PARSONS BRINCKERHOFF

FINAL

I-564 Intermodal Connector Rail Connection Study

PROJECT NO. (FO) R 000 -122-108, PE-101
FROM: I-564
TO: NORFOLK NAVAL BASE/
NORFOLK INTERNATIONAL TERMINALS
CITY OF NORFOLK
PPMS 18968

July 10, 2003

PARSONS BRINCKERHOFF

Baker

Engineering & Energy

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Typical Sections
Off-Shore Alternative Alignments
Segment One Connection
Inspection Station Options
On-Shore Alternative Alignments

GLOSSARY OF TERMS AND ACRONYMS

Term	Explanation
Bore	Separate roadway or railway within a sunken tunnel "tube"
EB	Eastbound – for purposes of this study I-564 is considered to be an east-west route
ERT	Elizabeth River Tunnel
Hampton Boulevard Project	Proposed lowering of Hampton Boulevard (Route 337) to separate the crossing of Hampton Boulevard traffic and freight rail traffic at the north side of Norfolk International Terminals
Hampton Roads Crossing Study	A study undertaken to determine the preferred alternative for crossing Hampton Roads to connect "south side" Virginia with the peninsula of Virginia
HR3X	Hampton Roads Third Crossing project – Candidate Build Alternative 9
I-564 Intermodal Connector Project	Proposed extension of I-564 from existing I-564 just south of the runway overpass to the west toward Hampton Boulevard. The project includes improvements to existing I-564 south to the interchange with Terminal Boulevard
MMMBT	Monitor-Merrimac Memorial Bridge Tunnel
NB	Northbound – for purposes of this study I-664 is considered to be a north-south route
SB	Southbound – for purposes of this study I-664 is considered to be a north-south route
Tube	Sunken (as opposed to bored) tunnel that may contain multiple "bores"
WB	Westbound – for purposes of this study I-564 is considered to be an east-west route

PROJECT TEAM

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OBJECTIVE

The objective of this study is to develop, analyze and report on the potential alternative concepts for connections of light and heavy rail within the limits of Segment 1 of the Hampton Roads Crossing project (HR3X) and the I-564 Intermodal Connector project. Segment 1 is that portion of the HR3X that connects the existing Monitor-Merrimac Memorial Bridge Tunnel with I-64. The study objective also included an investigation of possible locations for a truck inspection station for the proposed Elizabeth River Tunnel.

The design parameters for the current I-564 Intermodal Connector design plans were established prior to the Commonwealth Transportation Board approving the preferred alternative (HR3X) as presented by the ***Additional Conceptual Engineering Study, Technical Report for the Hampton Roads Crossing Study, Candidate Build Alternative No. 9 October, 1999***. As the work progressed on the I-564 Intermodal Connector project, it became obvious that the impact of Segment #1 of the HR3X on the I-564 Intermodal Connector and the rail connection plan needed to be investigated and coordinated.

This study provides the Department a detailed breakdown of the resulting impacts of the HR3X on the I-564 Intermodal Connector to allow the Department to make a better decision on the direction that both projects should follow.

BASELINE CONDITIONS

The development of this study is based on five key directives:

1. The design of the Hampton Boulevard project as presented on plans as of May 2003 (under right-of-way acquisition) should be presumed final and not subject to change;
2. The design of the I-564 Intermodal Connector as of May 2003 (right-of-way plans) is the baseline condition for that project;
3. The drawings of the HR3X as presented in the ***Hampton Road Crossing Study*** show the baseline conditions for that project.
4. The alternatives studied will begin operation as automobile HOV lanes and be capable of conversion to light or heavy passenger rail facilities at such time as rail service is warranted.
5. The geometry of these alignments must conform to the requirements for light and heavy passenger rail as presented in ***Hampton Roads Third Harbor Crossing, Technical Memorandum No. 2: Design Basis Memorandum, March 2003***, prepared for the Department of Rail and Public Transportation.

BASIC ALTERNATIVES

The alternatives considered are variations of two basic alignments:

ALTERNATIVE 1: The rail alignment between Newport News and Norfolk connecting the **east bore** of the proposed Monitor-Merrimac Tunnel to the **center bore** of the proposed Elizabeth River Tunnel; and

ALTERNATIVE 2: The rail alignment between Newport News and Norfolk connecting the **east bore** of the proposed Monitor-Merrimac tunnel to the **southern bore** of the proposed Elizabeth River Tunnel.

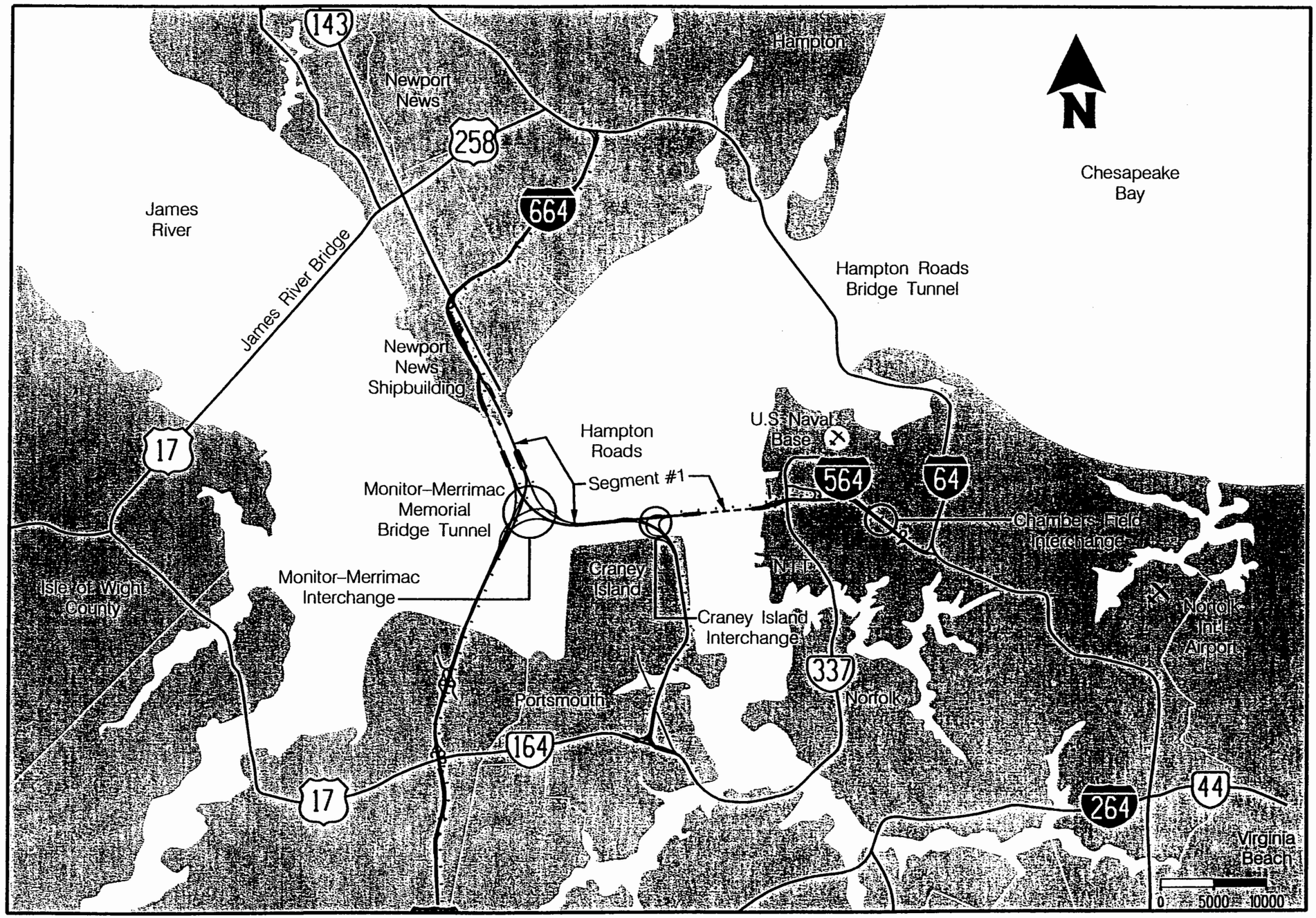
Variants of these basic alternatives are labeled 1A, 2A, etc. The study groups the alternatives into Off-shore and On-shore categories.

Alternatives Presented

Off-shore Alignments	On-shore Alignments
Alternative 1 – Center bore connection	Alternative 1A – Center bore with Ramp 564 – EB over rail
Alternative 1A – Center bore with HOV/Rail structure on separate structure than SOV lanes	Alternative 1B – Center bore with rail over Ramp 564-EB
Alternative 2: Southern bore connection	Alternative 2A – Southern bore connection HOV operation
	Alternative 2B – Southern bore rail operations

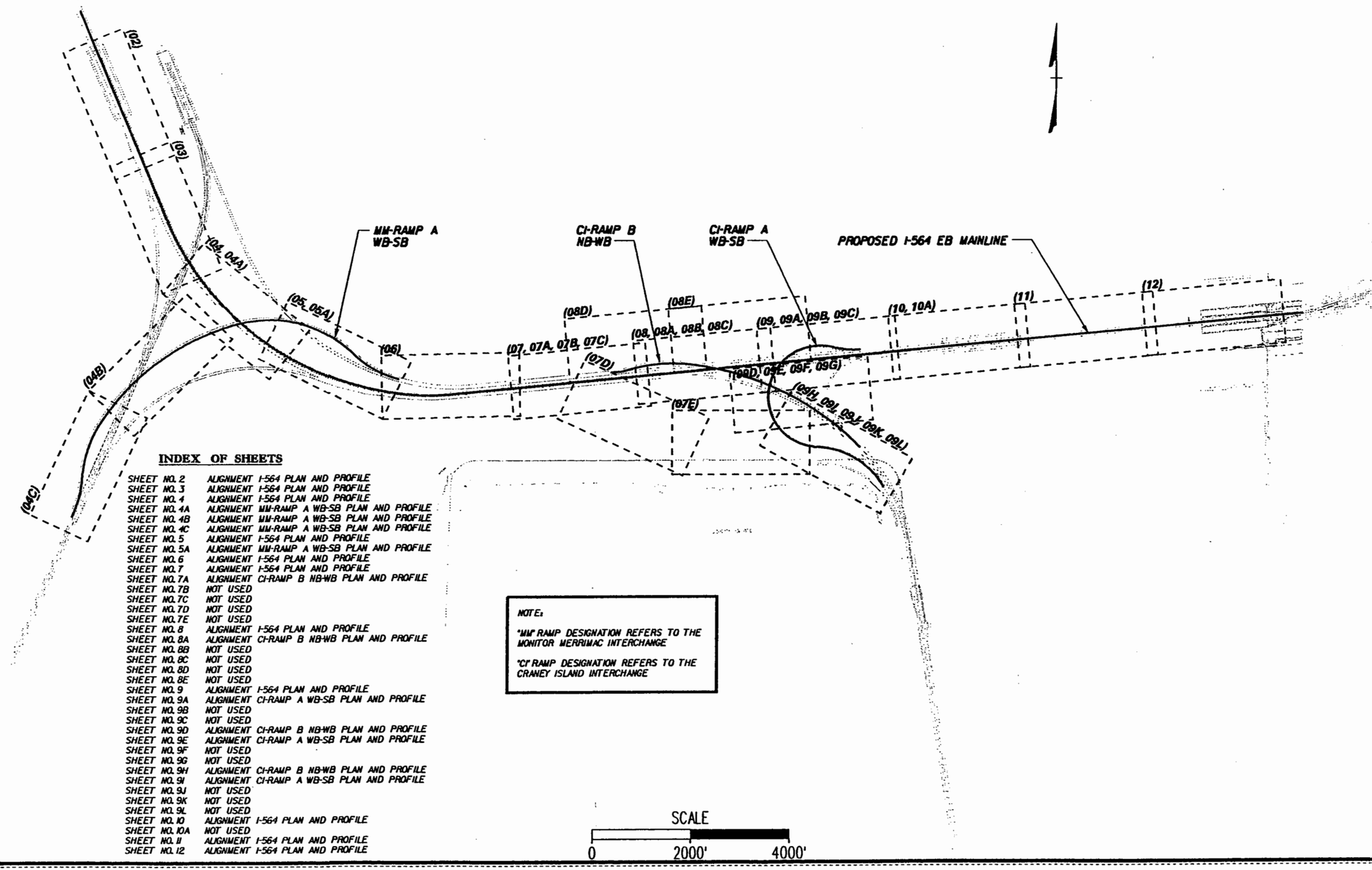
(NOTE: ON-SHORE ALTERNATIVE 2A AND 2B ARE ONE ALTERNATIVE. BECAUSE OF THE COMPLEXITY OF HOV to RAIL CONVERSION, THEY ARE DESCRIBED SEPARATELY)

The maps on the following pages show overall study area and index the drawings.



VICINITY MAP

ALTERNATIVE-1 OFF SHORE



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NOTE:

"MM" RAMP DESIGNATION REFERS TO THE MONITOR MERRIMAC INTERCHANGE

"CI" RAMP DESIGNATION REFERS TO THE CRANEY ISLAND INTERCHANGE

SCALE

0 2000' 4000'

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PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.

MICHAEL BAKER JR., INC.

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ALTERNATIVE-1 OFF SHORE

KEYMAP

I-564 INTERMODAL CONNECTOR
Rail Connection Study
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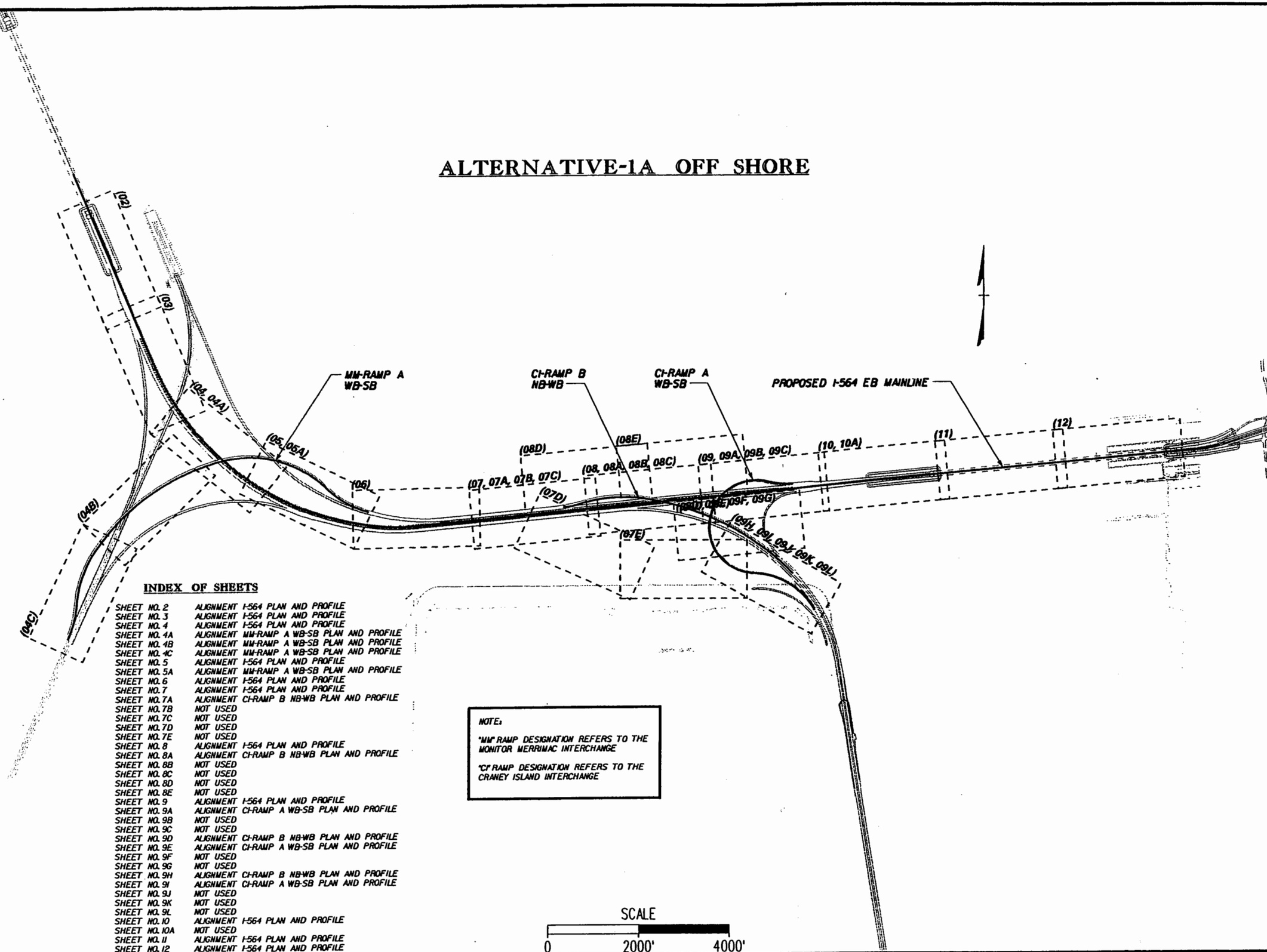

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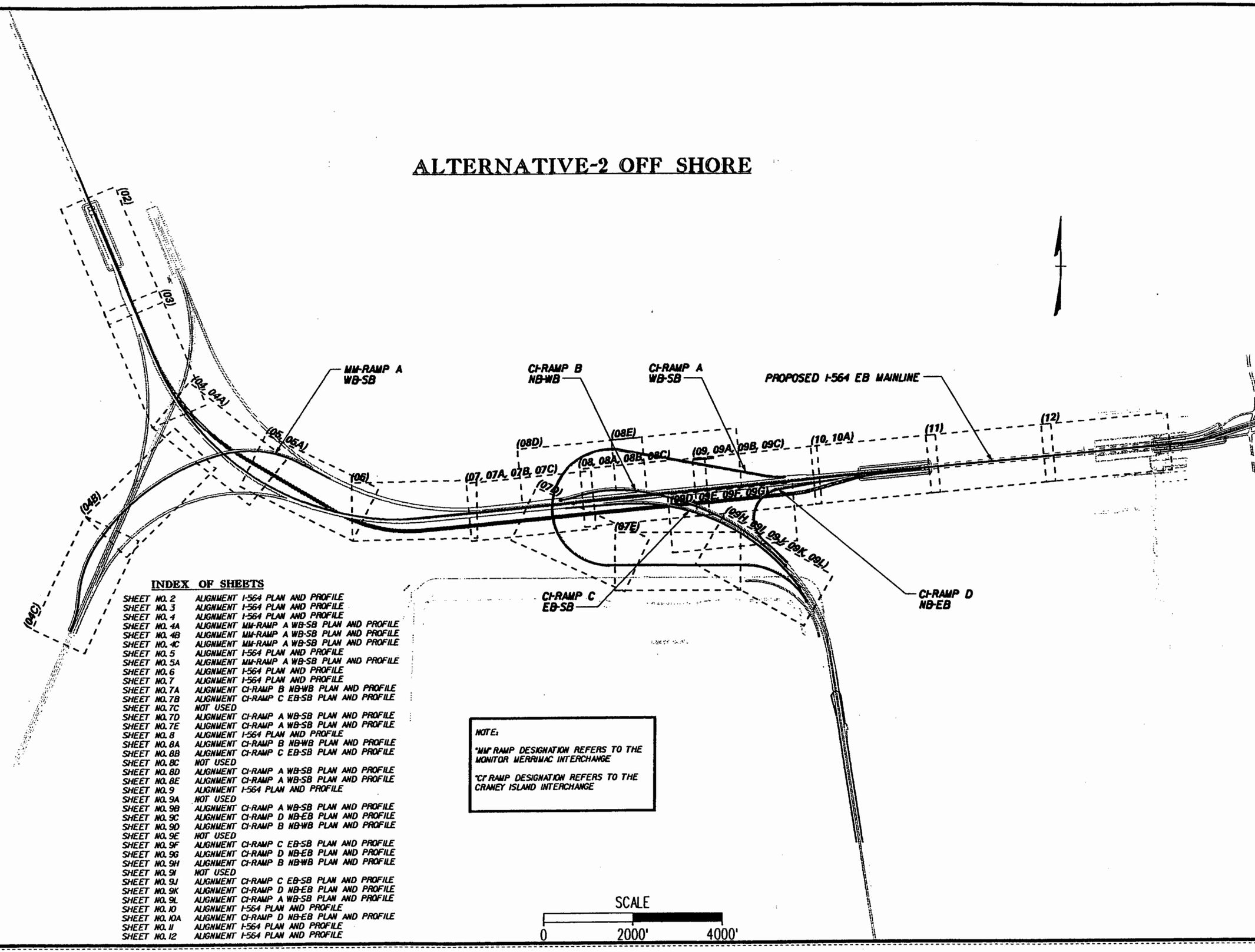

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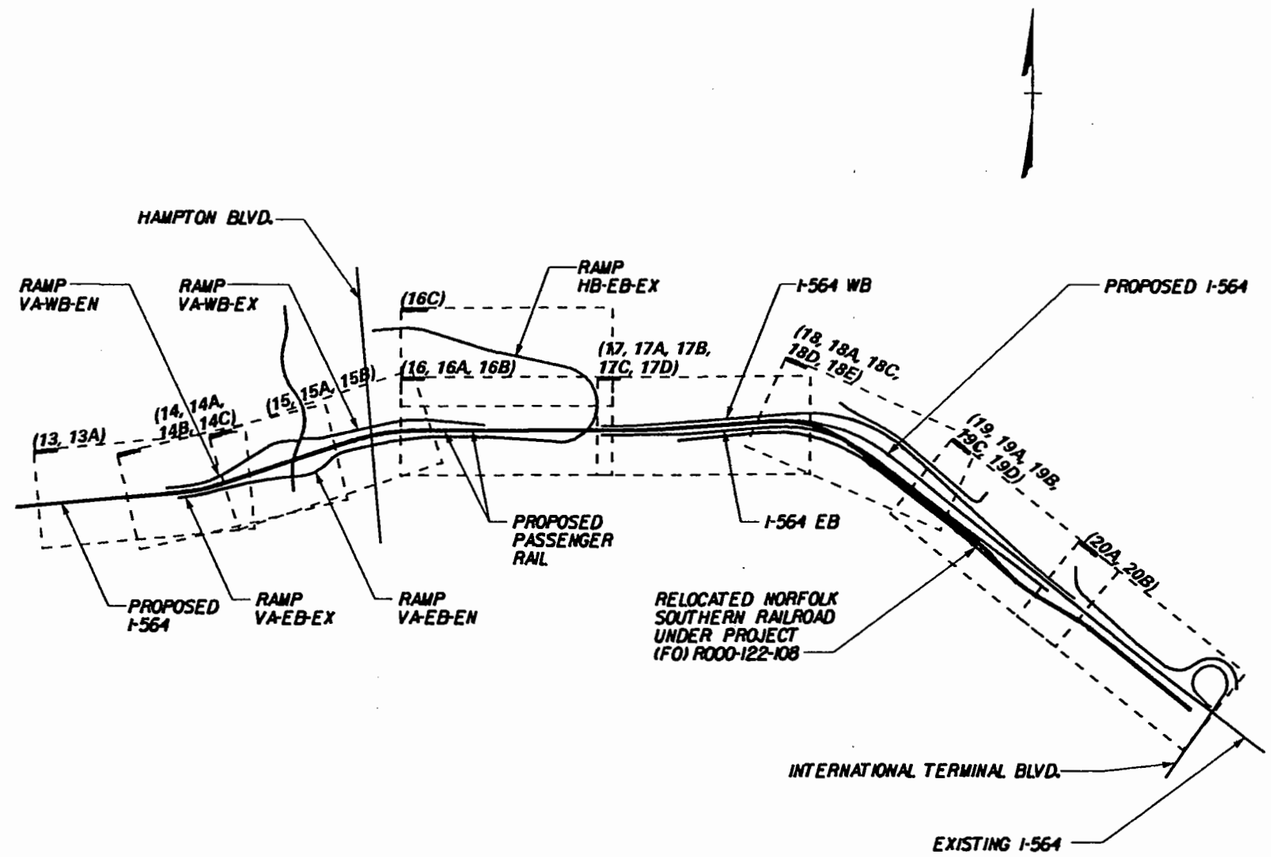

SCALE

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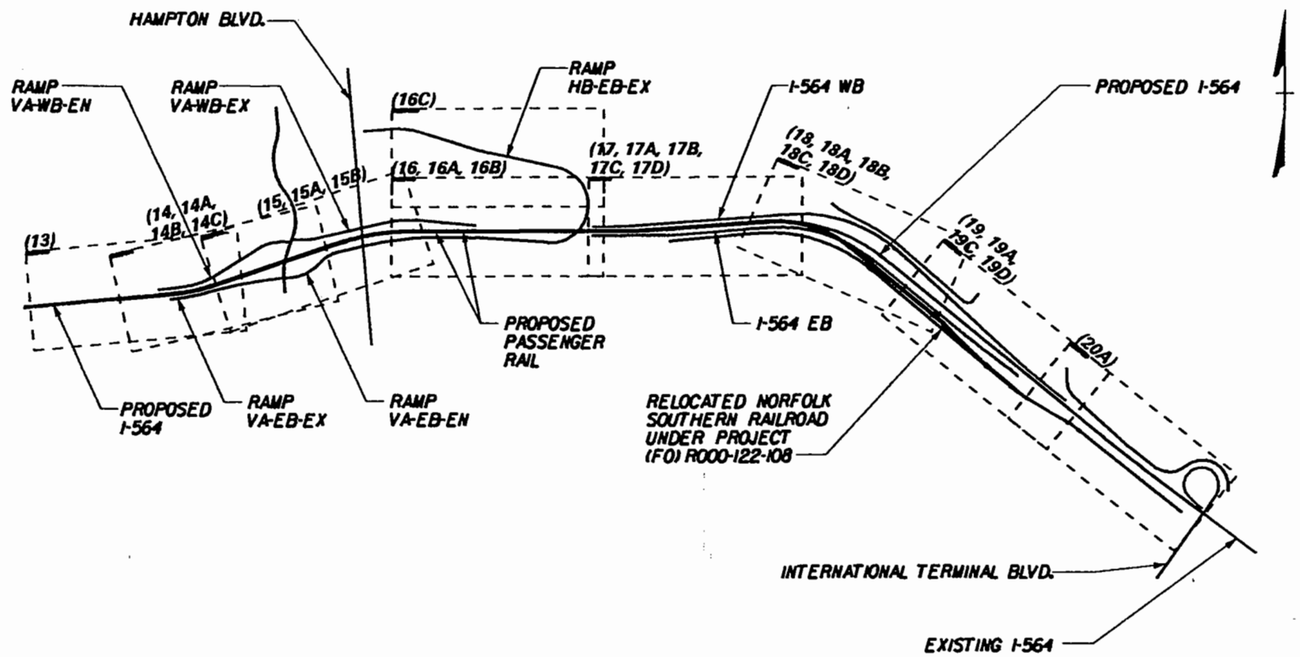
ALTERNATIVE-1B ON SHORE



SCALE

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MICHAEL BAKER JR., INC.

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ALTERNATIVE-1B ON SHORE

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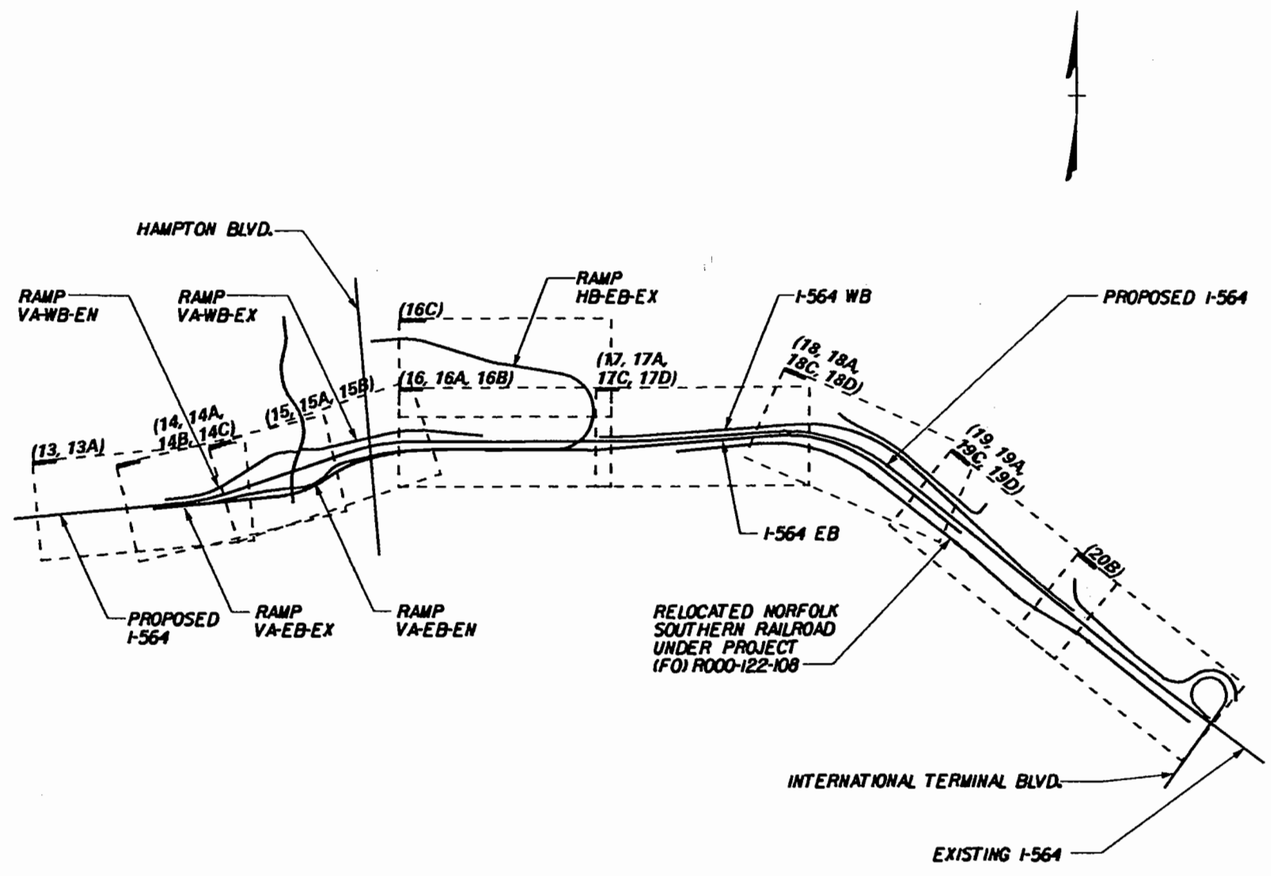
SHEET NO. 16C	ALIGNMENT RAMP HB-EB-EX PLAN AND PROFILE
SHEET NO. 17	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 17A	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 17B	NOT USED
SHEET NO. 17C	ALIGNMENT I-564 WB PLAN AND PROFILE
SHEET NO. 17D	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE
SHEET NO. 18	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 18A	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 18B	NOT USED
SHEET NO. 18C	ALIGNMENT I-564 WB PLAN AND PROFILE
SHEET NO. 18D	ALIGNMENT RELOCATED NORFOLK SOUTHERN PLAN AND PROFILE
SHEET NO. 18E	NOT USED
SHEET NO. 19	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 19A	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 19B	NOT USED
SHEET NO. 19C	ALIGNMENT I-564 WB PLAN AND PROFILE
SHEET NO. 19D	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE
SHEET NO. 20	NOT USED
SHEET NO. 20A	NOT USED
SHEET NO. 20B	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE

ALTERNATIVE-2A ON SHORE



SCALE

0 2000' 4000'

PREPARED BY
PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DATE	DATE	DATE	DATE
AAA	BBB	CCC	
DESIGN	DRAWN	CHCK	APPR

ALTERNATIVE-2A ON SHORE
KEYMAP

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT2A-KEY

INDEX OF SHEETS

SHEET NO. 13	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 13A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 14	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 14A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 14B	ALIGNMENT RAMP VA-WB-EN PLAN AND PROFILE
SHEET NO. 14C	ALIGNMENT RAMP VA-EB-EX PLAN AND PROFILE
SHEET NO. 15	ALIGNMENT I-564 PLAN AND PROFILE
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SHEET NO. 16B	ALIGNMENT RAMP HB-EB-EX PLAN AND PROFILE
SHEET NO. 16C	ALIGNMENT RAMP HB-EB-EX PLAN AND PROFILE
SHEET NO. 17	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 17A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 17B	NOT USED
SHEET NO. 17C	NOT USED
SHEET NO. 17D	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE
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SHEET NO. 18A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
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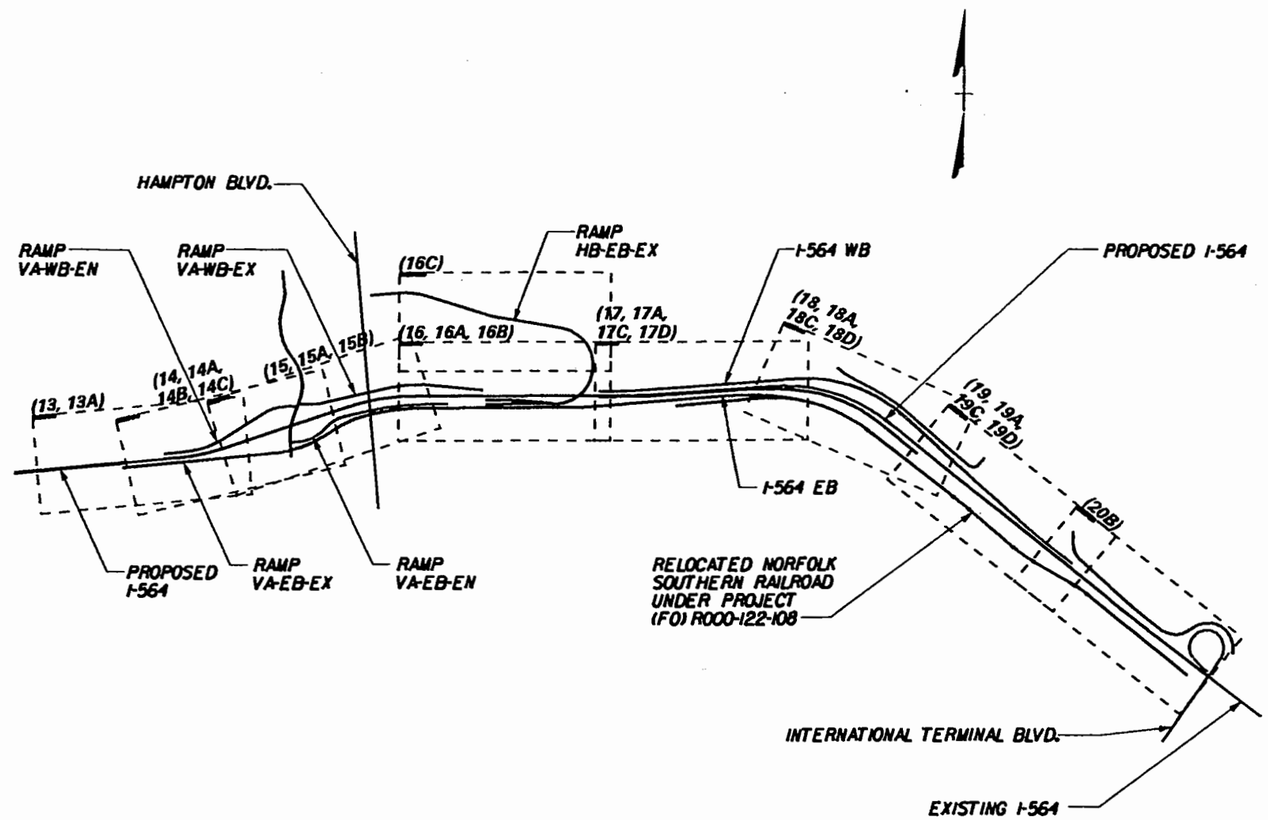
SHEET NO. 19D	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE
SHEET NO. 20	NOT USED
SHEET NO. 20A	NOT USED
SHEET NO. 20B	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE

ALTERNATIVE-2B ON SHORE



SCALE

0 2000' 4000'

PREPARED BY
PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2B ON SHORE
KEYMAP

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT2B-KEY

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OFF-SHORE ALIGNMENT ALTERNATIVES

Alternative 1 – CENTER BORE CONNECTION

DESCRIPTION: This alternative is very similar to HR3X. The intermodal corridor is in the proposed east bore of the proposed tunnel to be adjacent to the existing Monitor-Merrimac Memorial Bridge Tunnel (MMMBT)) and in the center bore of the proposed Elizabeth River Tunnel (ERT). And in both cases the rail/HOV corridor is on the same eastbound bridge structure as the passenger vehicles. Considering both rail and HOV scenarios, it would be prudent to initially design and construct the section under the railway/HOV section for the design railway loading. The main difference between this alternative and the original HR3X is the lane configuration for the eastbound mainline. In order to provide for a rail corridor an additional barrier was included to separate the mainline passenger vehicles from the railway. This added approximately 15 feet to the eastbound bridge structure. Because of this change, the westbound HOV lane and the HOV lane connection shown on HR3X was removed, and both directions of HOV/Rail where placed on the same structure with the eastbound SOV traffic. This resulted in the removal of westbound HOV access from the Craney Island interchange. Therefore, instead on having four lanes of SOV and one lane HOV on the same structure in both directions as shown in HR3X, there are four lanes of SOV on the westbound structure and two bi-directional concurrent HOV/Railway and four lanes of SOV on the eastbound structure (Dwg. No. ALT-1-002 through ALT-1-012).

WHY CHOSEN: This alternative meets all the study criteria and provides a feasible intermodal corridor that connects the Newport News/Hampton peninsula with the south-side of Hampton Roads. In addition, it has the least impact on the current HR3X alternative as presented in the Hampton Roads Third Crossing Study.

FEATURES:

1. Depth of profile grade line of ERT adjusted to accommodate a 65-ft. (plus 2 ft. overdredge) shipping channel.
2. Access to the operations on Craney Island from north of the island by adjusting the mainline and HOV/Rail profiles at approximate Station 825+00 to obtain 45-ft. vertical clearance under the bridge structures (Dwg. No. ALT-1-006).

IMPACTS:

1. Additional barrier required for rail/passenger separation.
2. Removes HOV access from the westbound Craney Island interchange.

Alternative 1A – CENTER BORE CONNECTION

DESCRIPTION: This alternative is the same as Alternative 1 described above except the HOV/Rail corridor is split from the eastbound and westbound passenger vehicles and placed on a separate bridge structure. Instead of having two structures there are three: one westbound for SOV traffic, one eastbound for SOV traffic and one for the HOV/Railway (Dwg. No. ALT-1A-002 through ALT-1A-012).

WHY CHOSEN: This alternative meets all the study criteria and provides a feasible Intermodal corridor that connects the Newport News/Hampton peninsula with the south-side of Hampton Roads. It also minimizes the impacts on the current HR3X alternative as presented in the Hampton Roads Third Crossing Study while allowing flexibility in design attributed to separating the HOV/Rail from the SOV with separate bridge structures.

FEATURES:

1. Depth of profile grade line of ERT adjusted to accommodate a 65-ft. (plus 2 ft. overdredge) shipping channel.
2. HOV/Railway on separate bridge structures
3. Access to the operations on Craney Island from north of the island by adjusting the mainline and HOV/Rail profiles at approximate Station 825+00 to obtain 45-ft. vertical clearance under the bridge structures (Dwg. No. ALT-1-006).

IMPACT:

1. Removes HOV access from the westbound Craney Island interchange.

Alternative 2 – SOUTHERN BORE CONNECTION

DESCRIPTION: As with the other alternatives, Alternative 2 uses the east bore of the proposed MMMBT for HOV/Railway but instead of using the center bore of the proposed ERT, it uses the southern bore. Coming out of the south end of the proposed MMMBT, the HOV/Railway splits off from the SOV traffic on a separate bridge structure. It then crosses over existing I-664, rises to allow marine access to Craney Island and then down toward the southern bore of the proposed ERT. The horizontal alignment of the HOV/Railway shifts from the center to south of the HR3X alignment with the eastbound SOV mainline bridge crossing over it just east of the Monitor-Merrimac interchange. Again, there are three separate bridge structures: one each for the east and west bound SOV traffic and one for the HOV/Railway.

Additionally, in order to have the HOV/Railway traverse the Craney Island interchange south of the mainline the westbound to southbound ramp was extended to allow it to cross over the three structures at a reasonable height and still maintain the vertical clearance specified in the design criteria (Dwg. No. ALT-2-002 through ALT-2-012).

WHY CHOSEN: This alternative meets all the study criteria and provides a feasible Intermodal corridor that connects the Newport News/Hampton peninsula with the south-side of Hampton Roads. It provides an option for a direct connection to the existing railway on the south side of the proposed I-564 Intermodal Connector on the land side of the proposed Elizabeth River Tunnel.

FEATURES:

1. Depth of profile grade line of ERT adjusted to accommodate a 65-ft. (plus 2 ft. overdredge) shipping channel. See page 16 for clearance chart.

2. HOV/Rail on separate structure located to the south of the mainline bridges.

3. Access to the operations on Craney Island from north of the island by adjusting the mainline and HOV/Rail profiles at approximate Station 825+00 to obtain 45-ft. vertical clearance under the bridge structures (Dwg. No. ALT-1-006).

IMPACTS:

1. Westbound to southbound Craney Island Interchange Ramp requires lengthening to minimize height of ramp bridge crossing.

2. Craney Island Interchange Ramps will require minor vertical adjustments to facilitate the crossing of the HOV/Rail bridge when compared to other alternatives.

3. Removes HOV access from the westbound Craney Island interchange.

Off-Shore: Connection to Segment One Only

DESCRIPTION:

To ensure each of the off-shore alternatives would meet the access requirements to I-664 and the proposed MMMBT as depicted in the Hampton Roads Crossing Study plans, the full build scenario was considered. However, a task of this study was to develop prudent options for connecting Segment One of the Hampton Roads Crossing Study into the existing MMMBT. Two options were developed and described below. (Dwg. SEGMENT ONE – following Dwg. No. ALT-2-012)

For each of the options, Monitor-Merrimac Interchange Ramp A westbound to southbound and Monitor-Merrimac Interchange Ramp coming from northbound I-664 and eastbound to I-564 could be constructed. And only "stub-outs" for the ramps at the interchange at Craney Island would be provided. In the westbound direction, both options connect Segment One to the existing I-664 with the two-lane ramp proposed in the Hampton Roads Crossing Study. However, this connection is slightly modified to have the ramp merge with existing I-664 instead of connecting directly into the existing tunnel. To be prudent, this study recommends constructing both lanes for this ramp, but only using one of the lanes to connect with existing I-664.

The difference in the two options is seen in the eastbound direction. Since the HOV/Railway is anticipated to be developed in later stages as part of the proposed new MMMBT and other segments of the Third Crossing, it is not included in either of these options. From the eastbound direction out of the existing MMMBT a temporary direct connection off-ramp is provided which would connect to the eastbound proposed Segment One mainline just north of the crossing of existing I-664. Therefore, the eastbound traffic currently on I-664 would come up out of the tunnel, be able to right exit onto a ramp that would continue up and over existing westbound I-664 and connect to eastbound Segment One mainline. A "stub-out" would be provided for the eastbound mainline for future connection to the proposed new MMMBT.

Option Two is similar, but instead of a direct ramp from the tunnel, a loop ramp would be provided. Eastbound traffic coming out of the existing MMMBT would come out of the tunnel, go under the proposed Segment One mainline bridge and then be able to right exit onto a loop ramp that would connect to the Segment One mainline and cross over existing westbound I-664.

ON-SHORE ALIGNMENT ALTERNATIVES

Alternative 1A – CENTER BORE – RAMP 564-EB OVER RAIL

DESCRIPTION: Alternate 1A uses the center bore of the proposed Elizabeth River Tunnel and takes the I-564 EB lanes over the proposed passenger rail lines just west of existing I-564 (Ramp 564 EB), (Dwg. No. ALT-1A-013 through ALT-1A-020B).

WHY CHOSEN: This alternative was chosen to determine the impacts to the I-564 Intermodal Connector project of shifting the I-564 EB lanes south to allow for the passenger rail between the EB and WB lanes of proposed I-564 and placing the proposed EB lanes connecting to exising I-564 on a flyover structure to pass over the proposed rail line.

FEATURES:

1. Rail in "median" area between EB and WB lanes of I-564 west of existing I-564.

2. Rail moves out of median area before reaching existing I-564 requiring a bridge over the rail to carry the EB lanes of I-564 connecting to existing I-564.

IMPACTS (Compared to I-564 Intermodal Connector project):

1. Shifts proposed I-564 eastbound lane 10 feet south.

2. Proposed right-of-way (ROW) crosses railroad realignment approximately STA. 1025+00 Rt. (Dwg. No. ALT-1A-015A).

3. Proposed ROW crosses existing rail yard; two storage tracks would be eliminated, from approximately STA. 1045+00 to 1053+00 Rt. (Dwg. No. ALT-1A-016A and -017)

4. I-564 side slope impacts concrete ditch and stormwater retention basin approximately STA. 1034+00 Rt. (Dwg. No. ALT-1A-016).

5. Requires moving the gores of Ramp HB-EB-EX (EB exit ramp to Hampton Blvd) and Ramp HB-WB-EN (WB entrance ramp from Hampton Blvd.) closer to Ramps VA-WB-EX (WB exit ramp to Virginia Ave.) and VA-EB-EN (EB entrance ramp from Virginia Ave.) resulting in a

distance of less than 2,000 feet between gores which is below the minimum spacing recommended by AASHTO standards (Dwg. No. ALT-1A-015 and -016).

6. Side slope impacts concrete ditch, approximately STA. 1050+00 Rt. (Dwg. No. ALT-1A-016).

7. Increases the impacts to the wetlands from approximately STA. 1054+00 to 1063+00 Lt. and Rt. (Dwg. No. ALT-1A-017).

8. More earthwork is needed at Boush Creek because the profile grade line had to be raised to allow for a deeper structure depth required for the railroad bridge (Dwg. No. ALT-1A-017A).

9. Requires moving the gores of the Ramp 564-EB lanes and the I-564-EB exit ramp for the Chambers Field Interchange resulting in a distance of less than 2,000 feet which is below the minimum spacing recommended by AASHTO standards (Dwg. No. ALT-1A-019).

10. Greater impacts to the landfill and salvage yard at STA. 1073+00 Rt. and 1080+00 to 1086+00 Rt. respectively (Dwg. No. ALT-1A-017 and -018).

11. Greater impacts to Navy property from STA. 1086+00 to 1125+00 (Dwg. No. ALT-1A-018 through -020).

12. Requires the demolition of the I-564 HOV flyover and retaining walls at existing I-564 when the rail option is initiated. The flyover will no longer serve a useful purpose and the lanes cannot be connected in a way that would provide a meaningful increase in capacity.

13. Requires additional bridge and retaining walls for Ramp 564-EB over passenger rail (Dwg. No. ALT-1A-017B-018C).

14. Requires lengthening the Chambers Field interchange bridge to accommodate the railroad and access road at STA. 1112+00 Rt. (Dwg. No. ALT-1A-019).

15. Requires the raising of the Ramp VA-EB-EN (EB entrance ramp from Virginia Ave.) profile over Hampton Blvd. in order to tie into the raised mainline profile which has to accommodate a deeper structure for the railroad loading (Dwg. No. ALT-1A-015).

Alternative 1B – CENTER BORE – RAIL OVER RAMP 564-EB

DESCRIPTION: Alternate 1B uses the center bore of the proposed Elizabeth River Tunnel and takes the proposed passenger rail lines over the proposed I-564 EB lanes just west of existing I-564 (Ramp 564 EB) (Dwg. No. ALT-1B-013 through ALT-1B-020A).

WHY CHOSEN: This alternative was chosen to determine the impacts to the I-564 Intermodal Connector project by shifting the I-564 EB lanes south and placing the passenger rail lines on a flyover structure over the 564 EB lanes.

FEATURES:

1. Rail in "median" area between EB and WB lanes of I-564 west of existing I-564.

2. Rail moves out of median area before reaching existing I-564 requiring a rail bridge over the the EB lanes of I-564 connecting to existing I-564.

IMPACTS (Compared to I-564 Intermodal Connector project):

1. Shifts proposed I-564 eastbound lane 10 feet south.

2. Proposed right-of-way (ROW) crosses railroad realignment approximately STA. 1025+00 Rt. (Dwg. No. ALT-1B-015A).

3. Proposed ROW crosses the existing rail yard, two storage tracks would be eliminated, at approximately STA. 1045+00 to 1053+00 Rt. (Dwg. No. ALT-1B-016A and -017).

4. I-564 side slope impacts concrete ditch and stormwater retention basin approximately STA. 1034+00 Rt. (Dwg. No. ALT-1B-016).

5. Requires moving the gores of Ramp HB-EB-EX (EB exit ramp to Hampton Blvd) and Ramp HB-WB-EN (WB entrance ramp from Hampton Blvd.) closer to Ramps VA-WB-EX (WB exit ramp to Virginia Ave.) and VA-EB-EN (EB entrance ramp from Virginia Ave.) resulting in a distance of less than 2,000 feet between gores which is below the minimum spacing recommended by AASHTO standards (Dwg. No. ALT-1B-015 and -016).

6. Side slope impacts concrete ditch, approximately STA. 1050+00 Rt. (Dwg. No. ALT-1B-016).

7. Increases wetland impacts from approximately STA. 1054+00 to 1063+00 Lt. and Rt. (Dwg. No. ALT-1B-017).

8. More earthwork is needed at Boush Creek because the profile grade line had to be raised to allow for a deeper structure depth required for the railroad bridge (Dwg. No. ALT-1B-017A).

9. Greater impacts to the landfill and salvage yard STA. 1073+00 Rt. and 1080+00 to 1086+00 Rt. respectively (Dwg. No. ALT-1B-017 and -018).

10. Requires demolition of the I-564 HOV flyover and retaining walls when rail option is initiated. The flyover will no longer serve a useful purpose and the lanes cannot be connected in a way that would provide a meaningful increase in capacity.

11. Requires rail bridge over Ramp 564 EB (Dwg. No. ALT-1B-018).

12. Requires lengthening the Chambers Field interchange bridge to accommodate the railroad and access road at STA. 1112+00 Rt. (Dwg. No. ALT-1b-019).

13. Requires the raising of the Ramp VA-EB-EN (EB entrance ramp from Virginia Ave.) profile over Hampton Blvd. in order to tie into the raised mainline profile which has to accommodate a deeper structure for the railroad loading (Dwg. No. ALT-1B-015).

Alternative 2A – SOUTHERN BORE – HOV LANES OPERATION

(NOTE: ON-SHORE ALTERNATIVE 2A AND 2B ARE ONE ALTERNATIVE. BECAUSE OF THE COMPLEXITY OF HOV to RAIL CONVERSION, THEY ARE DESCRIBED SEPARATELY)

DESCRIPTION: Alternative 2A uses the southern-most bore of the ERT. This alternative places the HOV lanes between the I-564 EB and WB lanes. The I-564 EB lanes are south of Ramp VA-EB-EX (EB exit ramp to Virginia Ave.) and south of the flyover Ramp HB-EB-EX (EB exit ramp to Hampton Bvld.). The I-564 EB lanes become the location of the passenger rail when the rail operations are initiated (Dwg. No. ALT-2A-013 through ALT-2A-020B).

WHY CHOSEN: This alternative was chosen to determine the impacts to the I-564 Intermodal Connector project by shifting the I-564 EB lanes south to eliminate the need for the structures required to separate the grade between passenger rail and Ramp 564-EB in On-shore Alternatives 1A and 1B. It also determines the impacts of using the southern bore of ERT for HOV/rail.

FEATURES:

1. Eliminates the highway-rail grade separation required by Alternative 1A and 1B.

2. Uses the southern bore of the ERT.

IMPACTS (Compared to I-564 Intermodal Connector project):

1. Shifts proposed I-564 eastbound lanes approximately 95 feet south (Dwg. No. ALT-2A-016).

2. During HOV operations Ramp VA-EB-EX is a left exit (Dwg. No. ALT-2A-014).

3. During HOV operations Ramp HB-EB-EX is a left exit (Dwg. No. ALT-2A-016).

4. Creates bridge conflict with Hampton Blvd. project relocated Norfolk-Southern rail and rail bridge (Dwg. No. ALT-2A-015).

5. Proposed ROW crosses railroad realignment approximately STA. 1015+00 – 1025+00 Rt. (Dwg. No. ALT-2A-015).

6. Proposed ROW crosses existing rail yard, four storage tracks, at approximately STA. 1045+00 to 1053+00 Rt. (Dwg. No. ALT-2A-016).

7. Sideslope impacts concrete ditch and stormwater retention basin approximately STA. 1034+00 Rt. (Dwg. No. ALT-2A-016).

8. Requires moving the gores of Ramp HB-EB-EX and Ramp HB-WB-EN closer to Ramps VA-WB-EX and VA-EB-EN resulting in a distance of less than 2,000 feet which is below the minimum spacing recommended by AASHTO standards (Dwg. No. ALT-2A-015, 016).

9. Sideslope impacts concrete ditch, approximately STA. 1050+00 Rt. (Dwg. No. ALT-2A-016.

10. Increases wetland impacts from approximately STA. 1054+00 to 1063+00 Lt. and Rt. (Dwg. No. ALT-2A-017)

11. More earthwork is needed at Boush Creek because the profile grade line had to be raised to allow for a deeper structure depth required for the railroad bridge (Dwg. No. ALT-2A-017).

12. Greater impacts to the landfill and salvage yard STA. 1073+00 Rt. and 1080+00 to 1086+00 Rt. Respectively (Dwg. No. ALT-2A-017, 18).

14. Requires lengthening the Chambers Field interchange bridge to accommodate the railroad and access road at STA. 1112+00 Rt. (Dwg. No. ALT-1b-019).

15. Requires the raising of the Ramp VA-EB-EN (EB entrance ramp from Virginia Ave.) profile over Hampton Blvd. in order to tie into the raised mainline profile which has to accommodate a deeper structure for the railroad loading (Dwg. No. ALT-1B-015).

Alternative 2B – SOUTHERN BORE – RAIL OPERATIONS

(NOTE: ON-SHORE ALTERNATIVE 2A AND 2B ARE ONE ALTERNATIVE. BECAUSE OF THE COMPLEXITY OF HOV to RAIL CONVERSION, THEY ARE DESCRIBED SEPARATELY)

DESCRIPTION: Alternate 2B uses the southern-most bore of the ERT. The rail operation requires that the Alternative 2A HOV lanes be widened and the EB traffic shifted to these former HOV lanes. The rail lines are then constructed on the alternative 2A EB lane alignment Dwg. No. ALT-2B-013 through ALT-2B-020B).

WHY CHOSEN: This alternative was chosen to determine the impacts to the I-564 Intermodal Connector project by shifting the I-564 EB lanes south to eliminate the need for the structures required to separate the grade between passenger rail and Ramp 564-EB in On-shore Alternatives 1A and 1B. It also determines the impacts of using the southern bore of ERT for HOV/rail.

FEATURES:

1. Shifts proposed I-564 EB traffic to Alternative 2A HOV alignment. Alternative 2A EB lanes become rail alignment.

IMPACTS (Compared to I-564 Intermodal Connector project):

Same as 1 and 4-14, Alternative 2A.

Truck Inspection Station

DESCRIPTION:

Based on the design criteria provided by VDOT on truck inspection stations, two design options were developed for a tunnel truck inspection station on the land-side between Virginia Avenue and the proposed Elizabeth River Tunnel portal (Dwg. No. INSPECTION STATION, OPTION 1; INSPECTION STATION, OPTION 2).

Option One provides and exit ramp to the inspection station between Hampton Boulevard and Virginia Avenue. This would require widening of the proposed bridge crossing Virginia Avenue. An additional slip ramp coming off the westbound on-ramp from Virginia Avenue would also be required to inspect trucks coming out of N.I.T. and the Naval Base. Therefore, the inspection station would be located in the open area between the westbound on-ramp into the proposed tunnel and the mainline corridor. A turnaround road for trucks that fail the inspection would be provided at the tunnel portal. To access the turnaround, trucks would cross over the westbound on-ramp into the tunnel, go around the tunnel portal and redirected to the eastbound exit ramp from the tunnel which enables them to access Virginia Avenue (Naval Base and/or N.I.T.) or the proposed I-564 Intermodal Connector.

Option Two starts at the same location as Option One, but would cross over Virginia Avenue and the westbound on-ramp into the proposed tunnel on a separate bridge structure. This will put the trucks on the north side of the westbound on-ramp into the tunnel. This provides better access to the turnaround road and eliminates the crossing over of the westbound on-ramp. The turnaround road would be the same as in Option One and access the eastbound exit ramp from the tunnel at the same location.

Recommendation

Of the two options developed we recommend Option Two. It allows the proposed truck inspection to operate more efficiently and safer. In addition, it positions the flagging station in a more ideal location and trucks that fail the inspection will not have to cross over the tunnel's entrance ramp (which is on a downgrade) to get to the turnaround road. Where Option One widens the proposed bridge over Virginia Avenue, Option Two requires a separate structure to the North. However, it is our opinion that the operational advantages inherent in Option Two are worth the minor increase in structure and roadway cost.

EVALUATION MATRIX FOR HR3X
OFF-SHORE ALIGNMENTS

Alternative	Construction Cost Opinion Variance*	Total Construction Cost Opinion	Cost Variance Explanation
Alternative 1 – CENTER BORE	$56,500,000	$830,000,000	Increase in bridge square footage due to the barrier separation required for rail and SOV.
Alternative 1A – CENTER BORE	$49,500,000	$823,000,000	Increase in bridge square footage due to the barrier separation required for rail but it is slightly less than Alternative 1 because the rail is on a separate structure and the bridge section is reduced in some of the gore/transition areas.
Alternative 2 – SOUTH BORE	$84,000,000	$857,500,000	Increase in bridge square footage due to the barrier separation required for rail and also the increase in the length of Ramp A at the Craney Island Interchange

EVALUATION MATRIX FOR HR3X
ON-SHORE ALIGNMENTS

Alternative	Construction Cost Opinion Variance*	Construction Cost Opinion Total	Right-of-Way*	Contaminated Soils*	Wetland Areas*	Cost Variance Explanation
			(Ac)	(Sq. Ft.)	(Ac)	*Note: Original estimates for HR3X as reported in the environmental document do not include cost for passenger rail.*
Alternative 1A – CENTER BORE – RAMP 564-EB OVER RAIL	15,500,000	$na	13.1	0.0	0.0	Passenger rail; Ramp bridge ($5 million); Demolition of HOV structure; Reloc. freight rail
Alternative 1B – CENTER BORE – RAIL OVER RAMP 564-EB	$35,500,000	$na	13.2	0.0	0.0	Passenger rail; Rail bridge ($15 million); Demolition of HOV structure; Reloc. freight rail
Alternative 2A – SOUTHERN BORE – HOV LANES & Alternative 2B – SOUTHERN BORE -- RAIL	$11,000,000	$na	12.9	0.0	0.0	Relocation of Norfolk Southern freight rail; Demolition of EB HOV lanes; Passenger rail; Relocate Freight rail

EVALUATION MATRIX FOR I-564
ON-SHORE ALIGNMENTS

Alternative	Construction Cost Opinion Variance*	Construction Cost Opinion Total	Right-of-Way*	Contaminated Soils*	Wetland Areas*	Cost Variance Explanation
			(Ac)	(Sq. Ft.)	(Ac)	
Alternative 1A – CENTER BORE – RAMP 564-EB OVER RAIL	$13,000,000	$61,000,000	3.0	21,000	0.1	Ramp bridge; Fill; Retaining wall
Alternative 1B – CENTER BORE – RAIL OVER RAMP 564-EB	$1,000,000	$49,000,000	3.0	21,000	0.1	Retaining wall; Fill (rail bridge included with HR3X)
Alternative 2A – SOUTHERN BORE – HOV LANES & Alternative 2B – SOUTHERN BORE – RAIL	$5,000,000	$53,000,000	4.6	18,000	0.3	Retaining wall; Fill

EVALUATION MATRIX FOR CHAMBERS AIR FIELD INTERCHANGE
ON-SHORE ALIGNMENTS

Alternative	Construction Cost Opinion Variance*	Construction Cost Opinion Total	Right-of-Way	Contaminated Soils	Wetland Areas	Cost Variance Explanation
			(Ac)	(Sq. Ft.)	(Ac)	
HAMPTON ROADS 3RD CROSSING	$500,000	$13,500,000	N/A	N/A	N/A	Realignment of Ramps onto I-564 if interchange constructed prior to HR3X

Note: Values shown indicate an increase or decrease in comparison with designs and partial plans and estimates as they exist as of the date of this study.

RECOMMENDATION

The results of this study indicate that Off-shore Alternative 1A (Center bore with HOV/Rail structure on separate structure than SOV lanes) be constructed for the following reasons:

- Compared to Off-shore Alternative 1, it provides flexibility in design. Because the HOV/Rail is on a separate structure it should equate to a more economical design that is adaptable to maximize the utility of the corridor. By separating the structures, the interchange ramp bridge span lengths can be minimized. This could potentially save construction costs by keeping the vertical profiles and height of bridge in a cost-effective range. Additionally, ramps are at a lower elevation thus improving the aesthetics and improving ride-ability by minimizing the anxiety associated with driving over the water at higher than normal elevations.

- Compared to Off-shore Alternative 2, it connects better with the HOV lanes at each of the termini as proposed on both I-664 and I-564 and eliminates the need for lengthening the westbound to southbound ramp at the Craney Island interchange.

- Off-shore Alternative 1A is also the least costly for construction and would be easier to stage during construction.

The additional cost to the HR3X project of this alternative is $49,500,000.

The results of this study indicate that On-shore Alternative 1A be constructed for the following reasons:

- Compared to On-shore Alternative 1B, it keeps the railroad at grade which reduces the cost of On-shore Alternate 1A.

- The amount of right-of-way that has to be taken is equal to or lower than the other alternatives.

This alternative, however, does cost more than On-shore Alternatives 2A and 2B but On-shore Alternatives 2A and 2B impact the railroad bridge proposed by the Hampton Boulevard project and would require the relocation of that proposed bridge south of its current location. Alternatives 2A and 2B also require shifting the low point of Hampton Boulevard (as proposed by the Hampton Boulevard project); the result of this shift would be to impact an existing commitment for access to Hampton Boulevard made to residents of a subdivision in the southeast quadrant of the Hampton Boulevard / I-564 Intermodal Connector grade separation. Additionally, these alternatives impact the rail work proposed by the Hampton Boulevard project, thus impacting operations at Norfolk International Terminals.

The total additional cost to both the HR3X and the I-564 Intermodal Connector projects of On-shore Alternative 1A is $28,500,000.

During the development of this study, it was determined that the spacing of the ramp gores along the alignment of the HR3X on shore, fall well below AASHTO minimums. The spacing of these ramps should be evaluated by weave analysis to determine their feasibility.

DESIGN CRITERIA – ROADWAYS

The criteria used for the design of this project shall conform to the Road Design Manual, Volume 1 (RDM 1); and Instructional and Informational Memoranda published by the Virginia Department of Transportation. When these manuals do not cover a specific situation, the governing criteria will be as stated in the Policy on Geometric Design of Highways and Streets 2001 published by the American Association of State Highway and Transportation Officials.

"Desirable" versus "minimum" criteria: VDOT and AASHTO often present a range of values for design criteria. "Desirable" criteria should always be used unless extreme conditions dictate otherwise. If conditions indicate that minimum values are required, consult with the PM before proceeding.

A list of criteria for each project roadway is shown on the following pages.

Key criteria for the Hampton Roads Third Crossing Mainline are as follows:

Design speed:	70 MPH
Design Year:	2018
Average Daily Traffic (ADT)	75,000 – 89,000
Percent Trucks	N/A%
Functional Class:	Urban Principal Arterial, Freeway, Level Terrain
VDOT Geometric Design Standard:	GS-5
Slope Design Standard:	CS-4
Maximum Superelevation:	TC-5R, 0.08ft/ft Max.
Minimum Grade Roadway:	0.3%
Minimum Grade Bridges:	0.5%
Median	58 ft., depressed, GS-11 and GS-13 slopes.
Maximum Grade	3.0% (4% Tunnels)
Number of Lanes:	4
Lane Width	12 ft
Stopping Sight Distance Road	850 ft Des., 625 ft Min.
Stopping Sight Distance Railroad	725 ft Min. (Tunnel)
Maximum Degree of Curvature	7° 54'
Min. Bridge Clearance Road	16 ft - 6 in
Min. Bridge Clearance Railroad	19 ft - 6 in
Clear Zone	30 ft
Safety Slopes	yes

Key criteria for the I-564 Main Line New Alignment are as follows:

Design speed:	60 MPH
Design Year:	2018
Average Daily Traffic (ADT)	27,800
Percent Trucks	23%
Functional Class:	Urban Principal Arterial, Freeway, Level Terrain
VDOT Geometric Design Standard:	GS-5
Slope Design Standard:	CS-4
Maximum Superelevation:	TC-5R, 0.08 ft/ft Max.
Minimum Grade Roadway:	0.3%
Minimum Grade Bridges:	0.5%
Median	58 ft., depressed, GS-11 and GS-13 slopes.
Maximum Grade	3.0%
Number of Lanes:	4
Lane Width	12 ft
Stopping Sight Distance	650 ft Des., 525 ft Min.
Maximum Degree of Curvature	4°30'
Bridge Clearances	16 ft - 6 in
Clear Zone	30 ft
Safety Slopes	yes

Key criteria for the I-564 Main Line Relocation and Widening are as follows:

Design speed:	60 MPH
Design Year:	2018
Average Daily Traffic (ADT)	27,800
Percent Trucks	23%
Functional Class:	Urban Principal Arterial, Freeway, Level Terrain
VDOT Geometric Design Standard:	GS-5
Slope Design Standard:	CS-4
Maximum Superelevation:	TC-5R, 0.08ft/ft Max.
Minimum Grade Roadway:	0.3%
Minimum Grade Bridges:	0.5%
Median	N/A.
Maximum Grade	3.0%
Number of Lanes:	2
Lane Width	12 ft.
Stopping Sight Distance	650 ft Des., 525 ft Min.
Maximum Degree of Curvature	4°30'
Bridge Clearances	16 ft - 6 in
Clear Zone	30 ft
Safety Slopes	no

Hampton Roads Third Crossing

Design speed:	Directional ramps: Desirable: 50 MPH Loop Ramps: Desirable: 50 MPH
Design Year	2018
Average Daily Traffic (ADT)	NA
Percent Trucks	NA%
Functional Class:	Interchange Ramp
VDOT Geometric Design Standard:	GS-RM
Slope Design Standard:	CS-4
Maximum Superelevation:	TC-5R, 0.08ft./ft. Max.
Minimum Grade Roadway:	0.3%
Minimum Grade Bridges:	0.5%
Maximum Grade	5.0%
Number of Lanes:	1 or 2
Lane Width	Single Lane 16' 2 Lane
	Nominal width see AASHTO Green book Case III, Condition (C)
Stopping Sight Distance	475 ft Des., 400 ft Min.
Maximum Degree of Curvature	7°30'
Bridge Clearances	16 ft - 6 in
Clear Zone	20 ft to 30 ft (See RDM, page A-33)
Safety Slopes	yes

Key criteria for the Interchange Ramps are as follows:

Key criteria for the Interchange Ramps are as follows:
Ramps over existing I-564

Design speed:	Directional ramps: Desirable: 60 MPH
Design Year	2018
Average Daily Traffic (ADT)	27,800
Percent Trucks	23%
Functional Class:	Interchange Ramp
VDOT Geometric Design Standard:	GS-RM
Slope Design Standard:	CS-4
Maximum Superelevation:	TC-5R, 0.08ft./ft. Max.
Minimum Grade Roadway:	0.3%
Minimum Grade Bridges:	0.5%
Maximum Grade	5.0%
Number of Lanes:	2
Lane Width	Nominal width see AASHTO Green book Case III, Condition (C).
Stopping Sight Distance	650 ft Des., 525 ft Min.
Maximum Degree of Curvature	4°30'
Bridge Clearances	16 ft - 6 in
Clear Zone	20 ft to 30 ft (See RDM, page A-33)
Safety Slopes	yes

Design speed:	Directional ramps: Desirable: 60 MPH, Min.: 25 MPH
Design Year	2018
Average Daily Traffic (ADT)	27,800
Percent Trucks	23%
Functional Class:	Interchange Ramp
VDOT Geometric Design Standard:	GS-RM
Slope Design Standard:	CS-4
Maximum Superelevation:	TC-5R, 0.08ft./ft. Max. & TC5-ULS, 0.0208ft./ft. Max.
Minimum Grade Roadway:	0.3%
Minimum Grade Bridges:	0.5%
Maximum Grade	8.0%
Number of Lanes:	1
Lane Width	16 ft ≥ 30 MPH 18 ft < 30MPH
Stopping Sight Distance	650 ft Des., 125 ft Min.
Maximum Degree of Curvature	4°30' at 60 MPH
Minimum Radius	90 ft at 25 MPH
Bridge Clearances	16 ft - 6 in
Clear Zone	7 ft to 30 ft (See RDM, page A-33)
Safety Slopes	yes

Key criteria for Diamond Ramps to Virginia Avenue are as follows:

Key criteria for Virginia Avenue are as follows:
Four lane, urban road with raised median, new location, railroad yard crossing, providing access between U.S. Navy and Norfolk International Terminal properties.

Design speed:	45 MPH
Design Year:	2018
Average Daily Traffic (ADT)	3200
Percent Trucks	90%
Functional Class:	Urban Collector Street, Curb & Gutter, Level Terrain
VDOT Geometric Design:	GS-7
Slope Design Standard:	2:1
Maximum Superelevation:	TC5-ULS 0.0208 ft./ft. Max.
Minimum Grade Roadway:	0.3%
Minimum Grade Bridges:	0.5%
Maximum Grade:	7.0%
Number of Lanes:	4
Median Type, Width	Raised Grass (16 ft. wide)
Lane Width	12 ft
Stopping Sight Distance	400 ft Des., 325 ft Min.
Maximum Degree of Curvature	7°
Bridge Clearances	16 ft - 6 in
Clear Zone	7.5 ft
Safety Slopes	No

Key criteria for Heavy Rail Relocation are as follows:
South of new alignment I-564 and parallel to existing I-564.

Design speed:	25 MPH
Design Year:	N/A
Average Daily Traffic (ADT)	N/A
Percent Trucks	N/A
Functional Class:	Industrial Lead
VDOT Geometric Design Standard:	N/A
Slope Design Standard:	
Maximum Superelevation:	
Grade (including bridges)	2.0% max., 0.0% Min.
Minimum Length of Vertical Curves:	(G2-G1)X100, Maximum rate of change for summits and sags = 1.0

DESIGN CRITERIA – RAIL

Key criteria for the Combined System Controlling Criteria:
Light Rail Transit & Inter-City Passenger Rail are as follows:

Maximum horizontal curvature/minimum curve radius See Note 1	10° / 570 feet (absolute limit) 3° -30'/ 1640 feet (desired limit)	(d) (d)
Required tangent length between reverse curves	Maximum: greater of 100 feet or L min. =3 X velocity "mph" Desired: Greater of 200 feet or L min. 3 X velocity "mph"	(g) (d) (c) (d)
Superelevation requirements	Ea = 0.0007(V2)D Ea max. = 4 inches Eu of 25 – 3 inches	(d) (c) (d) (g) (h)
Spiral length requirements	L min. = 1.63 EuV (desired) L min. = 1.25 EuV (minimum) Greater of LS= 62Ea (V<50) Ls=83 Ea (50<V<70) Ls=124 Ea (70<V<125) and when D<1 30'	(d) (d) (g)
Maximum grade – inside tunnels	4%	(c) (h)
Maximum grade – outside tunnels	4%	(c) (h)
Length of vertical curve/minimum radius, for crests	L min. IG2-G1I /0.0095	(i)
Length of vertical curve/minimum radius, for sags	L min. IG2-G1I /0.0095	(i)
Required length of constant grade between vertical curves	Greater than 100 feet or L min.= 3 X V	(d)
Track gauge	Standard Gauge of 4ft. – 81/2 in. for all modes to ensure compatibility	
Rail weight	115#, 119,# 132#, 133#, 140#, 141# See note 4	(d)
Rail Support System	All track on structures and in tunnel to be direct fixation	(h)
Controlling design standards	AREMA Manual (see note 8)	(d)
for special track facilities including turnouts, cross-overs, track crossings Turnout Size	#20 and greater	(f)
Maximum operational speed See notes 5 & 9	Light Rail line – 65 mph Inter-City Pass. 79 mph operating speed (See notes 10 & 11)	(c) (i)
Motive power source	Power source determined by mode selection	
Equipment design loads	Fully loaded transit car wt. = 185,000# Cooper – E60: Heavy Rail Passenger Car	(f) (h)
Miscellaneous equipment	Provisions for signal, catenary, and wayside equipment attachment to be considered	
Minimum track centers	See note 10 - Not applicable	
Minimum horizontal clearances to adjacent structure See note 6	9' – 0" tangent track Refer to AREMA Chapter 28 Sect. 1 For additional tunnel clearance requirements See note 6	(d) (d)
Minimum vertical clearances from top of high rail	19' – 6" preferred 17' – 6" minimum	(c) (h)
Minimum width evacuation paths	3' – 6" emergency walkway is recommended	
Midway universal track crossover	Should be considered in the event of line blockage or emergency situation, and for maintenance purposes	

Data sources a. Colorado railcar Manufacturing
b. Bombardier Transportation – indicates Acela Express equipment capabilities
c. Hampton Roads Transit Functional Design Criteria - June 25, 2002
d. ARMEA
e. Norfolk Southern reply to AASHTO/NSBA Street Bridge Collaboration
f. Hampton Roads Transit Tunnel Design Criteria Correspondence - June 25, 2002
g. Amtrak MW1000
h. Amtrak letter of 3/27/02 and meeting of 9/20/02
i. Amtrak direction per meeting of 12/30/02

Note 1: Degree of curve expressed as arc definition
Note 2: Guidelines for high speed turnout development
FTA approval required for under balanced elevation greater than 4 inches
Note 3: Consider as absolute minimum, longer curve is desirable if possible.

Key Combined System Controlling Criteria:
Diesel multiple units - DMU & Inter-City Passenger Rail are as follows:

Maximum horizontal curvature/minimum curve radius See Note 1	10° / 570 feet (absolute limit) 3° -30'/ 1640 feet (desired limit)	(d) (d)
Required tangent length between reverse curves	Maximum: greater of 100 feet or L min. =3 X velocity "mph" Desired: Greater of 200 feet or L min. 3 X velocity "mph"	(g) (d) (c) (d)
Superelevation requirements	Ea = 0.0007(V2)D Ea max. = 4 inches Eu of 25 – 3 inches	(d) (c) (d) (g) (h)
Spiral length requirements	L min. = 1.63 EuV (desired) L min. = 1.25 EuV (minimum) Greater of LS= 62Ea (V<50) Ls=83 Ea (50<V<70) Ls=124 Ea (70<V<125) and when D<1 30'	(d) (d) (g)
Maximum grade – inside tunnels	4%	(c) (h)
Grade – outside tunnels	2-1/2% Desirable	(c) (h)
Length of vertical curve/minimum radius, for crests	L min. IG2-G1I /0.0095	(i)
Length of vertical curve/minimum radius, for sags	L min. IG2-G1I /0.0095	(i)
Required length of constant grade between vertical curves	Greater than 100 feet or L min.= 3 X V	(d)
Track gauge	Standard Gauge of 4 ft. – 81/2 in. for all modes to ensure compatibility	
Rail weight	115#, 119,# 132#, 133#, 140#, 141# See note 4	(d)
Rail Support System	All track on structures and in tunnel to be direct fixation	(h)
Controlling design standards for special track facilities including turnouts, cross-overs, track crossings	AREMA Manual (see note 8)	(d)
Turnout Size	#20 and greater	(f)
Maximum operational speed See notes 5 & 9	Light Rail line – 65 mph Inter-City Pass. 79 mph operating speed	(c) (i)
	(See notes 10 & 11) #20 and greater	
Equipment design loads	Fully loaded transit car wt. = 185,000# Cooper – E60: Passeng. Only structure	(f) (h)
Miscellaneous equipment	Provisions for signal, catenary, and wayside equipment attachment to be considered	
Minimum track centers	See note 10 - Not applicable	
Minimum horizontal clearances to adjacent structure See note 6	9' – 0" tangent track Refer to AREMA Chapter 28 Sect. 1 For additional tunnel clearance requirements See note 6	(d) (d)
Minimum vertical clearances from top of high rail	19' – 6" preferred 17' – 6" minimum	(c) (h)
Minimum width evacuation paths	3' – 6" emergency walkway is recommended	

Data sources a. Colorado railcar Manufacturing
b. Bombardier Transportation – indicates Acela Express equipment capabilities
c. Hampton Roads Transit Functional Design Criteria - June 25, 2002
d. ARMEA
e. Norfolk Southern reply to AASHTO/NSBA Street Bridge Collaboration
f. Hampton Roads Transit Tunnel Design Criteria Correspondence - June 25, 2002
g. Amtrak MW1000
h. Amtrak letter of 3/27/02 and meeting of 9/20/02
i. Amtrak direction per meeting of 12/30/02

Note 1: Degree of curve expressed as arc definition
Note 2: Guidelines for high speed turnout development
FTA approval required for under balanced elevation greater than 4 inches
Note 3: Consider as absolute minimum, longer curve is desirable if possible.

DESIGN CRITERIA (Guidelines): Inspection Station

General Inspection Station Requirements:

- Location of inspection station must be accessible for all potential incoming tunnel traffic.
- The inspection station location must provide VDOT personnel direct access to incoming mainline traffic in order to direct (flag) vehicles that fail to pullover to the inspection station.
- The inspection station must have the ability to redirect/reroute vehicles away from the tunnel complex after inspection. (i.e. mainline crossovers, off ramps, etc.)
- The inspection station must have two (2) designated lanes for inspection in case a vehicle breaks down in one inspection lane.

Acceleration/De-acceleration Lanes: Minimum AASHTO Requirements

Truck Queue Requirements: total of (4) trucks at station

VDOT Personnel Parking Availability: (3) spaces

Inspection Station Lighting: Average Maintained Light Levels = 2.0 Footcandles
Uniformity Ratio = 3:1 to 4:1
Roadway lighting shall be in accordance with the American National Standard Practice for Roadway Lighting ANSI/IESNA RP-8-00. Lighting designs are required to meet the Illuminance Criteria and should meet the Luminance and Small Target Visibility Criteria as well. As a minimum, roadway lighting luminaires shall be semi-cutoff and when possible cutoff luminaires shall be used. Non-cutoff luminaires will not be allowed

VDOT Personnel Facility: Large enough to accommodate 3 VDOT personnel
(1) Restroom facility for VDOT personnel
HVAC equipment
Power sized to accommodate HVAC
Provision for backup/emergency power
Accessibility to water service
Accessibility to sewer service
Lighting
Communications – Telephone & Traffic Control System
Visual sight distance provided.
Provide approximately 180-degree view of roadway.
Alarm system for over height vehicles

Signing: Inspection station and hazardous material restriction signing distances must meet established signing guidelines. Sign Panel design shall be in accordance with Manual on Uniform Traffic Control Devices (MUTCD) and The Virginia Supplement to the MUTCD for Streets and Highways.

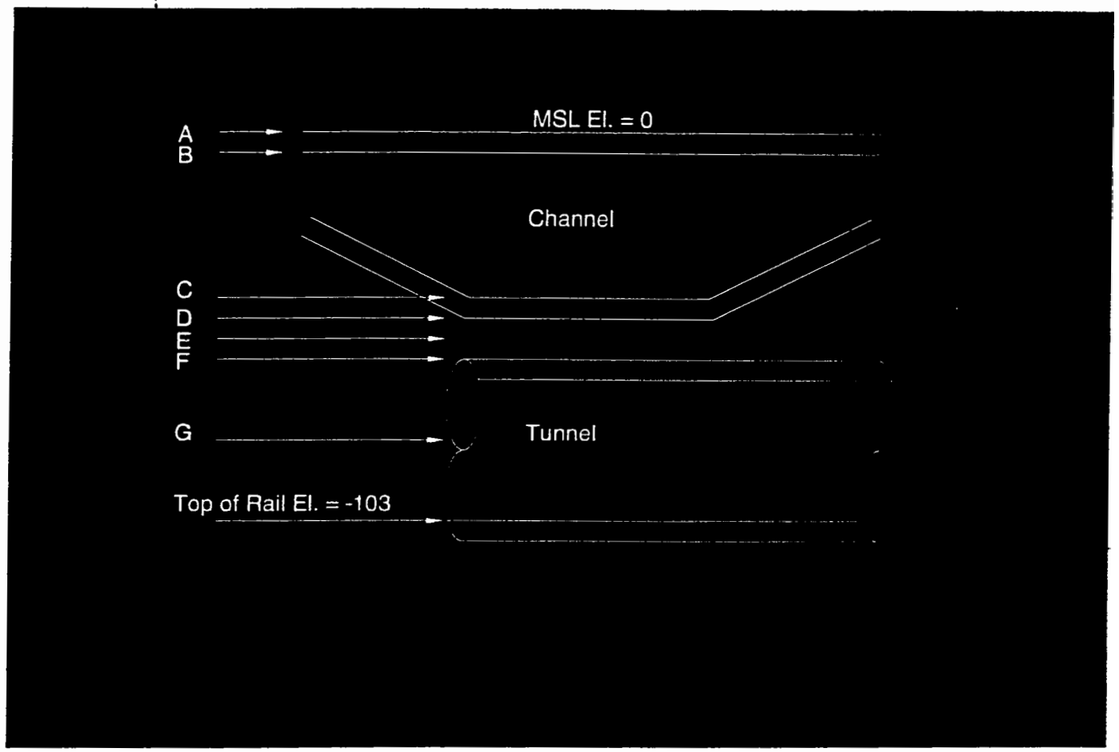
Over Height Detectors: Location of over height detectors must meet established signing guidelines in order to alert over height and vehicles carrying allowed hazardous materials to exit traffic and enter the inspection station. (The intent is for when an over height vehicle passes the detector the system will alert the driver to pull over for inspection by use of a VMS sign. Thus allowing enough time for the vehicle to exit traffic safely.)

Weighing Capability (Scales): Not Required.

TUNNEL / CHANNEL CLEARANCES

	Depth (ft)	Elevation (ft)	Label
Revised: May 15, 2003			
Project Datum (MSL)		0	A
MLW	1.5	-1.5	
MLLW	0.1	-1.6	B
Channel depth from MLLW	65.0	-66.6	C
Overdredge	2.0	-68.6	D
Overburden	6.0		E
Outside top of tunnel		-74.6	
Tunnel top thickness (Note 1)	8.2		F
Inside top of tunnel		-82.8	
Vertical clear to top of highest rail	19.5		G
Highest top of rail elevation that will clear shipping channel		-102.3	
	Say,	-103	

Note 1: Allows 1.5' for signs and lights.



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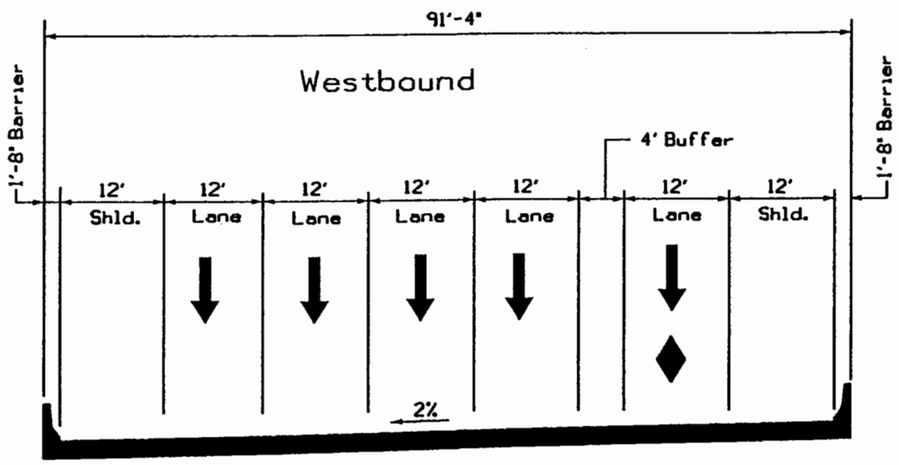
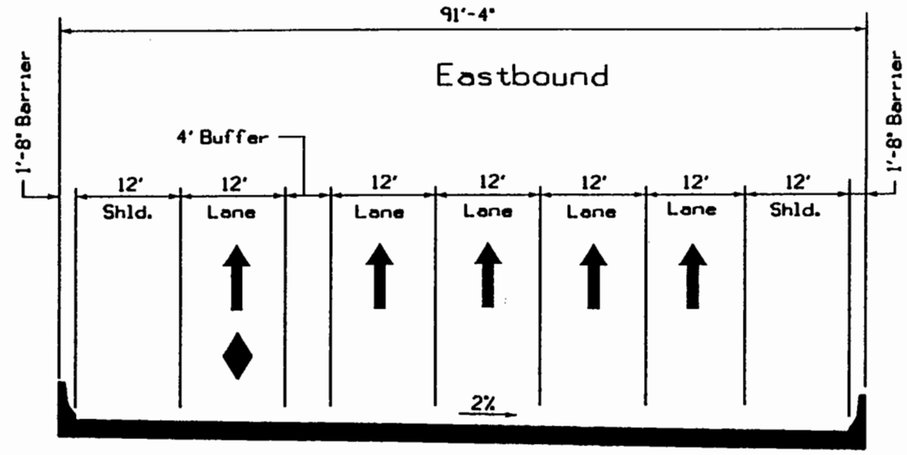




PROPOSED HR3X SECTION
NOT TO SCALE

PREPARED BY
PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

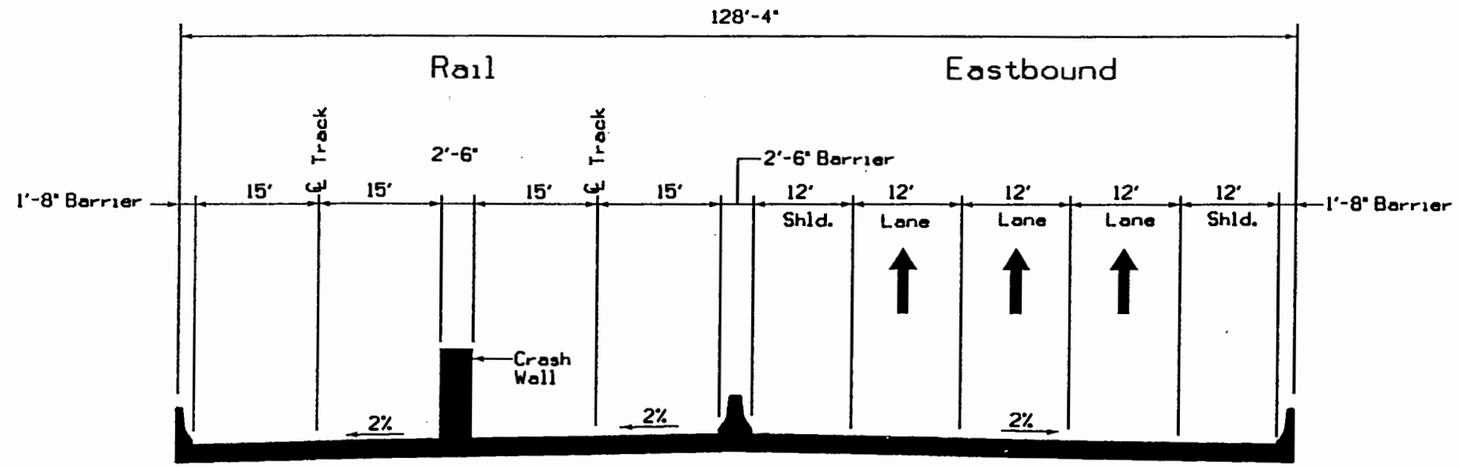
DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHKD.	CCC	DATE	DATE
APPR.		DATE	DATE

TYPICAL SECTIONS
PROPOSED HR3X SECTION

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
1

TYPICAL SECTIONS



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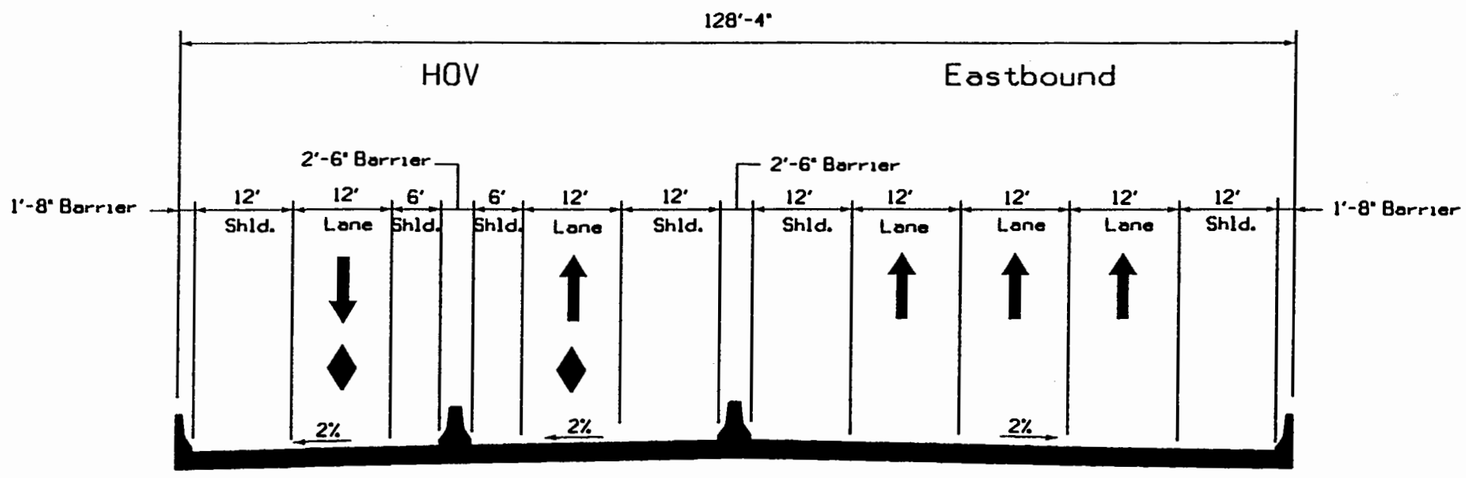


HOV SECTION
NOT TO SCALE

ALTERNATIVE 1 - SECTION A
(SEE PLAN SHT. ALT-1-004)

PREPARED BY
PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

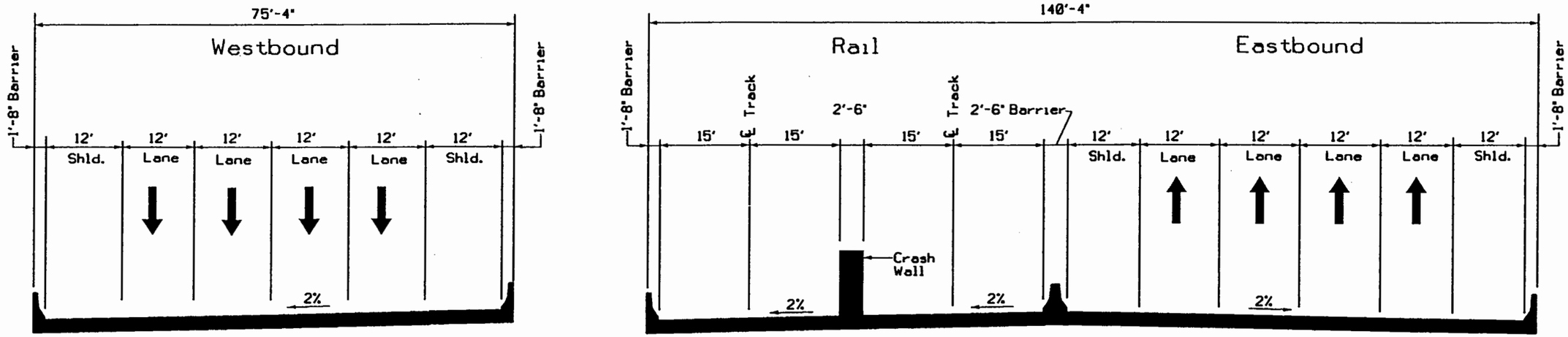
DESIGN	ORIGN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

TYPICAL SECTIONS
ALTERNATIVE 1 - SECTION A
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
1A

TYPICAL SECTIONS



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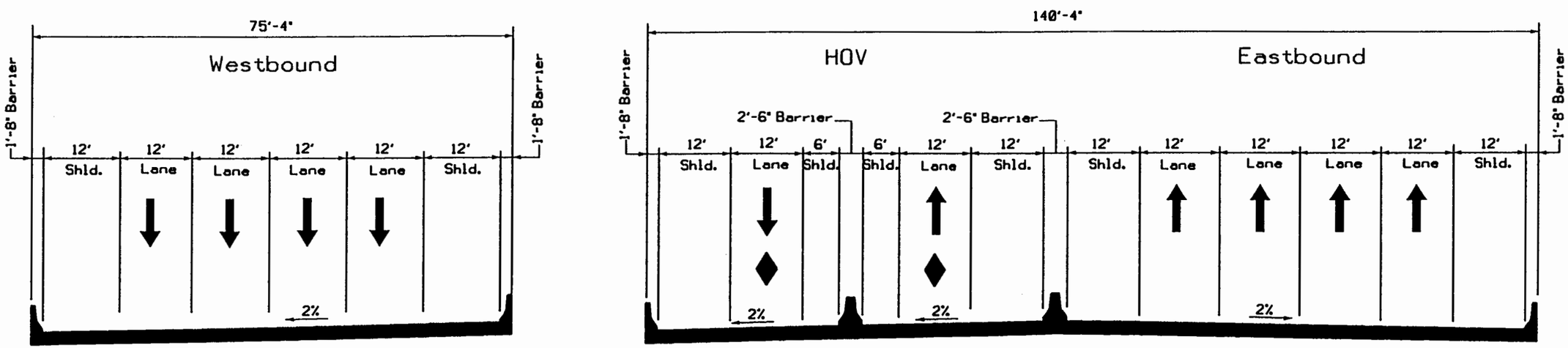


HOV SECTION
NOT TO SCALE

ALTERNATIVE 1 - SECTION B
(SEE PLAN SHT. ALT-1-006)

PREPARED BY
PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

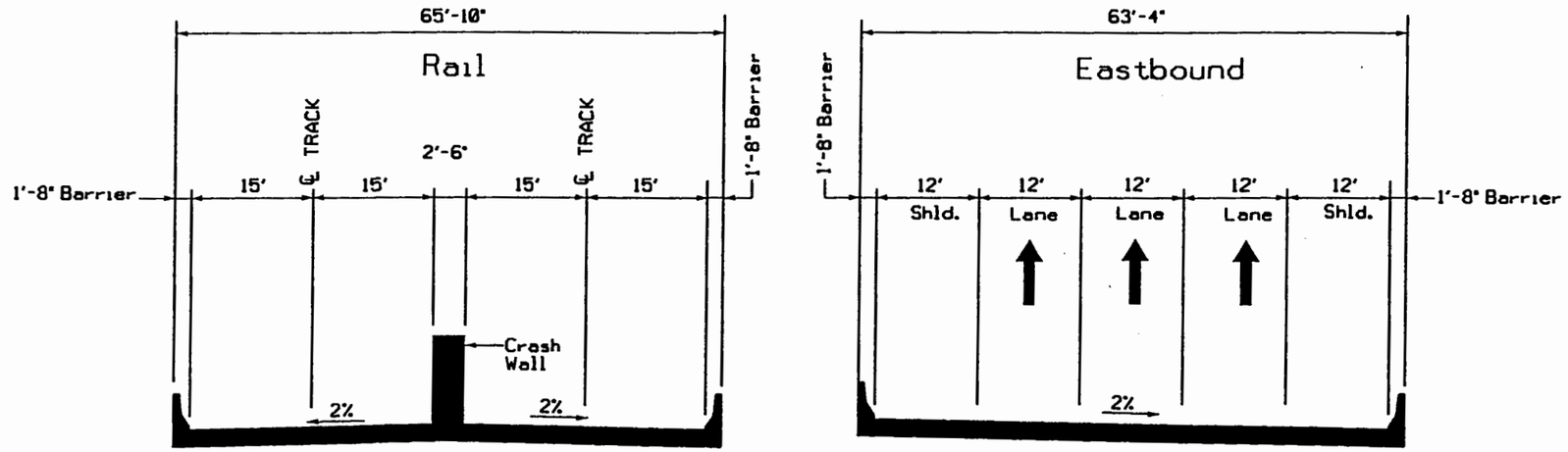
DESIGN AAA	DATE	DRAWN BBB	DATE
CHKD CCC	DATE	APPR	DATE

TYPICAL SECTIONS
ALTERNATIVE 1 - SECTION B
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
1B

TYPICAL SECTIONS



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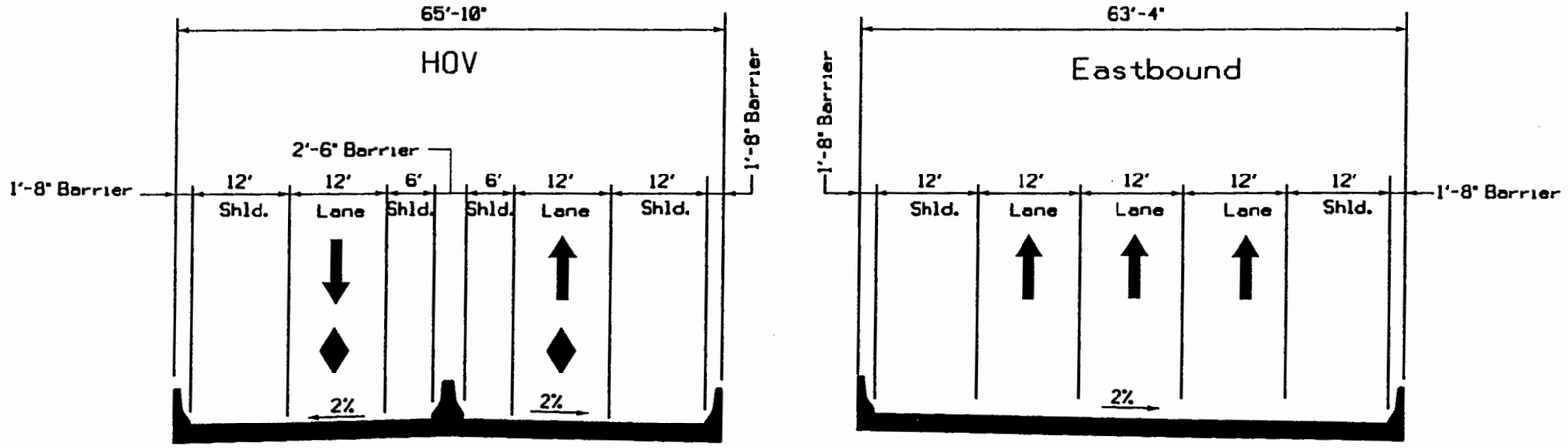
NOT TO SCALE



HOV SECTION
NOT TO SCALE

ALTERNATIVE 1A - SECTION A
(SEE PLAN SHT. ALT-1A-004A)

PREPARED BY
PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

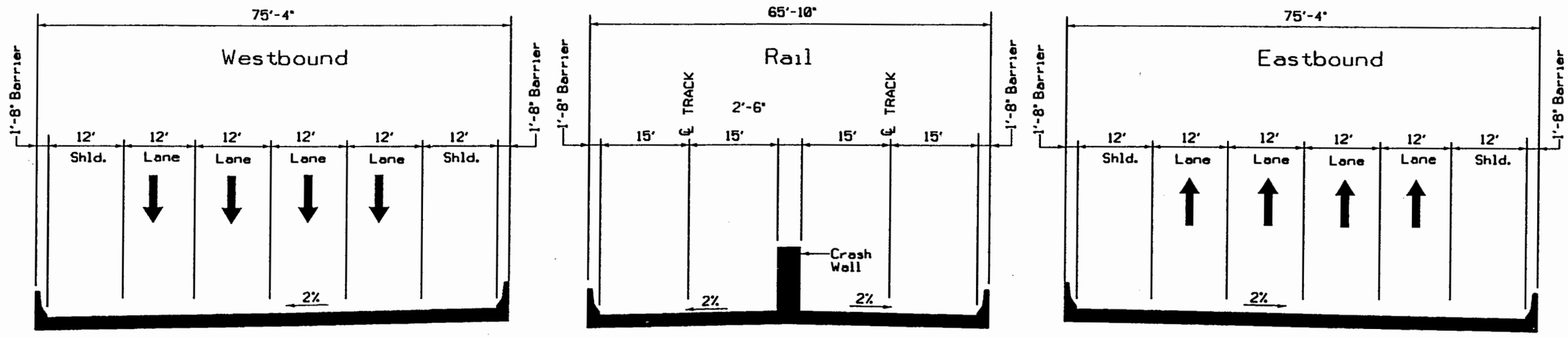
DATE	DATE	DATE	DATE
AAA	BBB	CCC	
DESIGN	DRAWN	CHECK	APPR

TYPICAL SECTIONS
ALTERNATIVE 1A - SECTION A
HOV/RAIL AND SOV ON SEPARATE BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
1C

TYPICAL SECTIONS



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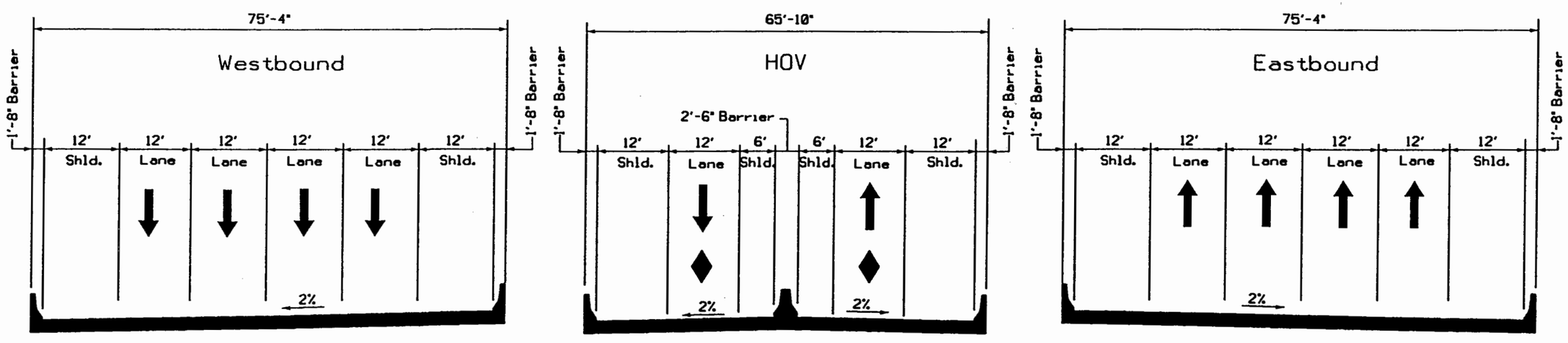
NOT TO SCALE



HOV SECTION
NOT TO SCALE

ALTERNATIVE 1A - SECTION B
(SEE PLAN SHT. ALT-1A-006)

PREPARED BY
PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

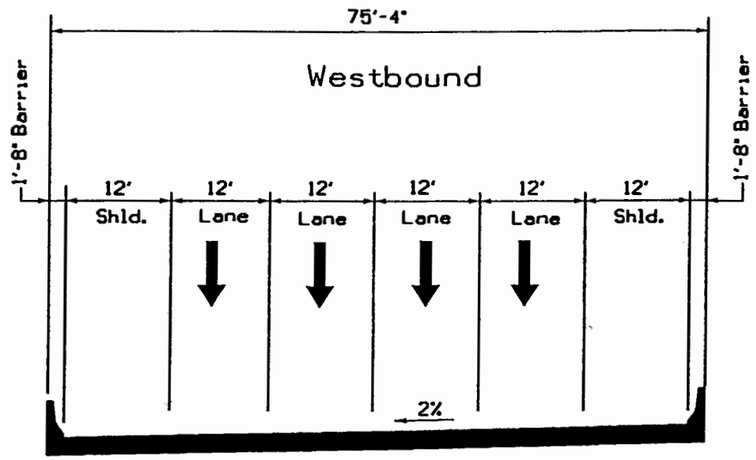
DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

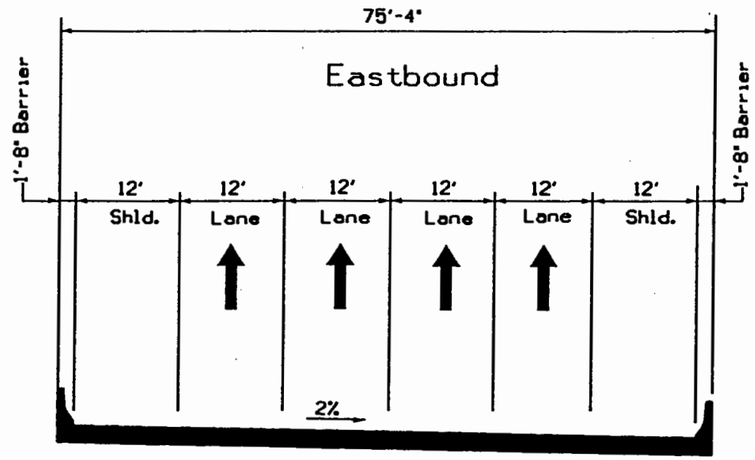
TYPICAL SECTIONS
ALTERNATIVE 1A - SECTION B
HOV/RAIL AND SOV ON SEPARATE BRIDGE
CENTER BORE

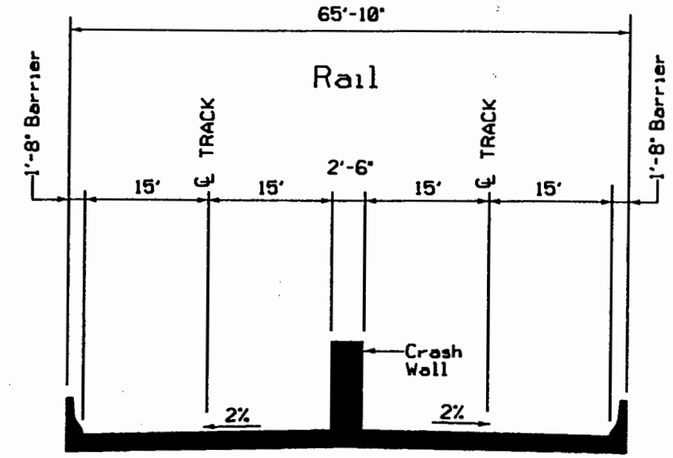
I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
1D

TYPICAL SECTIONS







RAIL SECTION
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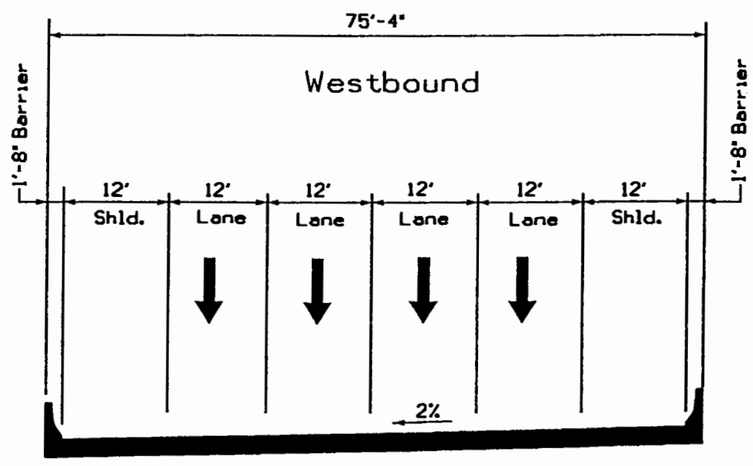
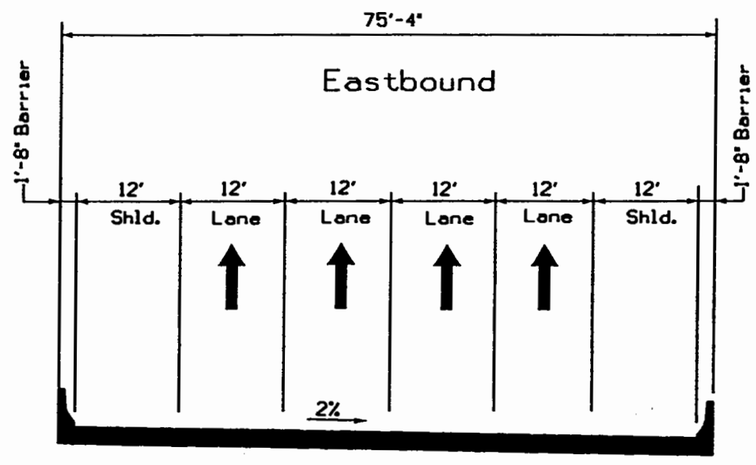
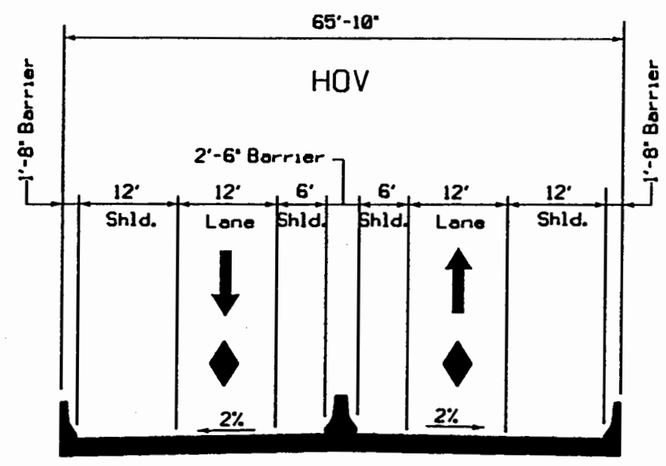






HOV SECTION
NOT TO SCALE

ALTERNATIVE 2 - SECTION A
(SEE PLAN SHT. ALT-2-006)

PREPARED BY
PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

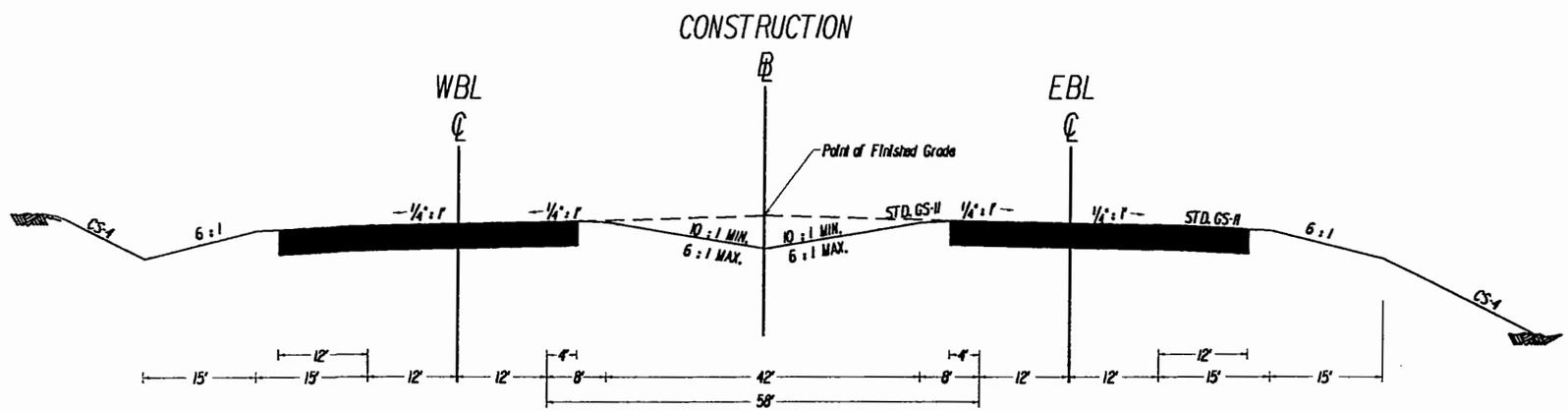
DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

TYPICAL SECTIONS
ALTERNATIVE 2 - SECTION A
HOV/RAIL AND SOV ON SEPARATE BRIDGE
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
1E

TYPICAL SECTION FOR CURRENT I-564 INTERMODAL CONNECTOR PROJECT



I-564 Intermodal Connector

STATION 1025+00.00

N.T.S.

