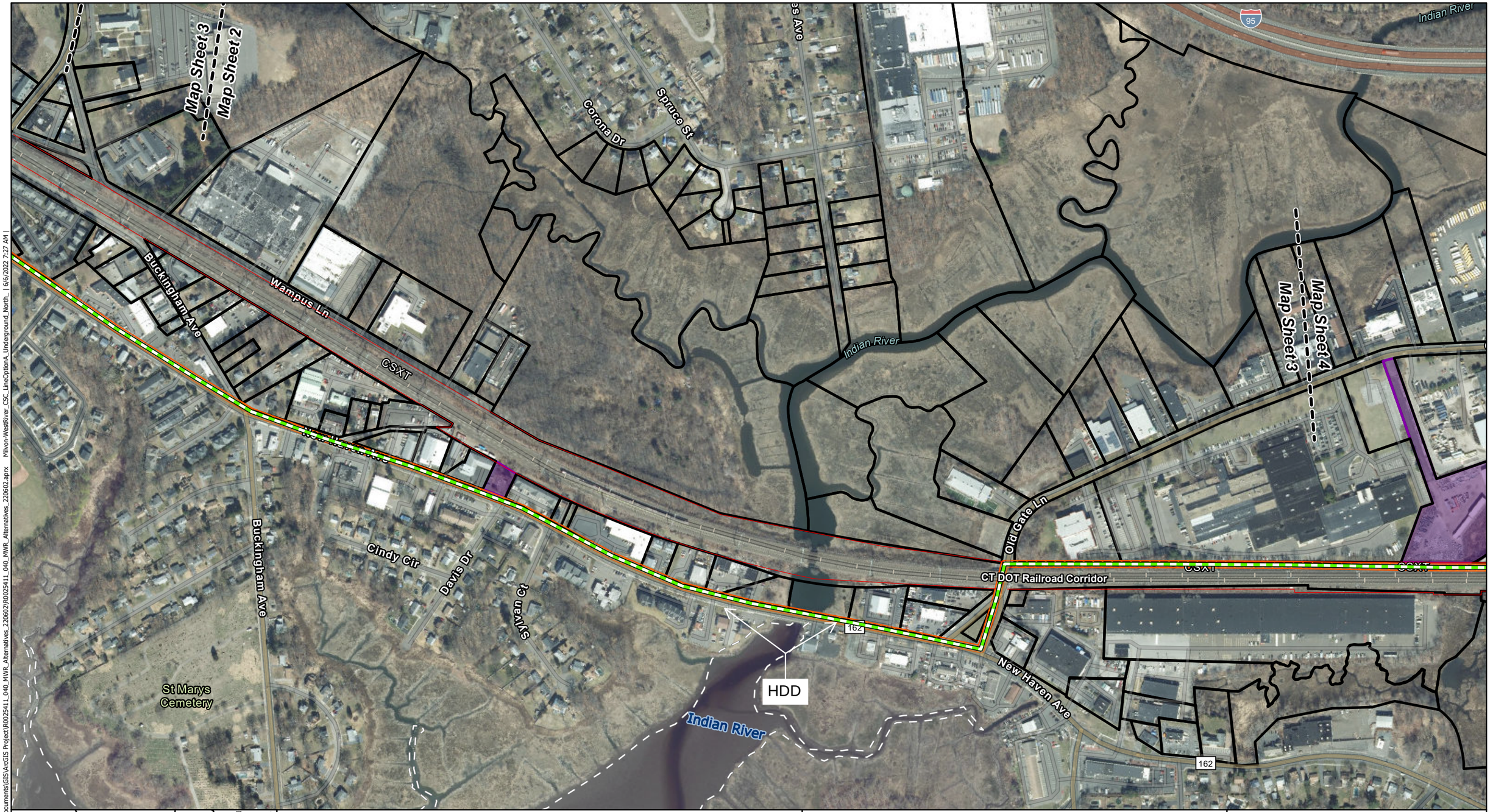

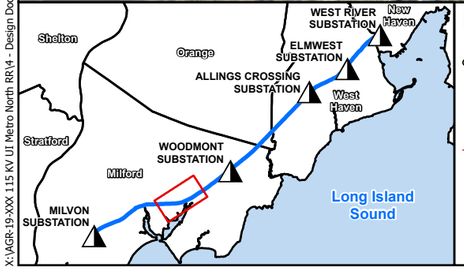

Map Legend

- Option E -- Rebuilt 115-kV Underground Lines -- North
- Substation
- CT DOT Corridor Boundary
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- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option E

CONCEPT ROUTE - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400' Revised: 06/06/2022

UI AVANGRID

Westwood

UG Option E Map 3 of 9

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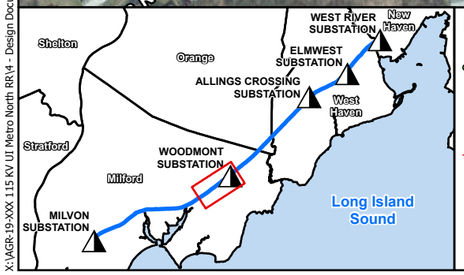

Map Legend

- Option E -- Rebuilt 115-kV Underground Lines -- North
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option E

CONCEPT ROUTE - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

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Westwood

UG Option E Map 4 of 9

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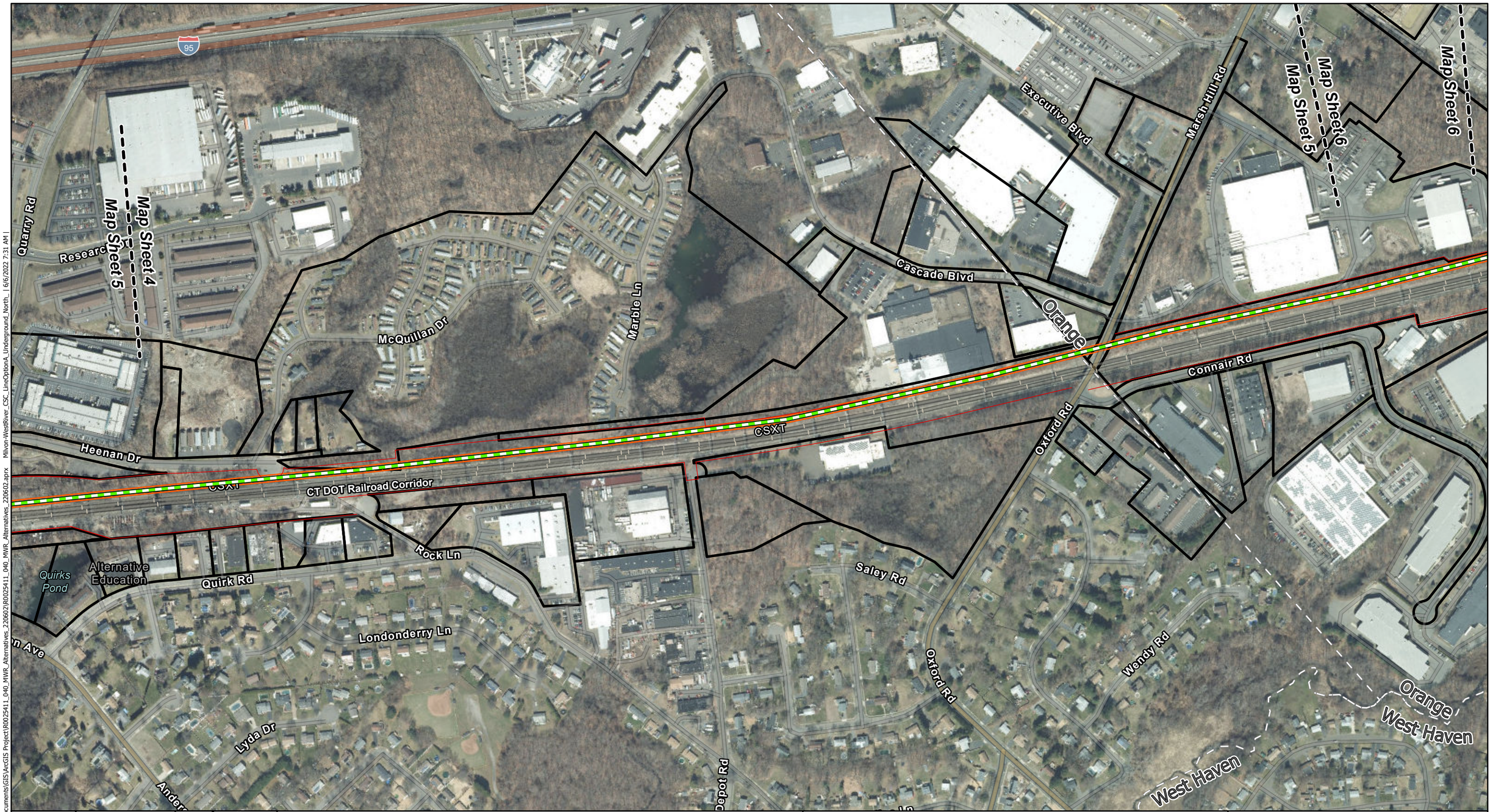

Map Legend

- Option E -- Rebuilt 115-kV Underground Lines -- North
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option E

CONCEPT ROUTE - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/06/2022

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UG Option E Map 5 of 9

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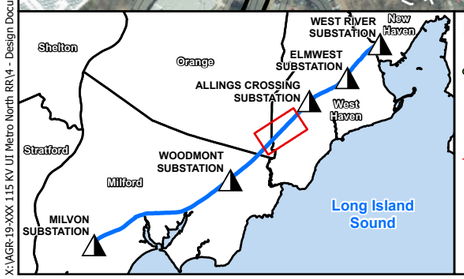

Map Legend

- Option E -- Rebuilt 115-kV Underground Lines -- North
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option E

CONCEPT ROUTE - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
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Revised: 06/06/2022

UI AVANGRID

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UG Option E Map 6 of 9

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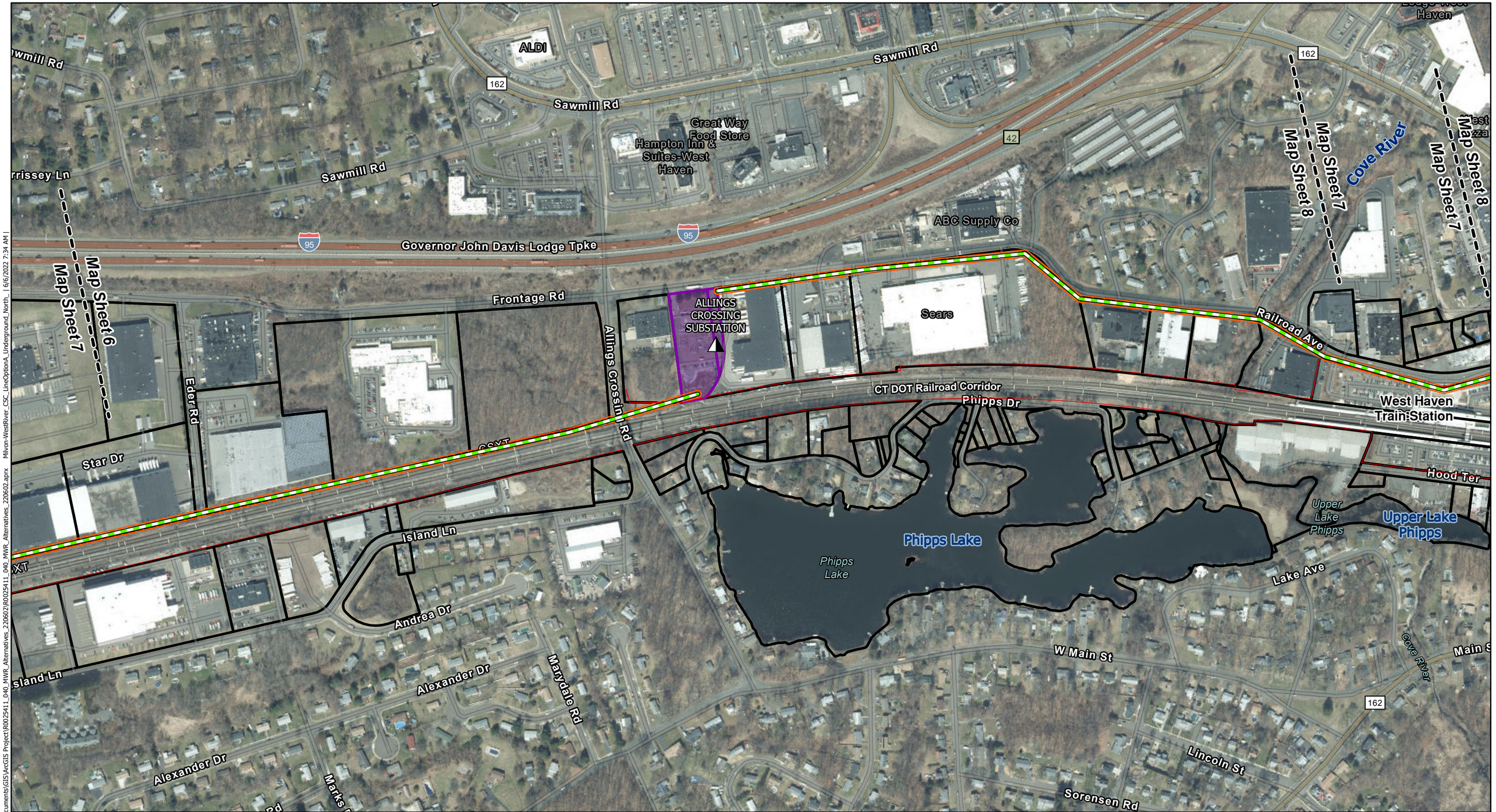