PREPARED BY
PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHECK	CCC	DATE	DATE
APPR.		DATE	DATE

TYPICAL SECTIONS
I-564 INTERMODAL CONNECTOR

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
1F

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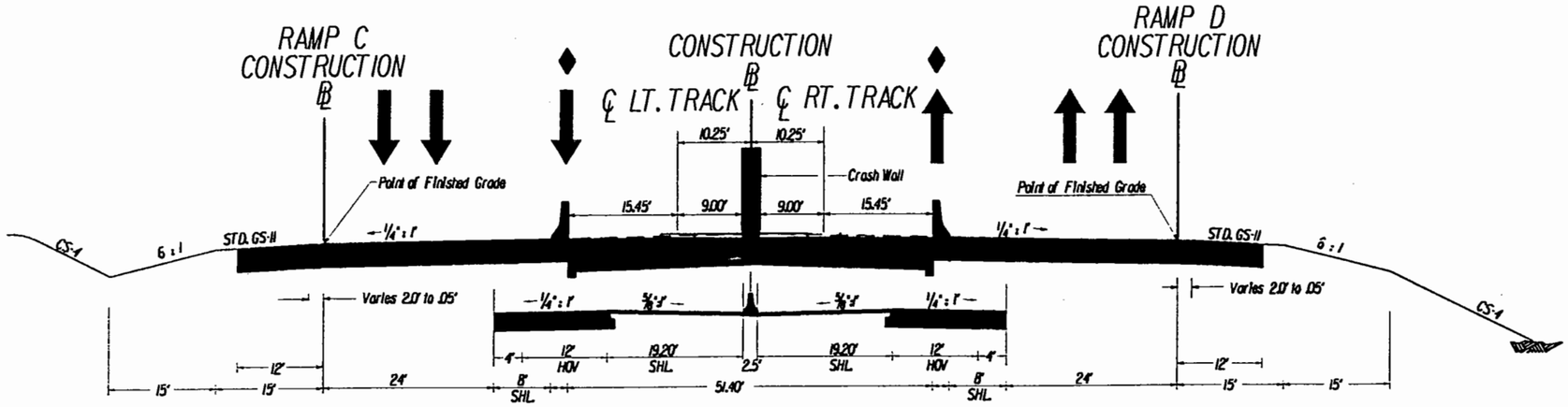
TYPICAL SECTIONS
ALTERNATIVES 1A AND 1B - CENTER BORE



Alternatives 1A and 1B at Grade Ballasted track - Highway Median

STATION 1025+00.00

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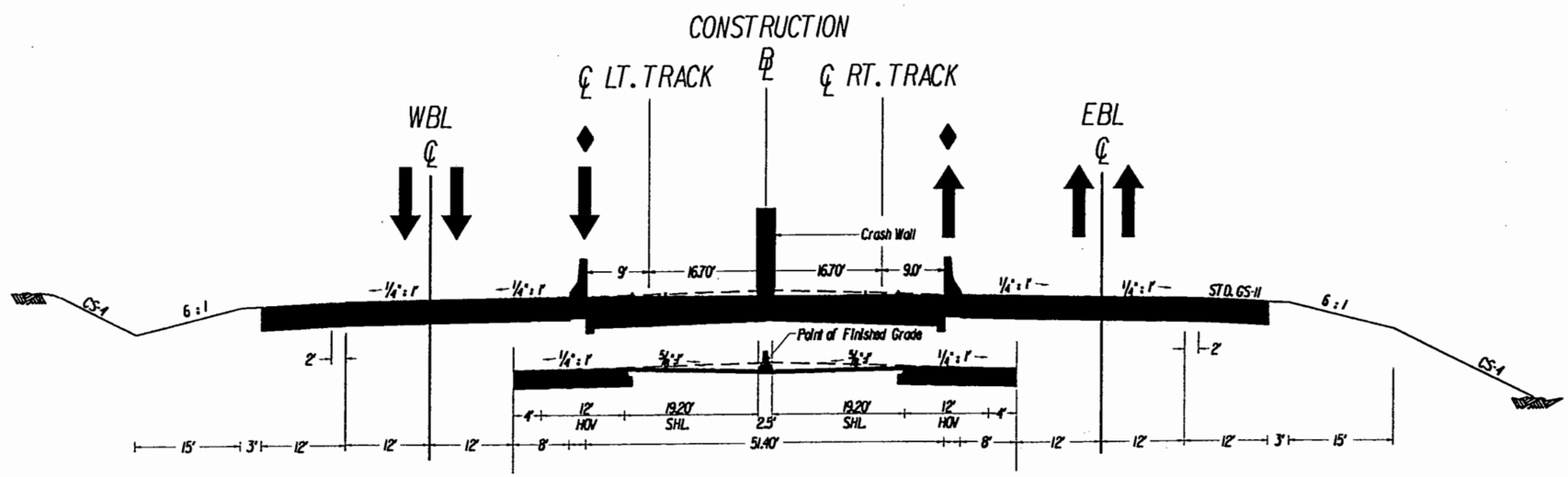

Alternatives 1A and 1B at-Grade Station - Center Platform

STATION 1025+00.00

N.T.S.

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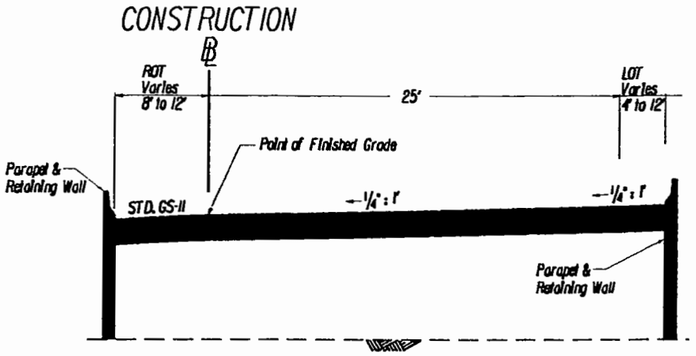
DESIGN AAA	DRAWN BBB	CHECK CCC	APPR.
DATE	DATE	DATE	DATE

TYPICAL SECTIONS
ALTERNATIVES 1A AND 1B
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
1G

TYPICAL SECTIONS



I-564 WB ALTERNATIVE IA AND IB

STATION 1090+00.00

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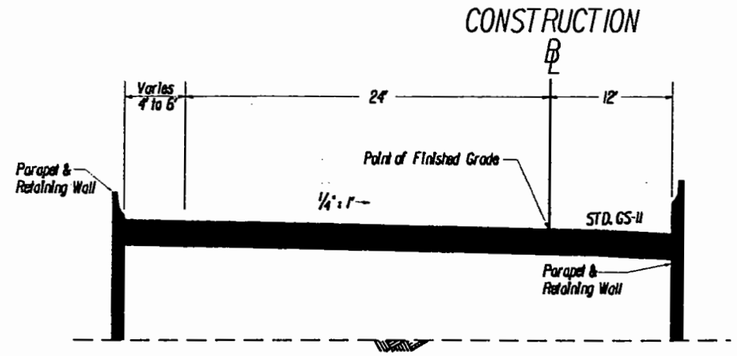

I-564 EB ALTERNATIVE IA

STATION 1090+00.00

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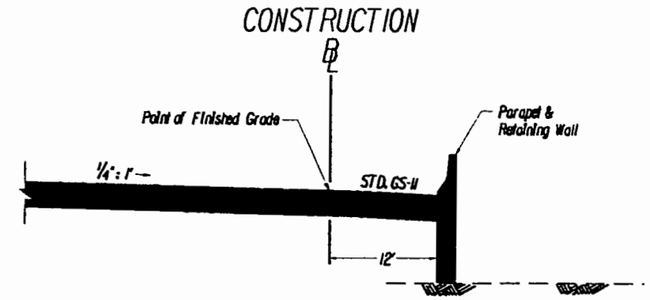

I-564 EB ALTERNATIVE IA AND IB

STATION 1060+00.00

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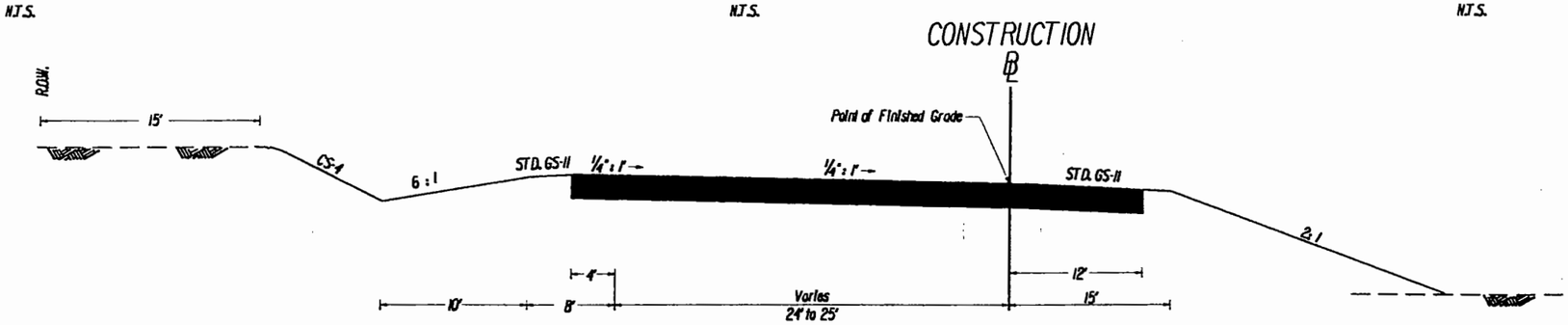

I-564 EB ALTERNATIVE IB

STATION 1090+00.00

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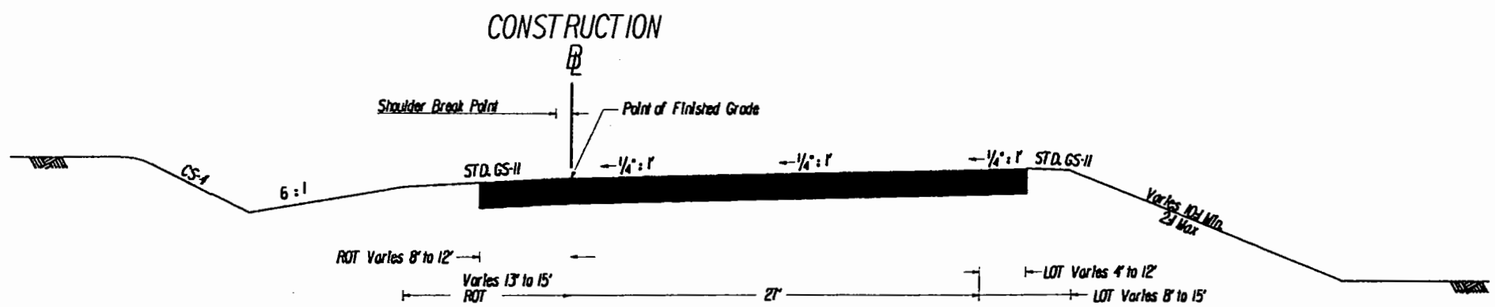

I-564 WB ALTERNATIVE IA AND IB

STATION 1075+00.00

N.T.S.

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MICHAEL BAKER JR., INC.

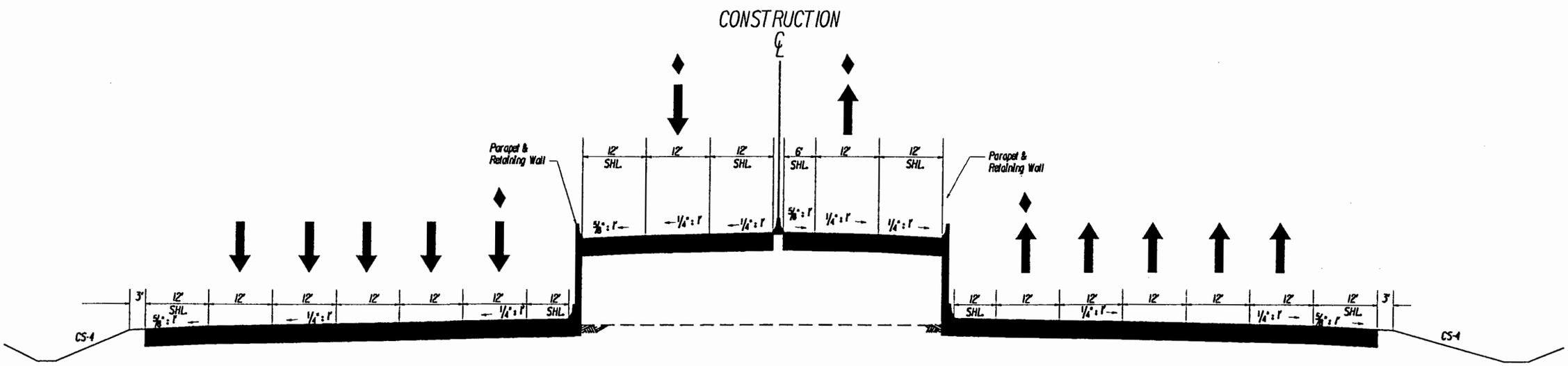
DATE	DATE	DATE	DATE
AAA	BBB	CCC	
DESIGN	DRAWN	CHECK	APPR.

TYPICAL SECTIONS
ALTERNATIVES 1A AND 1B
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
1H

TYPICAL SECTIONS
ALTERNATIVES 1A, 1B, 2A AND 2B



ALTERNATIVES 1A, 1B, 2A, AND 2B I-564 INTERMODAL CONNECTOR HOV FLYOVER

STATION 1095+00.00

N.T.S.

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHECK	CCC	DATE	DATE
APPR.		DATE	DATE

TYPICAL SECTIONS
ALTERNATIVES 1A, 1B, 2A AND 2B

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

1I

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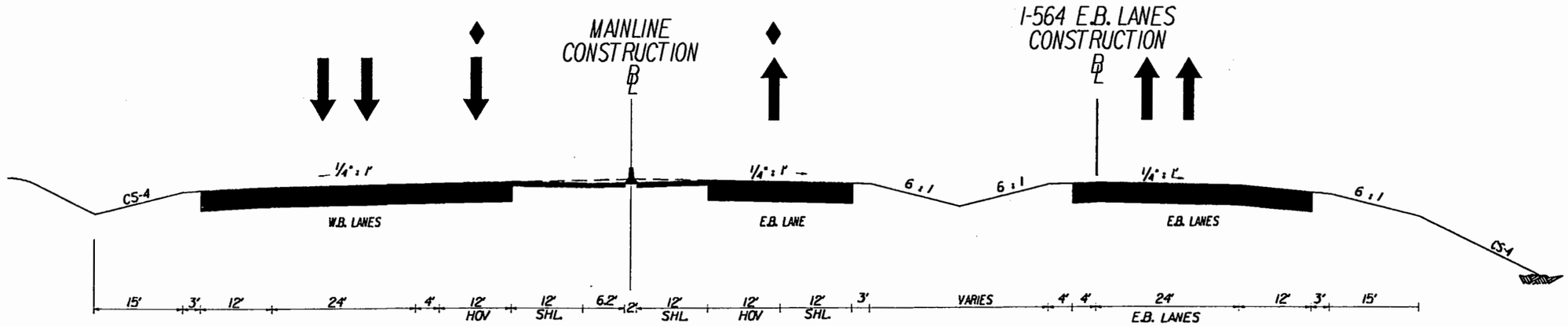
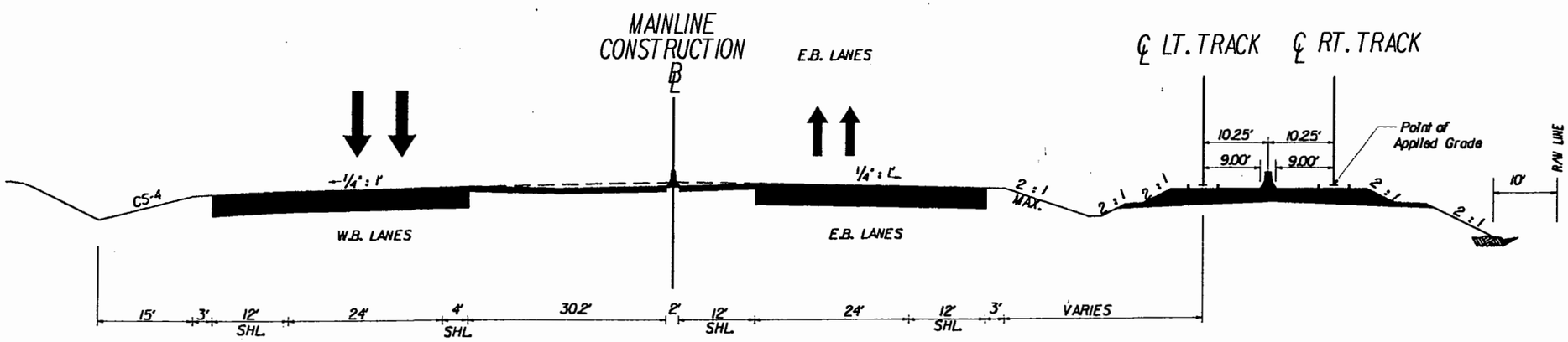
TYPICAL SECTIONS



Mainline with Eastbound Lanes in Southern Tube

STATION 1050+00.00 ALTERNATE - 2A

N.T.S.



Mainline with Passenger Rail Lines in Southern Tube

STATION 1050+00.00 ALTERNATE - 2B

N.T.S.

PREPARED BY:
PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

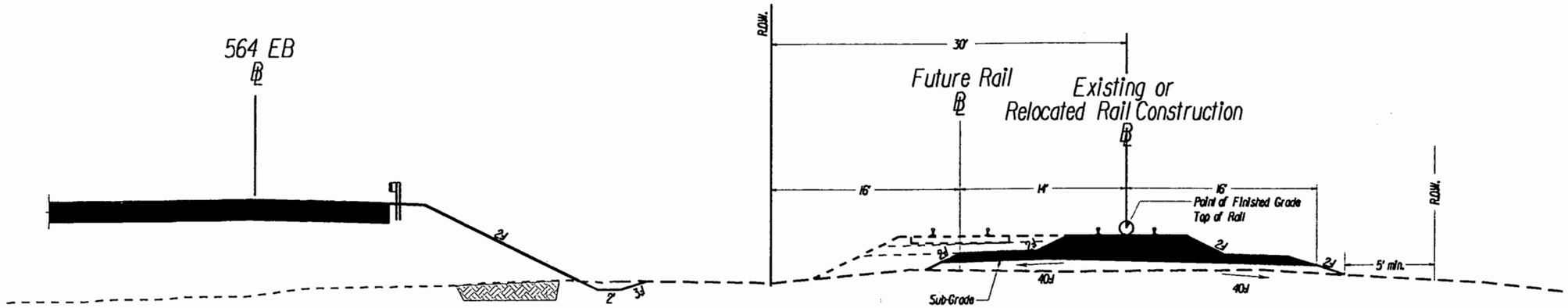
DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHECK	CCC	DATE	DATE
APPR.		DATE	DATE

TYPICAL SECTIONS
ALTERNATIVE 2A AND 2B
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
1J

TYPICAL SECTIONS



Relocated Norfolk Southern Railroad

STATION 125+00.00 ALTERNATES 1A, 1B, 2A AND 2B

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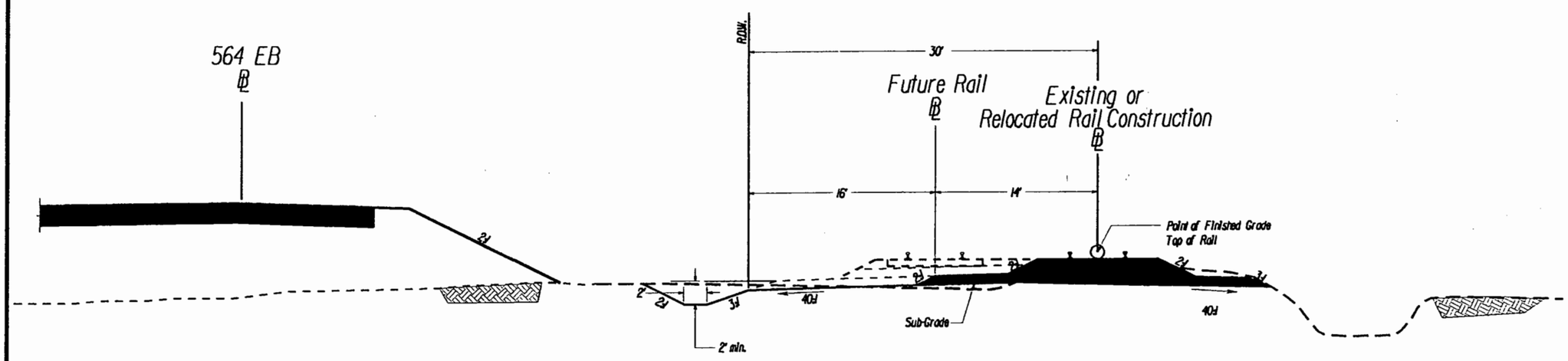

Relocated Norfolk Southern Railroad

STATION 112+00.00 ALTERNATES 1A, 1B, 2A AND 2B

N.T.S.

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PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN AAA	DATE	DRAWN BBB	DATE
CHCK CCC	DATE	APPR	DATE

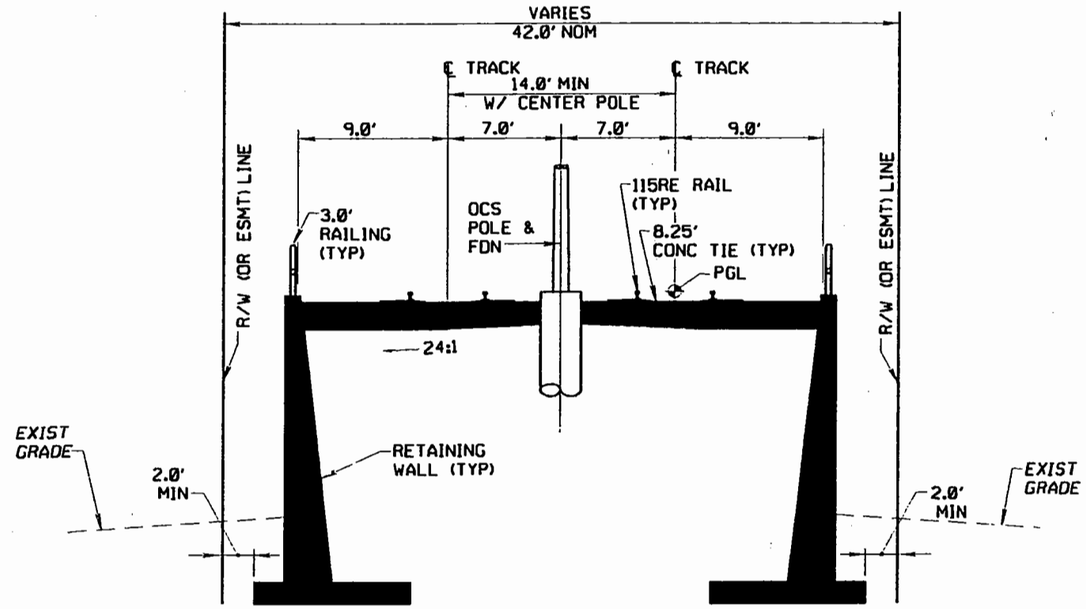
TYPICAL SECTIONS
ALTERNATIVES 1A, 1B, 2A AND 2B

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

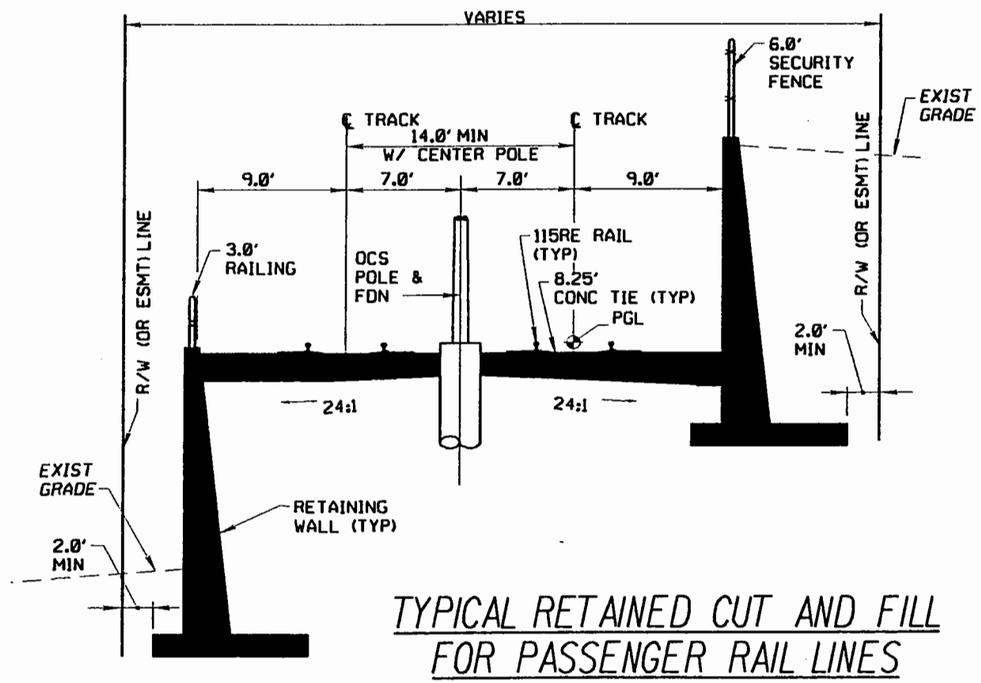
DWG. NO
1K

TYPICAL SECTIONS

ALTERNATIVES 1A, 1B AND 2A



TYPICAL RETAINED FILL - BOTH SIDES FOR PASSENGER RAIL LINES



TYPICAL RETAINED CUT AND FILL FOR PASSENGER RAIL LINES

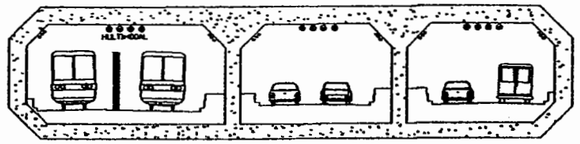
PREPARED BY
PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.

DESIGN	DRAWN	CHK	
AAA	BBB	CCC	
DATE	DATE	DATE	

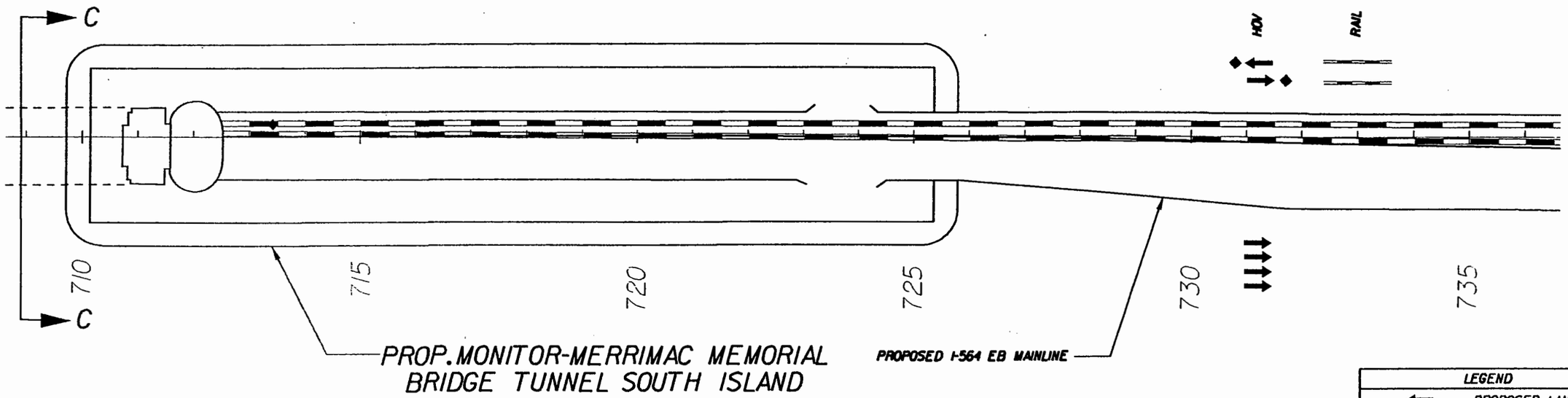
TYPICAL SECTIONS
ALTERNATIVES 1A, 1B AND 2A
PROVISION FOR HOV LANES

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108 PE-101

DWG. N
1L



SECTION C



SCALE

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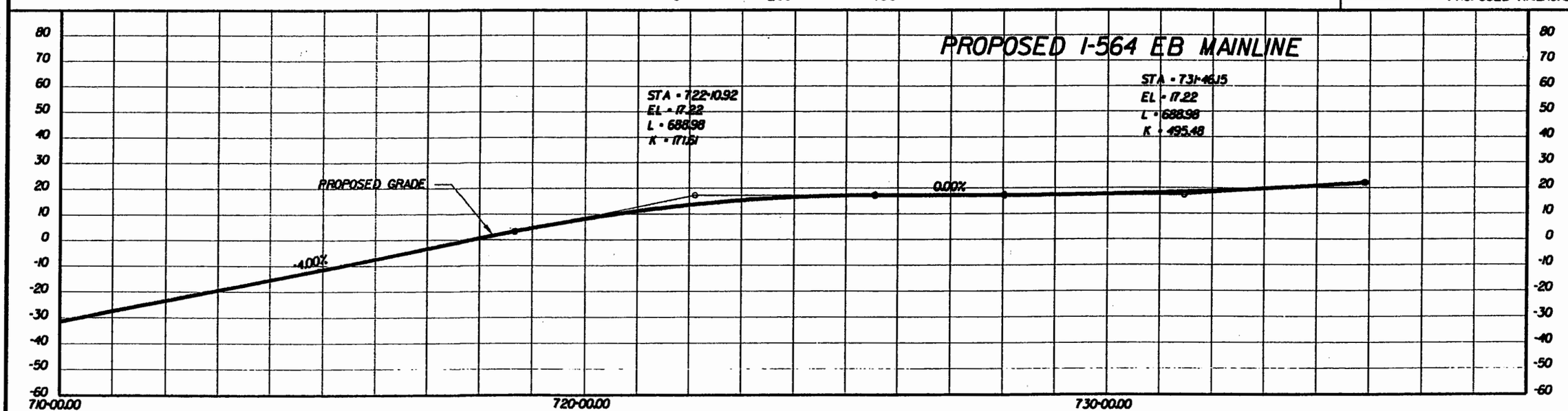
LEGEND
PROPOSED LANE
EXISTING LANE
PROPOSED HOV LANE
EXISTING HOV LANE
PROPOSED RAILROAD



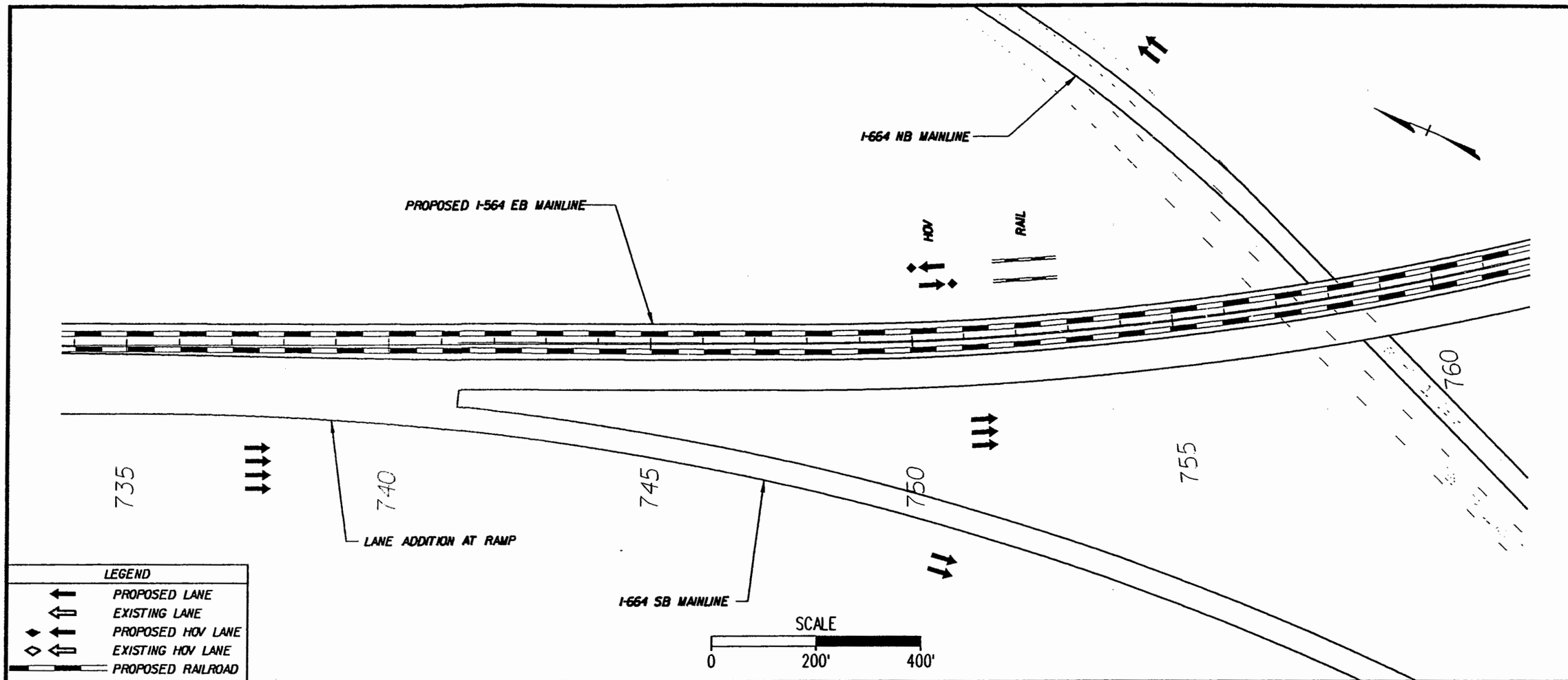
PREPARED BY
PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

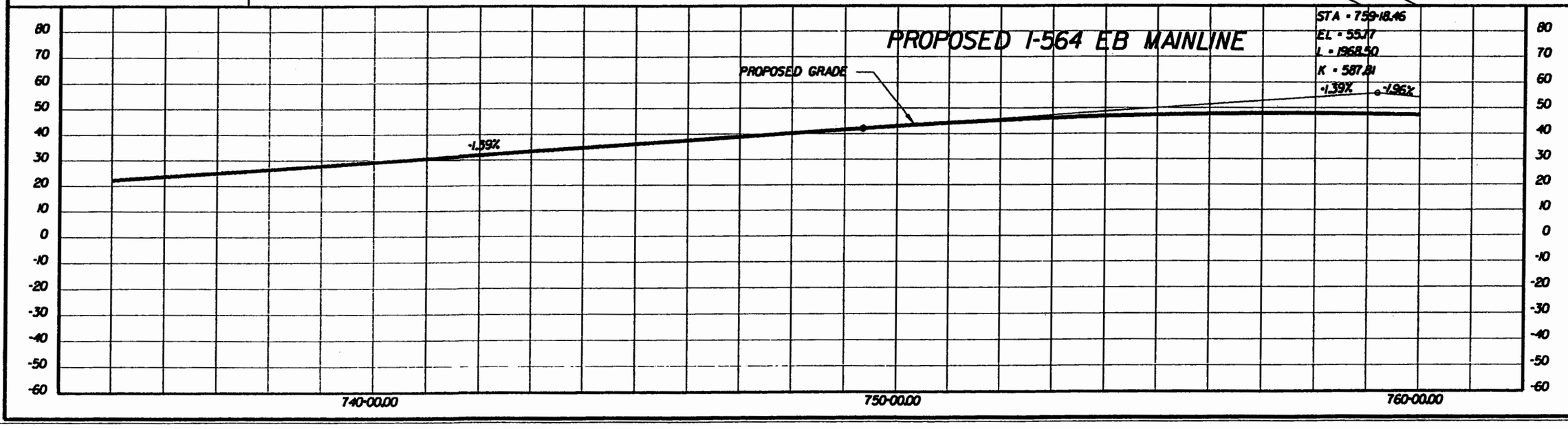
DESIGN	CHKD	CHECK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1-002





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MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1-003

REFER TO
TYPICAL SECTION
SECTION A PAGE IA

PROPOSED I-564 WB MAINLINE

MM-RAMP A
WB-SB

A

A

HOV

RAIL

I-664 NB MAINLINE

PROPOSED I-564 EB MAINLINE
WITH HOV/RAIL

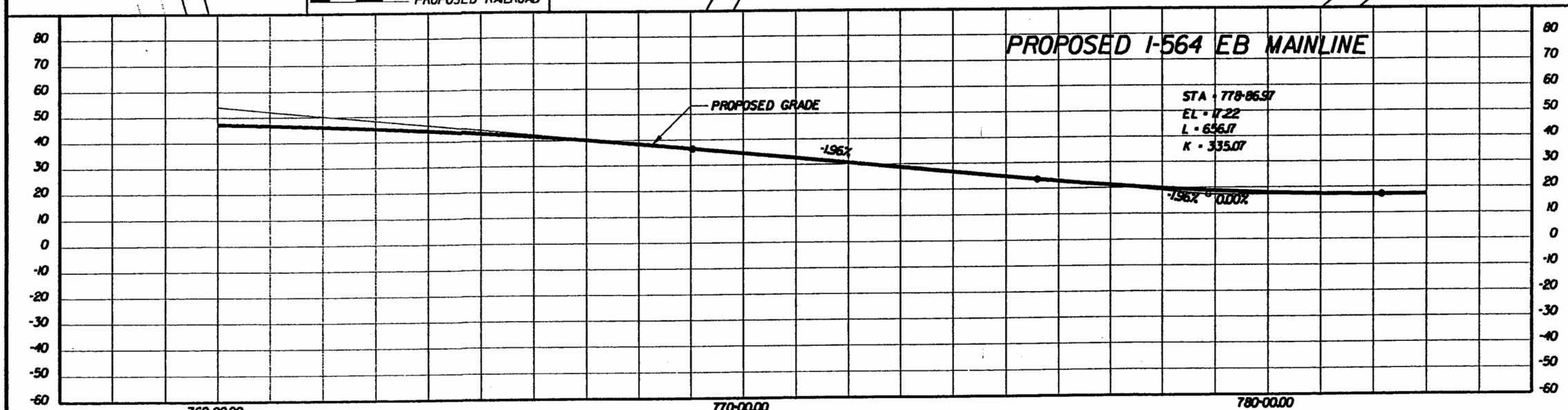
MM-RAMP
NB-EB

760 765 770 775 780 785

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

SCALE
0 200' 400'



PREPARED BY
PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHCK	CCC	DATE
APPR		DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1-004

REFER TO
TYPICAL SECTION
SECTION A PAGE IA

PROPOSED I-564 WB MAINLINE

MM-RAMP A
WB-SB

A

A

HOV

RAIL

I-664 NB MAINLINE

PROPOSED I-564 EB MAINLINE
WITH HOV/RAIL

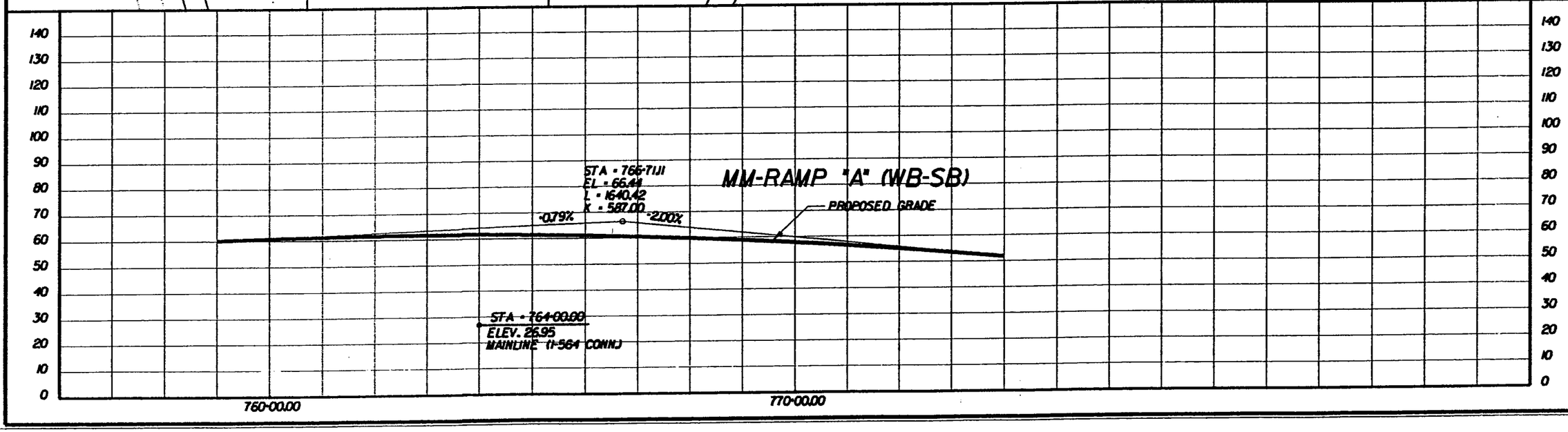
MM-RAMP
NB-EB

760 765 770 775 780 785

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

SCALE
0 200' 400'



PREPARED BY
PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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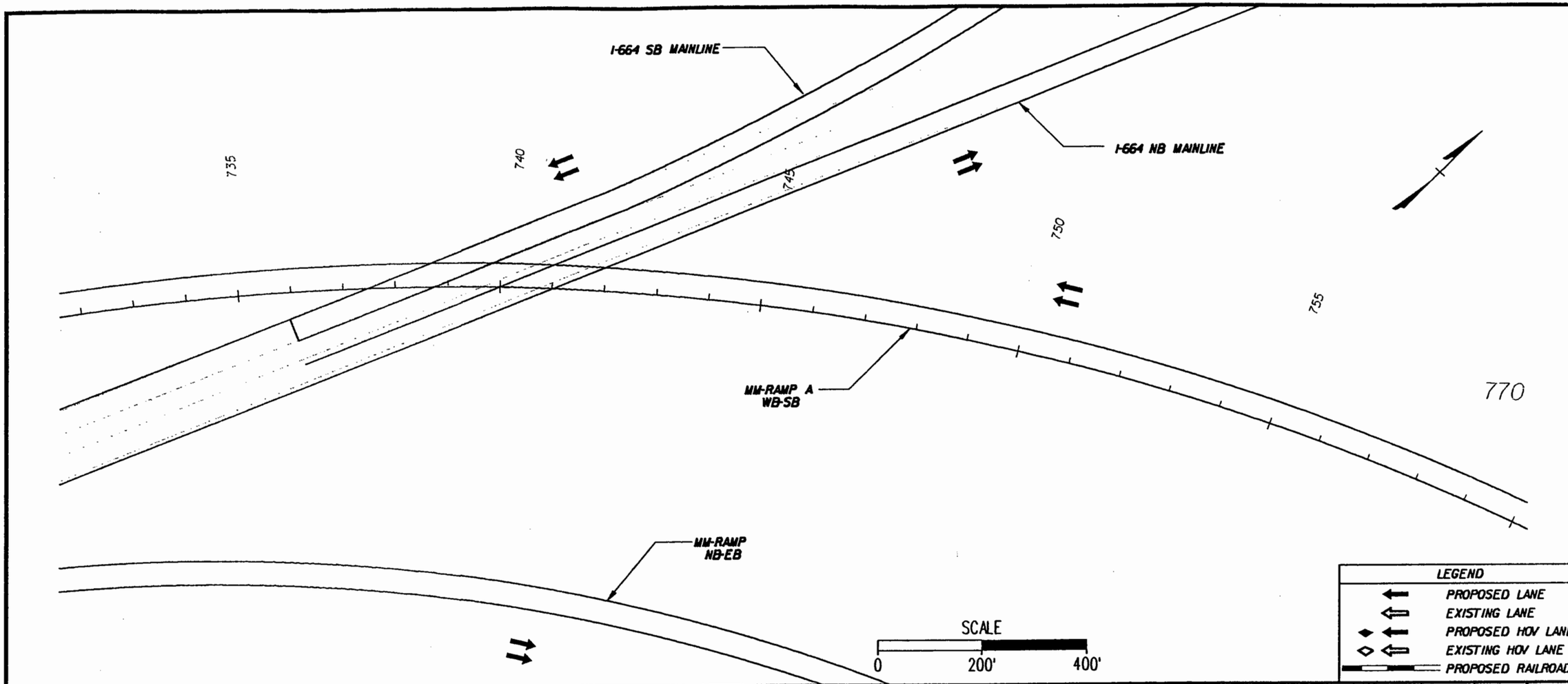

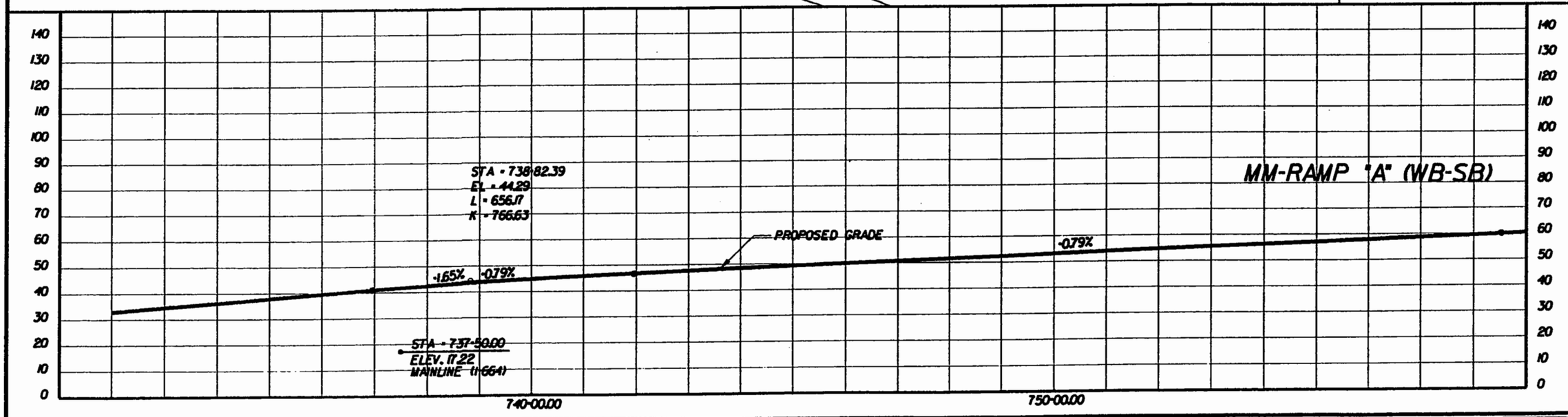

PREPARED BY

PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.

MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHCK	CCC	DATE
APPR		DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT-1-004B

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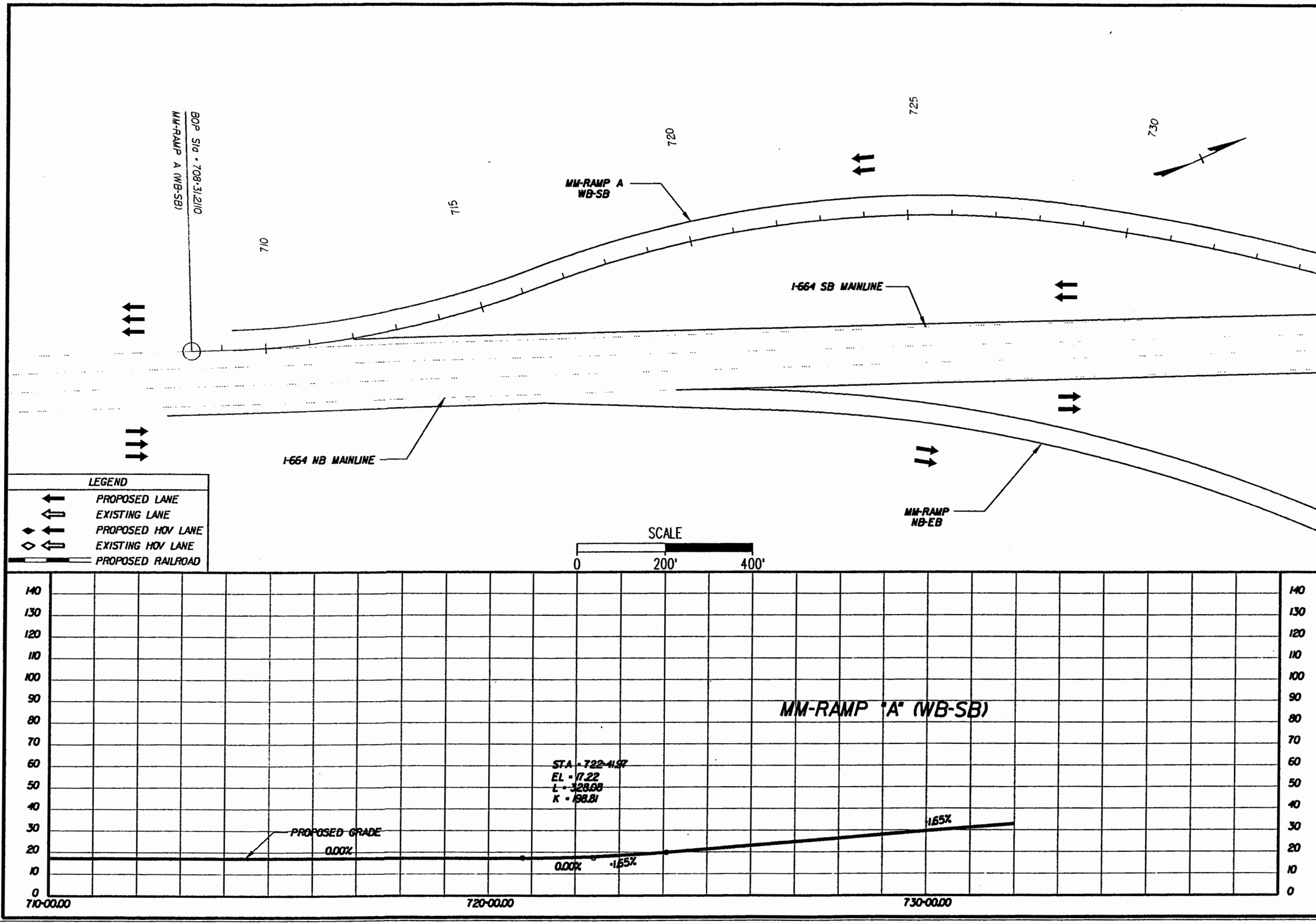


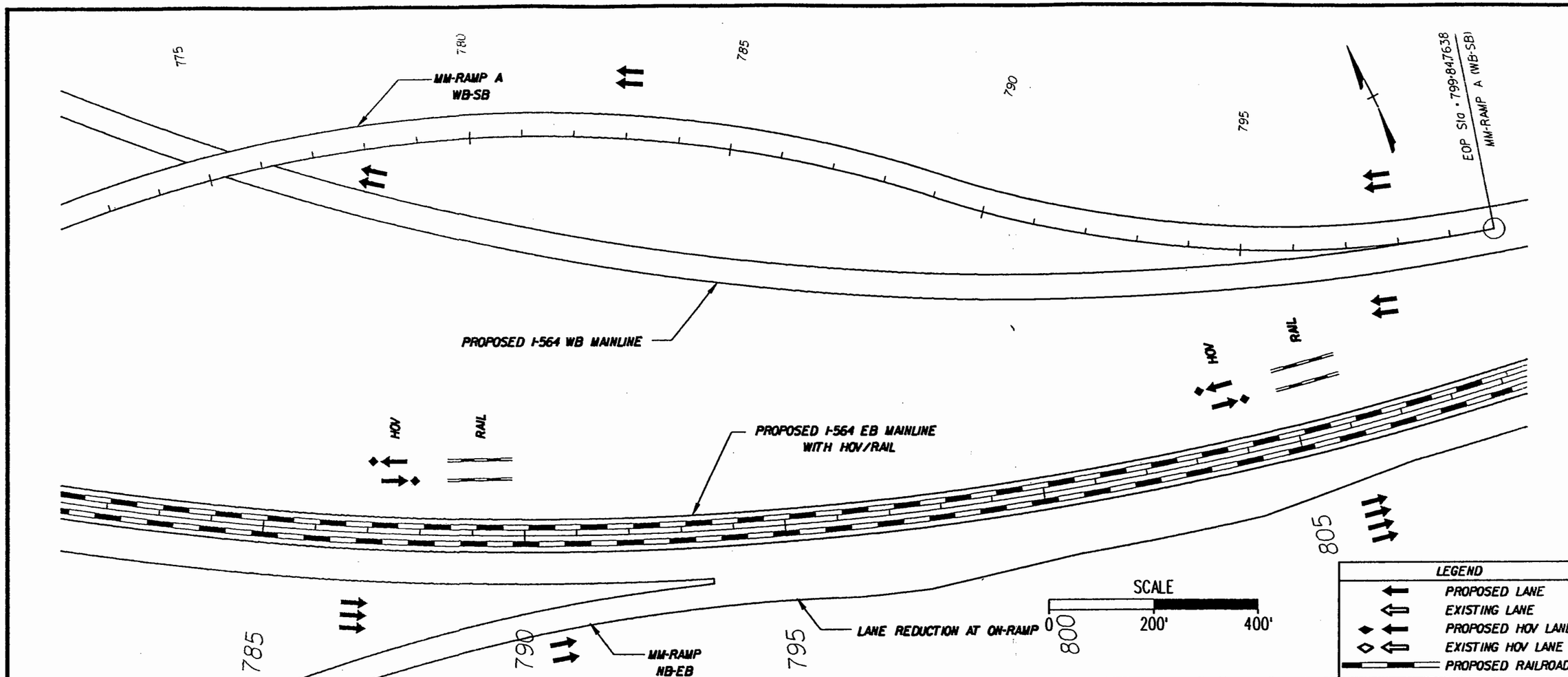
PREPARED BY:
PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

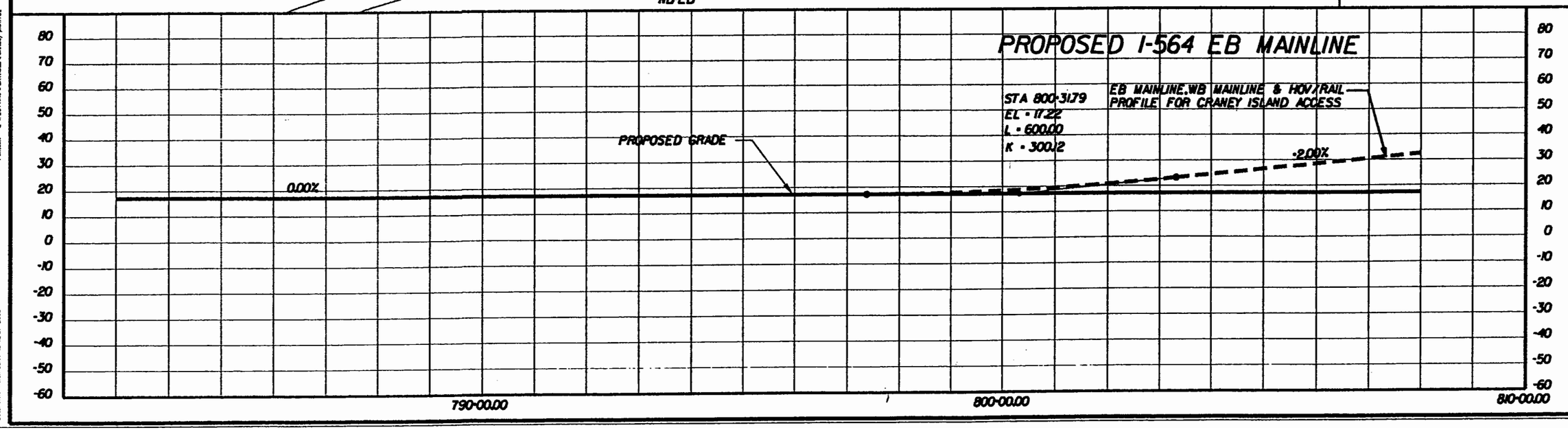
DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1-004C





PREPARED BY
PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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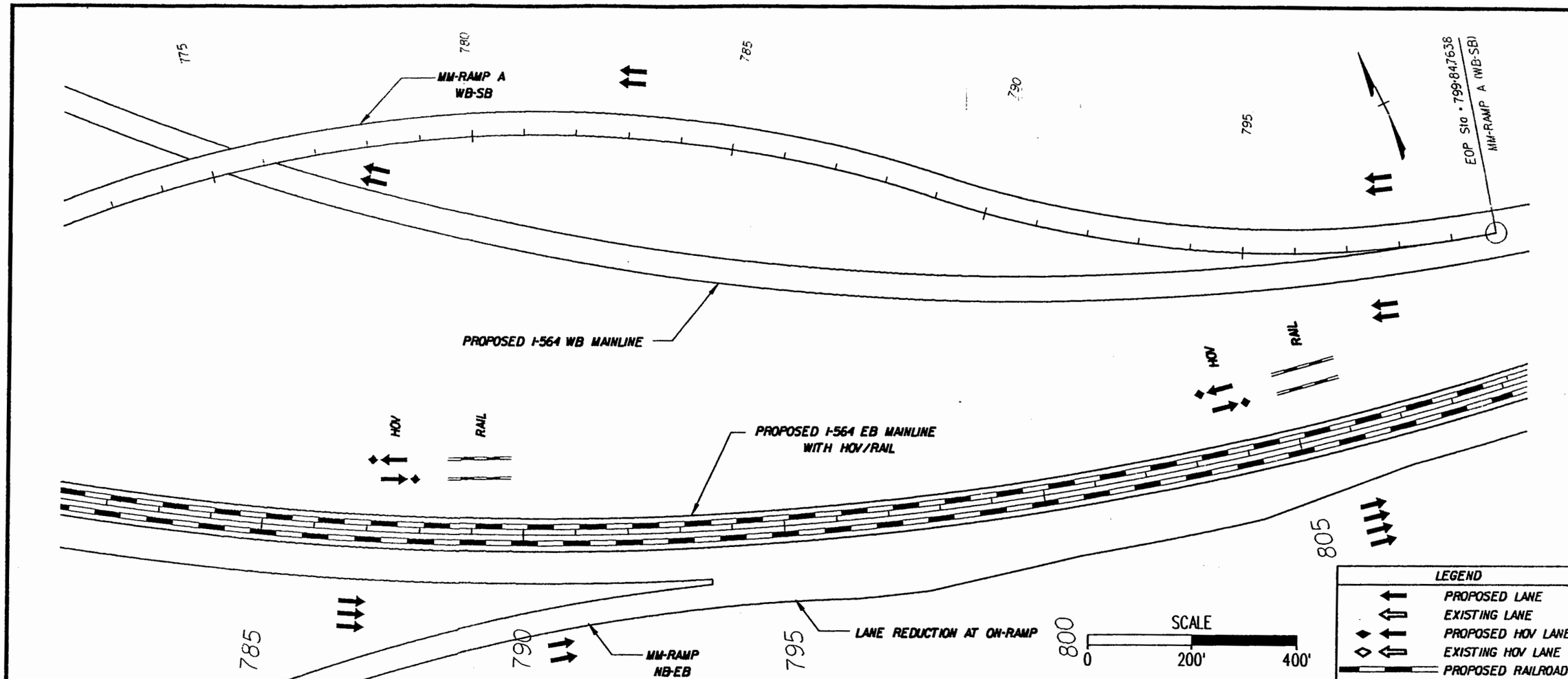

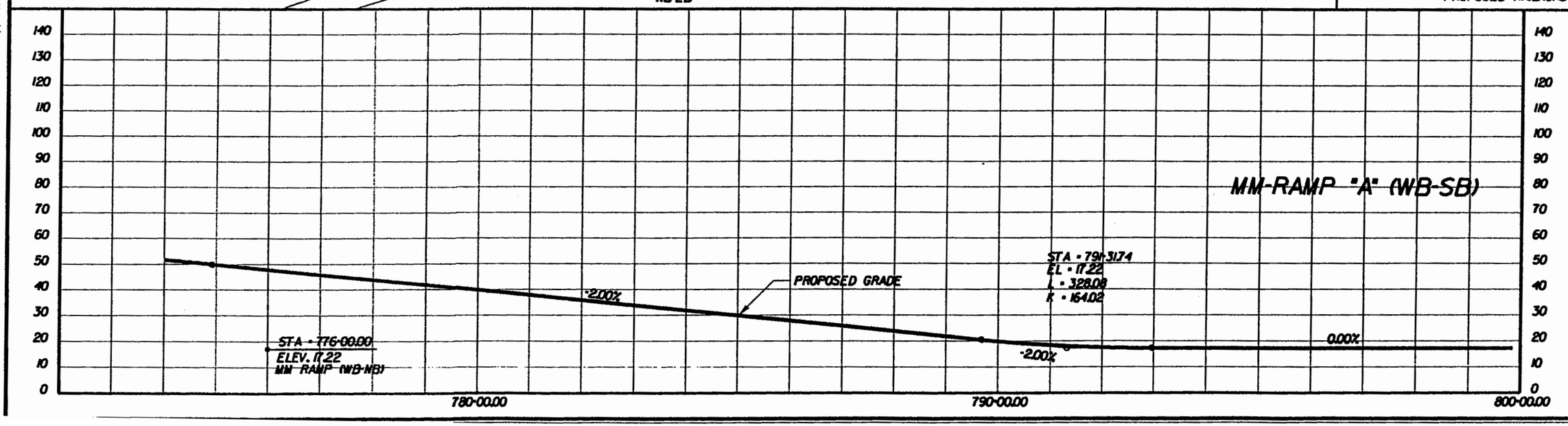

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MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHCK	CCC	DATE
APPR		DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1-005A

REFER TO
TYPICAL SECTION
SECTION B PAGE 1A

795

EOP Sta - 799+84.7638
MM-RAMP A (WB-SB)

PROPOSED I-564 WB MAINLINE

HOV & RAIL

B

B

PROPOSED I-564 EB MAINLINE
WITH HOV/RAIL

810

815

820

825

830

HOV

RAIL

LEGEND
PROPOSED LANE
EXISTING LANE
PROPOSED HOV LANE
EXISTING HOV LANE
PROPOSED RAILROAD

SCALE

0 200' 400'

STA = 823+85.89
EL = 64.28
L = 1600.00
K = 400.16

PROPOSED I-564 EB MAINLINE

EB MAINLINE, WB MAINLINE & HOV/RAIL
PROFILE FOR CRANEY ISLAND ACCESS

-2.00%

-2.00%

-2.00%

PROPOSED GRADE

0.00%

45' CLEARANCE
(MIN.)

CRANEY
ISLAND
ACCESS

2.8 M.H.W.

70'

80 70 60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60

810+00.00

820+00.00

830+00.00

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT-1-006

REFER TO
TYPICAL SECTION
SECTION B PAGE IA

PROPOSED I-564 WB MAINLINE

BOP Sta = 854+000
CI-RAMP B (NB-SB)

CI-RAMP B
NB-WB

860

B

B

HOV

RAIL

835

840

845

850

855

860

PROPOSED I-564 EB MAINLINE
WITH HOV/RAIL

HOV

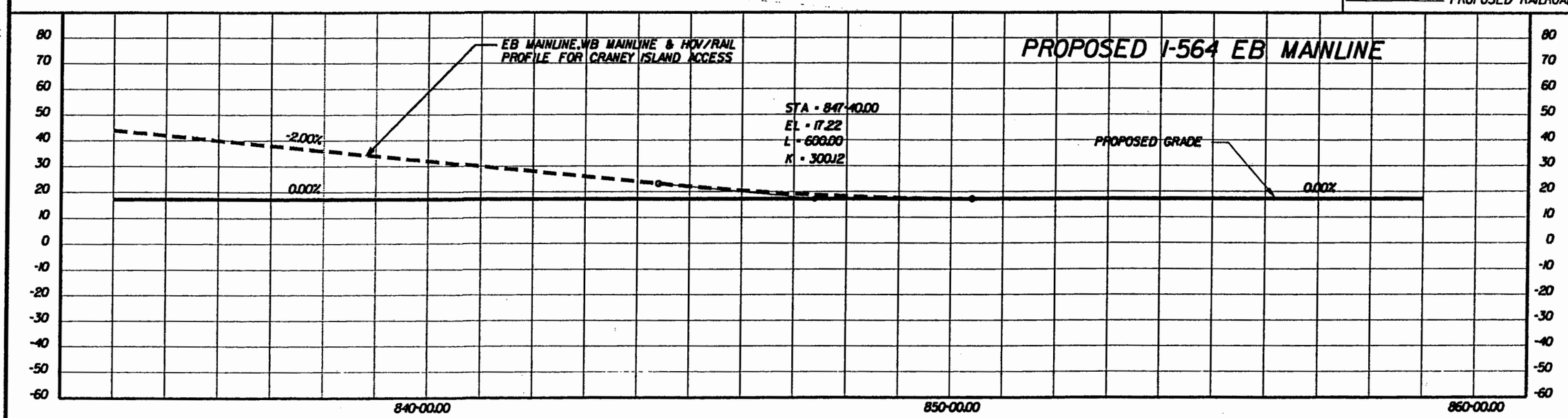
RAIL

SCALE

0 200' 400'

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD



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DESIGN	AAA	DATE	
DRAWN	BBB	DATE	
CHCK	CCC	DATE	
APPR		DATE	

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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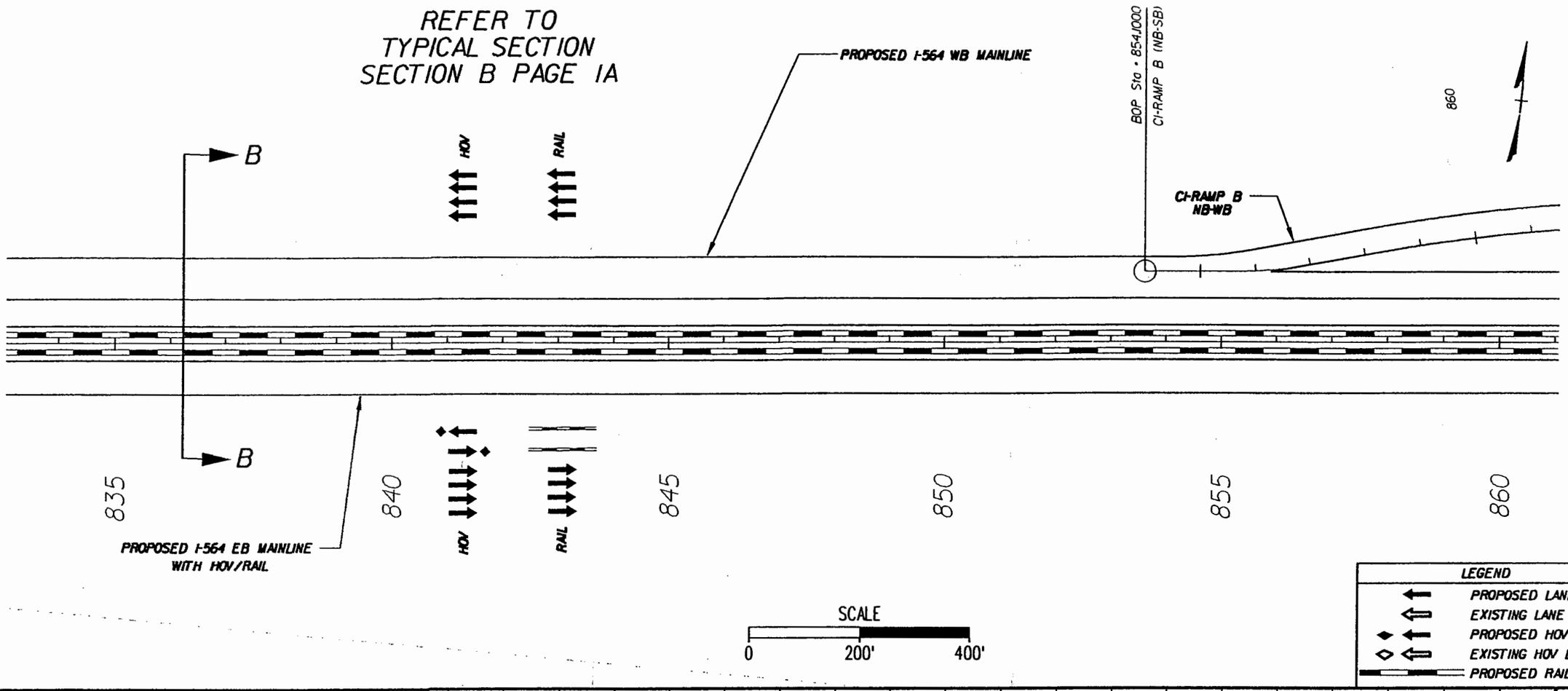

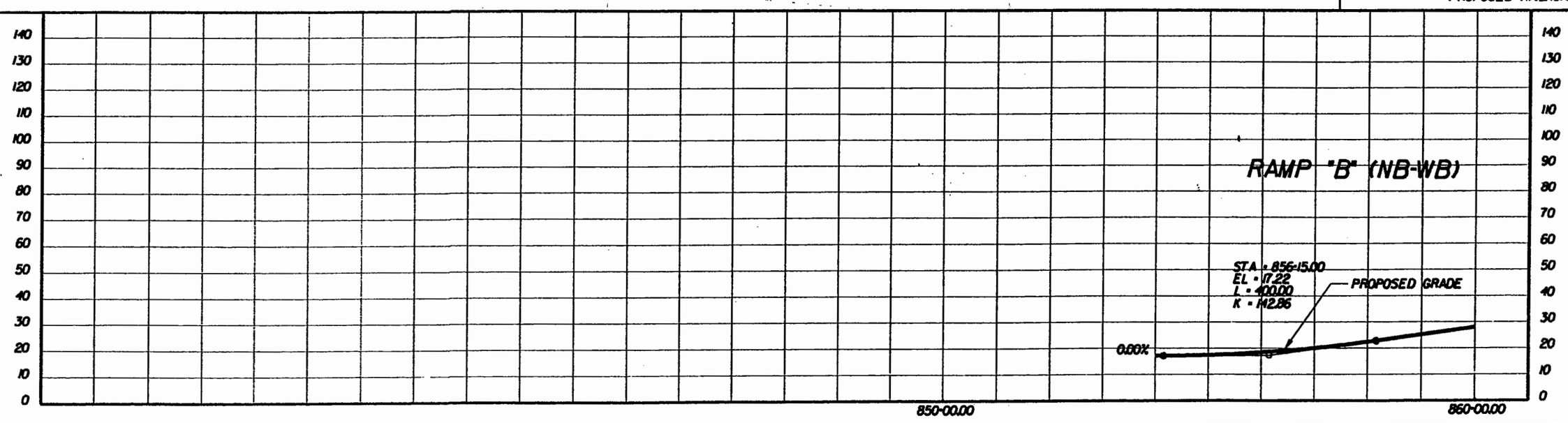

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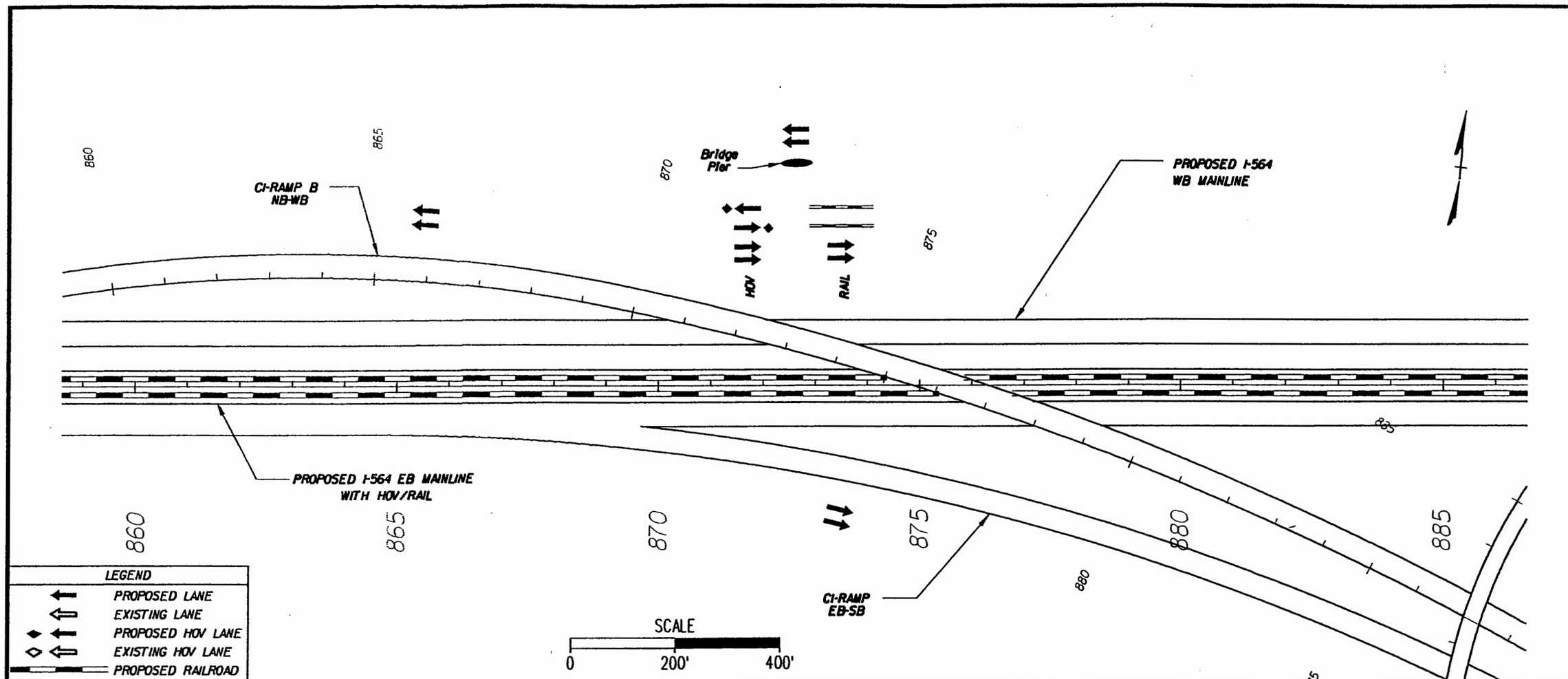
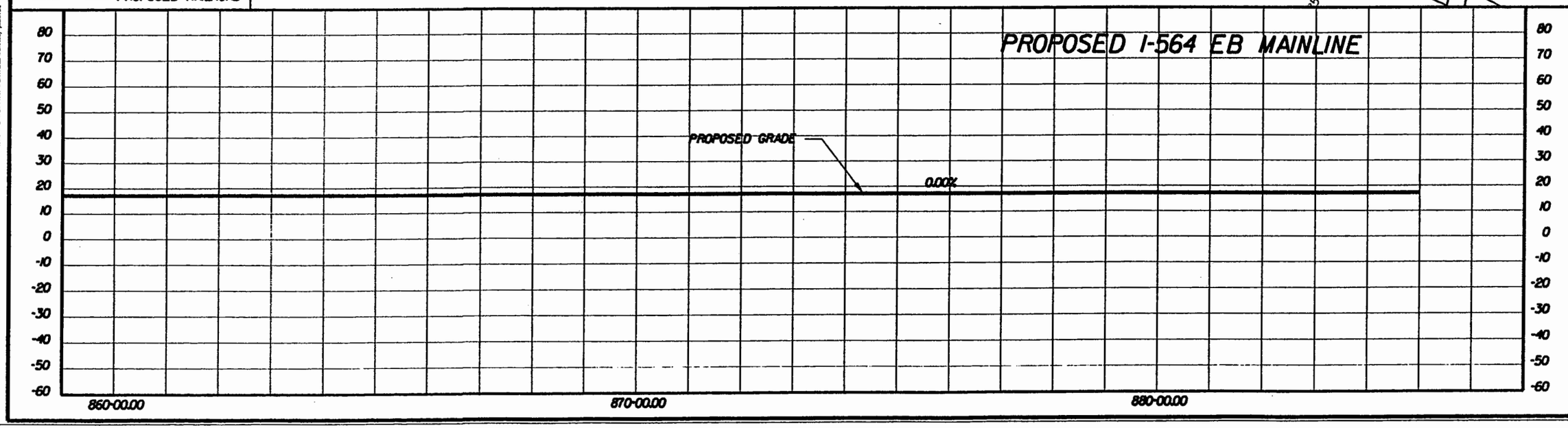
DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1-007A





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DESIGN	AAA	DATE	
DRAWN	BBB	DATE	
CHCK	CCC	DATE	
APPR		DATE	

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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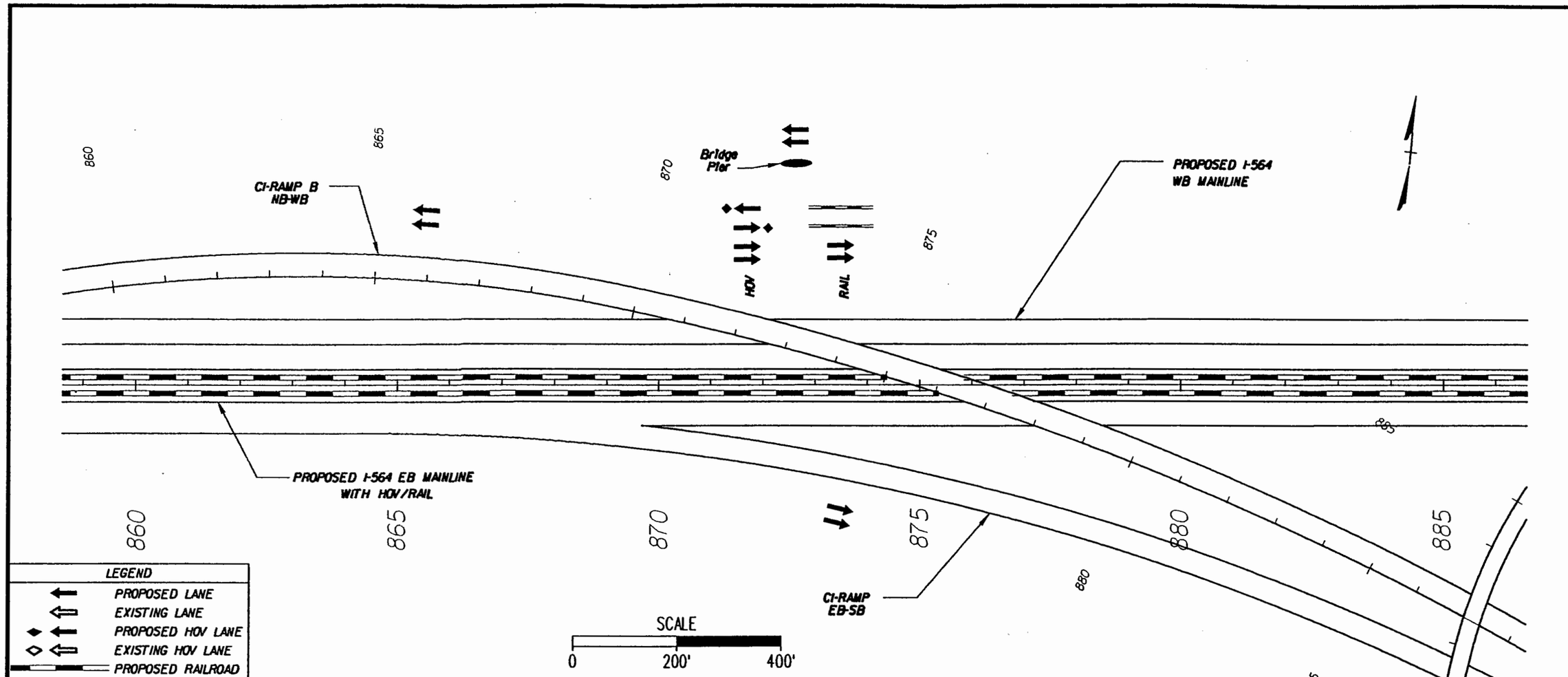

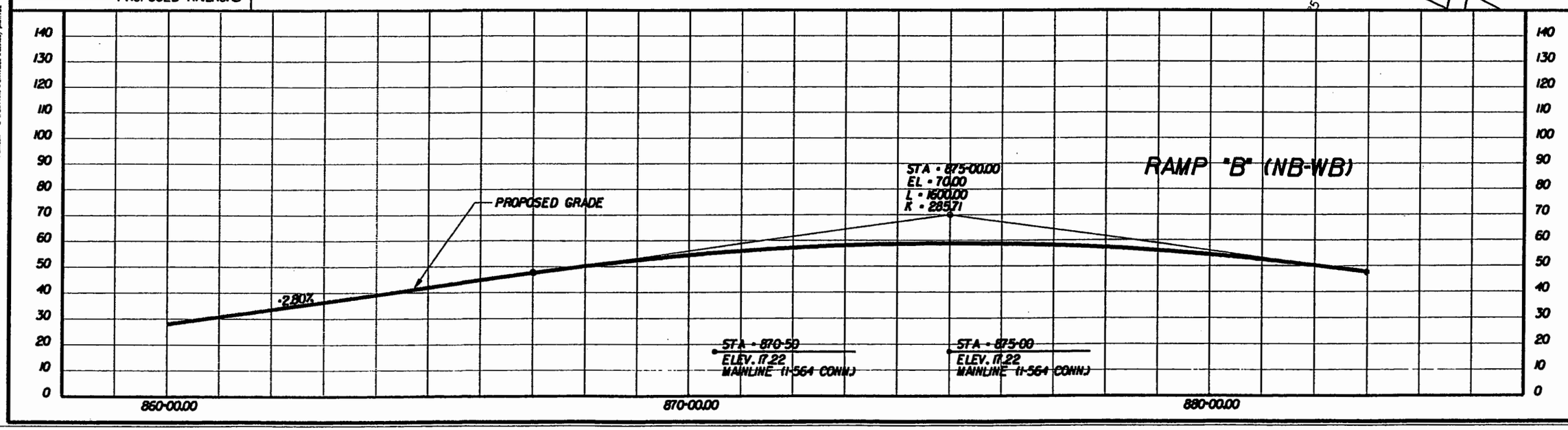

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DESIGN	AAA	DATE	
DRAWN	BBB	DATE	
CHCK	CCC	DATE	
APPR		DATE	

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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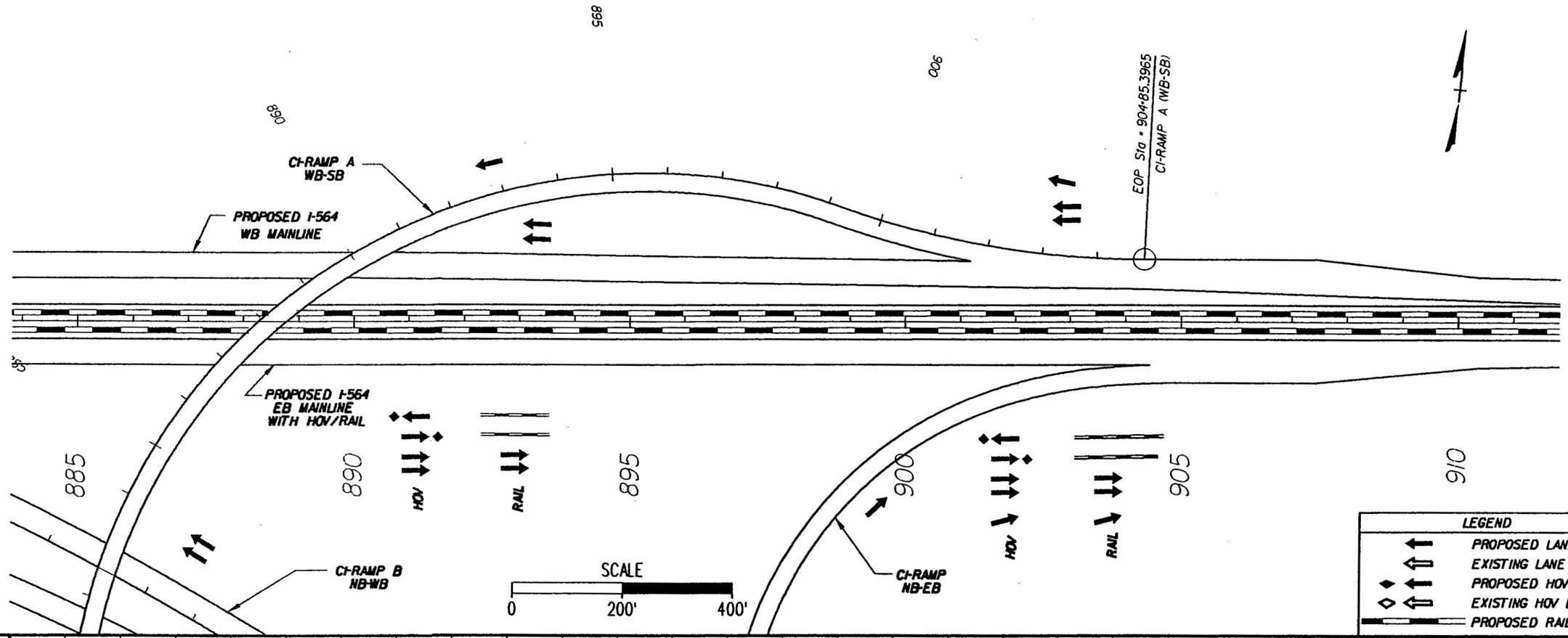

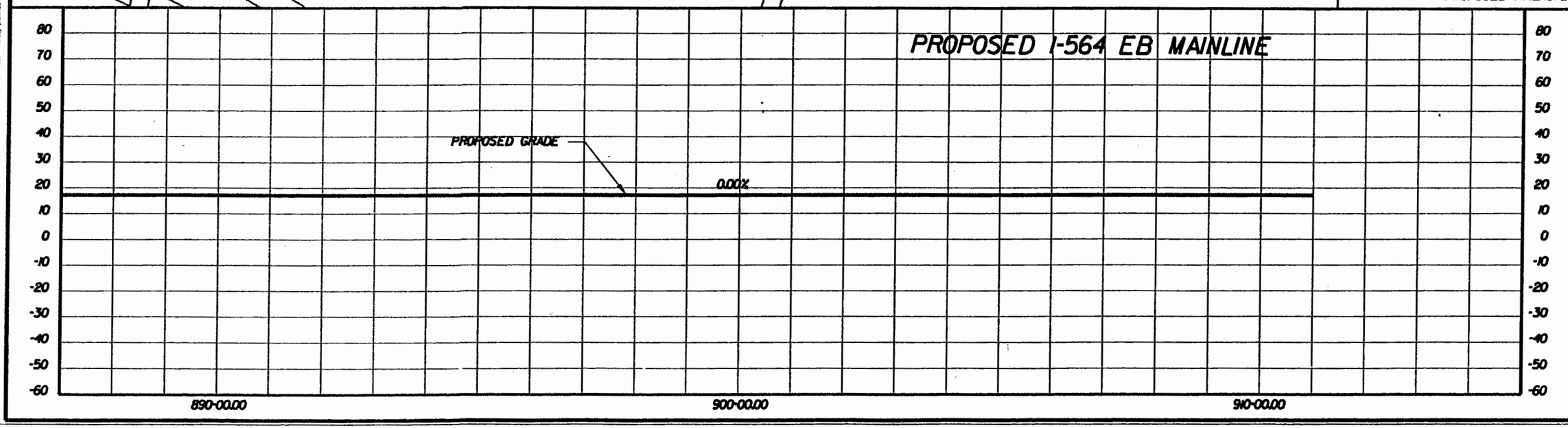

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DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1
HOVRAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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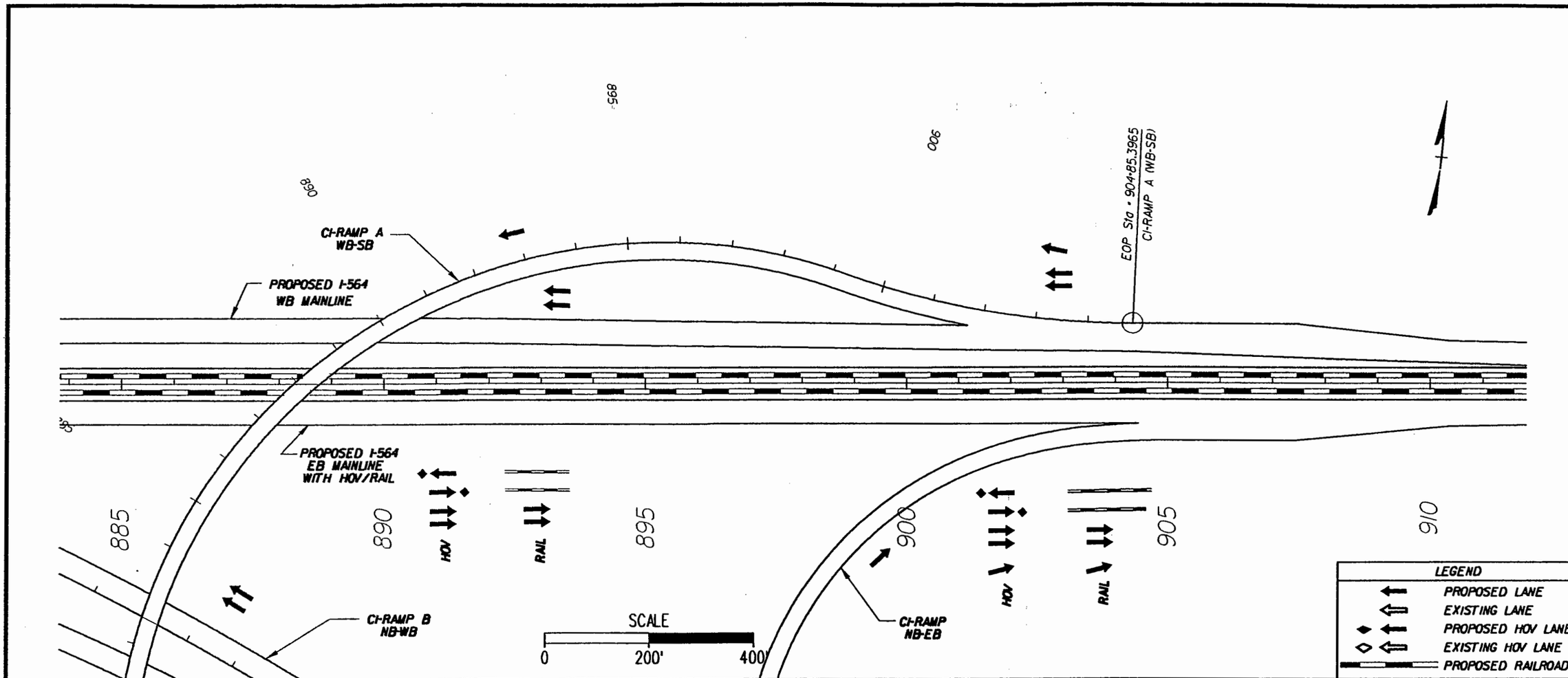

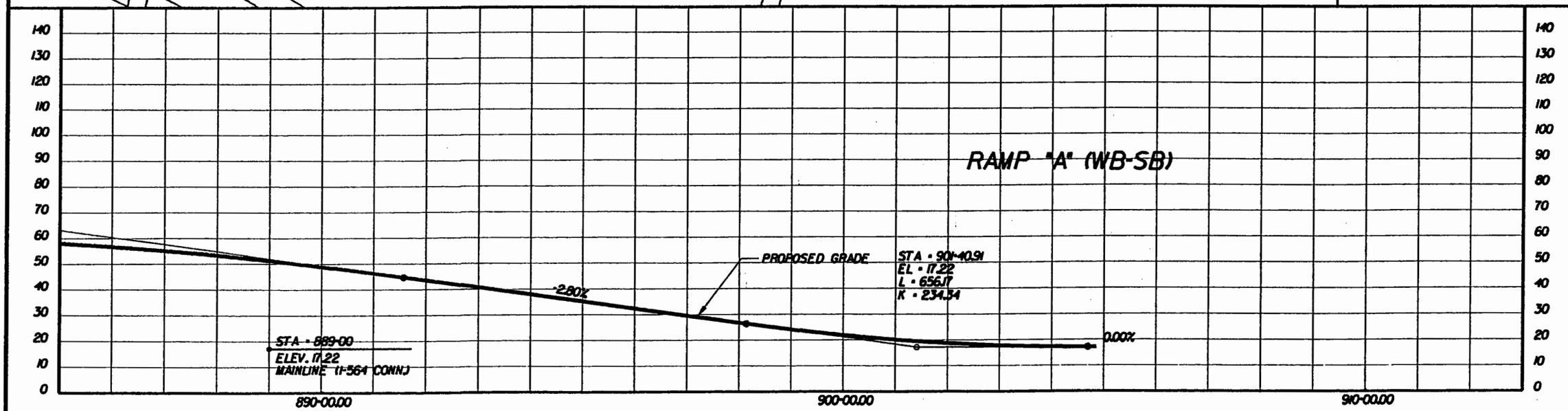

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DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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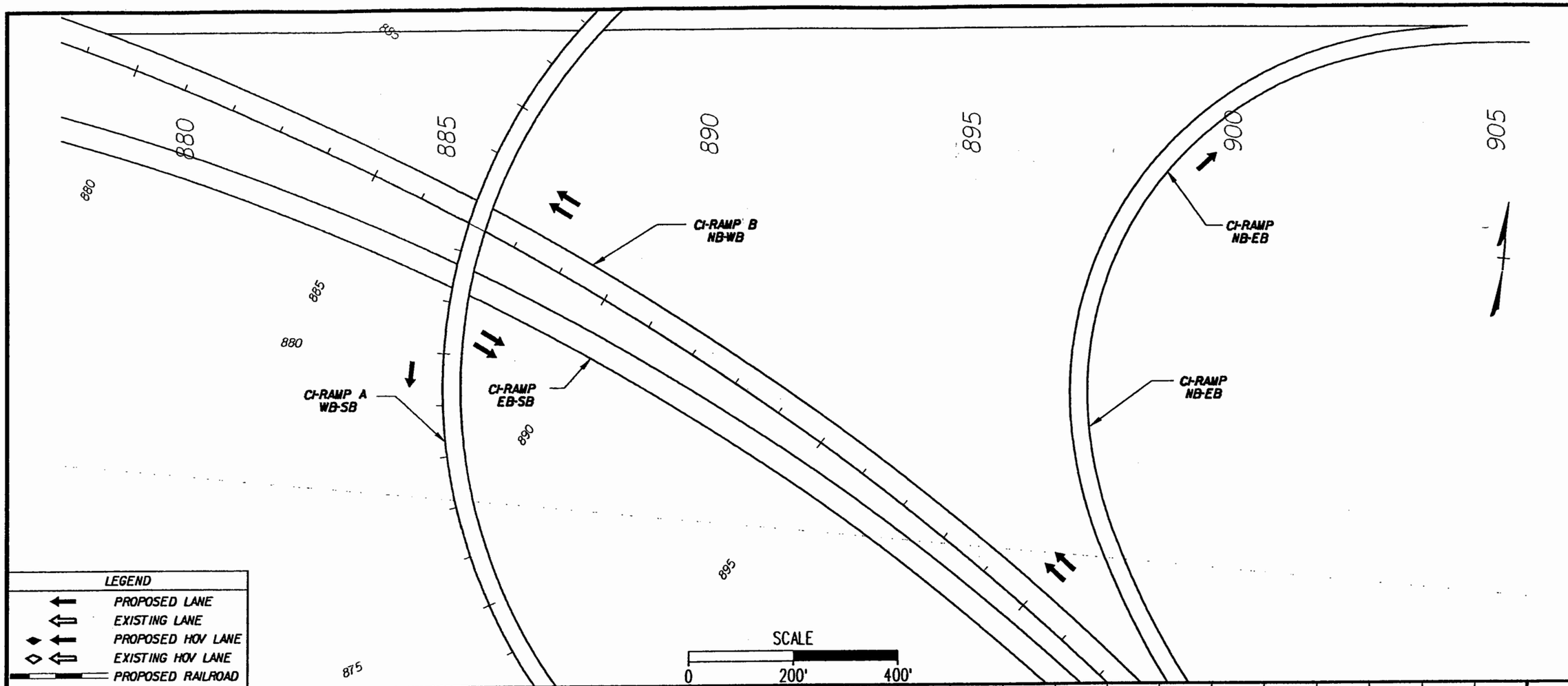

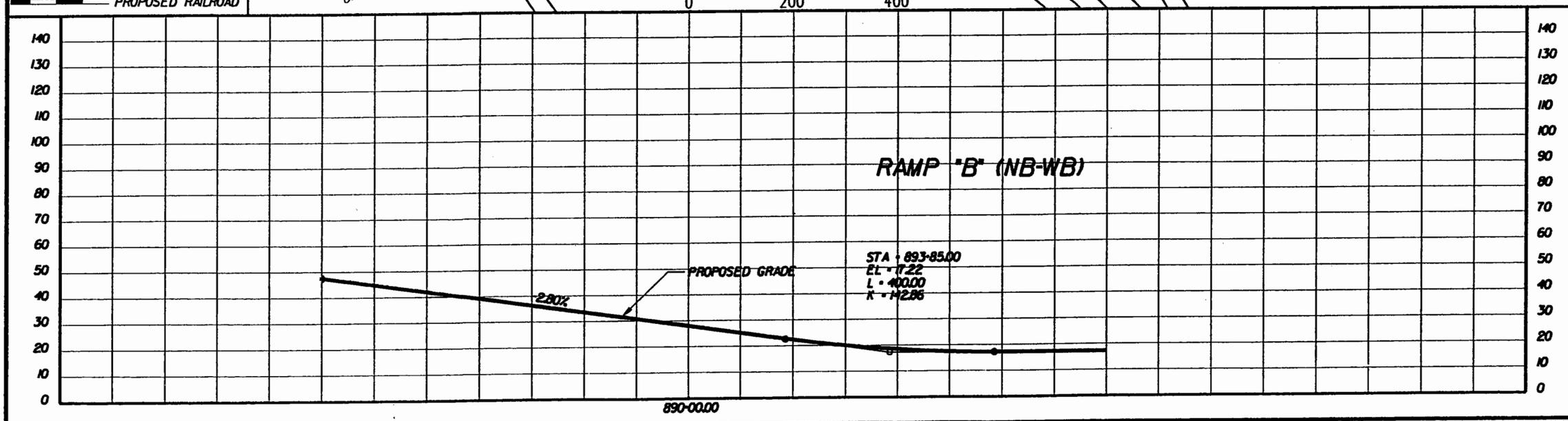

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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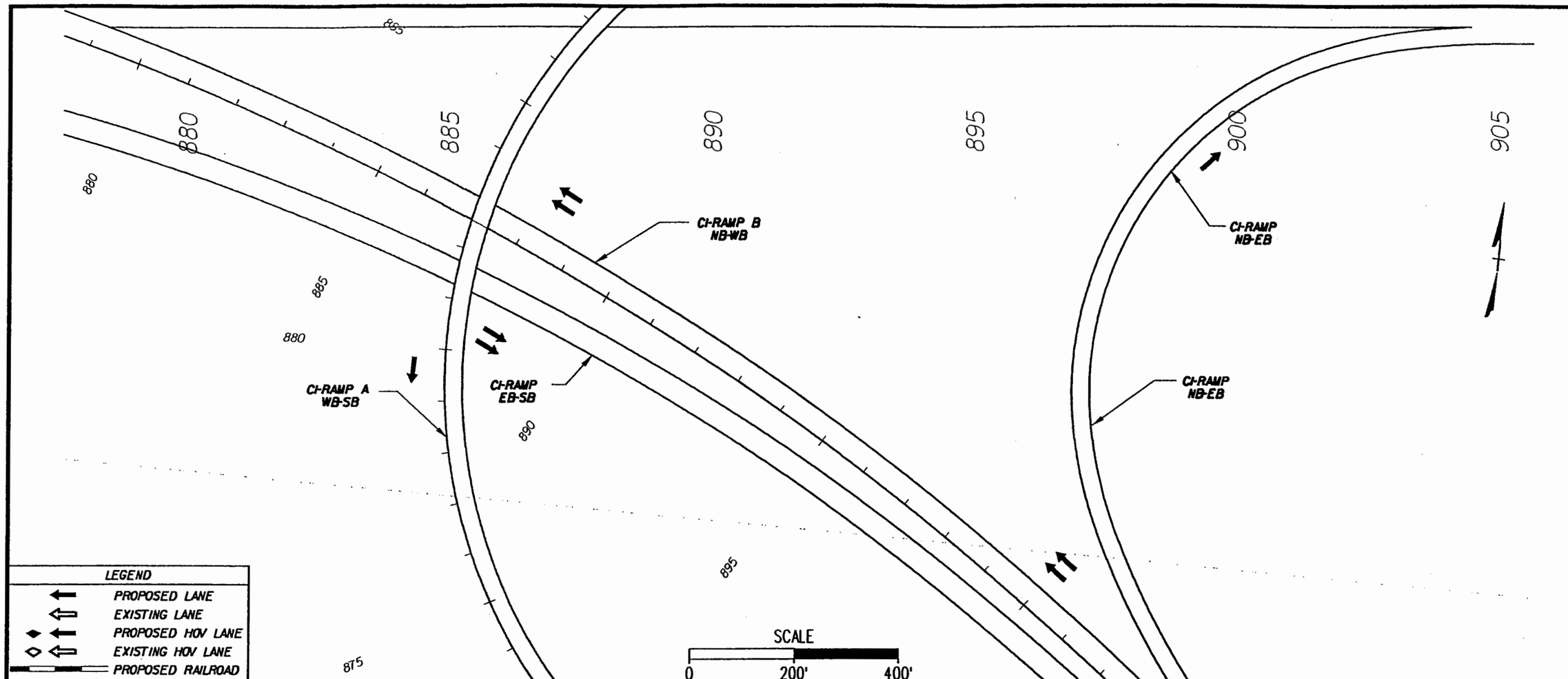

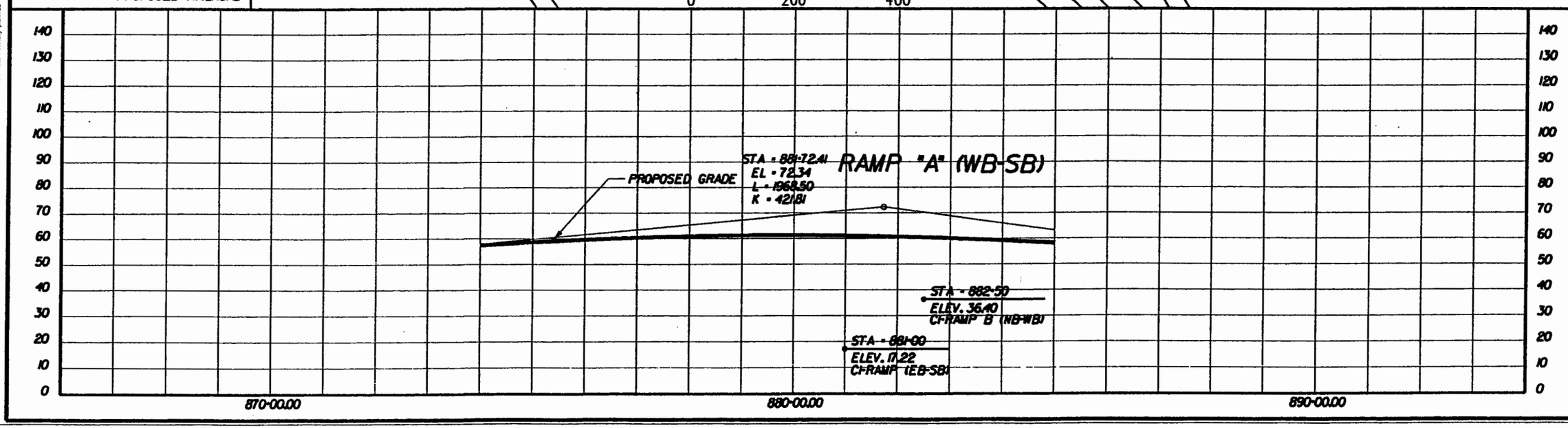

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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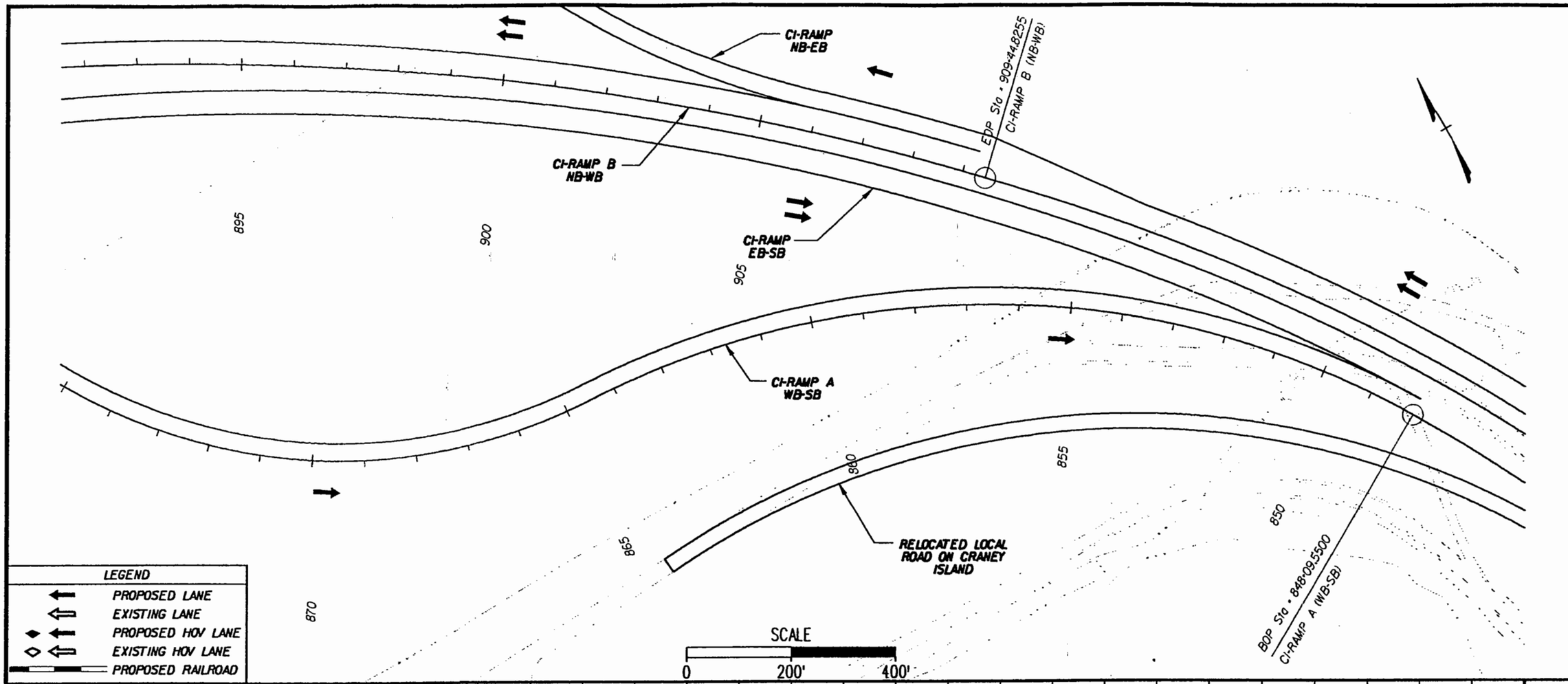

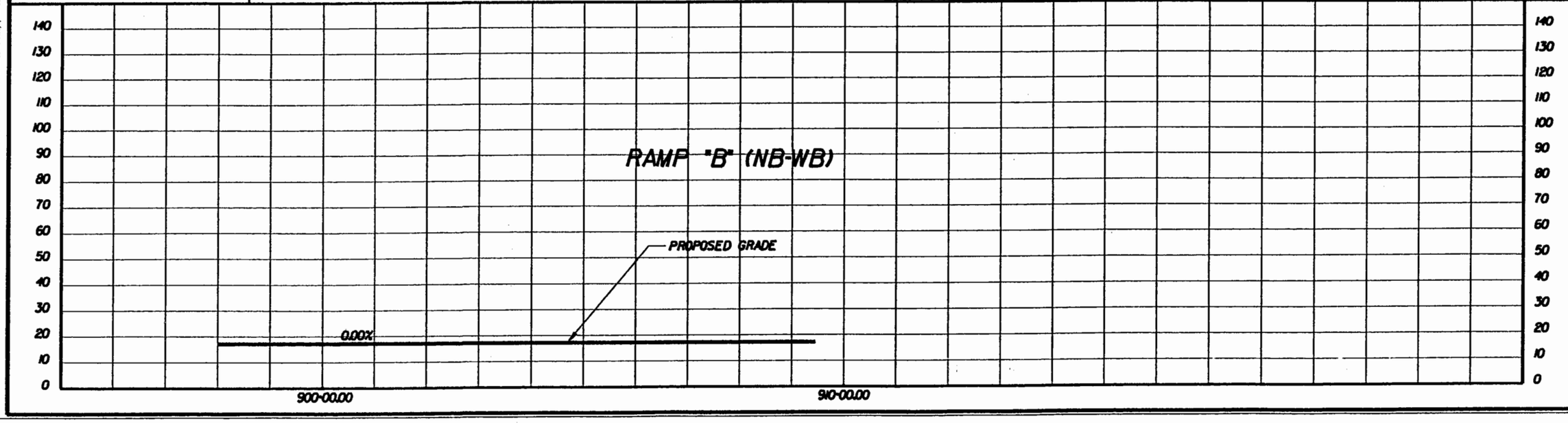

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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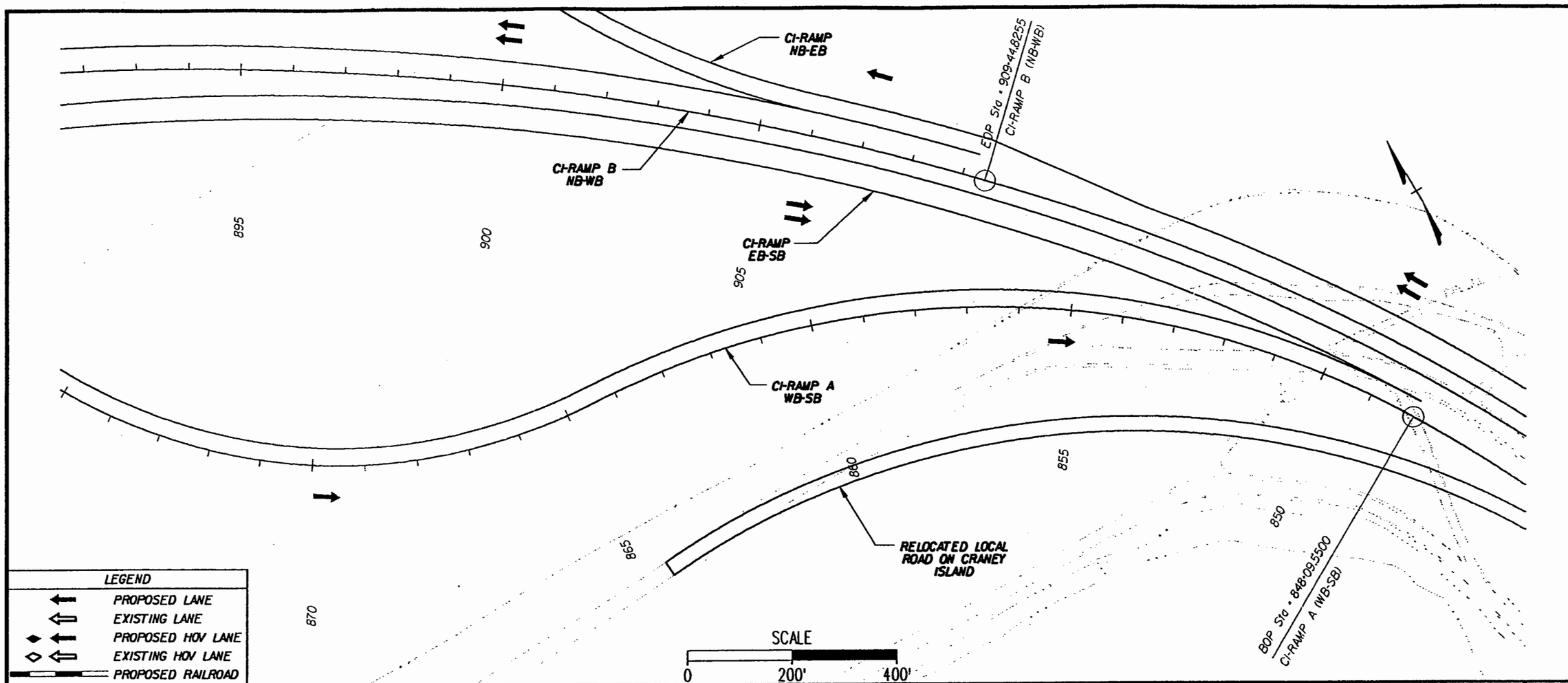

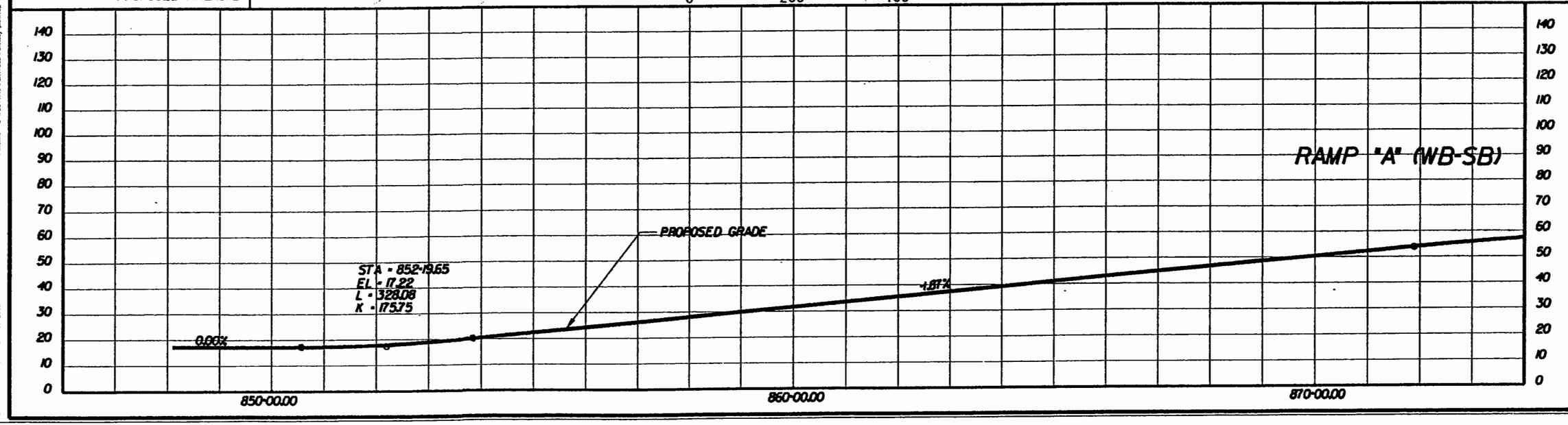

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DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1

HOV/RAIL AND SOV ON SAME BRIDGE CENTER BORE

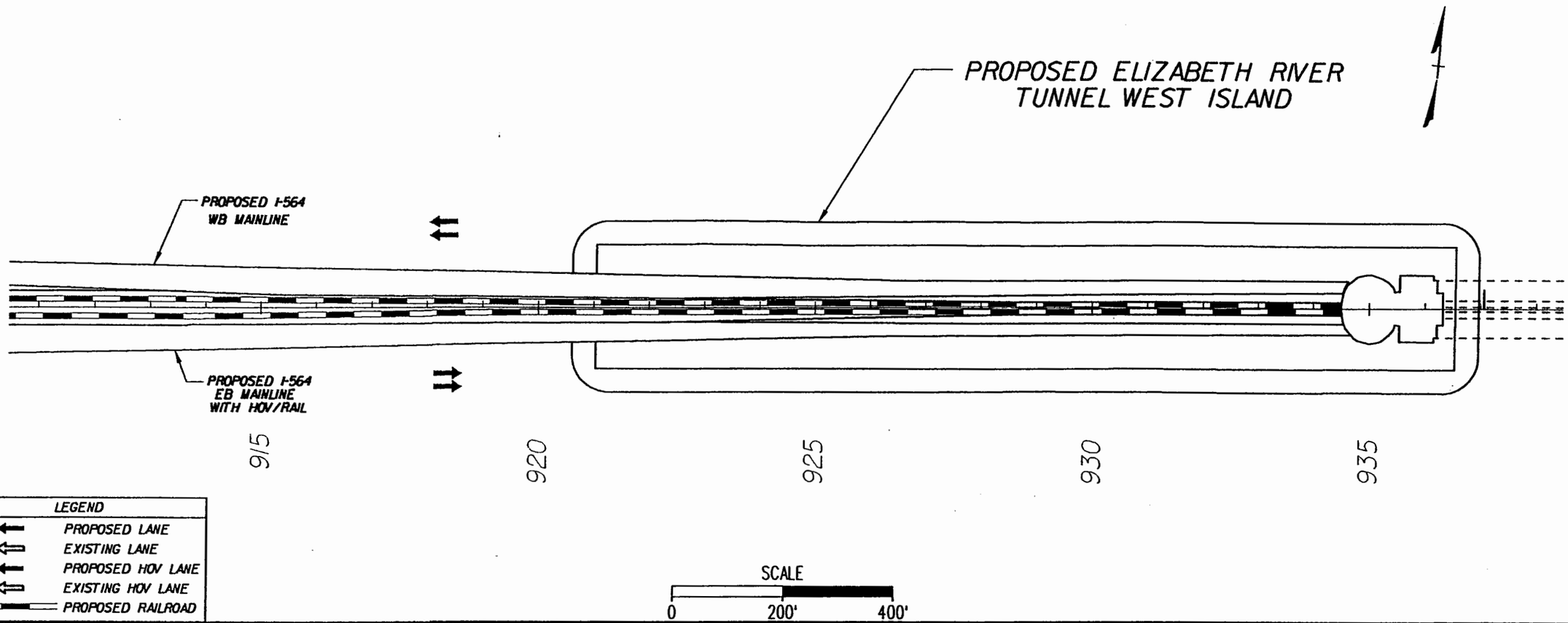
I-564 INTERMODAL CONNECTOR

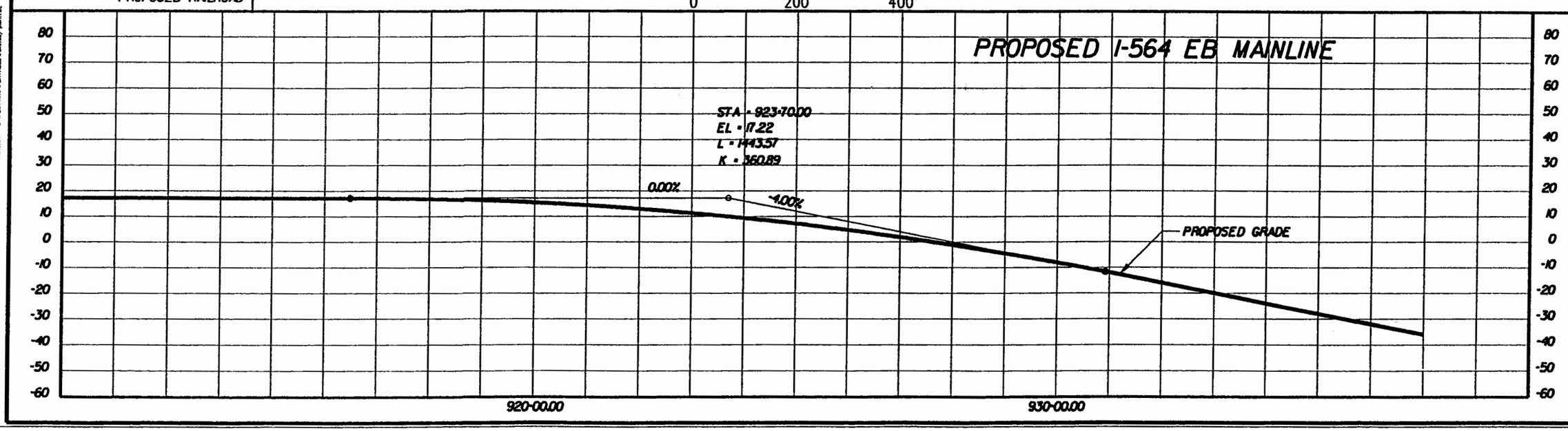
Rail Connection Study

(FO) R000-122-108, PE-101

DWG. NO

ALT-1-0091





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DESIGN	AAA	DATE	
DRAWN	BBB	DATE	
CHCK	CCC	DATE	
APPR		DATE	

ALTERNATIVE-1
HOVRAIL AND SOV ON SAME BRIDGE CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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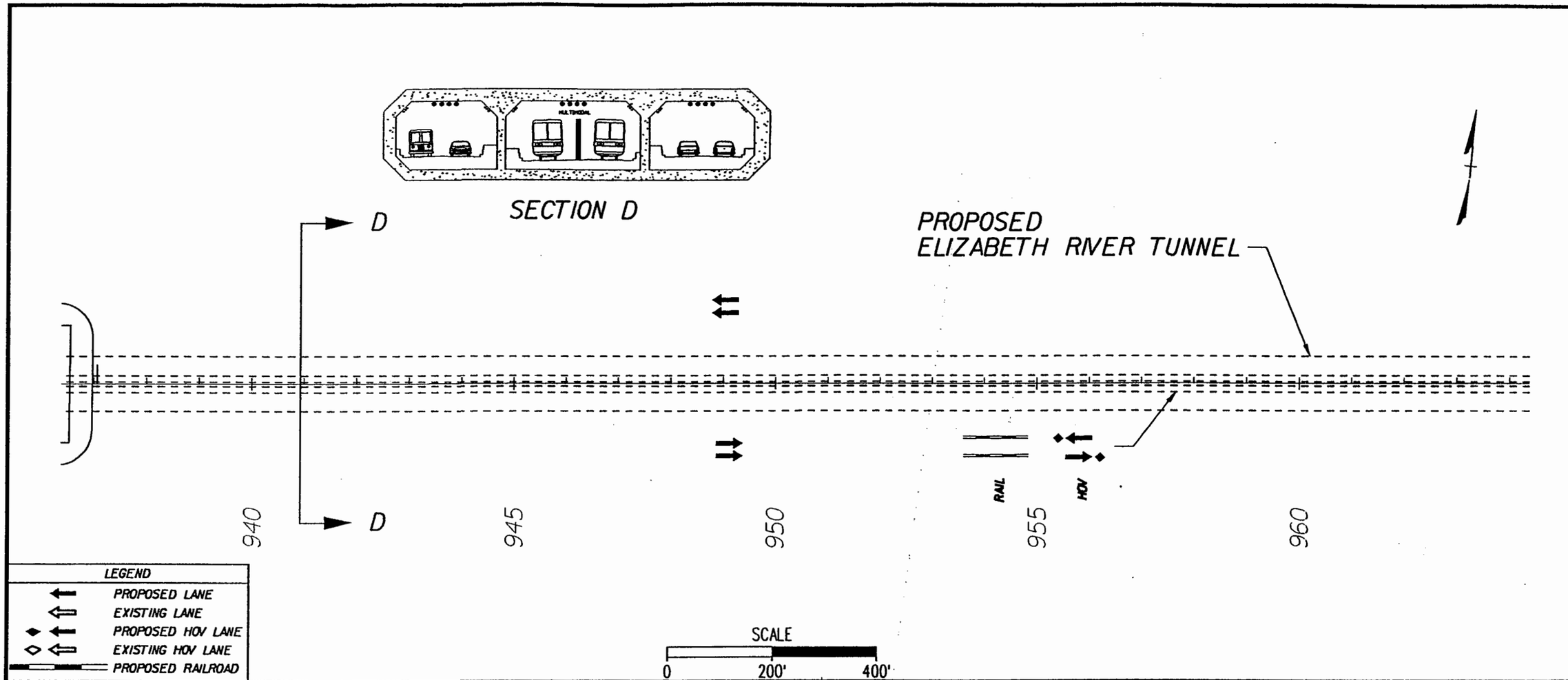

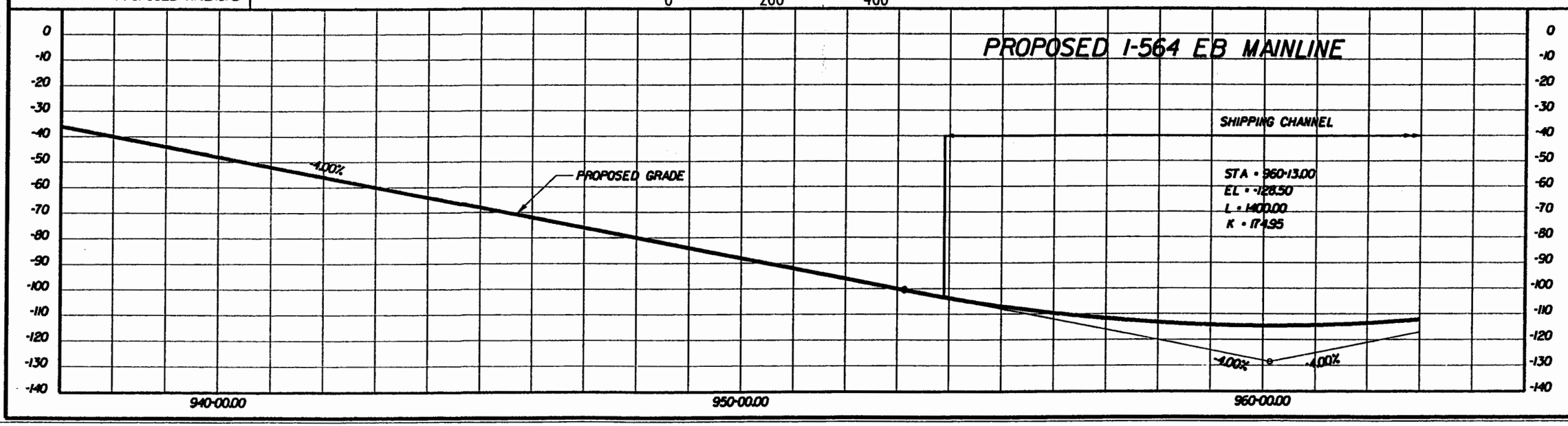

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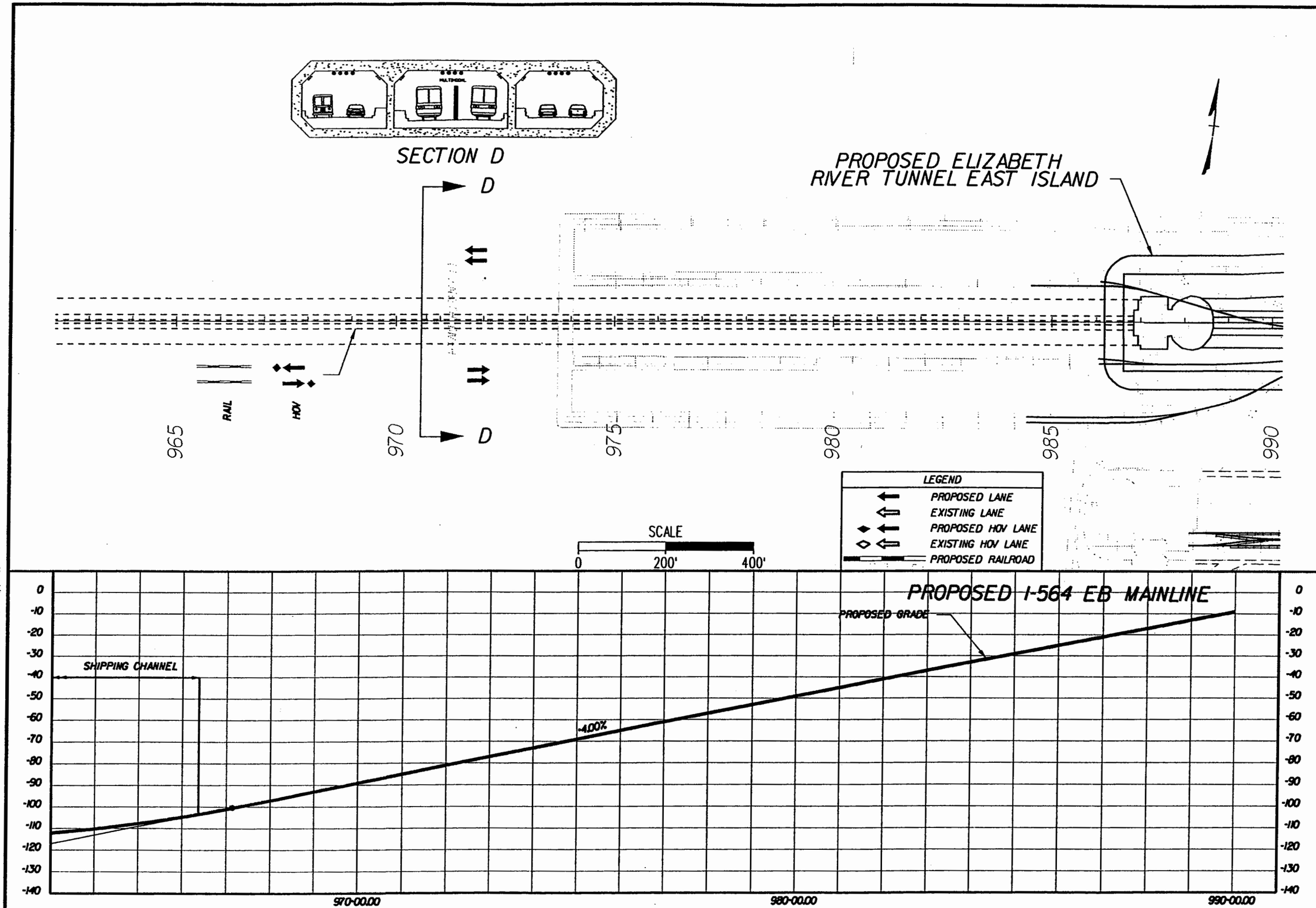
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHECK	CCC	DATE
APPR		DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1-011



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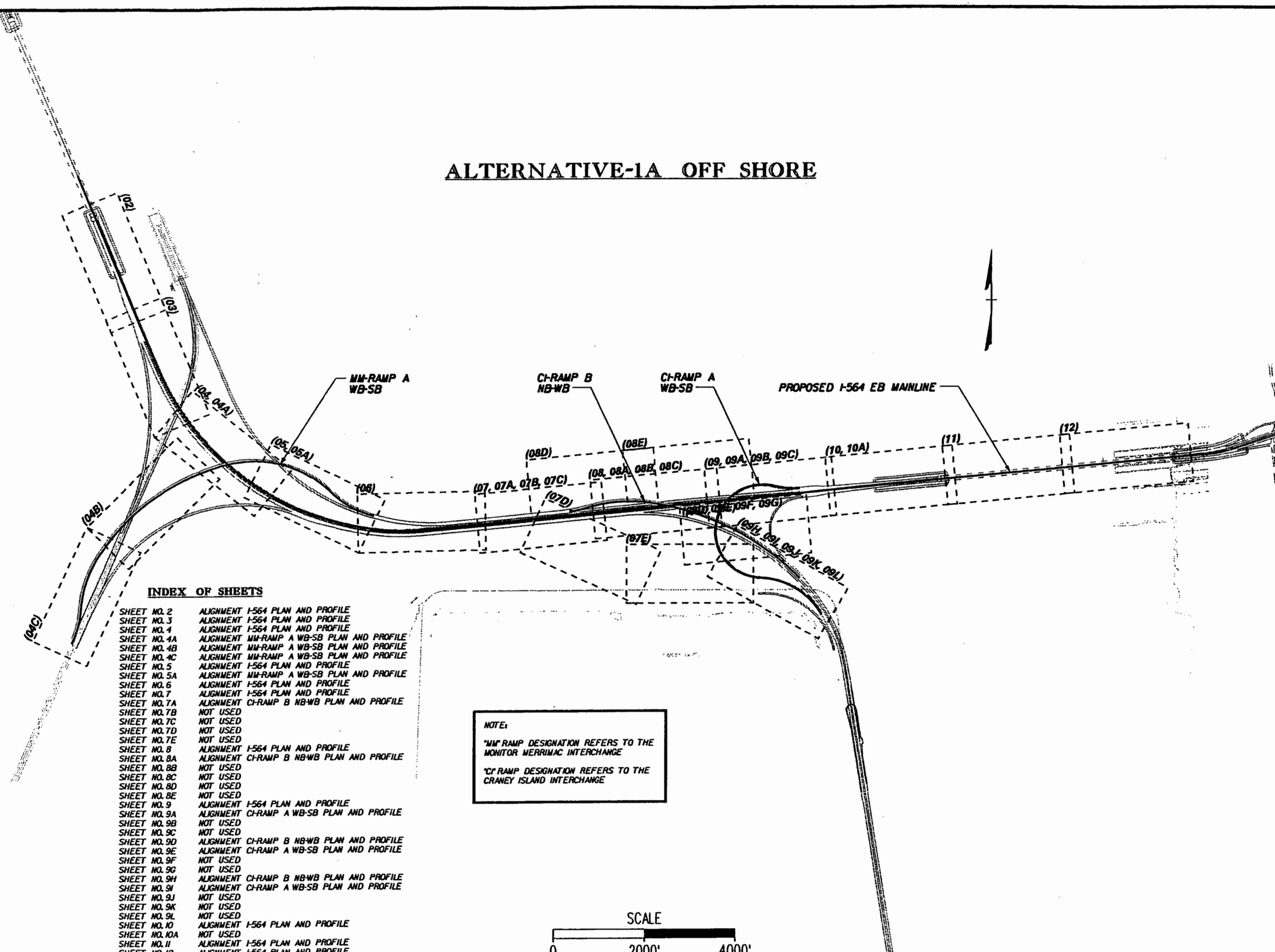
DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1
HOV/RAIL AND SOV ON SAME BRIDGE
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1-012

ALTERNATIVE-1A OFF SHORE



INDEX OF SHEETS

SHEET NO. 2	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 3	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 4	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 4A	ALIGNMENT MM-RAMP A WB-SB PLAN AND PROFILE
SHEET NO. 4B	ALIGNMENT MM-RAMP A WB-SB PLAN AND PROFILE
SHEET NO. 4C	ALIGNMENT MM-RAMP A WB-SB PLAN AND PROFILE
SHEET NO. 5	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 5A	ALIGNMENT MM-RAMP A WB-SB PLAN AND PROFILE
SHEET NO. 6	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 7	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 7A	ALIGNMENT CI-RAMP B NB-WB PLAN AND PROFILE
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SHEET NO. 7C	NOT USED
SHEET NO. 7D	NOT USED
SHEET NO. 7E	NOT USED
SHEET NO. 8	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 8A	ALIGNMENT CI-RAMP B NB-WB PLAN AND PROFILE
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SHEET NO. 9A	ALIGNMENT CI-RAMP A WB-SB PLAN AND PROFILE
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SHEET NO. 9C	NOT USED
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SHEET NO. 10A	NOT USED
SHEET NO. 11	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 12	ALIGNMENT I-564 PLAN AND PROFILE

NOTE:

"MM" RAMP DESIGNATION REFERS TO THE MONITOR MERRIMAC INTERCHANGE

"CI" RAMP DESIGNATION REFERS TO THE CRANEY ISLAND INTERCHANGE

PREPARED BY

PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.

MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A OFF SHORE

KEYMAP

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT1A-KEY

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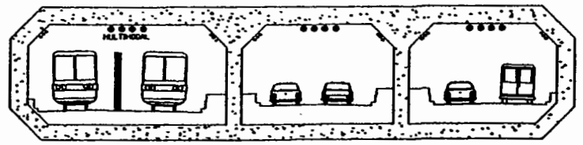

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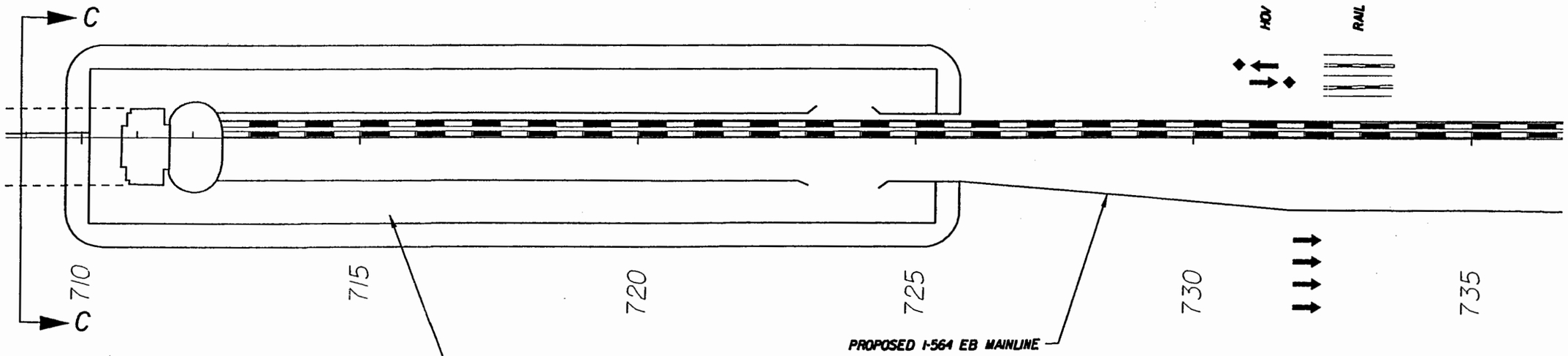
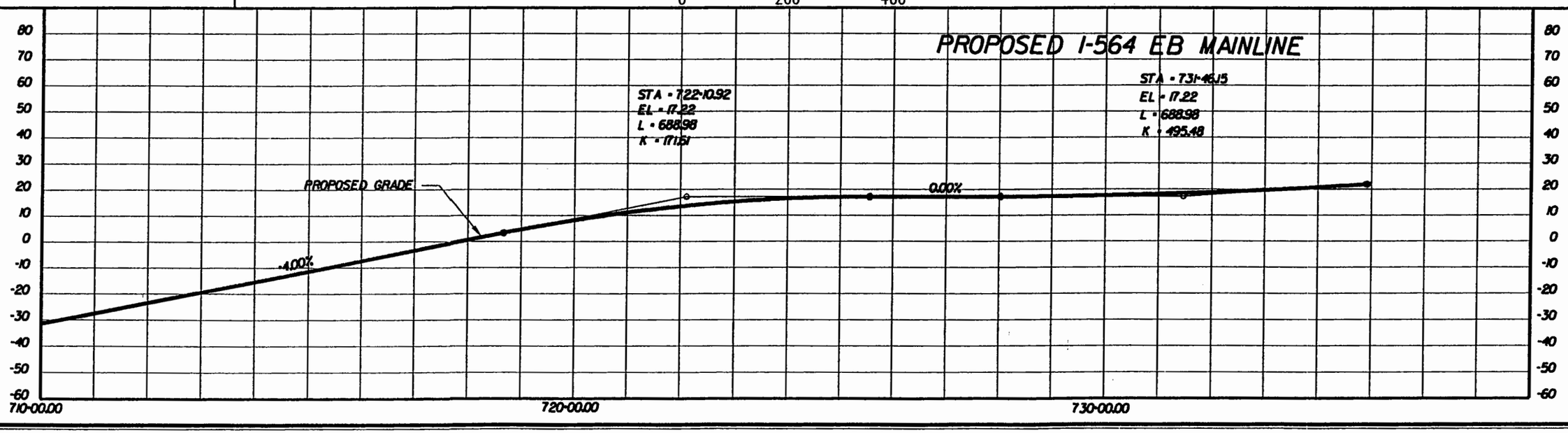


LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

SCALE

0 200' 400'



PREPARED BY

PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT-1A-002

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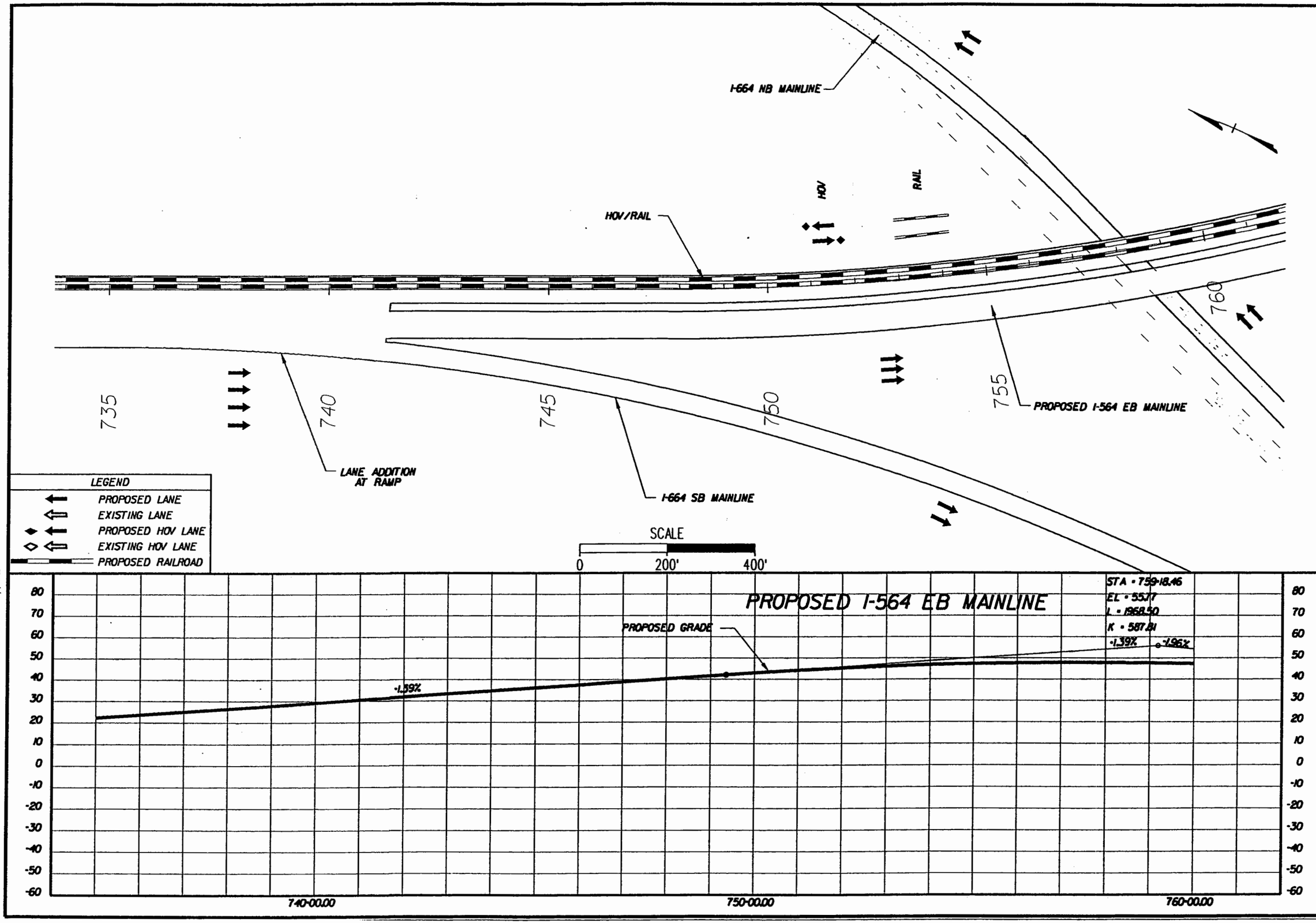
Date/Time = Mon Jul 14 12:49:02 2003



PREPARED BY
PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-003

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Date/Time = Mon Jul 11 12:49:10 2003

REFER TO
TYPICAL SECTION
SECTION A PAGE IC

PROPOSED I-564
WB MAINLINE

MM-RAMP A
WB-SB

HOV

RAIL

HOV/RAIL

A

A

I-664 NB MAINLINE

PROPOSED I-564
EB MAINLINE

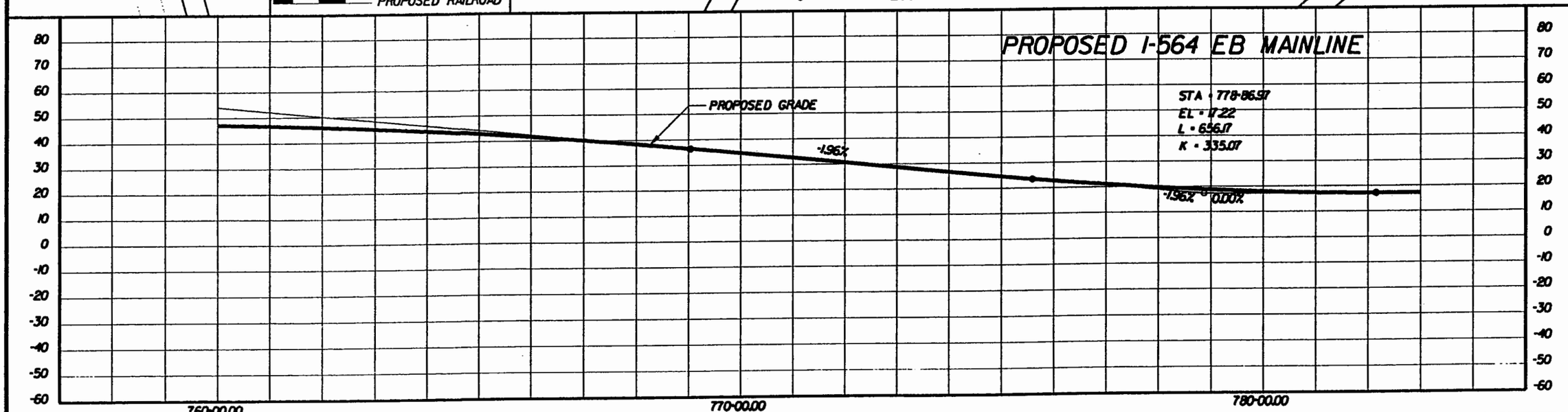
MM-RAMP
NB-EB

760 765 770 775 780 785

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

SCALE
0 200' 400'



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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-004

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REFER TO
TYPICAL SECTION
SECTION A PAGE IC

PROPOSED I-564 WB MAINLINE

MM-RAMP A WB-SB

HOV/RAIL

HOV

RAIL

A

A

INTERSTATE ROUTE 664 NBL

INTERSTATE ROUTE 664 SBL

I-664 NB MAINLINE

PROPOSED I-564 EB MAINLINE

MM-RAMP NB-EB

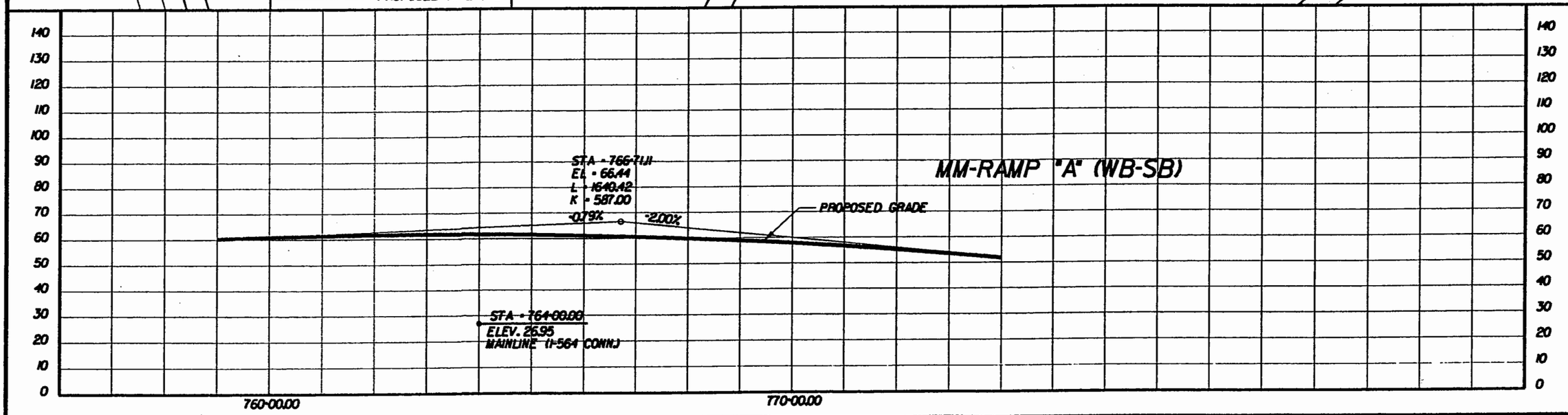
710 760 765 770 775 780 785

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

SCALE

0 200' 400'



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DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-004A

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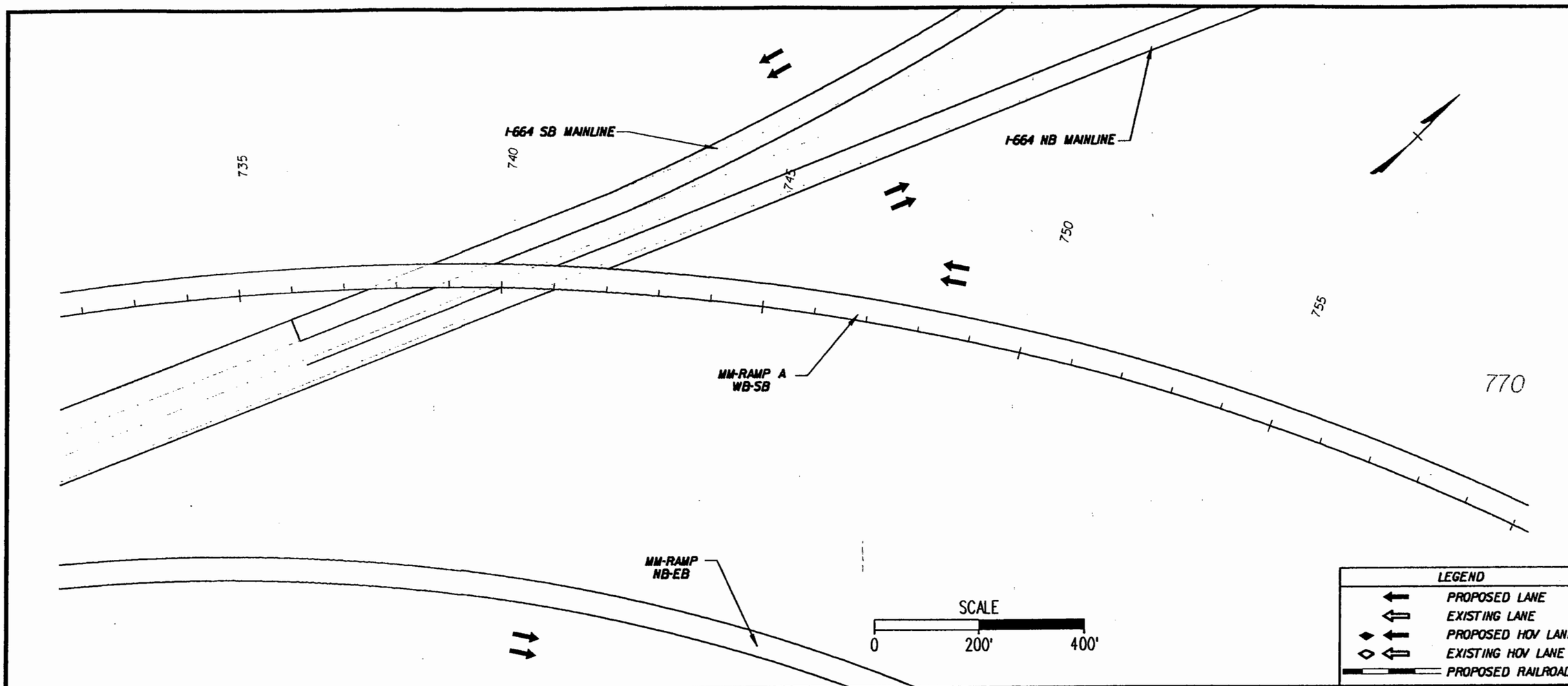

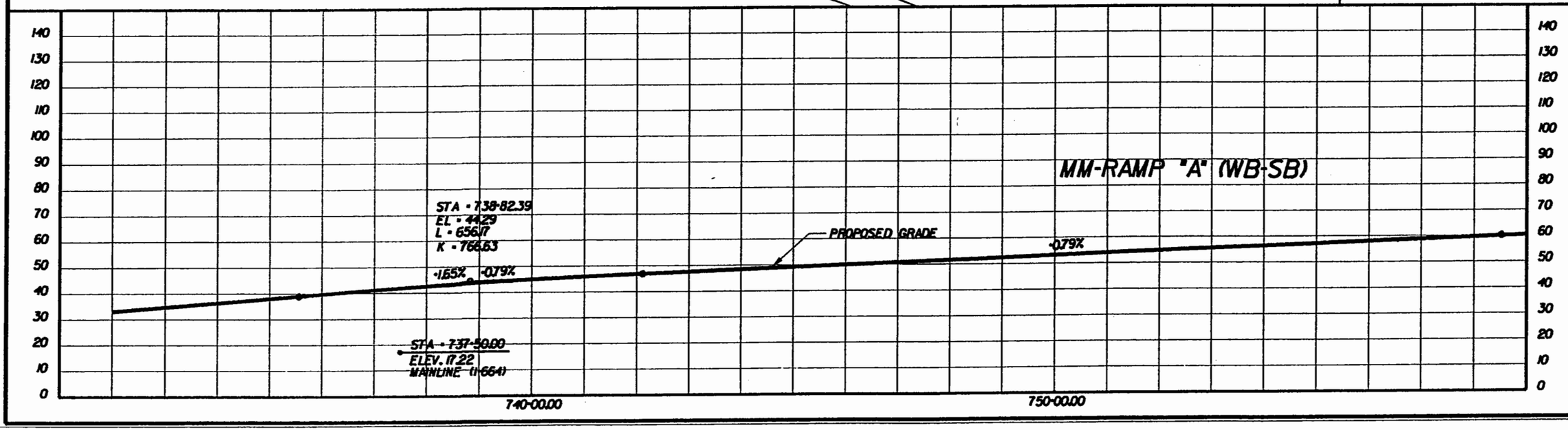

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DESIGN	AAA	DATE	DATE
DRWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-004B

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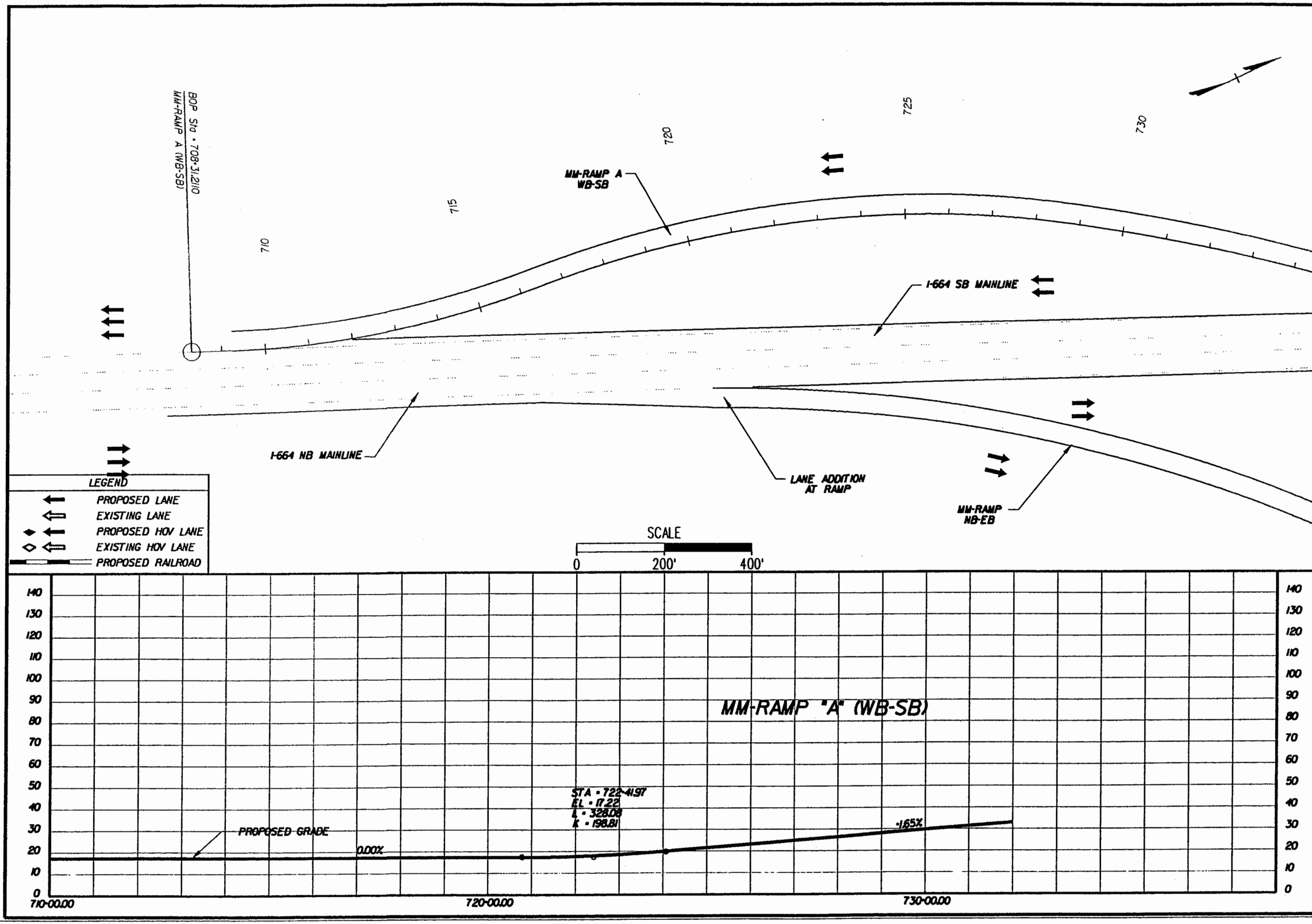

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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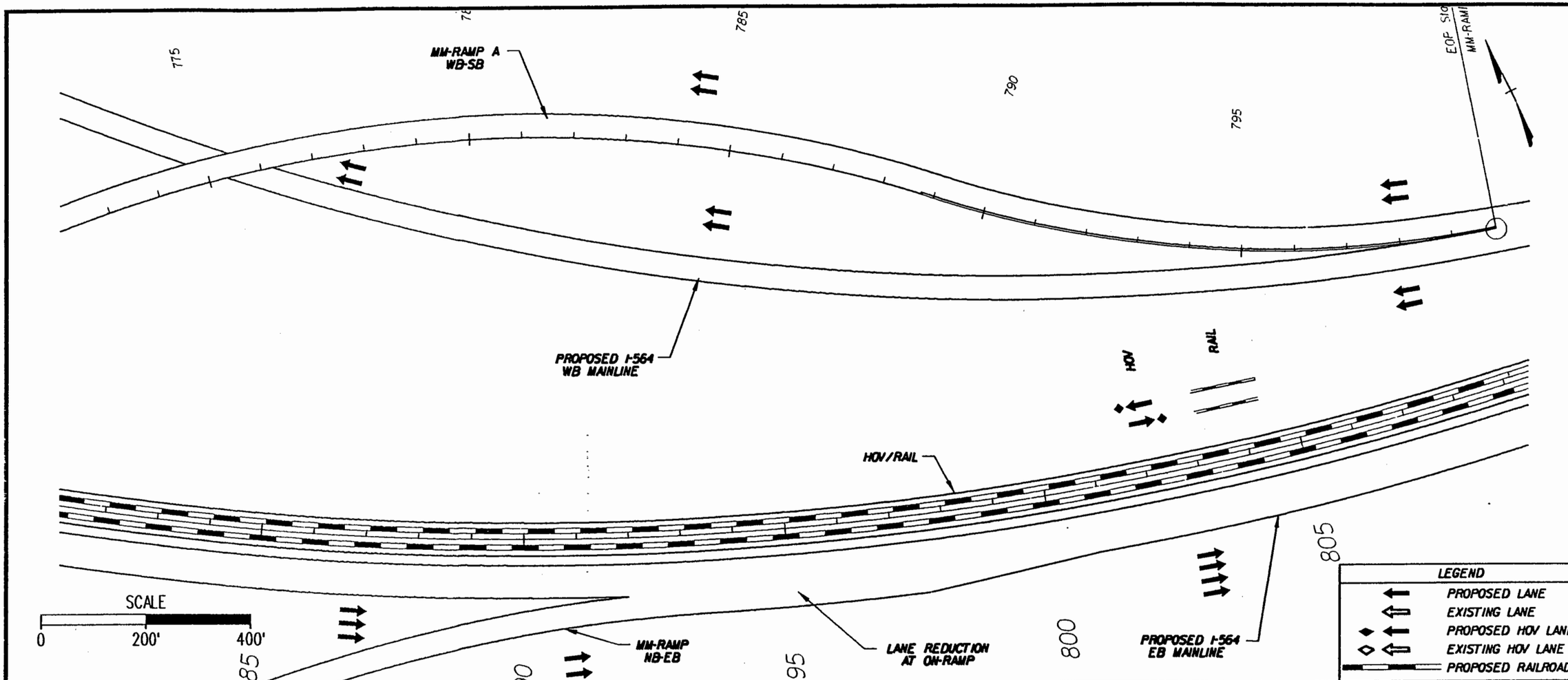

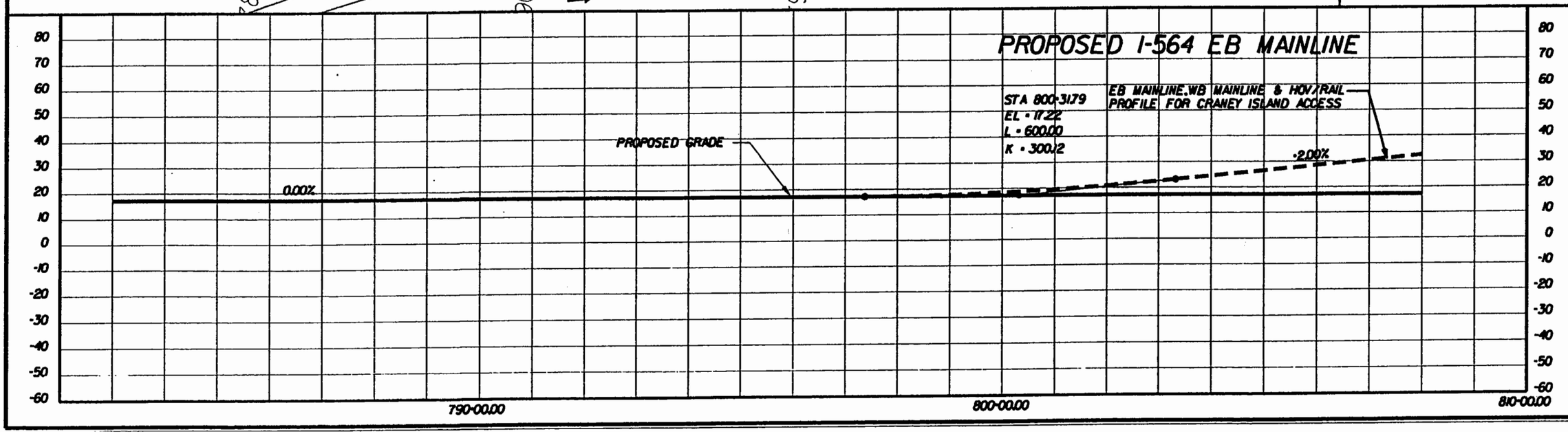

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-005

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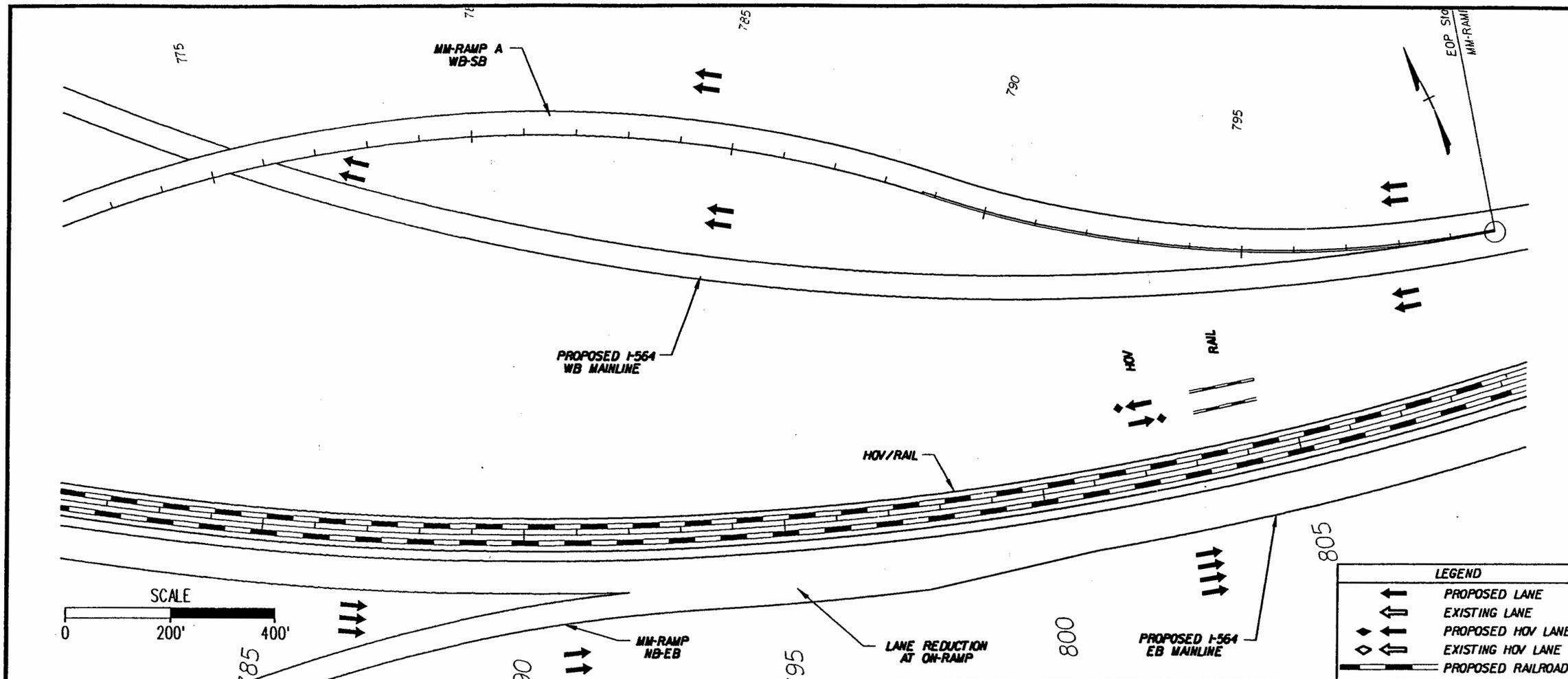

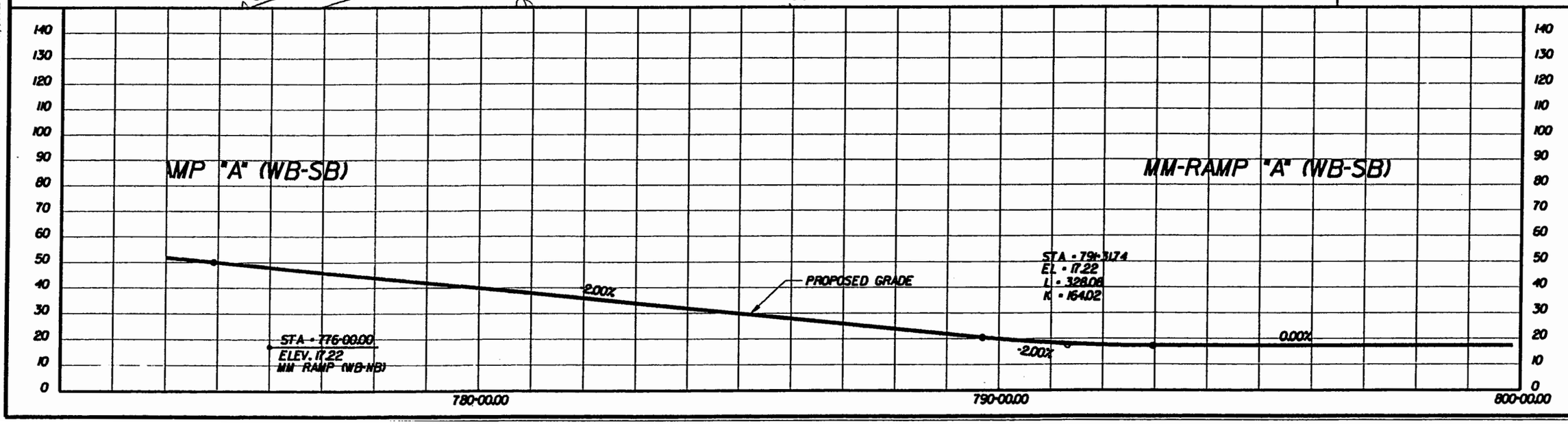

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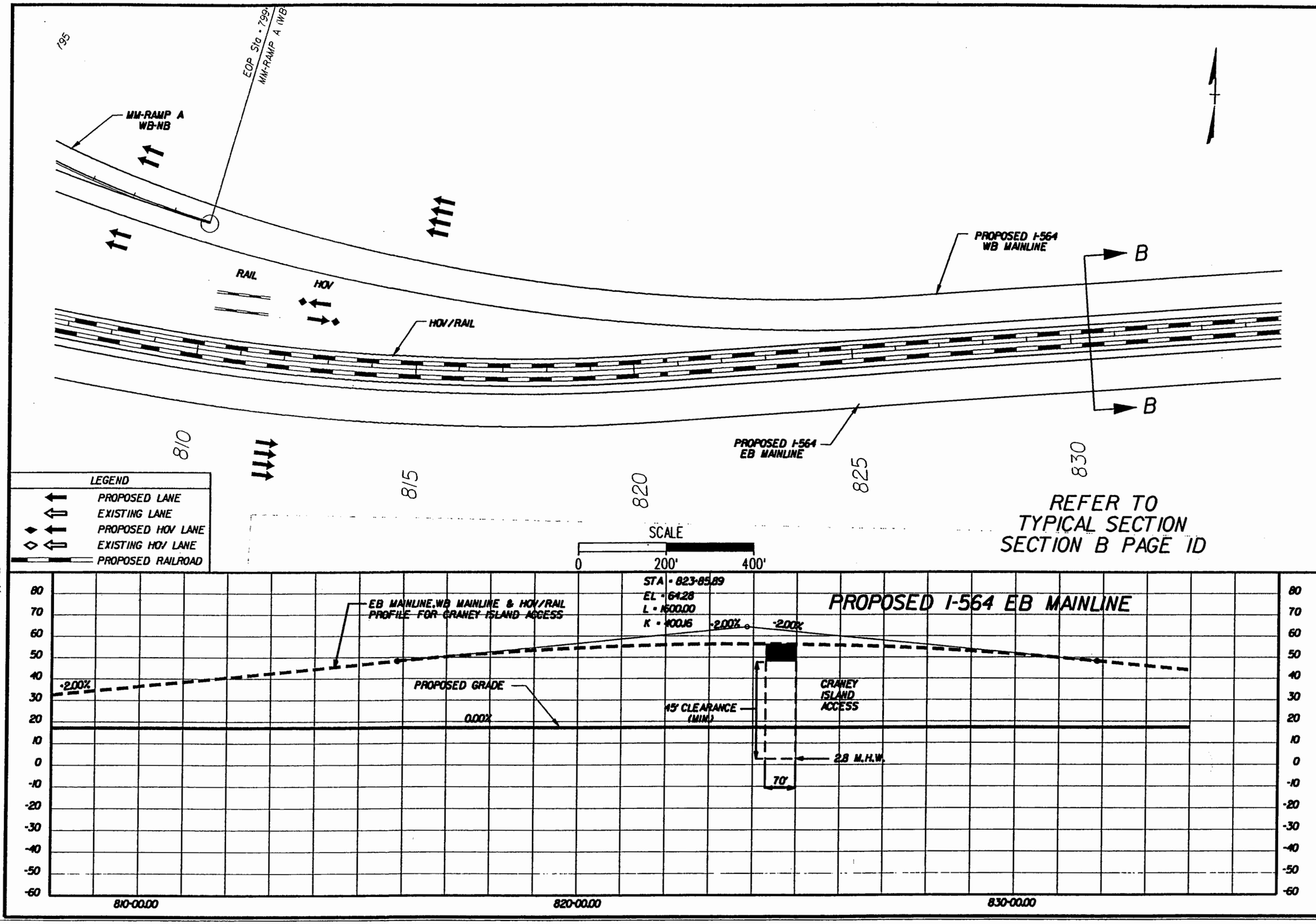
DESIGN	AAA	DATE	
DRAWN	BBB	DATE	
CHCK	CCC	DATE	
APPR		DATE	

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-005A



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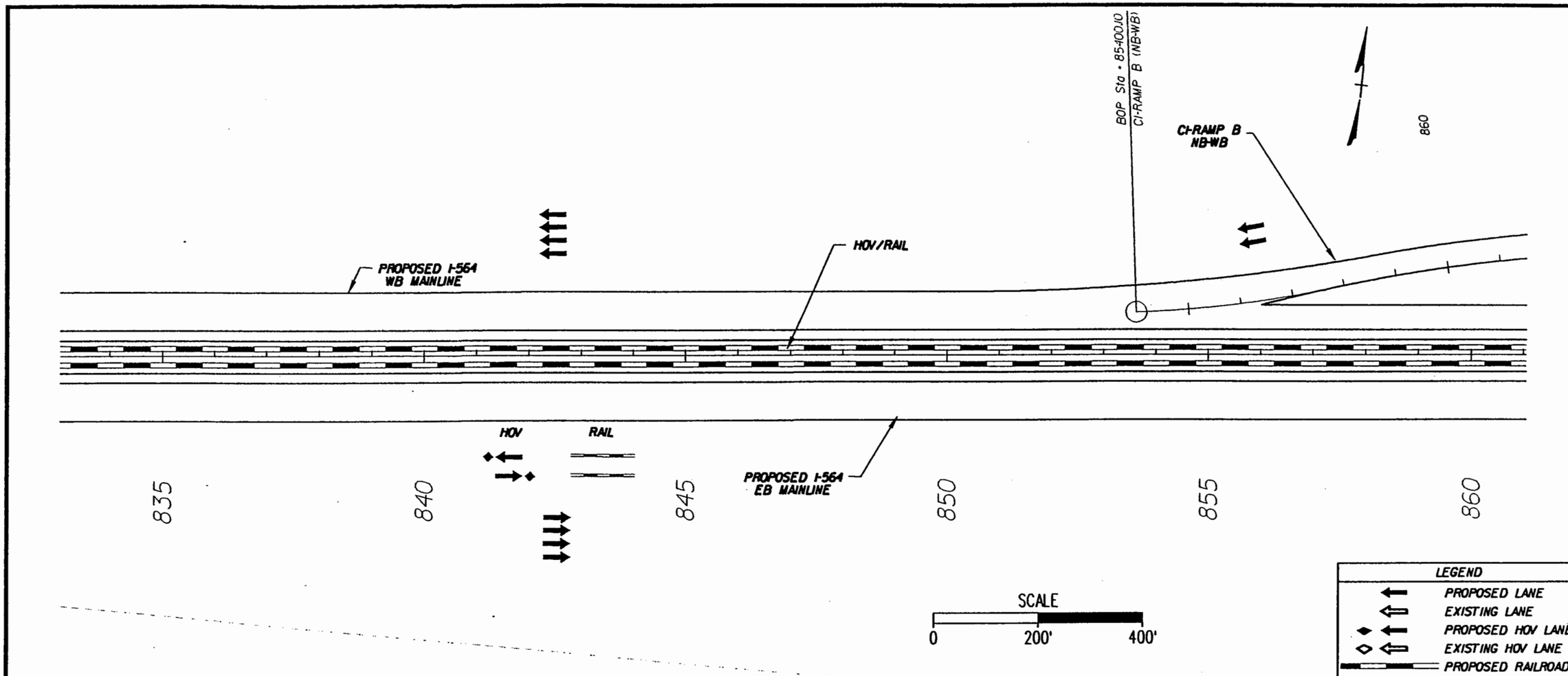
DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

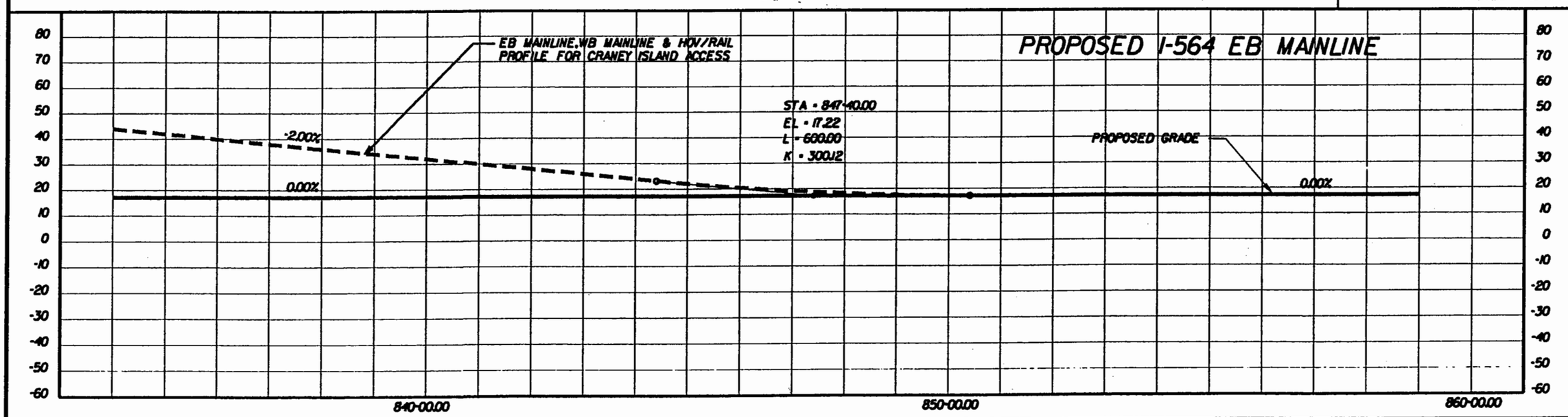
ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT-1A-006





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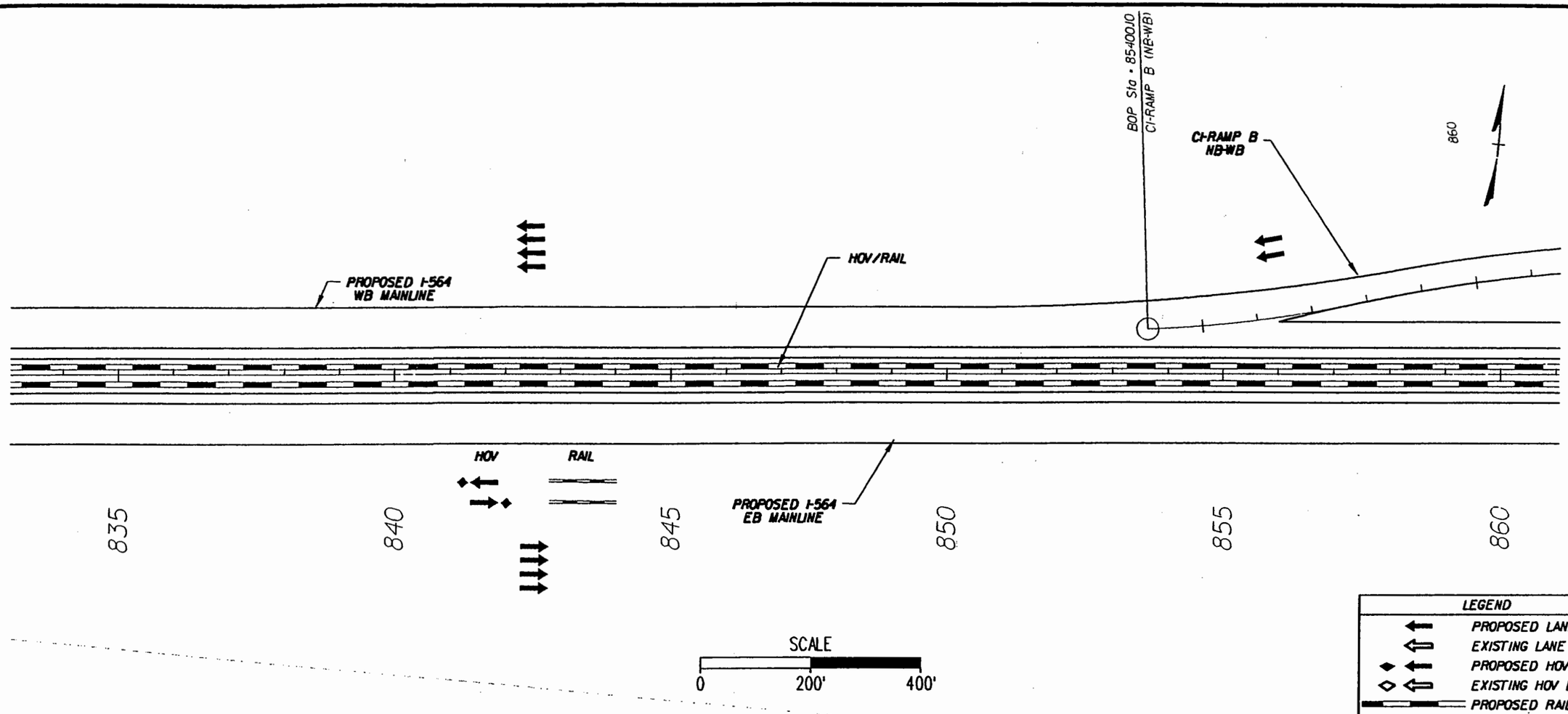
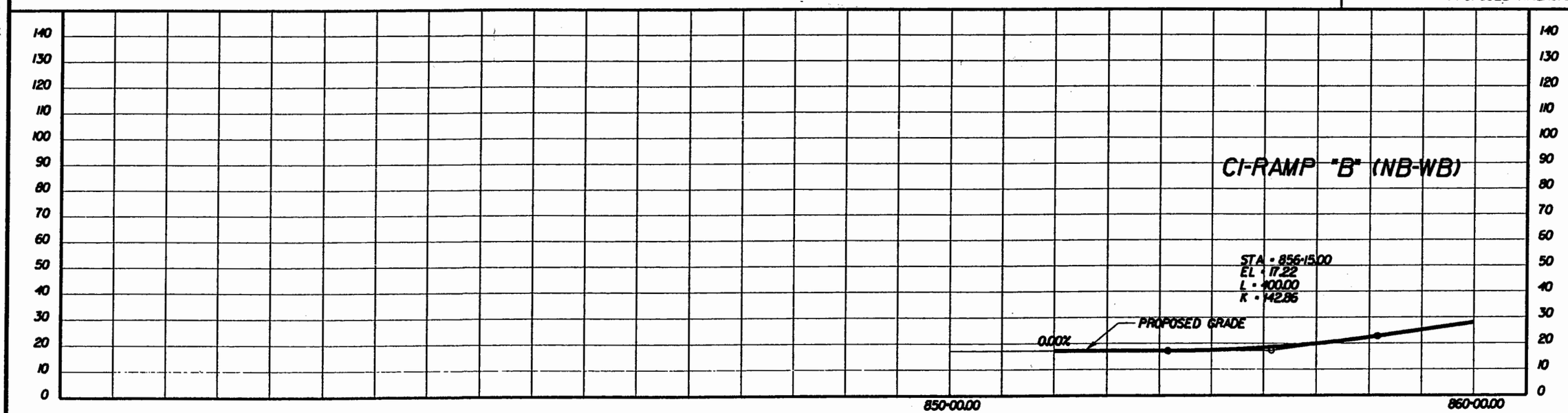
DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-007