Map Legend

- Option E -- Rebuilt 115-kV Underground Lines -- North
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option E

CONCEPT ROUTE - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

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UG Option E Map 7 of 9

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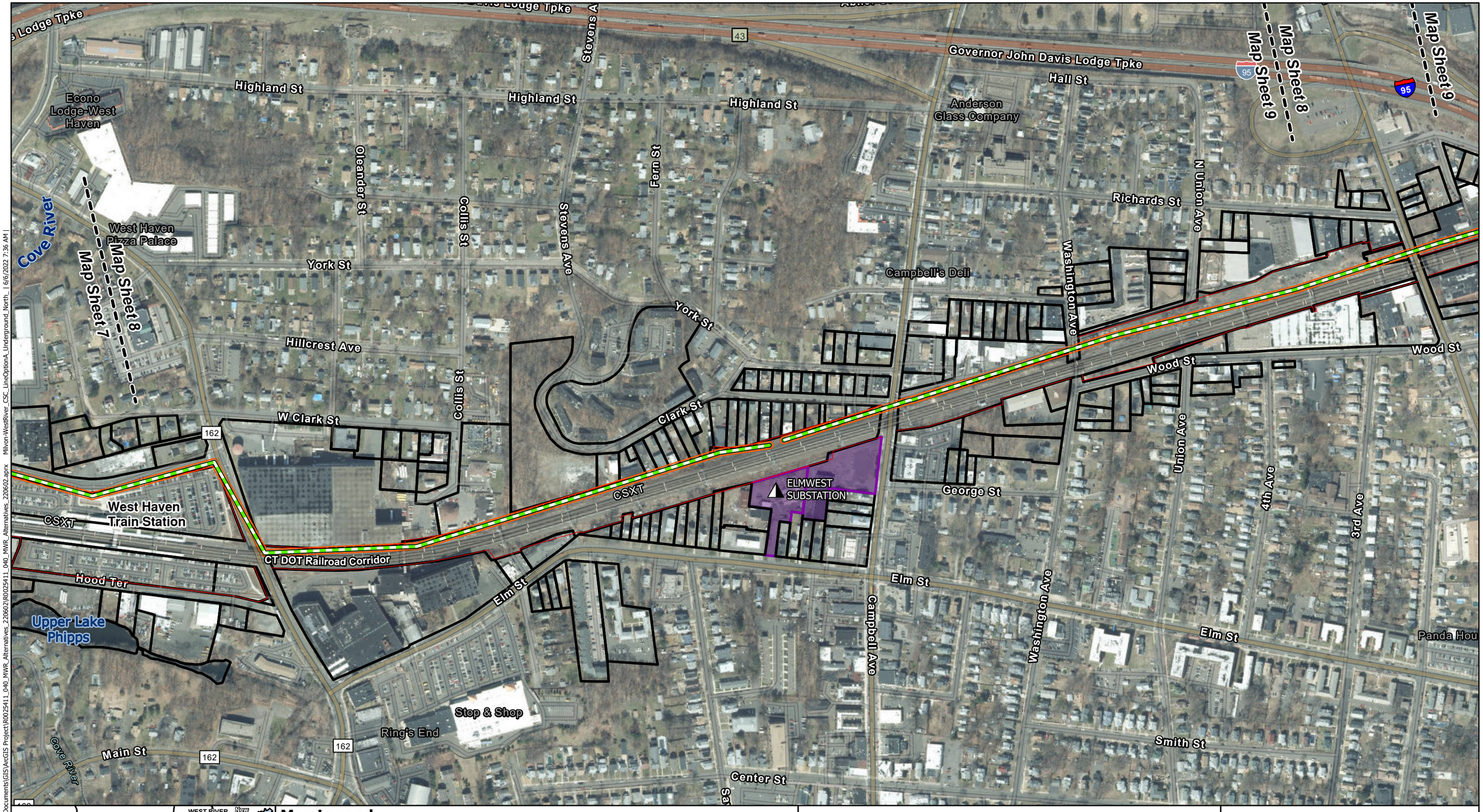

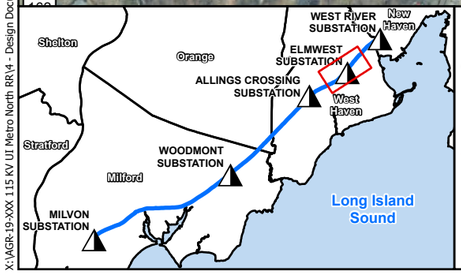

Map Legend

- Option E -- Rebuilt 115-kV Underground Lines -- North
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option E

CONCEPT ROUTE - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

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Westwood

UG Option E Map 8 of 9

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Map Legend

- Option E -- Rebuilt 115-kV Underground Lines -- North
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option E

CONCEPT ROUTE - North Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

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Revised: 06/06/2022

UI AVANGRID

Westwood

UG Option E Map 9 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionA_Underground_North_ | 6/6/2022 7:38 AM |

Cost Estimate – Furnish and Install

Item	Quantity	Estimate
Engineering & Indirects		$177,723,000
Cable installation, accessories and commissioning[1]		$242,084,000
Duct bank installation	50,860’	$259,071,000
HDD	9,000’	$19,871,000
Jack and Bore		-
Substation Work		$21,388,000
Land Rights	28 acres	$21,150,000
Environmental		$18,341,000
AFUDC		$249,089,000
Contingency (30%)		$222,819,000
Option E Total Cost		$1,231,536,000

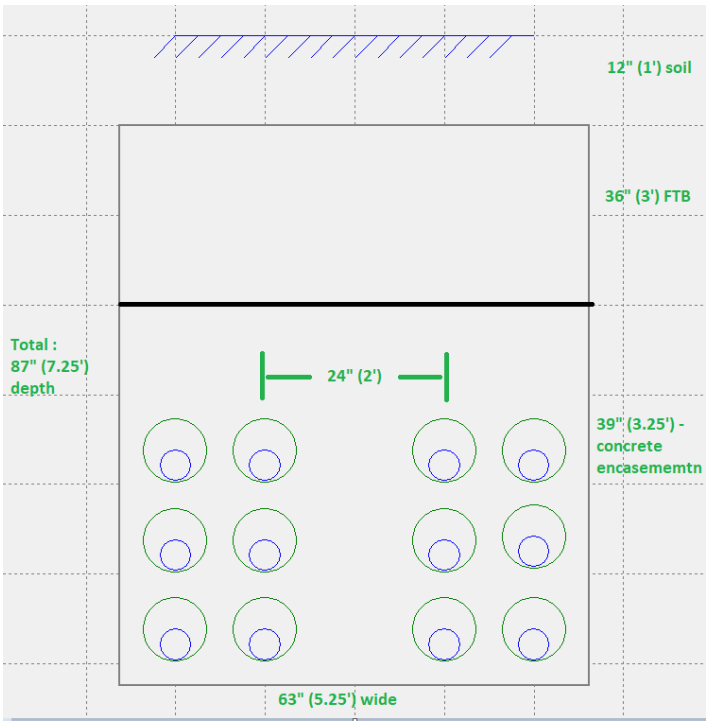
[1] The following quantities were used in this estimate: Cable – 1,445,208’ Terminations 96, Splices: 420

Assumptions

Design/Engineering/Scope

- Approval by CTDOT to install the 115kV underground facilities in the railroad corridor
- Transmission center line shown on the drawings is based on above grade visual inspection of the area and is subject to change based on completion of below grade survey
- Changes to the typical cross section depth may result in increased cable size or other design parameters to achieve required ampacity
- This option poses a higher likelihood of encountering unknown archeological resources.
- The transition from UG line to substation has yet to be determined. If required to be pursued further, this would be determined during the detailed design phase. The cost estimates assumed a couple of the substations would be rebuilt to accommodate an underground entrance and the remainder would remain with UG to OH riser structures being located adjacent to the substation
- For this estimate It is assumed that substation upgrades will include:
    - New terminal structures to support cable terminations
    - New line terminal switches
    - New surge arrestors
    - New CT/PTs
    - New steel structures to support above equipment
    - Riser structures to connect underground cable to overhead wires
- Cable system consists of 2 cables per phase – 3,500 kcmil to achieve required ampacity
- Assumed duct bank cross section[2]:

[2] Typical single cable per phase, double circuit duct bank: ~3.16' width, with smaller FTB envelope. Cross section does not show spare or communications ducts for clarity.



Cost Estimate

- ISO-PP4 Appendix D assumptions:
  - This is a "Project Initiation" type estimate (-50%/+200% accuracy)
  - Contingency for this type of estimate is 30%-50%
  - This estimate used 30% contingency
- Does not include taxes
- Any estimates on rock or foreign utilities are based on surface level observations
- Land right costs are preliminary. Final acreage will be determined once final route is selected
- Escalation is calculated at 1.75% per year
- Soil and groundwater disposal costs have been estimated based on soil and groundwater analysis along the route which was performed in preparation for the proposed solution, which will be substantially higher for this option
- Permanent impacts to wetlands and watercourses have not been assessed and therefore environmental permitting costs have been estimated
- Multiple HDDs will be required for this option
- No costs have been included for mitigation for potential direct or indirect impacts to cultural resources.
- Four flagmen per day (2 crews) have been allocated for the duration of the construction schedule

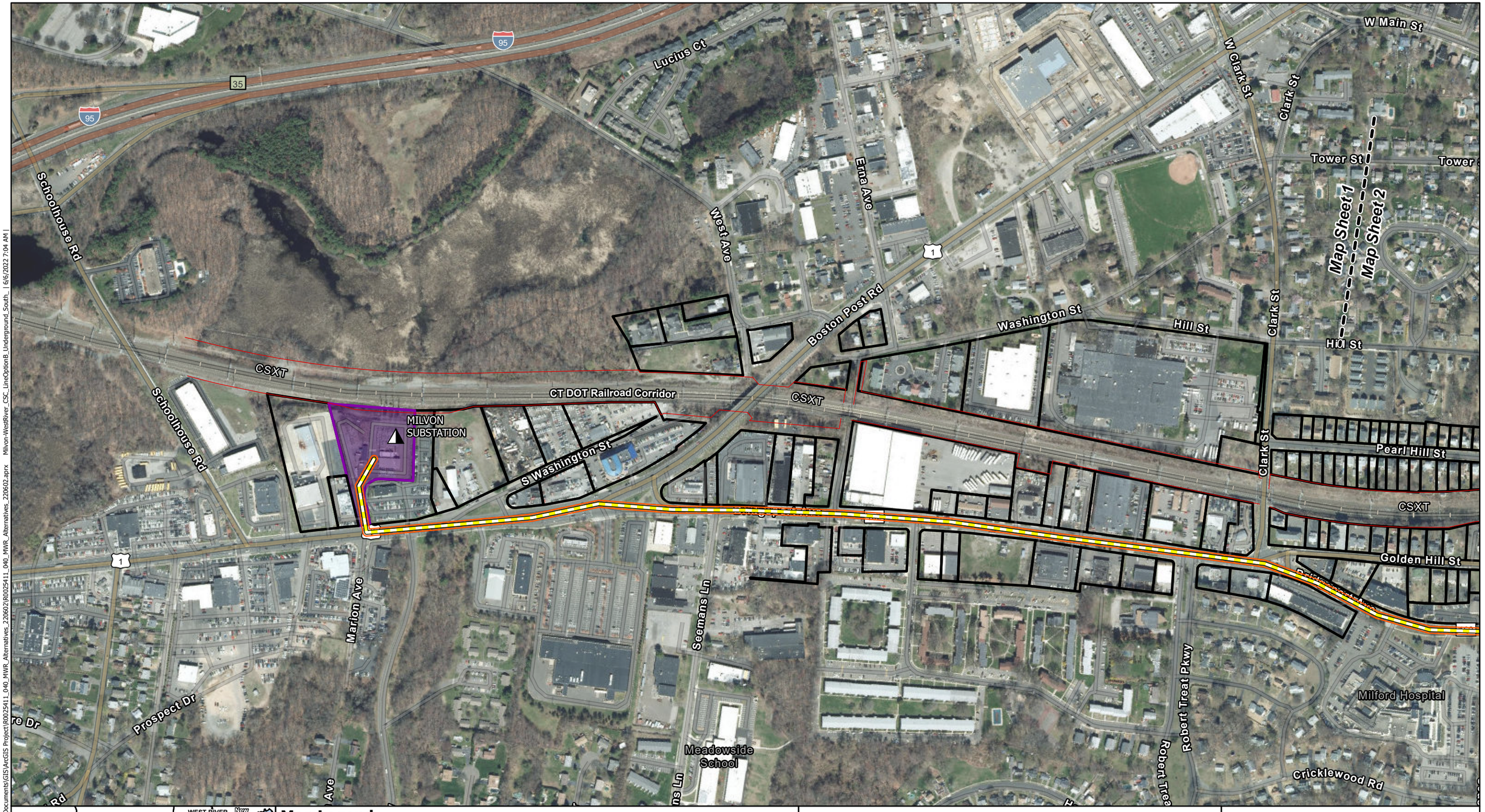
Schedule

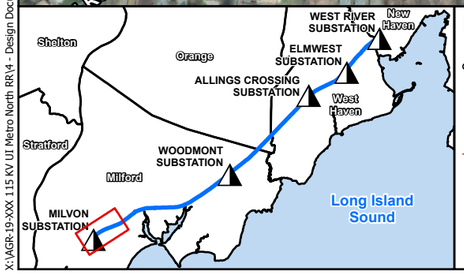
- Detailed engineering of the project will commence Q1 2024
- Conceptual level schedule is based on duct bank installation at 40'/day, and 20'/day in public roads
- Cable pulling, termination, and splicing is based on past project: ~1 year for 8 miles, 1 cable per phase, 1 circuit
- One year of Procurement is assumed in the schedule
- MNR can provide sufficient flaggers to cover the construction and survey work (2 crews)
- Timely review and approval of detailed design drawings by CDOT/MNR
- It is anticipated that construction for this option will extend into 2034 or beyond

Option F

Underground Transmission Line, south side of RR ROW

Proposed Project area constructed completely underground between Milvon Substation to West River Substation, within the RR ROW (where feasible) on the south side of the tracks





Map Legend

- Option F -- Rebuilt 115-kV Underground Lines -- South
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option F

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/06/2022

UI AVANGRID

Westwood

UG Option F Map 1 of 9

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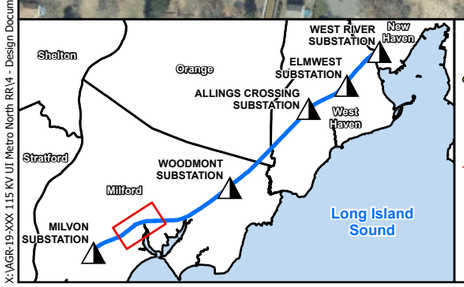
Tower St
Tower St
Lamplight Ln
High St
Constitution Dr
Parsons Government Center
W River St
W Main St
North St
Governors Ave
Sunnyside Ct
Map Sheet 1
Map Sheet 2
Map Sheet 1
Map Sheet 2
W Town St
Hill St
Hill St
Jepson Dr
Harborside Middle School
Wepawaug River
Milford
Cherry St
River St
Prospect St
Pearl Hill St
Railroad Ave
CT DOT Railroad Corridor
Metro-North-Milford
HORIZONTAL DIRECTIONAL DRILL
CSXT
Milford Train Station
Milford Cemetery
Golden Hill St
Broad St
Broad St
Broad St
162
Milford Health Department
Map Sheet 2
Map Sheet 3
Milford Library
Buckingham Ave
Milford Hospital
Central Ave
Lafayette Ave
High St
Noble Ave
Green St
Wilcox Park
Gulf St
Map Sheet 3
Seaside Ave
Lisman Landing
Shipyard la
Harborside Dr
Elton St
Buckingham Ave
Wepawaug River
Reed St



Map Legend

- Option F -- Rebuilt 115-kV Underground Lines -- South
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option F

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/06/2022

UI AVANGRID

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UG Option F Map 2 of 9

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Map Legend

- Option F -- Rebuilt 115-kV Underground Lines -- South
- Substation
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- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option F

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/06/2022

UI AVANGRID

Westwood

UG Option F Map 3 of 9

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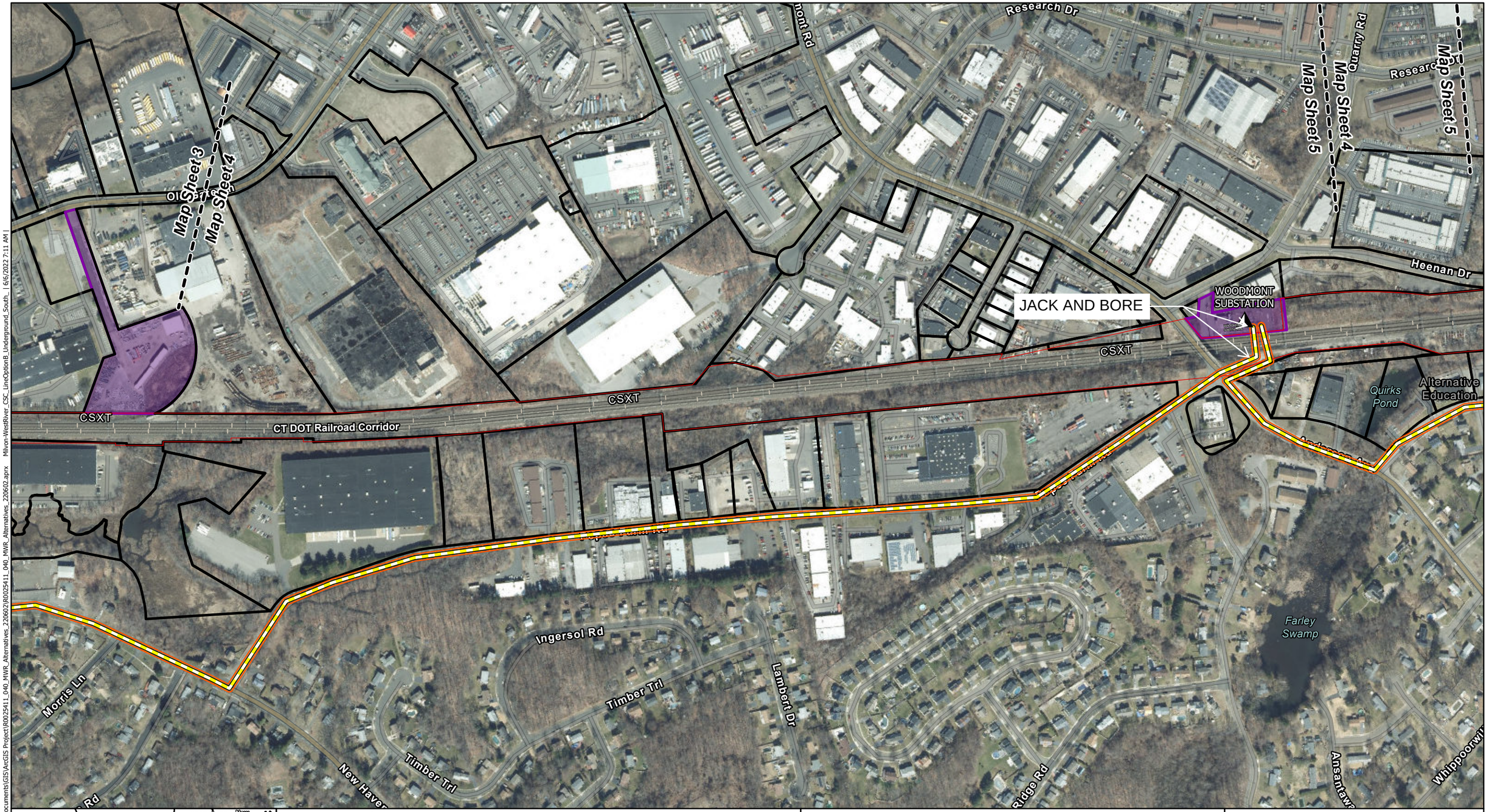

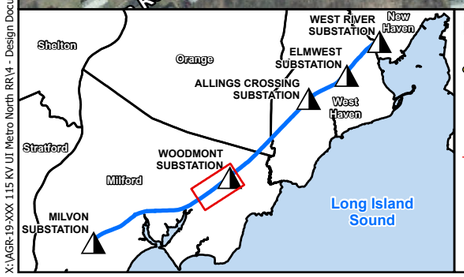

Map Legend

- Option F -- Rebuilt 115-kV Underground Lines -- South
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option F

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400' Revised: 06/06/2022

UI AVANGRID

Westwood

UG Option F Map 4 of 9

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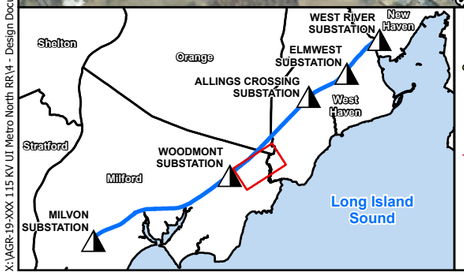

Map Legend

- Option F -- Rebuilt 115-kV Underground Lines -- South
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option F

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/06/2022

UI AVANGRID

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UG Option F Map 5 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionB_Underground_South_ | 6/6/2022 7:14 AM |

Map Legend

- Option F -- Rebuilt 115-kV Underground Lines -- South
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option F

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/06/2022

UI AVANGRID

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UG Option F Map 6 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionB_Underground_South_ | 6/6/2022 7:15 AM |

JACK AND BORE

ALLINGS CROSSING SUBSTATION

Sawmill Rd

Governor John Davis Lodge Tpke

Frontage Rd

Allings Crossing Rd

CSXT

CT DOT Railroad Corridor

Phipps Dr

Sears

ABC Supply Co

Great Way Food Store

Hampton Inn & Suites-West Haven

ALDI

Cove River

Phipps Lake

Upper Lake Phipps

West Haven Train Station

Hood Ter

Lake Ave

W Main St

Lincoln St

Sorensen Rd

Andrea Dr

Alexander Dr

Marydale Rd

Island Ln

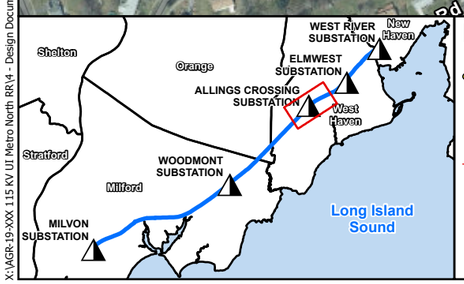
Star Dr

Eder Rd

Map Sheet 6

Map Sheet 7

Map Sheet 8



Map Legend

- Option F -- Rebuilt 115-kV Underground Lines -- South
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option F