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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-007A

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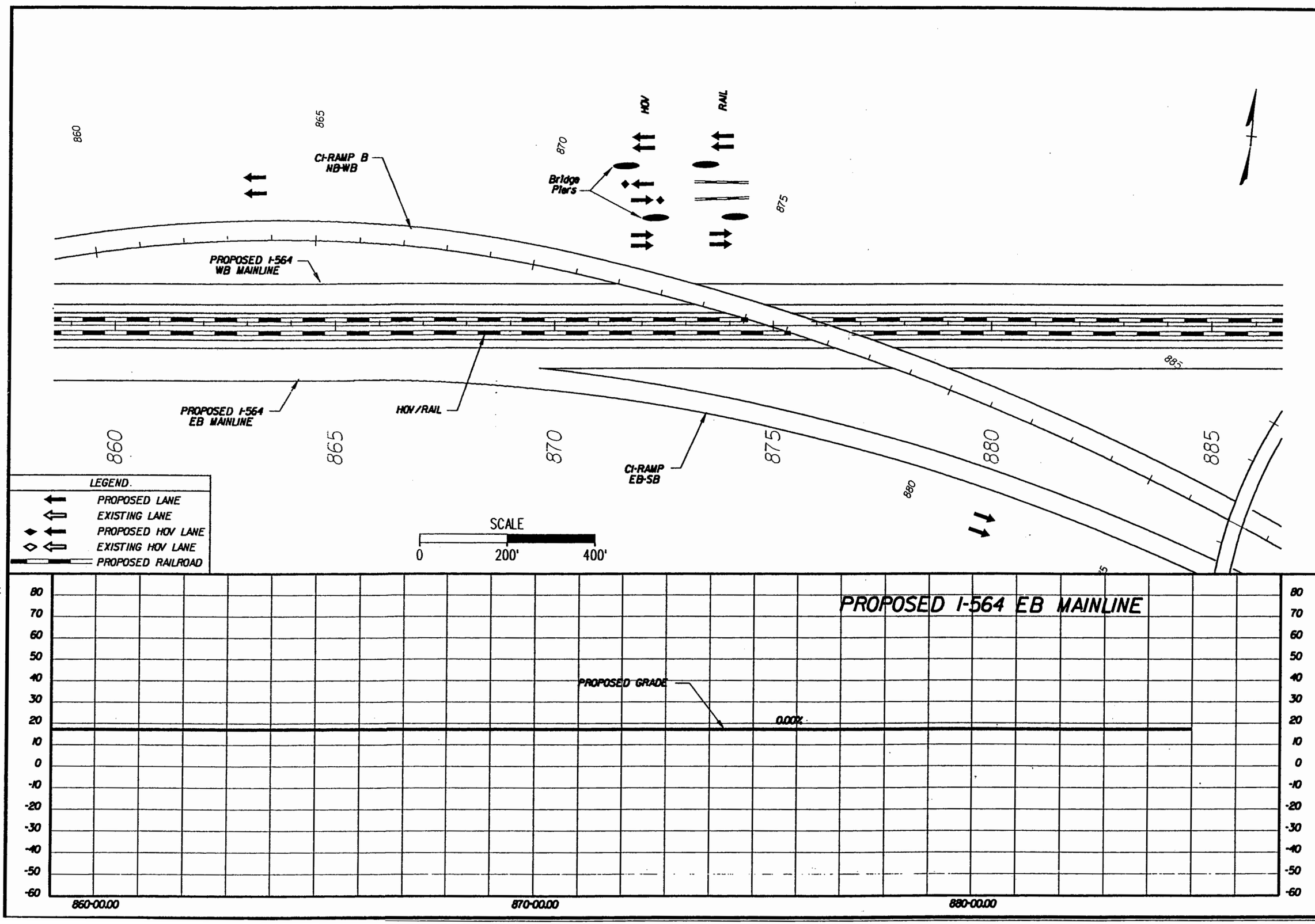

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QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHCK	CCC	DATE
APPR		DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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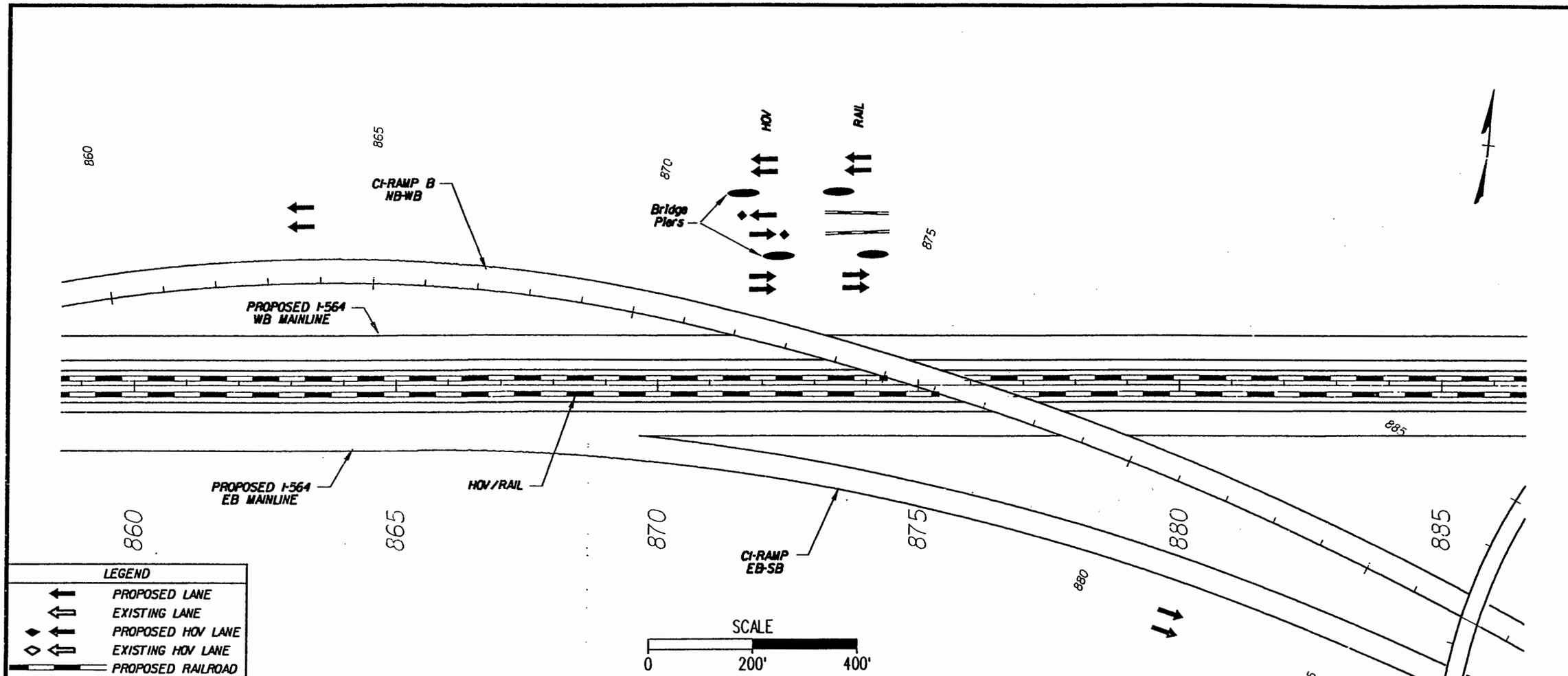

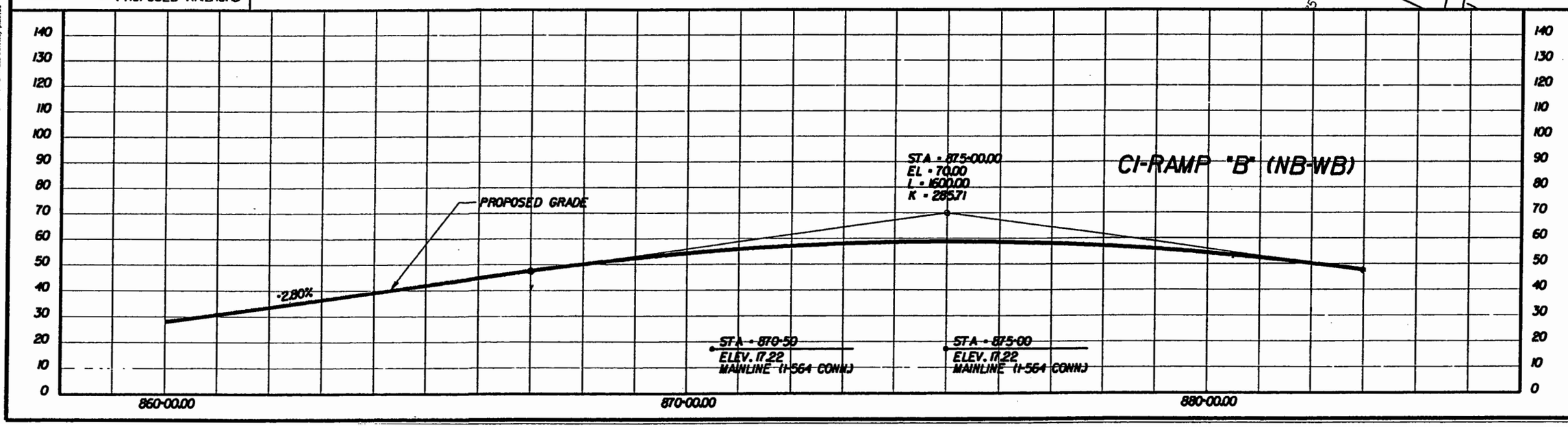

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DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHCK	CCC	DATE
APPR		DATE

ALTERNATIVE-1A

I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT-1A-008A

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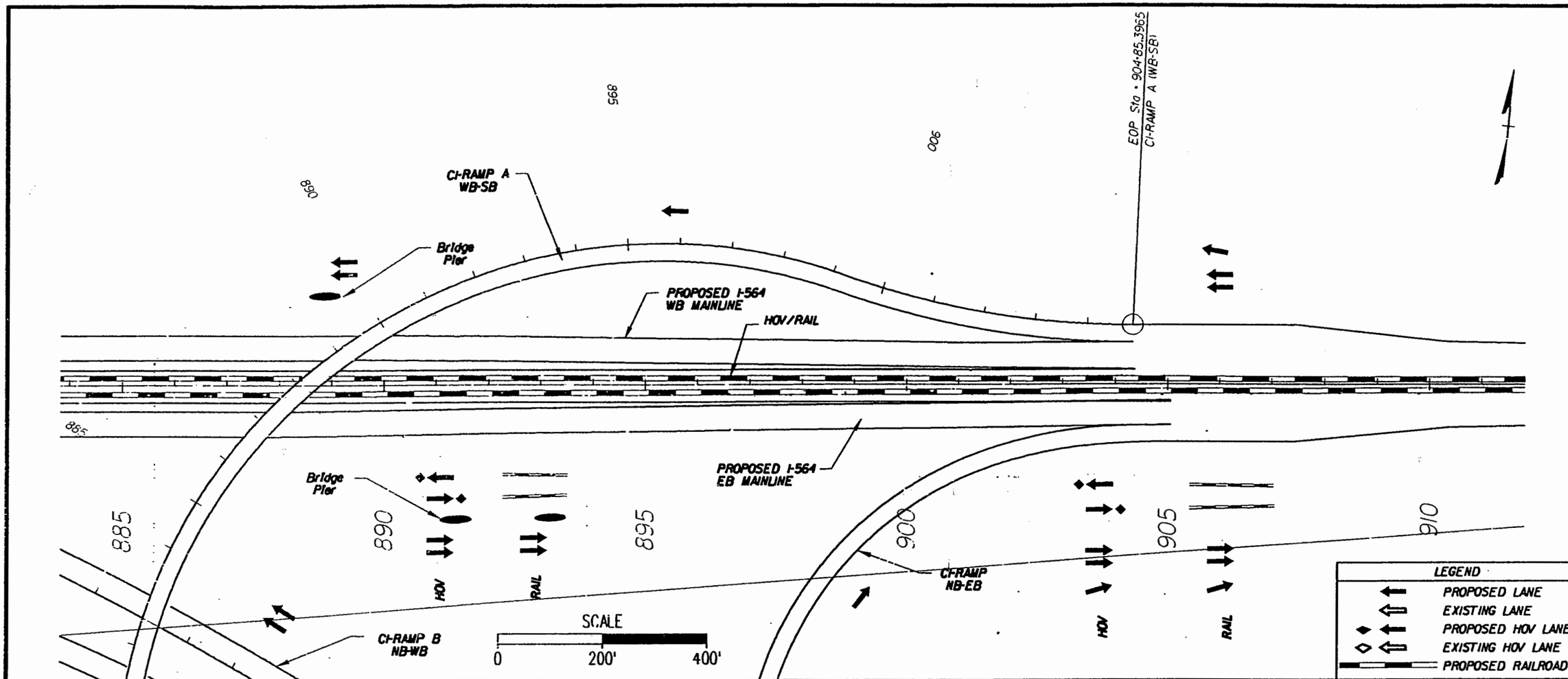

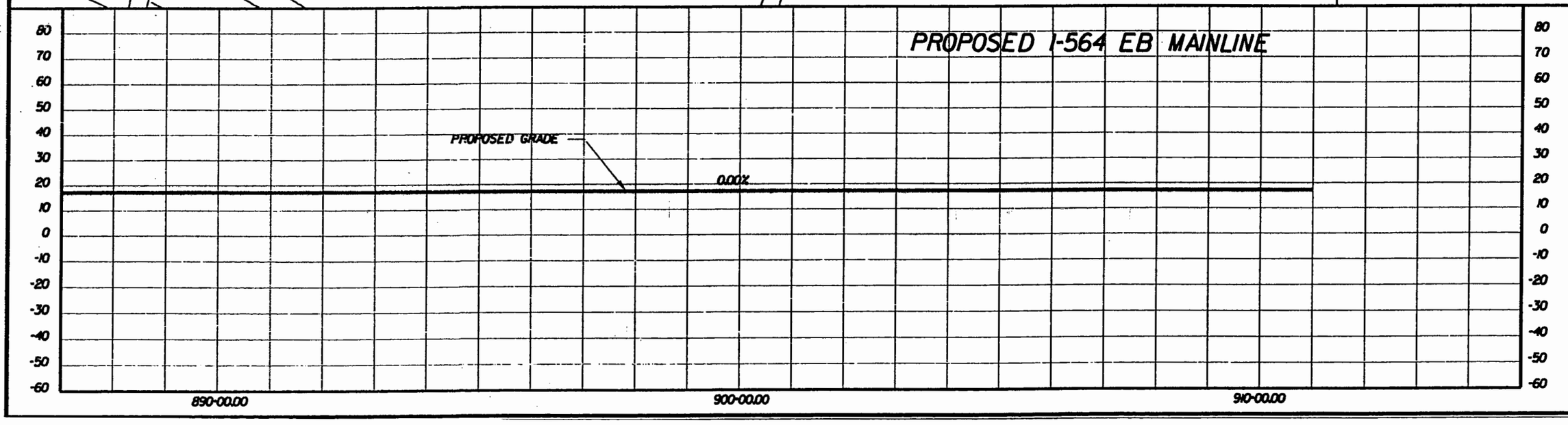

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MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHCK	CCC	DATE
APPR		DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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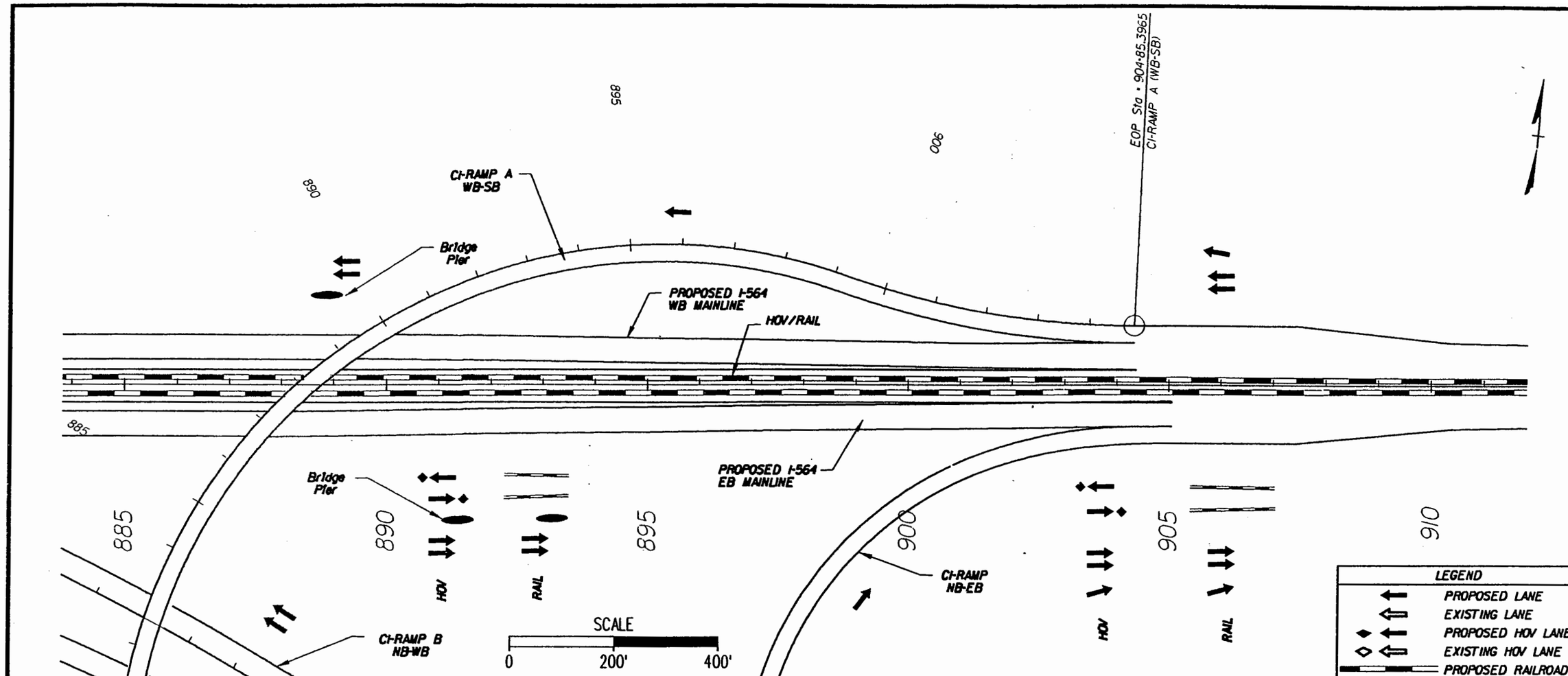

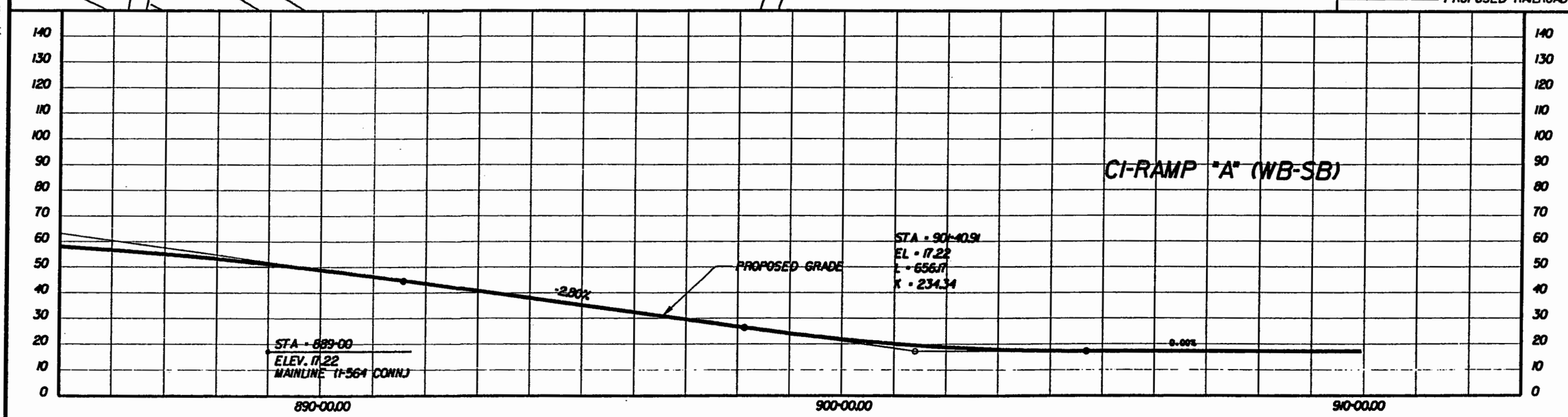

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MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-009A

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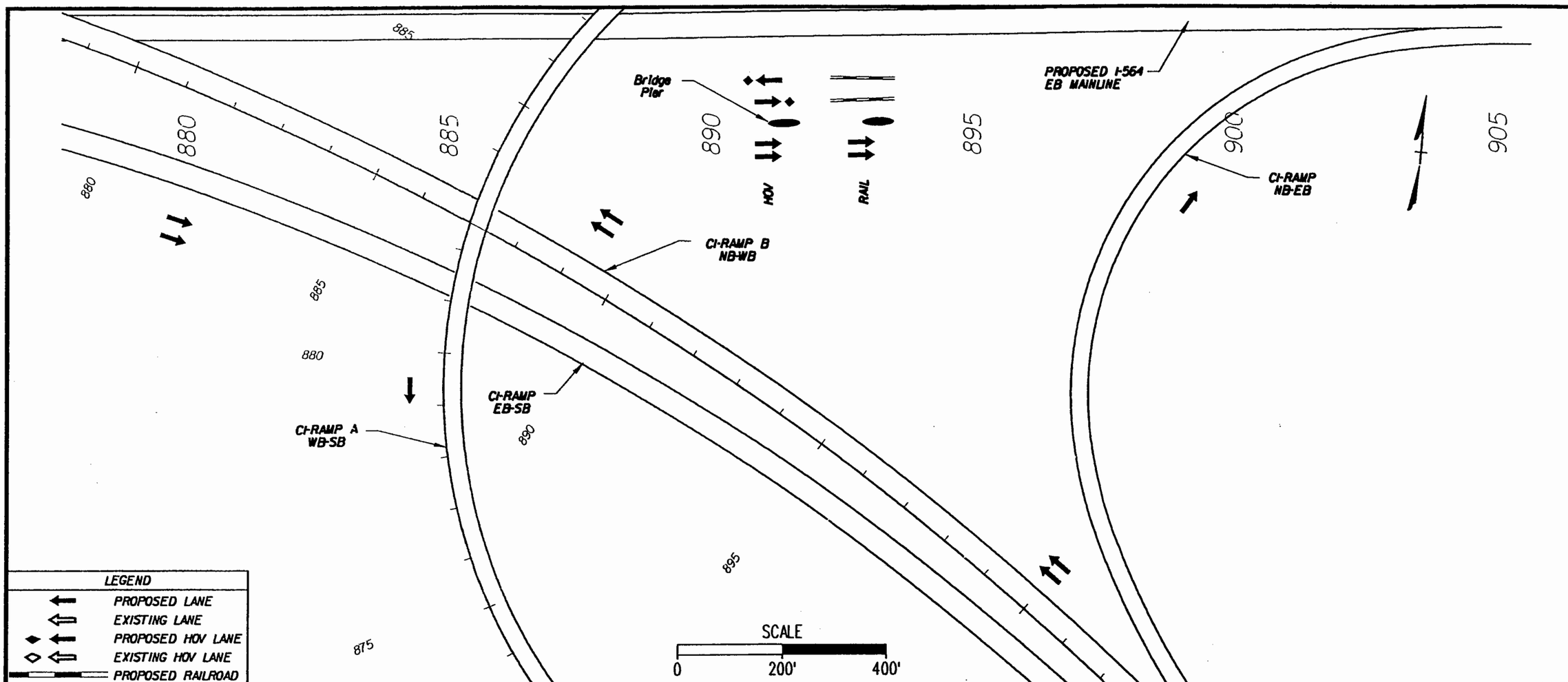

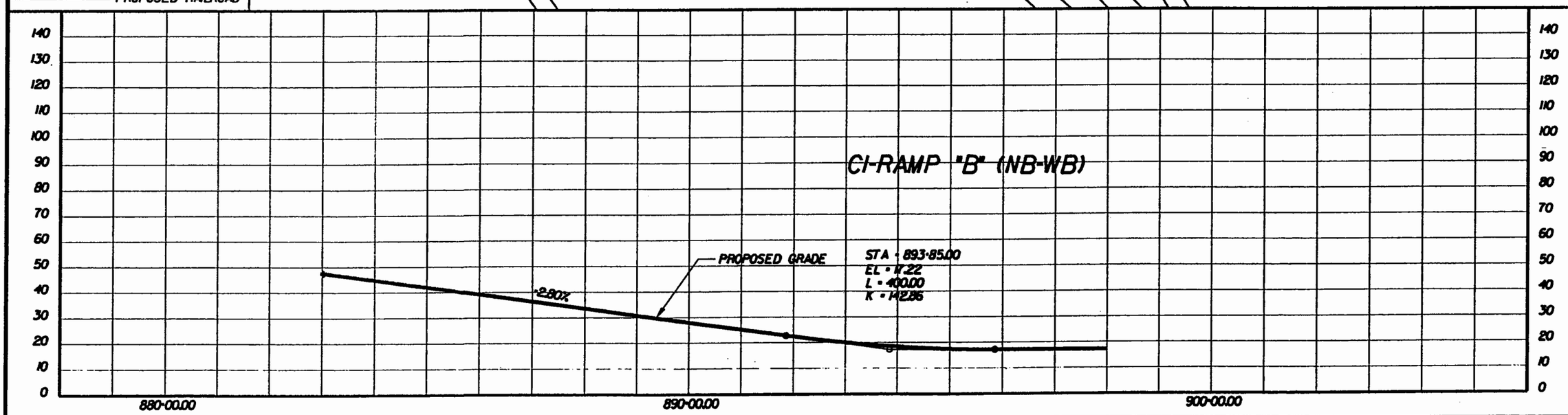

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MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHECK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-009D

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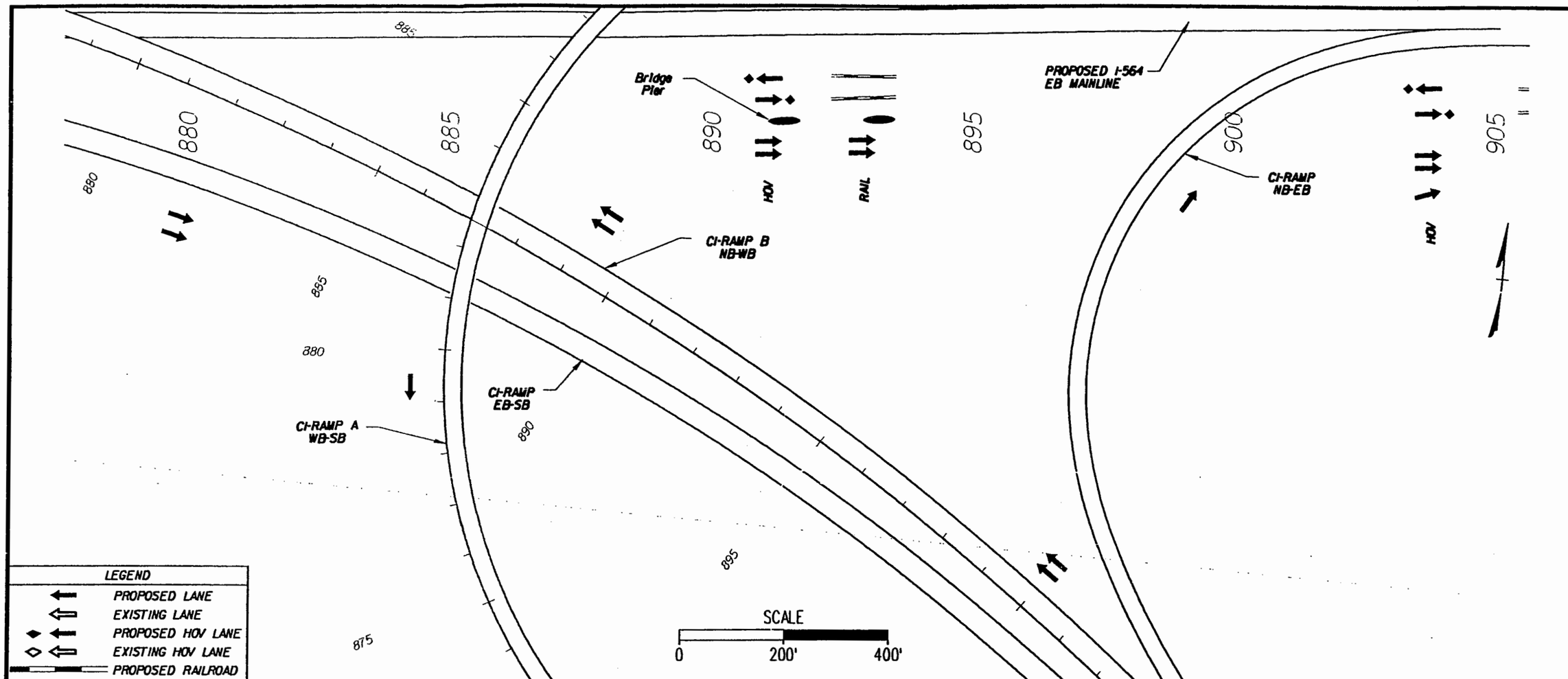

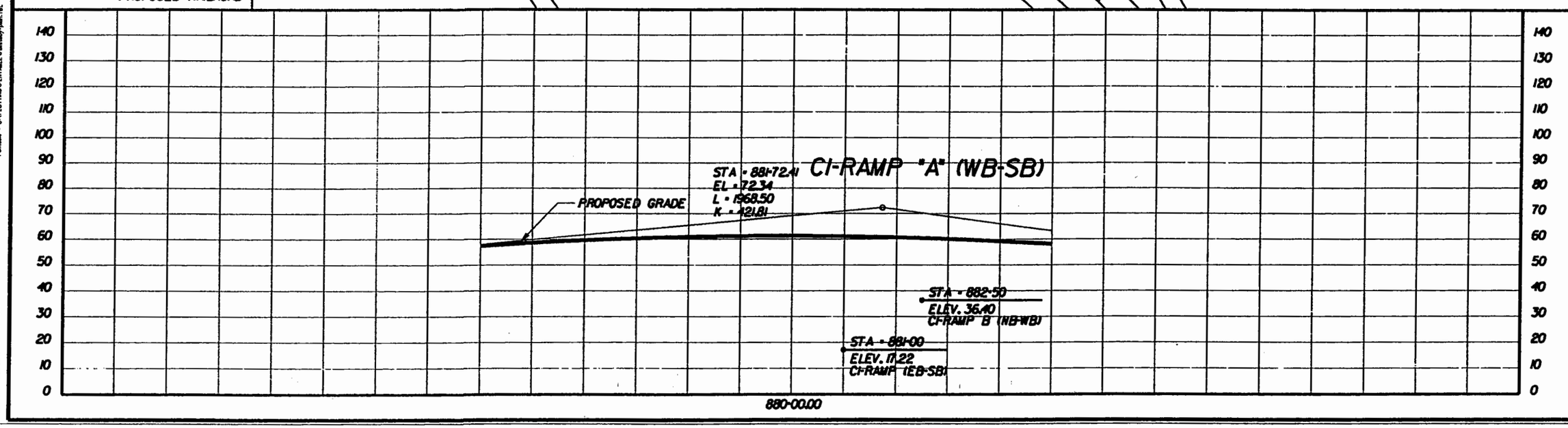

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MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHKD	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-009E

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Date/Time = Mon Jul 14 12:47:07 2003

CI-RAMP NB-EB

CI-RAMP B NB-WB

CI-RAMP EB-SB

CI-RAMP A WB-SB

895

900

905

860

855

850

865

870

RELOCATED LOCAL ROAD ON CRANEY ISLAND

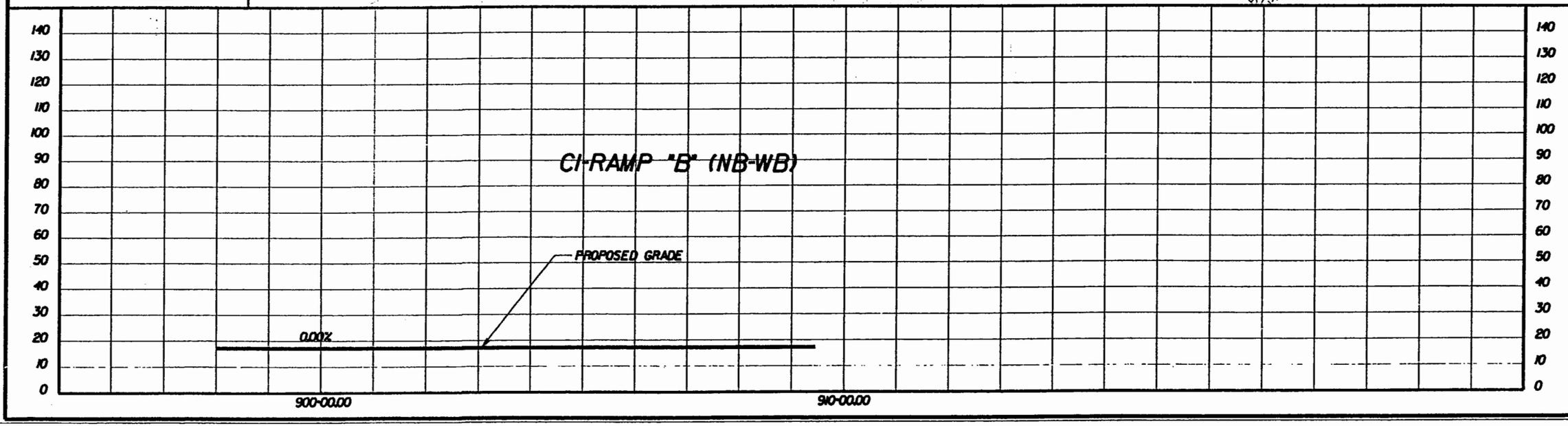
POP Sta = 848+09.5500
CI-RAMP A (WB-SB)

SCALE

0 200' 400'

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD



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MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHECK	CCC	DATE
APPR		DATE

ALTERNATIVE-1A

I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

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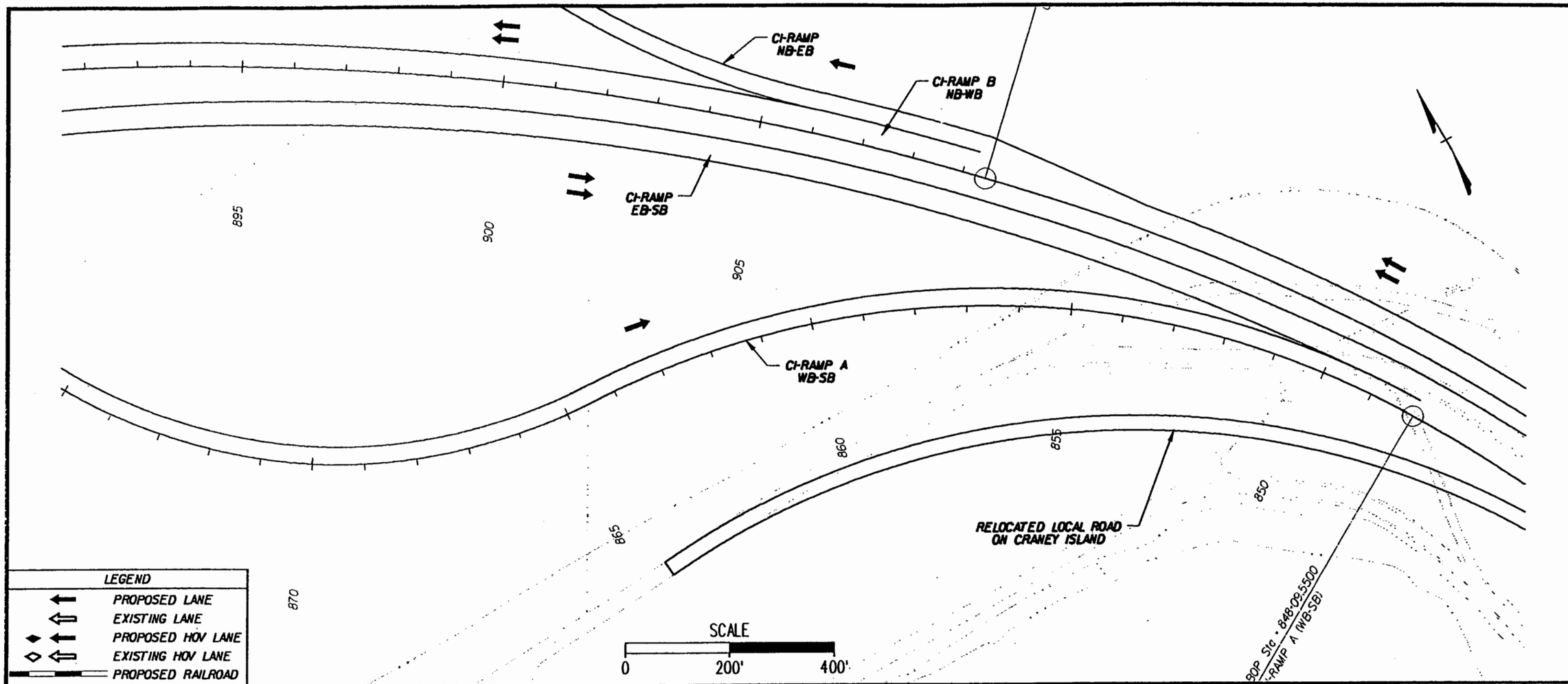

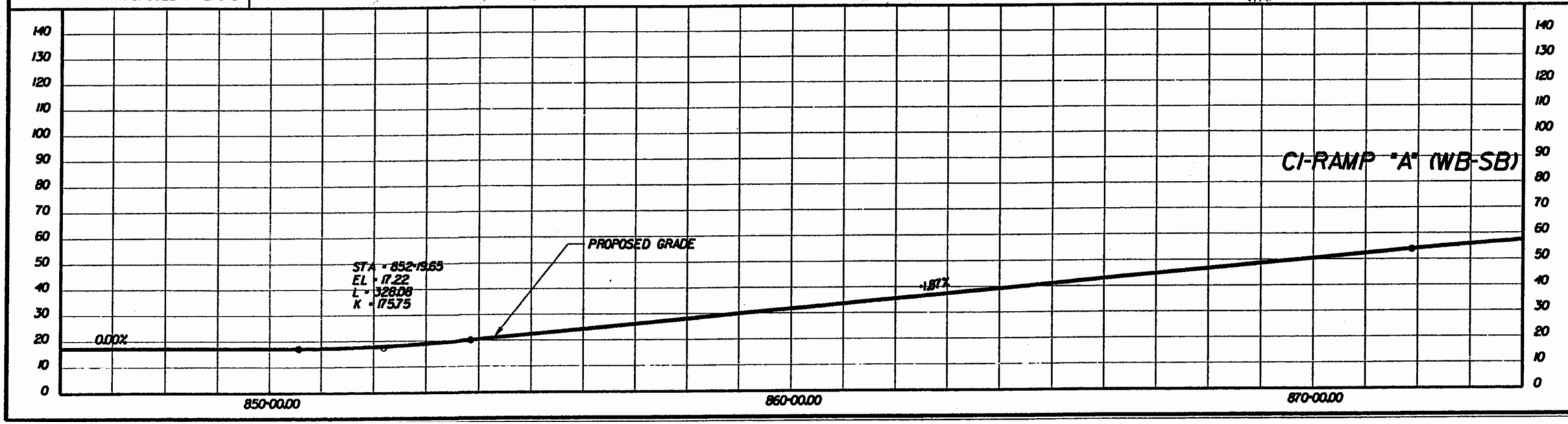

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DESIGN	DRAWN	CHCK	PM
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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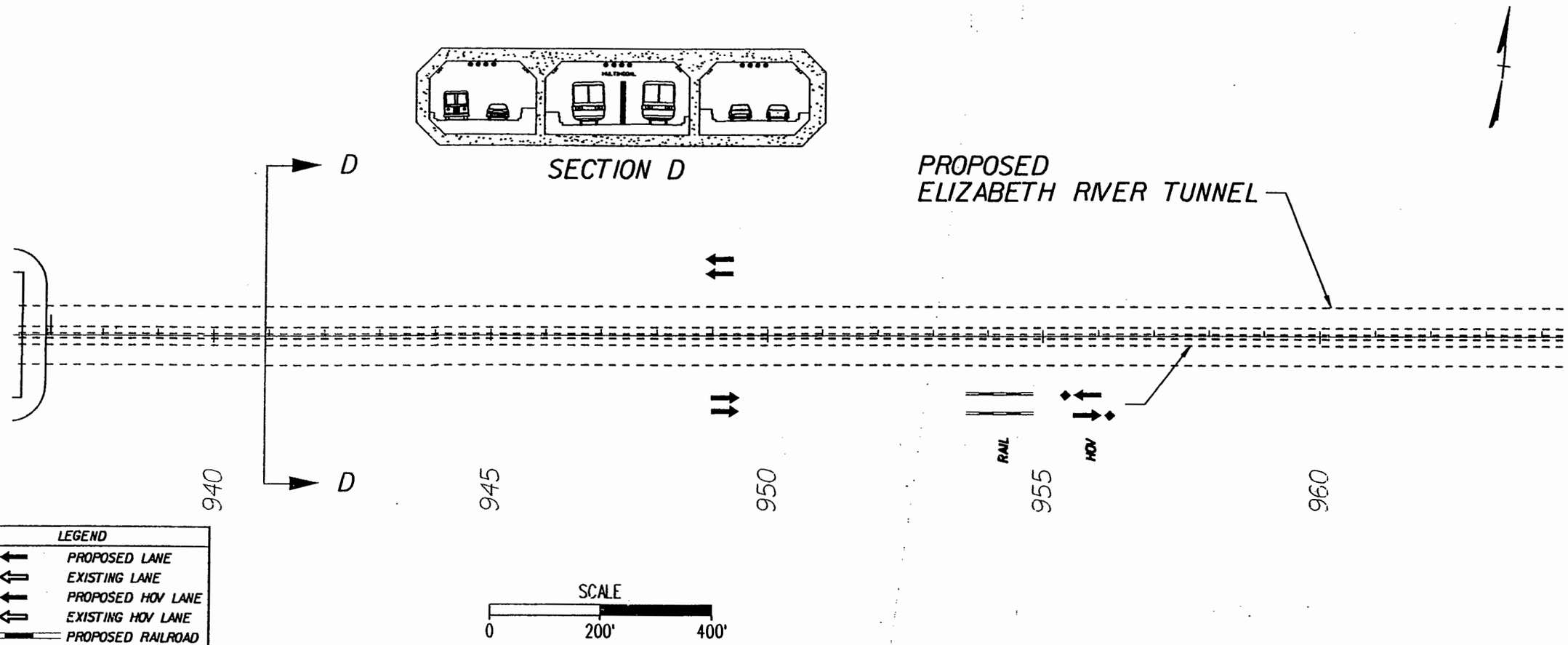

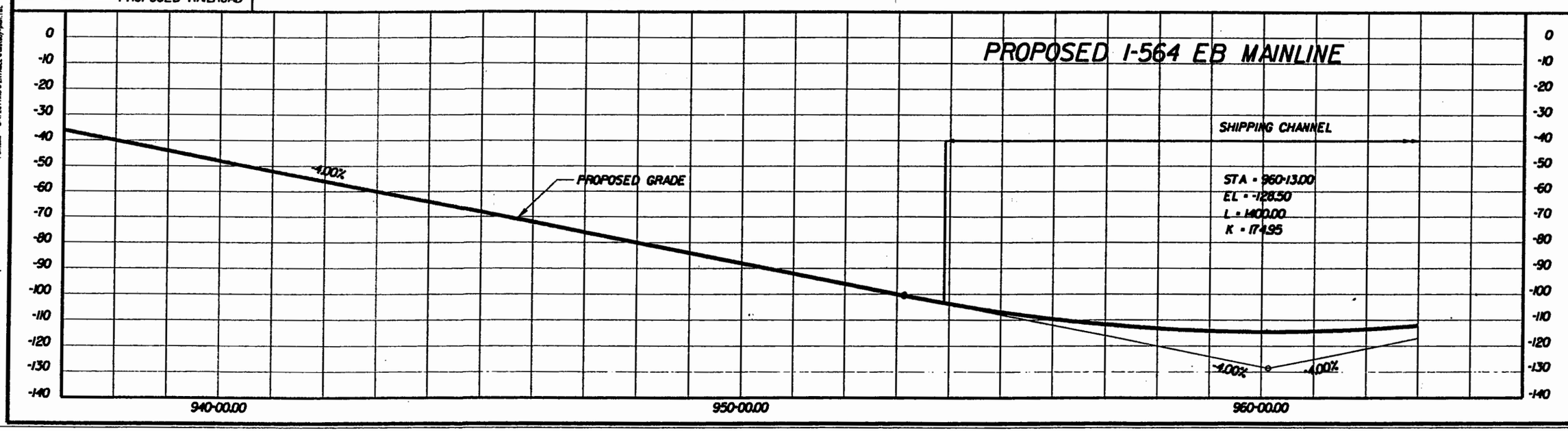

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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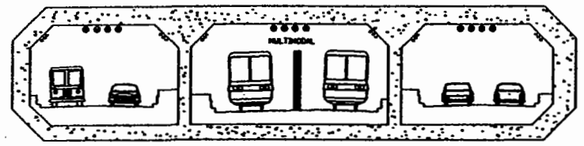

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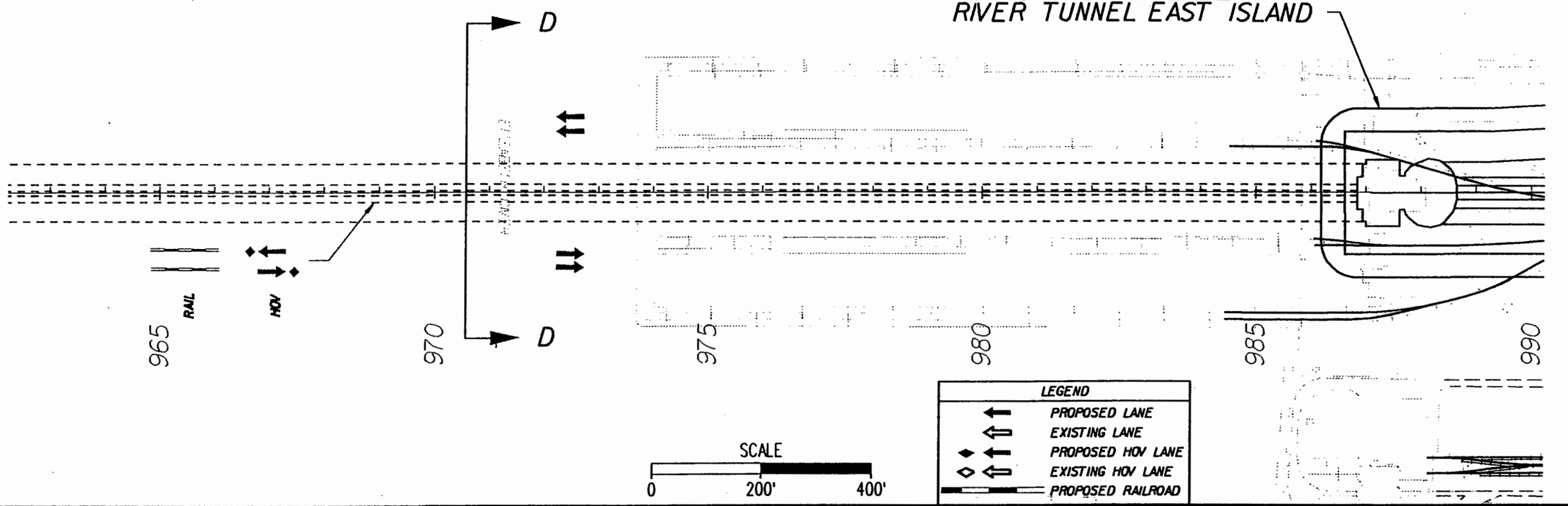

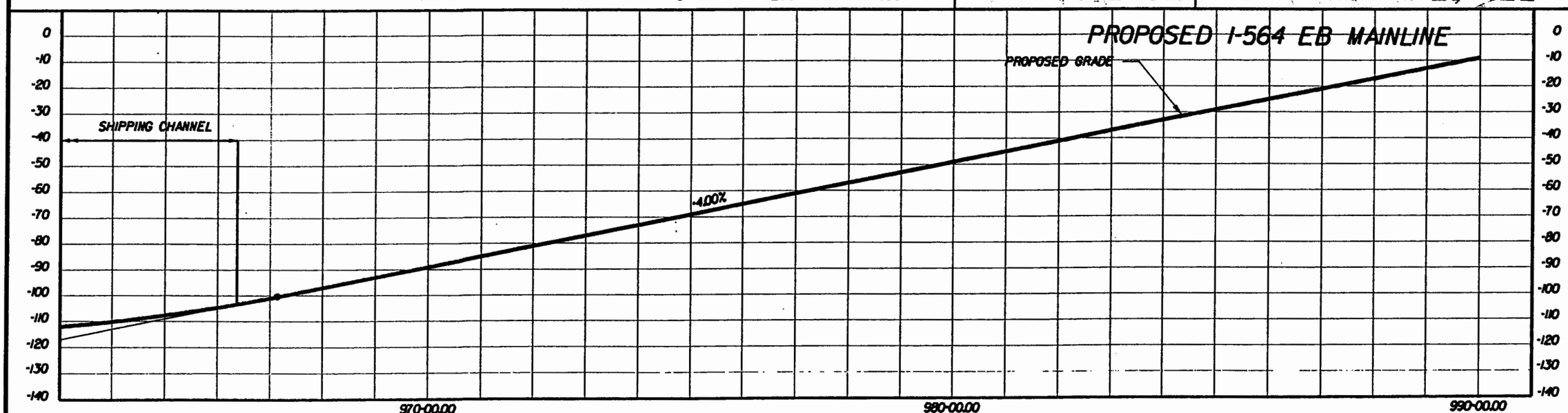

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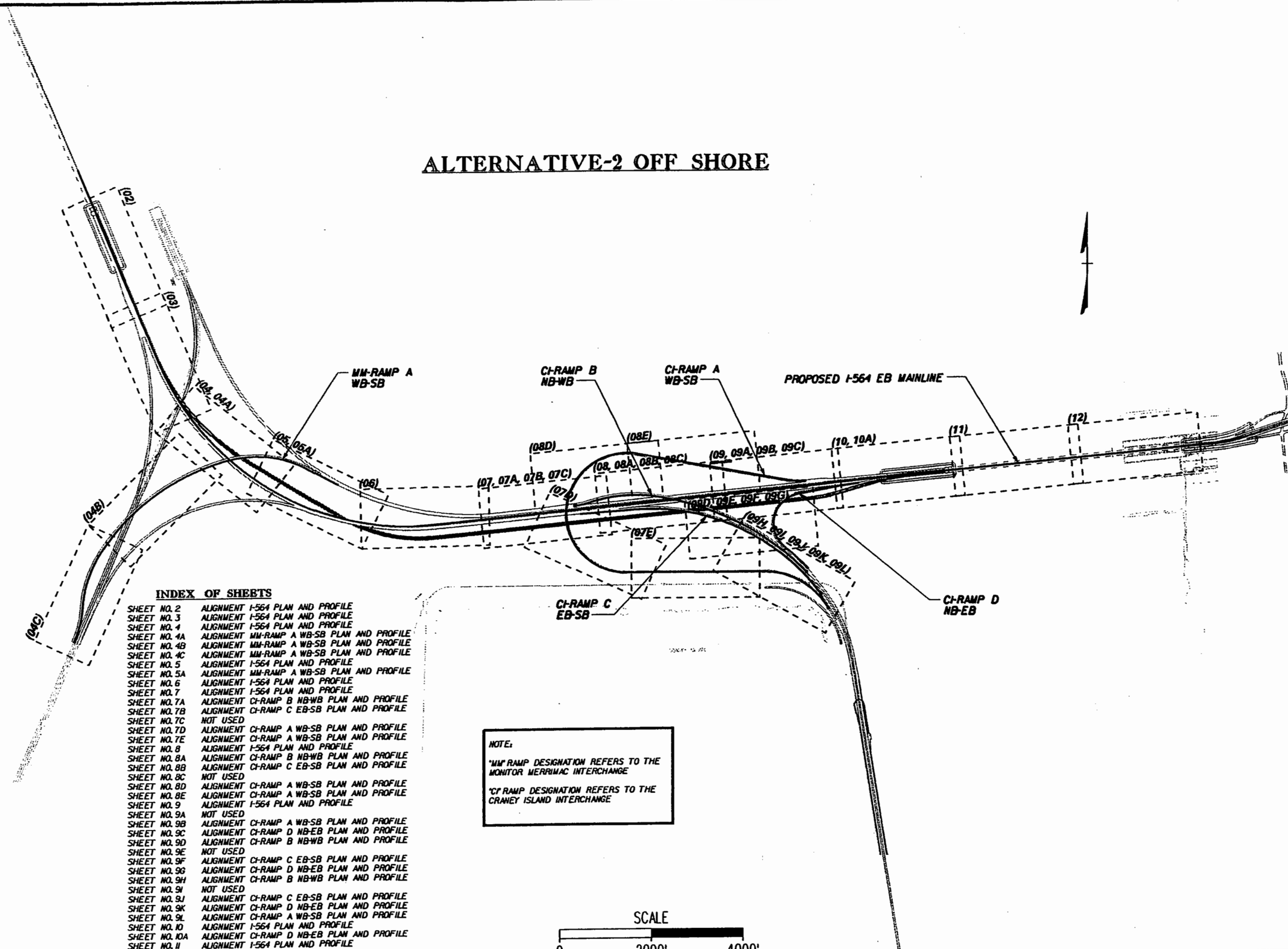
DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
I-564 EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-012

ALTERNATIVE-2 OFF SHORE



INDEX OF SHEETS

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SHEET NO. 4	ALIGNMENT I-564 PLAN AND PROFILE
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SHEET NO. 4B	ALIGNMENT MM-RAMP A WB-SB PLAN AND PROFILE
SHEET NO. 4C	ALIGNMENT MM-RAMP A WB-SB PLAN AND PROFILE
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SHEET NO. 7B	ALIGNMENT CI-RAMP C EB-SB PLAN AND PROFILE
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SHEET NO. 7D	ALIGNMENT CI-RAMP A WB-SB PLAN AND PROFILE
SHEET NO. 7E	ALIGNMENT CI-RAMP A WB-SB PLAN AND PROFILE
SHEET NO. 8	ALIGNMENT I-564 PLAN AND PROFILE
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SHEET NO. 12	ALIGNMENT I-564 PLAN AND PROFILE

NOTE:

"MM" RAMP DESIGNATION REFERS TO THE MONITOR MERRIMAC INTERCHANGE

"CI" RAMP DESIGNATION REFERS TO THE CRANEY ISLAND INTERCHANGE

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2 OFF SHORE
KEYMAP

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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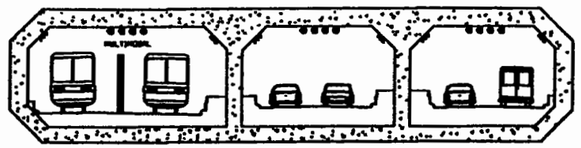

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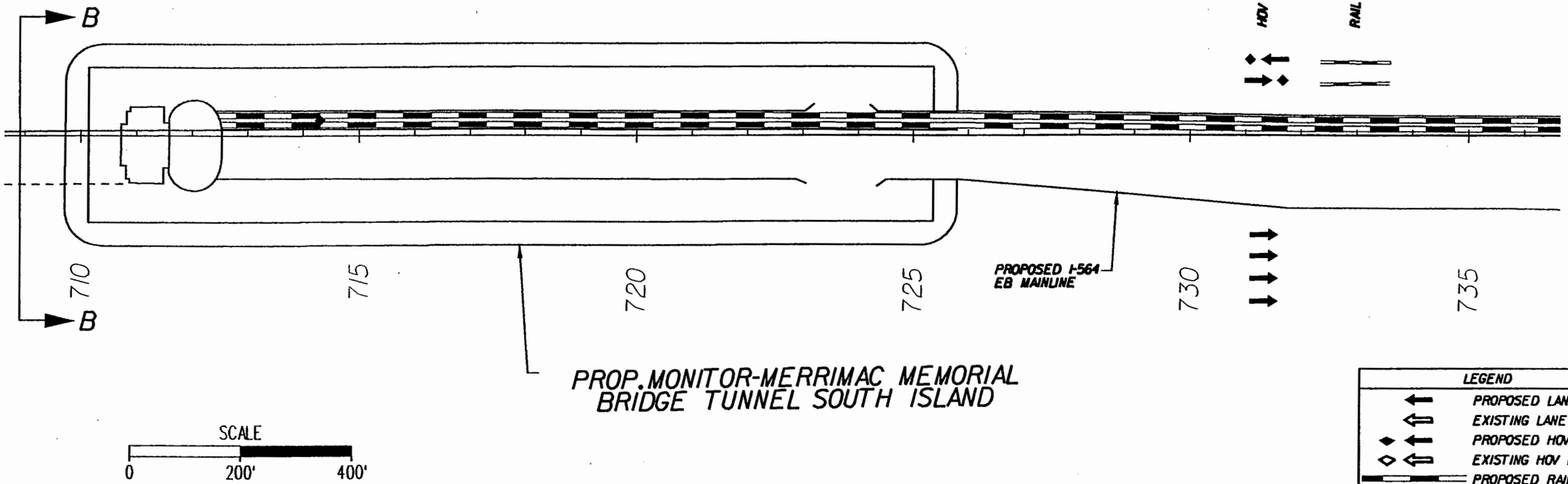

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- EXISTING LANE
- PROPOSED HOV LANE
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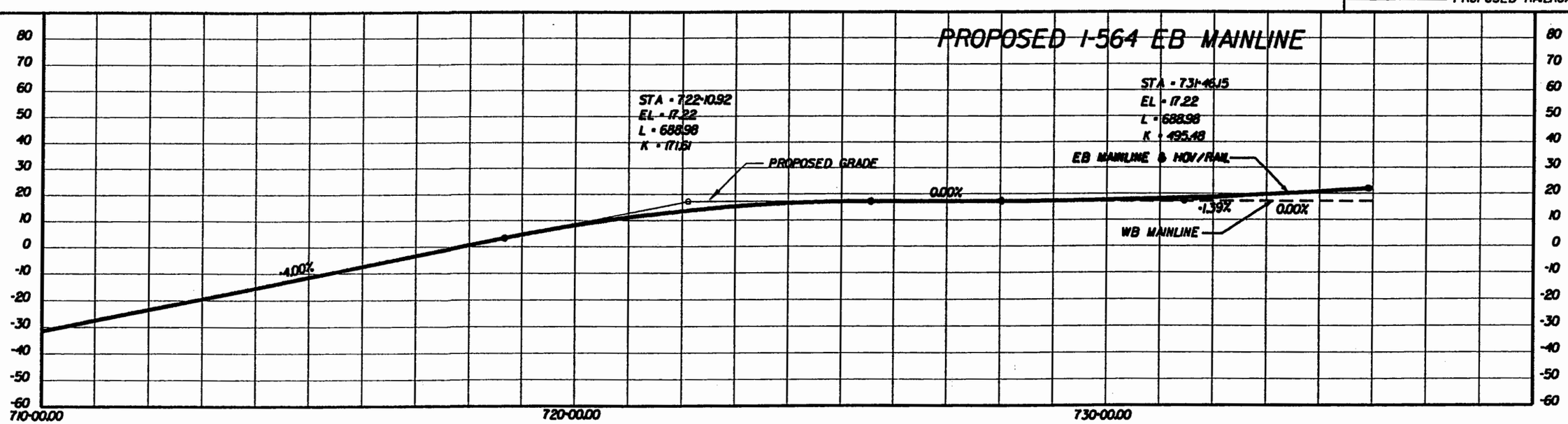
- PROPOSED RAILROAD



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DESIGN	AAA	DRAWN	BBB
CHCK	CCC	APPR	
DATE	DATE	DATE	DATE
DATE	DATE	DATE	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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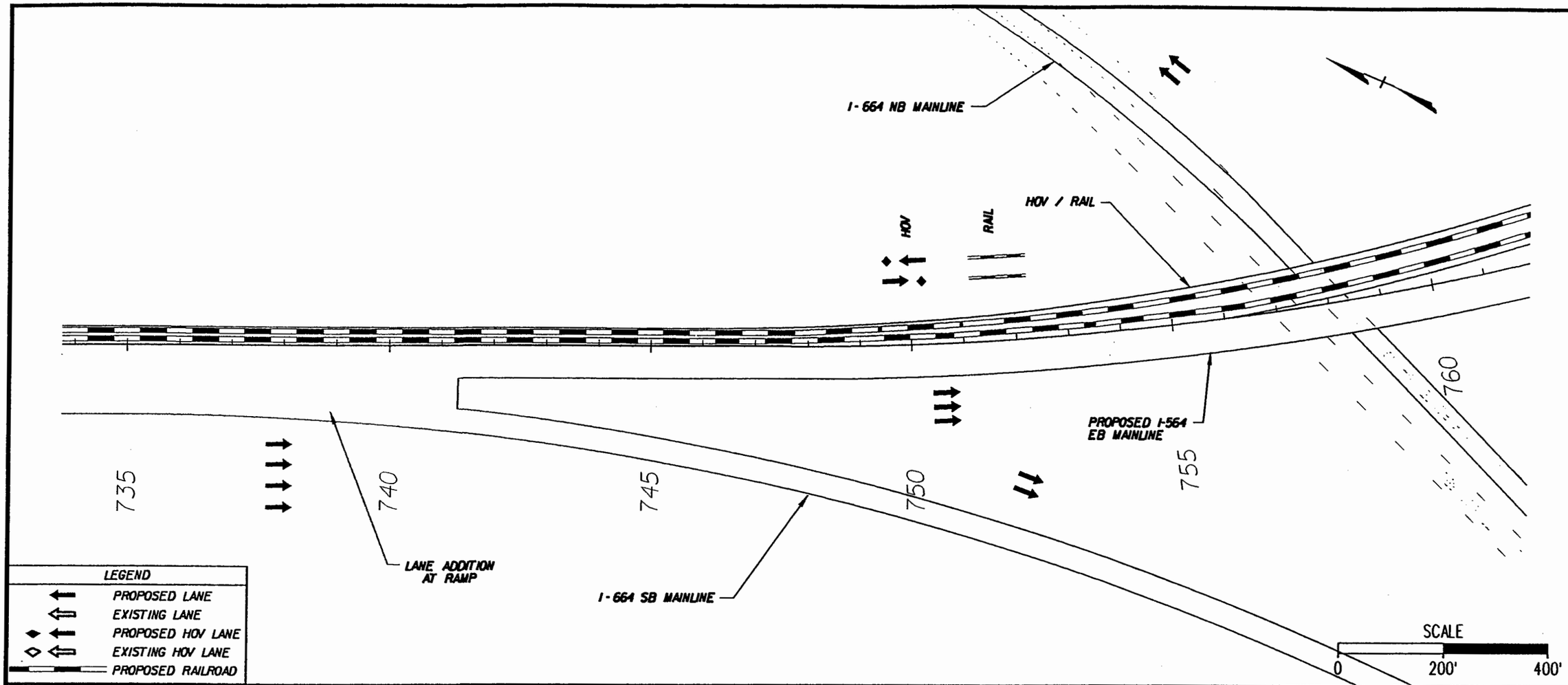

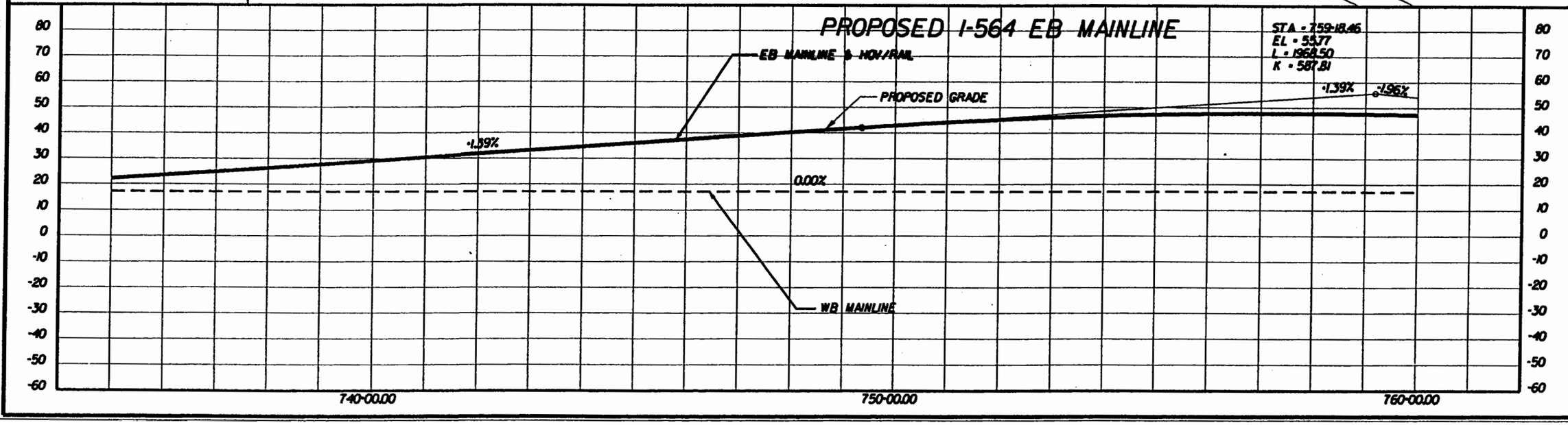

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DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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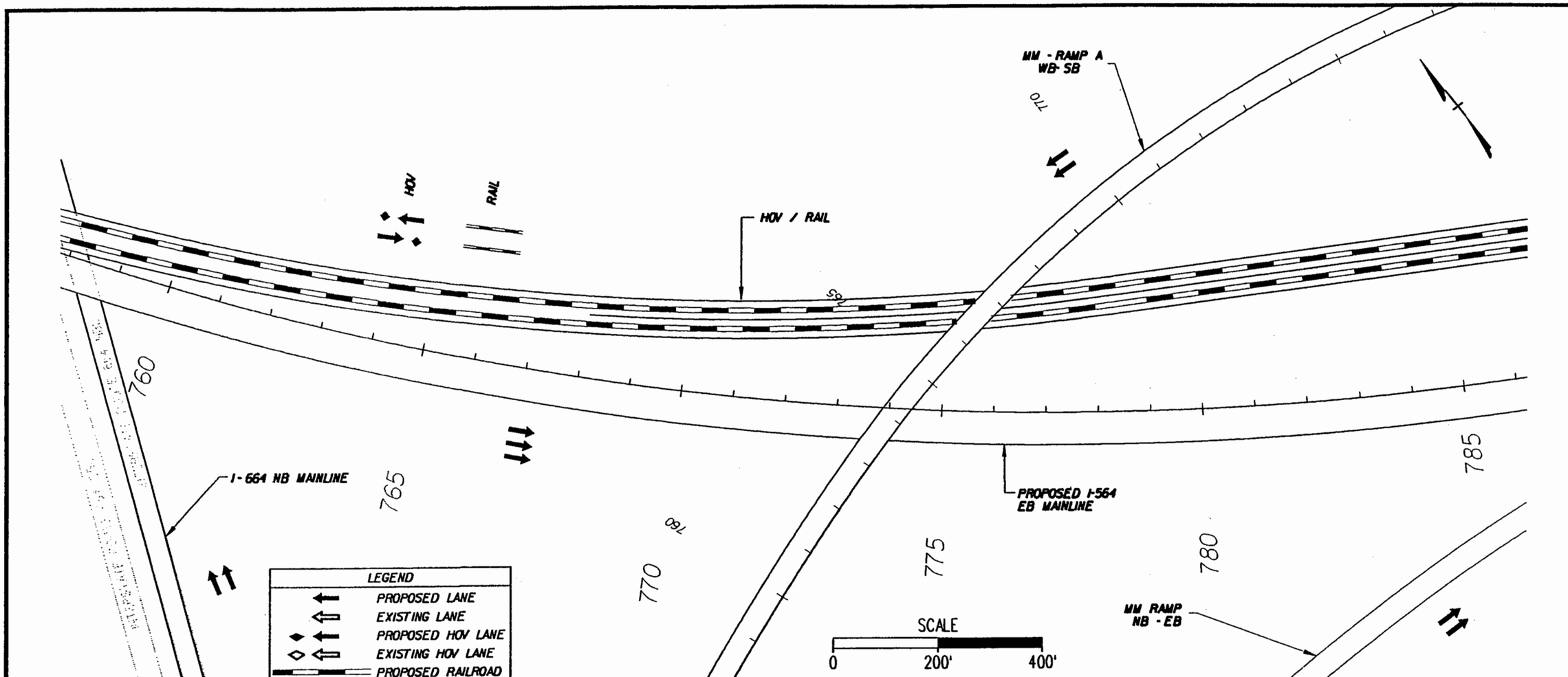

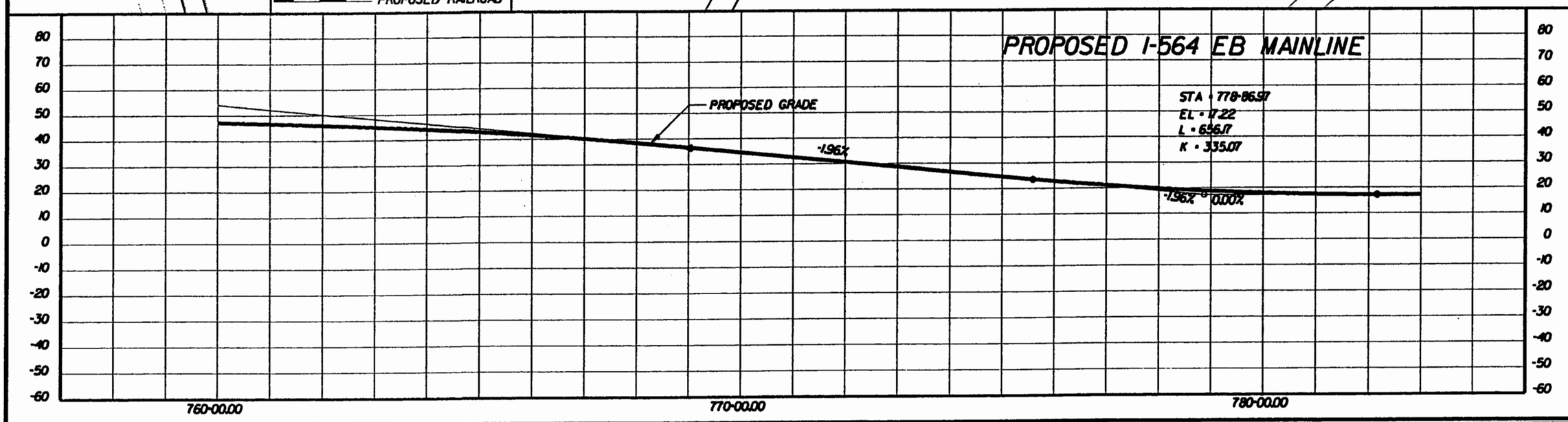

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ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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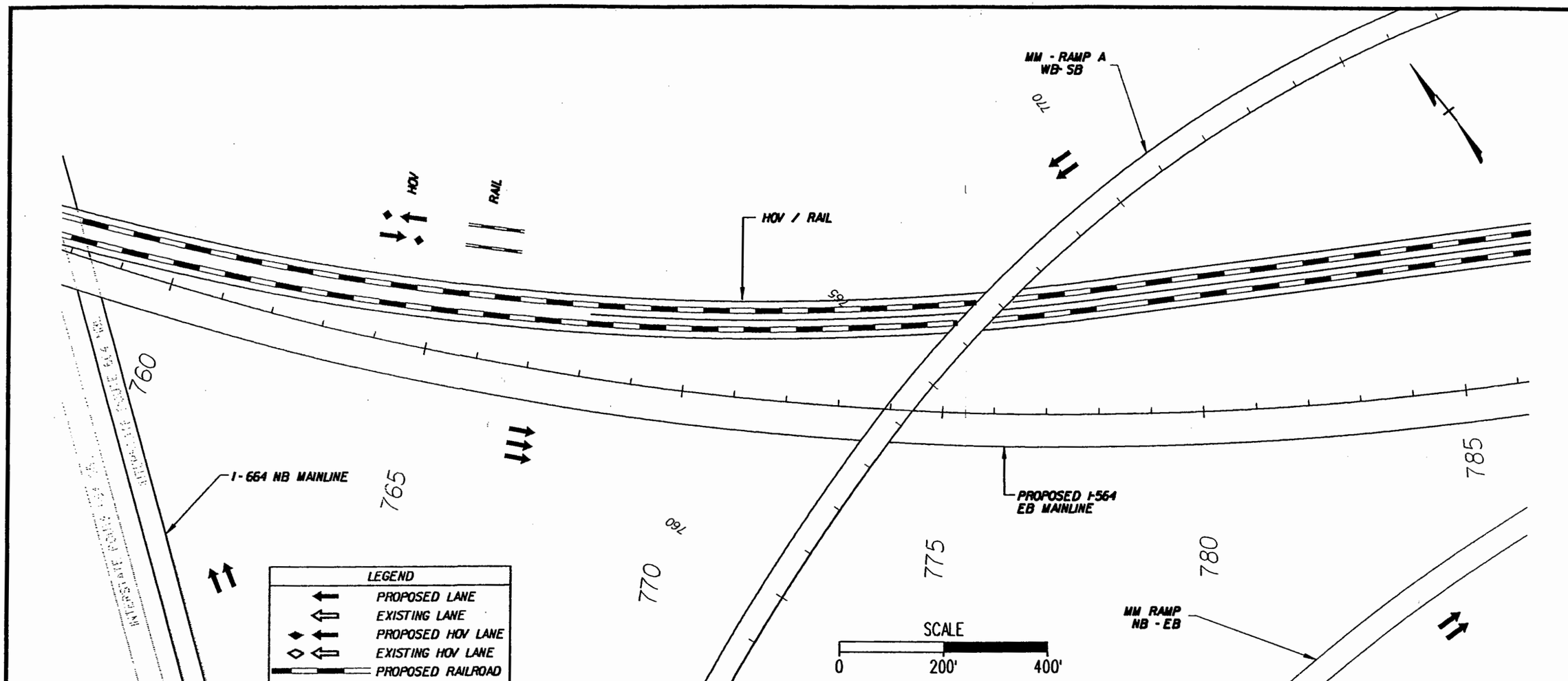

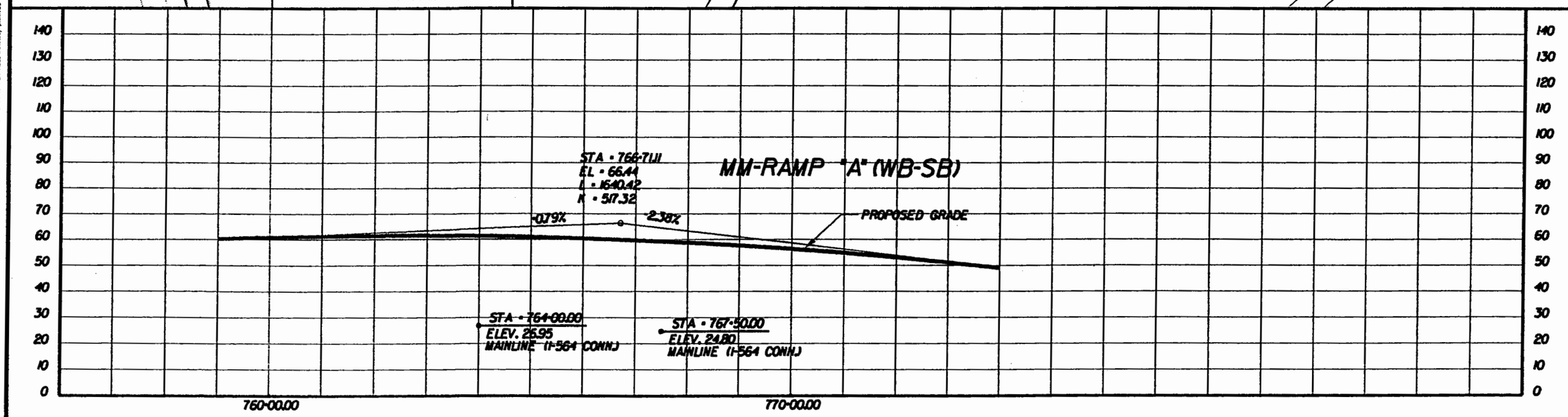

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DATE	DATE	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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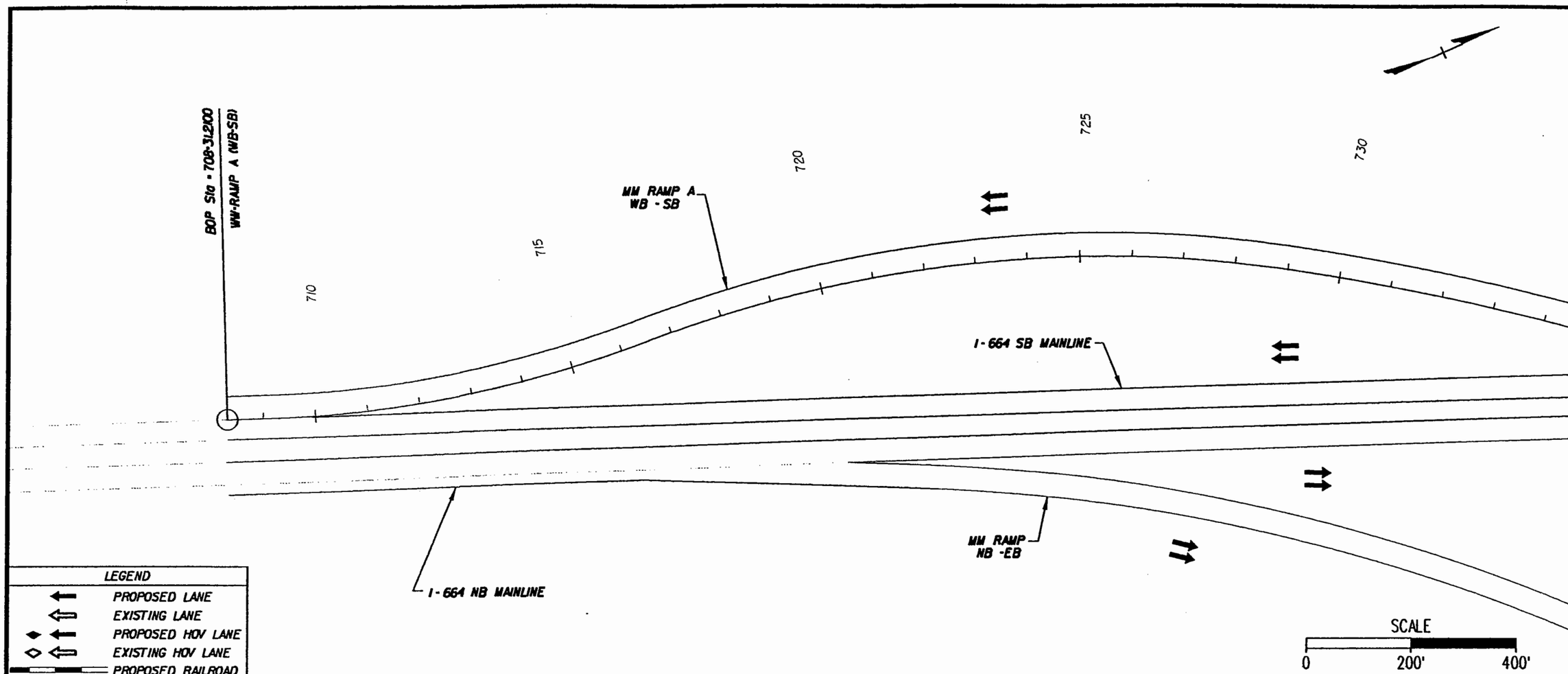

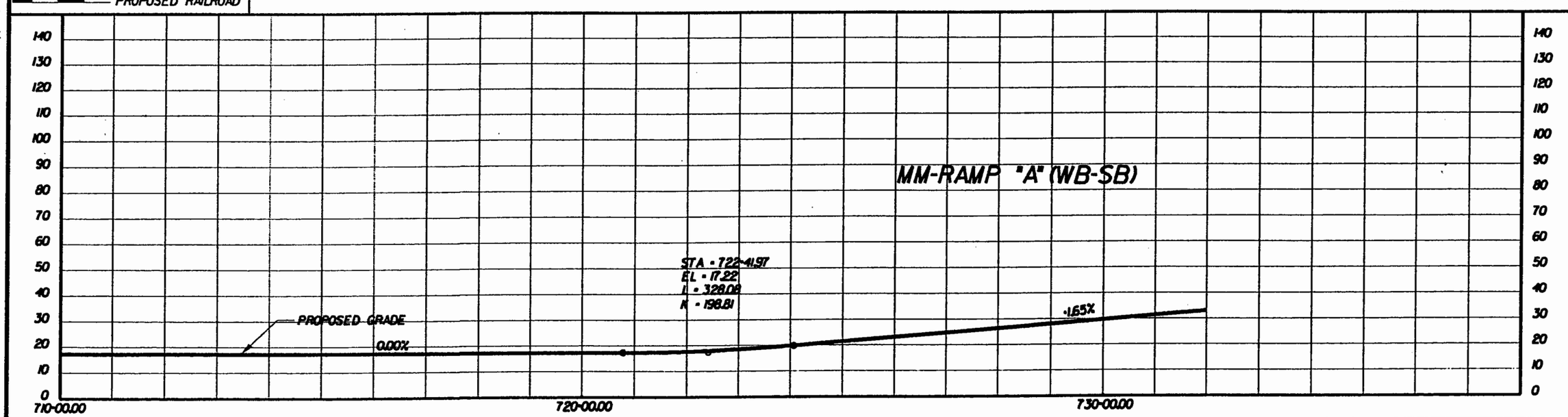

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DESIGN	AAA	DATE	DATE
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ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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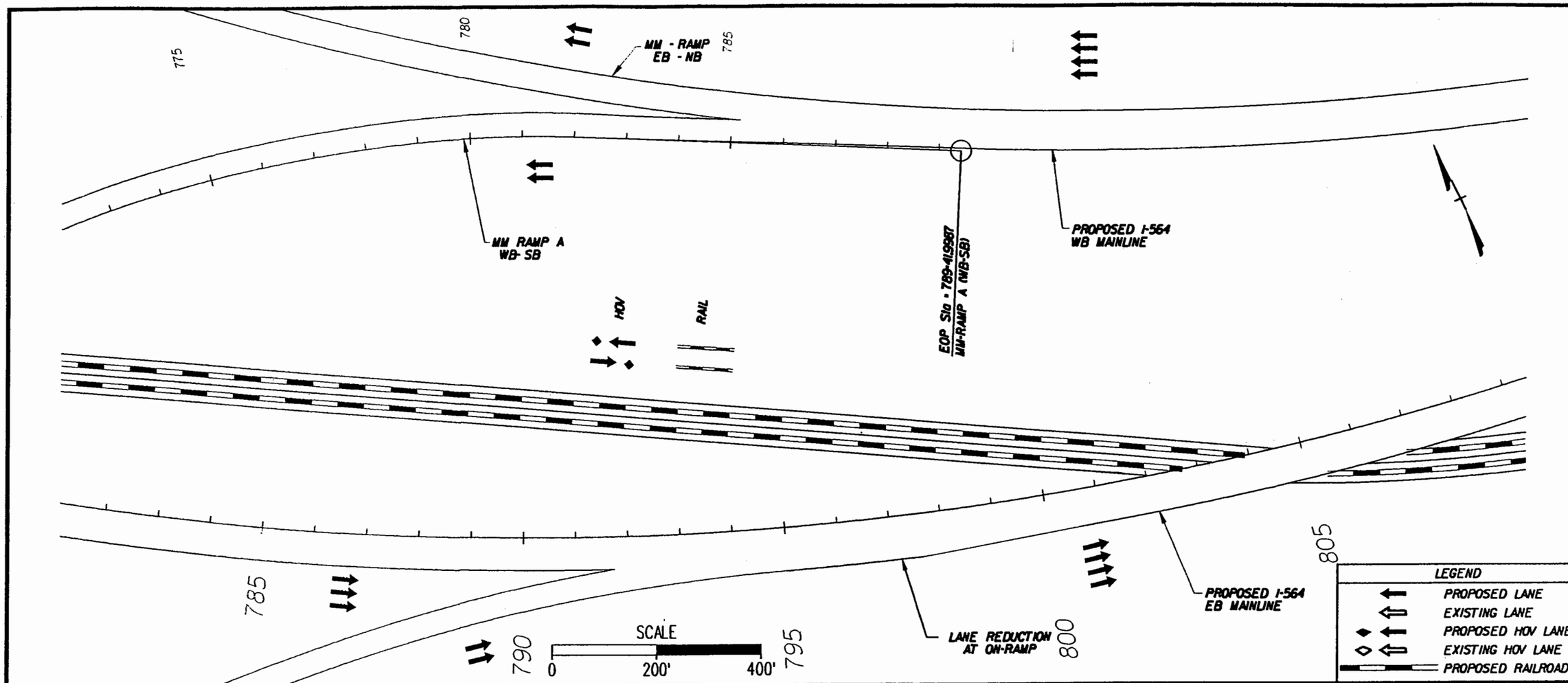

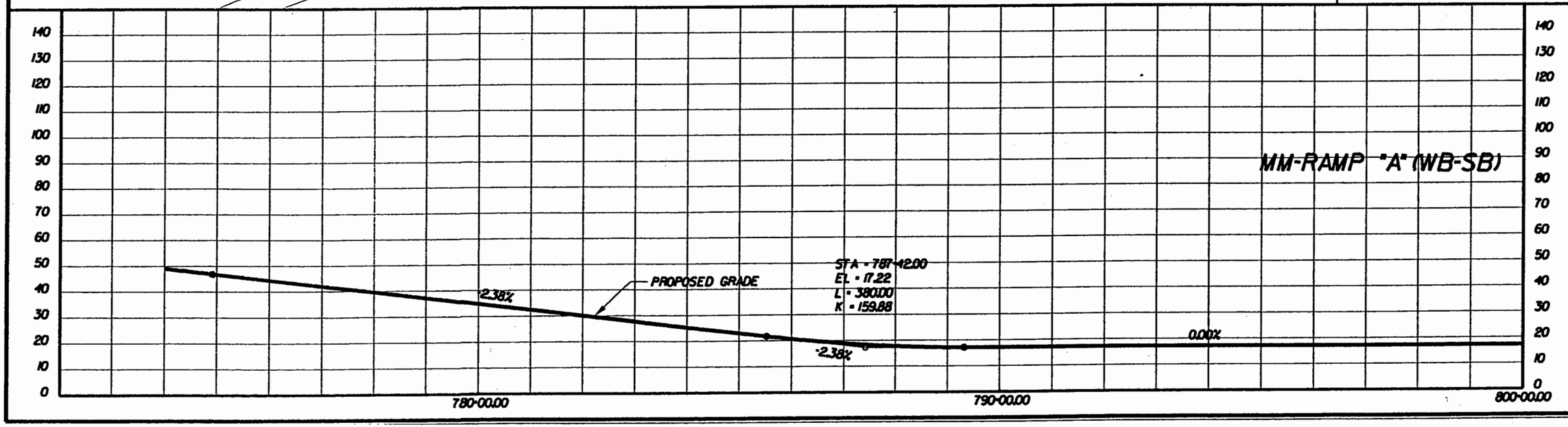

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CHCK	CCC	DATE	DATE
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ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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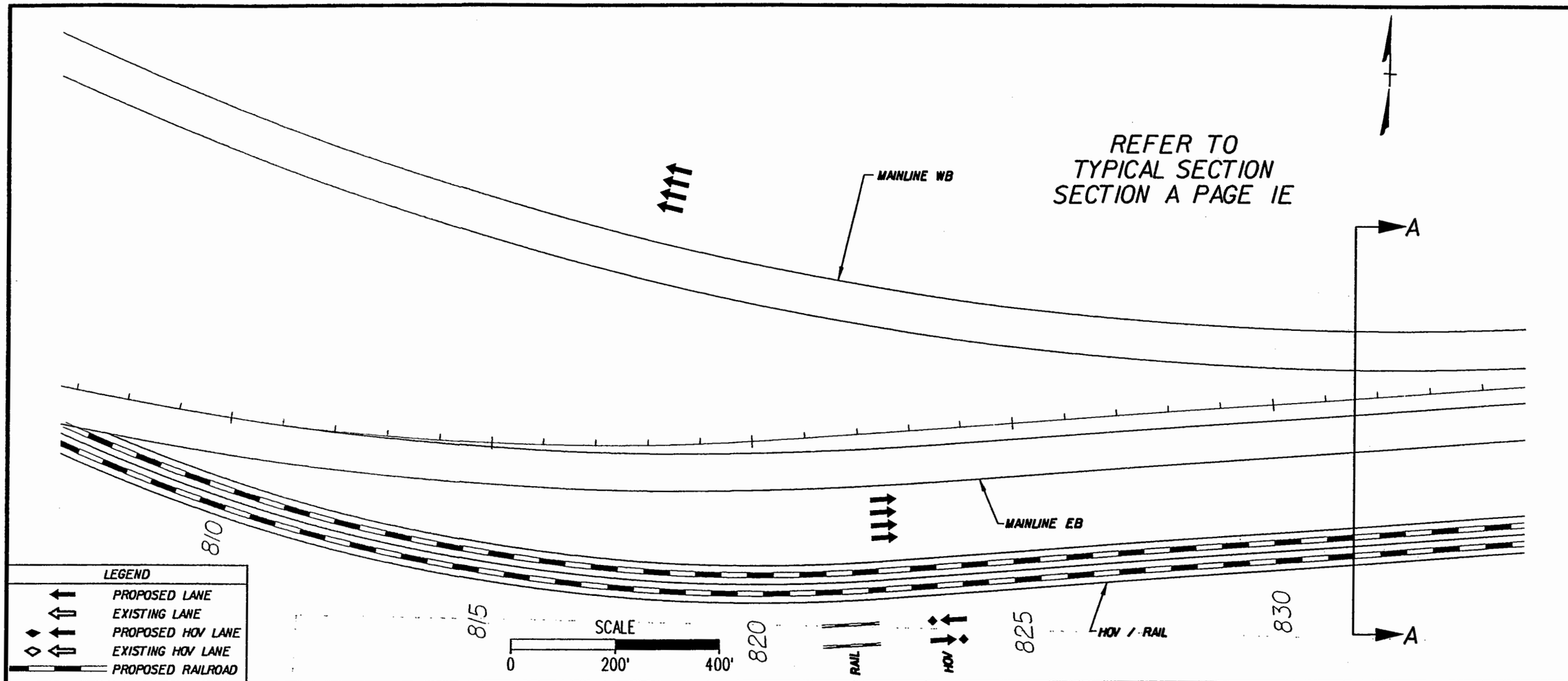

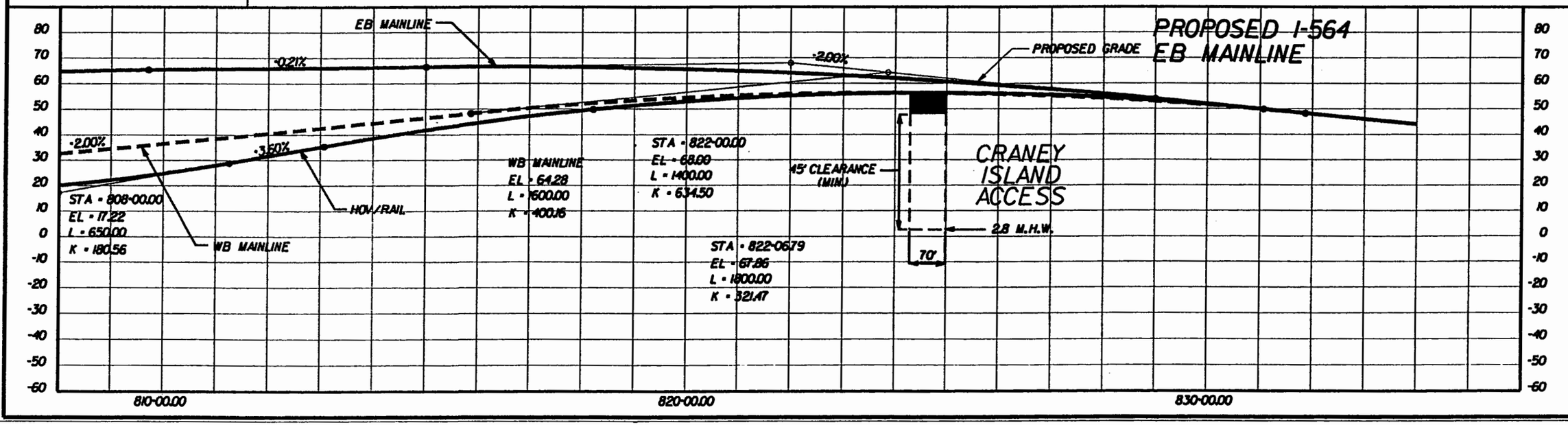

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DESIGN	AAA	DATE
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ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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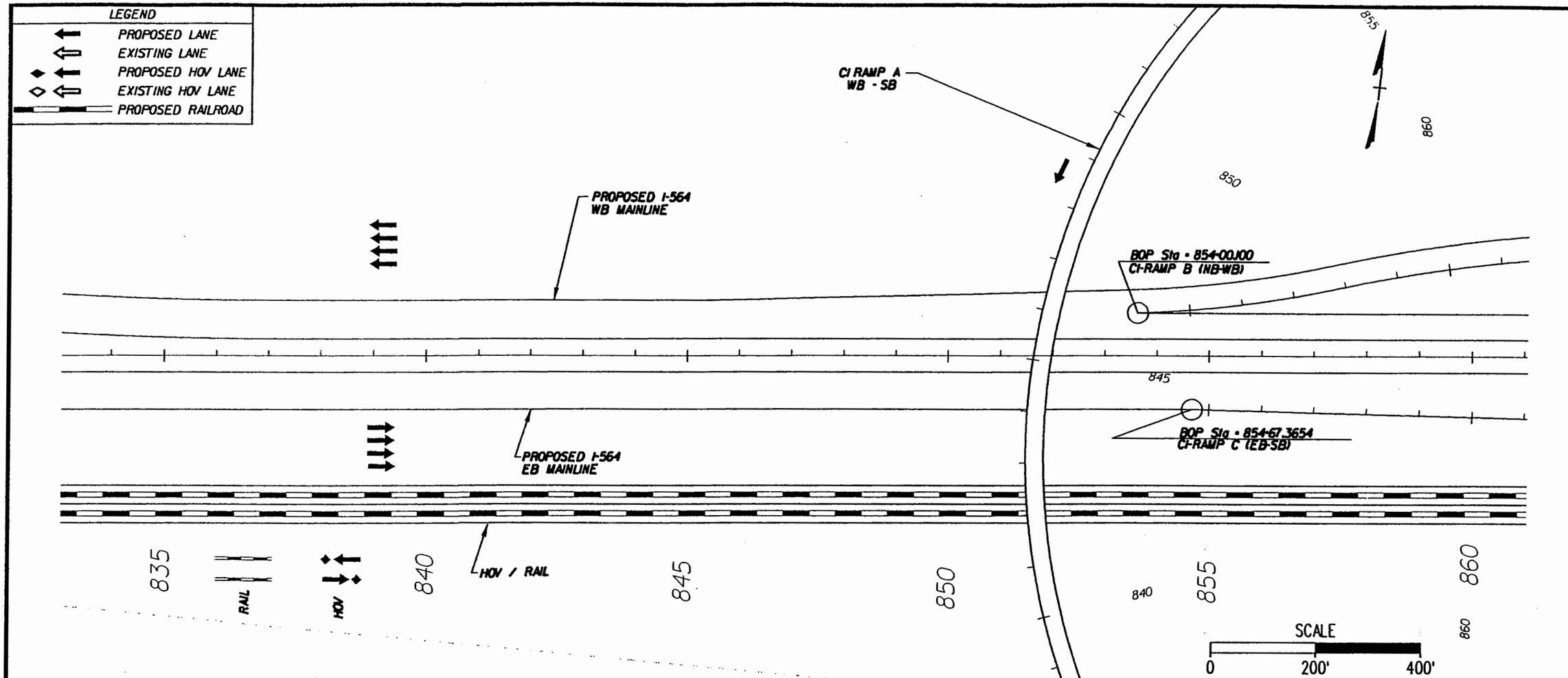