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/06/2022

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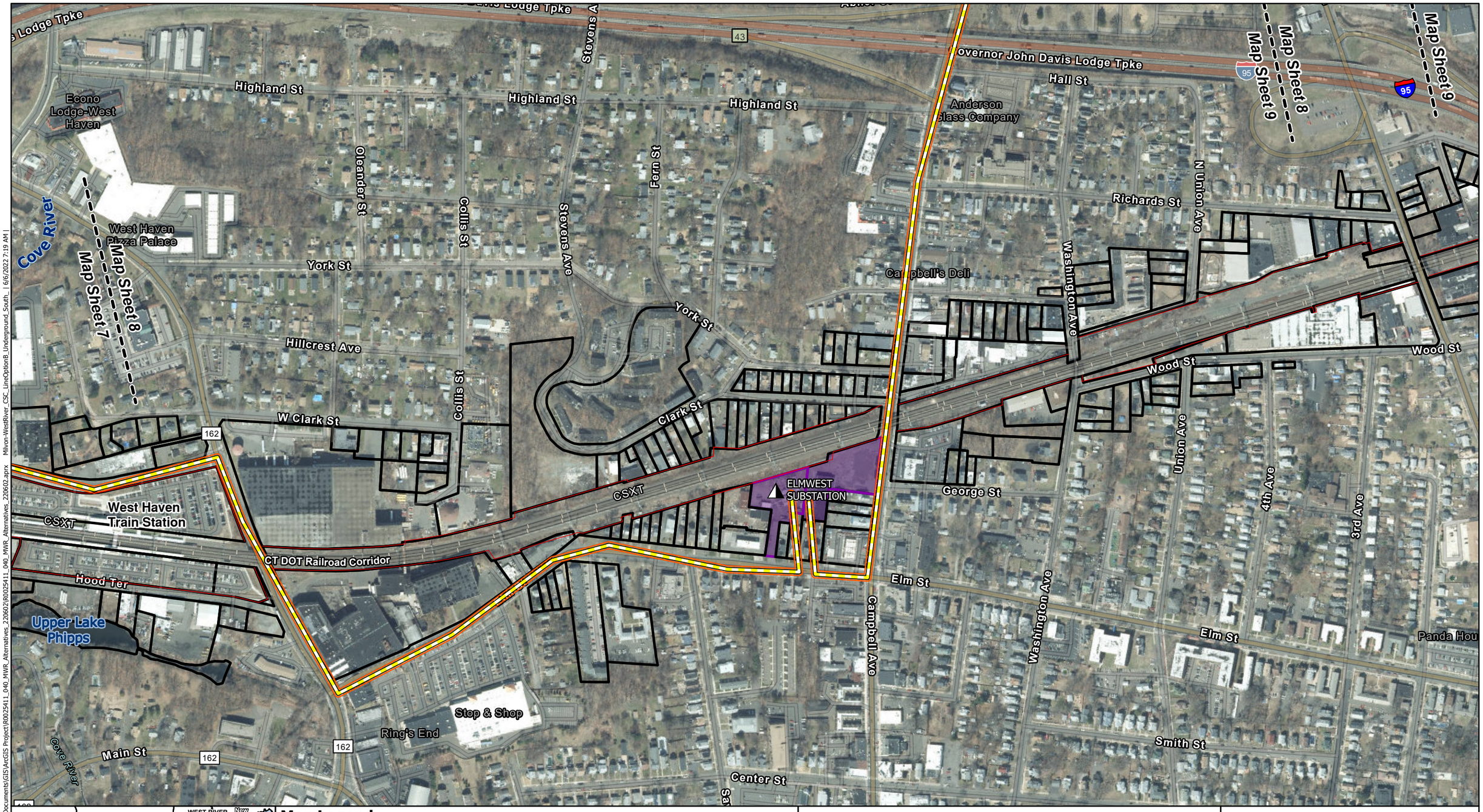
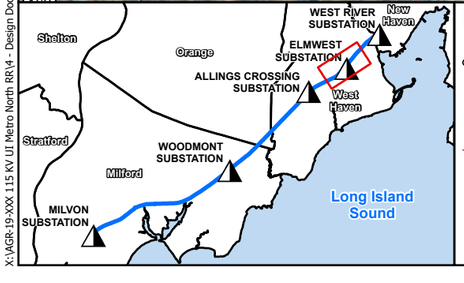
UG Option F Map 7 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionB_Underground_South_ | 6/6/2022 7:16 AM |





Map Legend

- Option F -- Rebuilt 115-kV Underground Lines -- South
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option F

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400' Revised: 06/06/2022

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UG Option F Map 8 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionB_Underground_South_ | 6/6/2022 7:19 AM |

HORIZONTAL DIRECTIONAL DRILL

Lamson St
Spring St
Clifton St
1st Ave
Map Sheet 9
Map Sheet 8
New Haven
West Haven
Ella T Grasso Blvd
State Route 10
Washington Ave
Morris St
Wilson St
Hurlburt St
Button St
Arthur St
Dewitt St
Howard Ave
Spring St
Truman St
Dewitt St
CT DOT Railroad Corridor
CSXT
WEST RIVER SUBSTATION
C Town Supermarket
American Floor Contractors
West River
Governor John Davis Lodge Tpke
Grant St
Plymouth St
Kimberly Ave
1st St
Greenwich Ave
Howard Ave
Hallock Ave
3rd St
Wood St
Maple St
1st Ave
Willow St
95
43
122
44

Map Legend

- Option F -- Rebuilt 115-kV Underground Lines -- South
- Substation
- CT DOT Corridor Boundary
- Approximate Work Area
- Parcel Boundary
- UI Owned Property
- Municipal Boundary

UI 115 KV RAILROAD PROJECT – MILVON TO WEST RIVER

MILFORD, ORANGE, WEST HAVEN, & NEW HAVEN, CT

Underground Route Option F

CONCEPT ROUTE - South Side of RR ROW

Coordinate System:
NAD 1983 (2011) State Plane Connecticut FIPS 0600 (US Feet)
Linear Units: Foot US

0 400 US Feet

1" = 400'

Revised: 06/06/2022

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UG Option F Map 9 of 9

X:\AGR-19-XXX 115 KV UI Metro North RR\4 - Design Documents\GIS\ArcGIS Project\R0025411_040_MWR_Alternatives_220602\R0025411_040_MWR_Alternatives_220602.aprx Milvon-WestRiver_CSC_LineOptionB_Underground_South_ | 6/6/2022 7:21 AM |

Cost Estimate-Furnish and Install

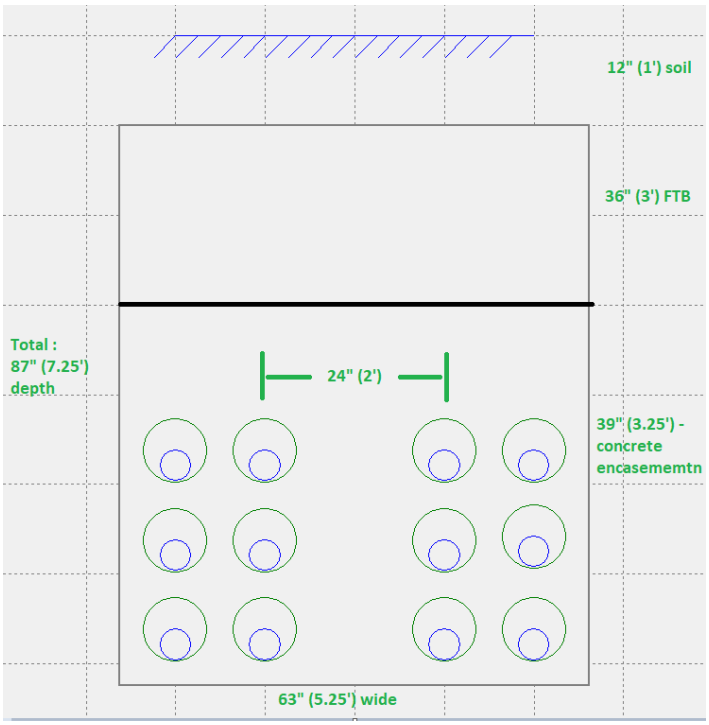
Item	Quantity	Estimate
Engineering & Indirects		$193,640,000
Cable installation, accessories and commissioning[3]		$293,531,000
Duct bank installation	61,361’	$300,938,000
HDD	11,500’	$27,540,000
Jack and Bore	2,000	$6,328,000
Substation Work		$11,458,000
Land Rights	14 acres	$10,725,000
Environmental		$18,791,000
AFUDC		$288,541,000
Contingency (30%)		$252,932,000
Option F Total Cost		$1,404,424,000

[3] The following quantities were used in this estimate: Cable – 1,445,208’ Terminations 96, Splices: 420

Assumptions

Design/Engineering

- Based on the narrow railroad corridor to the south of the tracks, this option is located within the public streets with the most direct route selected
- Transmission center line shown on the drawings is based above grade visual inspection of the area and is subject to change based on completion of below grade survey
- Any estimates on rock or foreign utilities are based on surface level observations
- Changes to the typical cross section depth may result in increased cable size or other design parameters to achieve required ampacity
- No P&C work has been included
- Potential archeological impacts have not been assessed on the south side of the corridor. This option poses a higher likelihood of encountering unknown archeological resources.
- The transition from UG line to substation has yet to be determined. If required to be pursued further, this would be determined during the detailed design phase. The cost estimates assumed a couple of the substations would be rebuilt to accommodate an underground entrance and the remainder would remain with UG to OH riser structures being located adjacent to the substation
- For this estimate it is assumed that substation upgrades will include:
    - New terminal structures to support cable terminations
    - New line terminal switches
    - New surge arrestors
    - New CT/PTs
    - New steel to support above equipment
    - Riser poles at substations to connect underground cables to overhead wires
- Cable system consists of 2 cables per phase – 3,500 kcmil
- Assumed duct bank cross section:



Cost Estimate

- ISO-PP4 Appendix D assumptions:
  - This is a “Project Initiation” type estimate (-50%/+200% accuracy)
  - Contingency for this type of estimate is 30%-50%
  - This estimate used 30% contingency
- Does not include taxes
- Escalation is calculated at 1.75% per year
- Land right costs are preliminary. Final acreage will be determined once final route is selected
- Soil and groundwater disposal costs have been estimated based on soil and groundwater analysis along the route, which was performed in preparation for the proposed solution, which will be substantially higher for this option
- Permanent impacts to wetlands and watercourses have not been assessed and therefore environmental permitting costs have been estimated

Schedule

- Detailed engineering will commence Q1 2023
- Conceptual level schedule is based on duct bank installation at 20'/day
- Cable pulling, termination, and splicing is based on past project: ~1 year for 8 miles, 1 cable per phase, 1 circuit
- It is anticipated construction for this alternative will extend into 2036 or beyond

Construction

- It anticipated for this option there will be significant impacts to local traffic, business, and public during construction activities. Both cable pulling and splicing as well as duct bank excavation

Option G

Underground Transmission Line, P905N-P914N, within public streets

Proposed Project area between P905N and P914N constructed completely underground, within the public roads

APPROX. 800 SF, 12' TALL CONTROL ENCLOSURE FOR OVERHEAD TO UNDERGROUND TRANSITION

FENCED AREA APPROXIMATELY 0.3 ACRES

P905NN

P905NS

RISER POLES APPROX. 115' TALL

~100'

~120'

TO PROPOSED UI P904

CONDUCTORS SEPARATE FROM DOUBLE CIRCUIT POLE TO SINGLE CIRCUIT RISER POLES

SECURITY FENCE

RAILROAD AVE

BEARDSLEY AVE

BROAD ST

30'

ROW

P-POH

LEGEND

- RISER POLE
- OPTION G CONCEPT UNDERGROUND ALIGNMENT
- TREE CLEARING AREA
- SPLICE CHAMBER
- P-POH — OVERHEAD TRANSMISSION CENTER LINE
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- APPROXIMATE WORK AREA

DOWNTOWN MILFORD CONCEPT PLAN

0' 40 80 120

PLAN		BY	DATE
NOTEBOOK NO.	SURVEYED		
	REVIEWED		
	ROW CHKD		

PROFILE			
NOTEBOOK NO.	SURVEYED		DATE
	REVIEWED	BY	
	NOTES REDUCED		

Westwood Surveying & Engineering

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Fax (952) 937-5822
Email (952) 937-5150
Website Westwood Surveying and Engineering, P.C.

12701 Whitewater Drive, Suite #300
Minnetonka, MN 55343

CADD Drawing. DO NOT REVISE MANUALLY

ANSI D

UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

NOTES:
1. PRELIMINARY, NOT FOR CONSTRUCTION

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REV.	DATE	BY	DESCRIPTION	APP.

UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION G - UNDERGROUND IN STREETS
1 OF 3

DR.	SFB	SCALE AS SHOWN	FILE:
CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

LEGEND

- RISER POLE
- OPTION G CONCEPT UNDERGROUND ALIGNMENT
- TREE CLEARING AREA
- SPLICE CHAMBER
- P-POH — OVERHEAD TRANSMISSION CENTER LINE
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- APPROXIMATE WORK AREA

DOWNTOWN MILFORD CONCEPT PLAN

0' 20 40 60

PLAN		BY	DATE
NOTEBOOK NO.	SURVEYED		
	REVIEWED		
	ROW CHKD		

PROFILE		BY	DATE
NOTEBOOK NO.	SURVEYED		
	REVIEWED		
	NOTES REDUCED		

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Toll Free (888) 937-5150 www.westwoodps.com
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CADD Drawing. DO NOT REVISE MANUALLY.

ANSI D

UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

NOTES:
1. PRELIMINARY, NOT FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION	APP.

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REV.	DATE	BY	DESCRIPTION	APP.

UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION G - UNDERGROUND IN STREETS
2 OF 3

DR.	SFB	SCALE AS SHOWN	FILE:
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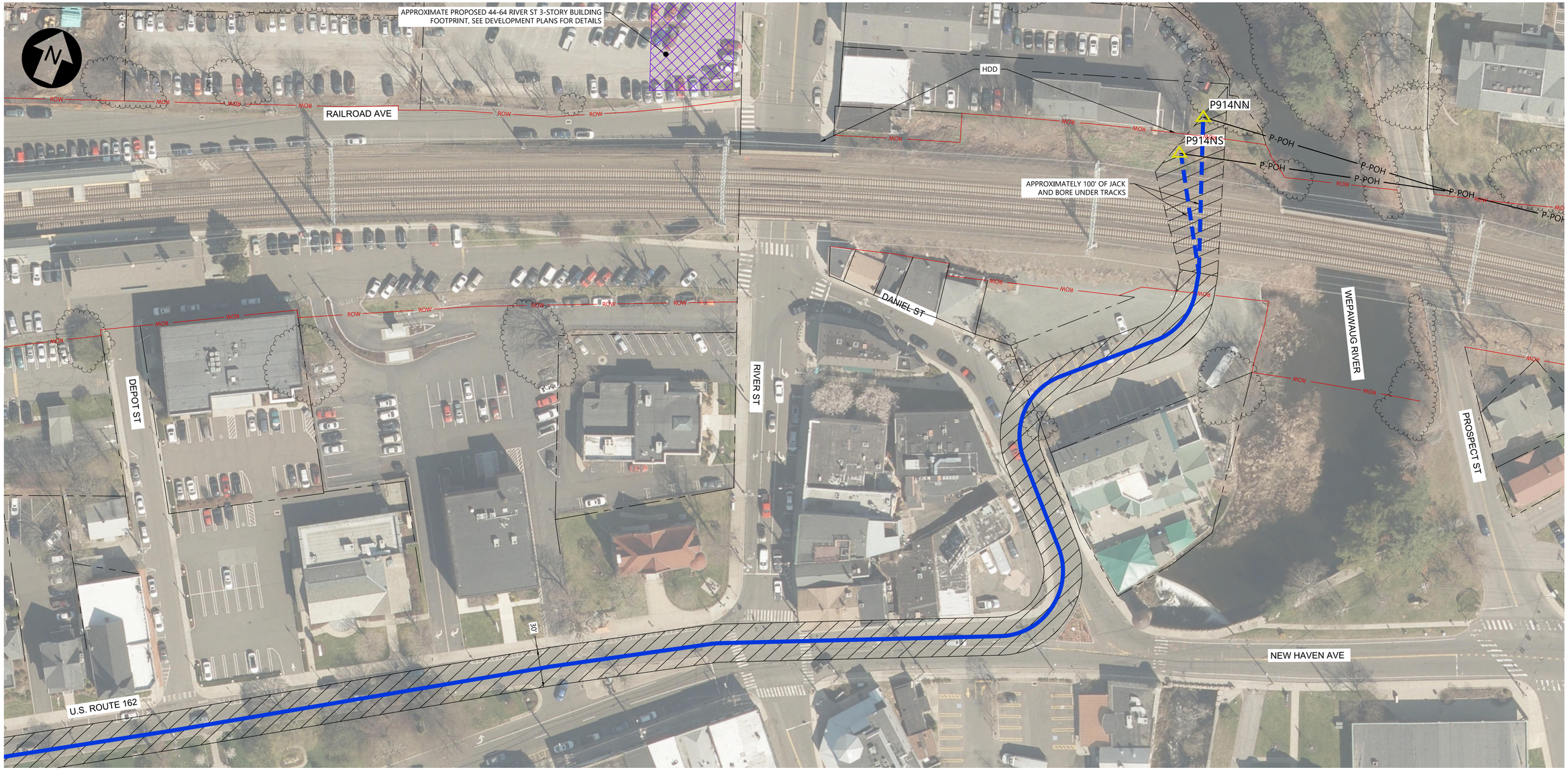
APP.	MSP		
DATE:			



LEGEND

- RISER POLE
- OPTION G CONCEPT UNDERGROUND ALIGNMENT
- TREE CLEARING AREA
- SPLICE CHAMBER
- P-POH — OVERHEAD TRANSMISSION CENTER LINE
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- APPROXIMATE WORK AREA

DOWNTOWN MILFORD CONCEPT PLAN

0' 20 40 60

PLAN		BY	DATE
	SURVEYED		
NOTEBOOK NO.	REVIEWED		
	ROW CHKD		

PROFILE		BY	DATE
	SURVEYED		
NOTEBOOK NO.	REVIEWED		
	NOTES REDUCED		

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CADD Drawing. DO NOT REVISE MANUALLY

ANSI D

UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

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1. PRELIMINARY, NOT FOR CONSTRUCTION

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REV.	DATE	BY	DESCRIPTION	APP.

UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION G - UNDERGROUND IN STREETS
3 OF 3

DR.	SFB	SCALE AS SHOWN	FILE:
CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

Cost Estimate-Furnish and Install-Option G

Item	Quantity	Estimate
Overhead Line Design and Construction[4]		$290,961,000
Engineering & Indirects		$9,439,000
Cable installation, accessories and commissioning[5]		$14,646,000
Duct bank installation	3,500’	$18,941,000
HDD		-
Jack and Bore	200’	$590,000
Transition Stations	1	$1,522,000
Land Rights		$371,000
Environmental		$1,839,000
AFUDC		$11,993,000
Contingency (30%)		$14,082,000
Option G Total Cost		$364,384,000

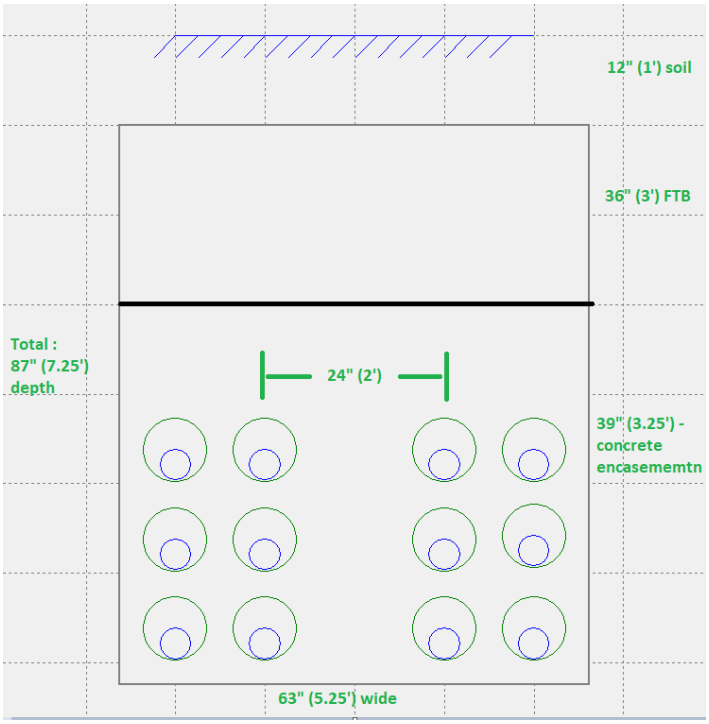
[4] Inclusive of all associated costs for the overhead design to connect to this underground option. Other detailed cost are pertinent to the underground engineering and construction only

[5] The following quantities were used in this estimate: Cable – 66,996’ Terminations 24, Splices: 12

Assumptions

Design/Engineering

- Transmission center line shown on the drawings is based above grade visual inspection of the area and is subject to change based on completion of below grade survey
- Changes to the typical cross section depth may result in increased cable size or other design parameters to achieve required ampacity
- No P&C work has been included (remote ends)
- This option poses a higher likelihood of encountering unknown archeological resources.
- 1 transition station is included and will consist of a fenced in area containing:
    - 2 riser poles
    - 1 control enclosure
- Cable system consists of 2 cables per phase – 3,500 kcmil
- Assumed duct bank cross section:



Cost Estimate

- ISO-PP4 Appendix D assumptions:
    - This is a “Project Initiation” type estimate (-50%/+200% accuracy)
    - Contingency for this type of estimate is 30%-50%
    - This estimate used 30% contingency
- Does not include removals
- Does not include remote substation work (P&C)
- Does not include taxes
- Land right costs are preliminary. Final acreage will be determined once final route is selected
- Escalation is calculated at 1.75% per year
- Any estimates on rock or foreign utilities are based on surface level observations
- Soil and groundwater disposal costs have been estimated based on soil and groundwater analysis along the route which was performed in preparation for the proposed solution, which will be substantially higher for this option

Schedule

- Conceptual level schedule is based on duct bank installation at 20’/day
- Cable pulling, termination, and splicing is based on past project: ~1 year for 8 miles, 1 cable per phase, 1 circuit
- Extended schedule due to undergrounding, longer stretch and two additional track crossings

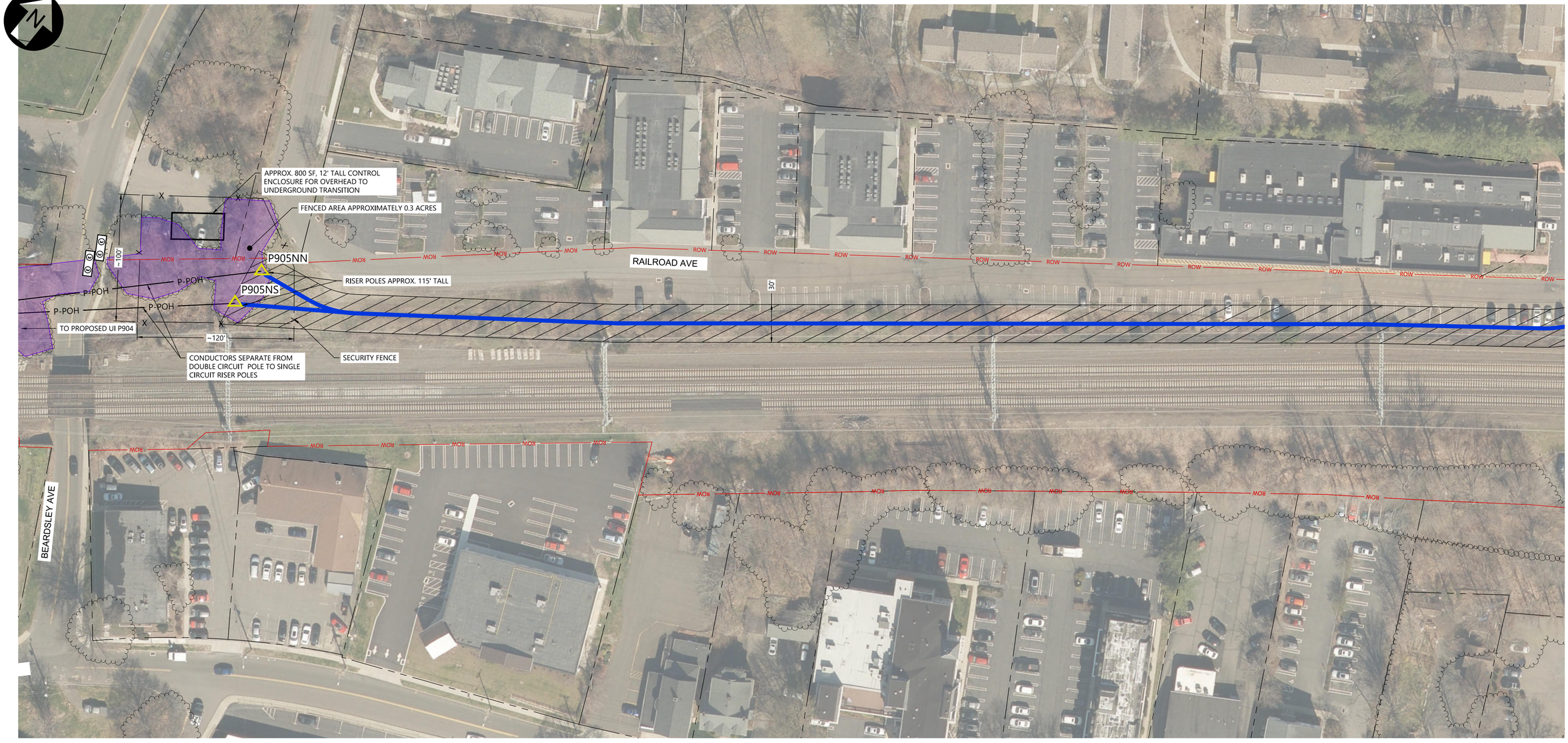
Construction

- It anticipated for this option there will be significant impacts to local traffic, business, and public during construction activities. Both cable pulling and splicing as well as duct bank excavation