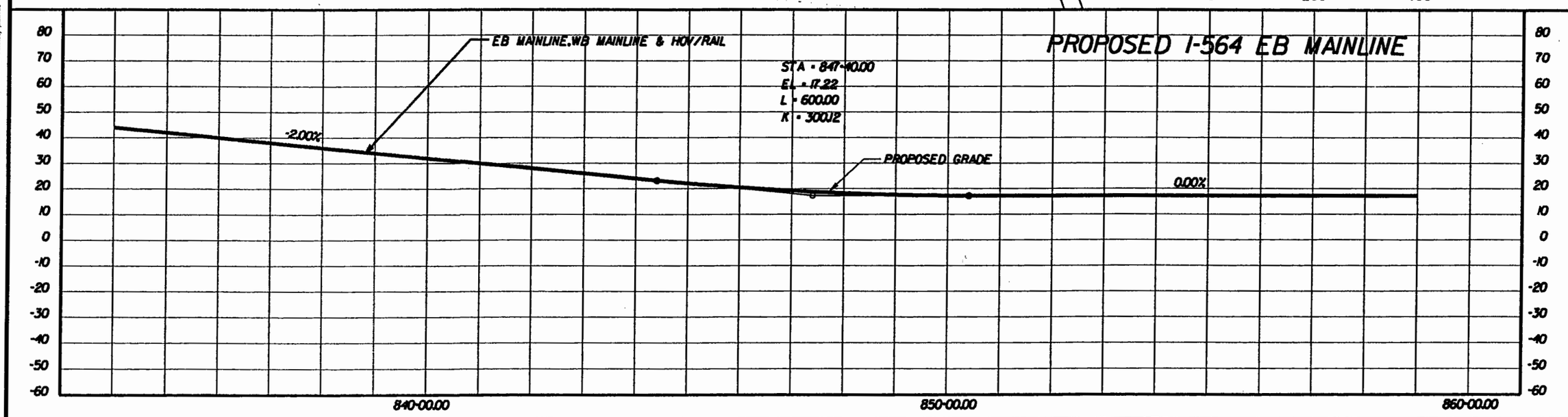

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DESIGN AAA	DRAWN BBB	CHCK CCC	APPR
DATE	DATE	DATE	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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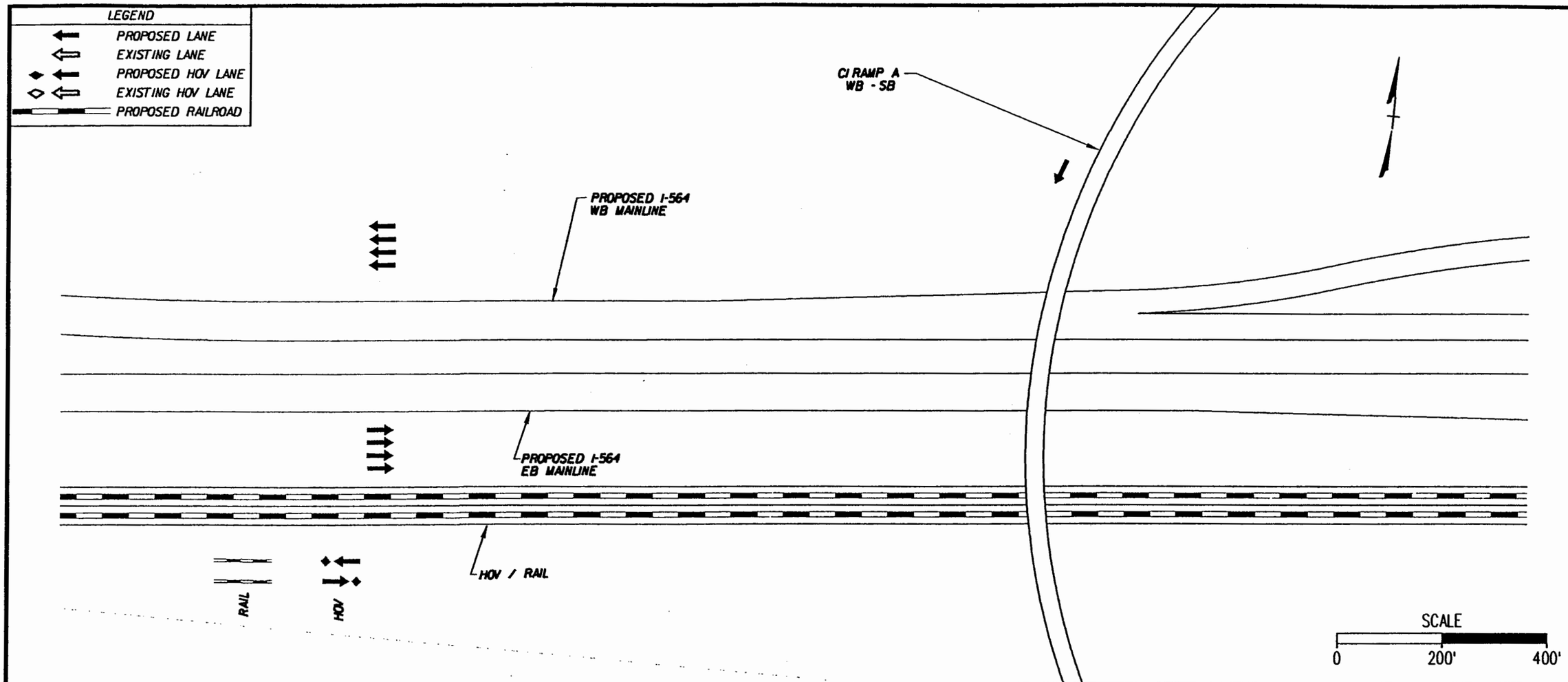

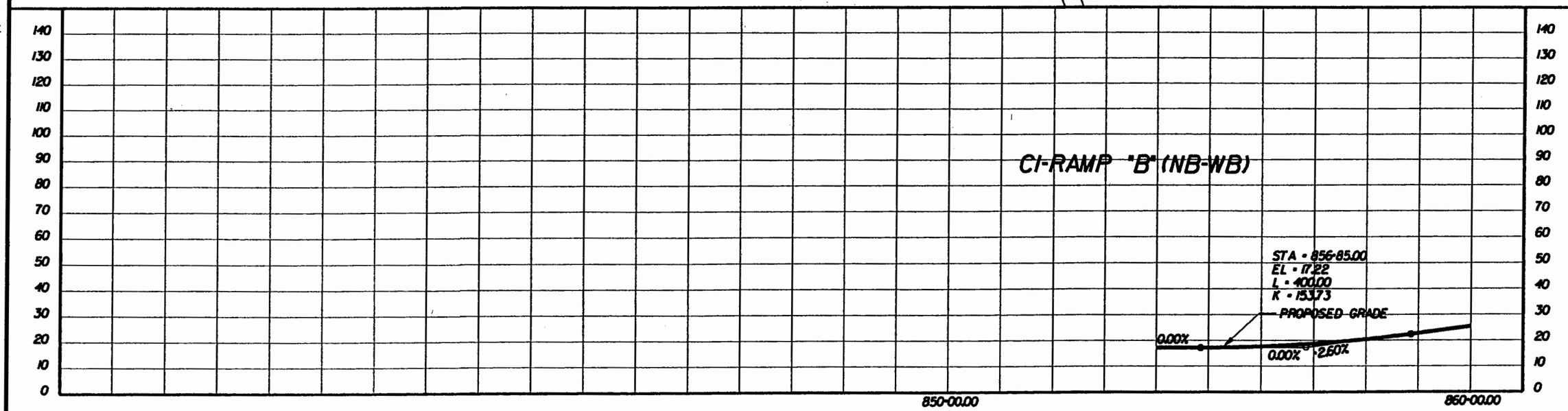

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DESIGN	AAA	DATE	DATE
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CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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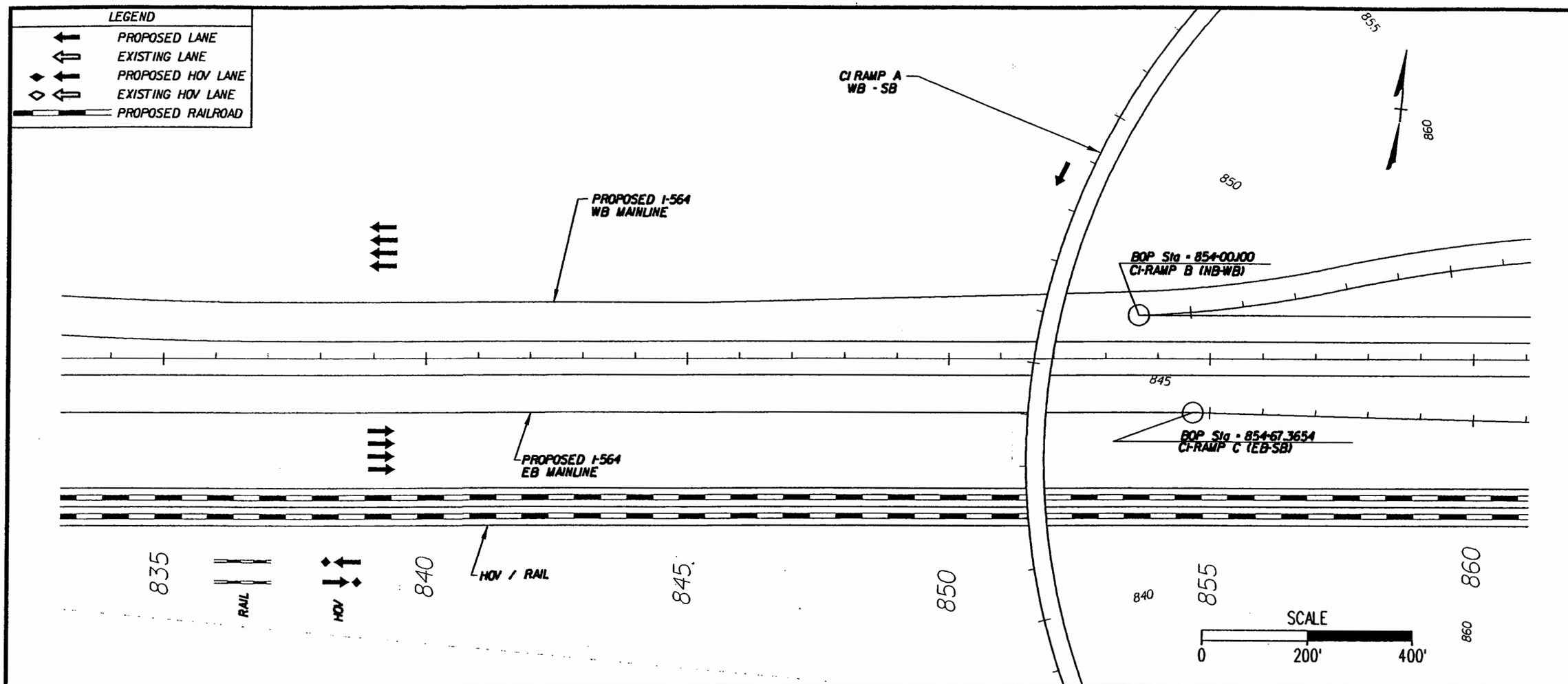

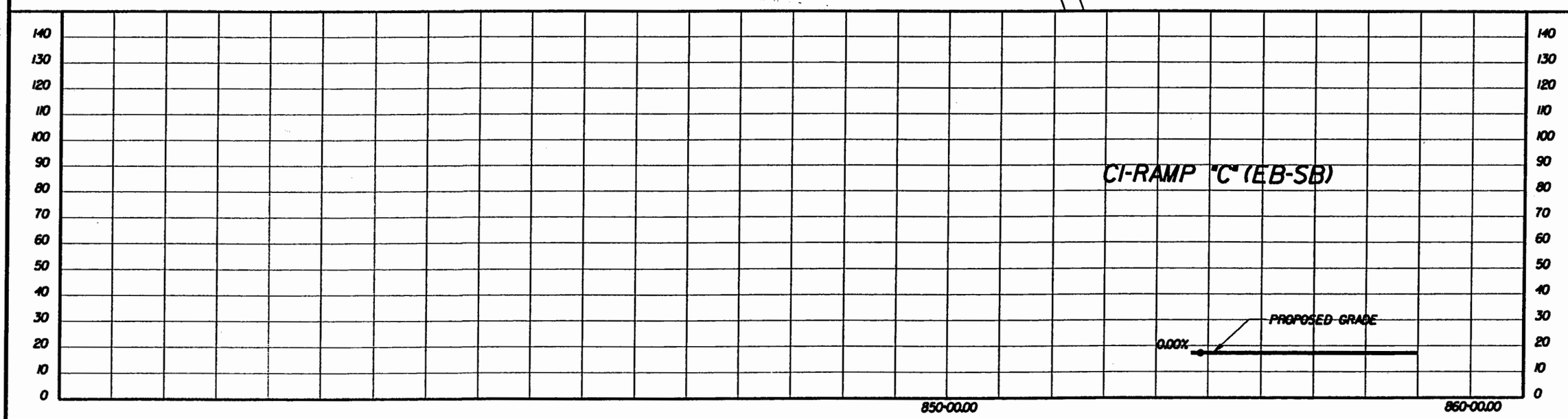

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DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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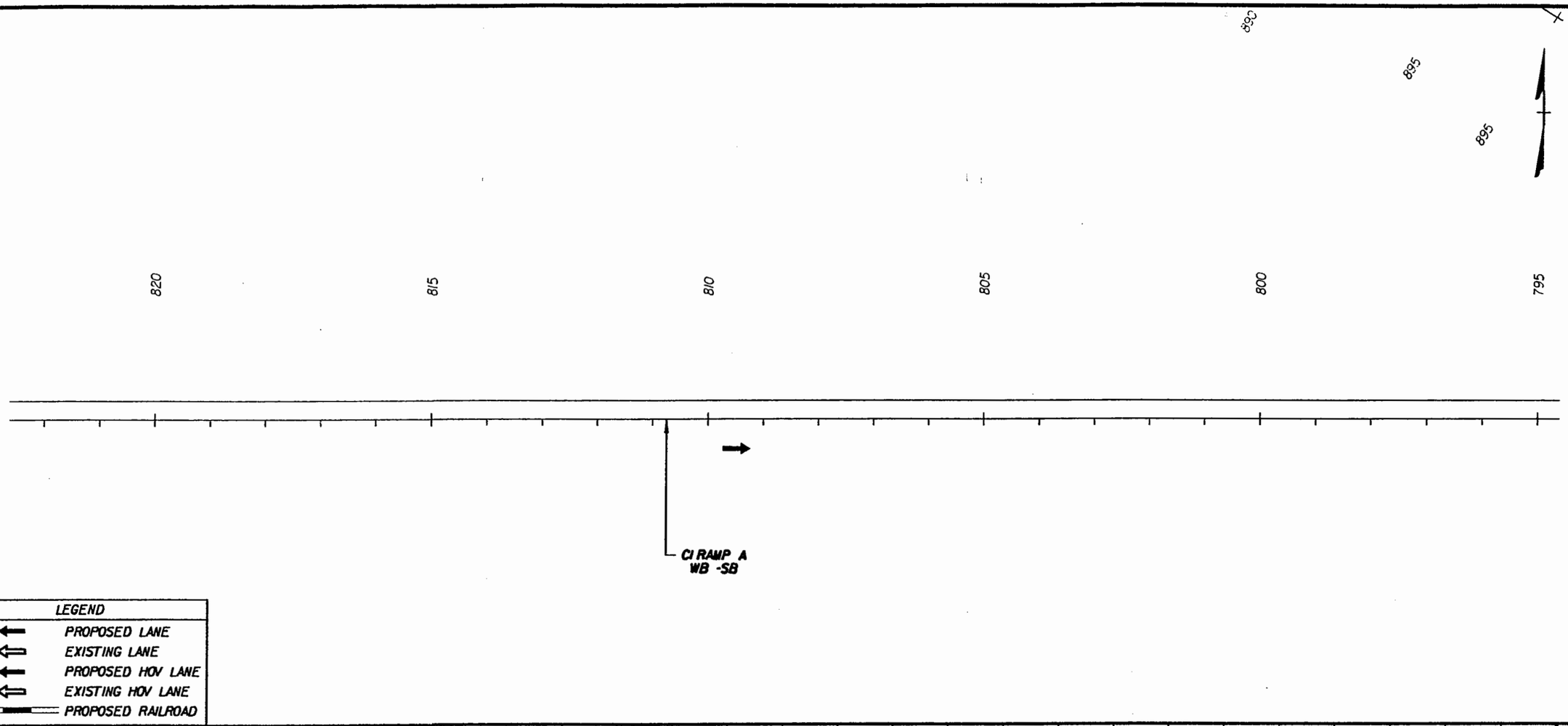

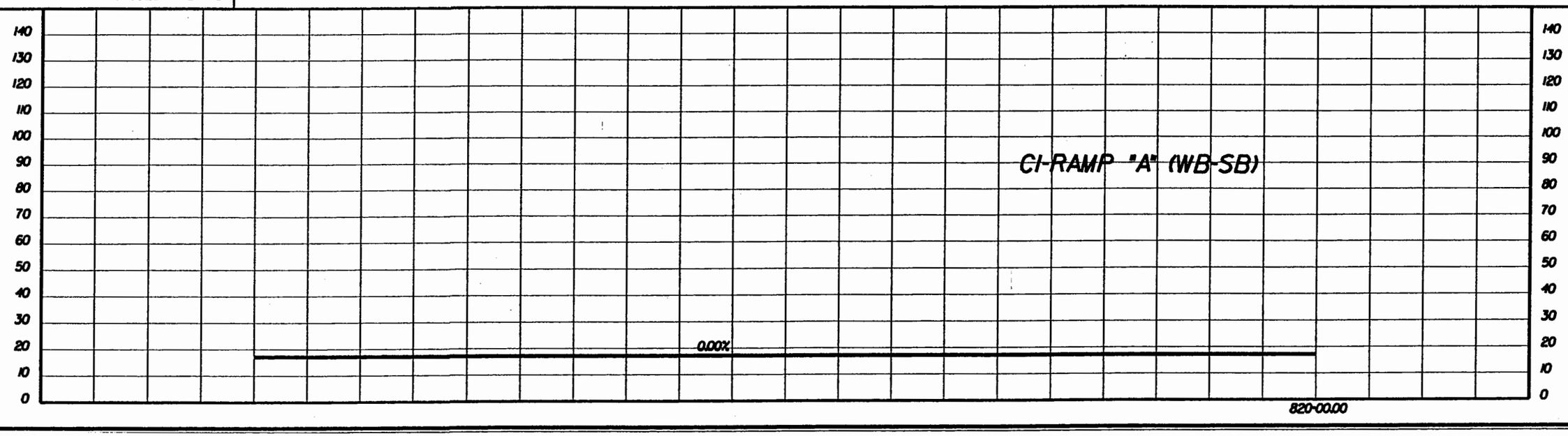

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DRAWN	BBB	DATE
CHCK	CCC	DATE
APPR		DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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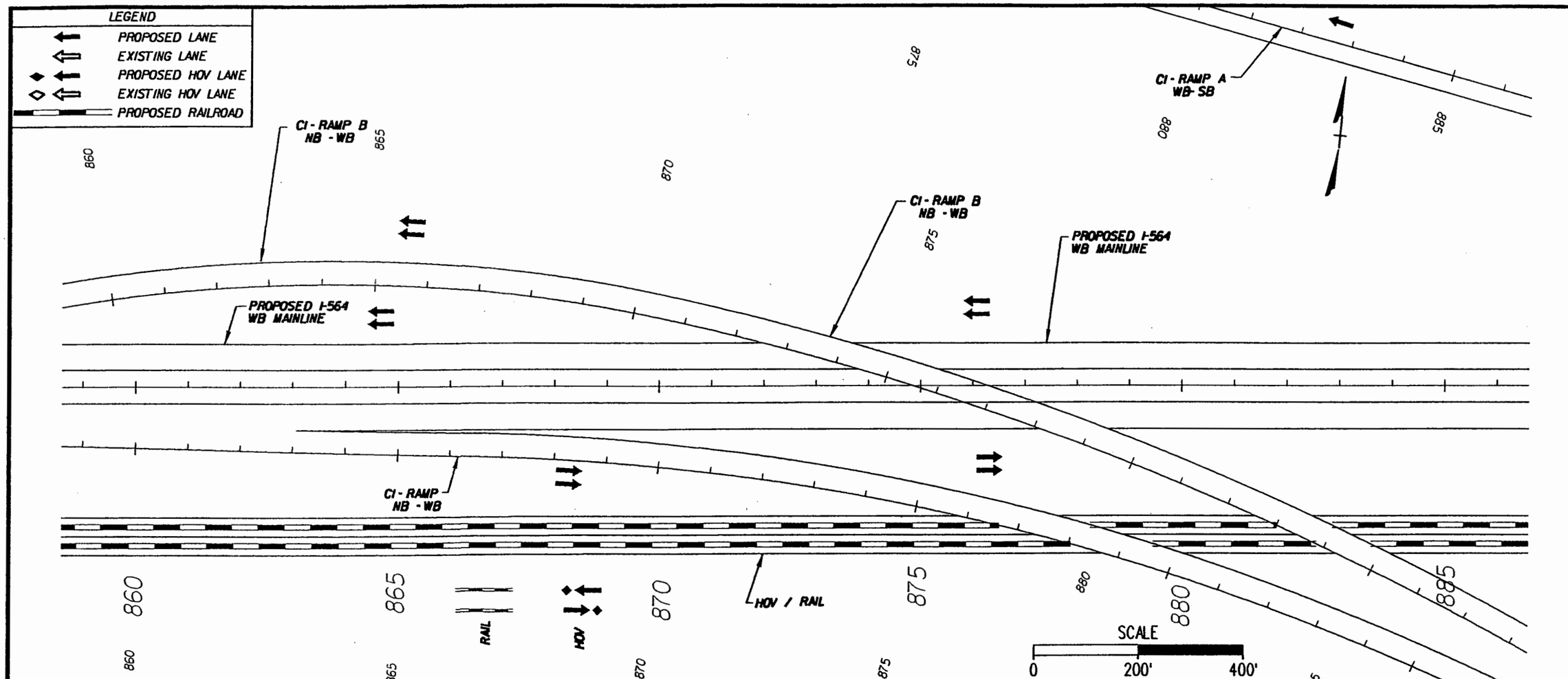

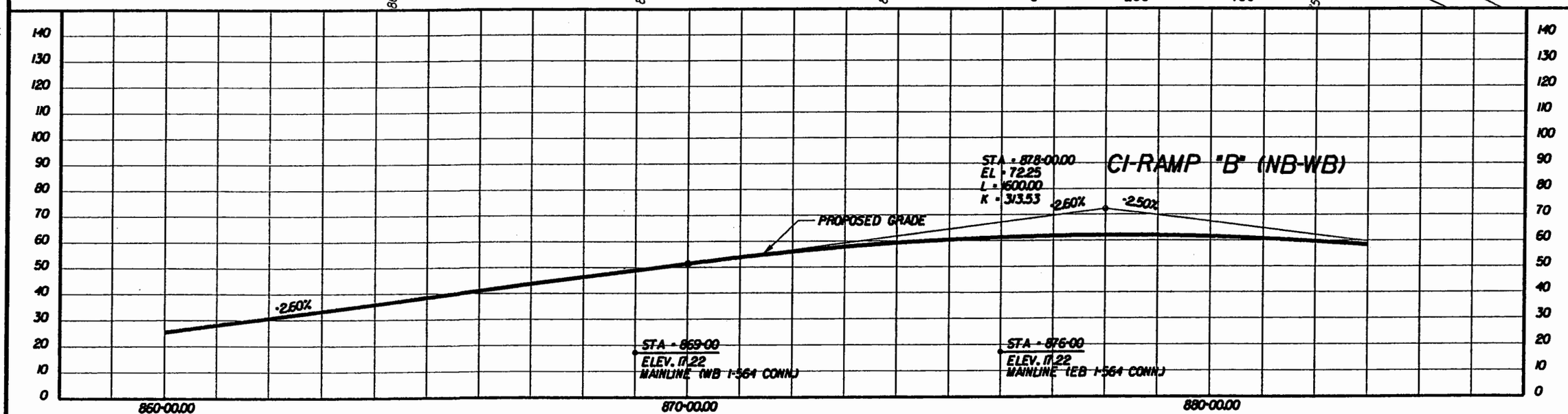

PREPARED BY
PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2-008A

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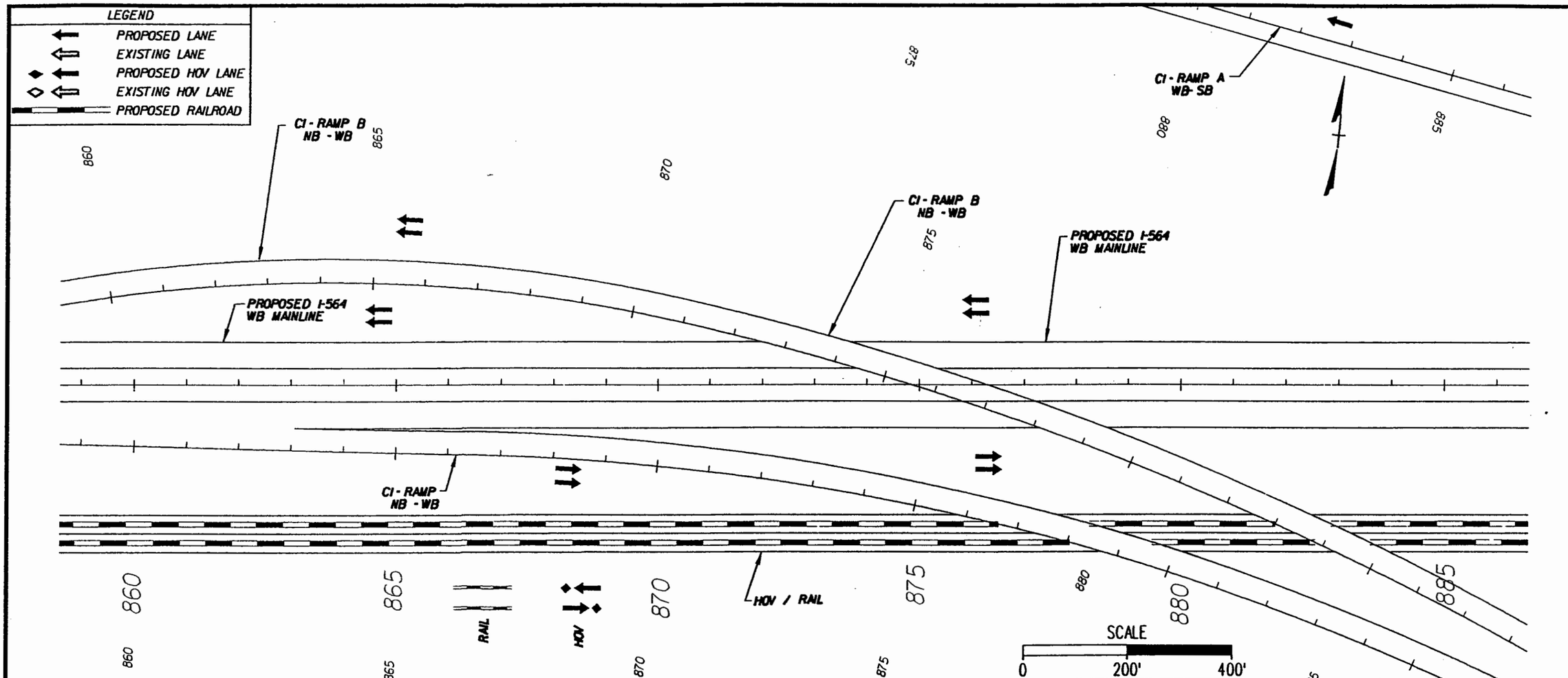

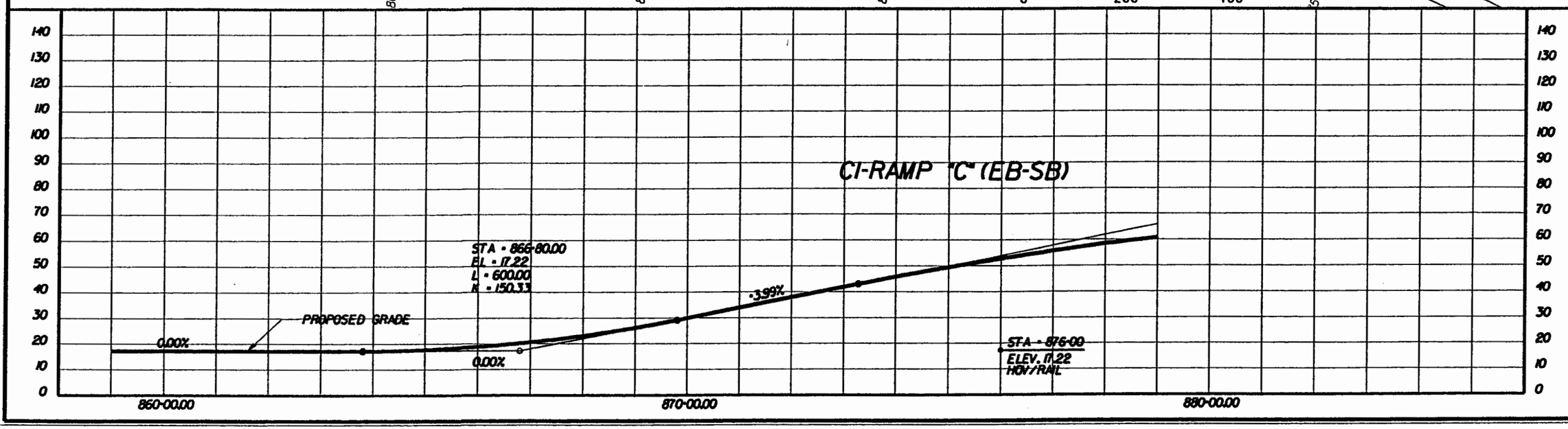

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MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2-008B

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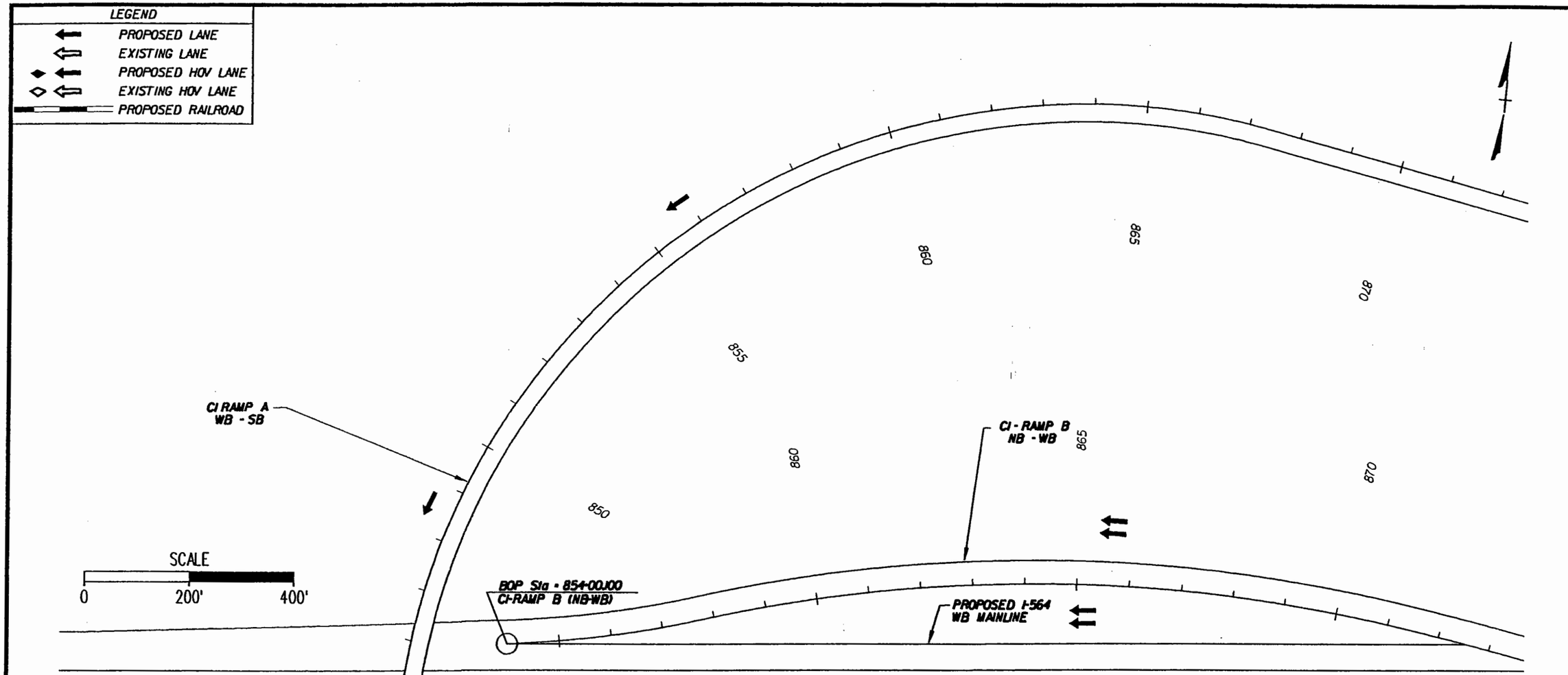

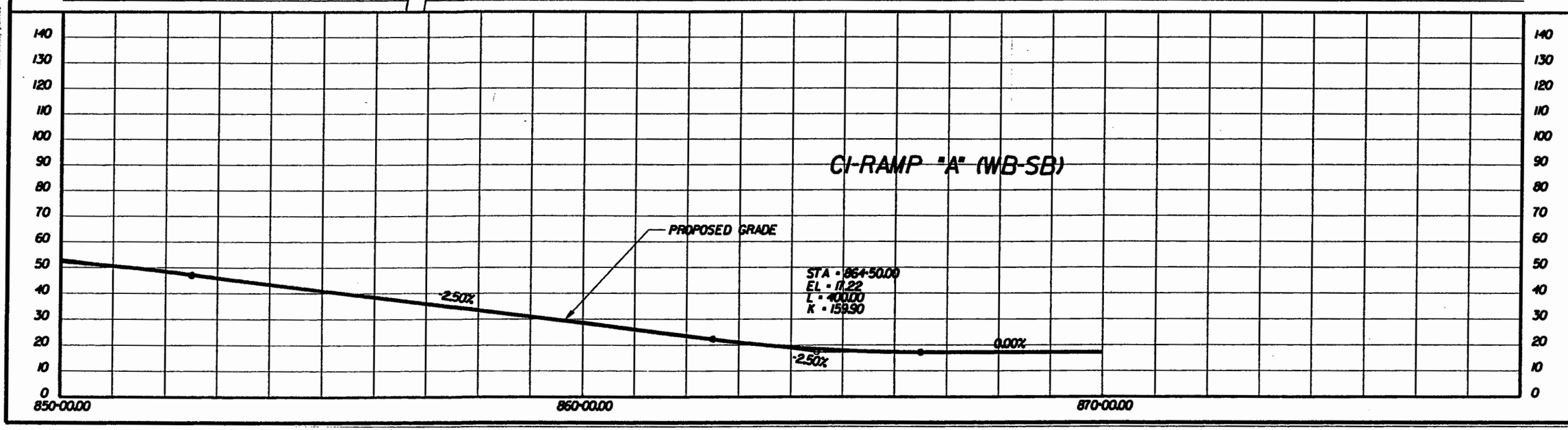

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DATE	DATE	DATE	DATE
AAA	BBB	CCC	APPR
DESIGN	DRAWN	CHCK	

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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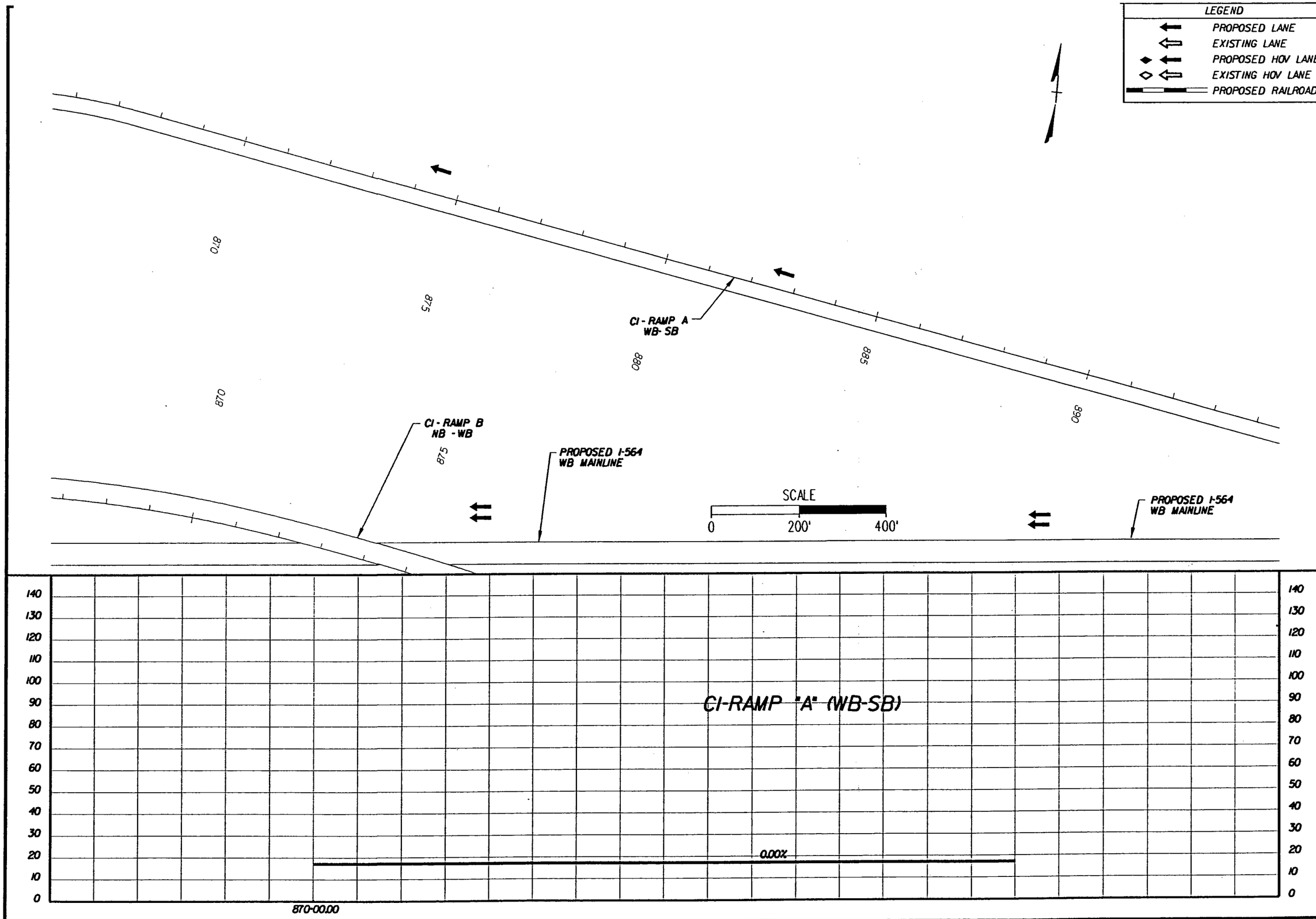

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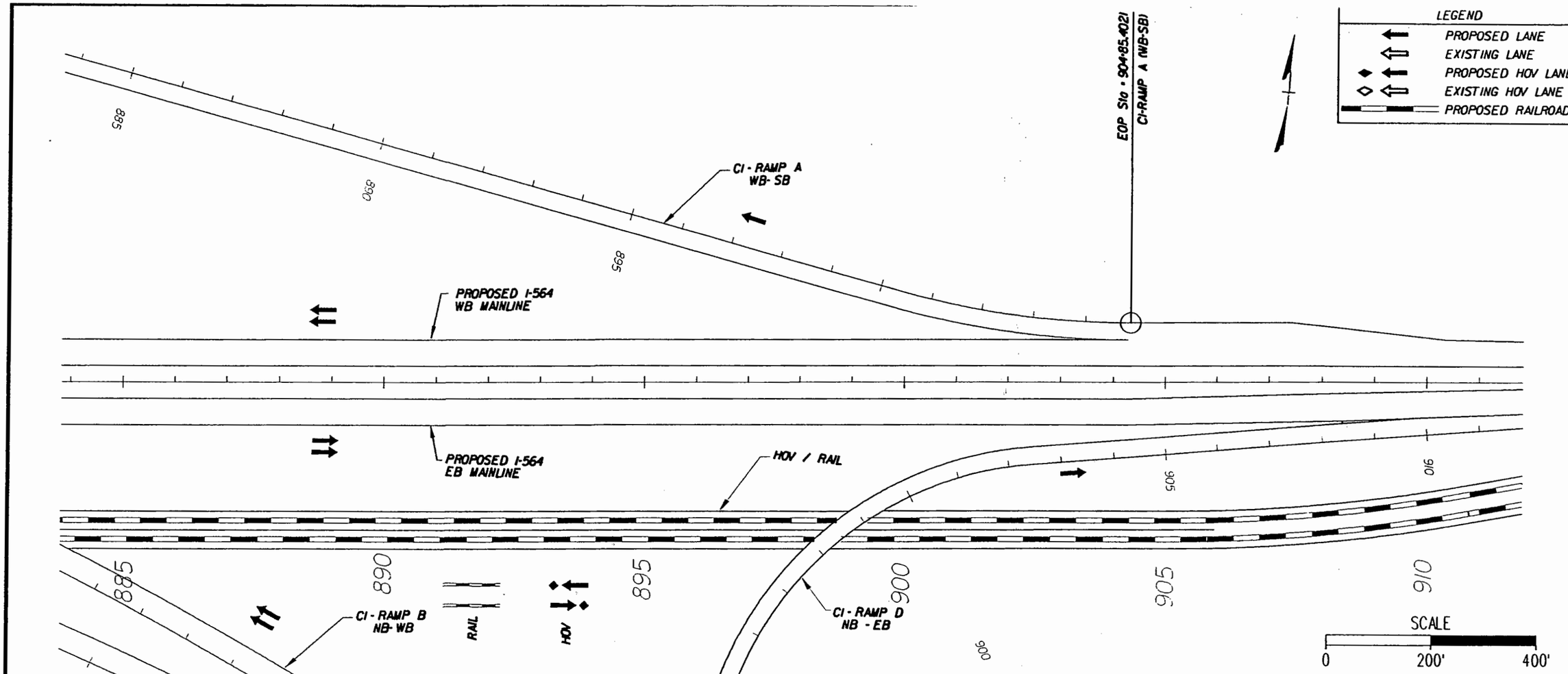
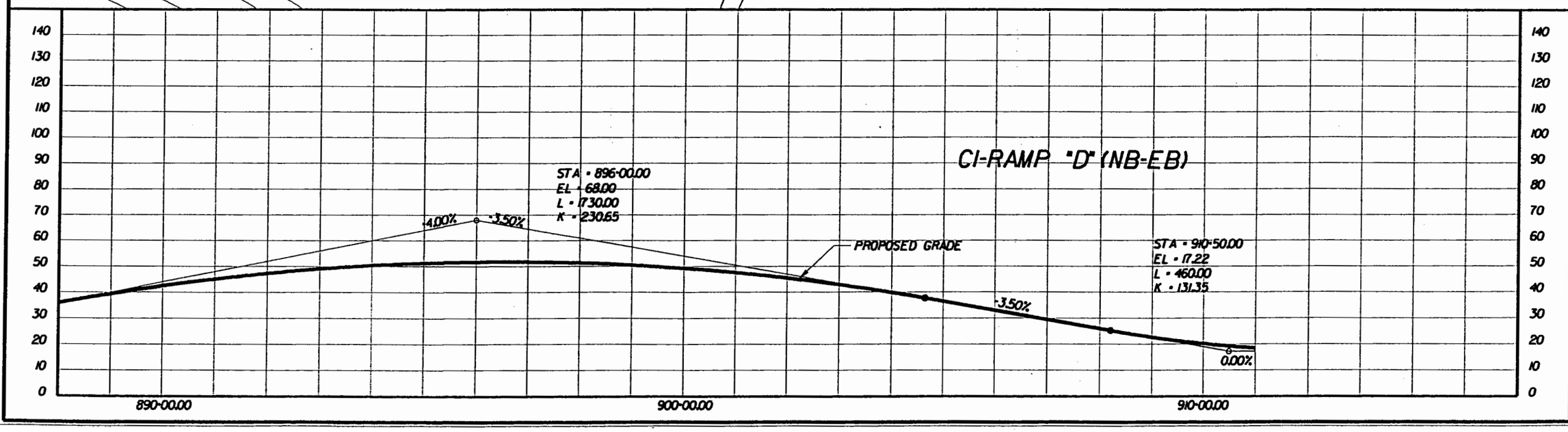
DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHCK	CCC	DATE
APPR		DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2-008E





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PARSONS BRINCKERHOFF
QUADE & DOUGLASS, INC.

MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT-2-009C

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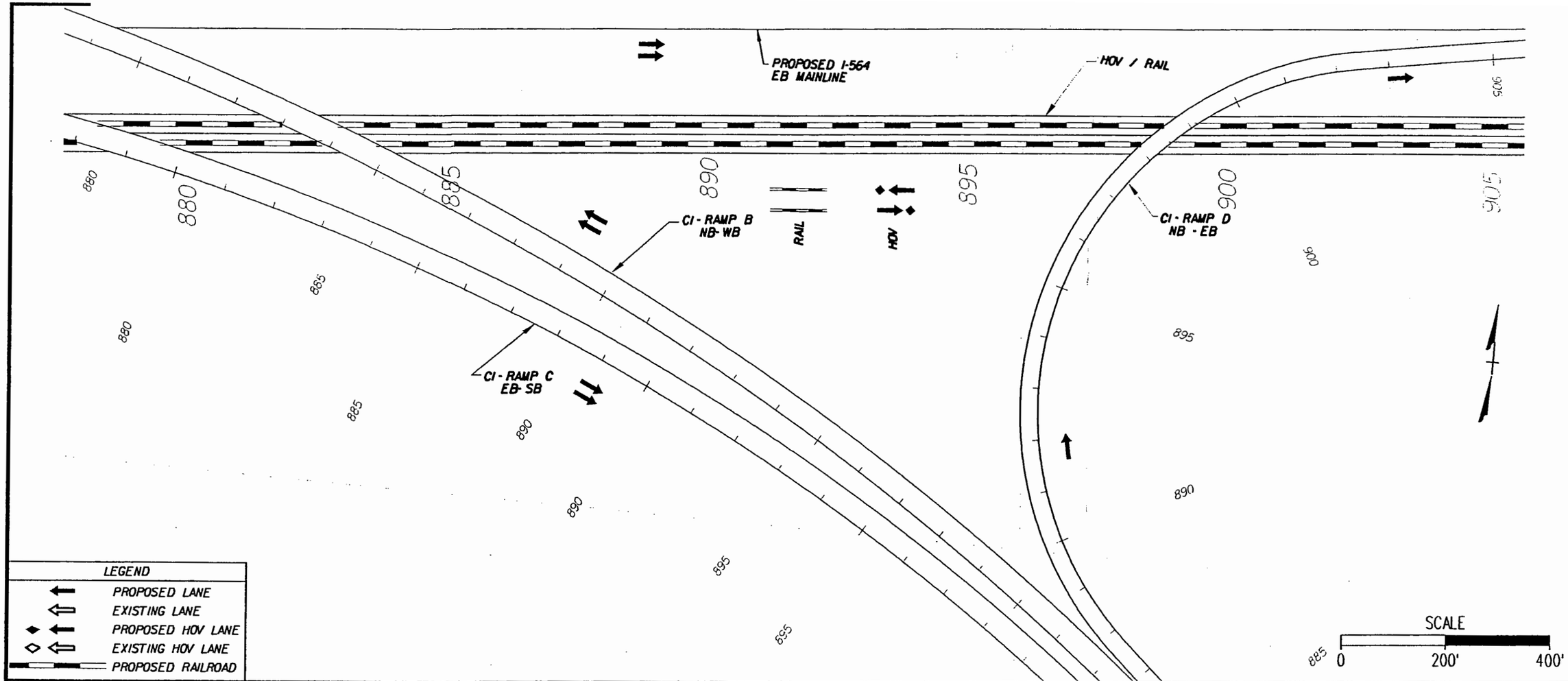

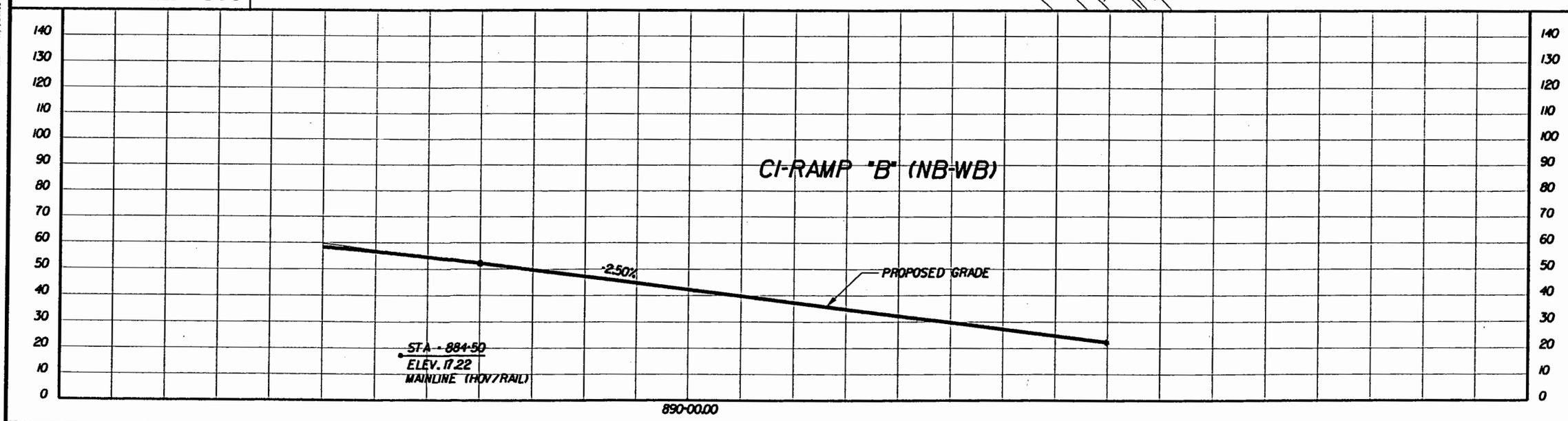

PREPARED BY
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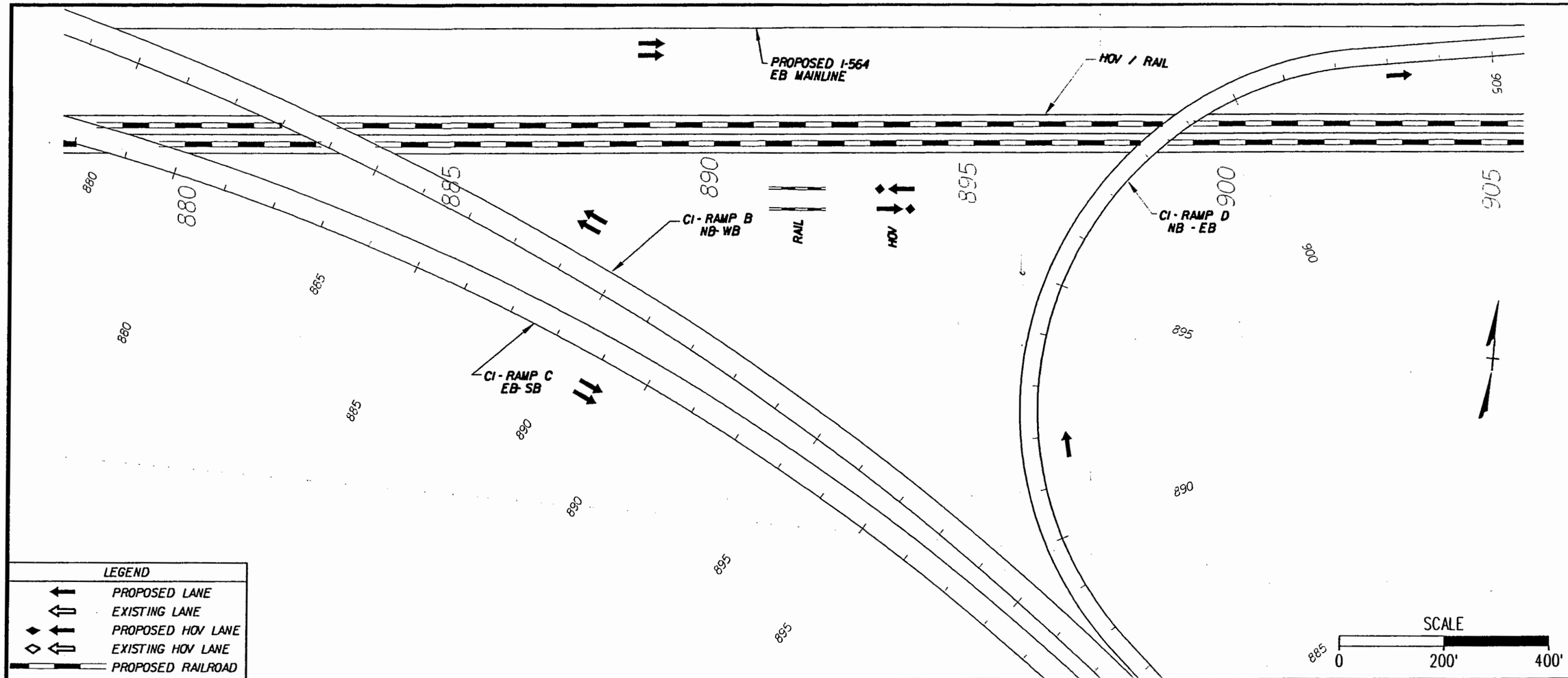
MICHAEL BAKER JR., INC.

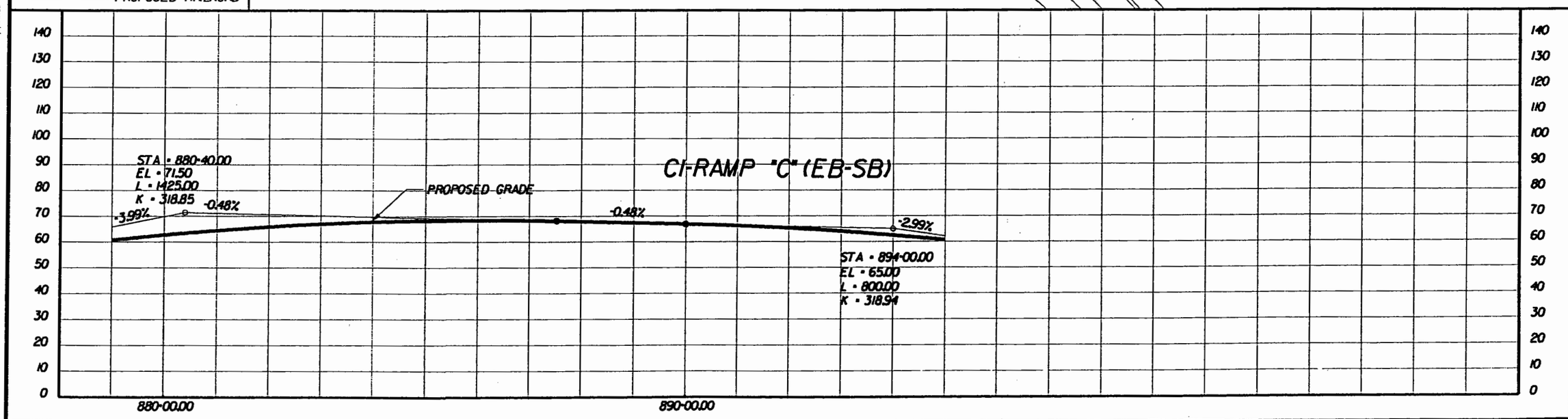
DESIGN	AAA	DATE	
DRAWN	BBB	DATE	
CHCK	CCC	DATE	
APPR		DATE	

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2-009D





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DESIGN	AAA	DATE	
DRAWN	BBB	DATE	
CHKD	CCC	DATE	
APPR		DATE	

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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Date/Time = Mon Jul 14 13:17:31 2003

PROPOSED I-564 EB MAINLINE

HOV / RAIL

CI - RAMP B NB-WB

RAIL

HOV

CI - RAMP C EB-SB

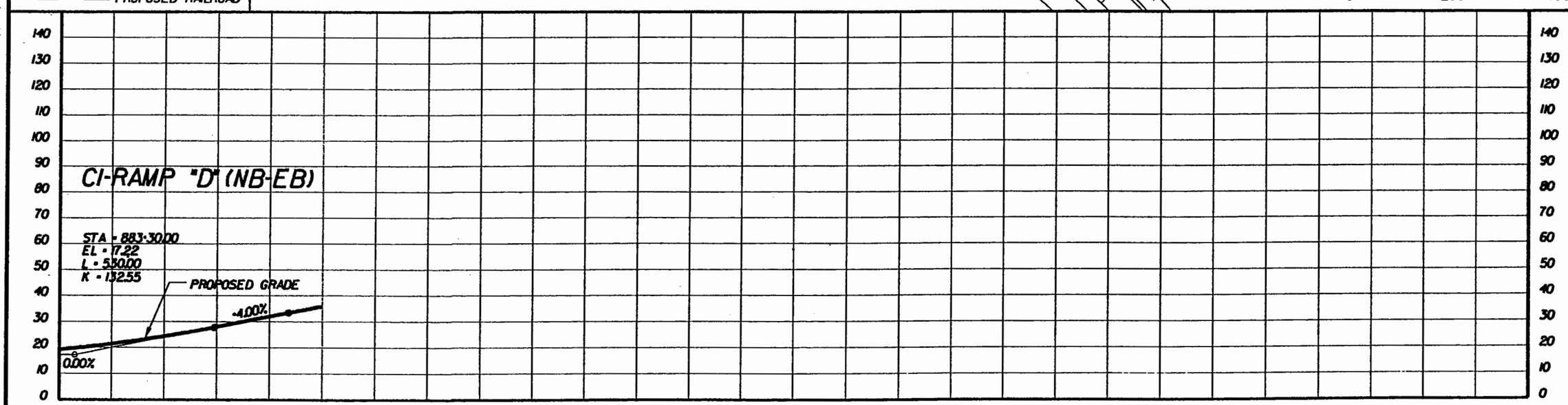
CI - RAMP D NB - EB

880 885 890 895 900 905

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

SCALE 0 200' 400'



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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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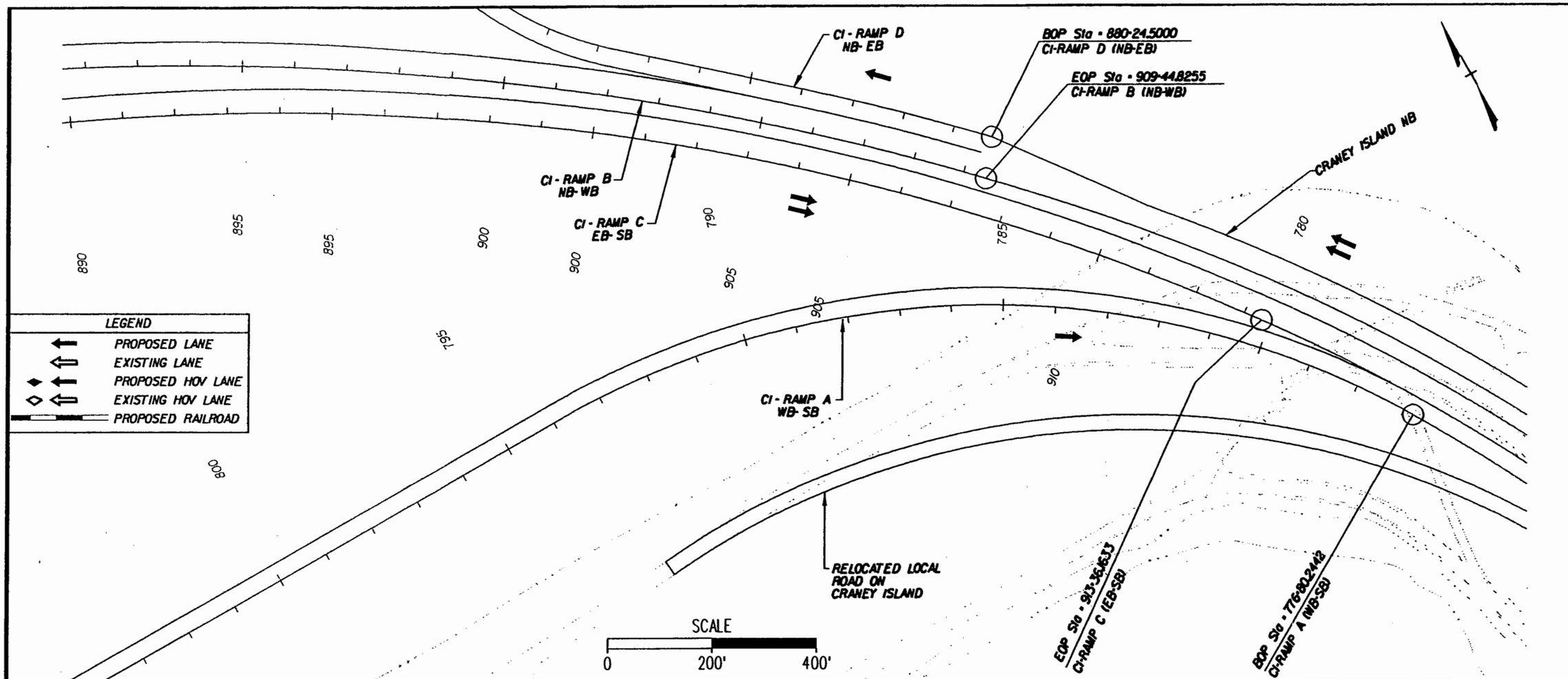

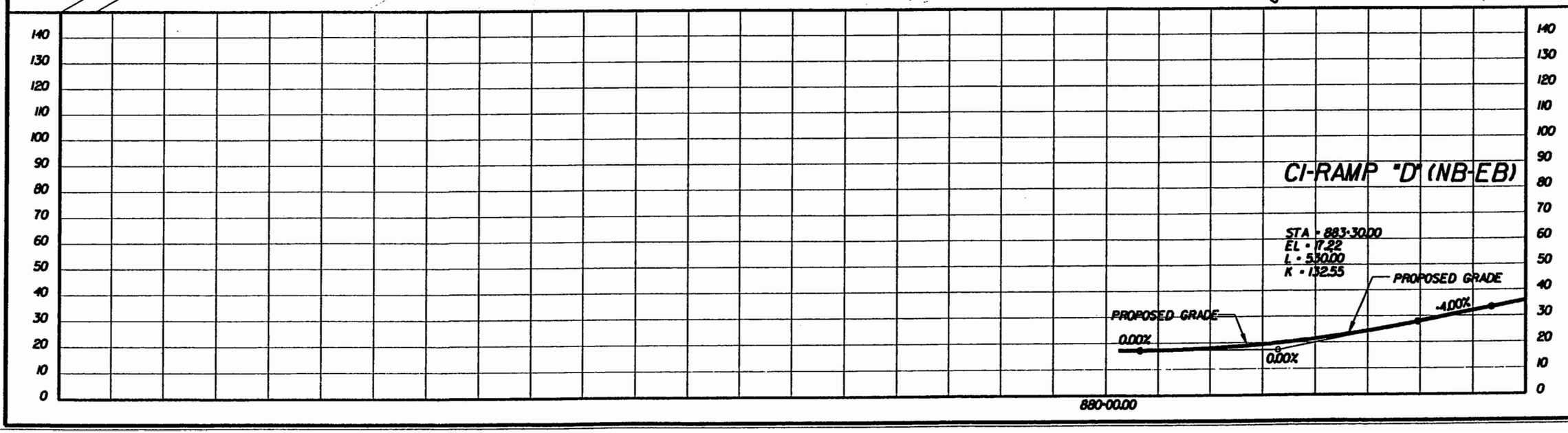

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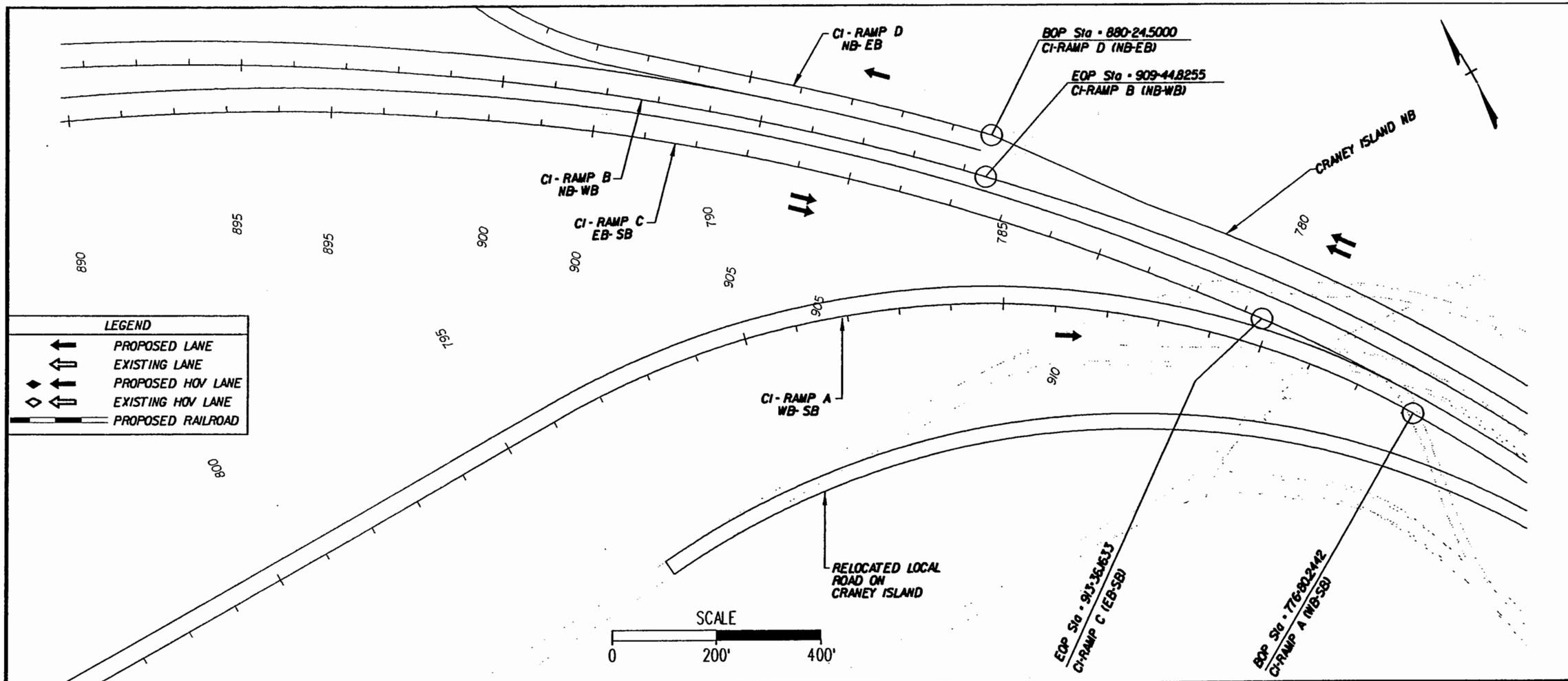
QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

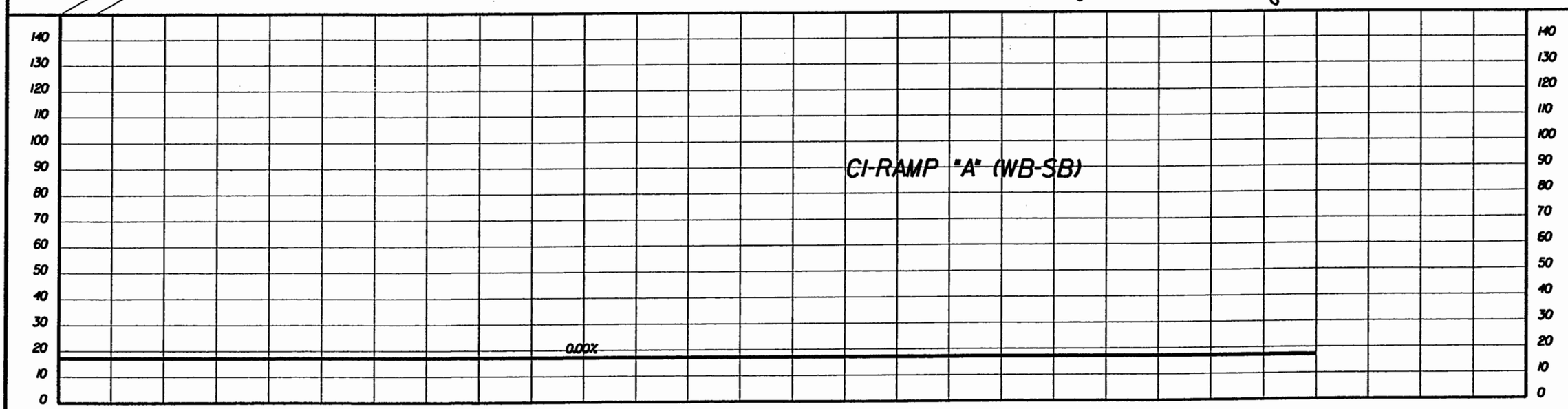
DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2-009K





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DESIGN	AAA	DATE	
DRAWN	BBB	DATE	
CHCK	CCC	DATE	
APPR		DATE	

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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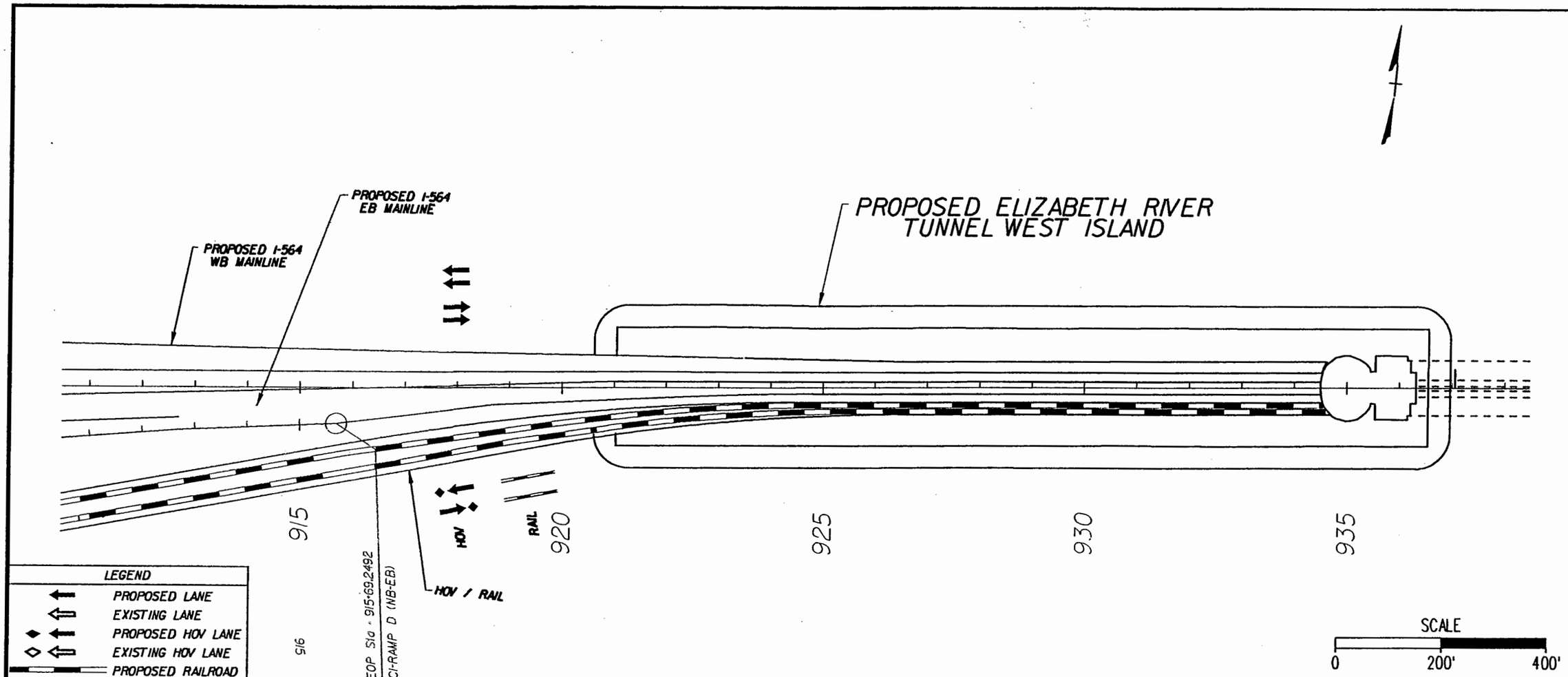

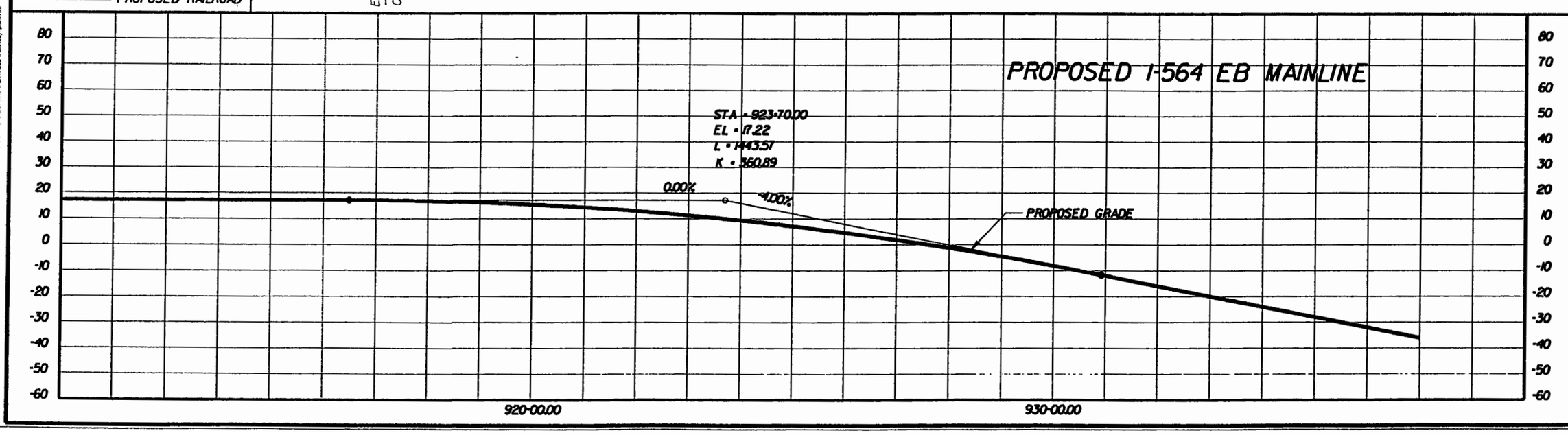

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MICHAEL BAKER JR., INC.

DESIGN AAA	DATE	DRAWN BBB	DATE
CHCK CCC	DATE	APPR	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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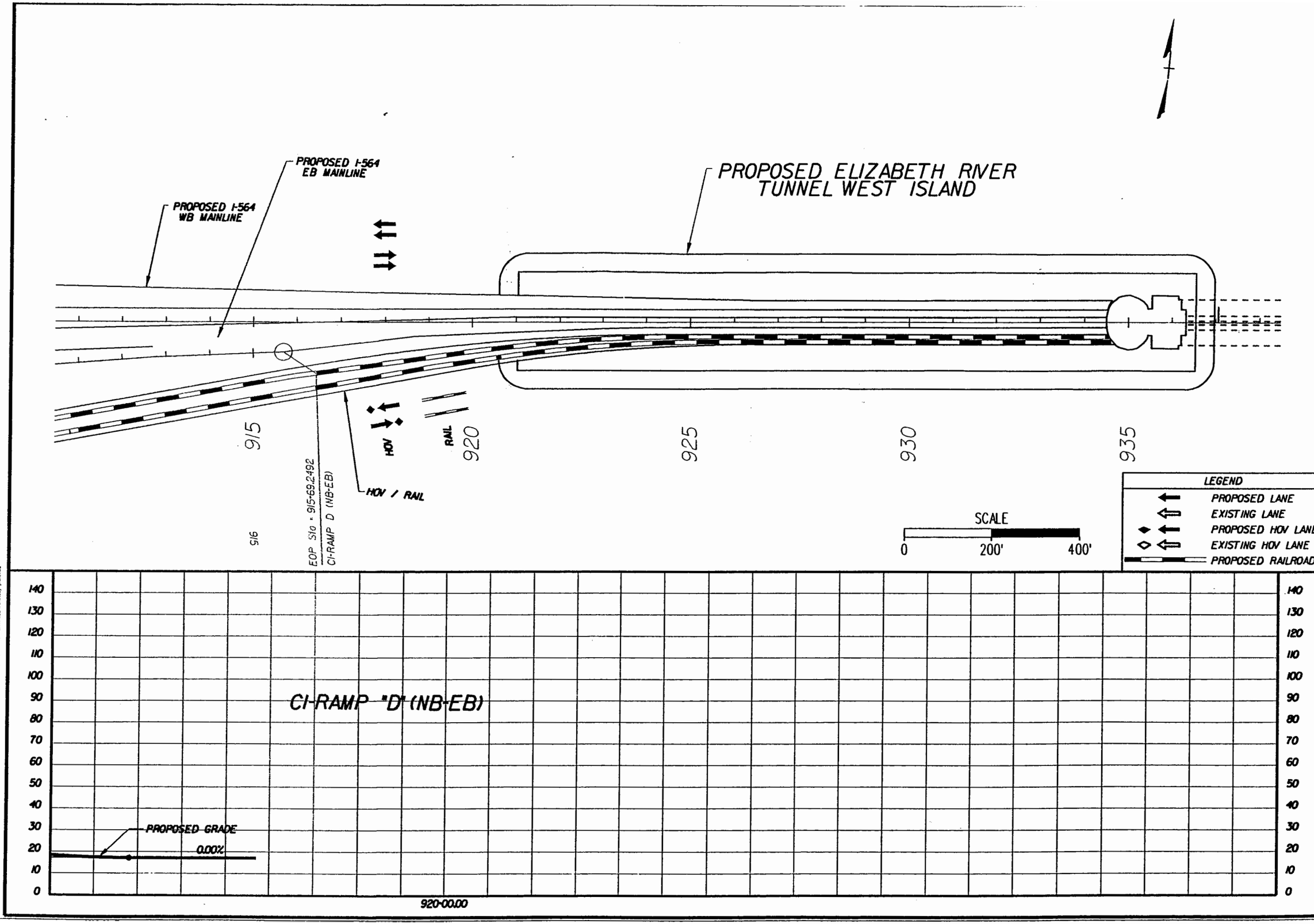

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QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	
DRAWN	BBB	DATE	
CHCK	CCC	DATE	
APPR		DATE	

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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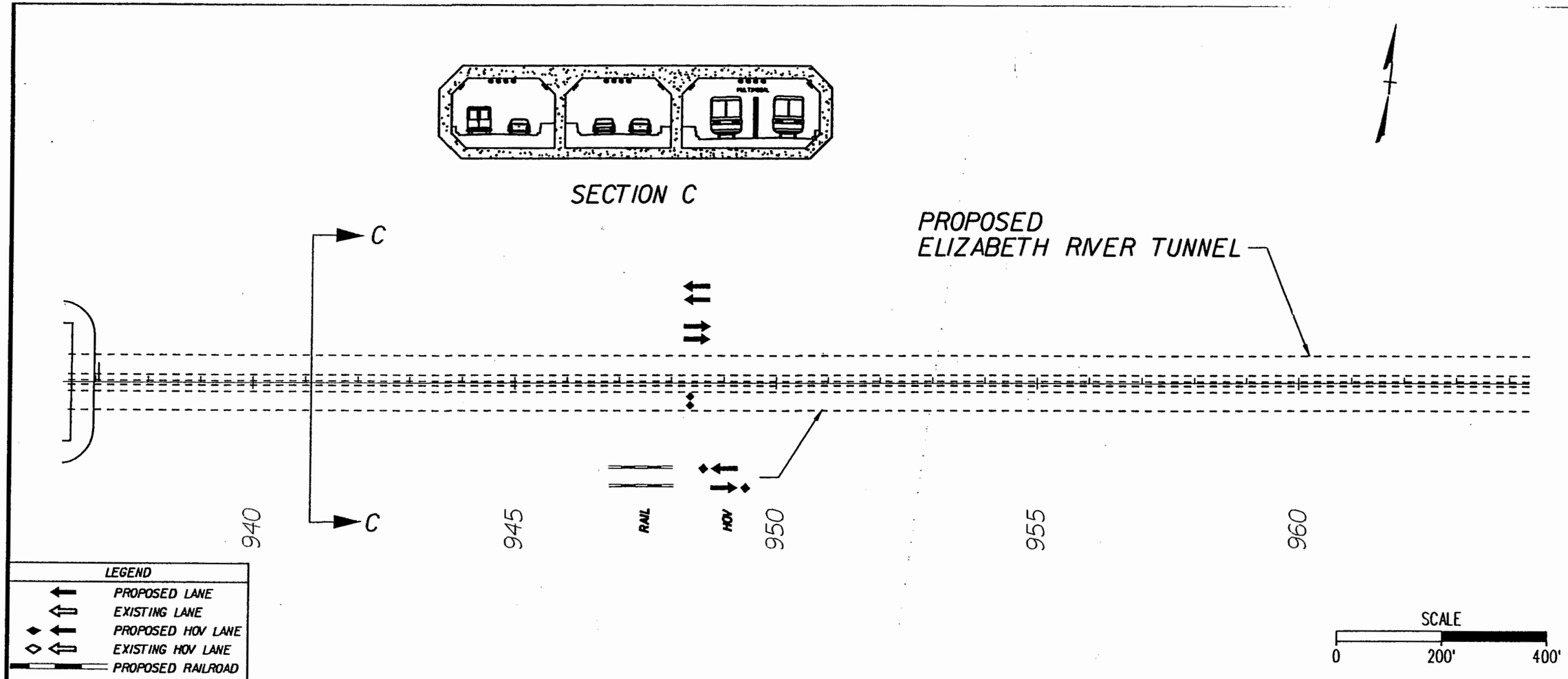

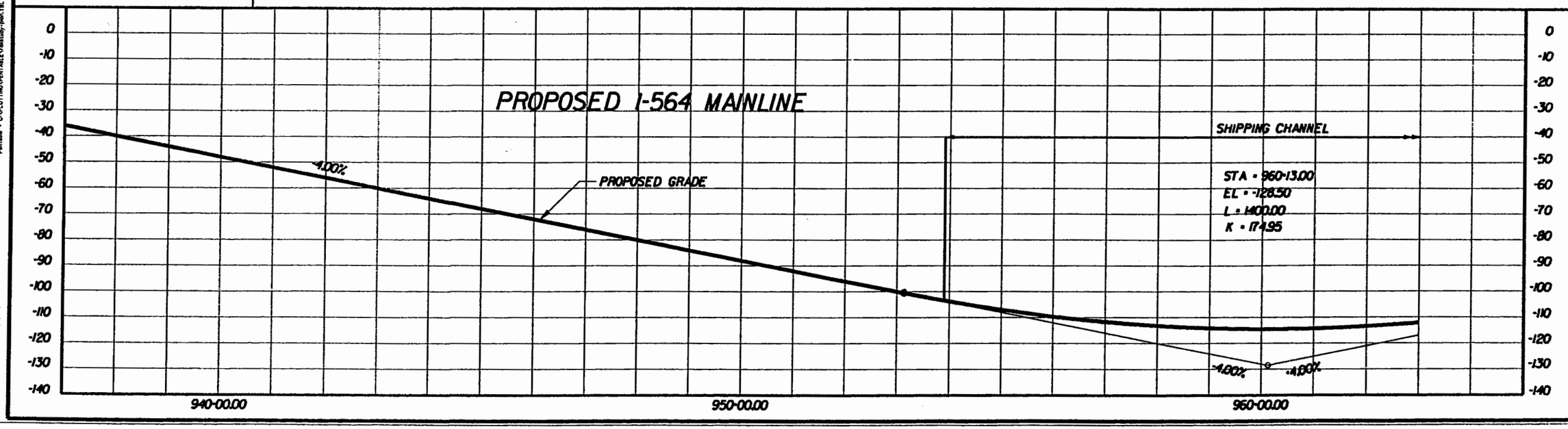

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

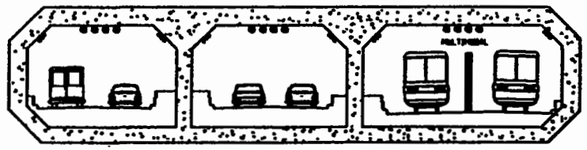
ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2-011

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD



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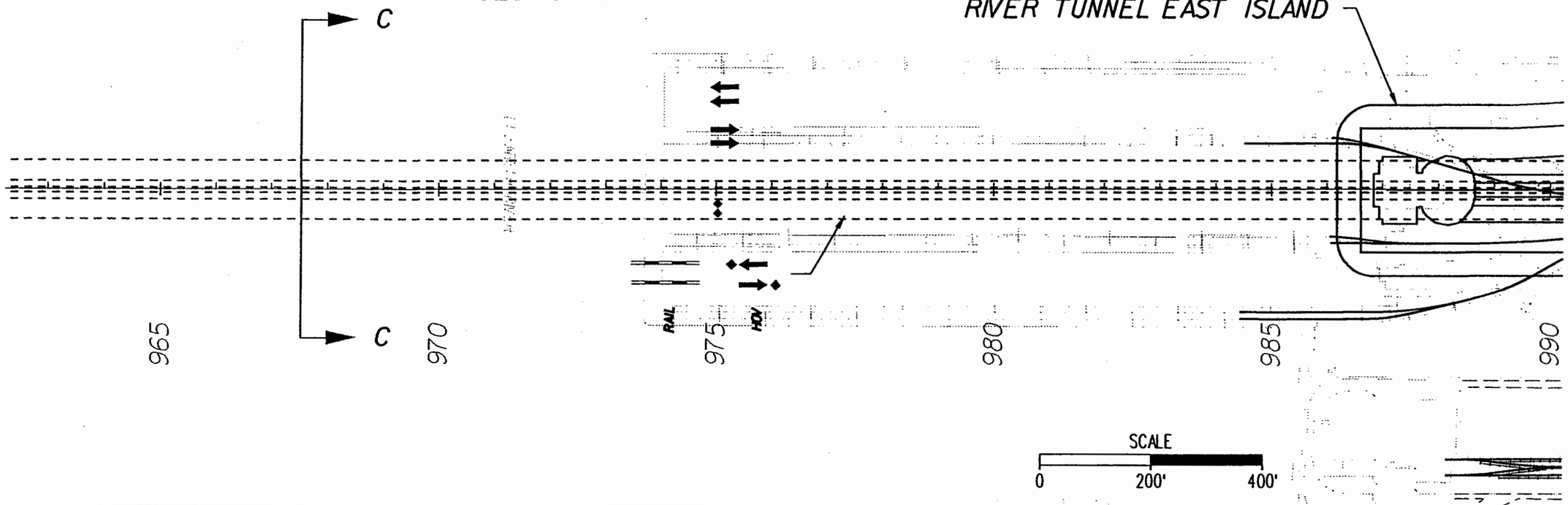

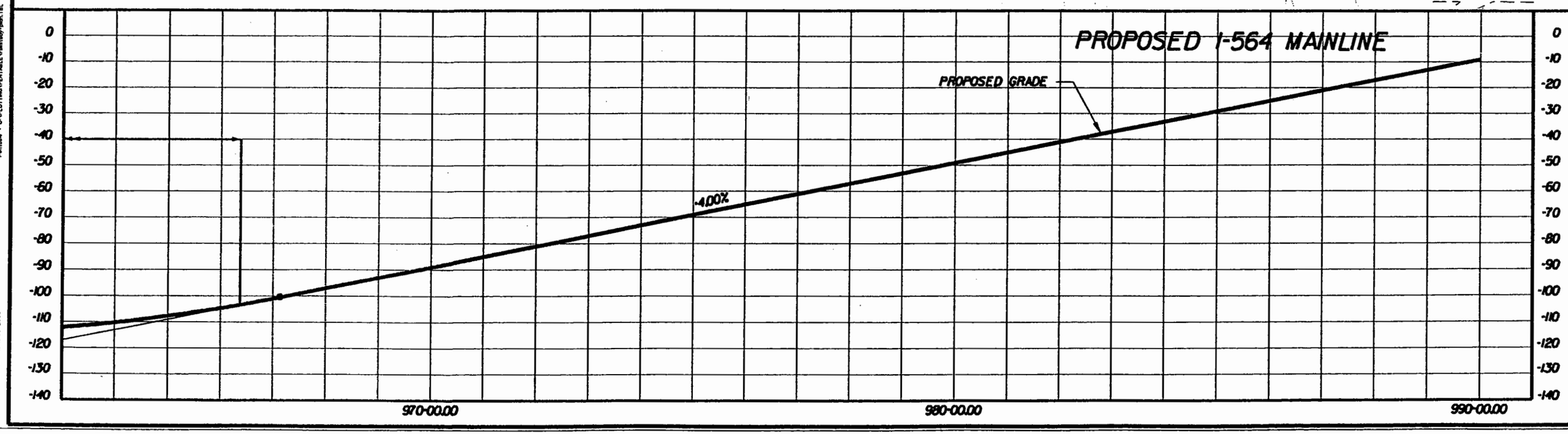

PREPARED BY
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MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2
HOV/RAIL
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2-012

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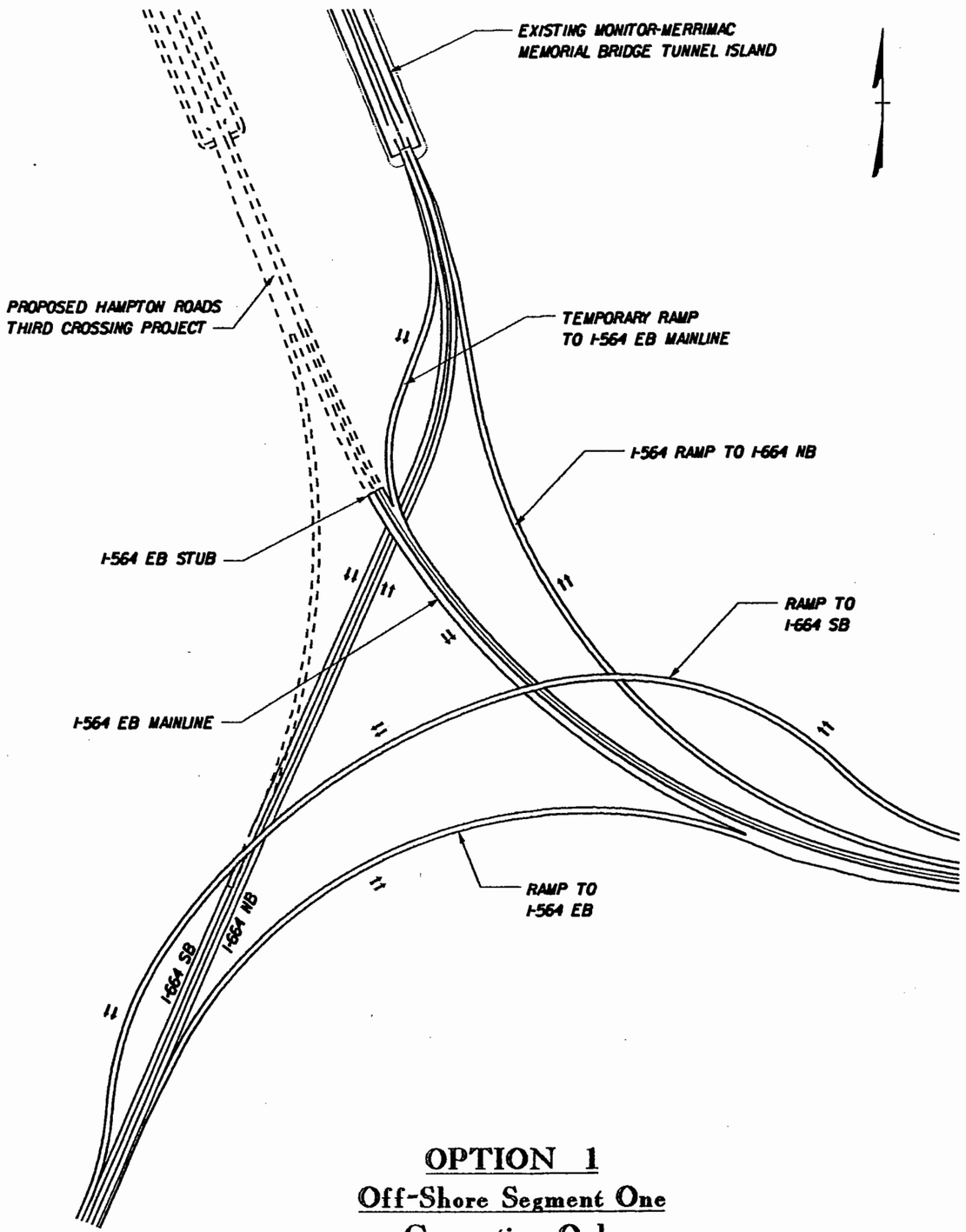

OPTION 1
Off-Shore Segment One Connection Only

SCALE
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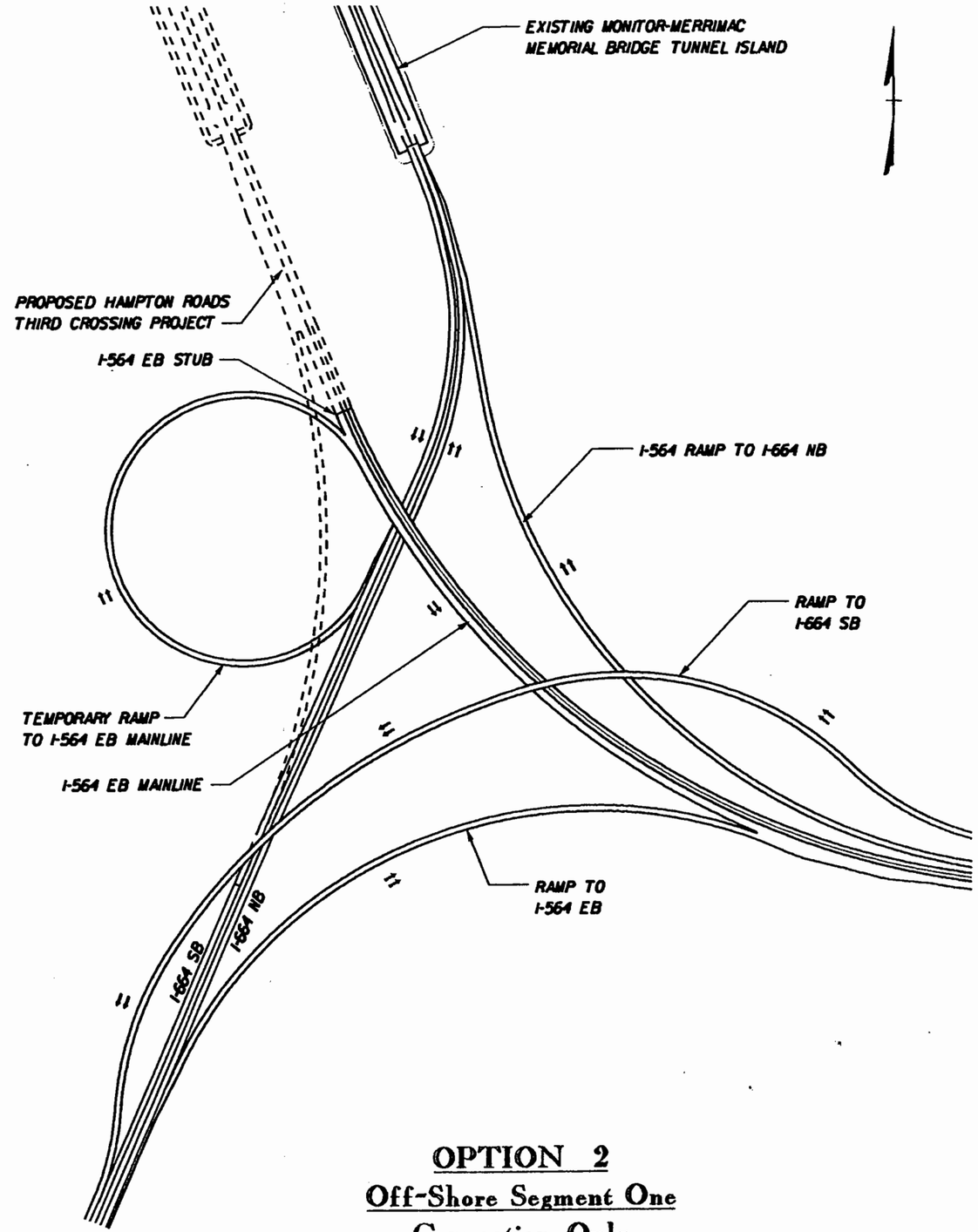

OPTION 2
Off-Shore Segment One Connection Only

SCALE
0 1000' 2000'

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MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

SEGMENT ONE
OFF-SHORE CONNECTION ONLY

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
SEGMENT ONE

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Date/Time = Mon Jul 14 13:41:13 2003

HAZARDOUS MATERIAL INSPECTION STATION

FLAGGING STATION

RAMP VA-WB-EN

RAMP VA-WB-EX

VIRGINIA AVE.

PROPOSE ELIZABETH RIVER TUNNEL EAST ISLAND

Approach Zone Limit

ISLAND ACCESS ROAD TURN AROUND

(HOV)

(RAIL)

Approach Zone Limit

RAMP VA-WB-EN

PROPOSED I-564 MAINLINE

Beginn

RAMP VA-EB-EN

RAMP VA-EB-EX

PROPOSED I-564 MAINLINE

(HOV)

(RAIL)

(HOV)

OPTION 1
INSPECTION STATION NORFOLK

SCALE

0 100' 200'

LEGEND	
←	PROPOSED LANE
⇦	EXISTING LANE
◆ ←	PROPOSED HOV LANE
◇ ⇦	EXISTING HOV LANE
▬	PROPOSED RAILROAD

PREPARED BY

PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.

MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHECK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

OPTION #1

INSPECTION STATION NORFOLK

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
INSPECTION STATION OPTION #1

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Design File = O:\126467A\ROALSTUDY\sheets\inspec station-Leg.
Date/Time = Mon JUN 16 13:45:54 2003

HAZARDOUS MATERIAL INSPECTION STATION

VIRGINIA AVE.

FLAGGING STATION TO BE LOCATED AT START OF RAMP

PROPOSE ELIZABETH RIVER TUNNEL EAST ISLAND

Approach Zone Limit

ISLAND ACCESS ROAD TURN AROUND

(HOV) (RAIL)

Approach Zone Limit

RAMP VA-WB-EN

RAMP VA-WB-EX

RAMP VA-WB-EN

PROPOSED I-564 MAINLINE

Begin

RAMP VA-EB-EN

RAMP VA-EB-EX

PROPOSED I-564 MAINLINE

(HOV) (RAIL)

OPTION 2
INSPECTION STATION NORFOLK

SCALE

0 100' 200'

LEGEND	
	PROPOSED LANE
	EXISTING LANE
	PROPOSED HOV LANE
	EXISTING HOV LANE
	PROPOSED RAILROAD

PREPARED BY

PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.

MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

OPTION #2

INSPECTION STATION NORFOLK

I-564 INTERMODAL CONNECTOR

Rail Connection Study

(FO) R000-122-108, PE-101

DWG. NO

INSPECTION STATION OPTION #2

Plot File = bh\inspec station-2.plt
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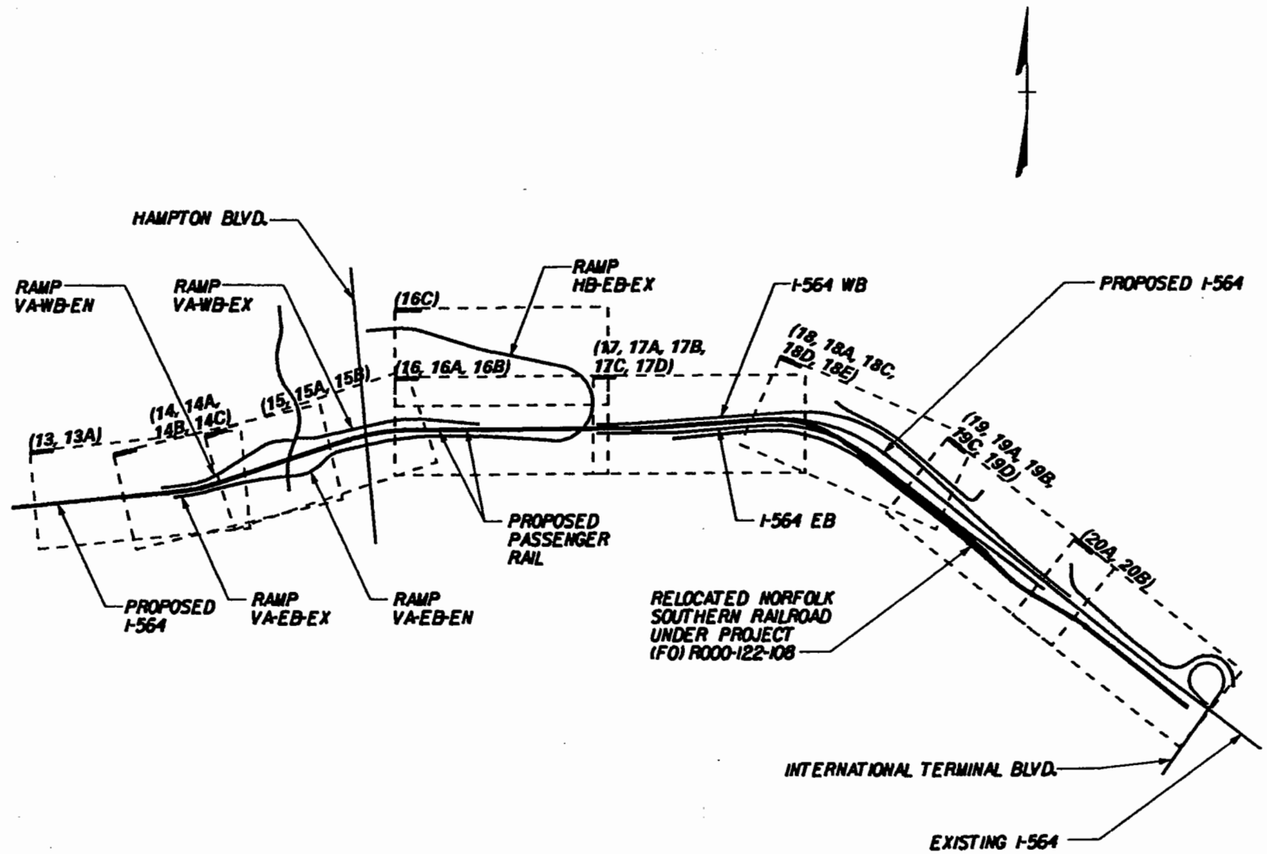
Design File = D:\24847A\BALSTUDY\sheets\inspec station-2.dgn
Date/Time = mon Jul 14 13:45:00 2003

INDEX OF SHEETS

SHEET NO. 13	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 13A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 14	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 14A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 14B	ALIGNMENT RAMP VA-WB-EN PLAN AND PROFILE
SHEET NO. 14C	ALIGNMENT RAMP VA-EB-EX PLAN AND PROFILE
SHEET NO. 15	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 15A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 15B	ALIGNMENT RAMP VA-EB-EN PLAN AND PROFILE
SHEET NO. 16	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 16A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 16B	ALIGNMENT RAMP HB-EB-EX PLAN AND PROFILE
SHEET NO. 16C	ALIGNMENT RAMP HB-EB-EX PLAN AND PROFILE
SHEET NO. 17	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 17A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 17B	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 17C	ALIGNMENT I-564 WB PLAN AND PROFILE
SHEET NO. 17D	ALIGNMENT RELOCATED NORFOLK SOUTHERN PLAN AND PROFILE
SHEET NO. 18	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 18A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 18B	NOT USED
SHEET NO. 18C	ALIGNMENT I-564 WB PLAN AND PROFILE
SHEET NO. 18D	ALIGNMENT RELOCATED NORFOLK SOUTHERN PLAN AND PROFILE
SHEET NO. 18E	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 19	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 19A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 19B	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 19C	ALIGNMENT I-564 WB PLAN AND PROFILE
SHEET NO. 19D	ALIGNMENT RELOCATED NORFOLK SOUTHERN PLAN AND PROFILE
SHEET NO. 20	NOT USED
SHEET NO. 20A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 20B	ALIGNMENT RELOCATED NORFOLK SOUTHERN PLAN AND PROFILE

ALTERNATIVE-1A ON SHORE



SCALE

0 2000' 4000'

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MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A ON SHORE

KEYMAP

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT1A-2KEY

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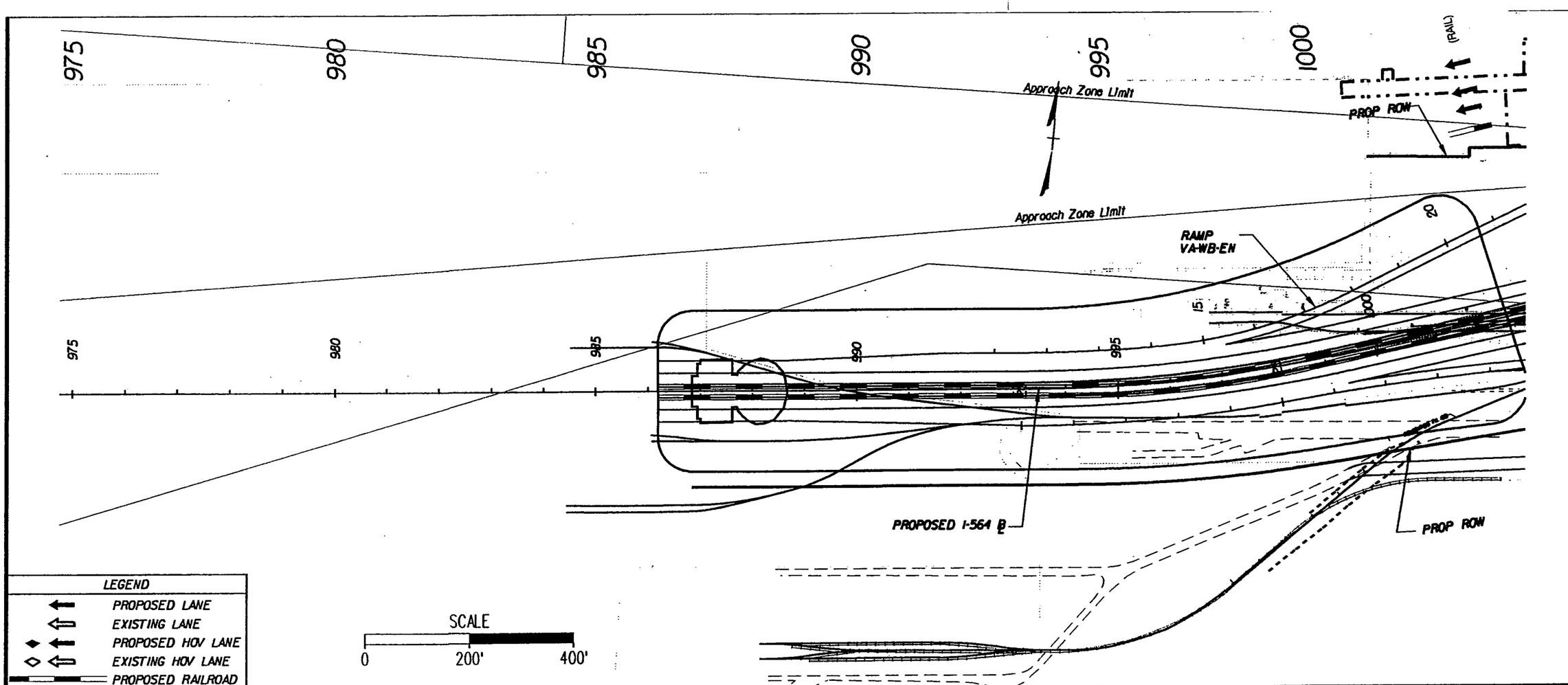

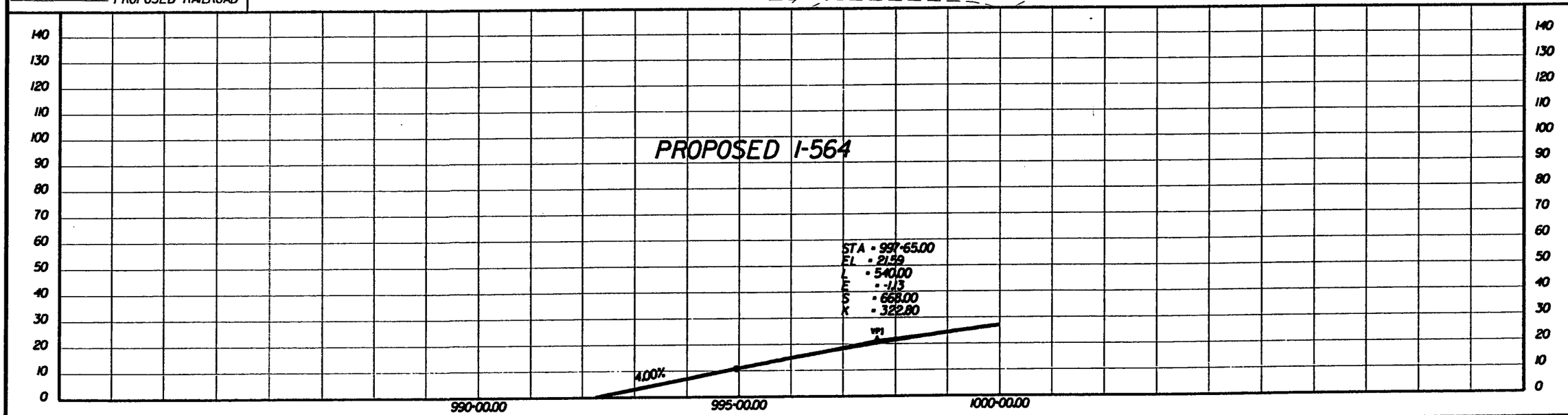

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHECK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-013

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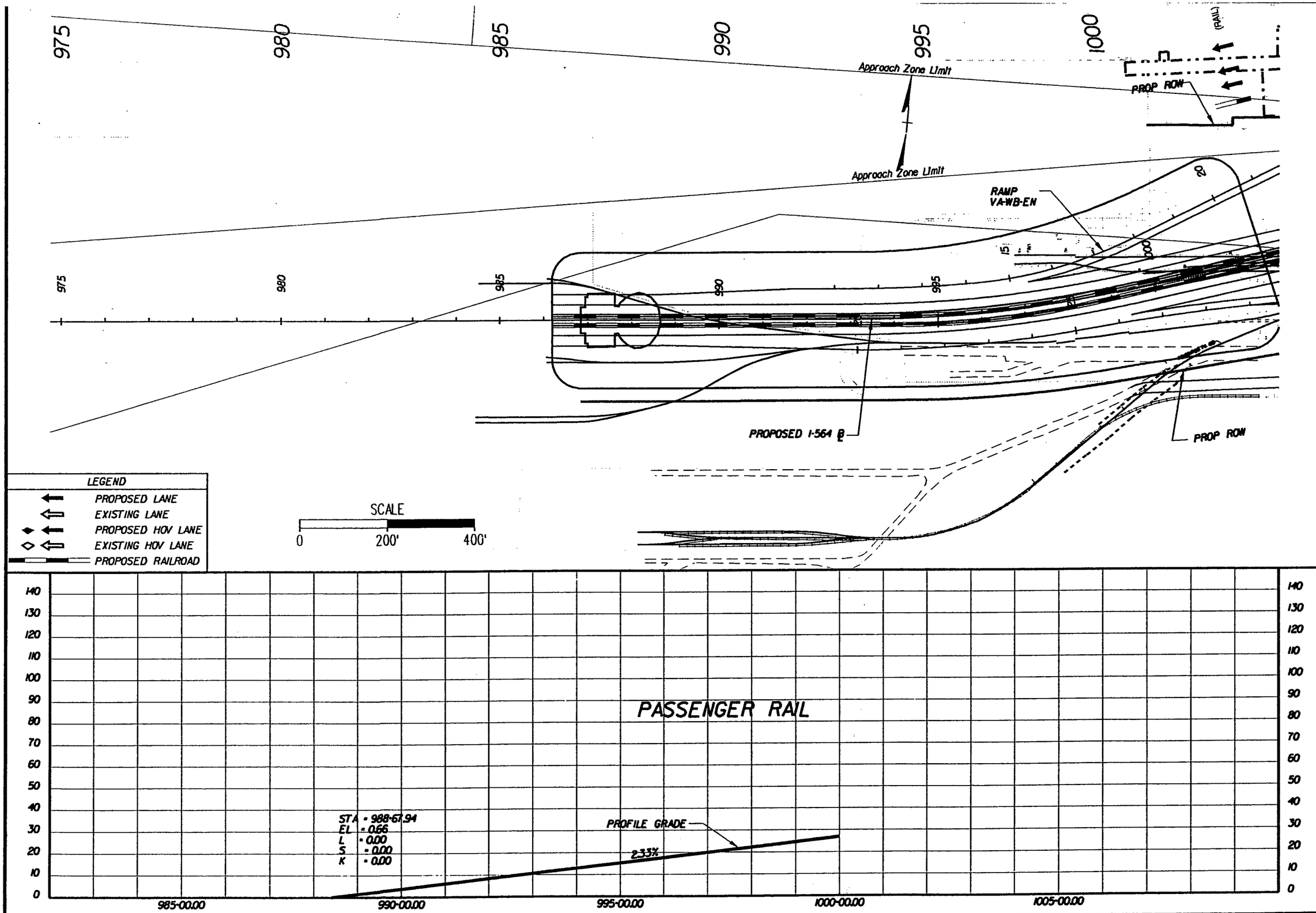

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-013A

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

Approach Zone Limit

Approach Zone Limit

995 1000 1005 1010 1015

(RAIL) (HOV)

RAMP VA-WB-EN

PROP ROW

RAMP VA-WB-EX

VIRGINIA AVE

RAMP VA-WB-EN

PROPOSED I-564 ℄

RETAINING WALL

PROPOSED I-564 ℄

RAMP VA-EB-EX

PROP ROW

RETAINING WALL

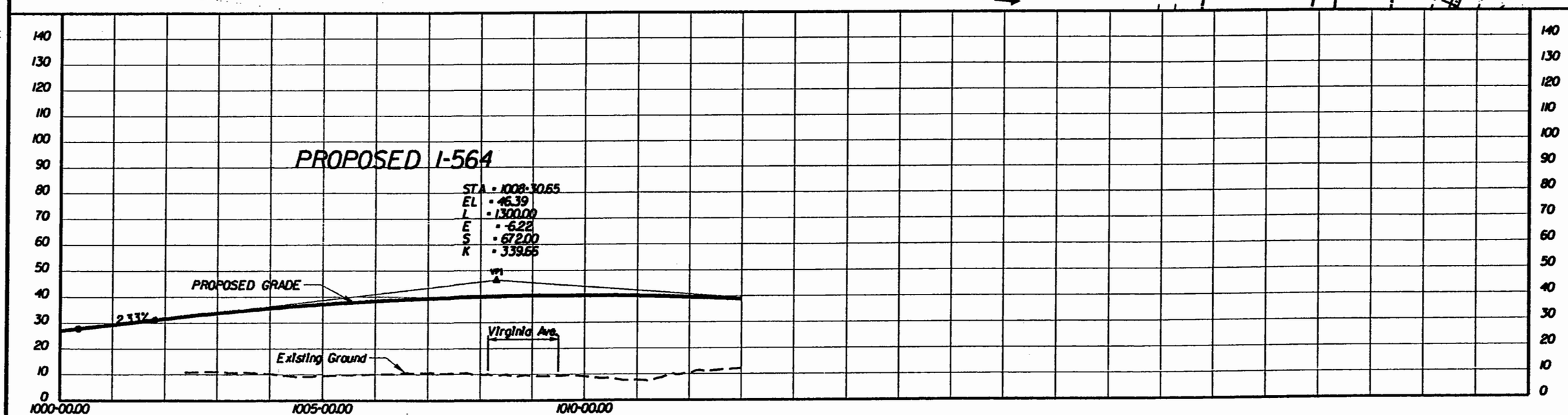
RAMP VA-EB-EN

LIMITS OF WETLANDS

(RAIL) (HOV)

SCALE

0 200' 400'



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DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A

564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT-1A-014

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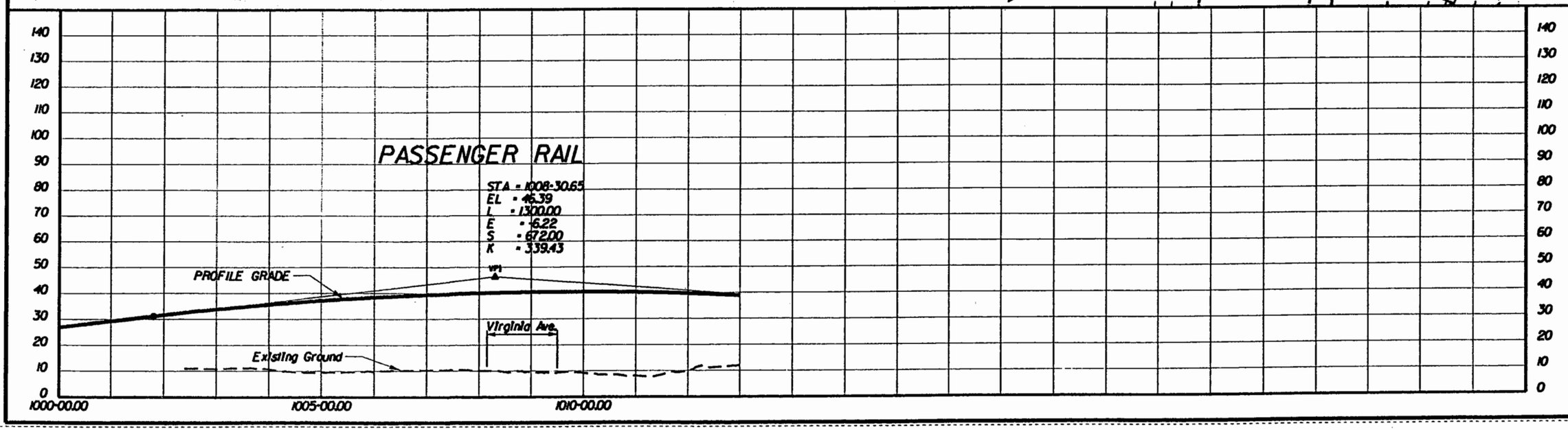
LEGEND
- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

Approach Zone Limit
Approach Zone Limit
PROP ROW
RAMP VA-WB-EN
RAMP VA-WB-EN
RAMP VA-WB-EX
VIRGINIA AVE.
PROPOSED I-564 ℄
PROPOSED I-564 ℄
RETAINING WALL
RETAINING WALL
RAMP VA-EB-EX
RAMP VA-EB-EN
PROP ROW
LIMITS OF WETLANDS
(RAIL)
(HOV)
SCALE
0 200' 400'



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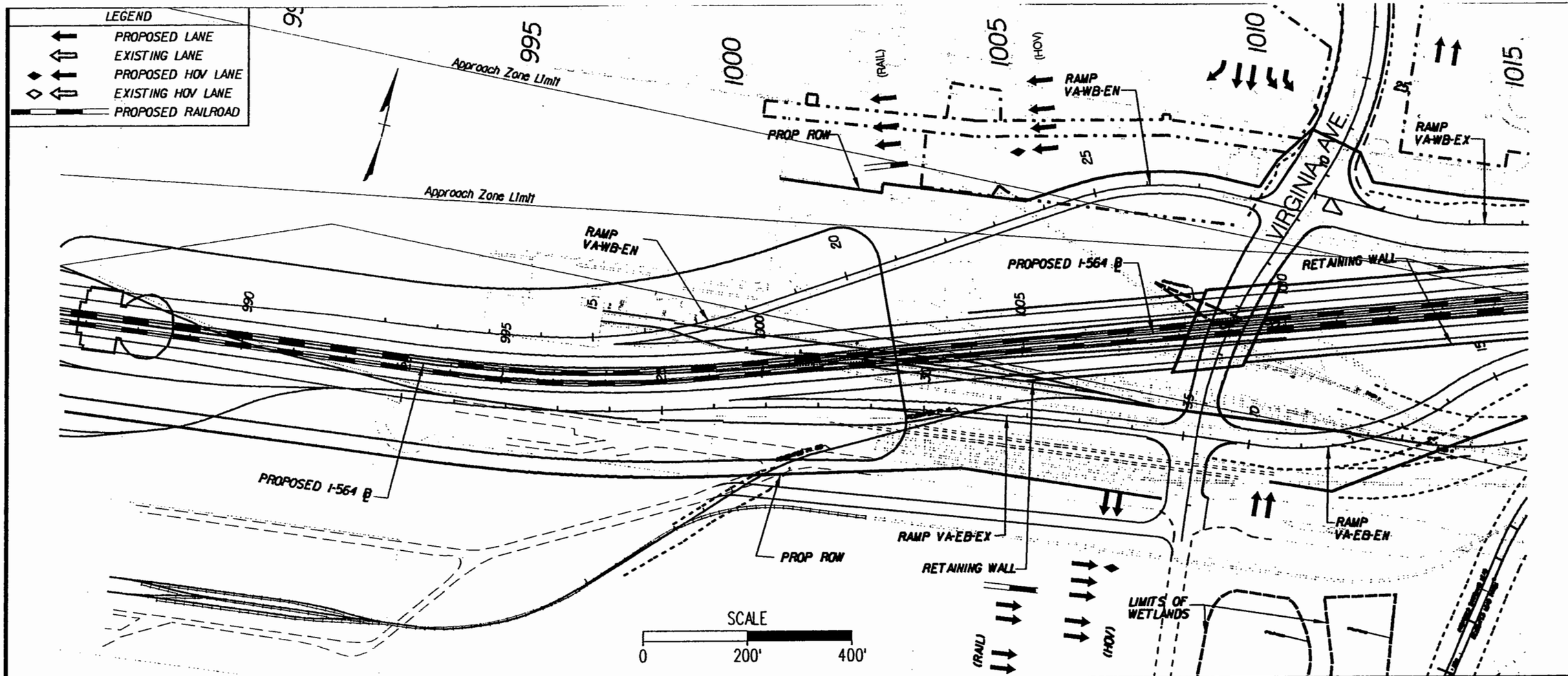
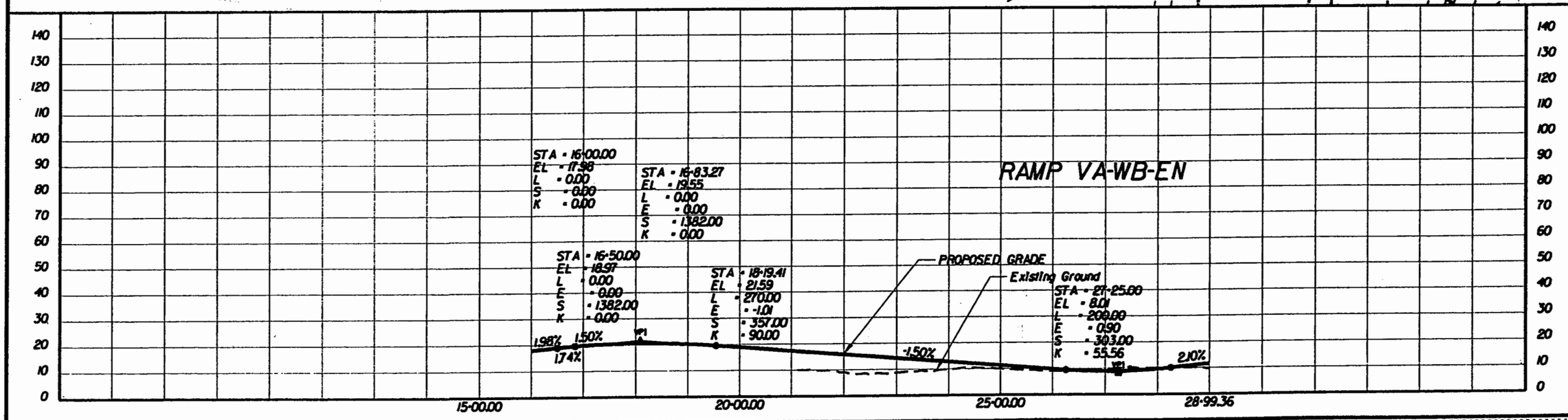
DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-014A





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DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-014B

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

Approach Zone Limit

Approach Zone Limit

PROP ROW

RAMP VA-WB-EN

RAMP VA-WB-EN

RAMP VA-WB-EX

VIRGINIA AVE.

PROPOSED I-564 ℄

PROPOSED I-564 ℄

RETAINING WALL

RAMP VA-EB-EX

RAMP VA-EB-EN

PROP ROW

RETAINING WALL

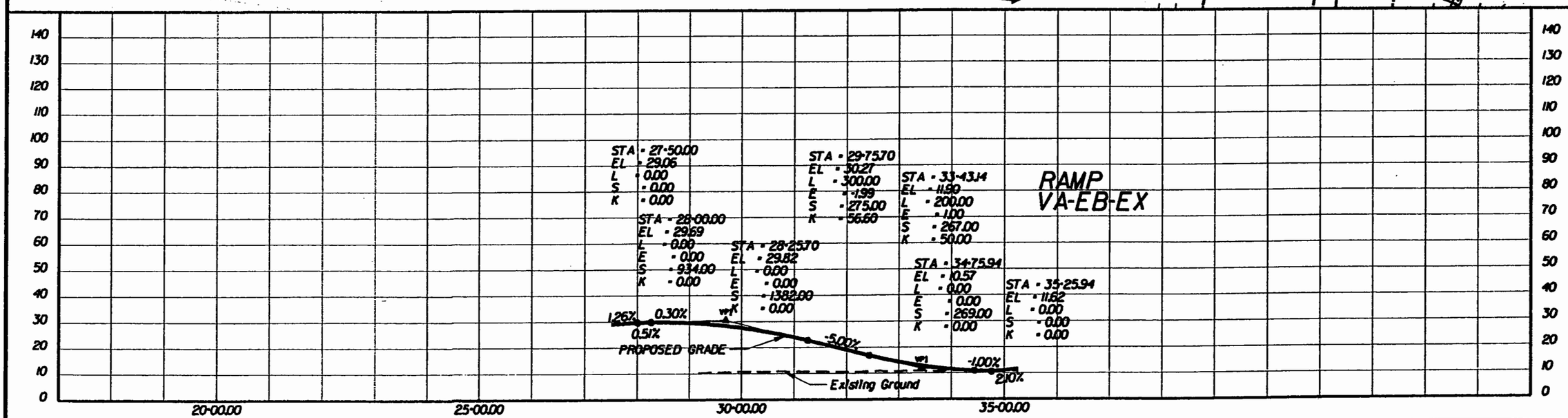
LIMITS OF WETLANDS

(RAIL)

(HOV)

SCALE

0 200' 400'



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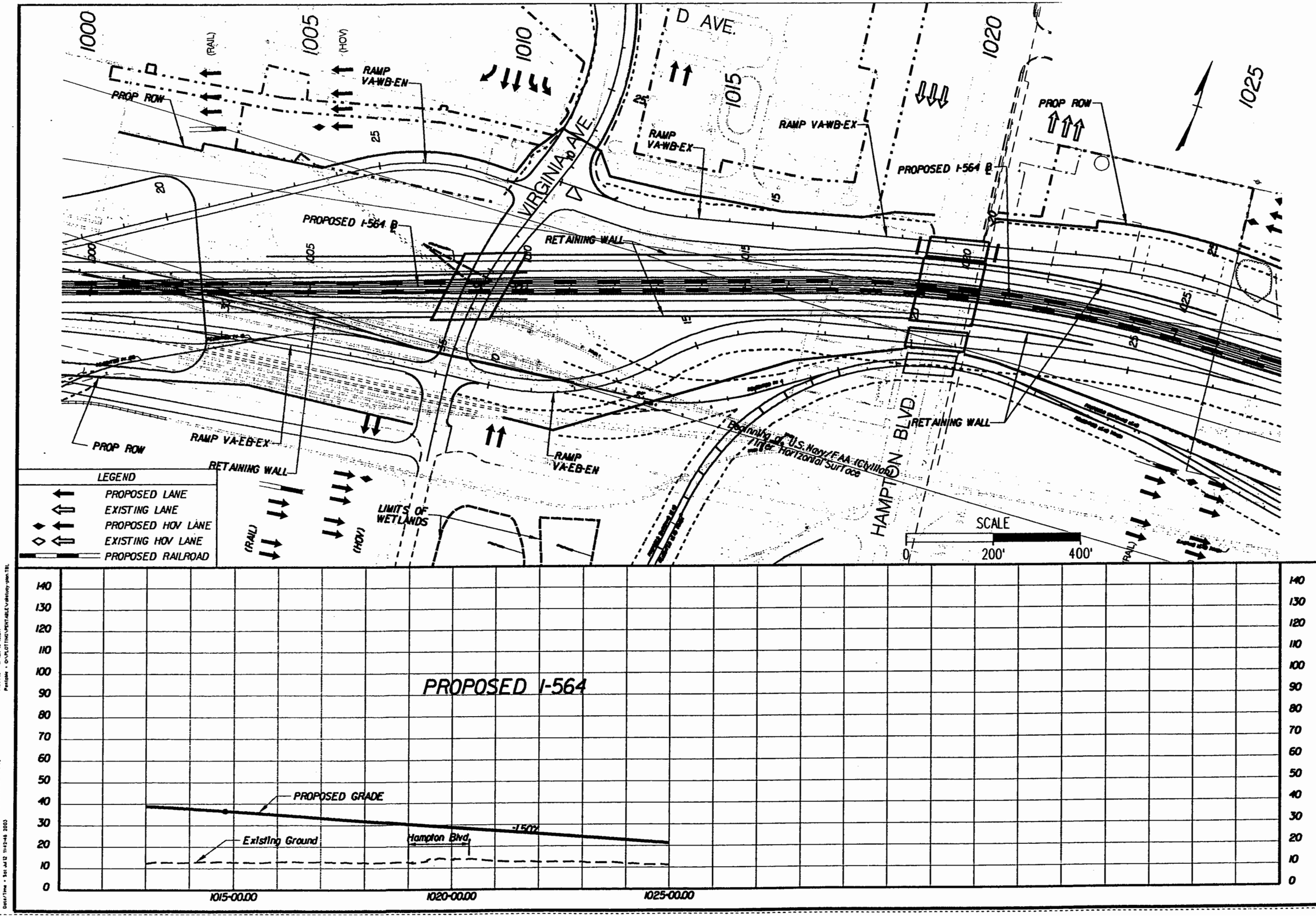
DESIGN	AAA	DATE	
DRAWN	BBB	DATE	
CHCK	CCC	DATE	
APPR		DATE	

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-014C



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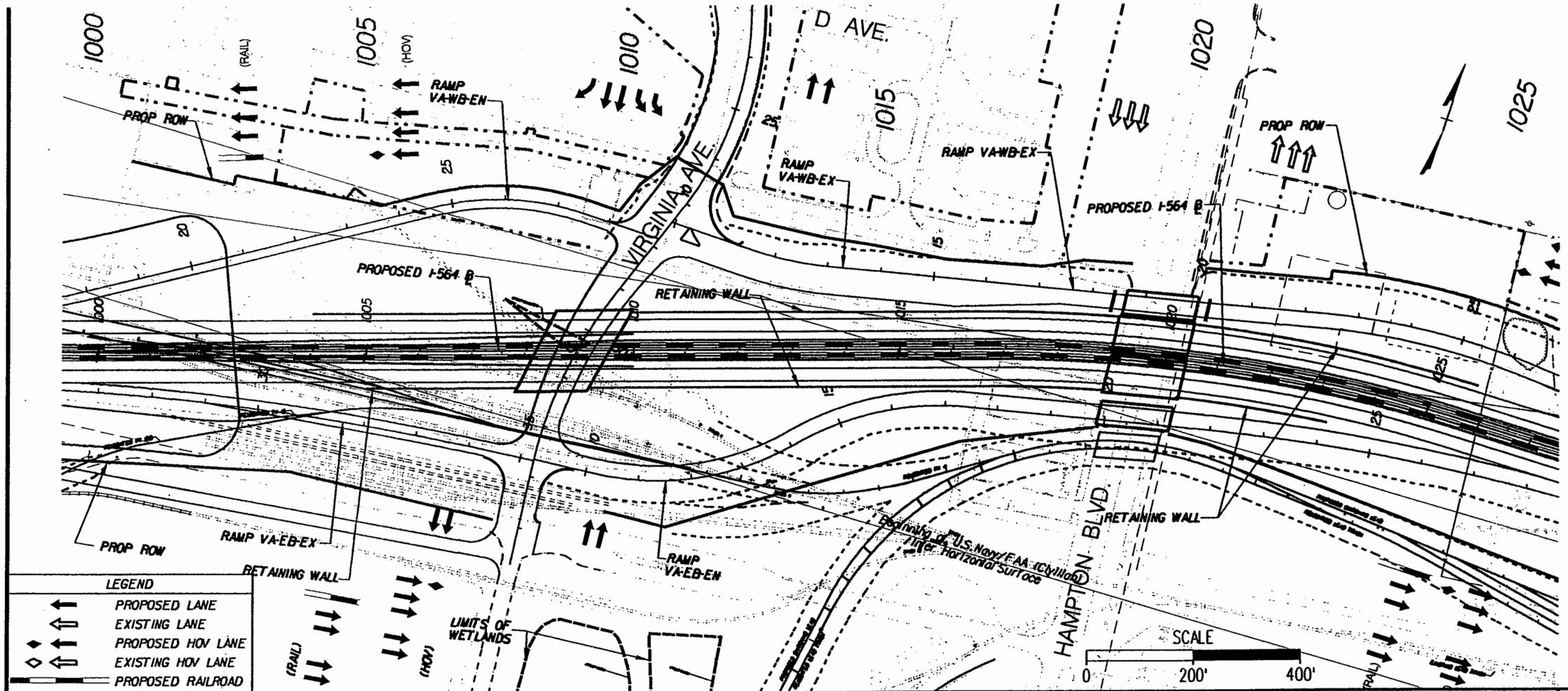
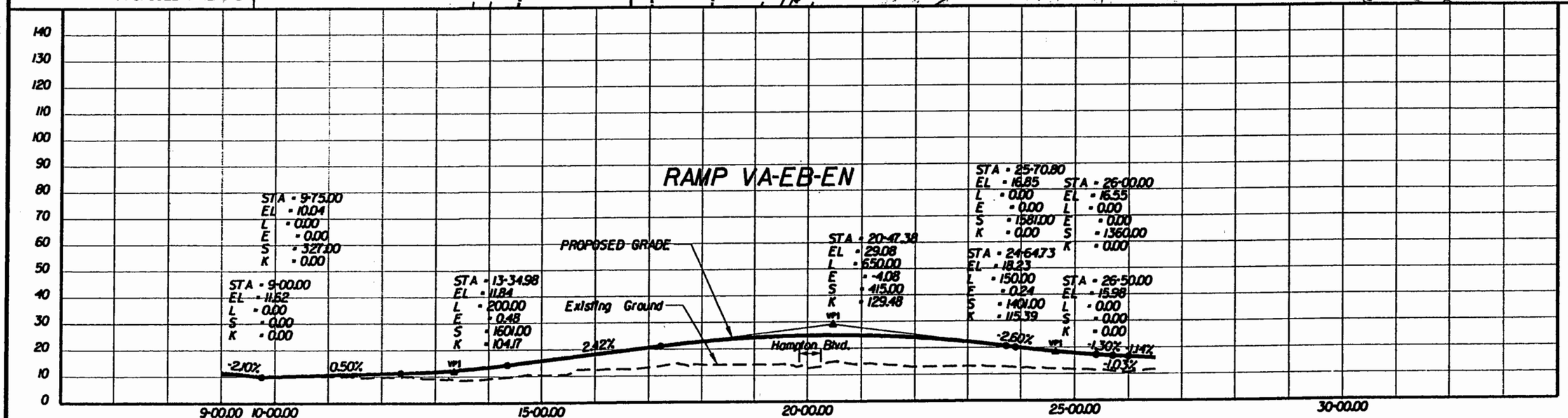
DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-015





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DESIGN	AAA	DATE	DATE
DRWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

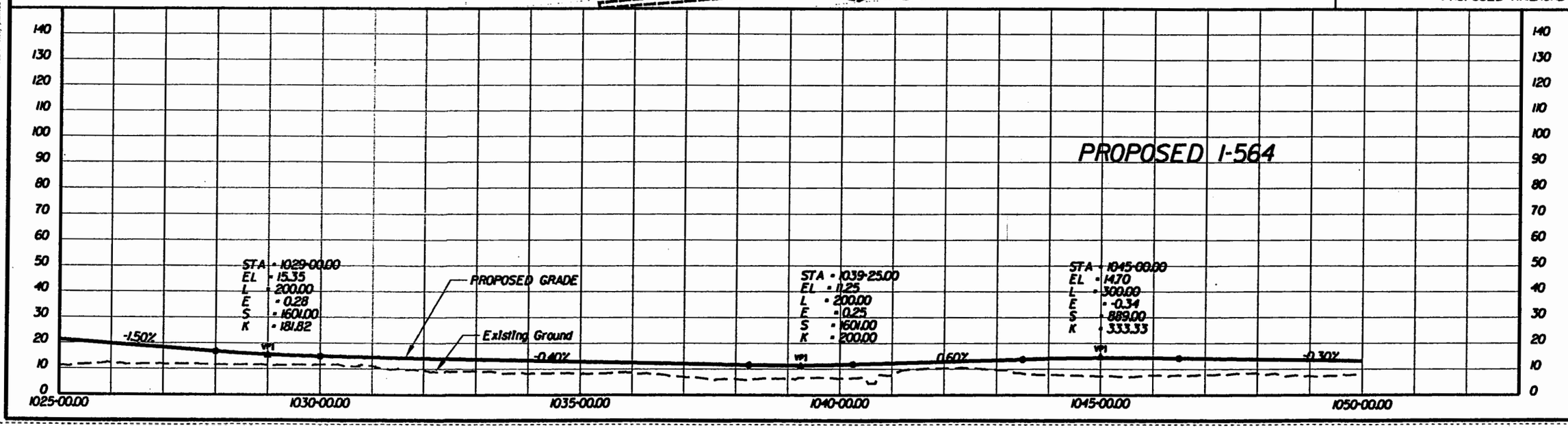
ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-015B

1025
1030
1035
1040
1045
1050
(HOV)
(RAIL)
RAMP VA-WB-EX
PROPOSED I-564 ℄
LIMITS OF WETLANDS
PROP ROW
RAMP HB-WB-EN
RAMP HB-EB-EX
Approach Zone Light
RETAINING WALL
RAMP VA-EB-EN
PROPOSED PASSENGER RAIL
RELOCATED RAILROAD UNDER PROJECT 0337-122-F14,C-501
SCALE
Beginning of U.S.Navy/F[redacted]
Inter Horizontal Space
200
400'
TOE OF SLOPE
RETAINING WALL
PROP ROW
LIMITS OF WETLANDS

LEGEND
PROPOSED LANE
EXISTING LANE
PROPOSED HOV LANE
EXISTING HOV LANE
PROPOSED RAILROAD



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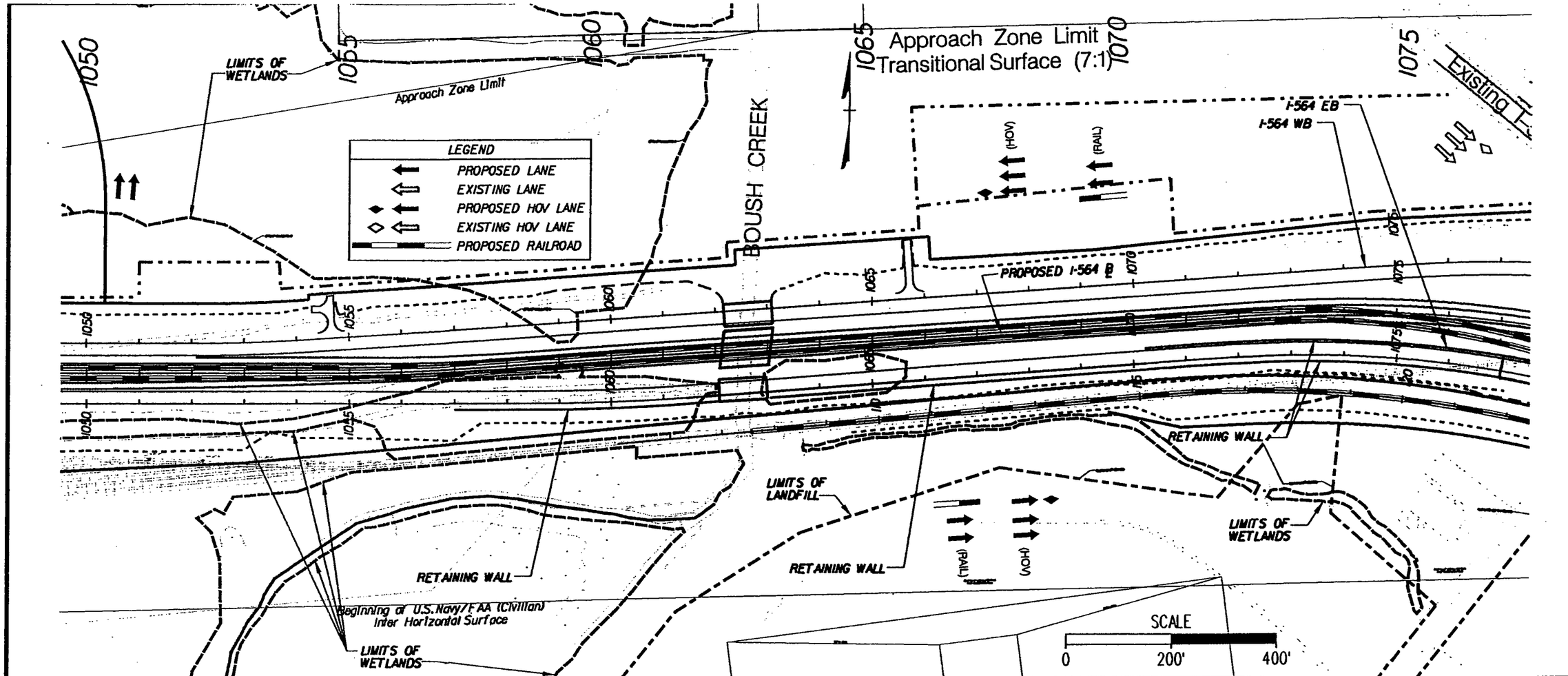
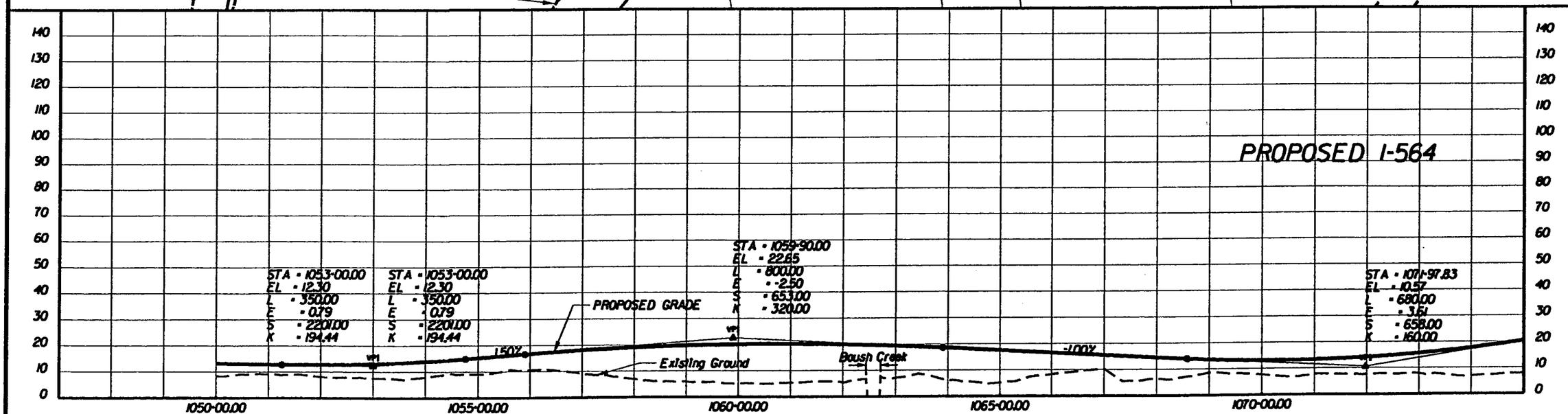
DESIGN	DRWN	CHKD	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-016





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DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
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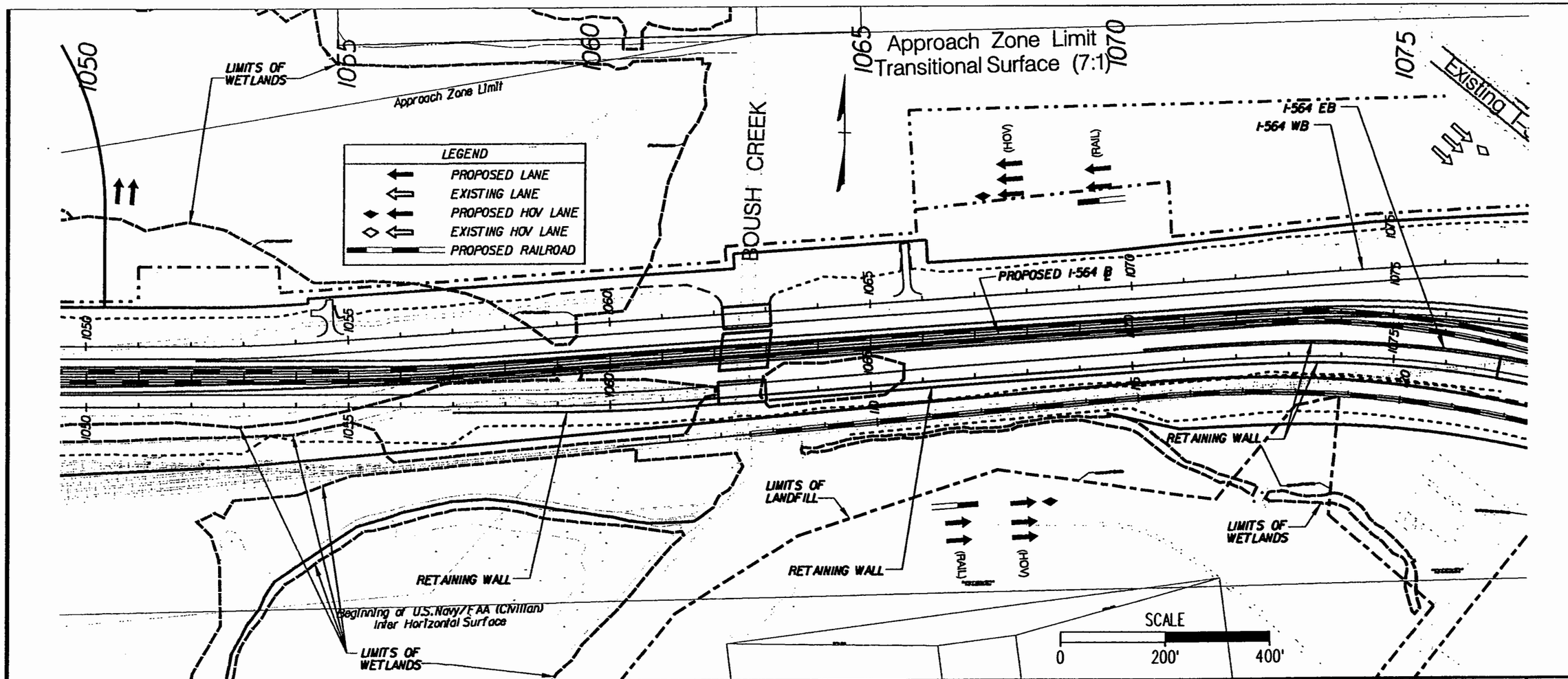
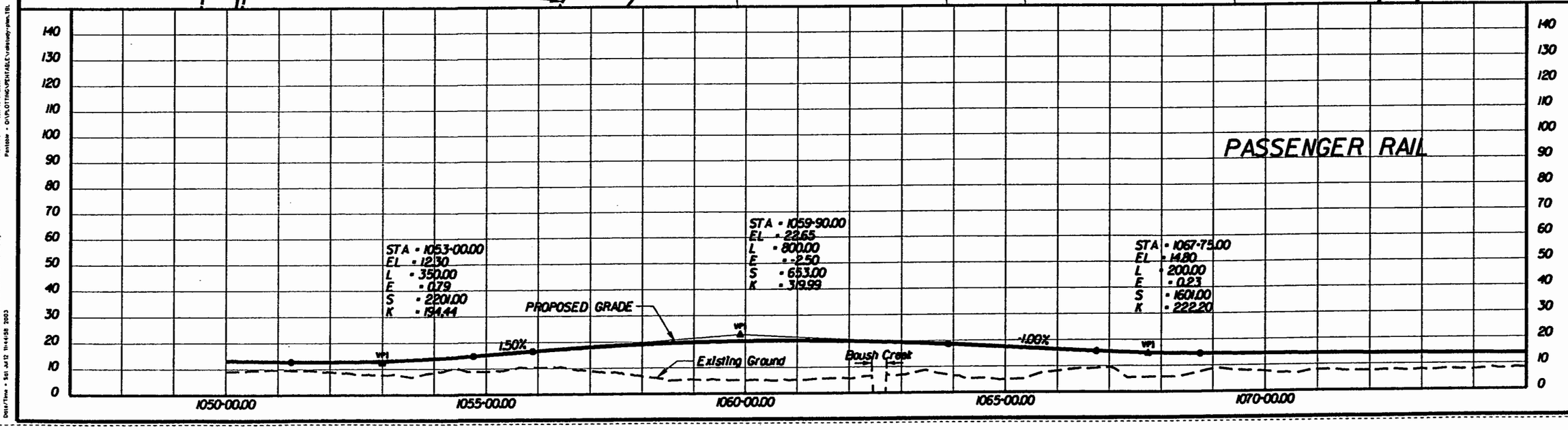
I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-017





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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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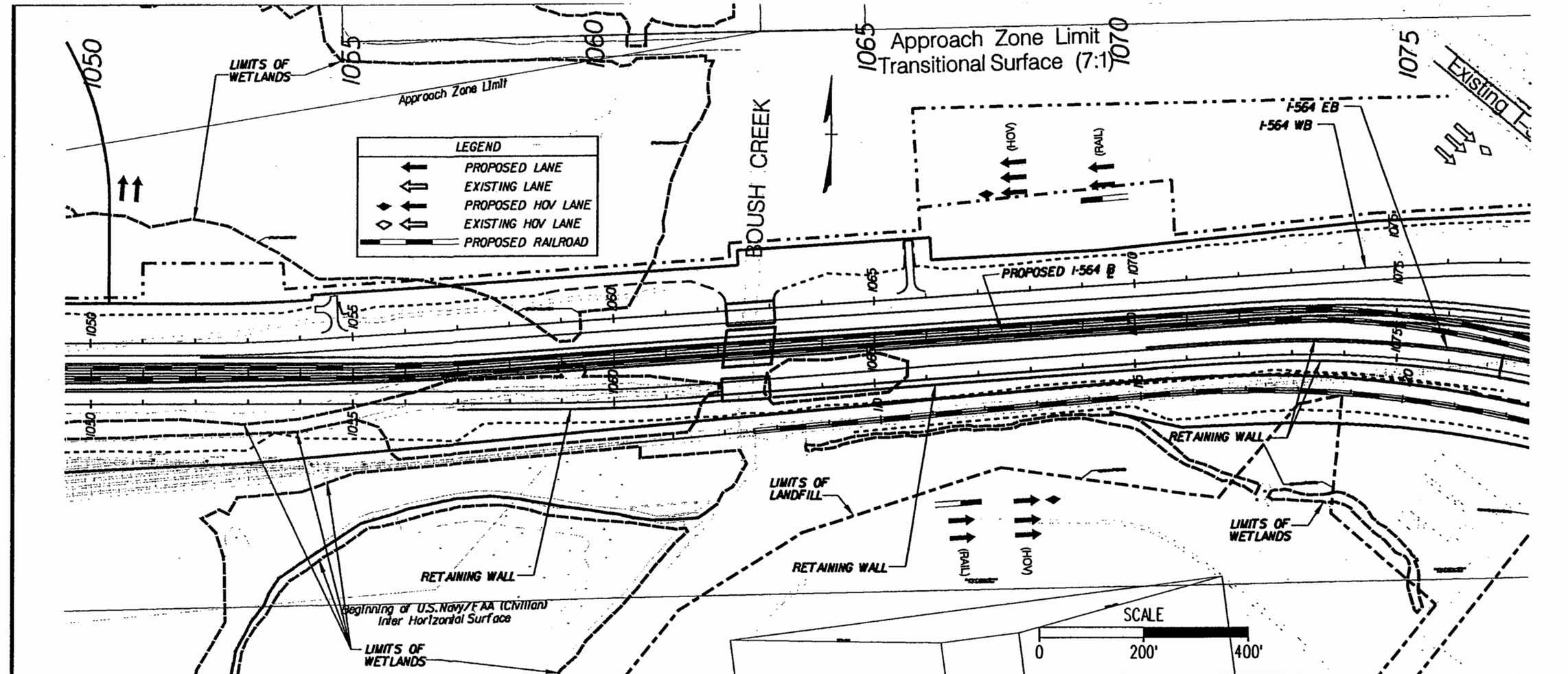

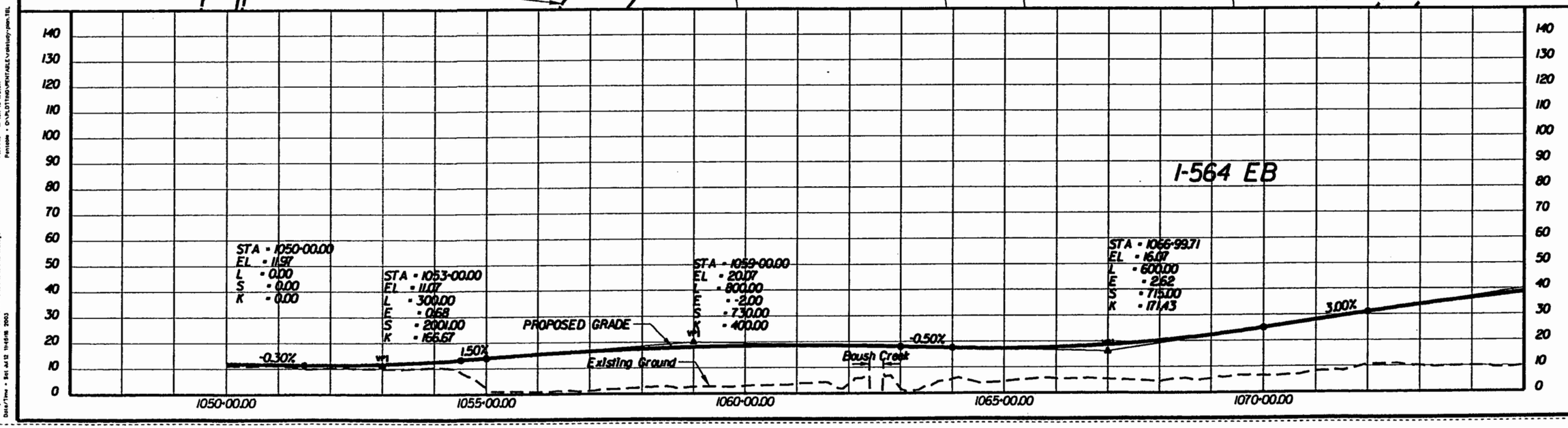

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DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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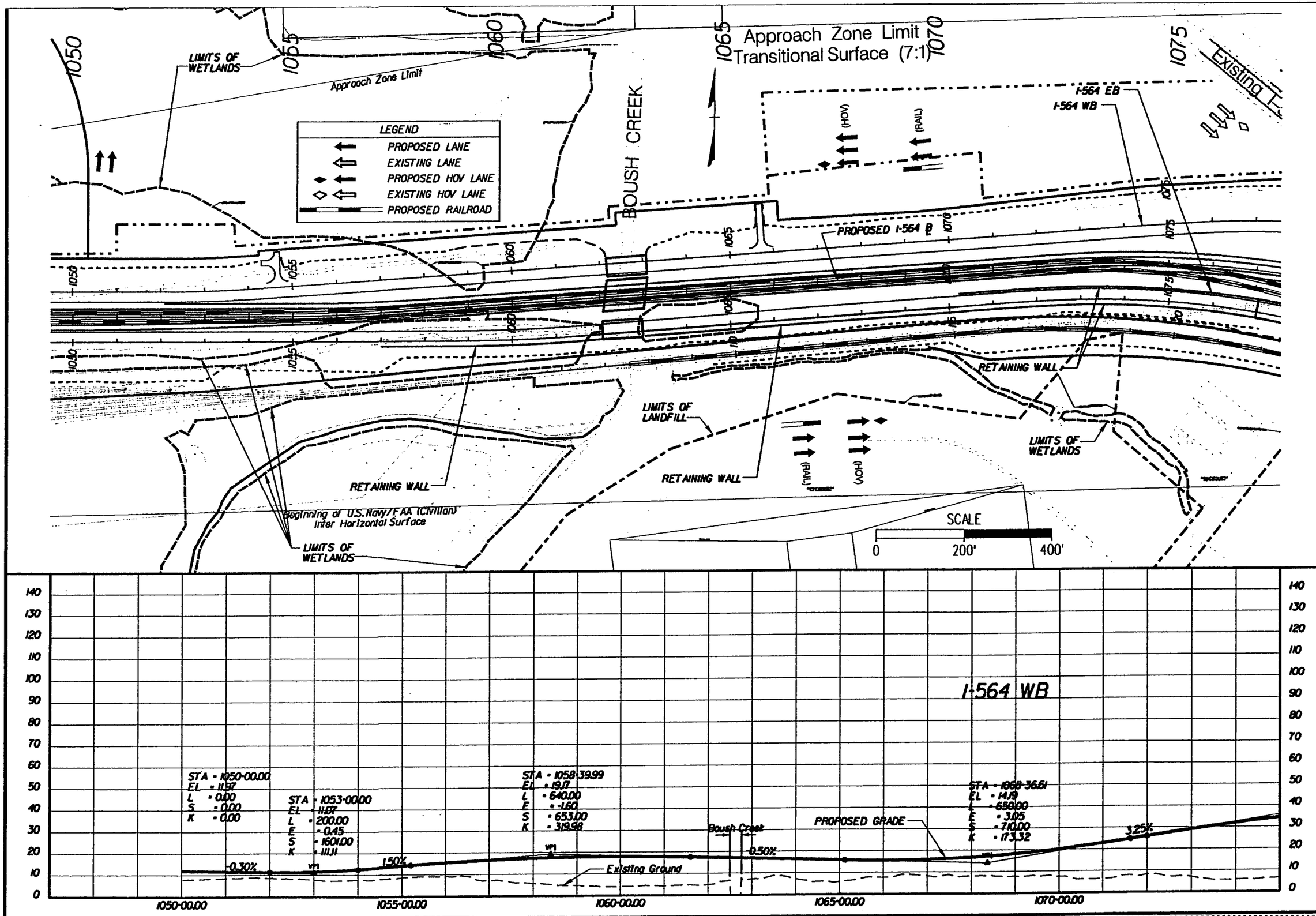

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DESIGN	DRAWN	CHECK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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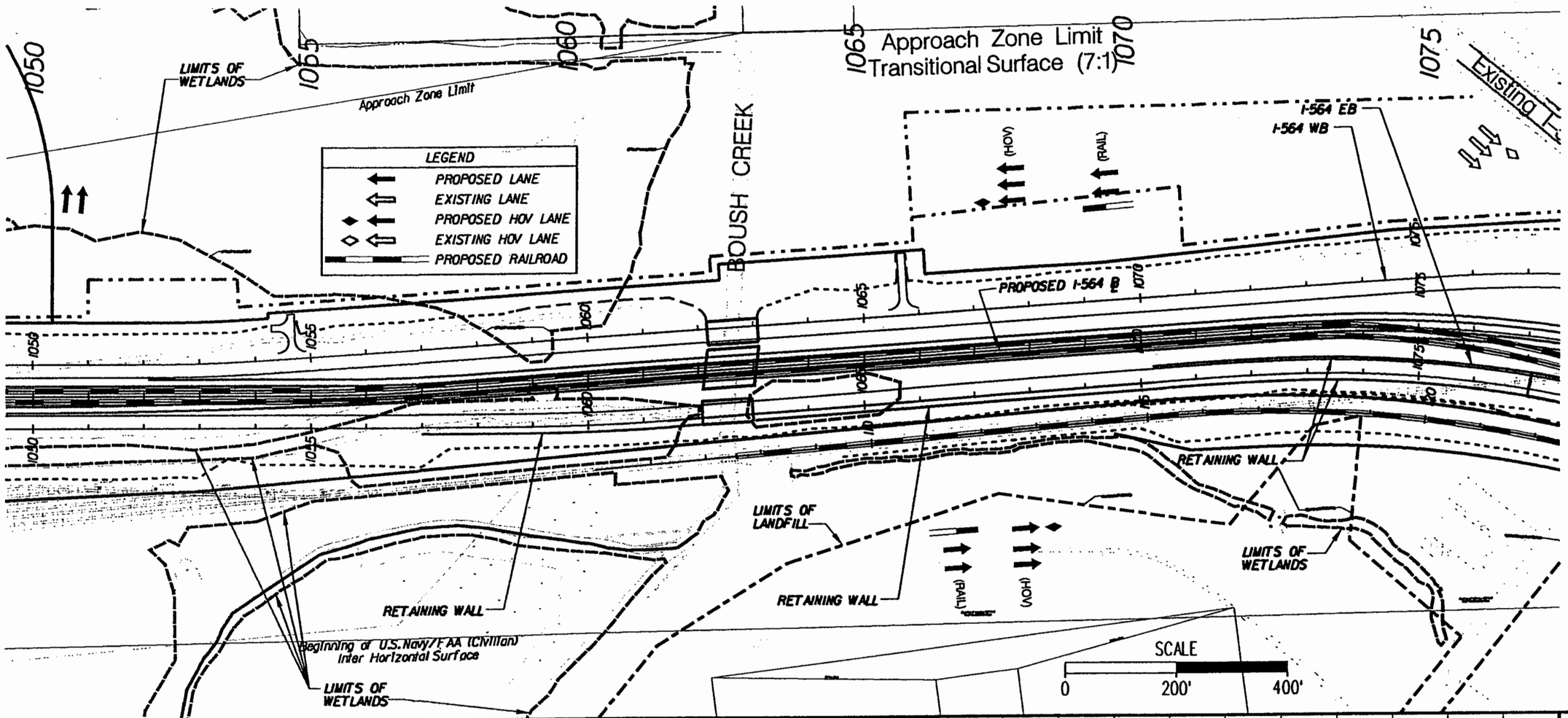

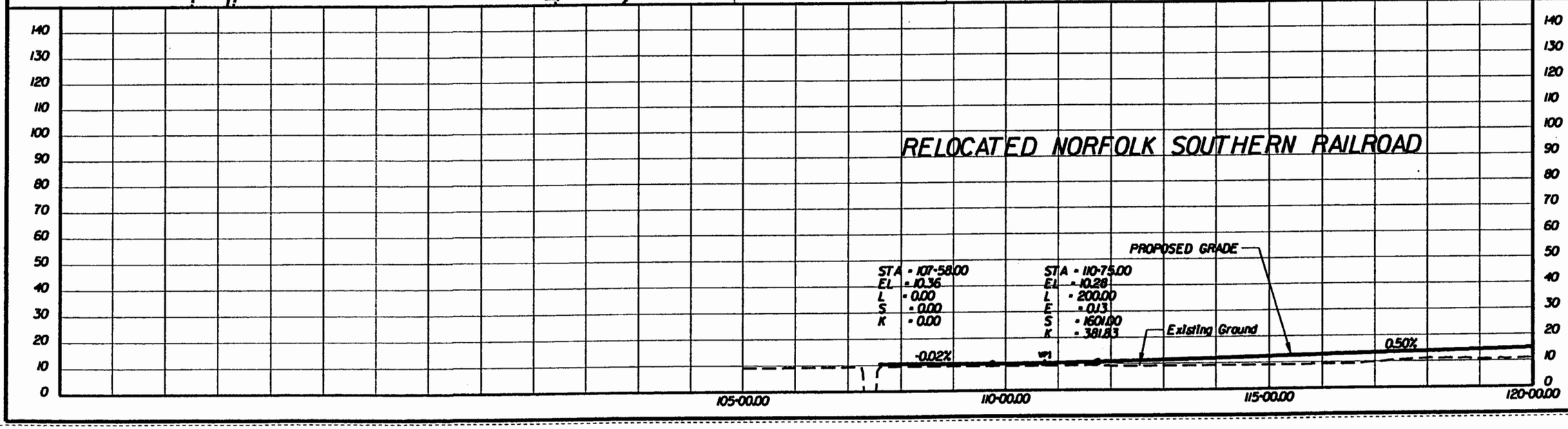

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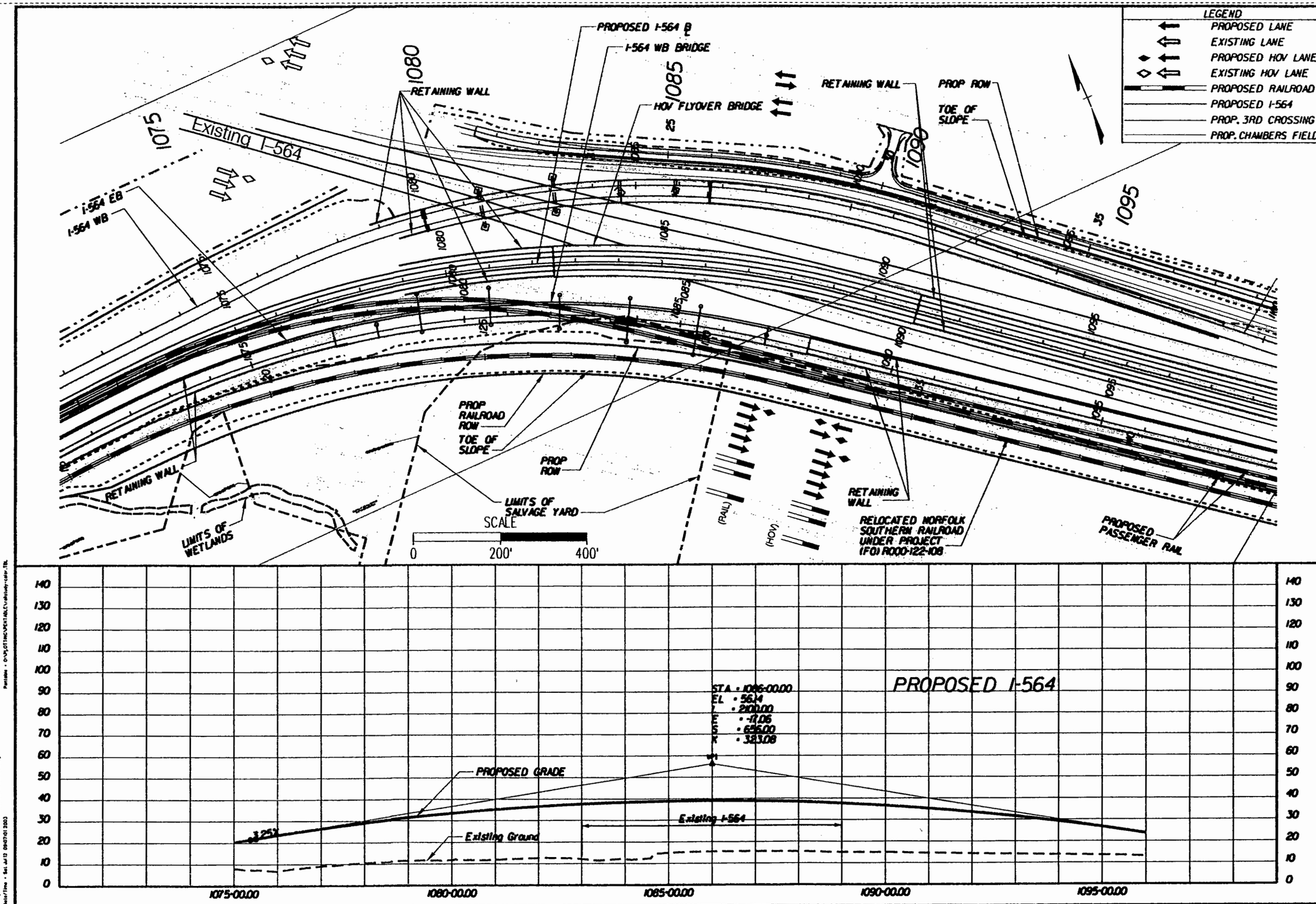
DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-017D



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PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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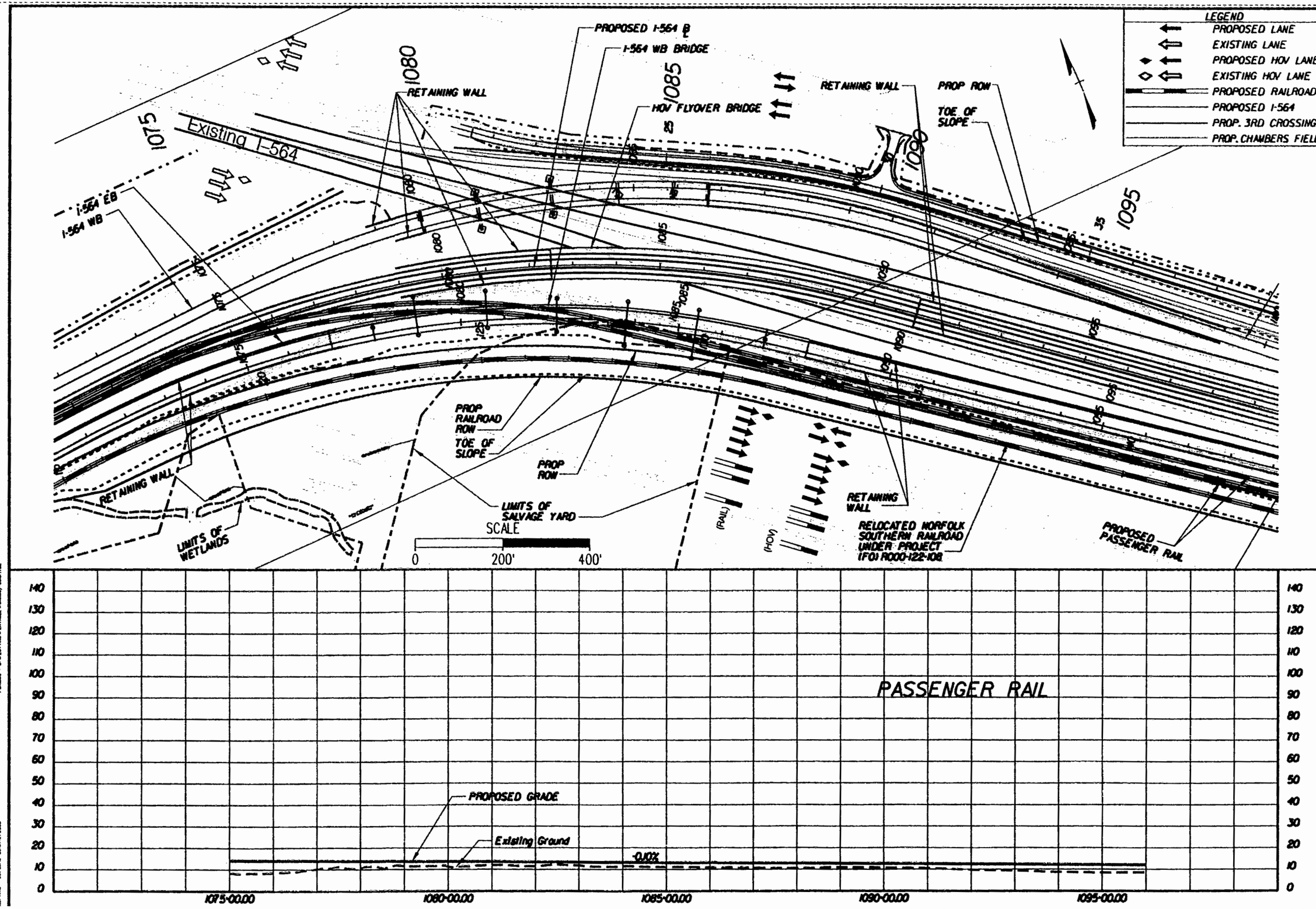

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MICHAEL BAKER JR., INC.

DESIGN	CHKD	CHKD	APVD
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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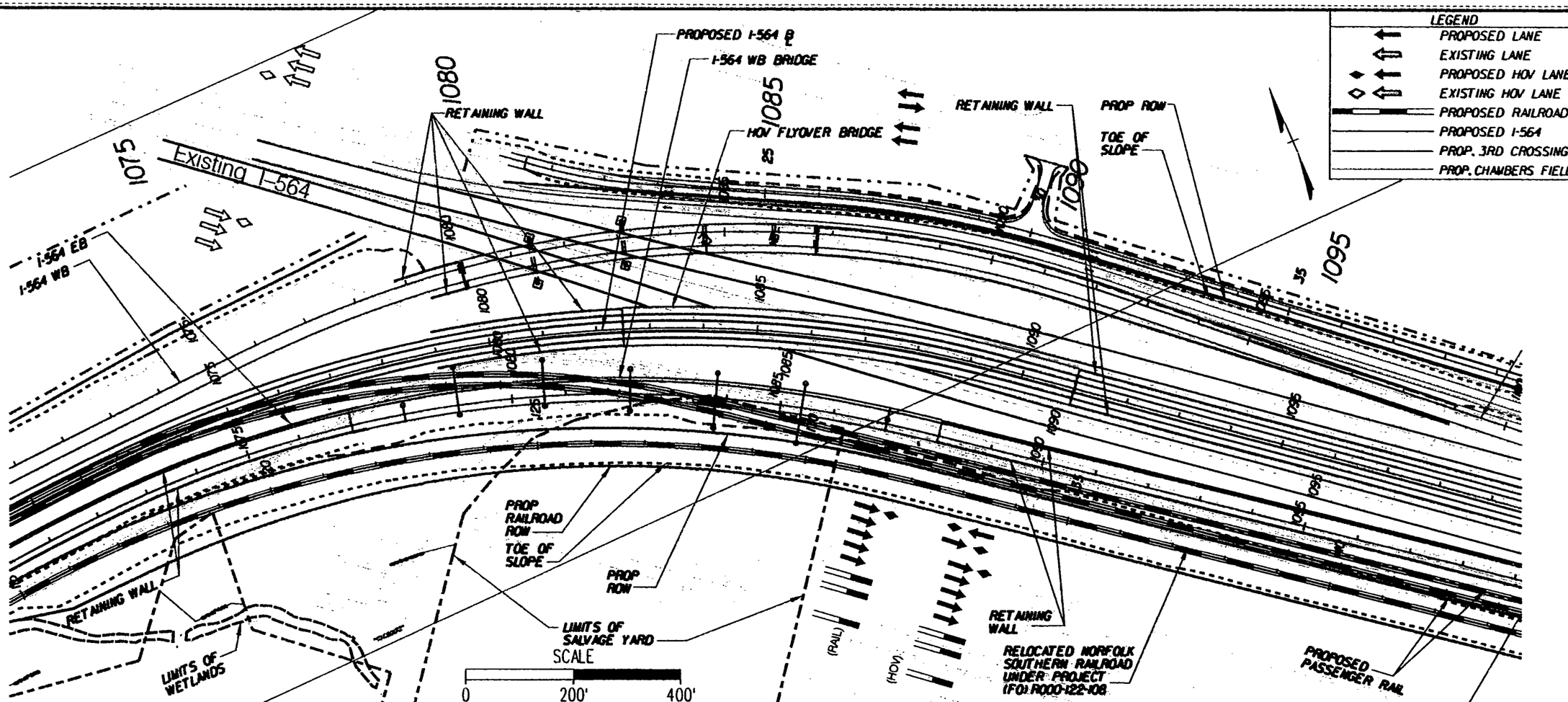

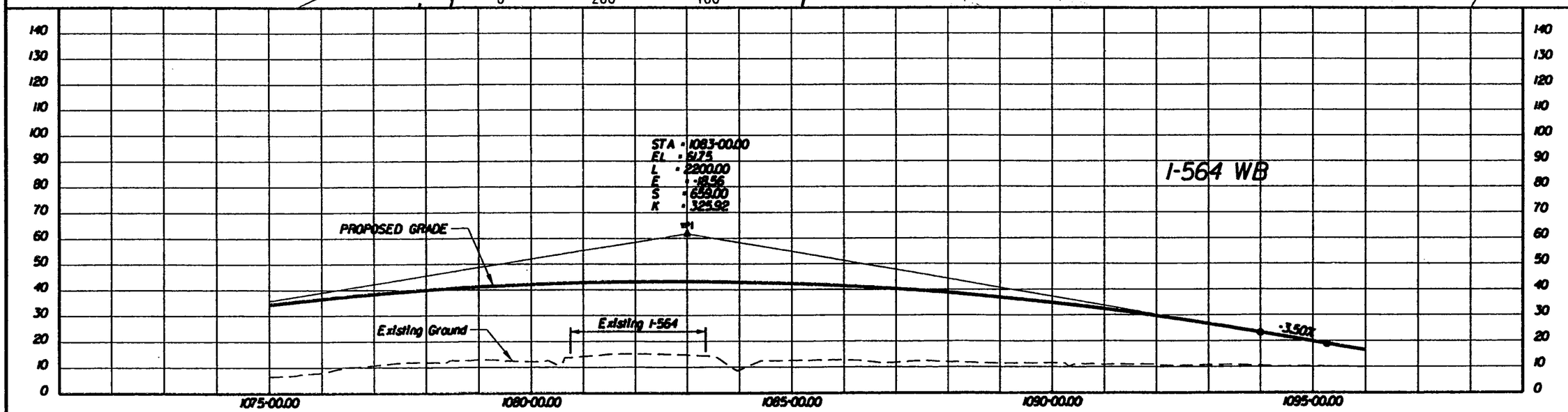

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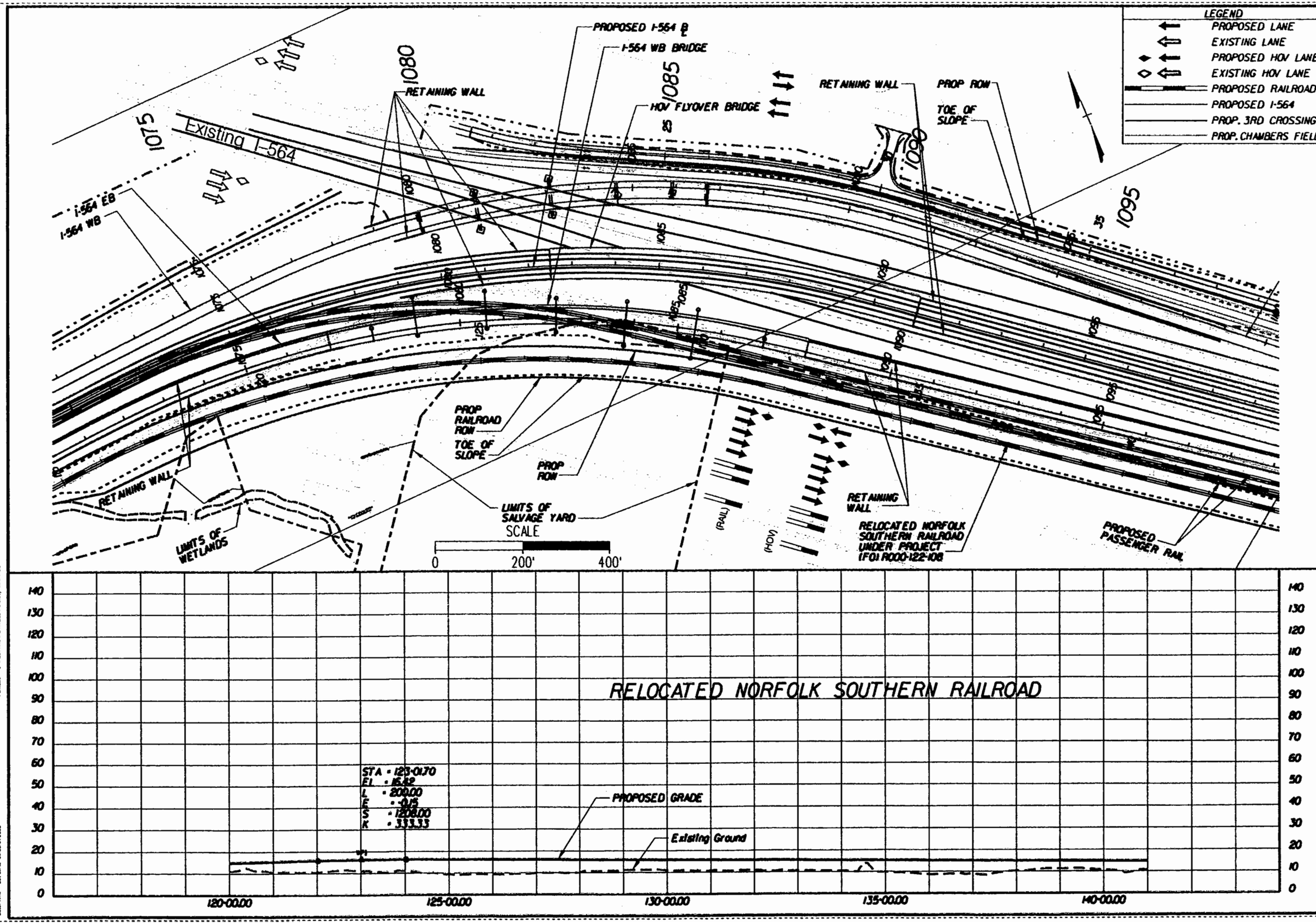
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHECK	CCC	DATE
APPR		DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-018C



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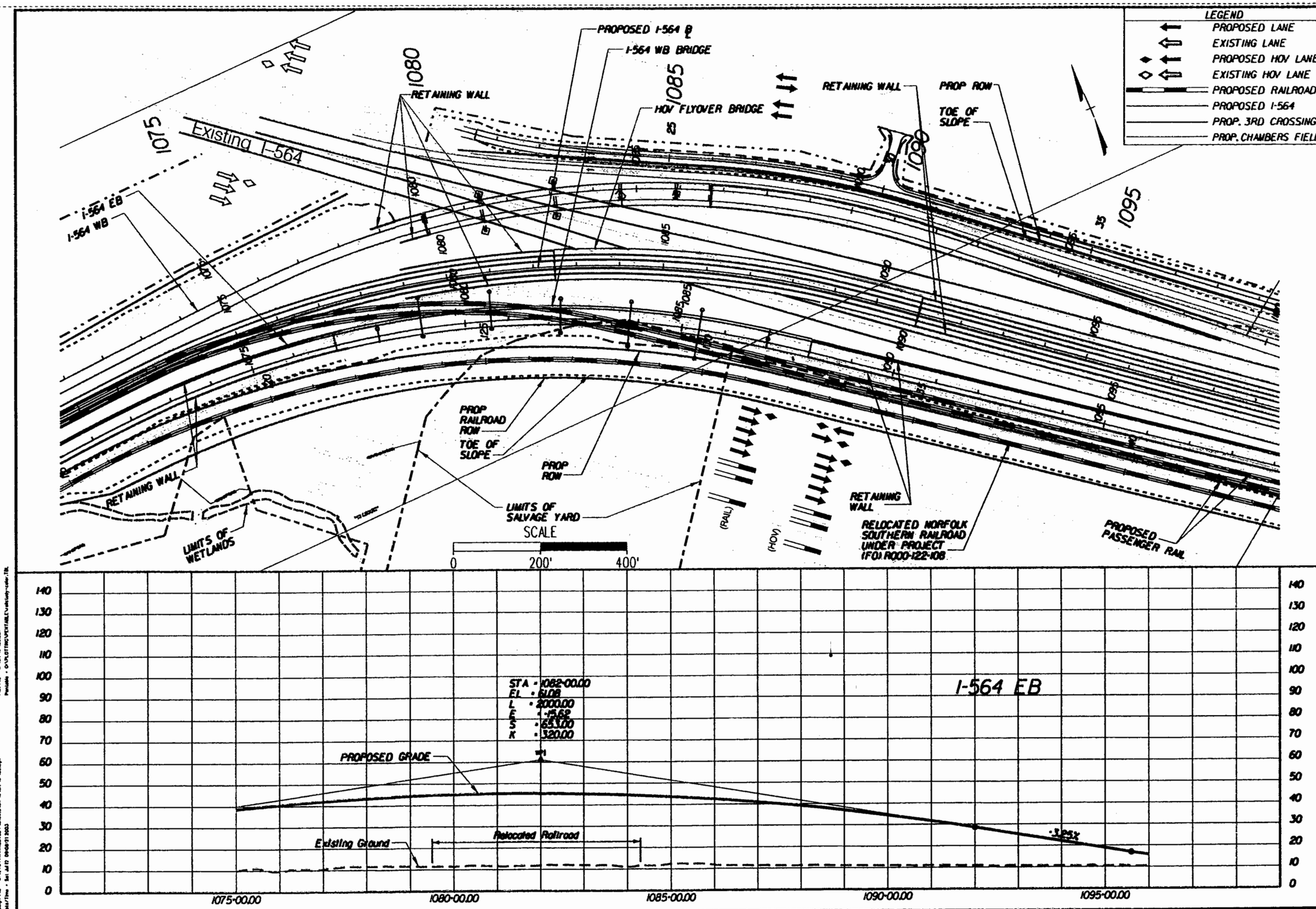
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-018D



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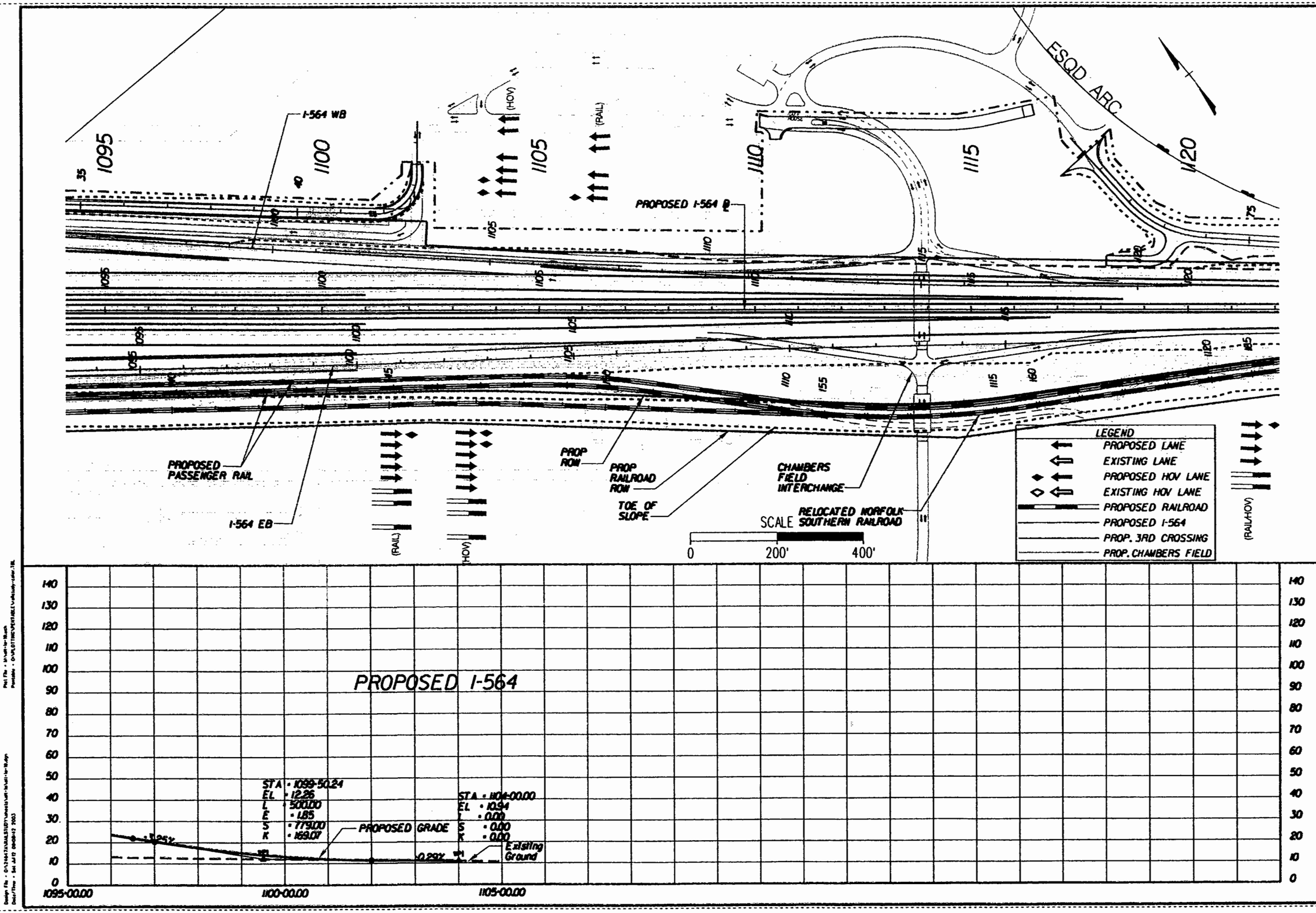
MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-018E



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DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A

564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

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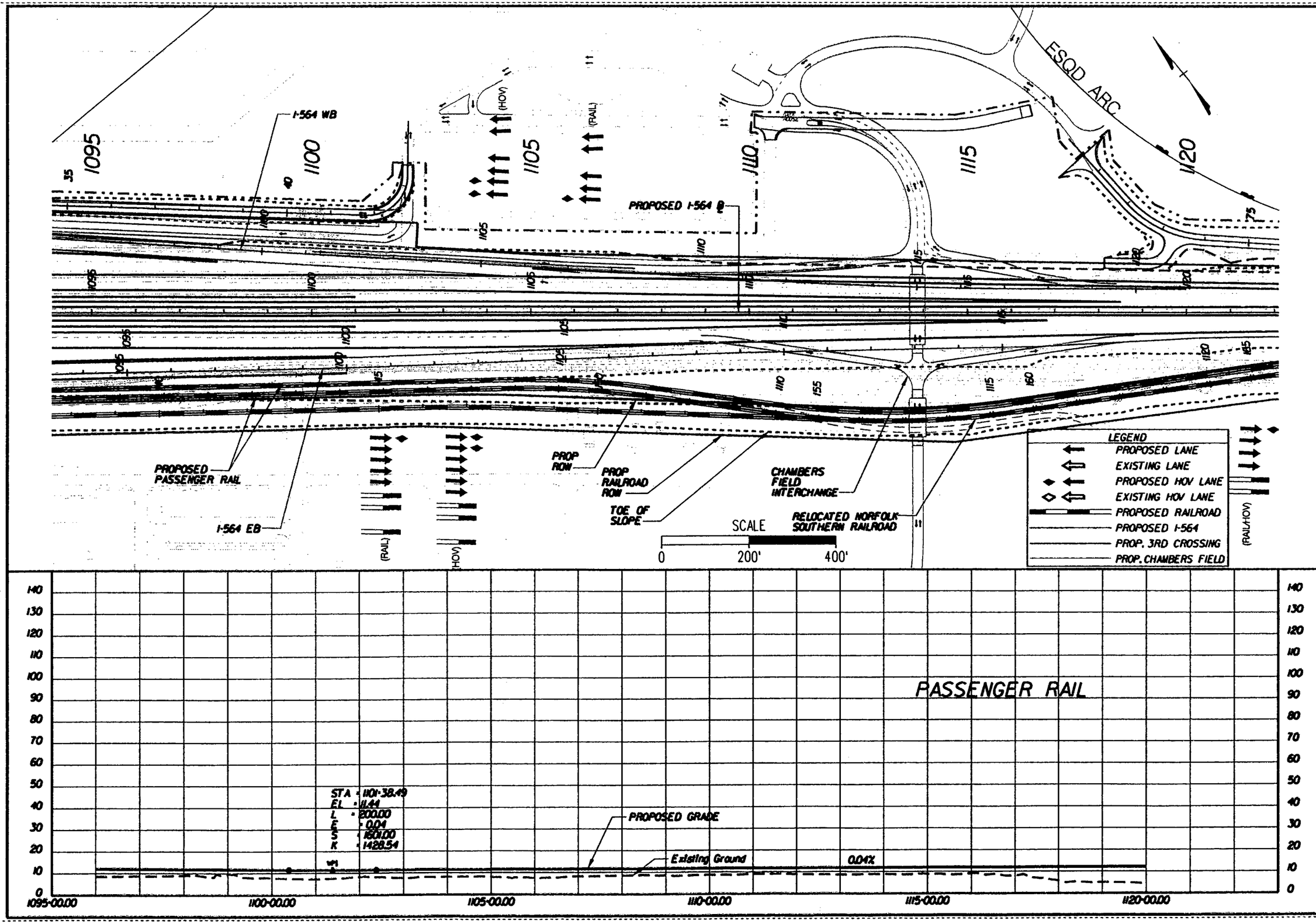

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DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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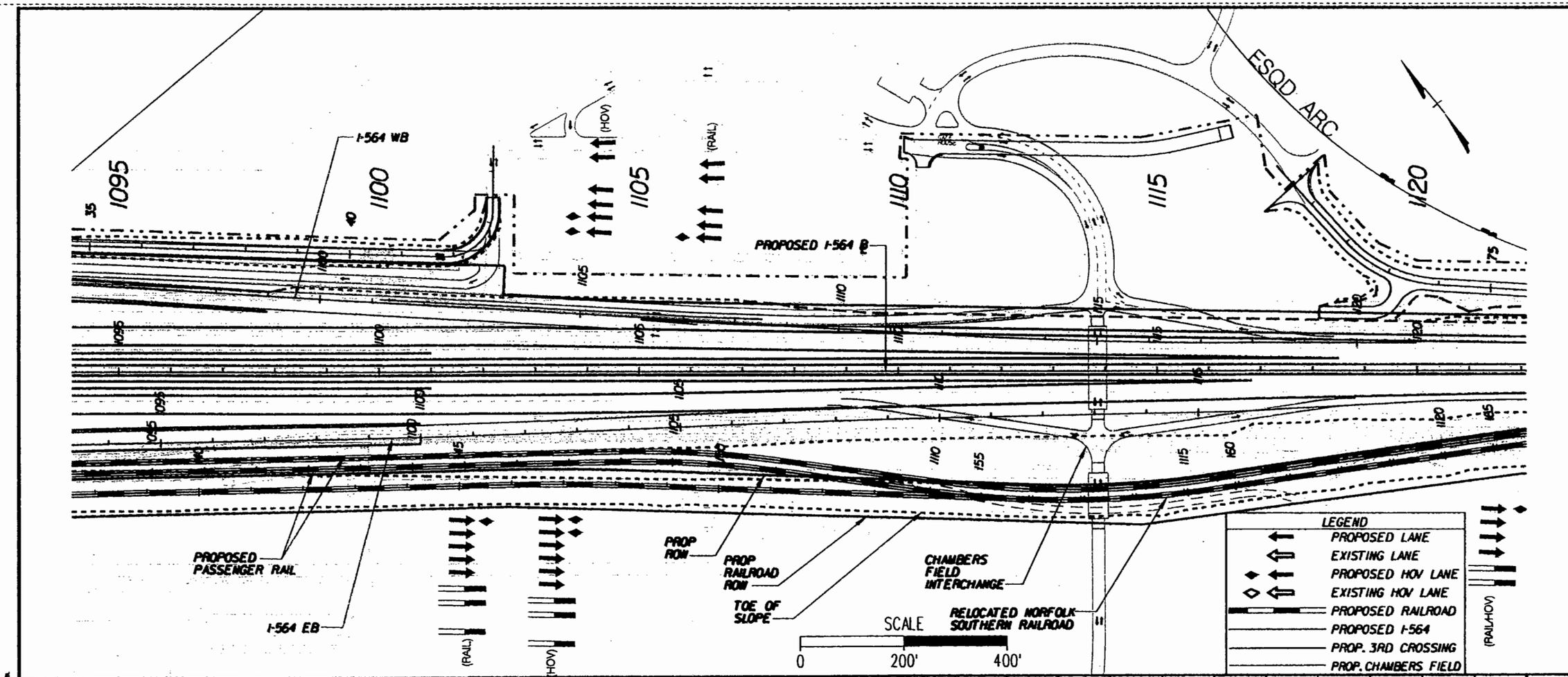

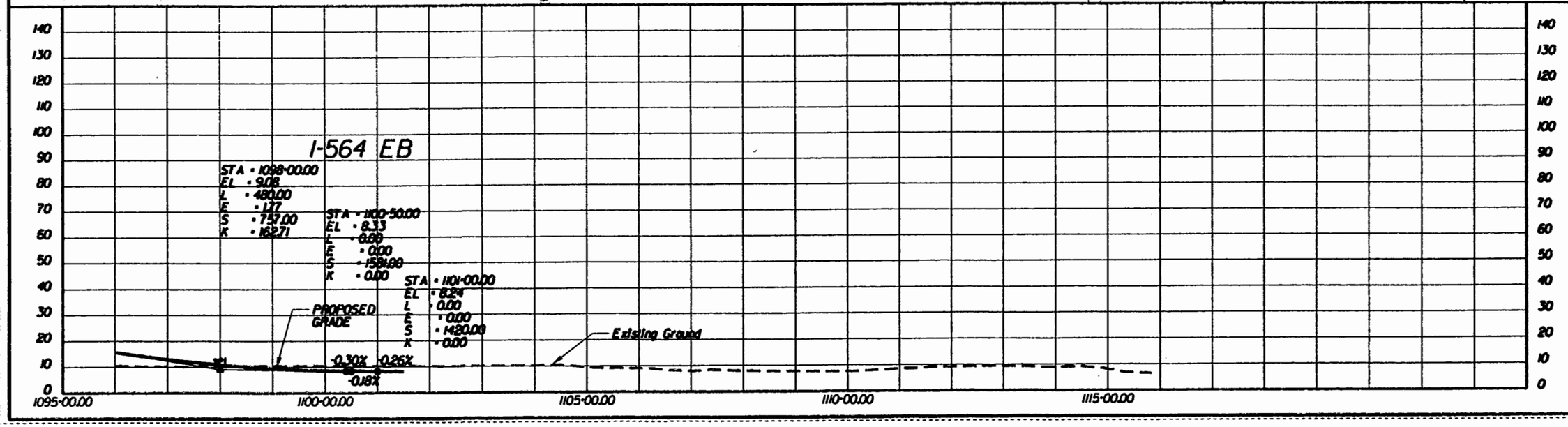

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DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A

564-EB OVER RAIL PROVISION FOR HOV LANES CENTER BORE

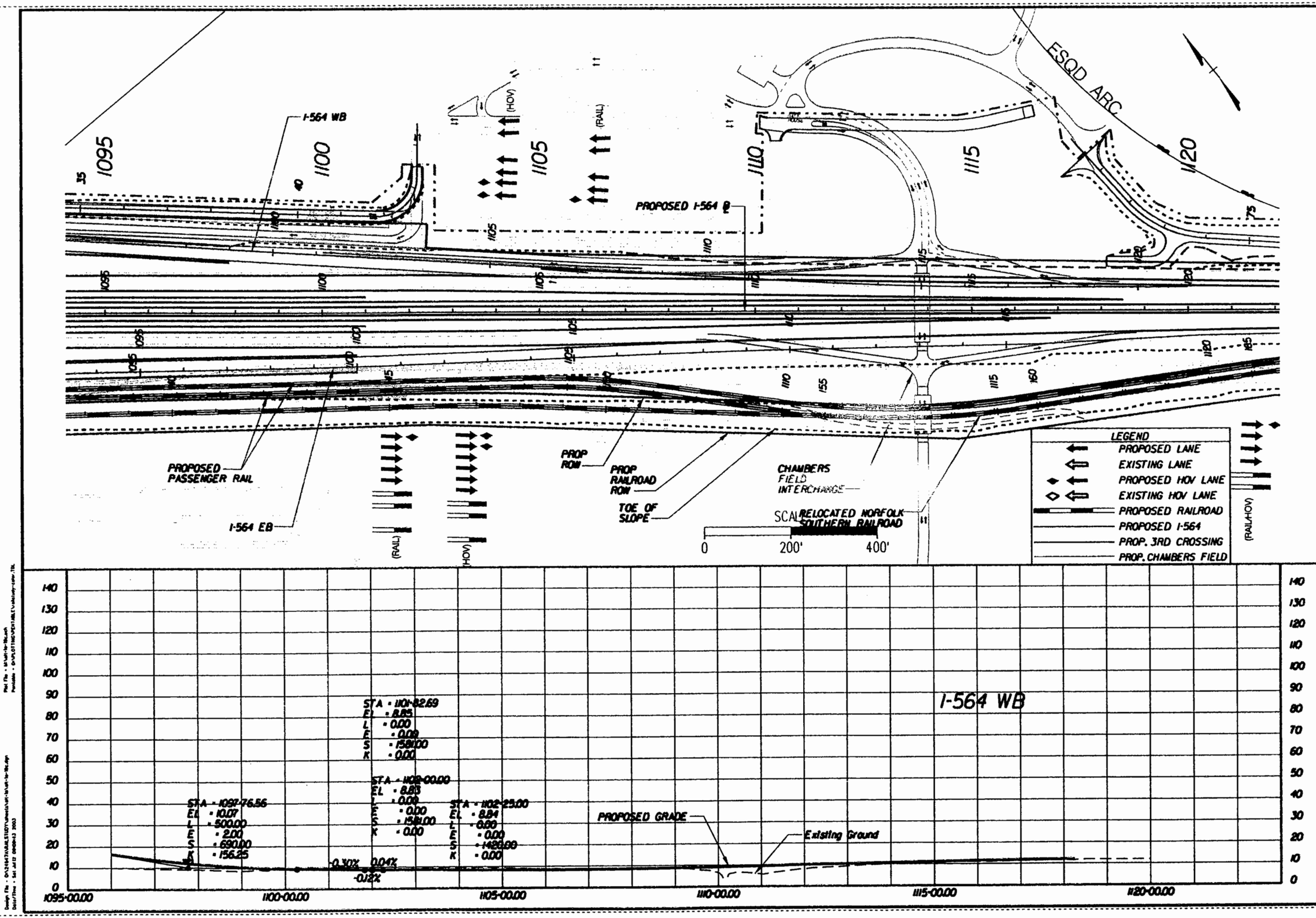
I-564 INTERMODAL CONNECTOR

Rail Connection Study

(FO) R000-122-108, PE-101

DWG. NO

ALT-1A-019B



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DESIGN	DRAWN	CHECK	APPR.
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DATE	DATE	DATE	DATE

ALTERNATIVE-1A

564-EB OVER RAIL PROVISION FOR HOV LANES CENTER BORE

I-564 INTERMODAL CONNECTOR

Rail Connection Study

(FO) R000-122-108, PE-101

DWG. NO

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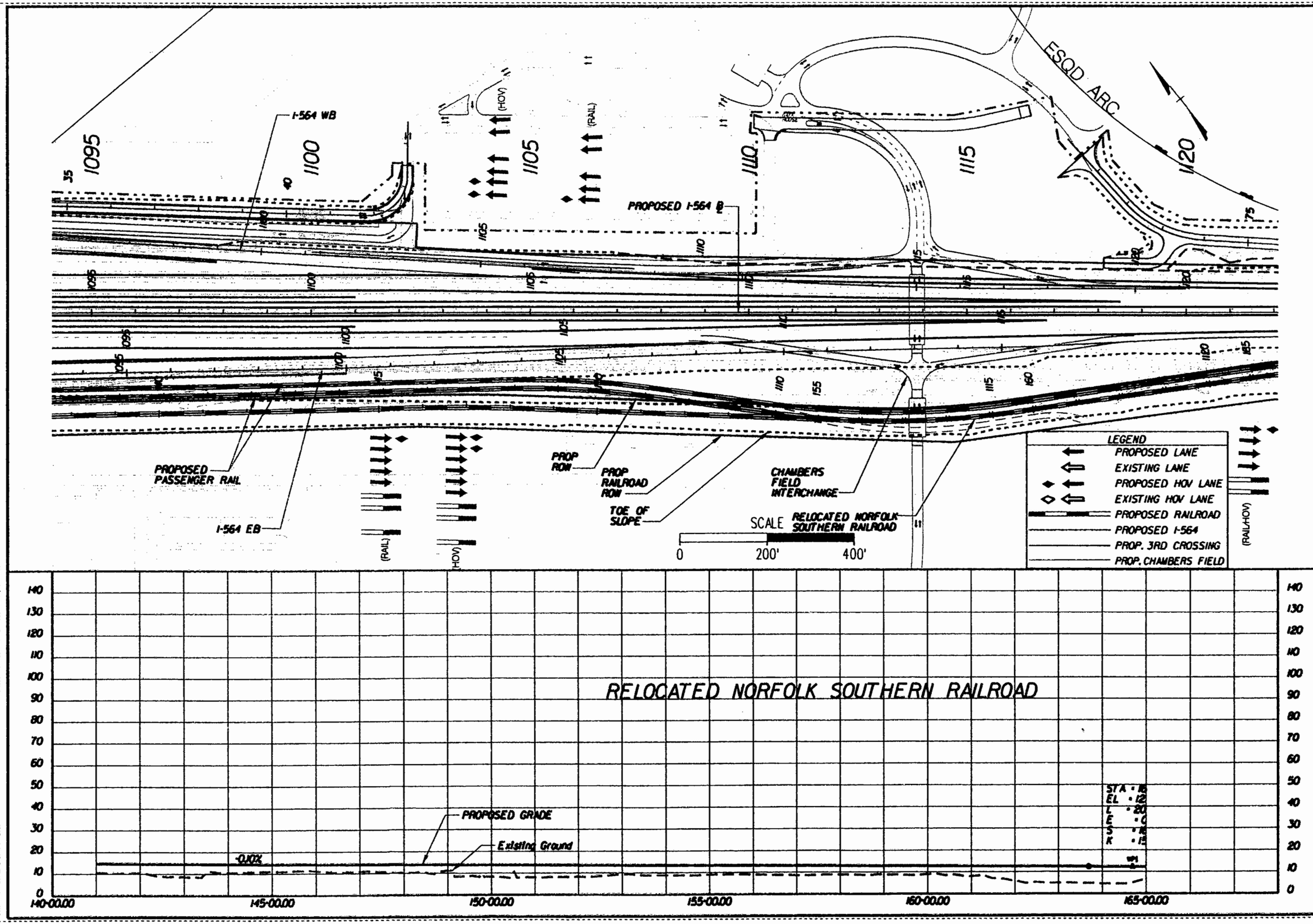

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DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHECK	CCC	DATE
APPR		DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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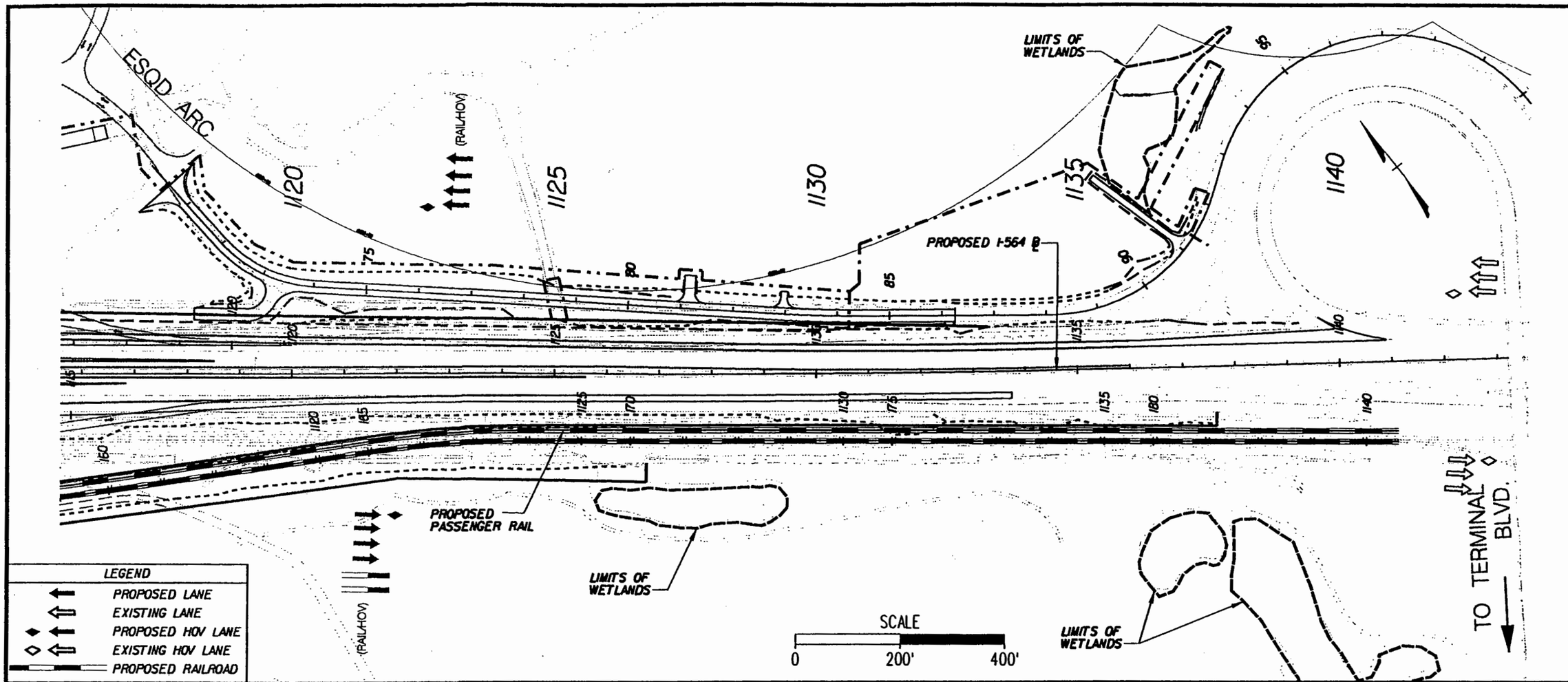

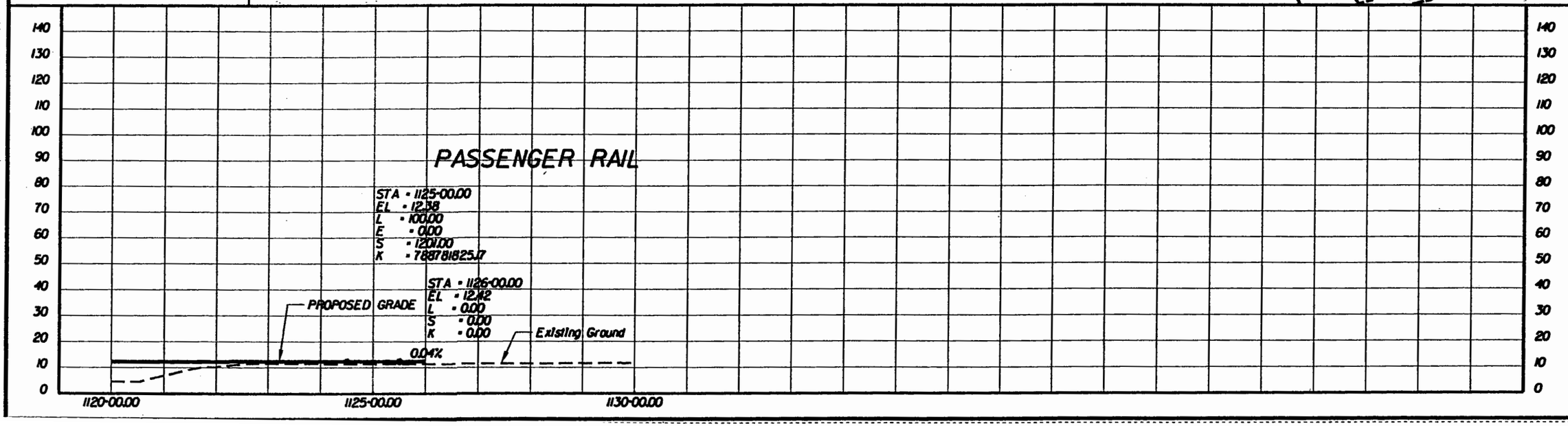

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DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHECK	CCC	DATE
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ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-020A

ESQD ARC

(RAIL/HOV)

1120 1125 1130 1135 1140

LIMITS OF WETLANDS

PROPOSED I-564 ℄

PROPOSED PASSENGER RAIL

LIMITS OF WETLANDS

LIMITS OF WETLANDS

TO TERMINAL BLVD.