Option H

Underground Transmission Line, P905N-P914N, within RR ROW

Proposed Project area between P905N and P914N constructed completely underground, within the RR ROW



LEGEND

- RISER POLE
- OPTION H CONCEPT UNDERGROUND ALIGNMENT
- TREE CLEARING AREA
- SPLICE CHAMBER
- P-POH — OVERHEAD TRANSMISSION CENTER LINE
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- APPROXIMATE WORK AREA

DOWNTOWN MILFORD CONCEPT PLAN

0' 40 80 120

PLAN	BY	DATE
SURVEYED		
NOTEBOOK NO.	REVIEWED	
	ROW CHKD	

PROFILE	BY	DATE
SURVEYED		
NOTEBOOK NO.	REVIEWED	
	NOTES REDUCED	

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ANSI D

UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

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UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION H - UNDERGROUND IN ROW
1 OF 3

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CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

LEGEND

- RISER POLE
- OPTION H CONCEPT UNDERGROUND ALIGNMENT
- TREE CLEARING AREA
- SPLICE CHAMBER
- P-POH — OVERHEAD TRANSMISSION CENTER LINE
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- APPROXIMATE WORK AREA

DOWNTOWN MILFORD CONCEPT PLAN

0' 20 40 60

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PLAN		BY	DATE
	SURVEYED		
NOTEBOOK	REVIEWED		
NO.	ROW CHKD		

PROFILE			
	SURVEYED		
NOTEBOOK	REVIEWED		
NO.	NOTES REDUCED		

UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

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REV.	DATE	BY	DESCRIPTION	APP.

UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION H - UNDERGROUND IN ROW
2 OF 3

DR.	SFB	SCALE AS SHOWN	FILE:
CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

CADD Drawing. DO NOT REVISE MANUALLY.
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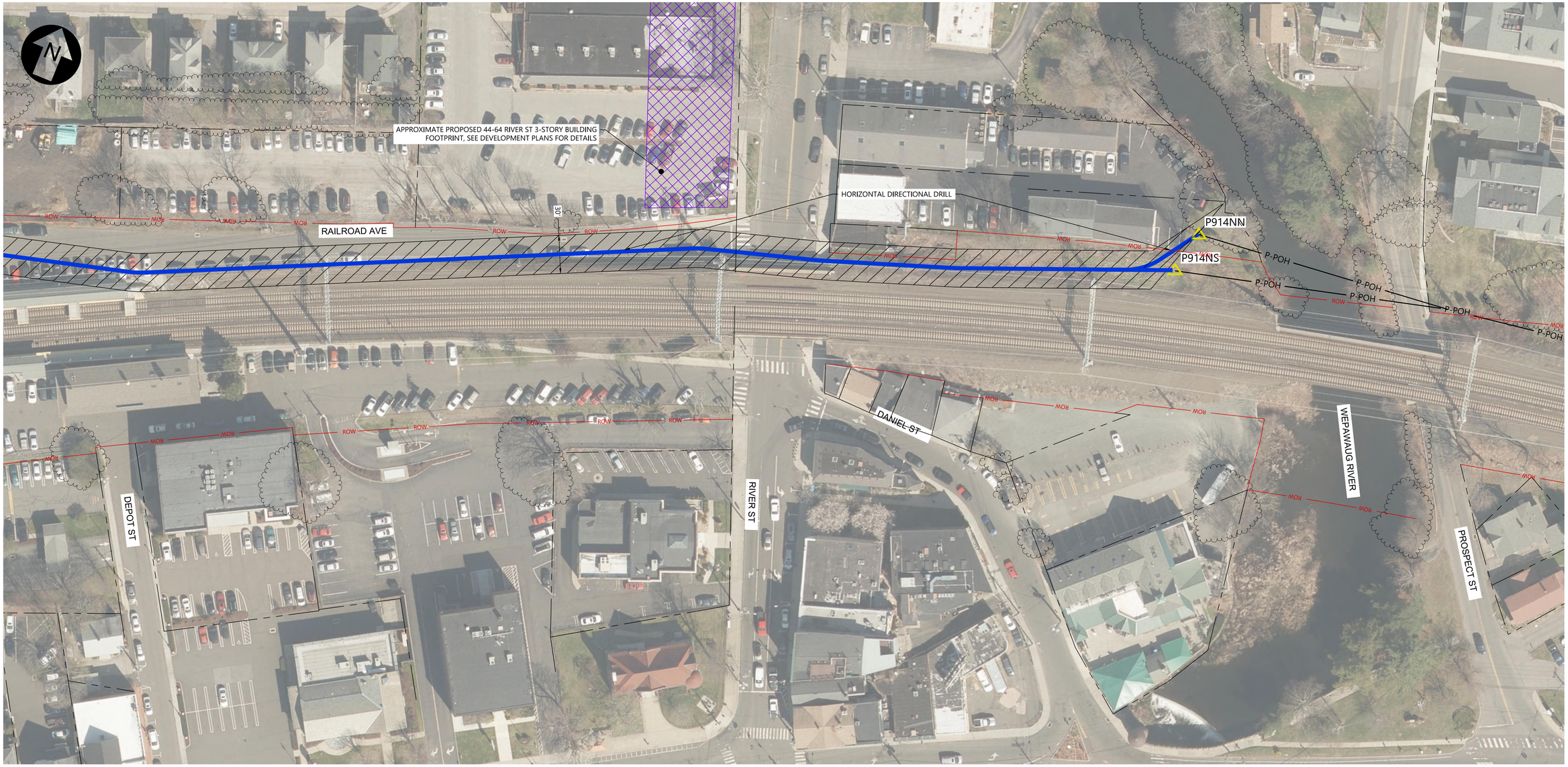

LEGEND

- RISER POLE
- OPTION H CONCEPT UNDERGROUND ALIGNMENT
- TREE CLEARING AREA
- SPLICE CHAMBER
- P-POH — OVERHEAD TRANSMISSION CENTER LINE
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- APPROXIMATE WORK AREA

DOWNTOWN MILFORD CONCEPT PLAN

0' 20 40 60

PLAN		BY	DATE
NOTEBOOK NO.	SURVEYED		
	REVIEWED		
	ROW CHKD		

PROFILE		BY	DATE
NOTEBOOK NO.	SURVEYED		
	REVIEWED		
	NOTES REDUCED		

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ANSI D

UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

NOTES:
1. PRELIMINARY, NOT FOR CONSTRUCTION

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UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION H - UNDERGROUND IN ROW
3 OF 3

DR.	SFB	SCALE AS SHOWN	FILE:
CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

Cost Estimate-Furnish and Install

Item	Quantity	Estimate
Overhead Line Design and Construction[6]		$291,020,000
Engineering & Indirects		$8,749,000
Cable installation, accessories and commissioning[7]		$12,871,000
Duct bank installation	2,680’	$15,635,000
HDD	800’	$1,492,000
Jack and Bore		-
Transition Station	1	$1,522,000
Land Rights		$998,000
Environmental		$1,490,000
AFUDC		$10,498,000
Contingency (30%)		$12,736,000
Option H Total Cost		$357,011,000

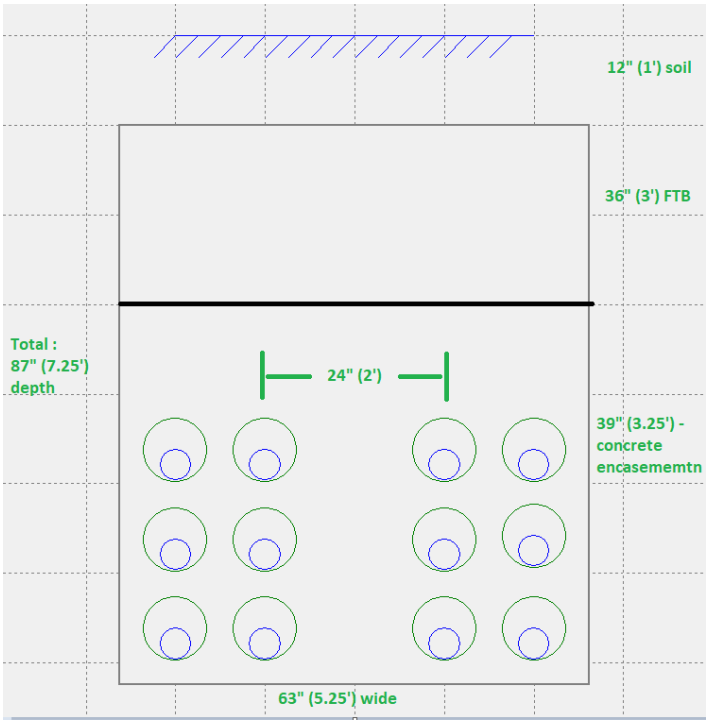
[6] Inclusive of all associated costs for the overhead design to connect to this underground option. Other detailed cost are pertinent to the underground engineering and construction and removals only

[7] The following quantities were used in this estimate: Cable – 57,636’ Terminations 24, Splices: 12

Assumptions

Design/Engineering

- Transmission center line shown on the drawings is based above grade visual inspection of the area and is subject to change based on completion of below grade survey
- 1 transition station is included and will consist of a fenced in area containing:
  - 2 riser poles
  - 1 control enclosure
- Changes to the typical cross section depth may result in increased cable size or other design parameters to achieve required ampacity
- No P&C work has been included (remote ends)
- This option poses a higher likelihood of encountering unknown archeological resources.
- Installation of underground cable system within RR ROW is contingent on approval from CDOT/MNR
- Cable system consists of 2 cables per phase – 3,500 kcmil
- Assumed duct bank cross section:



Cost Estimate

- ISO-PP4 Appendix D assumptions:
  - This is a "Project Initiation" type estimate (-50%/+200% accuracy)

    - Contingency for this type of estimate is 30%-50%
    - This estimate used 30% contingency
- Does not include removals
- Does not include remote substation work (P&C)
- Does not include taxes
- Land right costs are preliminary. Final acreage will be determined once final route is selected
- Any estimates on rock or foreign utilities are based on surface level observations
- Escalation is calculated at 1.75% per year
- Soil and groundwater disposal costs have been estimated based on soil and groundwater analysis along the route which was performed in preparation for the proposed solution, which will be substantially higher for this option

Schedule

- Conceptual level schedule is based on duct bank installation at 40'/day
- Cable pulling, termination, and splicing is based on past project: ~1 year for 8 miles, 1 cable per phase, 1 circuit

Option I

Underground Transmission Line P900N-P914N

Proposed Project area between P900N and P914N constructed completely underground-Through RR Corridor

LEGEND

- RISER POLE
- OPTION I CONCEPT UNDERGROUND ALIGNMENT
- TREE CLEARING AREA
- SPLICE CHAMBER
- P-POH — OVERHEAD TRANSMISSION CENTER LINE
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- APPROXIMATE WORK AREA