(RAIL/HOV)

SCALE

0 200' 400'

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

RELOCATED NORFOLK SOUTHERN RAILROAD

STA = 170-00.00
EL = 12.41
L = 0.00
E = 0.00
S = 1581.00
K = 0.00

4-69.04
25
0.00
1.03
10.00
38.64

PROPOSED GRADE

STA = 171-00.00
EL = 12.45
L = 0.00
S = 0.00
K = 0.00

Existing Ground

0.03%

10.04%

165-00.00

170-00.00

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DESIGN	DRWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1A
564-EB OVER RAIL
PROVISION FOR HOV LANES
CENTER BORE

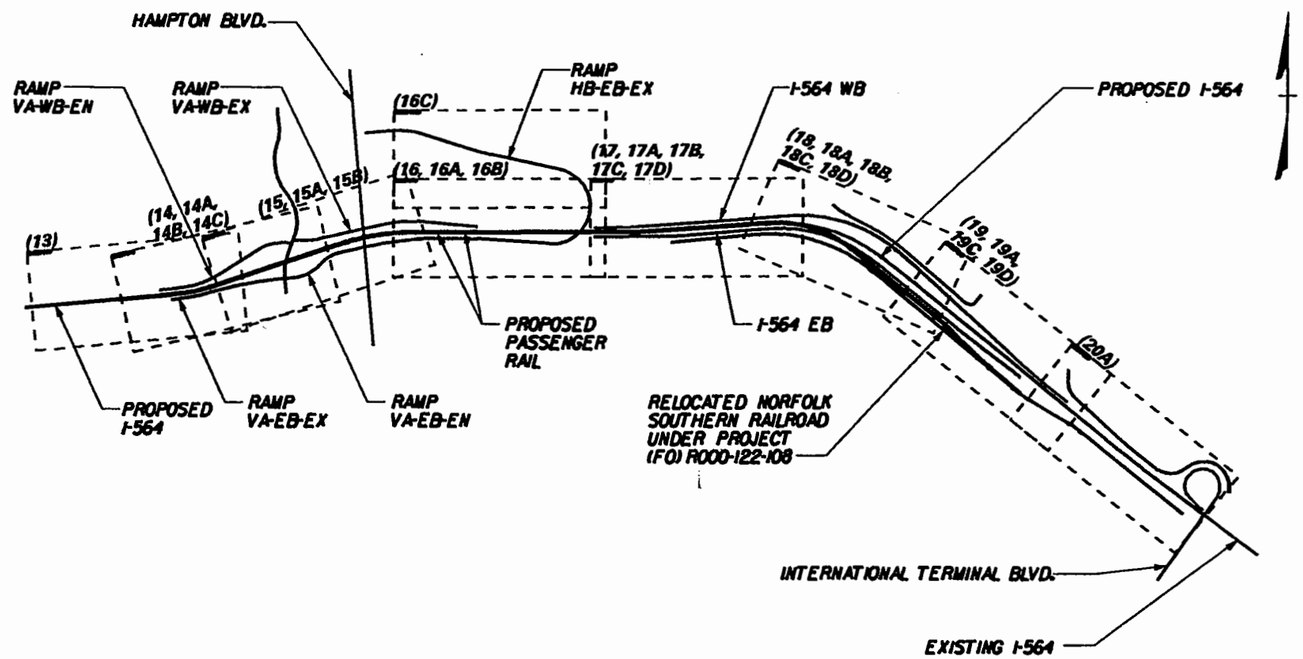
I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1A-020B

INDEX OF SHEETS

SHEET NO. 13	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 13A	NOT USED
SHEET NO. 14	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 14A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 14B	ALIGNMENT RAMP VA-WB-EN PLAN AND PROFILE
SHEET NO. 14C	ALIGNMENT RAMP VA-EB-EX PLAN AND PROFILE
SHEET NO. 15	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 15A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 15B	ALIGNMENT RAMP VA-EB-EN PLAN AND PROFILE
SHEET NO. 16	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 16A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 16B	ALIGNMENT RAMP HB-EB-EX PLAN AND PROFILE
SHEET NO. 16C	ALIGNMENT RAMP HB-EB-EX PLAN AND PROFILE
SHEET NO. 17	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 17A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 17B	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 17C	ALIGNMENT I-564 WB PLAN AND PROFILE
SHEET NO. 17D	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE
SHEET NO. 18	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 18A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 18B	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 18C	ALIGNMENT I-564 WB PLAN AND PROFILE
SHEET NO. 18D	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE
SHEET NO. 18E	NOT USED
SHEET NO. 19	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 19A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
SHEET NO. 19B	NOT USED
SHEET NO. 19C	ALIGNMENT I-564 WB PLAN AND PROFILE
SHEET NO. 19D	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE
SHEET NO. 20	NOT USED
SHEET NO. 20A	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE
SHEET NO. 20B	NOT USED

ALTERNATIVE-1B ON SHORE



SCALE

0 2000' 4000'

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

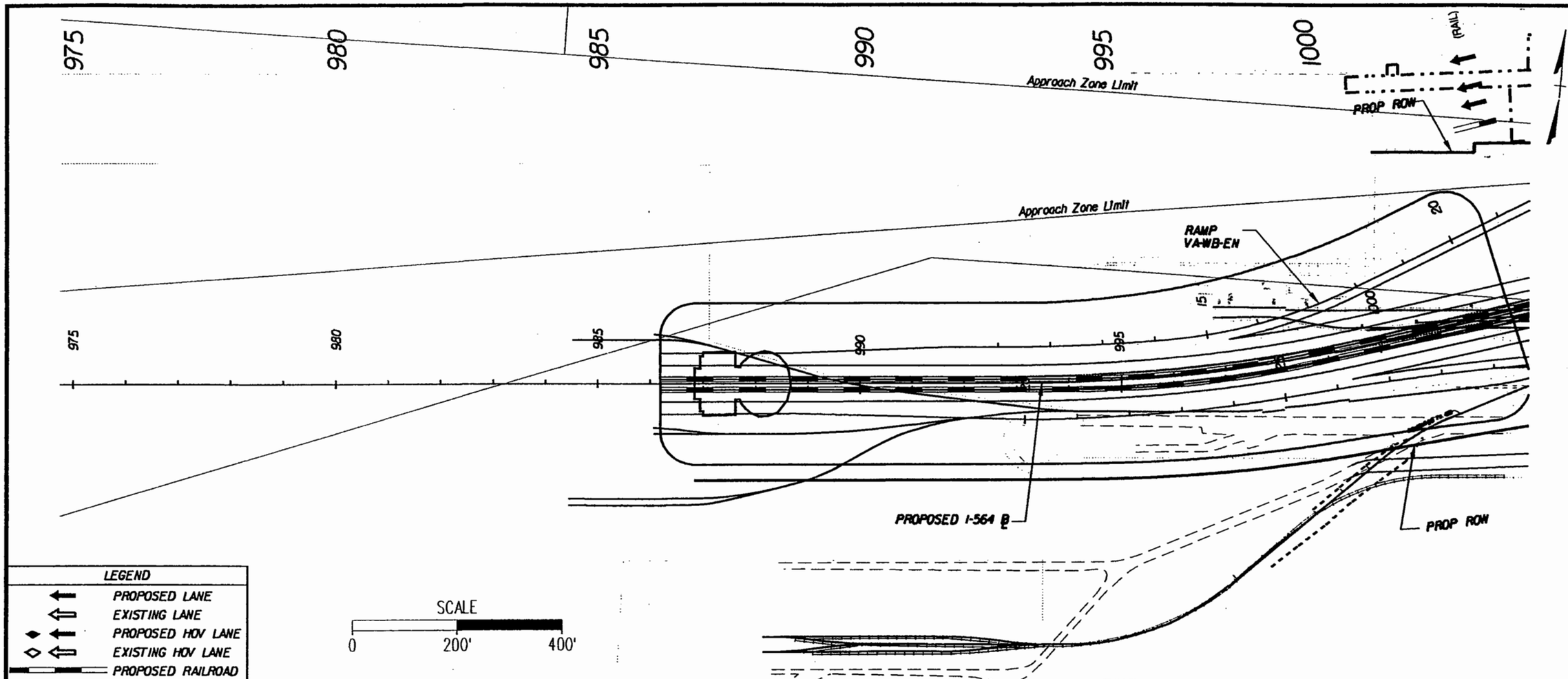
ALTERNATIVE-1B ON SHORE

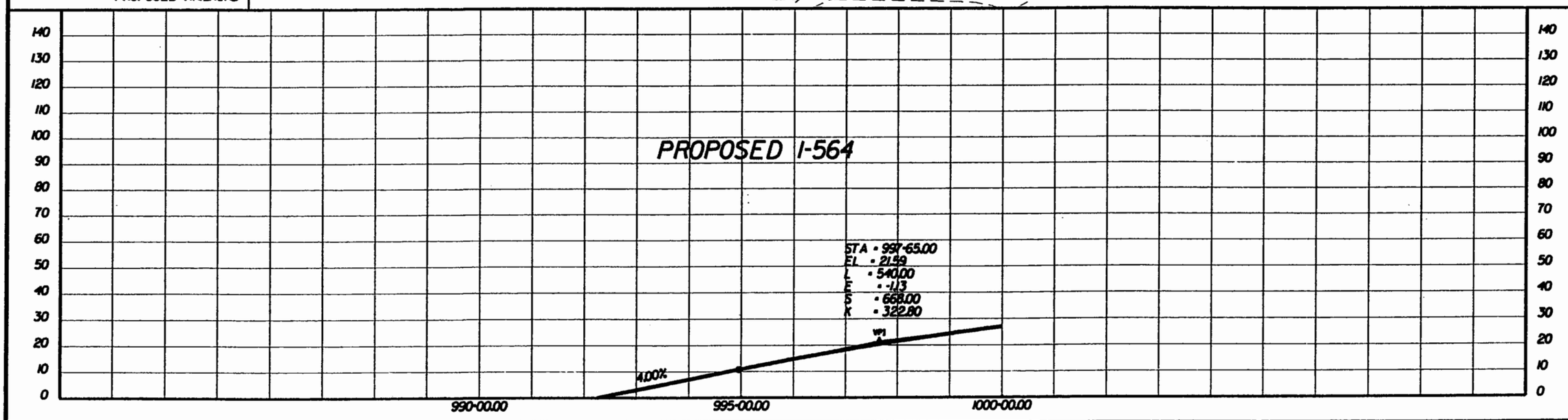
KEYMAP

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT1B-KEY





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DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHCK	CCC	DATE
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ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1B-013

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

Approach Zone Limit

Approach Zone Limit

PROP ROW

RAMP VA-WB-EN

RAMP VA-WB-EN

RAMP VA-WB-EX

VIRGINIA AVE.

PROPOSED I-564 ℄

PROPOSED I-564 ℄

RETAINING WALL

RAMP VA-EB-EX

PROP ROW

RETAINING WALL

RAMP VA-EB-EN

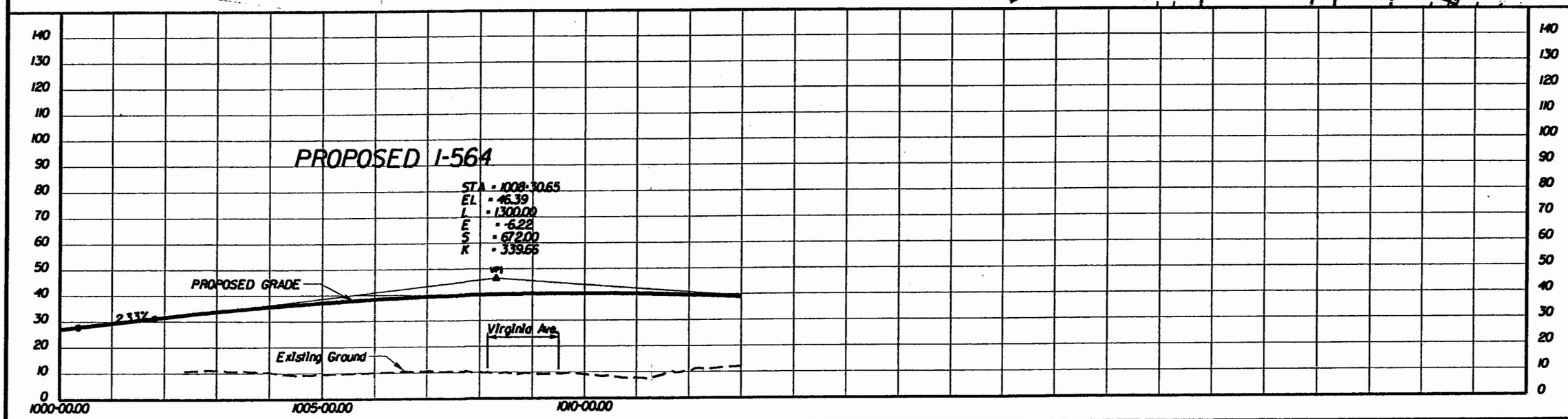
LIMITS OF WETLANDS

(RAIL)

(HOV)

SCALE

0 200' 400'



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DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1B

564-EB UNDER RAIL PROVISION FOR HOV LANES CENTER BORE

I-564 INTERMODAL CONNECTOR

Rail Connection Study

(FO) R000-122-108, PE-101

DWG. NO

ALT-1B-014

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

Approach Zone Limit

Approach Zone Limit

PROP ROW

RAMP VA-WB-EN

RAMP VA-WB-EX

RAMP VA-WB-EN

PROPOSED I-564 ℄

PROPOSED I-564 ℄

RETAINING WALL

RETAINING WALL

RAMP VA-EB-EX

RAMP VA-EB-EN

PROP ROW

LIMITS OF WETLANDS

VIRGINIA AVE.

(RAIL)

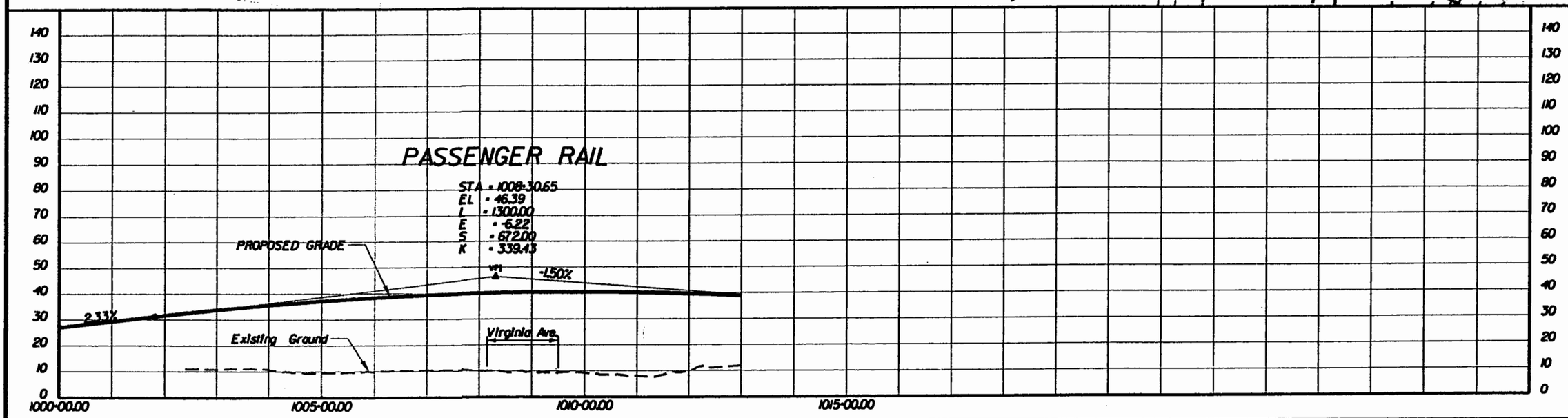
(HOV)

(RAIL)

(HOV)

SCALE

0 200' 400'



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DESIGN	AAA	DATE	DATE
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CHCK	CCC	DATE	DATE
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ALTERNATIVE-1B

564-EB UNDER RAIL PROVISION FOR HOV LANES CENTER BORE

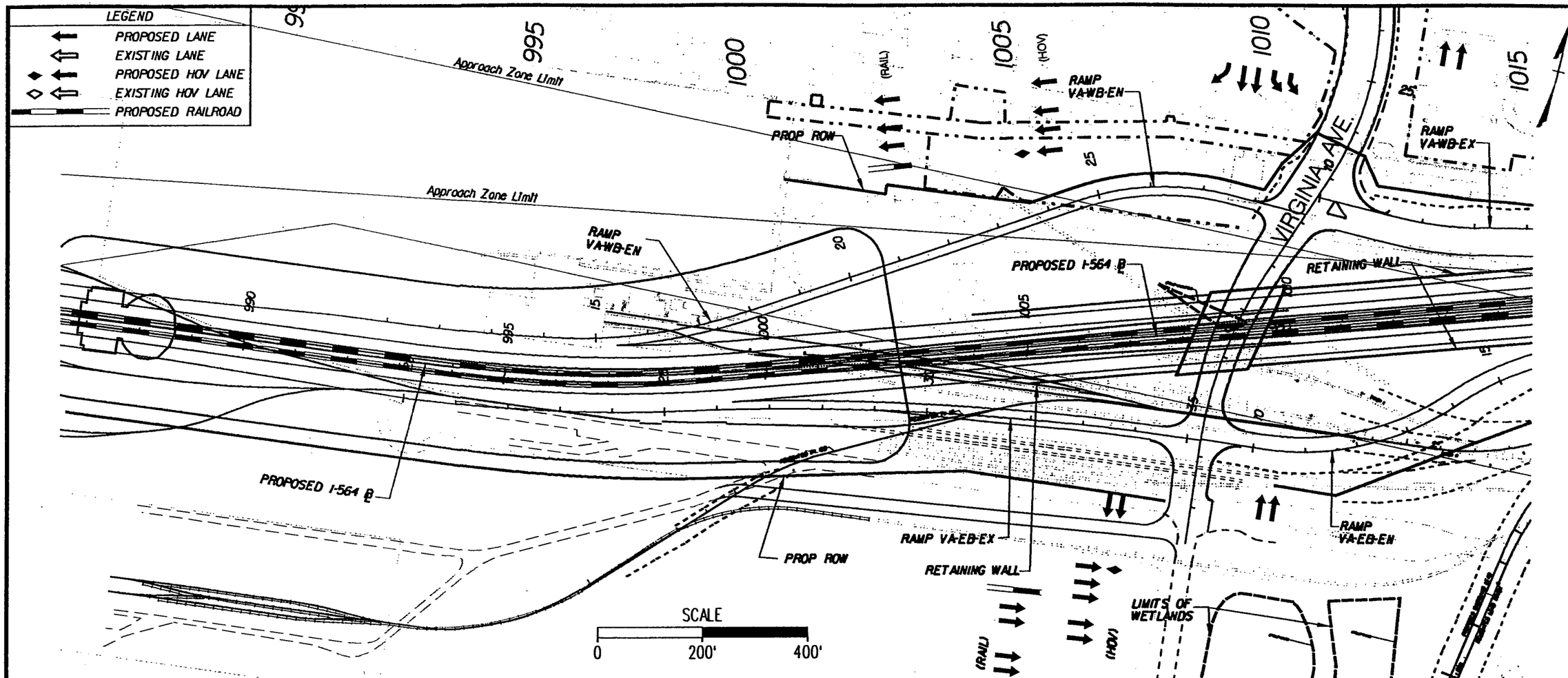
I-564 INTERMODAL CONNECTOR

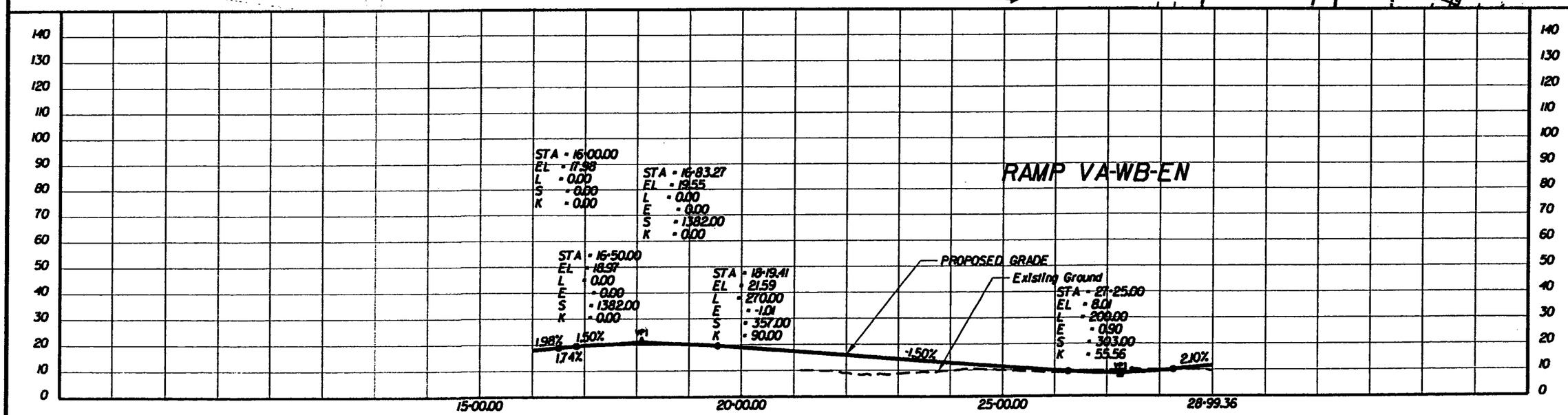
Rail Connection Study

(FO) R000-122-108, PE-101

DWG. NO

ALT-1B-014A





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ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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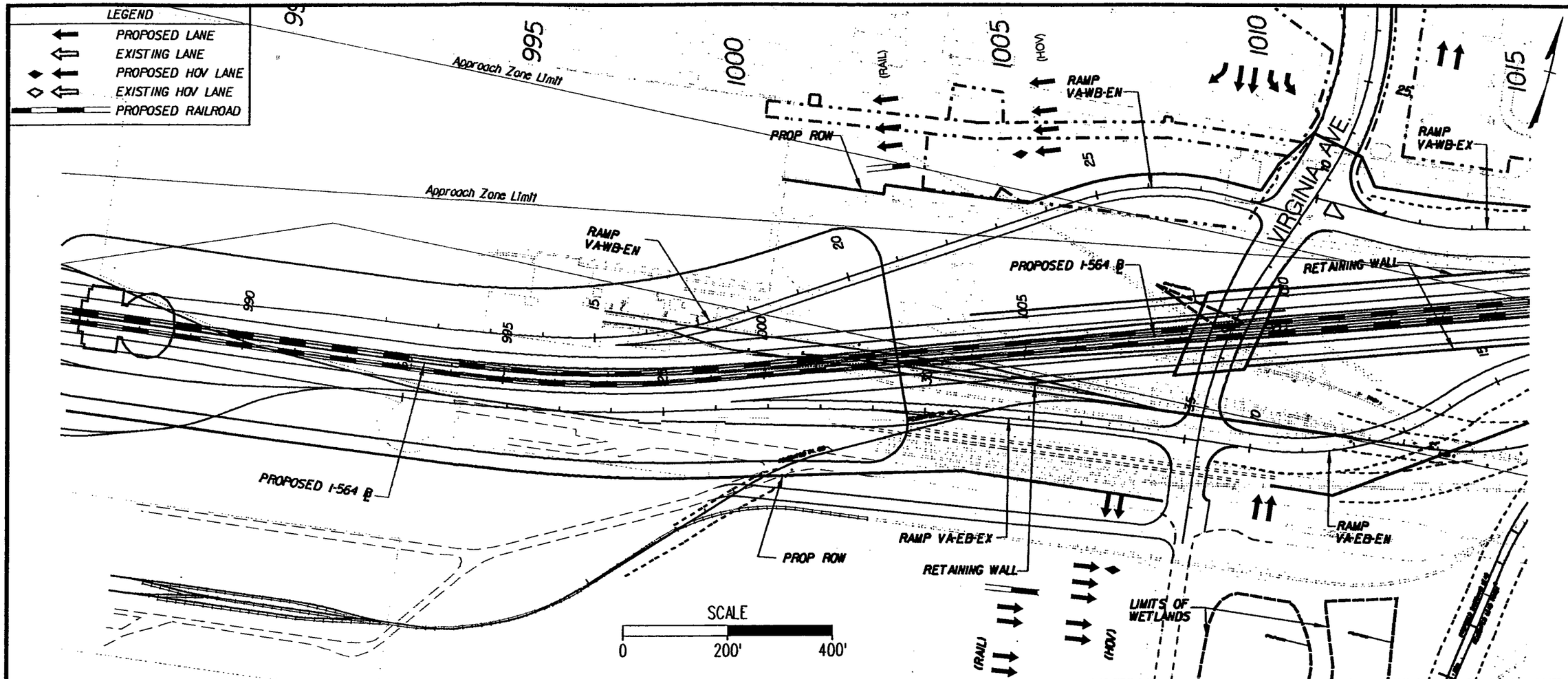

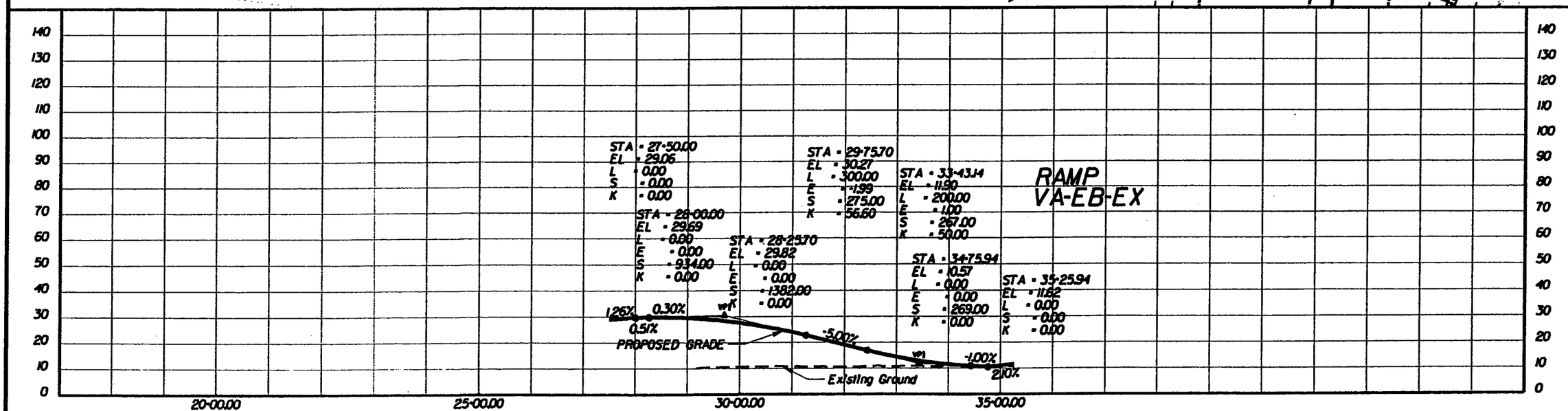

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ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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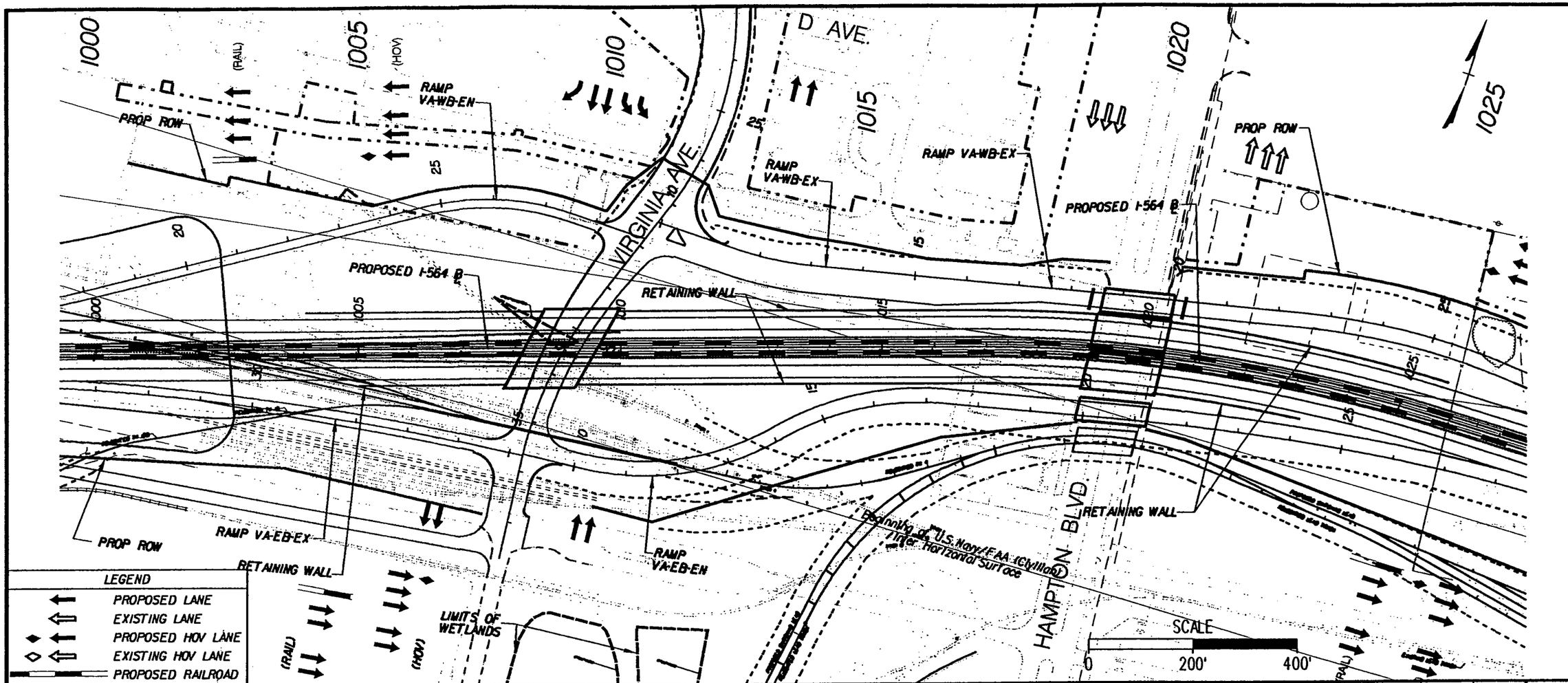

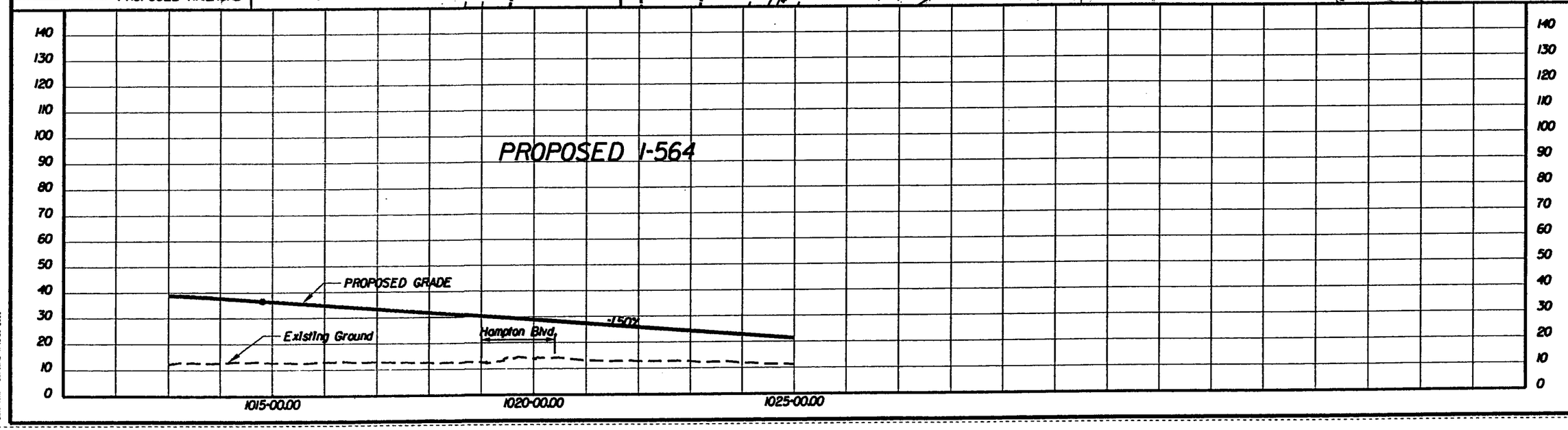

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CHCK	CCC	DATE	DATE
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ALTERNATIVE-1B
564-EB UNDER RAIL
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CENTER BORE

I-564 INTERMODAL CONNECTOR
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(FO) R000-122-108, PE-101

DWG. NO
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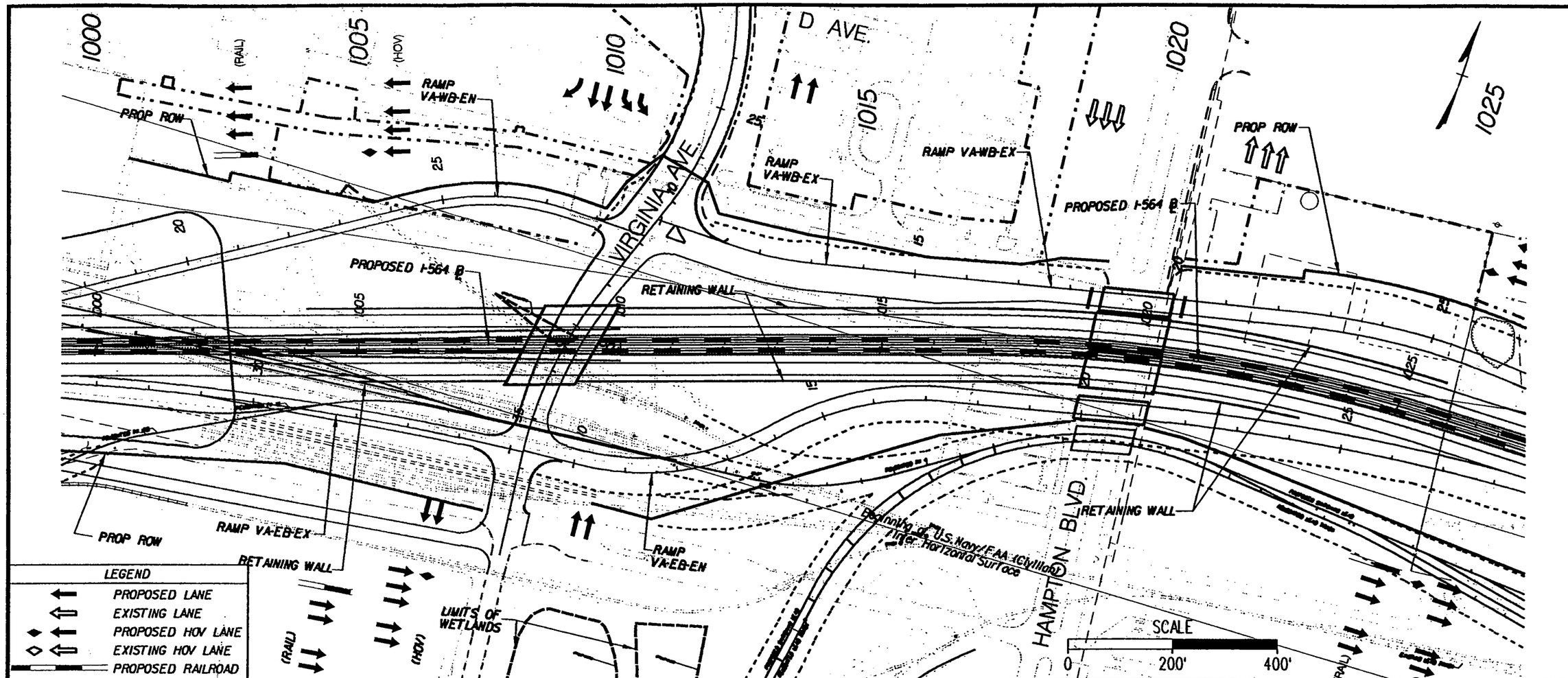

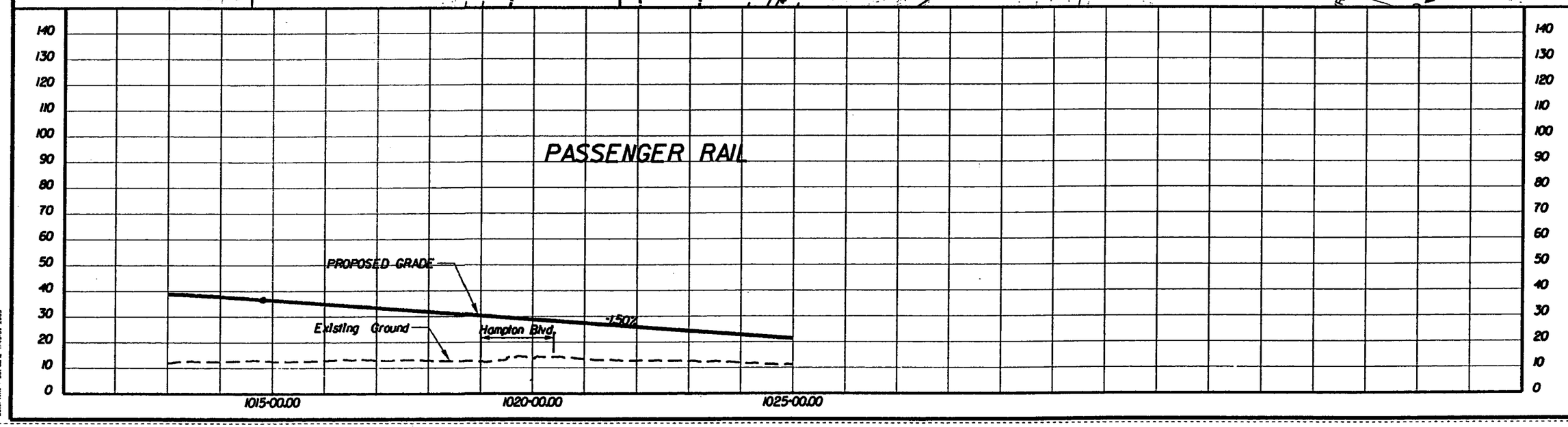

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DESIGN	AAA	DATE	DATE
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CHCK	CCC	DATE	DATE
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ALTERNATIVE-1B
564-EB UNDER RAIL
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CENTER BORE

I-564 INTERMODAL CONNECTOR
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DWG. NO
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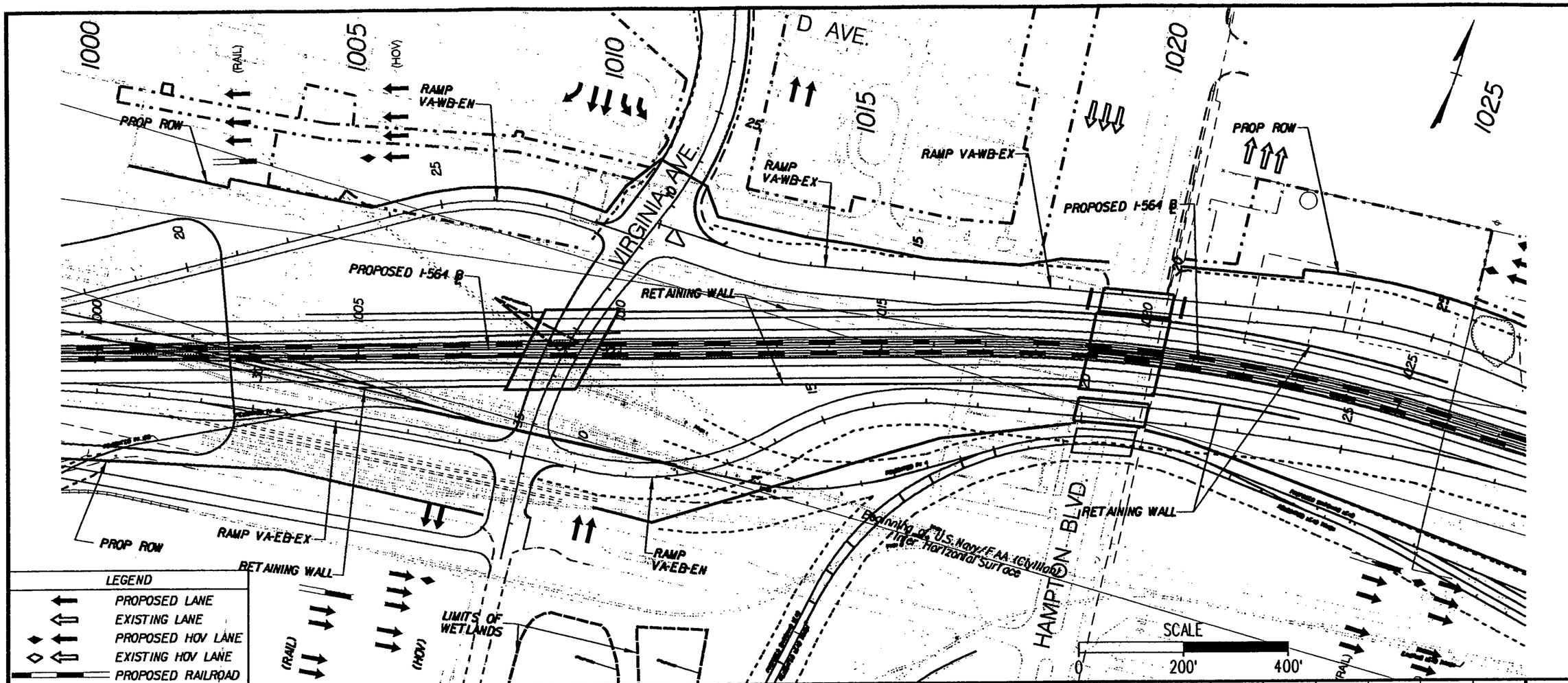

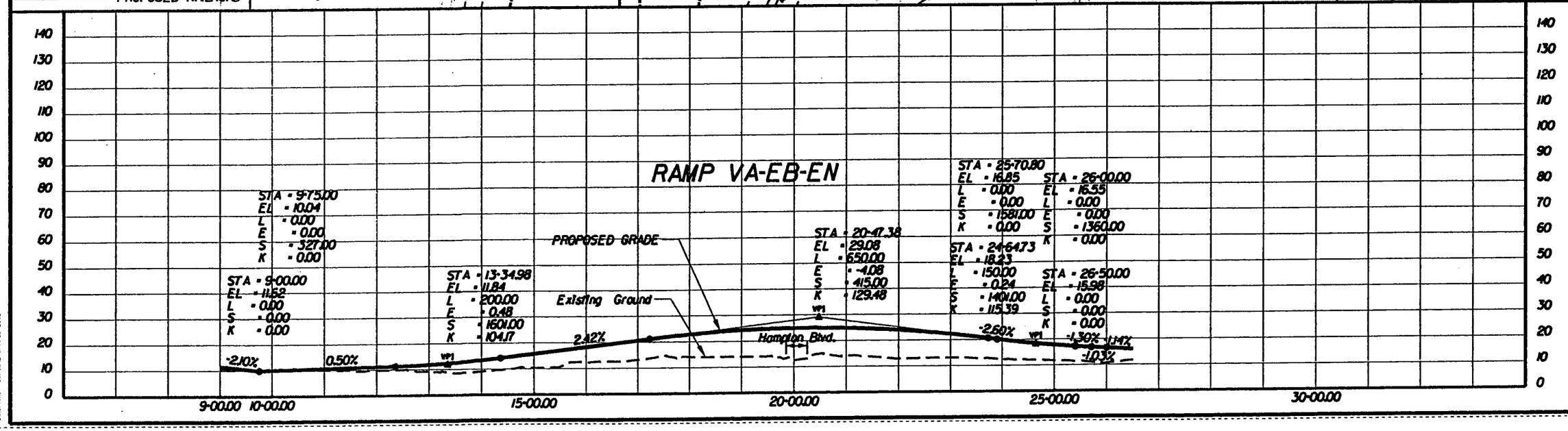

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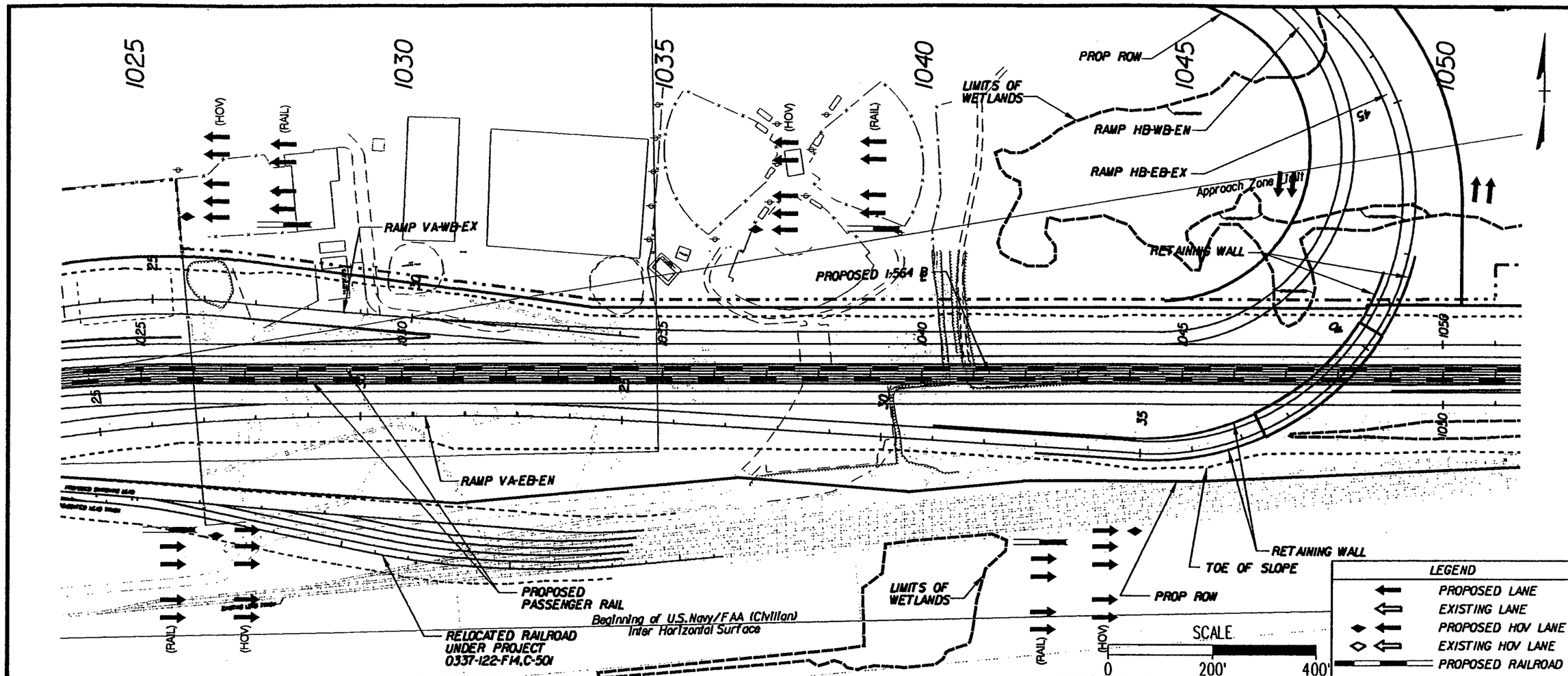

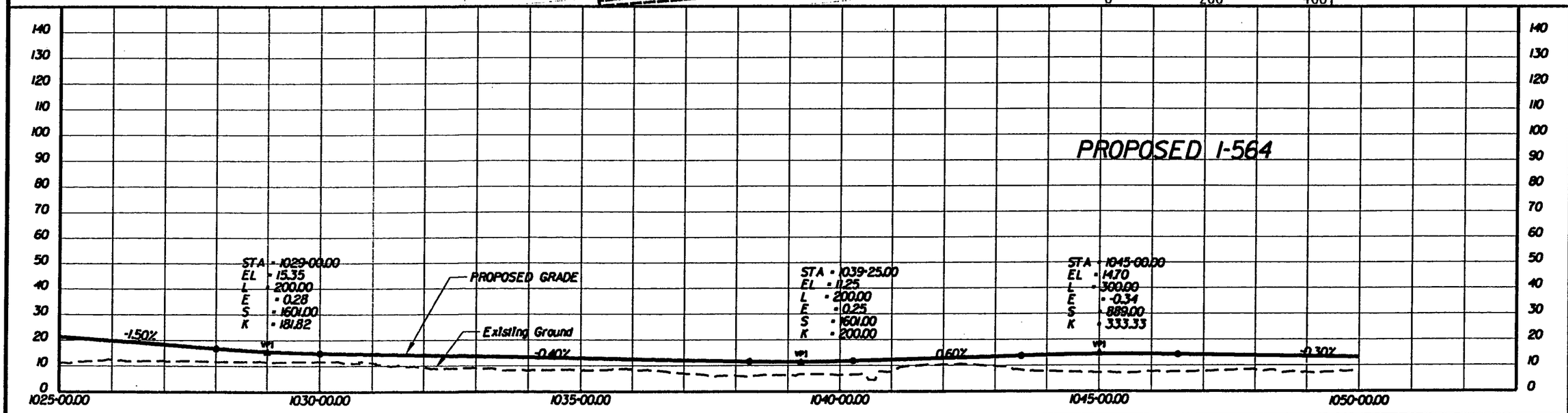

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DESIGN	DRAWN	CHECK	APPR
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DATE	DATE	DATE	DATE

ALTERNATIVE-1B
564-EB UNDER RAIL
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CENTER BORE

I-564 INTERMODAL CONNECTOR
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(FO) R000-122-108, PE-101

DWG. NO
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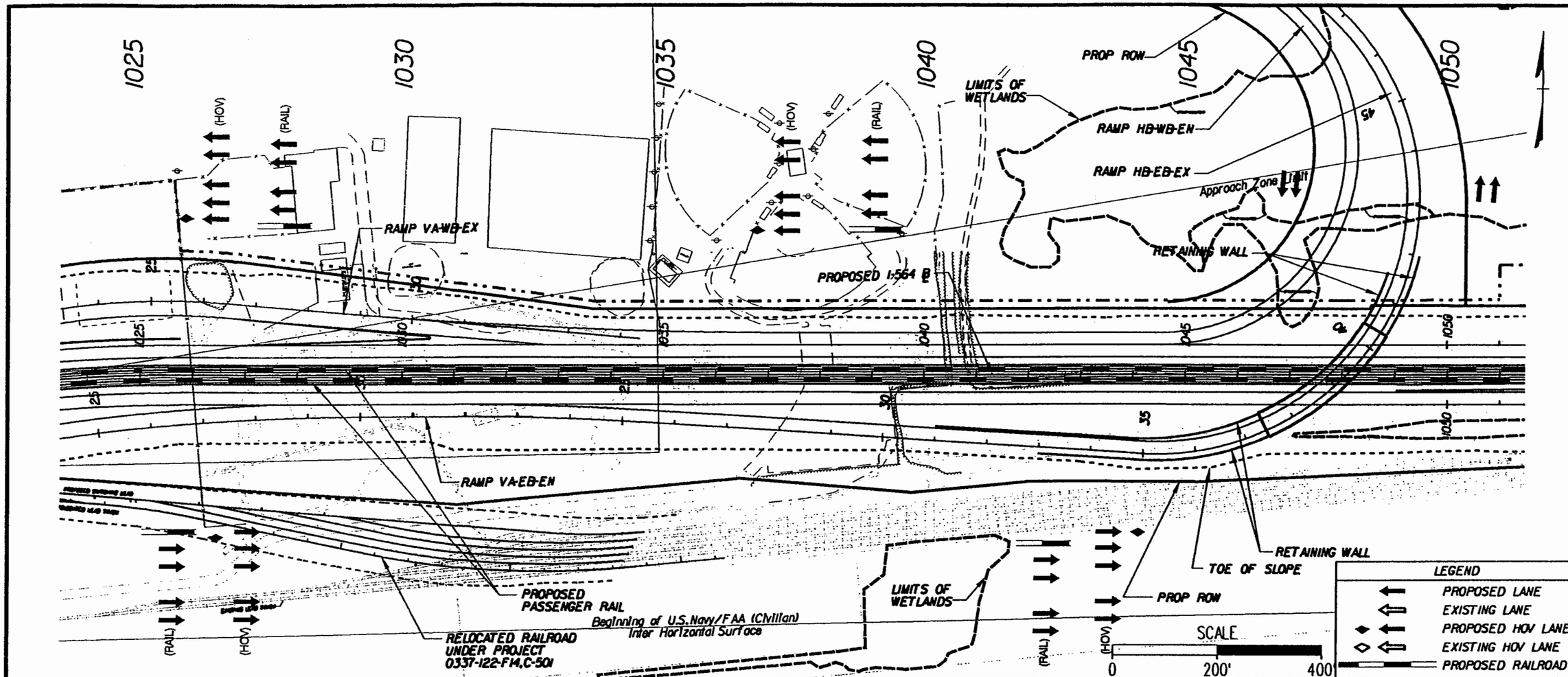

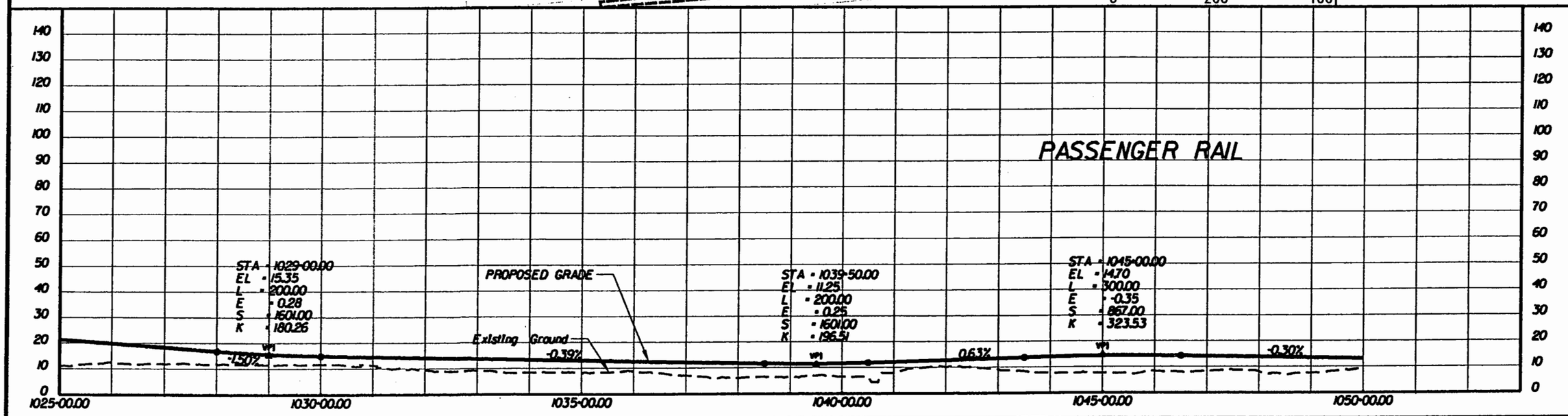

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ALTERNATIVE-1B
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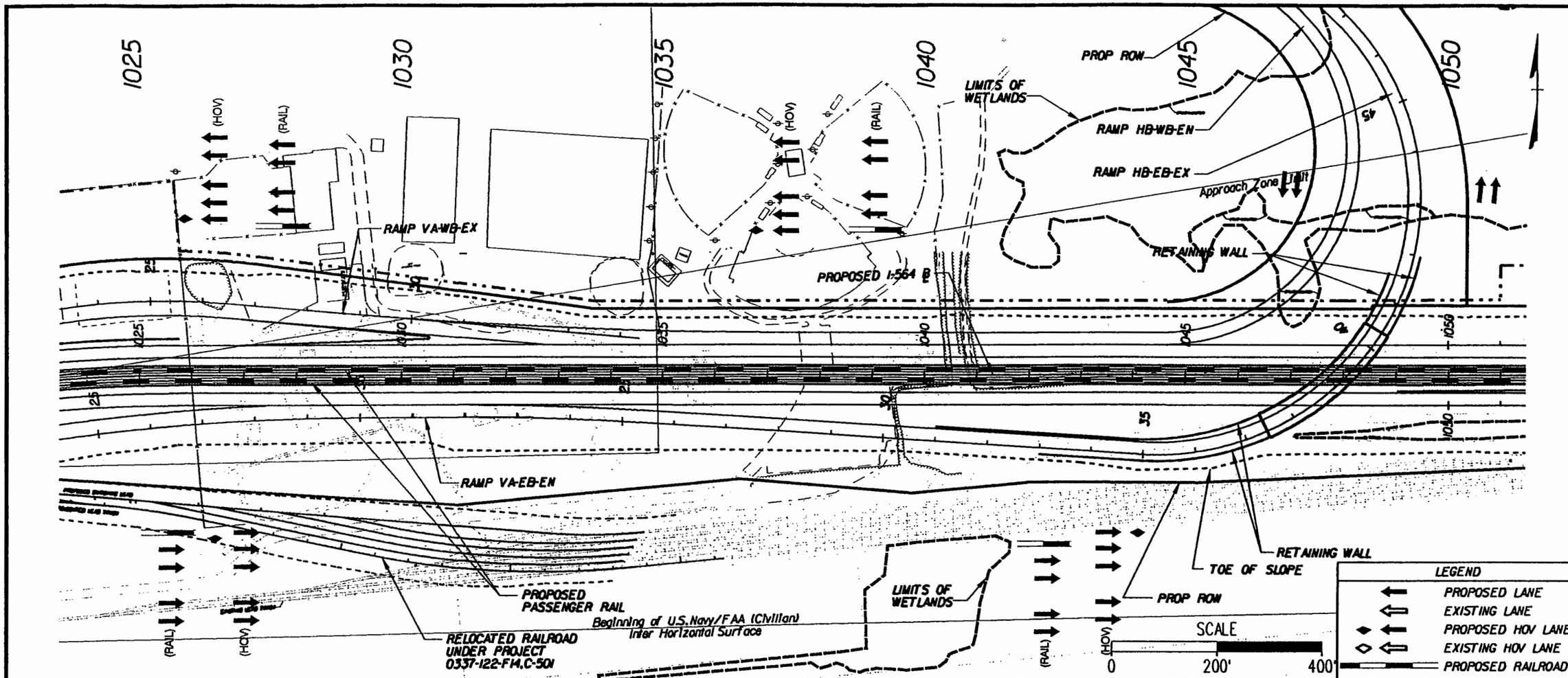

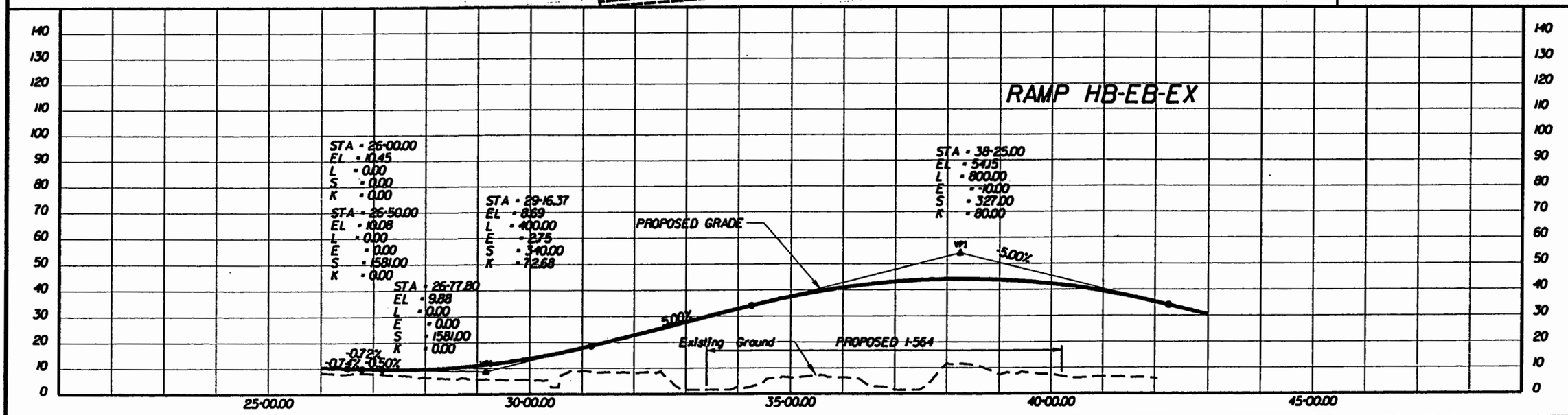

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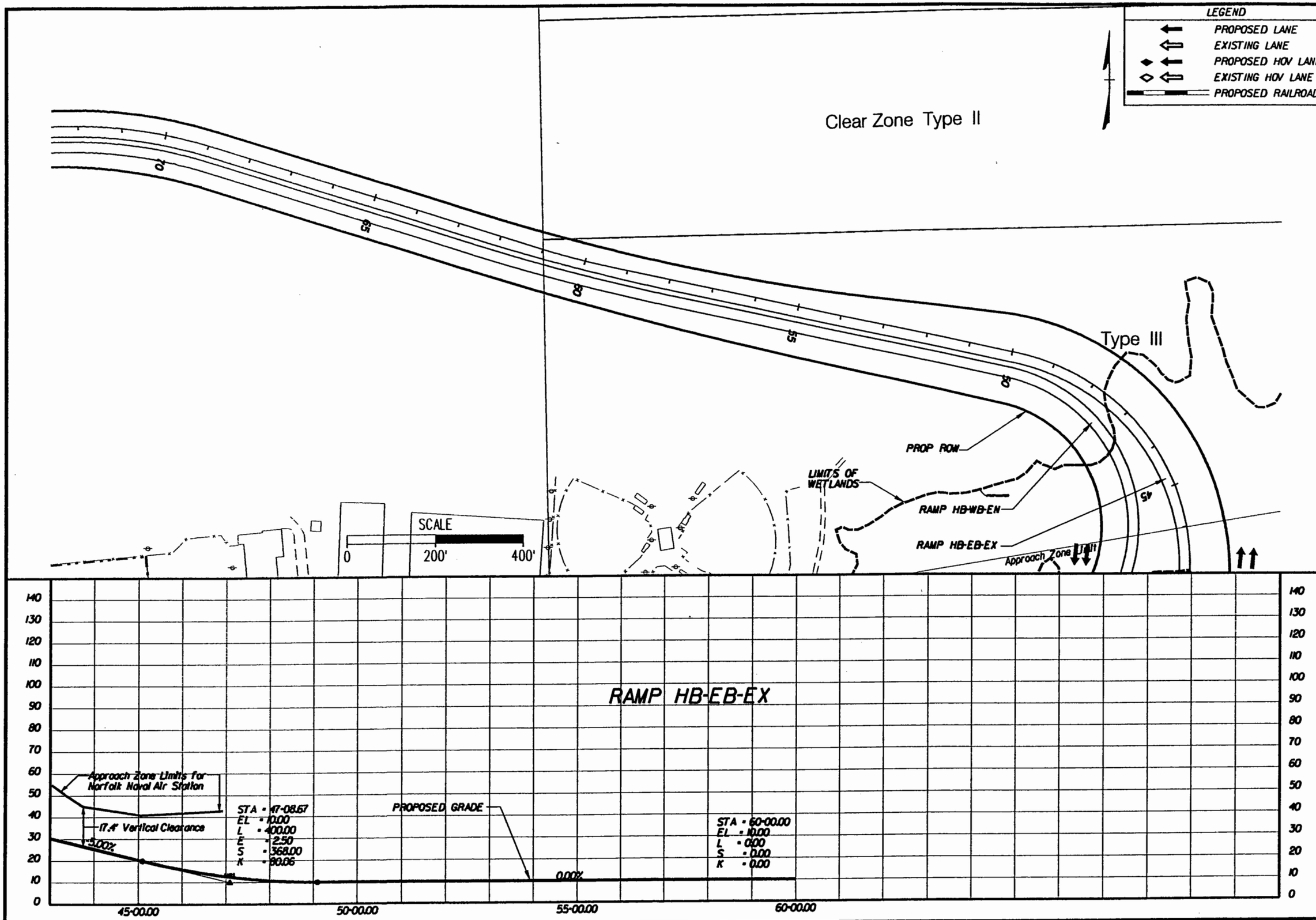
MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1B-016B



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MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1B-016C

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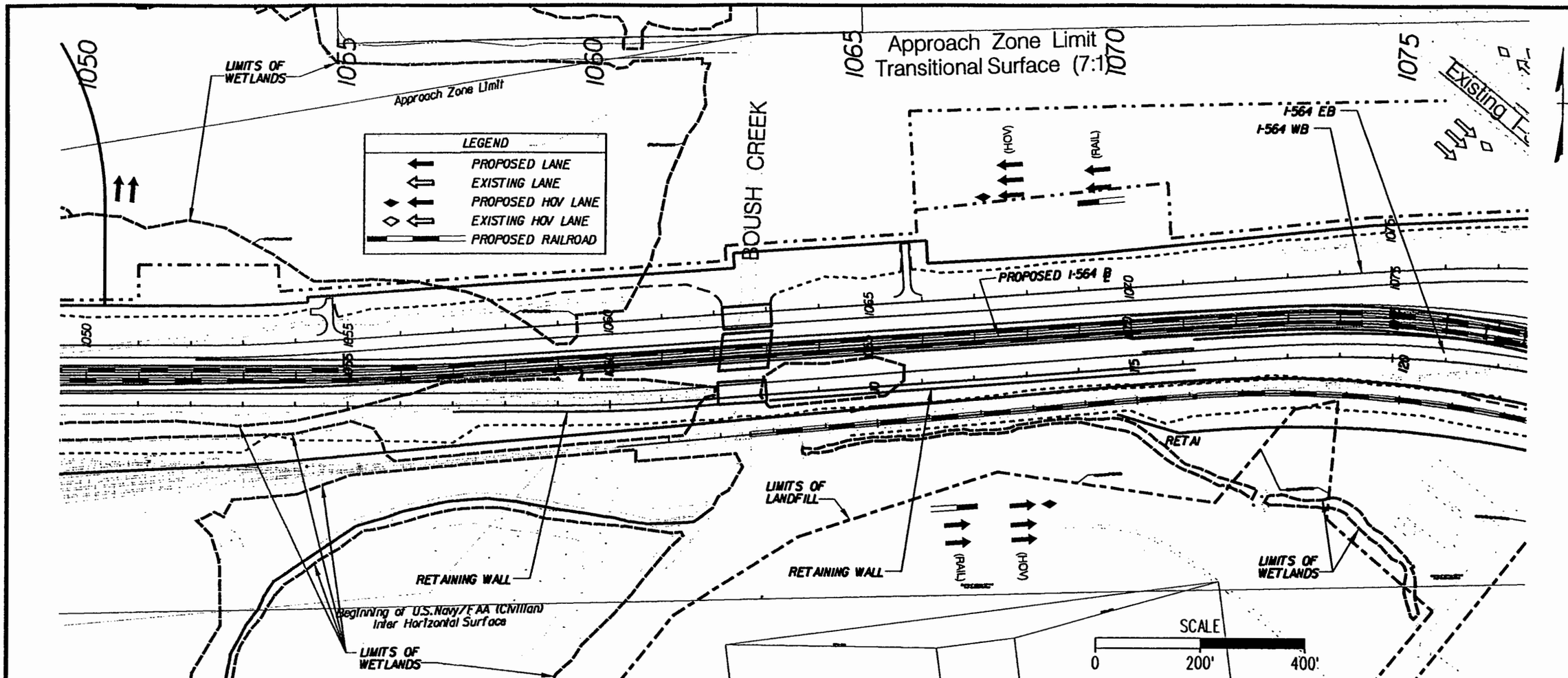

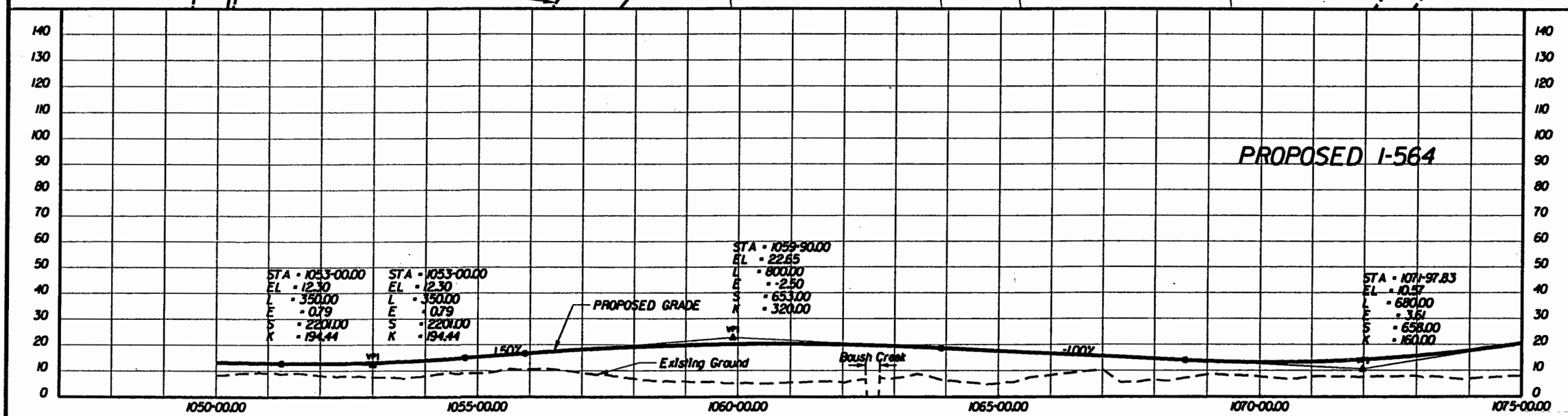

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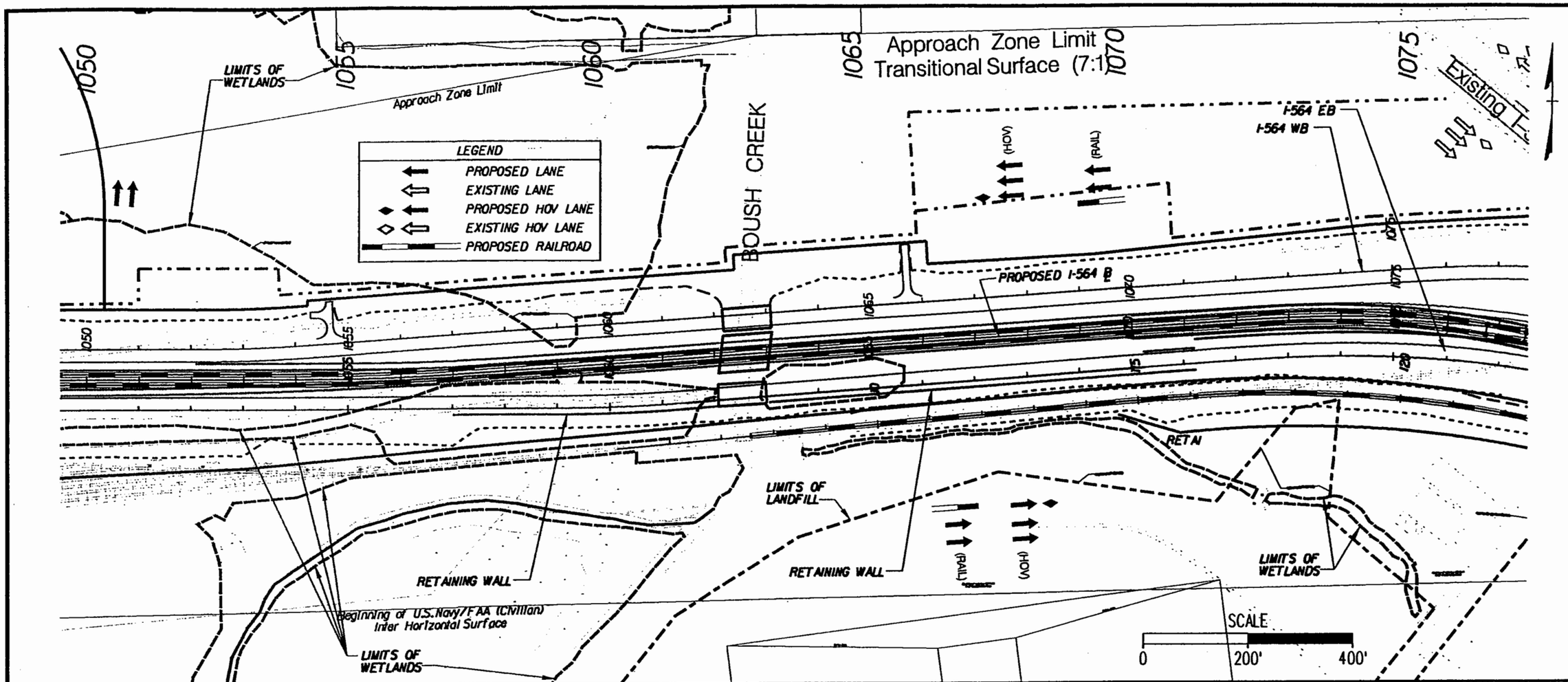
MICHAEL BAKER JR. INC.