PEARL HILL ST CONCEPT PLAN

0' 40 80 120

PLAN	SURVEYED	BY	DATE
NOTEBOOK NO.	REVIEWED		
	ROW CHKD		

PROFILE	SURVEYED	BY	DATE
NOTEBOOK NO.	REVIEWED NOTES REDUCED		

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UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

NOTES:
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UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION I - MORISSETTE UNDERGROUND
1 OF 2

DR.	SFB	SCALE AS SHOWN	FILE:
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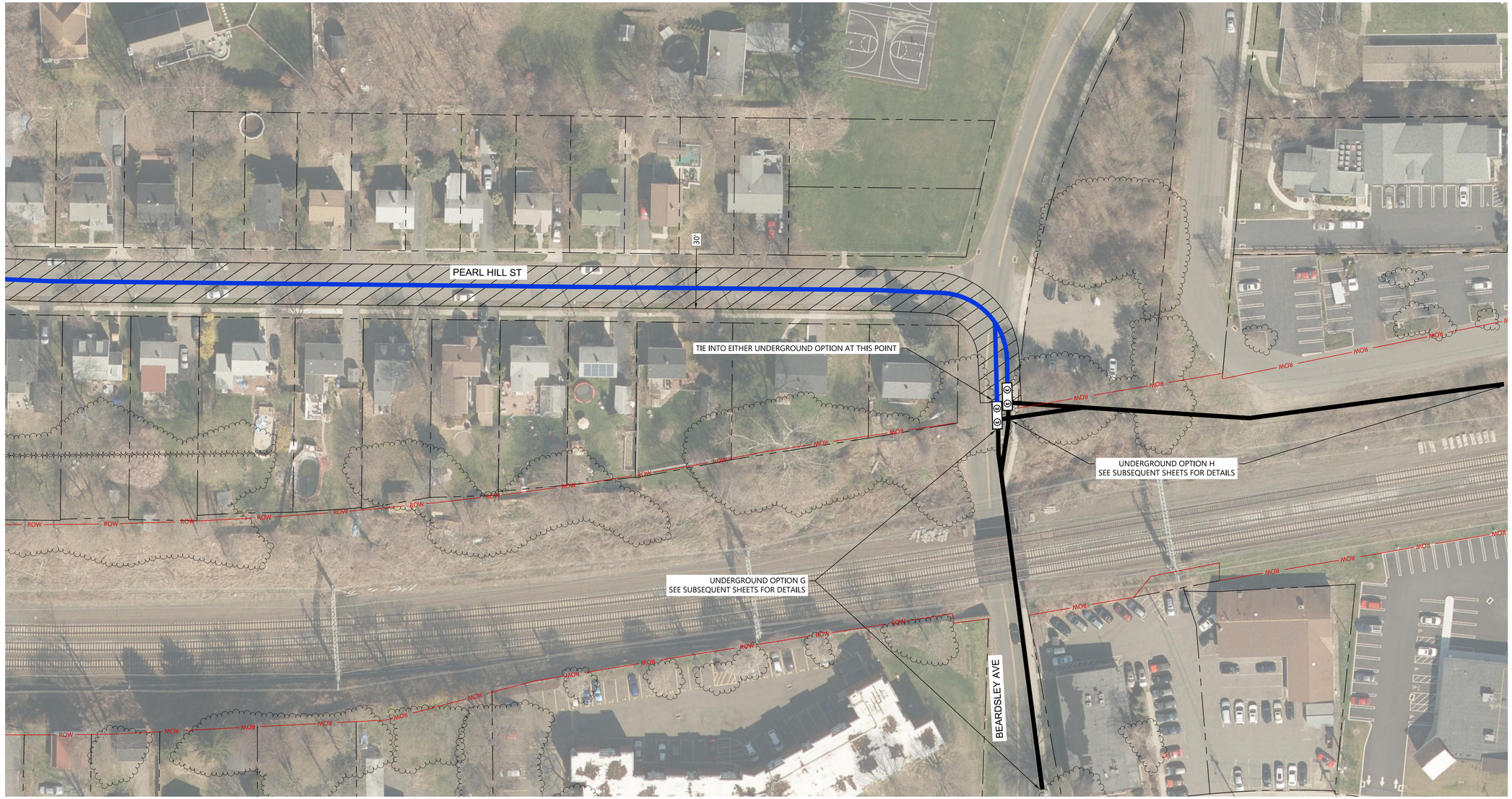
APP.	MSP		
DATE:			



LEGEND

- RISER POLE
- OPTION I CONCEPT UNDERGROUND ALIGNMENT
- TREE CLEARING AREA
- SPLICE CHAMBER
- P-POH — OVERHEAD TRANSMISSION CENTER LINE
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- APPROXIMATE WORK AREA

PEARL HILL ST CONCEPT PLAN

0' 40 80 120

PLAN	SURVEYED	BY	DATE
NOTEBOOK NO.	REVIEWED		
	ROW CHKD		

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UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

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UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION I - MORISSETTE UNDERGROUND
2 OF 2

DR.	SFB	SCALE AS SHOWN	FILE:
CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

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Cost Estimate-Furnish and Install

Item	Quantity	Estimate
Overhead Line Design and Construction[8]		$289,100,000
Engineering & Indirects		$13,063,000
Cable installation, accessories and commissioning[9]		$20,410,000
Duct bank installation	4,368’	$22,322,000
HDD	800’	$1,492,000
Jack and Bore		-
Transition Station		$1,522,000
Land Rights		$998,000
Environmental		$2,023,000
AFUDC		$15,311,000
Contingency (30%)		$18,135,000
Option I Total Cost		$384,376,000

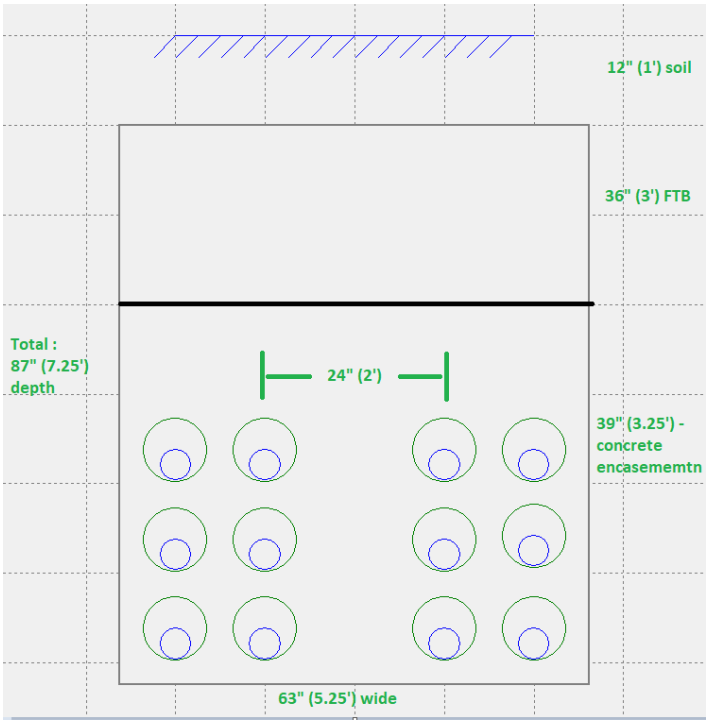
[8] Inclusive of all associated costs for the overhead design to connect to this underground option. Other detailed cost are pertinent to the underground engineering and construction and removals only

[9] The following quantities were used in this estimate: Cable – 95,340’’ Terminations 24, Splices: 24

Assumptions

Design/Engineering

- Transmission center line shown on the drawings is based above grade visual inspection of the area and is subject to change based on completion of below grade survey
- Any estimates on rock or foreign utilities are based on surface level observations
- Changes to the typical cross section depth may result in increased cable size or other design parameters to achieve required ampacity
- No P&C work has been included (remote ends)
- This option poses a higher likelihood of encountering unknown archeological resources.
- 1 transition station is included and will consist of a fenced in area containing:
    - 2 riser poles
    - 1 control enclosure
- Installation of underground cable system within RR ROW is contingent on approval from CDOT/MNR
- Cable system consists of 2 cables per phase – 3,500 kcmil
- Assumed duct bank cross section:



Cost Estimate

- ISO-PP4 Appendix D assumptions:

    - This is a “Project Initiation” type estimate (-50%/+200% accuracy)
    - Contingency for this type of estimate is 30%-50%
    - This estimate used 30% contingency
- Does not include removals
- Does not include remote substation work (P&C)
- Does not include taxes
- Land right costs are preliminary. Final acreage will be determined once final route is selected
- Escalation is calculated at 1.75% per year
- Soil and groundwater disposal costs have been estimated based on soil and groundwater analysis along the route which was performed in preparation for the proposed solution, which will be substantially higher for this option

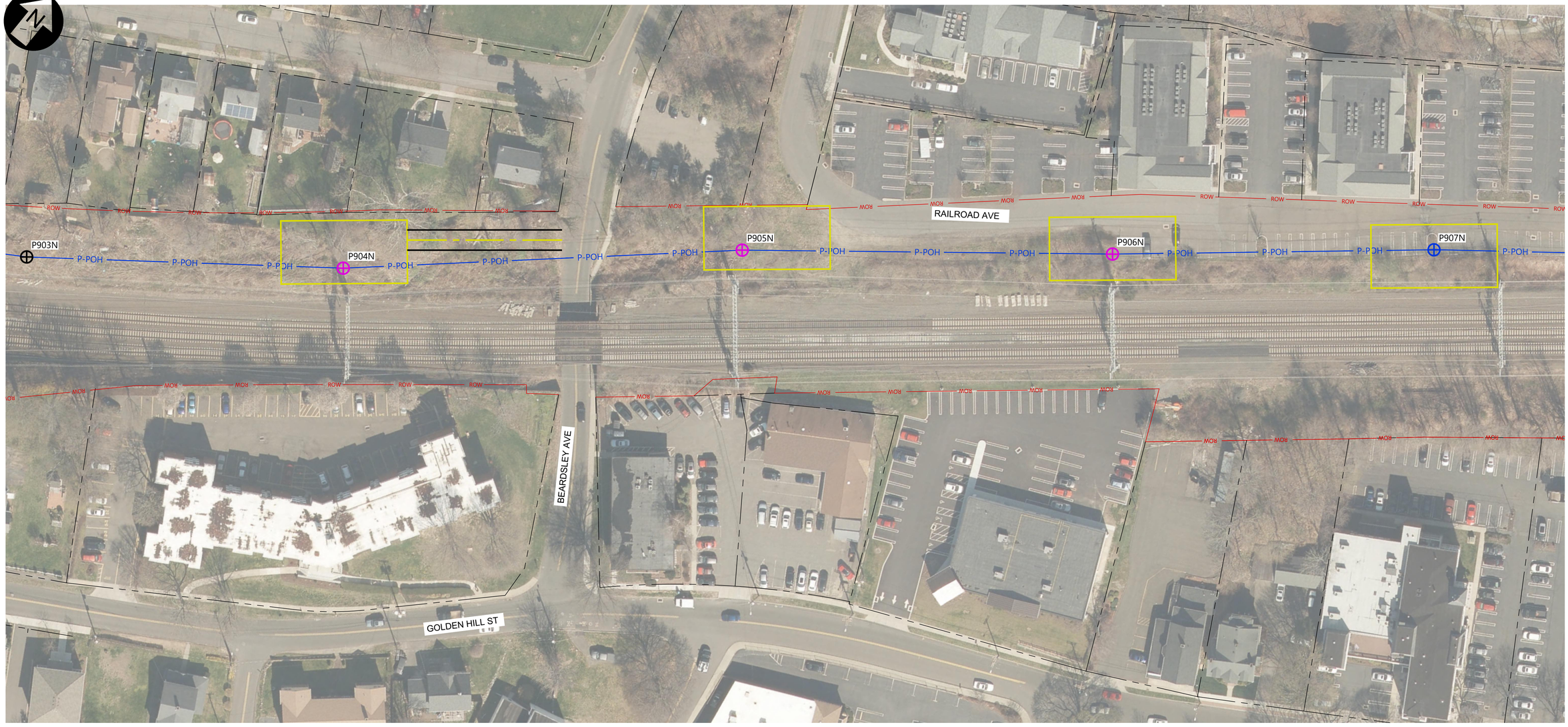
Schedule

- Conceptual level schedule is based on duct bank installation at 40’/day
- Cable pulling, termination, and splicing is based on past project: ~1 year for 8 miles, 1 cable per phase, 1 circuit

Option J

Overhead Double Circuit Transmission Line, north side of RR ROW (Proposed Project with Reduced Structure Heights from P904N to P916N)

Proposed Project constructed completely overhead between Milvon Substation to West River Substation primarily on the north side of the tracks with reduced structure heights from P904N to P916N



LEGEND

- OPTION J NEW STRUCTURE LOCATION
- ORIGINAL STRUCTURE LOCATION WITH REDUCED HEIGHT
- ORIGINAL UI PROPOSED 115-KV TRANSMISSION LINE STRUCTURE
- P-POH — OPTION J CONCEPT OVERHEAD ALIGNMENT
- ROW — EXISTING CT DOT CORRIDOR BOUNDARY
- EXISTING PROPERTY LINE
- ACCESS ROAD
- WORK PAD

DOWNTOWN MILFORD CONCEPT PLAN

0' 40 80 120

PLAN		BY	DATE
NOTEBOOK NO.	SURVEYED		
	REVIEWED		
	ROW CHKD		

PROFILE		BY	DATE
NOTEBOOK NO.	SURVEYED		
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UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

YR. CONST. W/O

NOTES:
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REV.	DATE	BY	DESCRIPTION	APP.

UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION J - OH REDUCED STR. HEIGHTS
1 OF 4

DR.	SFB	SCALE AS SHOWN	FILE:
CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

LEGEND

- OPTION J NEW STRUCTURE LOCATION
- ORIGINAL STRUCTURE LOCATION WITH REDUCED HEIGHT
- ORIGINAL UI PROPOSED 115-KV TRANSMISSION LINE STRUCTURE
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DOWNTOWN MILFORD CONCEPT PLAN

0' 20 40 60

PLAN		BY	DATE
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TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

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OPTION J - OH REDUCED STR. HEIGHTS
2 OF 4

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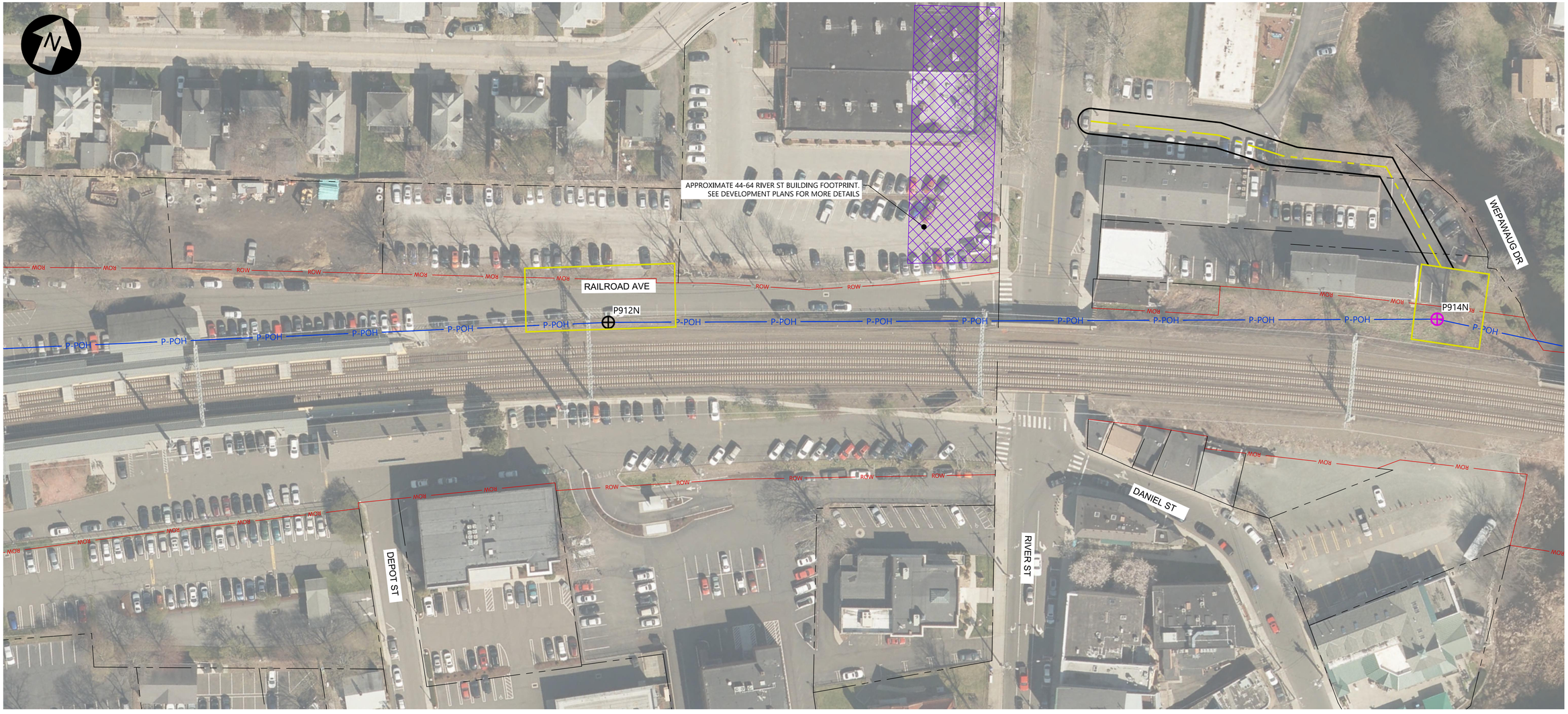

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DOWNTOWN MILFORD CONCEPT PLAN

0' 20 40 60

UNDERBUILD CONDUCTOR TYPE	NEUTRAL CONDUCTOR TYPE	OPGW TYPE	CONDUCTOR TYPE
TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

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OPTION J - OH REDUCED STR. HEIGHTS
3 OF 4

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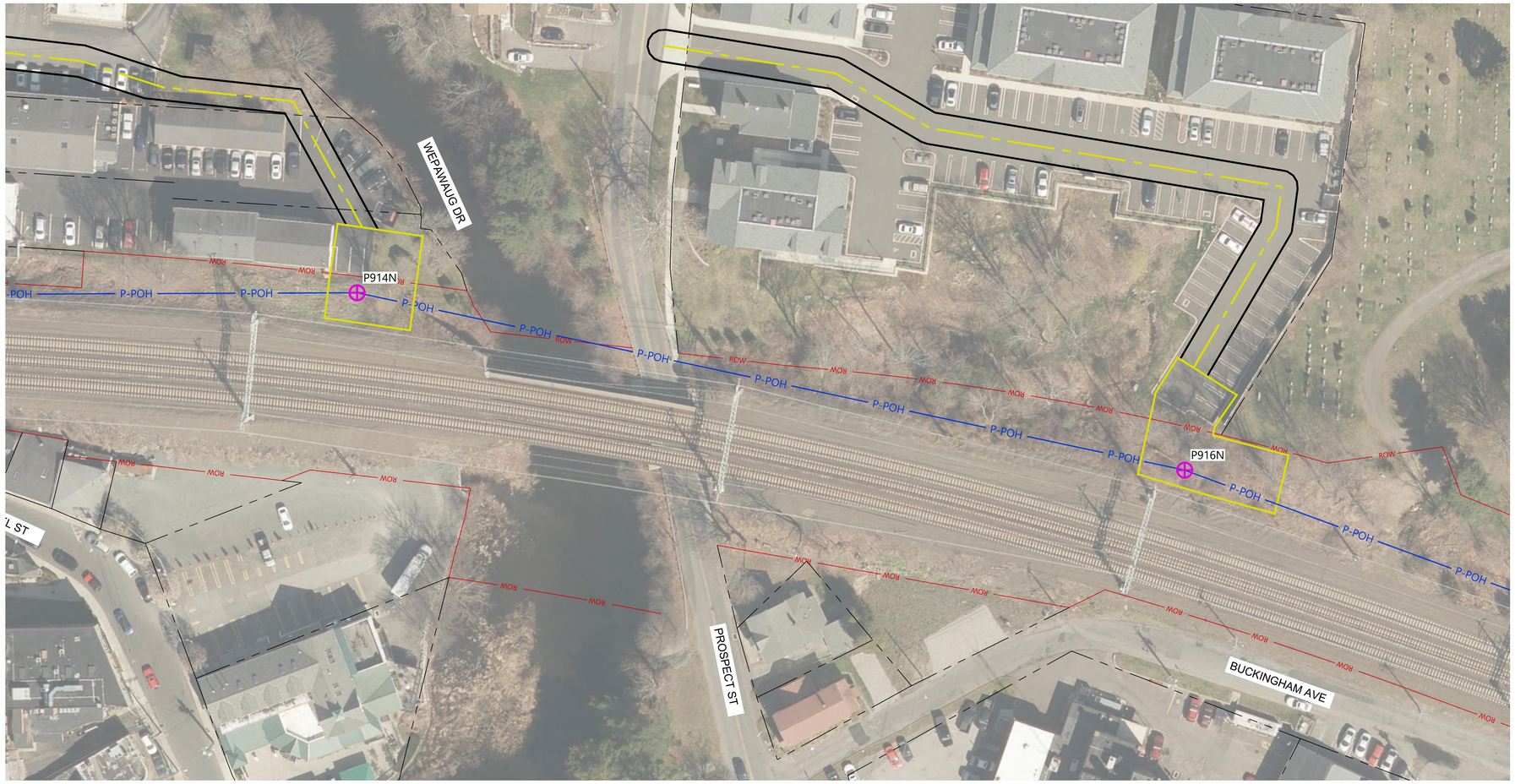

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- ORIGINAL STRUCTURE LOCATION WITH REDUCED HEIGHT
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DOWNTOWN MILFORD CONCEPT PLAN

0' 20 40 60

PLAN				BY	DATE
	SURVEYED				
NOTEBOOK NO.	REVIEWED				
	ROW CHKD				

PROFILE				BY	DATE
	SURVEYED				
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TENSION	TENSION	TENSION	TENSION
DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.	DESIGN TEMP.

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UI 115-kV RR PROJECT MILVON TO WEST RIVER
OPTION J - OH REDUCED STR. HEIGHTS
4 OF 4

DR.	SFB	SCALE AS SHOWN	FILE:
CK.	JRD	NO.	REV. 0
APP.	MSP		
DATE:			

Cost Estimate – Furnish and Install

Item	Quantity	Estimate
Engineering & Indirects		$43,600,000
Steel Poles, Foundations, and Attachment Hardware	159	$46,350,000
OPGW and Conductors		$28,500,000
Removals		$17,500,000
Other Construction Requirements (Mobilization, Laydown Yards, Commissioning of Line, etc)		$10,900,000
Distribution Work		$400,000
Substation Work		$1,200,000
Land Rights	18 acres	$12,950,000
Environmental Controls (Matting, Clearing, etc)		$35,450,000
Flagmen/Police Support		$13,400,000
AFUDC		$40,700,000
Contingency (30%)		$44,400,000
Option J Total Cost		$295,350,000

Assumptions

Design/Engineering/Scope

- Existing structure location for P908N shifted ~135' west to support shorter poles and balance out spans between the additional and existing poles.
- No underground subsurface utility survey has been performed at either new structure locations or relocated (P908N) structure location.
- No geotechnical investigation has been performed at either new structure locations or relocated (P908N) structure location which dictate pole foundation sizing in addition to soil and groundwater environmental characterization and disposal volume estimates
- Installation of Anti-Galloping Devices in the Span between P914N and P916N in order to remove P915N.
- Net increase of one (1) additional steel pole and foundation needed in comparison to the Proposed Project.
- 7 Poles with decreased heights in comparison to the Proposed Project

Structure Number	Old Height	New Height	Notes
P904N	105'	100'	-
P905N	115'	100'	-
P906N	120'	100'	-
P907N	-	105' (New)	-
P908N	130'	110'	Existing location shifted west ~135'
P909N	-	110' (New)	-
P910N	140'	125'	-
P912N	130'	130'	-
P914N	135'	130'	-
P915N	145'	Removed	-
P916N	135'	130'	-

Cost Estimate

- ISO-PP4 Appendix D assumptions:
  - This is a "Project Initiation" type estimate (-50%/+200% accuracy)
  - Contingency for this type of estimate is 30%-50%
  - This estimate used 30% contingency
- Escalation is calculated at 1.75% per year
- Four flagmen per day (2 crews) have been allocated for the duration of the construction schedule