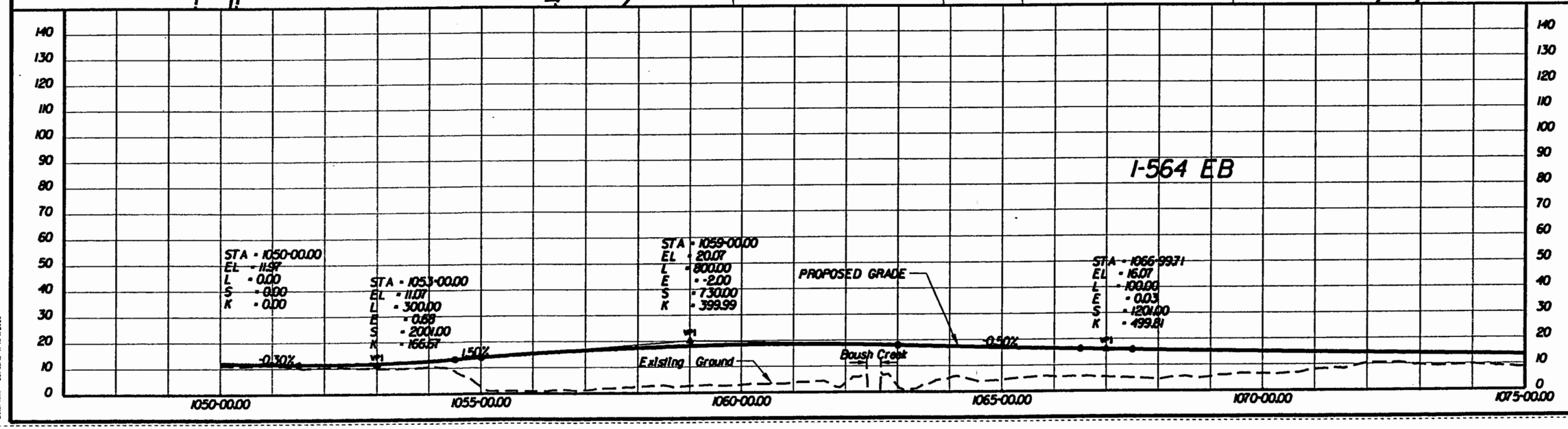
DESIGN AAA	DRAWN BBB	CHCK CCC
DATE	DATE	DATE

ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1B-017





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CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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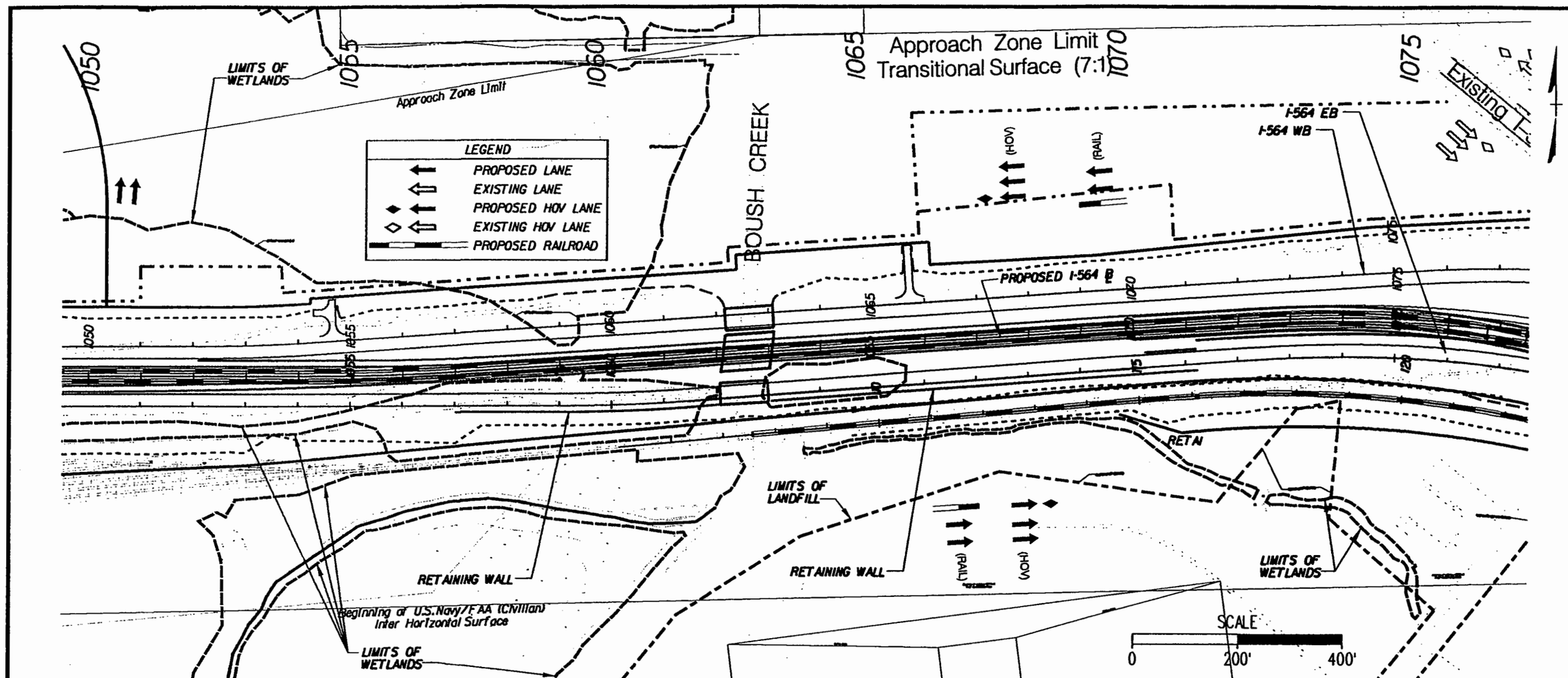

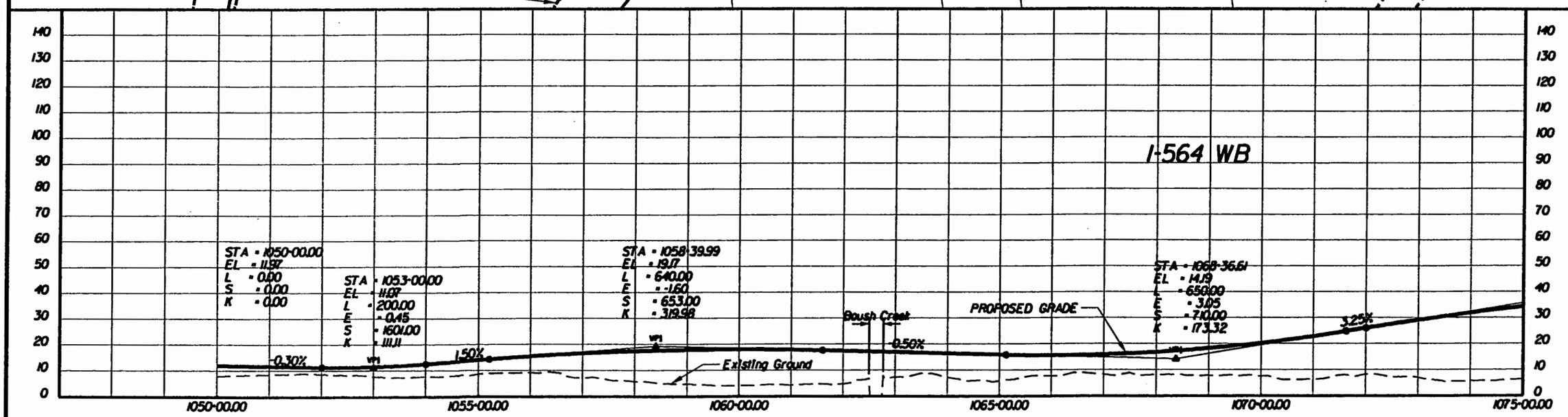

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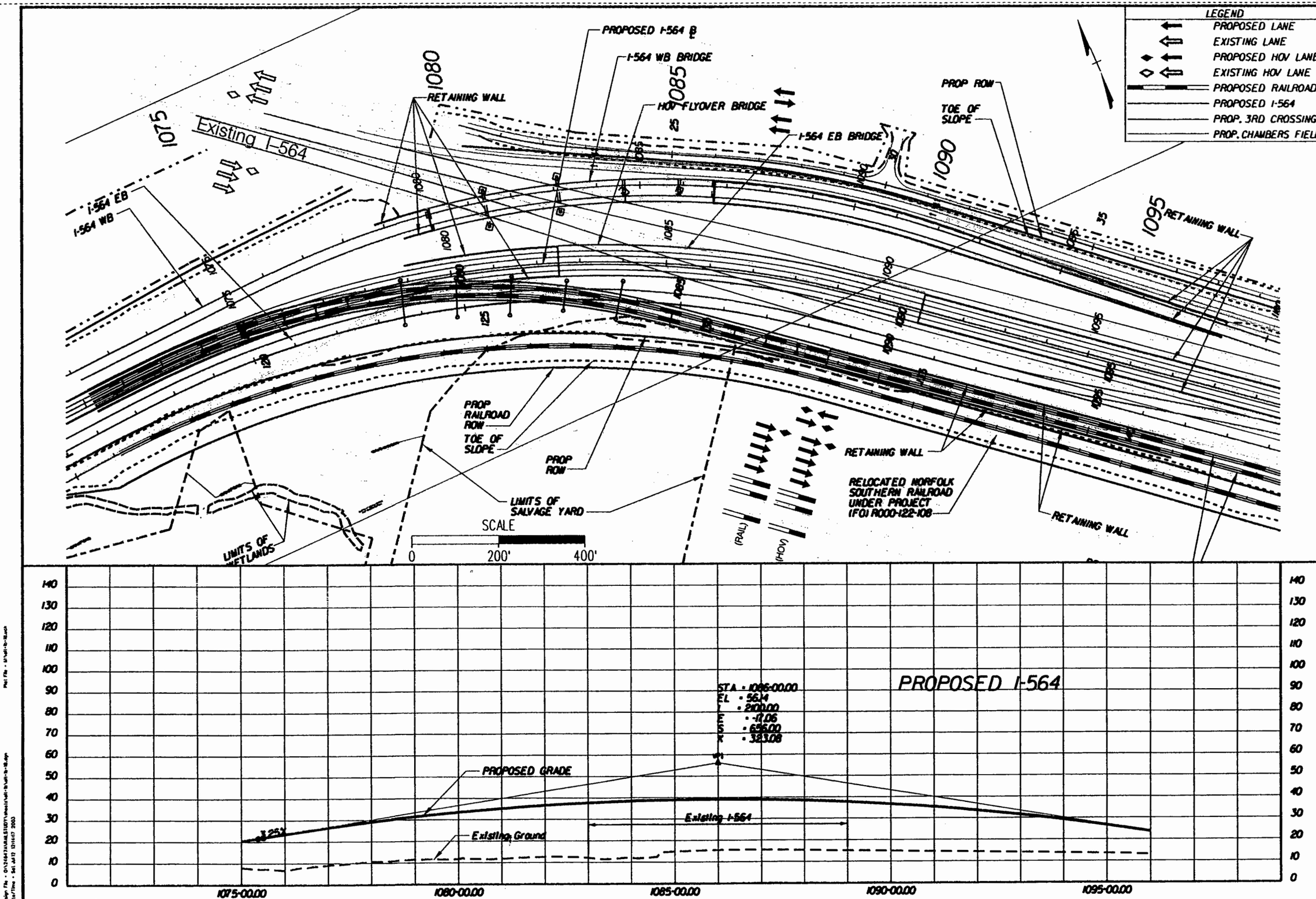
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1B-017C



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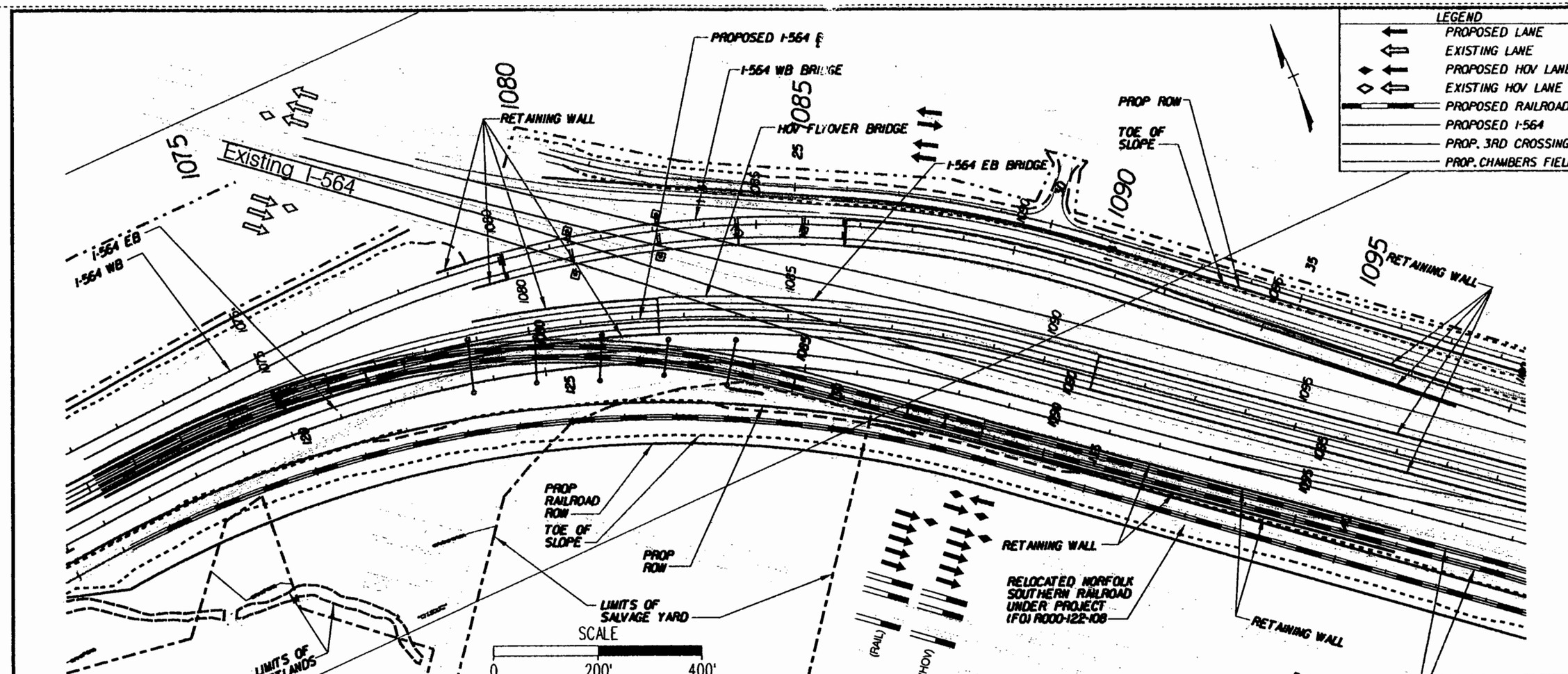
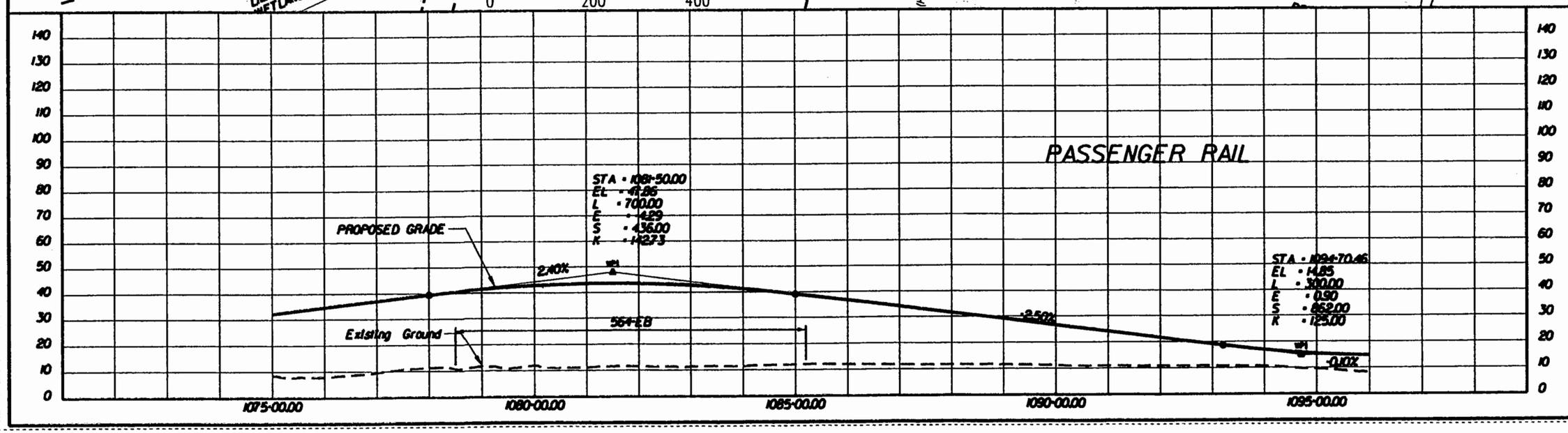
DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1B-018





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DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

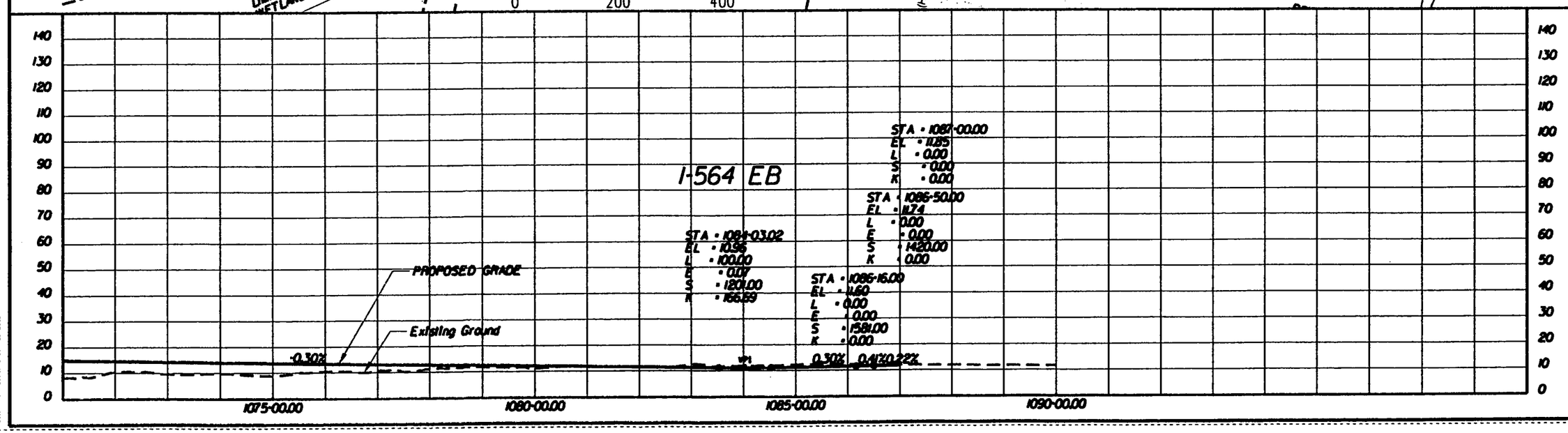
ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1B-018A

LEGEND
- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD
- PROPOSED I-564
- PROP. 3RD CROSSING
- PROP. CHAMBERS FIELD

PROPOSED I-564 ℄
I-564 WB BRIDGE
RETAINING WALL
HOV FLYOVER BRIDGE
I-564 EB BRIDGE
PROP ROW
TOE OF SLOPE
Existing I-564
I-564 EB
I-564 WB
1075
1080
1085
1090
1095
RETAINING WALL
PROP RAILROAD ROW
TOE OF SLOPE
PROP ROW
LIMITS OF SALVAGE YARD
LIMITS OF WETLANDS
RETAINING WALL
RELOCATED NORFOLK SOUTHERN RAILROAD UNDER PROJECT (FO) R000-122-108
RETAINING WALL
(RAIL)
(HOV)
SCALE
0 200' 400'



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DESIGN AAA	DRAWN BBB	CHECK CCC	APPR.
DATE	DATE	DATE	DATE

ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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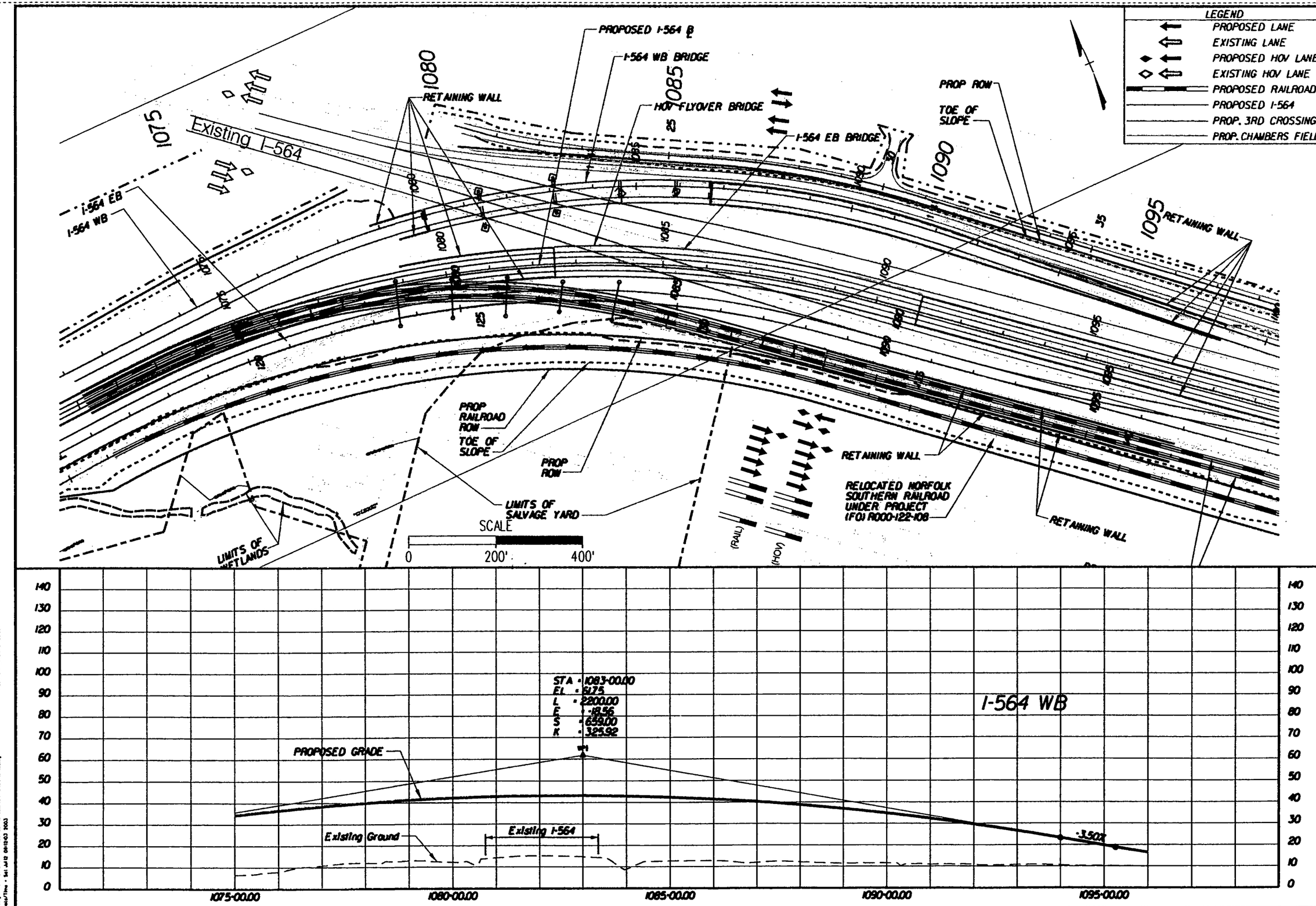

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AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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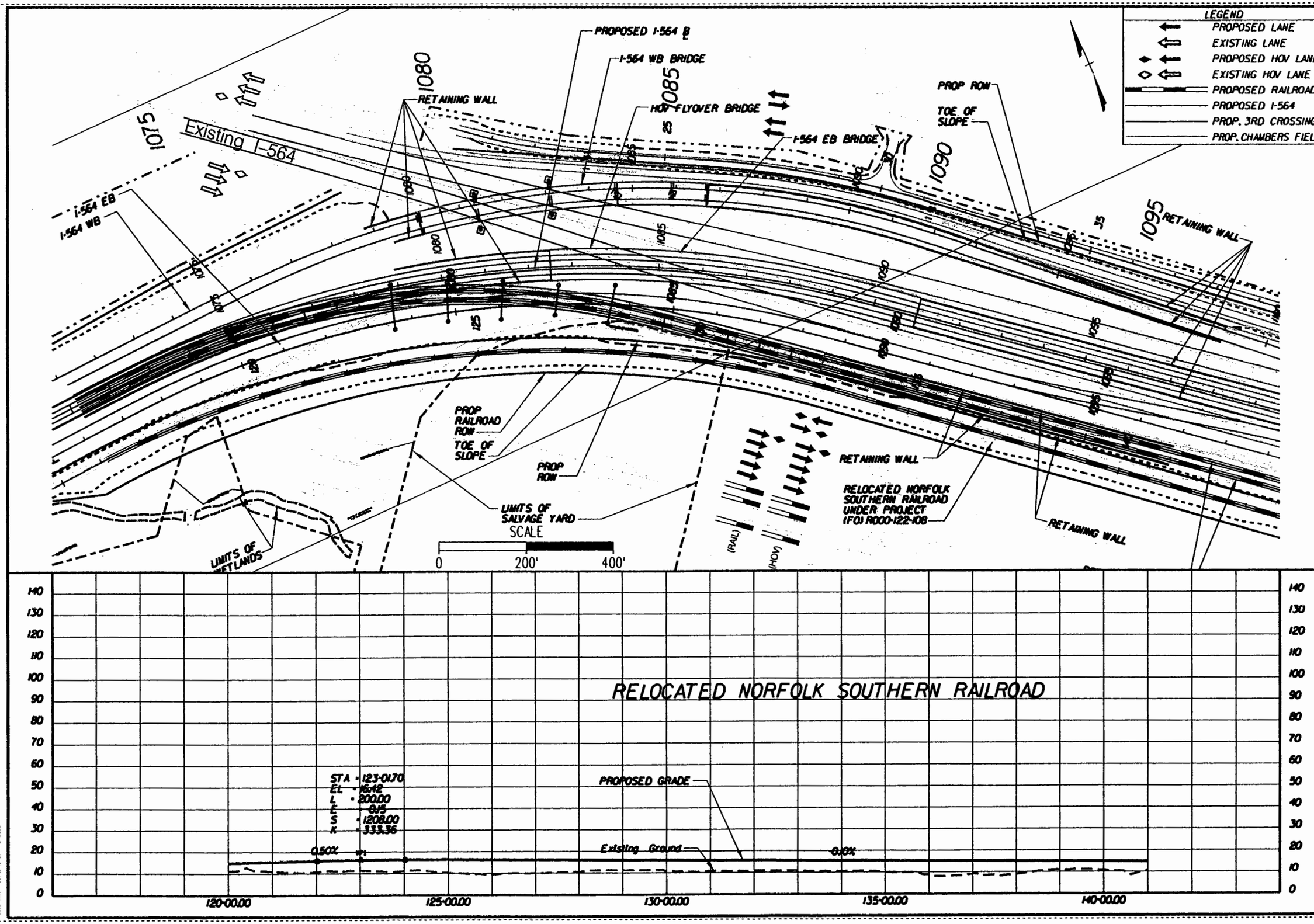

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DATE	DATE	DATE	DATE
AAA	BBB	CCC	
DESIGN	DRWN	CHCK	APPR

ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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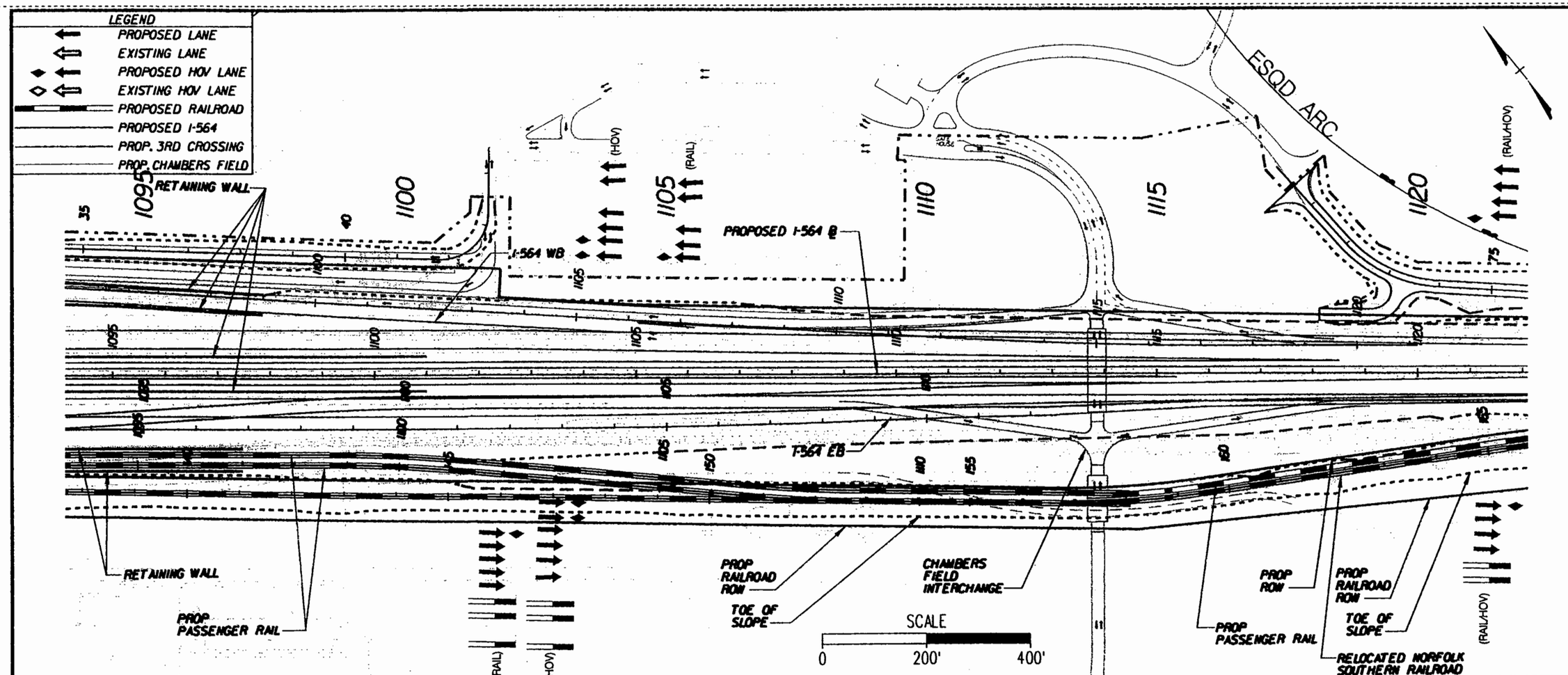

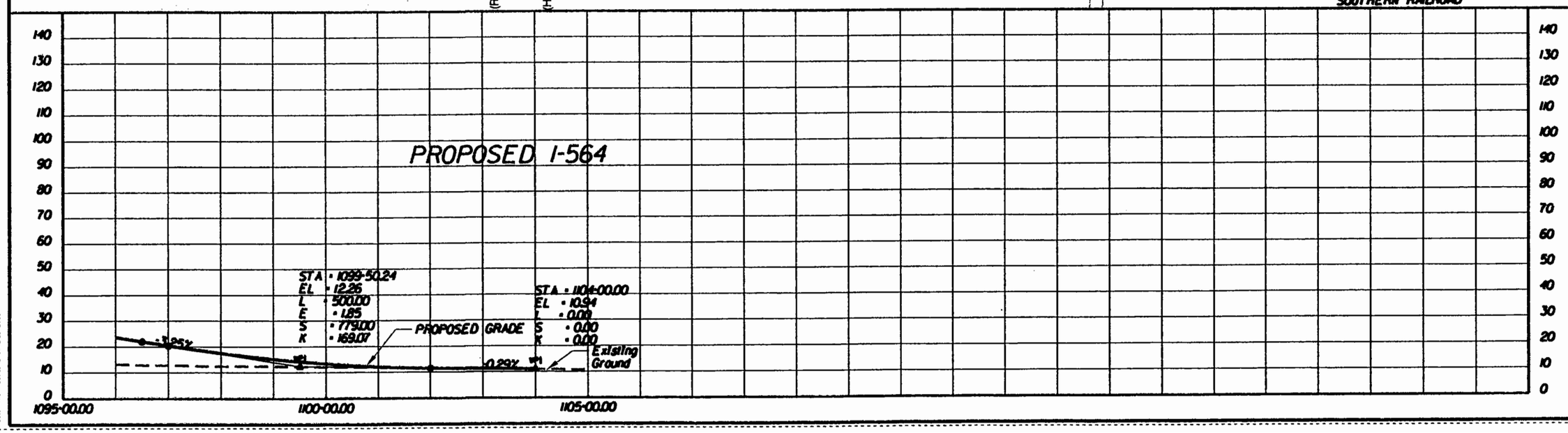

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AAA	BBB	CCC	
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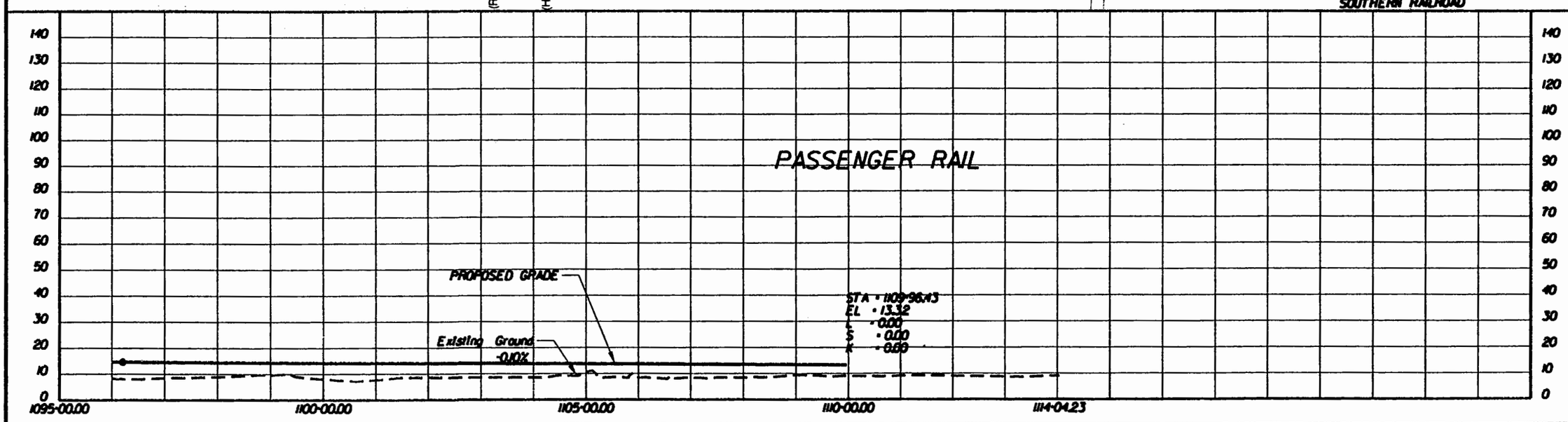
ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1B-019

LEGEND
- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD
- PROPOSED I-564
- PROP. 3RD CROSSING
- PROP. CHAMBERS FIELD

RETAINING WALL
1095
1100
1105
1110
1115
1120
(HOV)
(RAIL)
(RAIL/HOV)
I-564 WB
PROPOSED I-564 EB
I-564 EB
ESQD ARC
RETAINING WALL
PROP PASSENGER RAIL
PROP RAILROAD ROW
TOE OF SLOPE
CHAMBERS FIELD INTERCHANGE
PROP ROW
PROP RAILROAD ROW
TOE OF SLOPE
PROP PASSENGER RAIL
RELOCATED NORFOLK SOUTHERN RAILROAD
SCALE
0 200' 400'



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AAA	BBB	CCC	
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ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1B-019A

LEGEND
- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD
- PROPOSED I-564
- PROP. 3RD CROSSING
- PROP. CHAMBERS FIELD

RETAINING WALL
I-564 WB
PROPOSED I-564 ℄
I-564 EB
ESQD ARC
(HOV)
(RAIL)
(RAIL/HOV)
RETAINING WALL
PROP PASSENGER RAIL
PROP RAILROAD ROW
TOE OF SLOPE
CHAMBERS FIELD INTERCHANGE
PROP ROW
PROP RAILROAD ROW
TOE OF SLOPE
PROP PASSENGER RAIL
RELOCATED NORFOLK SOUTHERN RAILROAD

SCALE
0 200' 400'

I-564 WB

STA = 1101+82.69
EL = 8.85
L = 0.00
E = 0.00
S = 158.00
K = 0.00

STA = 1102+00.00
EL = 8.83
L = 0.00
E = 0.00
S = 158.00
K = 0.00

STA = 1097+76.56
EL = 10.07
L = 500.00
E = 2.00
S = 690.00
K = 156.25

STA = 1102+25.00
EL = 8.84
L = 0.00
E = 0.00
S = 1420.00
K = 0.00

PROPOSED GRADE
Existing Ground
-0.30%
0.04%
-0.12%

1095+00.00 1100+00.00 1105+00.00 1110+00.00 1115+00.00 1120+00.00

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CHK	CCC	DATE	DATE
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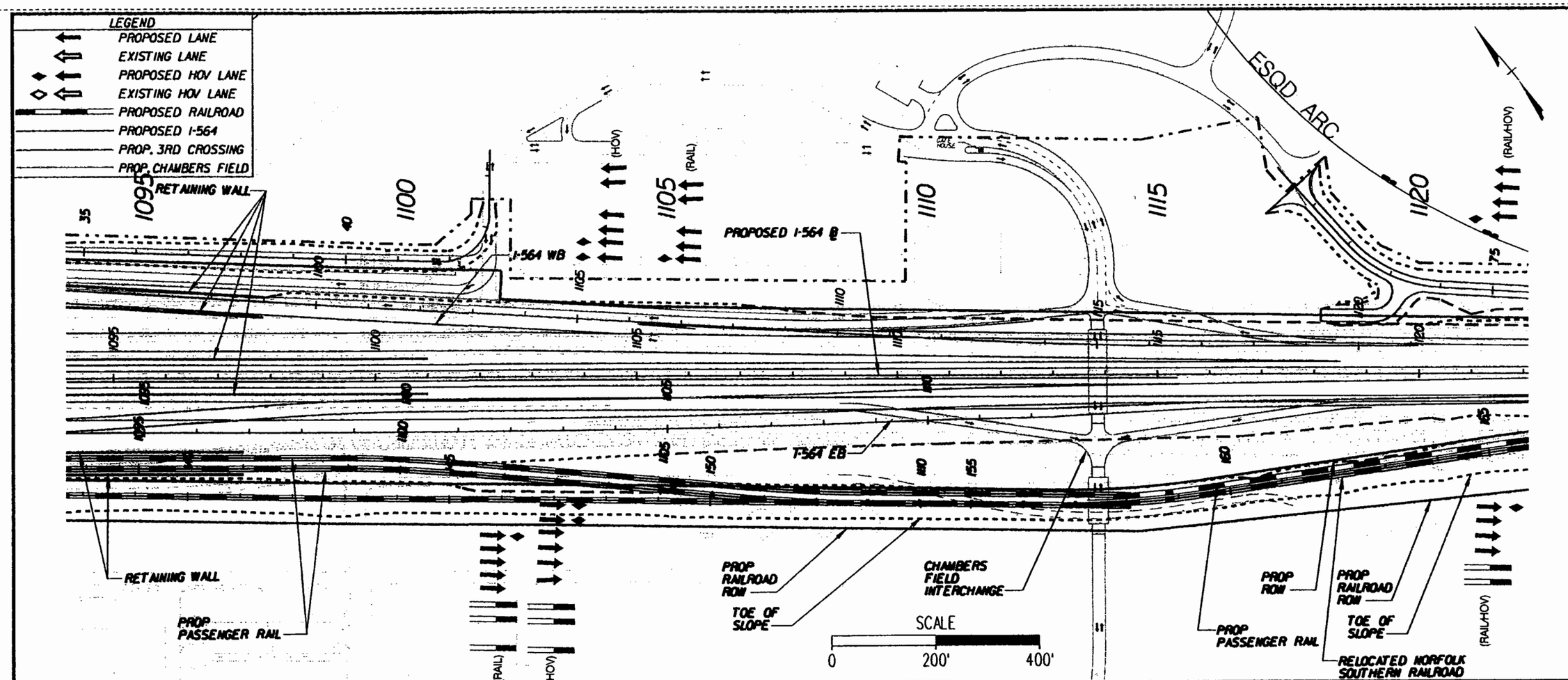
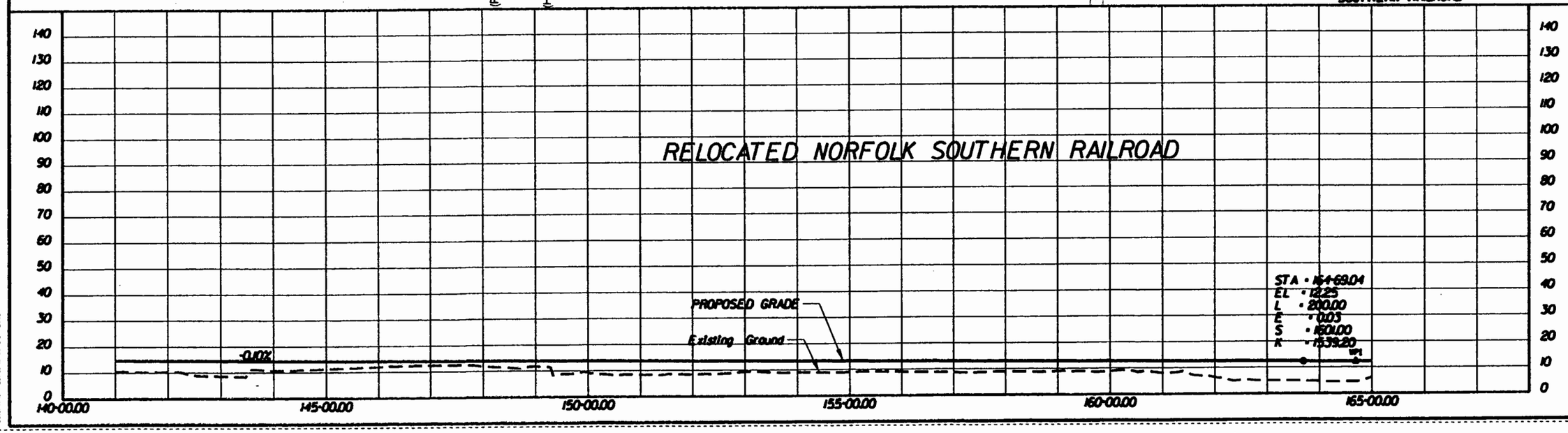
ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1B-019C





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ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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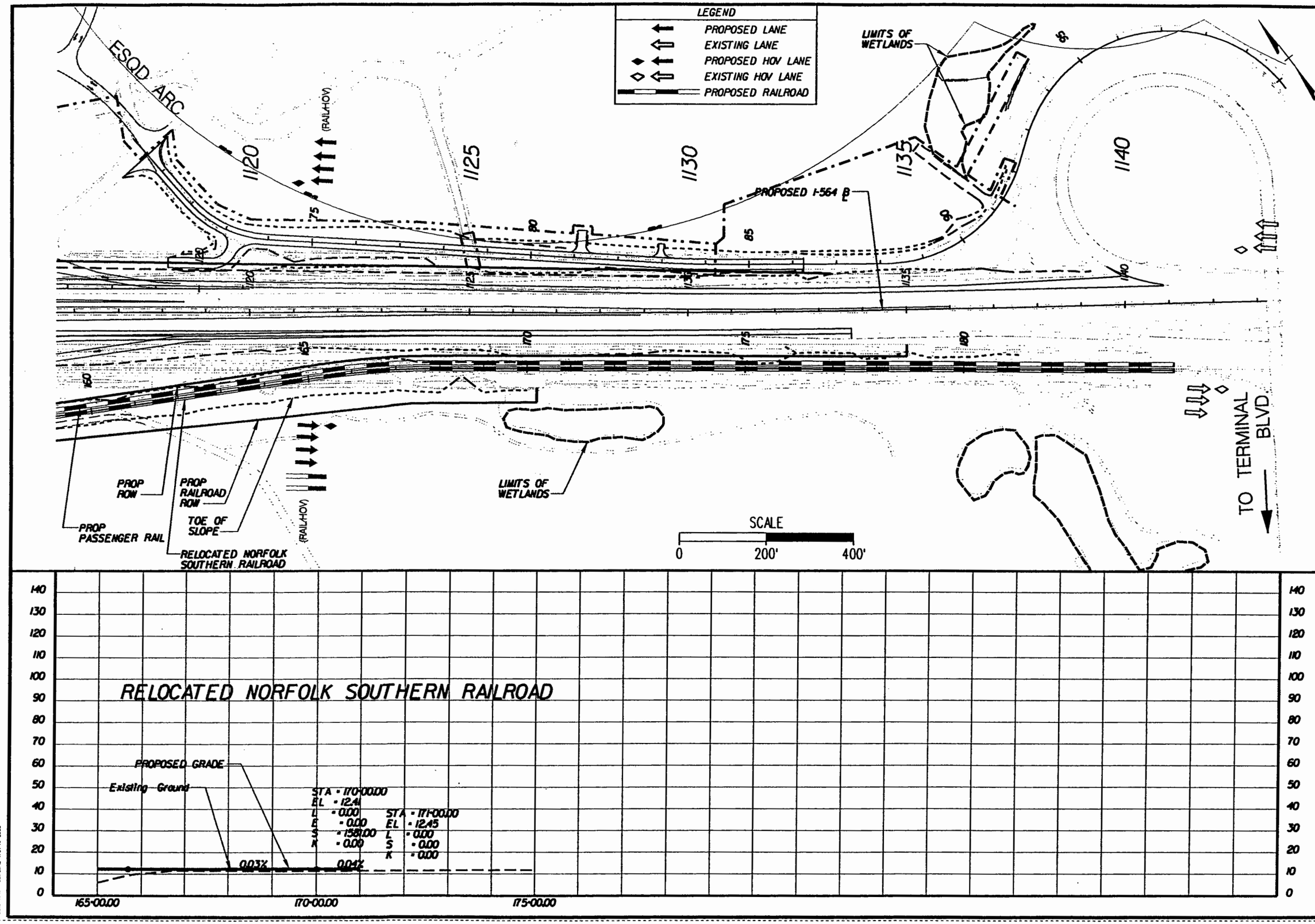

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CHCK	CCC	DATE	
APPR		DATE	
DATE		DATE	

ALTERNATIVE-1B
564-EB UNDER RAIL
PROVISION FOR HOV LANES
CENTER BORE

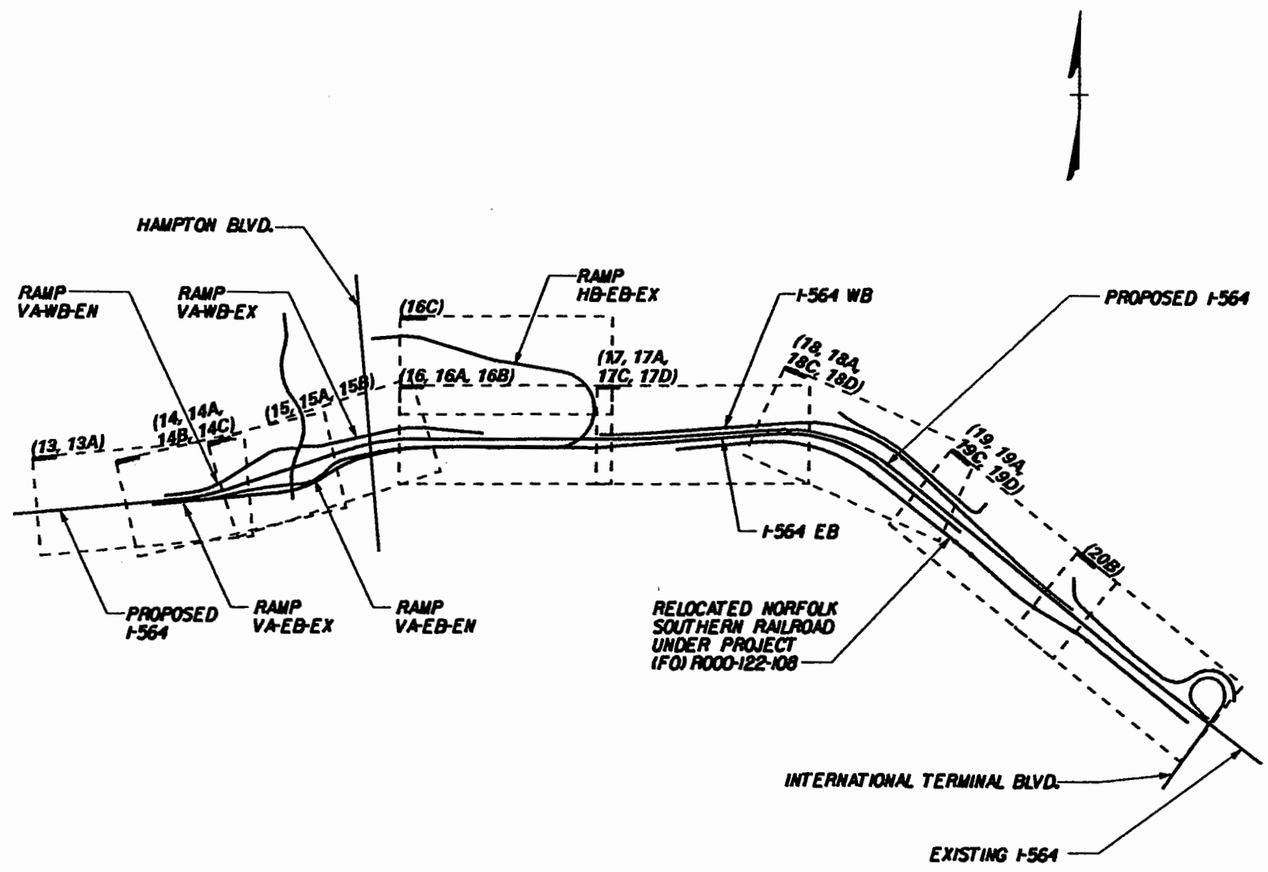
I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-1B-020A

INDEX OF SHEETS

SHEET NO. 13	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 13A	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 14	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 14A	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 14B	ALIGNMENT RAMP VA-WB-EN PLAN AND PROFILE
SHEET NO. 14C	ALIGNMENT RAMP VA-EB-EX PLAN AND PROFILE
SHEET NO. 15	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 15A	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 15B	ALIGNMENT RAMP VA-EB-EN PLAN AND PROFILE
SHEET NO. 16	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 16A	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 16B	ALIGNMENT RAMP HB-EB-EX PLAN AND PROFILE
SHEET NO. 16C	ALIGNMENT RAMP HB-EB-EX PLAN AND PROFILE
SHEET NO. 17	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 17A	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 17B	NOT USED
SHEET NO. 17C	ALIGNMENT I-564 WB PLAN AND PROFILE
SHEET NO. 17D	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE
SHEET NO. 18	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 18A	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 18B	NOT USED
SHEET NO. 18C	ALIGNMENT I-564 WB PLAN AND PROFILE
SHEET NO. 18D	ALIGNMENT RELOCATED NORFOLK SOUTHERN PLAN AND PROFILE
SHEET NO. 18E	NOT USED
SHEET NO. 19	ALIGNMENT I-564 PLAN AND PROFILE
SHEET NO. 19A	ALIGNMENT I-564 EB PLAN AND PROFILE
SHEET NO. 19B	NOT USED
SHEET NO. 19C	ALIGNMENT I-564 WB PLAN AND PROFILE
SHEET NO. 19D	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE
SHEET NO. 20	NOT USED
SHEET NO. 20A	NOT USED
SHEET NO. 20B	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE

ALTERNATIVE-2A ON SHORE



SCALE

0 2000' 4000'

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QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
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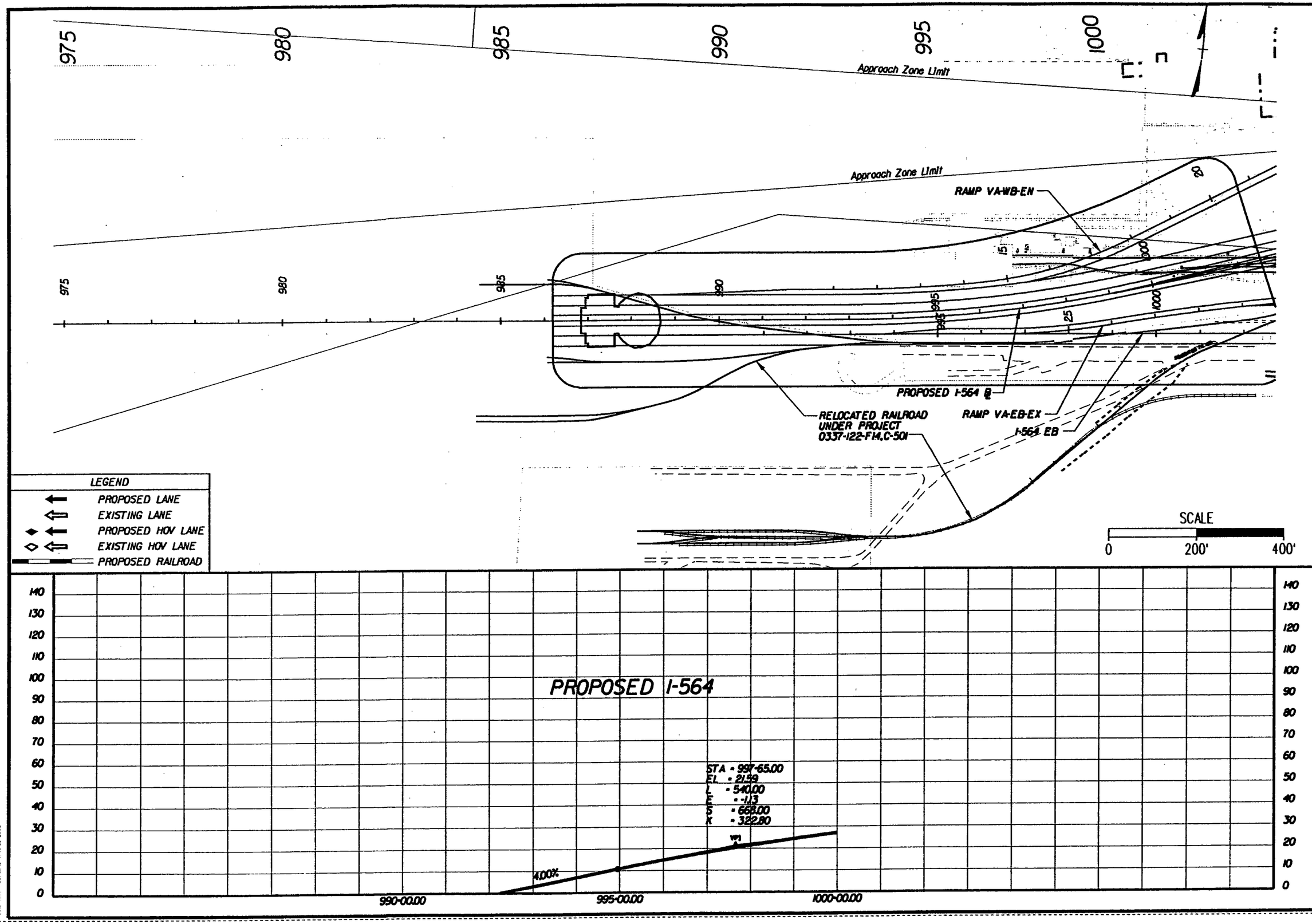
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2A ON SHORE
KEYMAP

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT2A-KEY



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MICHAEL BAKER JR., INC.

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ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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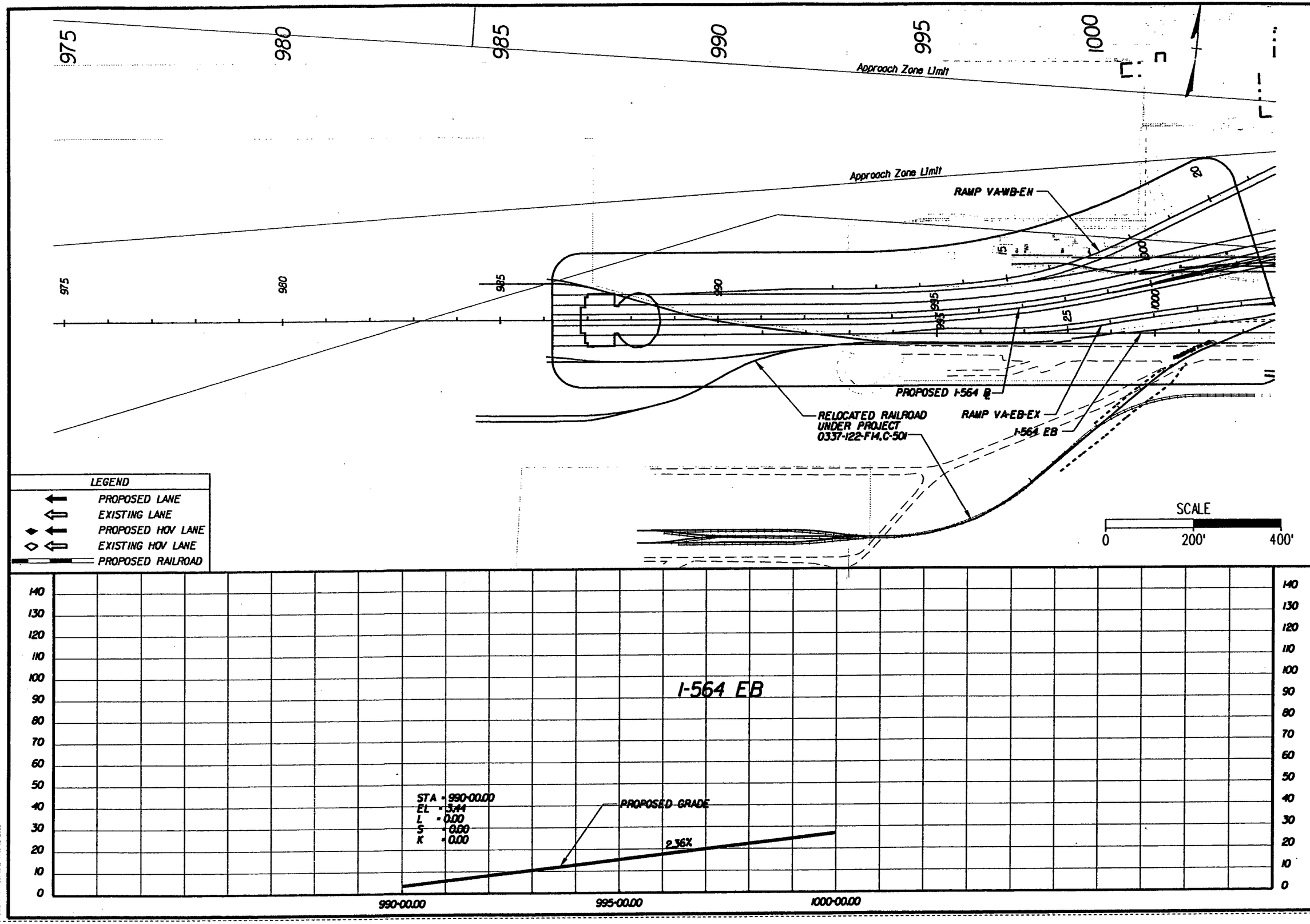

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MICHAEL BAKER JR., INC.

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ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2A-013A

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

Approach Zone Limit

Approach Zone Limit

RAMP VA-WB-EN

RAMP VA-WB-EN

RELOCATED RAILROAD UNDER PROJECT 0337-122-F14,C-501

PROPOSED I-564 ℄

RAMP VA-WB-EX

VIRGINIA AVE.

RETAINING WALL

RAMP VA-EB-EN

PROPOSED I-564 ℄

RELOCATED RAILROAD UNDER PROJECT 0337-122-F14,C-501

RAMP VA-EB-EX

I-564 EB

RAMP VA-EB-EX

RETAINING WALL

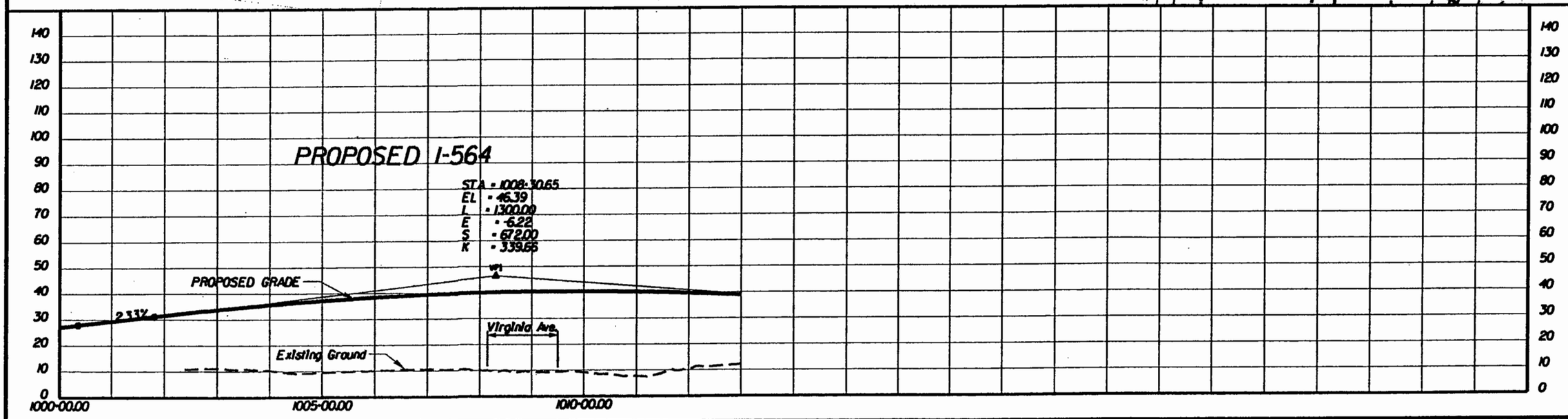
PROP ROW

I-564 EB

LIMITS OF WETLANDS

SCALE

0 200' 400'



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CHECK	CCC	DATE	DATE
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ALTERNATIVE-2A

PROVISION FOR HOV LANES SOUTHERN BORE

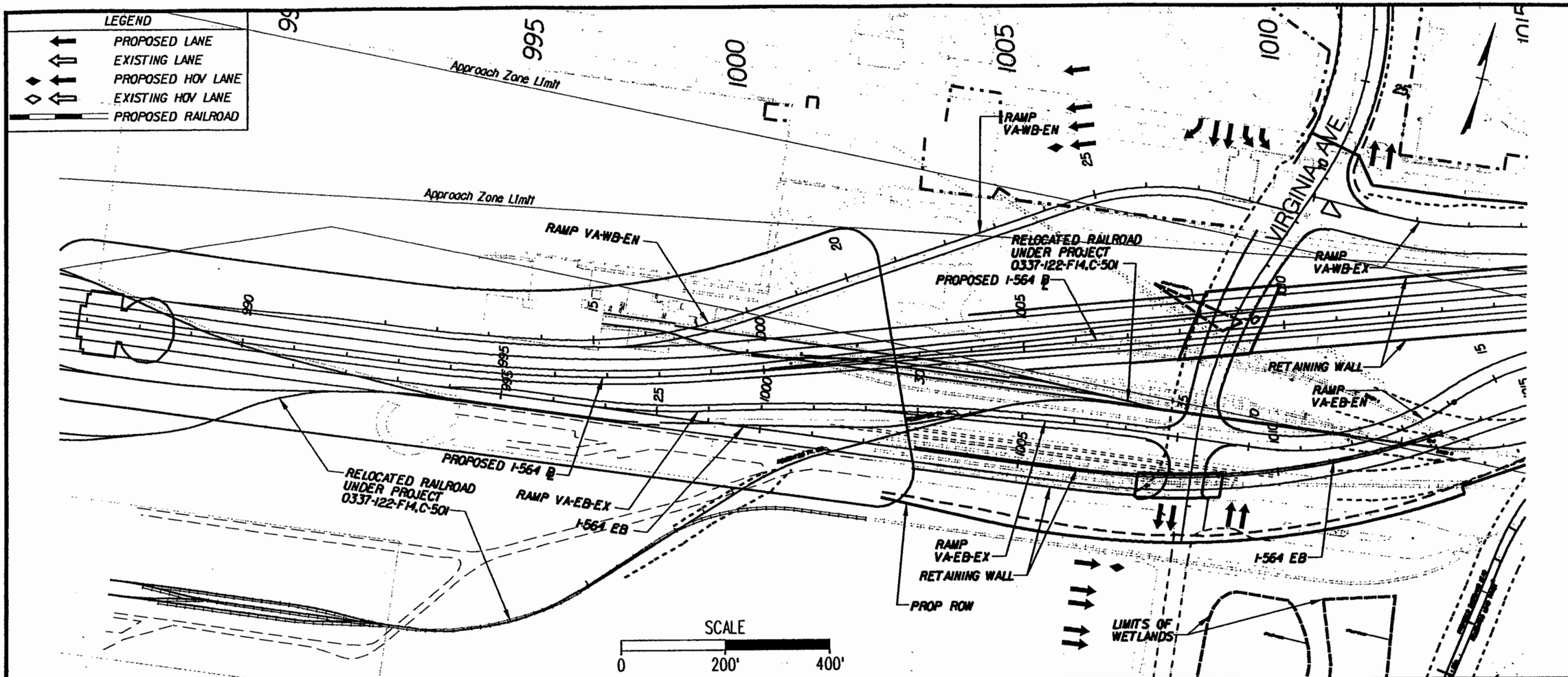
I-564 INTERMODAL CONNECTOR

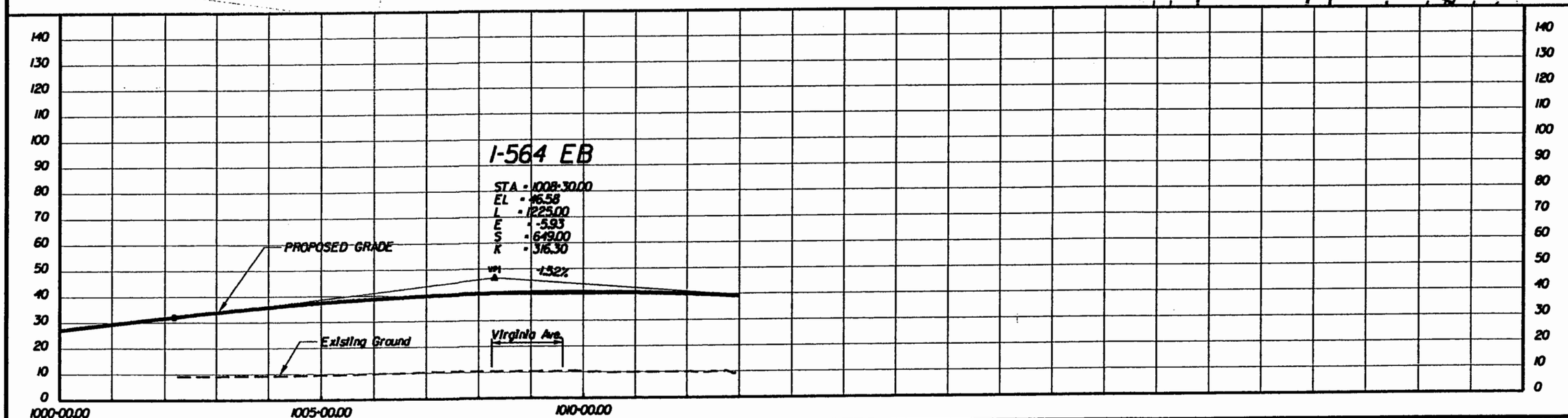
Rail Connection Study

(FO) R000-122-108, PE-101

DWG. NO

ALT-2A-014





PREPARED BY
PARSONS BRINCKERHOFF QUADE & DOUGLASS, INC.
MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2A-014A

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

Approach Zone Limit

Approach Zone Limit

RAMP VA-WB-EN

RAMP VA-WB-EN

RELOCATED RAILROAD UNDER PROJECT 0337-122-F14,C-501

PROPOSED I-564 ℄

RAMP VA-WB-EX

RETAINING WALL

RAMP VA-EB-EN

VIRGINIA AVE.

PROPOSED I-564 ℄

RELOCATED RAILROAD UNDER PROJECT 0337-122-F14,C-501

RAMP VA-EB-EX

I-564 EB

RAMP VA-EB-EX

RETAINING WALL

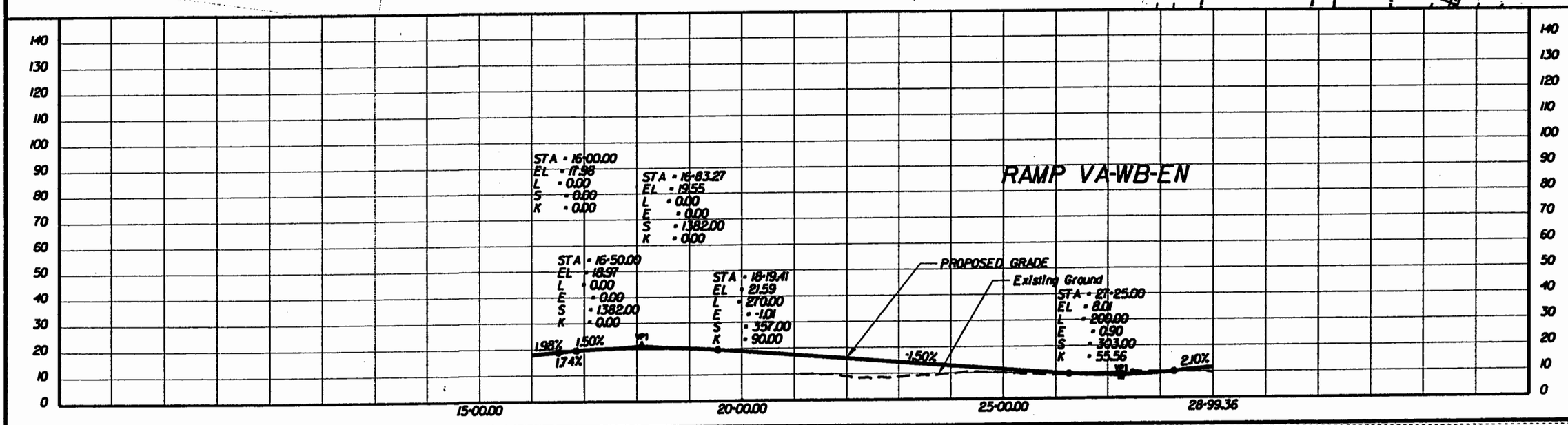
PROP ROW

I-564 EB

LIMITS OF WETLANDS

SCALE

0 200' 400'



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AAA	BBB	CCC	
DESIGN	DRAWN	CHCK	APPR
DATE	DATE	DATE	DATE

ALTERNATIVE-2A

PROVISION FOR HOV LANES SOUTHERN BORE

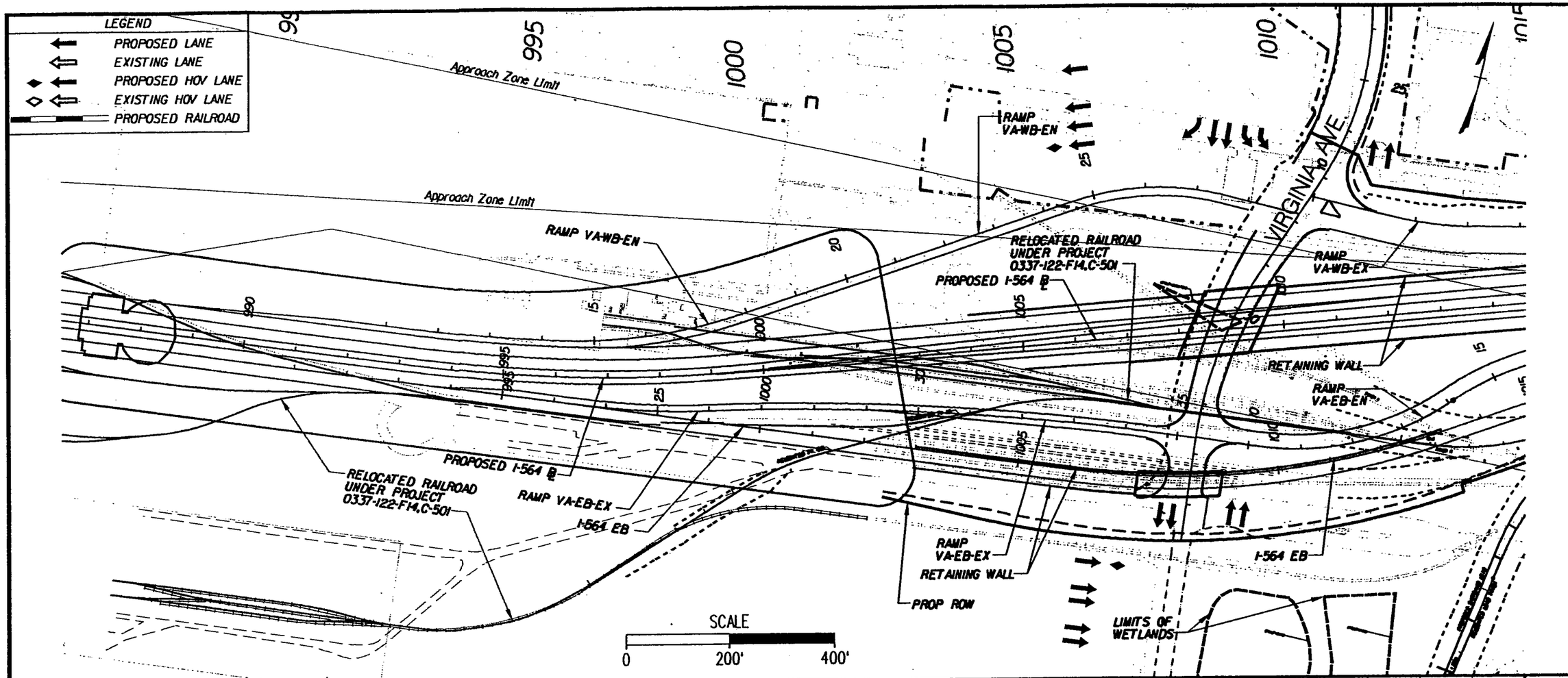
I-564 INTERMODAL CONNECTOR

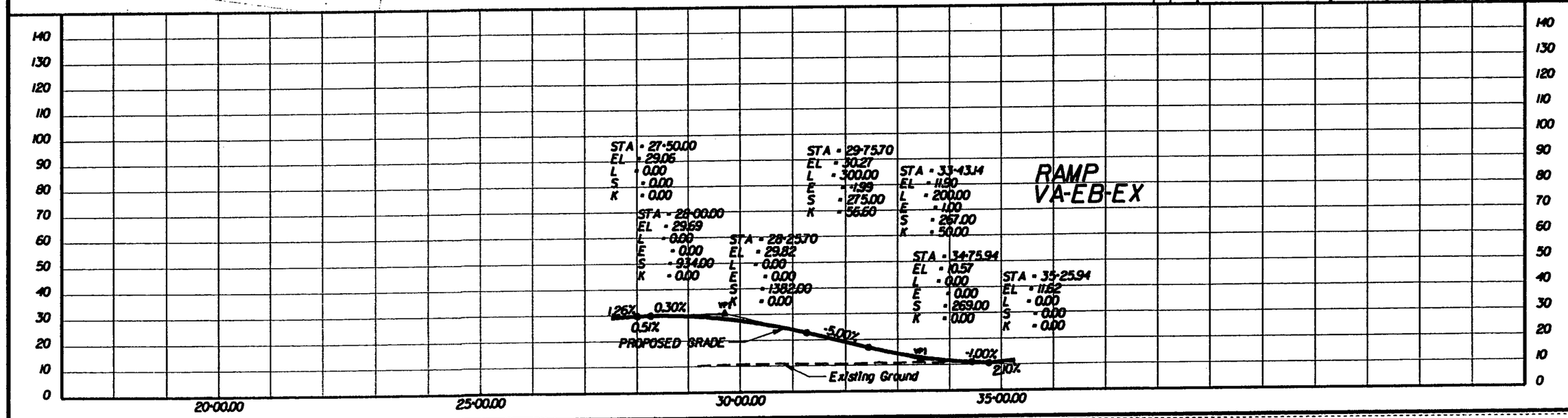
Rail Connection Study

(FO) R000-122-108, PE-101

DWG. NO

ALT-2A-014B





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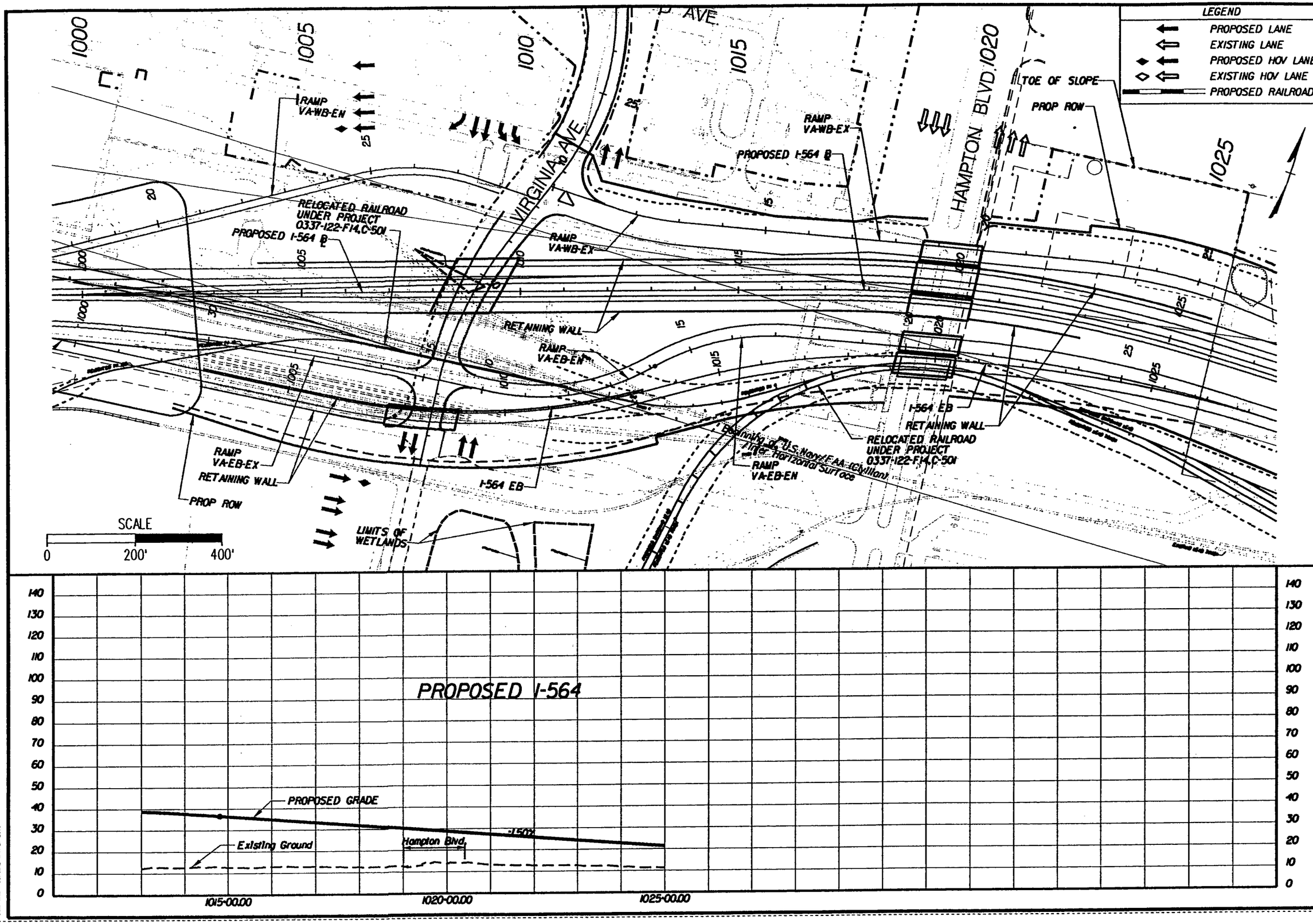
DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2A-014C



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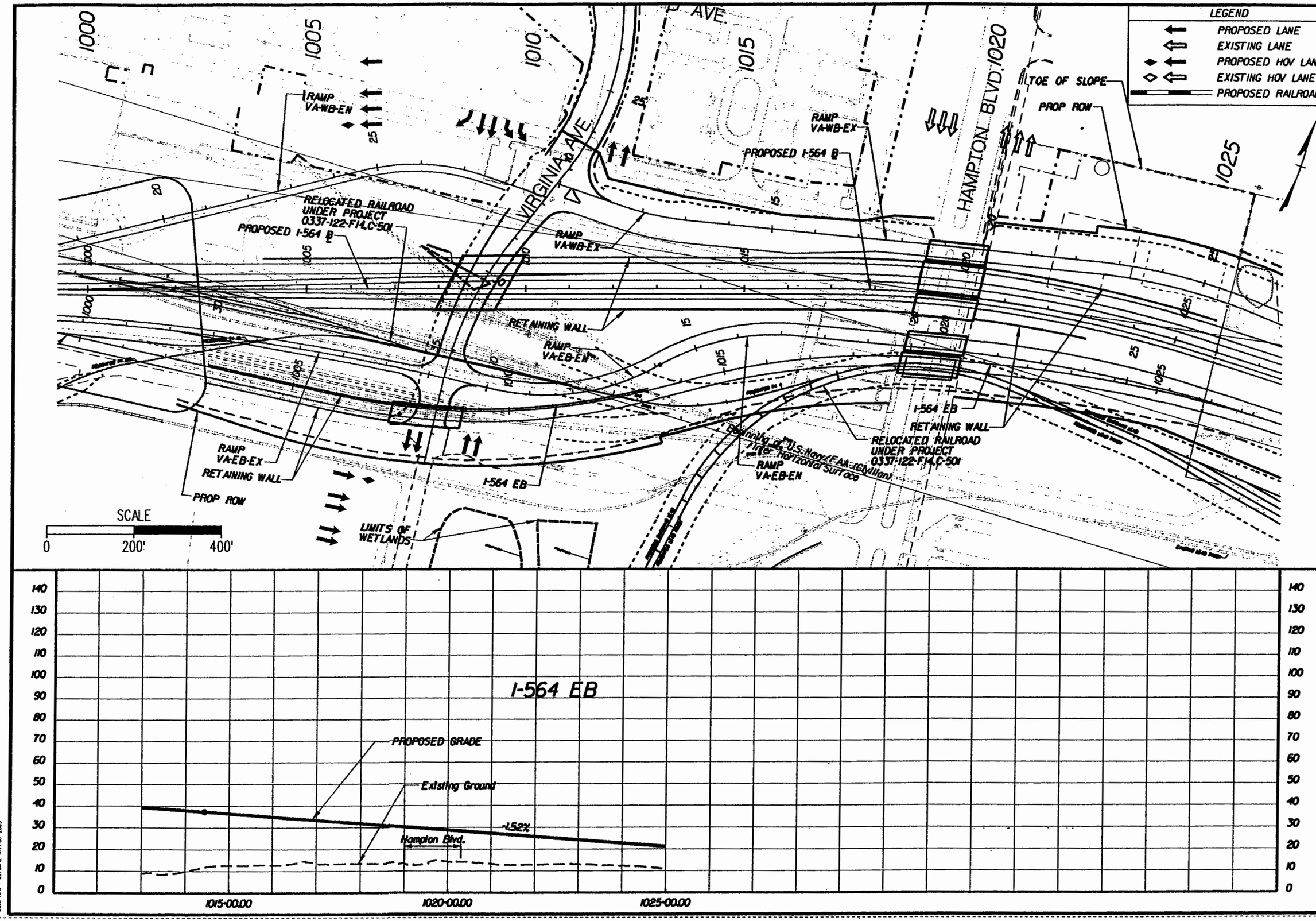
DESIGN	AAA	DATE	
DRAWN	BBB	DATE	
CHCK	CCC	DATE	
APPR		DATE	

ALTERNATIVE–2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I–564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000–122–108, PE–101

DWG. NO
ALT–2A–015



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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHECK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2A-015A

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

RAMP VA-WB-EN
RAMP VA-WB-EX
PROPOSED I-564 B
TOE OF SLOPE
PROP ROW
VIRGINIA AVE
HAMPTON BLVD.
RELOCATED RAILROAD UNDER PROJECT 0337-122-F14,C-501
PROPOSED I-564 B
RAMP VA-WB-EX
RETAINING WALL
RAMP VA-EB-EN
I-564 EB
RETAINING WALL
RELOCATED RAILROAD UNDER PROJECT 0337-122-F14,C-501
Boundary of U.S. Navy/FAA (Clyllton) Inner Horizontal Surface
RAMP VA-EB-EN
RAMP VA-EB-EX
RETAINING WALL
PROP ROW
I-564 EB
LIMITS OF WETLANDS

SCALE
0 200' 400'

RAMP VA-EB-EN

PROPOSED GRADE
Existing Ground
Hampton Blvd.

STA = 9+75.00
EL = 10.04
L = 0.00
E = 0.00
S = 327.00
K = 0.00

STA = 9+00.00
EL = 11.52
L = 0.00
S = 0.00
K = 0.00

STA = 13+34.98
EL = 11.84
L = 200.00
E = 0.48
S = 1601.00
K = 104.17

STA = 20+47.38
EL = 29.08
L = 650.00
E = -4.08
S = 415.00
K = 129.48

STA = 25+70.80
EL = 16.85
L = 0.00
E = 0.00
S = 1581.00
K = 0.00

STA = 24+64.73
EL = 18.23
L = 150.00
E = 0.24
S = 1401.00
K = 115.39

STA = 26+00.00
EL = 16.55
L = 0.00
E = 0.00
S = 1360.00
K = 0.00

STA = 26+50.00
EL = 15.98
L = 0.00
S = 0.00
K = 0.00

-2.10% 0.50% 2.42% -2.60% -1.30% -1.14% -1.03%

9+00.00 10+00.00 15+00.00 20+00.00 25+00.00 30+00.00

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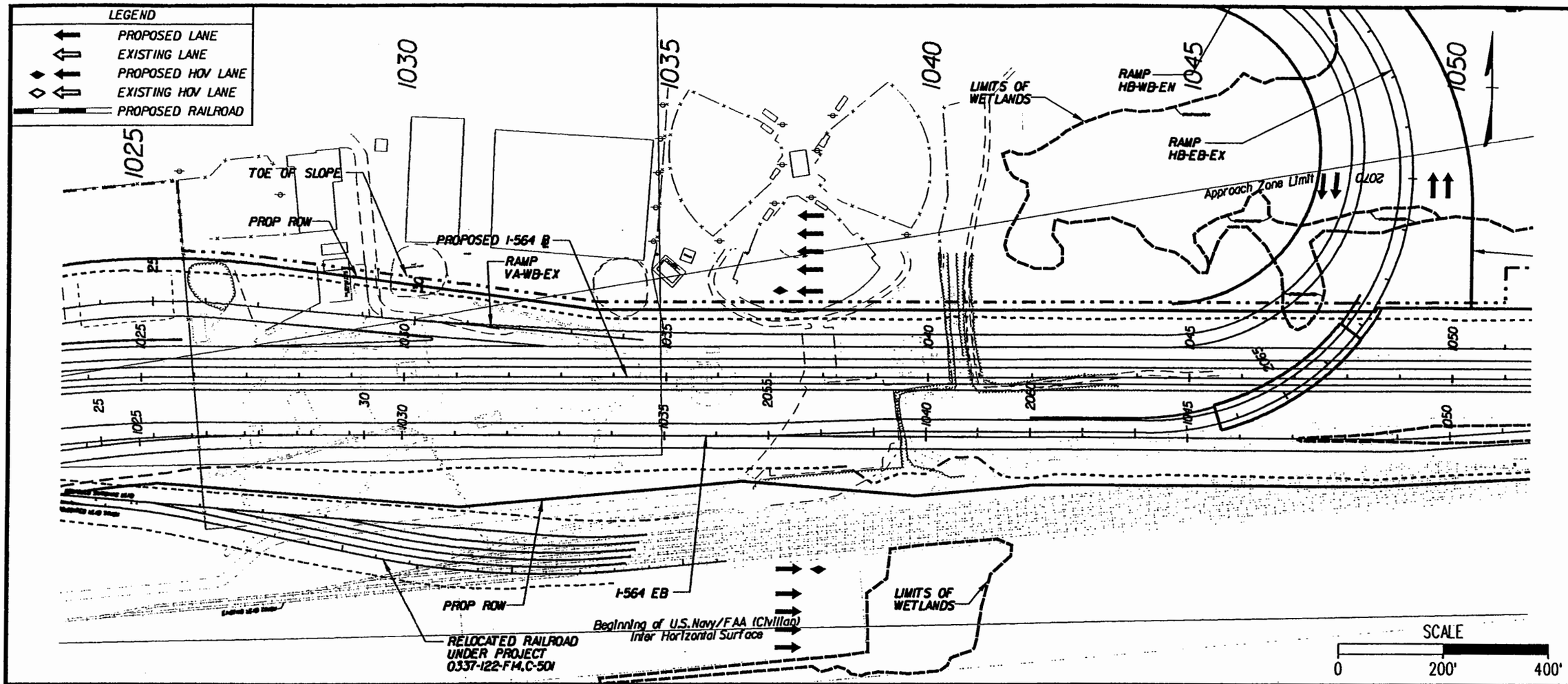
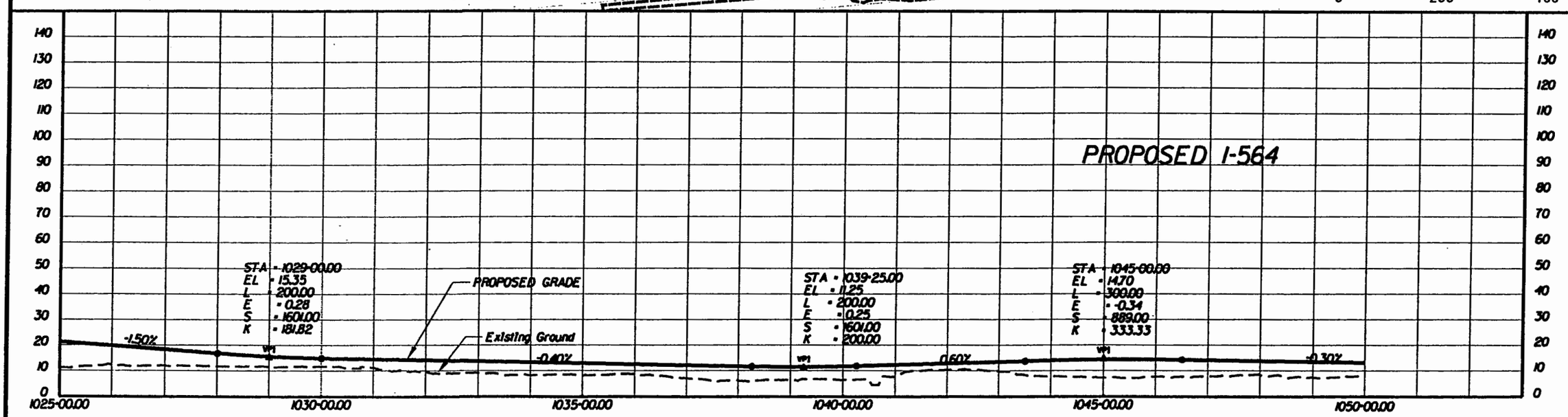
DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2A-015B





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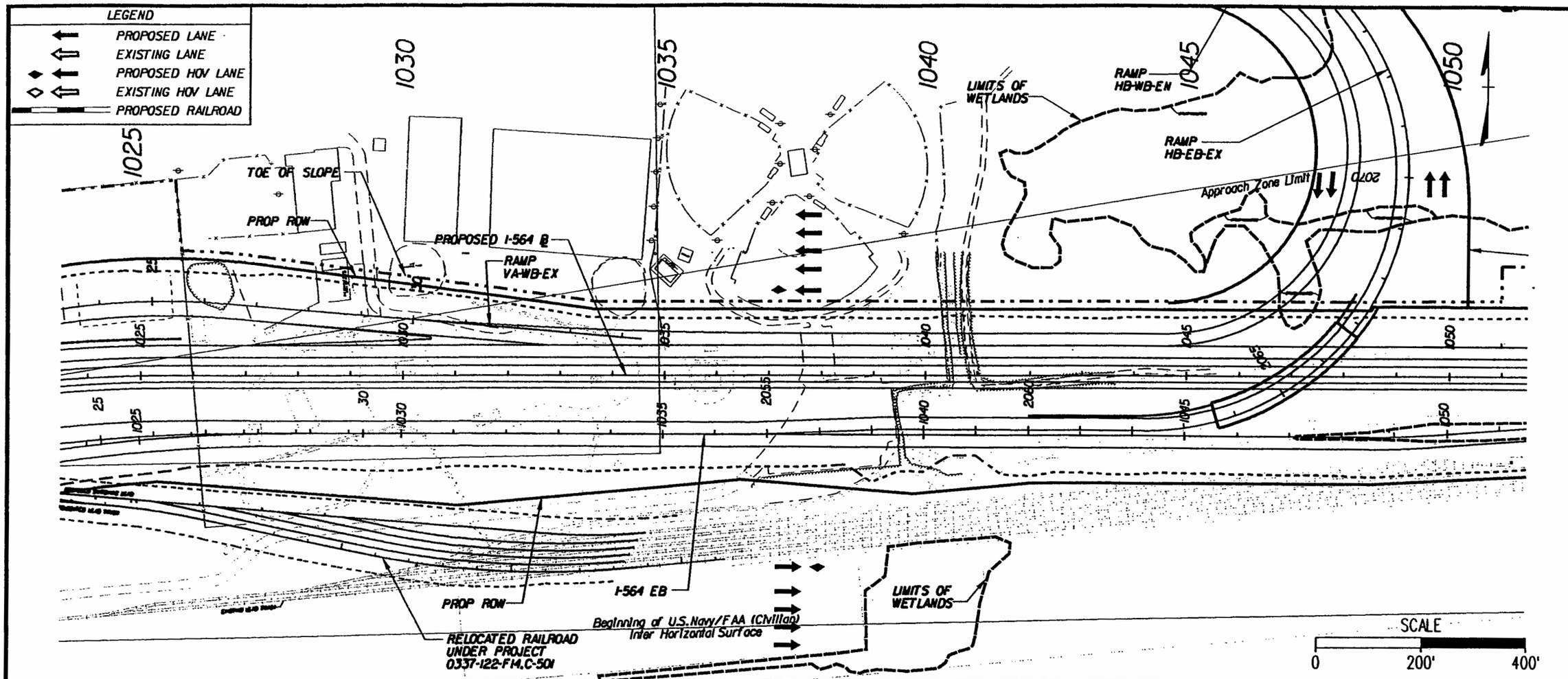
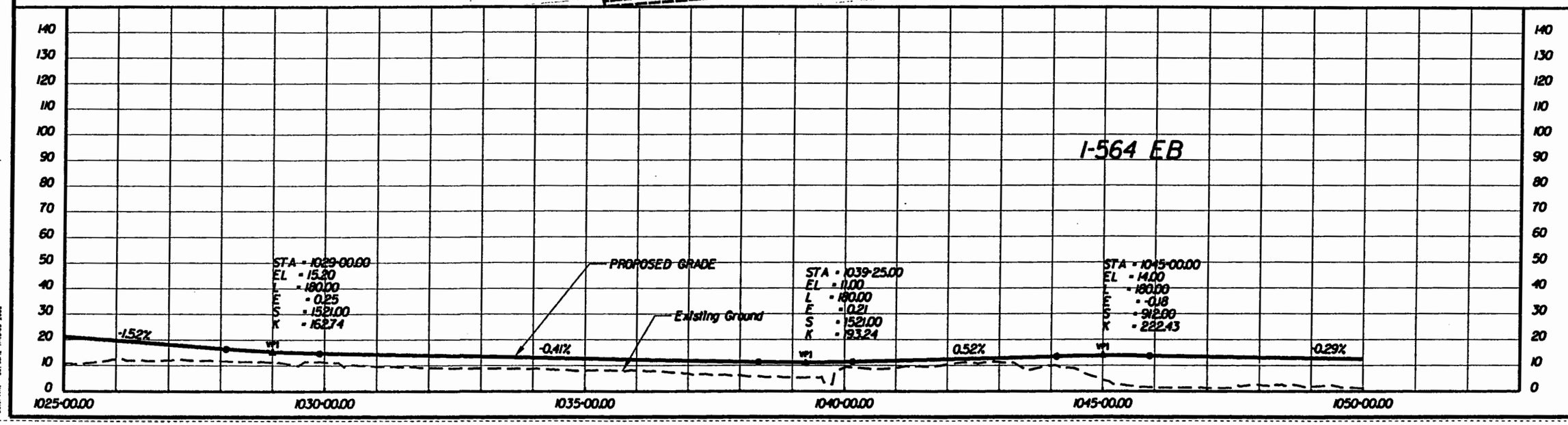
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2A-016





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DESIGN	DRAWN	CHECK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2A-016A

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

1025 1030 1035 1040 1045 1050

TOE OF SLOPE

PROP ROW

PROPOSED I-564 ℄

RAMP VA-WB-EX

LIMITS OF WETLANDS

RAMP HB-WB-EN

RAMP HB-EB-EX

Approach Zone Limit

2070

I-564 EB

PROP ROW

RELOCATED RAILROAD UNDER PROJECT 0337-122-F14,C-501

Beginning of U.S.Navy/FAA (Civilian) Inter Horizontal Surface

LIMITS OF WETLANDS

SCALE

0 200' 400'

RAMP HB-EB-EX

STA = 26+00.00
EL = 10.45
L = 0.00
S = 0.00
K = 0.00

STA = 26+50.00
EL = 10.08
L = 0.00
E = 0.00
S = 1581.00
K = 0.00

STA = 26+77.80
EL = 9.88
L = 0.00
E = 0.00
S = 1581.00
K = 0.00

STA = 29+16.37
EL = 8.69
L = 400.00
E = 2.75
S = 340.00
K = 72.68

STA = 38+25.00
EL = 54.05
L = 800.00
E = -10.00
S = 327.00
K = 80.00

PROPOSED GRADE

VPI

5.00%

5.00%

-0.72%

-0.72% -0.50%

Existing Ground

PROPOSED I-564

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

25+00.00 30+00.00 35+00.00 40+00.00

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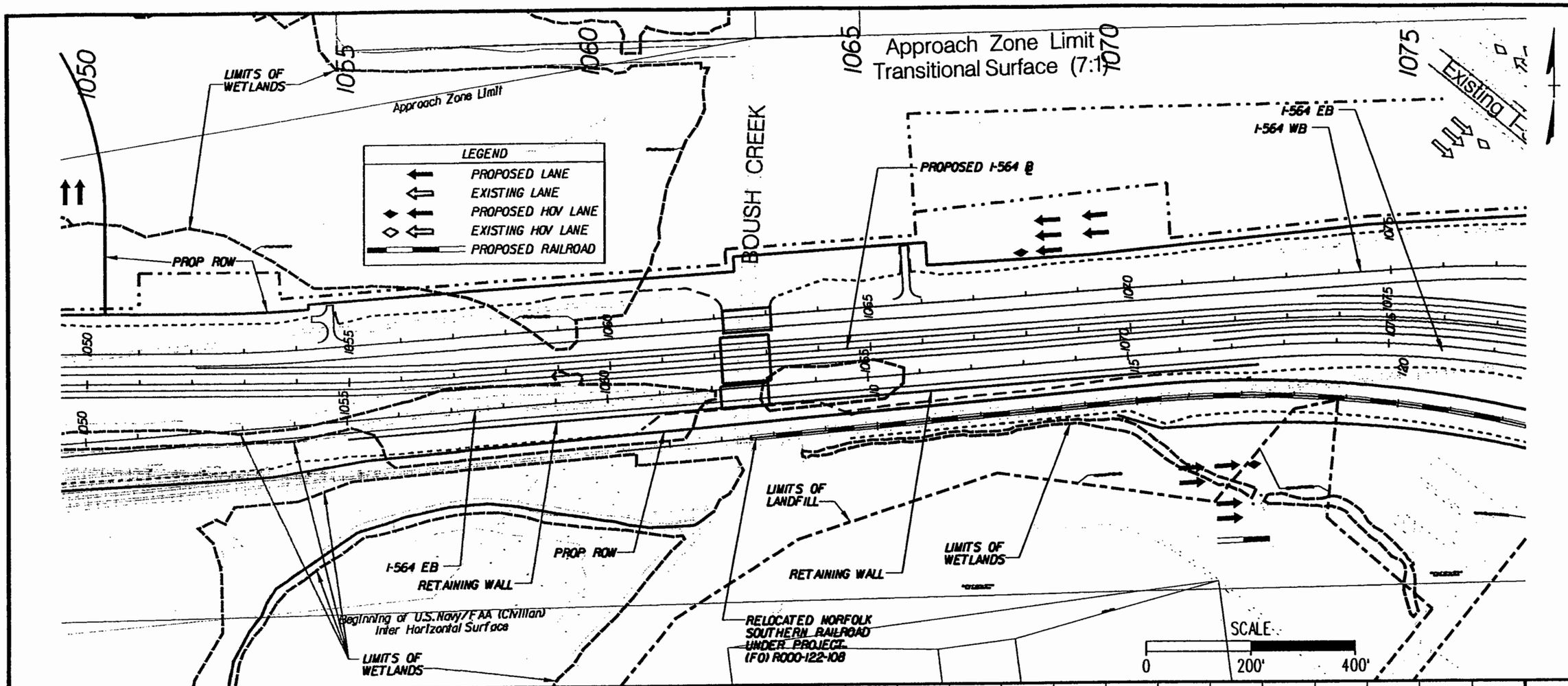
DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
PPR		DATE	DATE

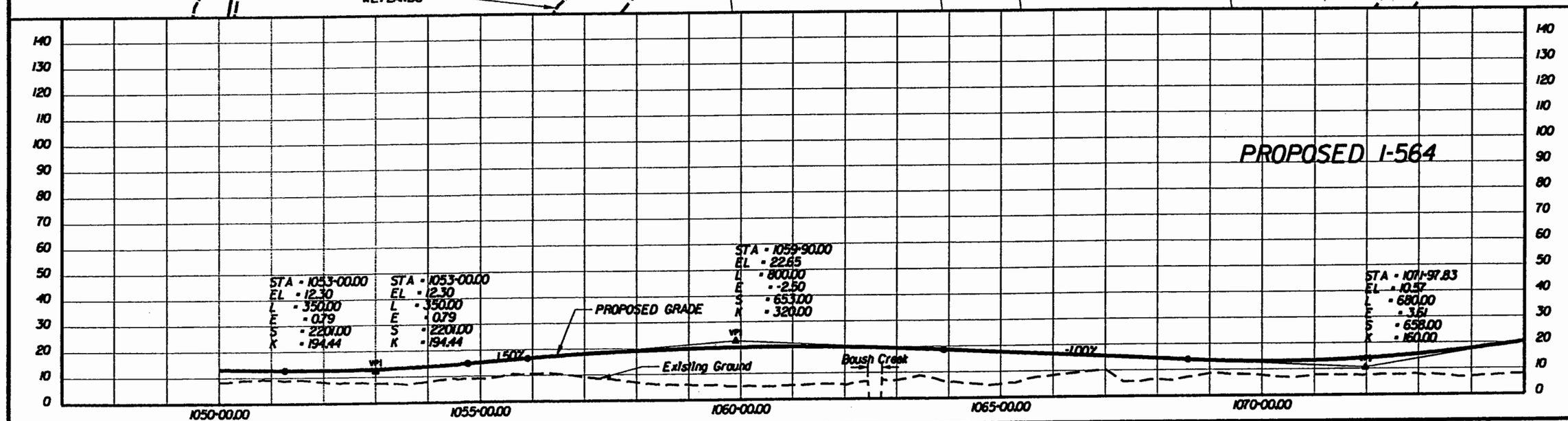
ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT-2A-016B





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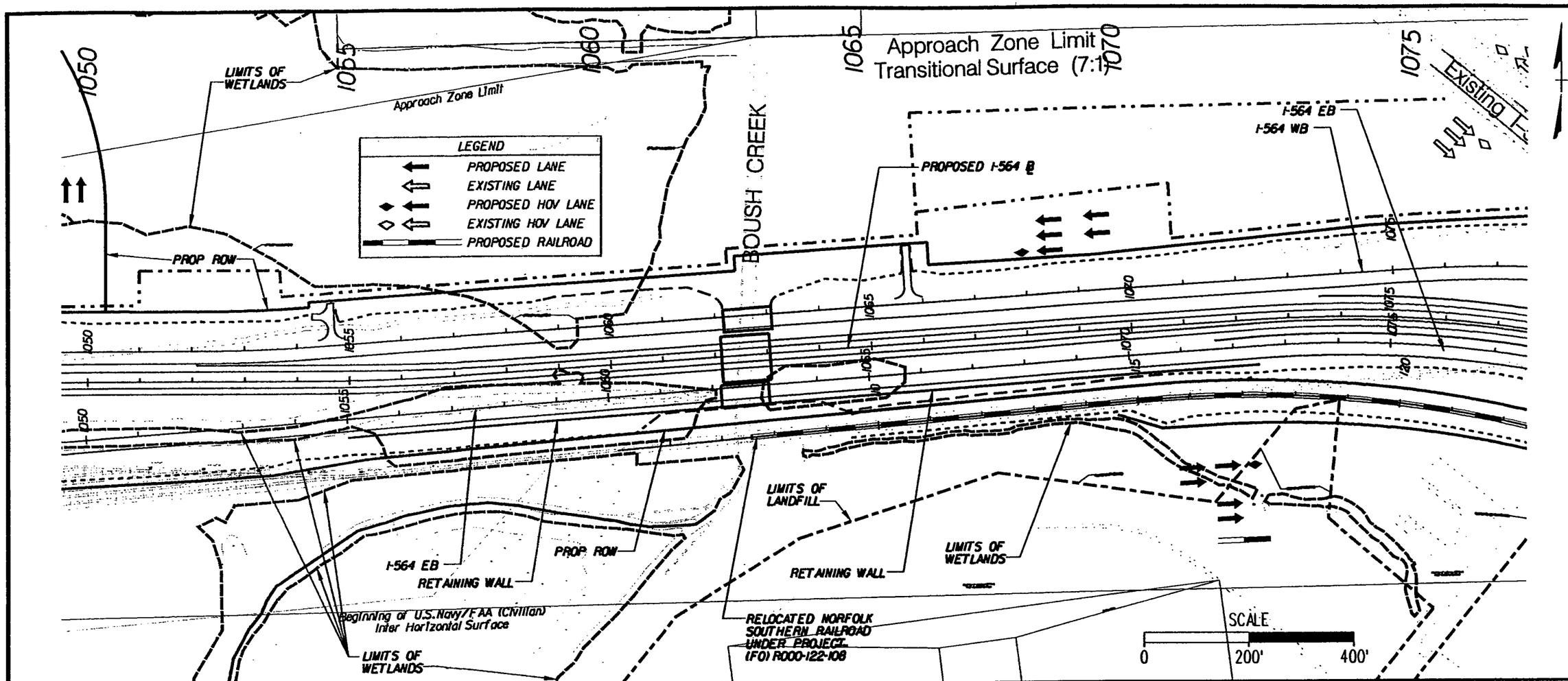
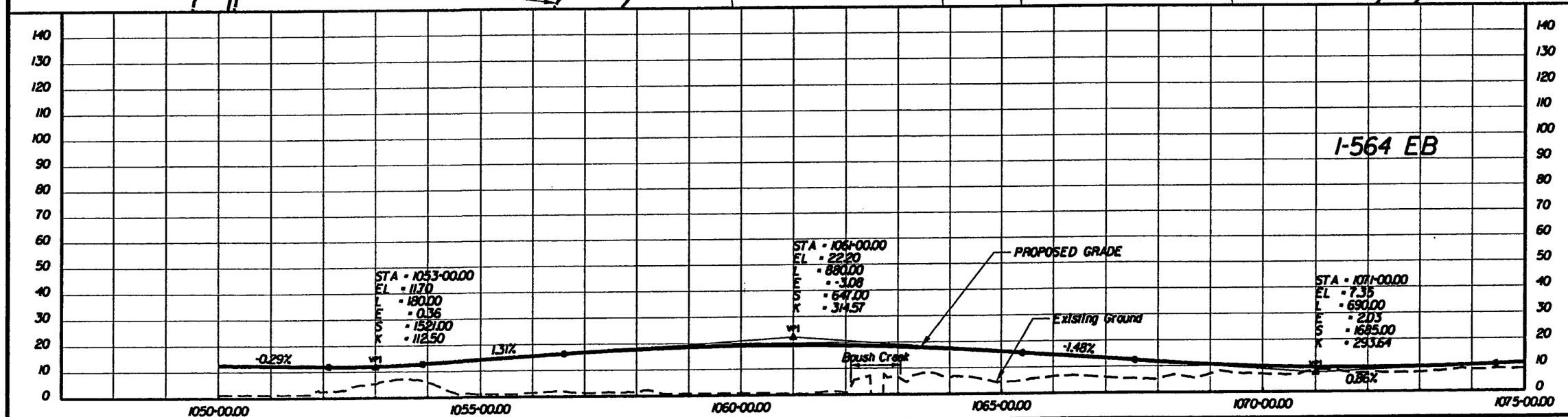
DESIGN	AAA	DATE
DRAWN	BBB	DATE
CHCK	CCC	DATE
APPR		DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2A-017





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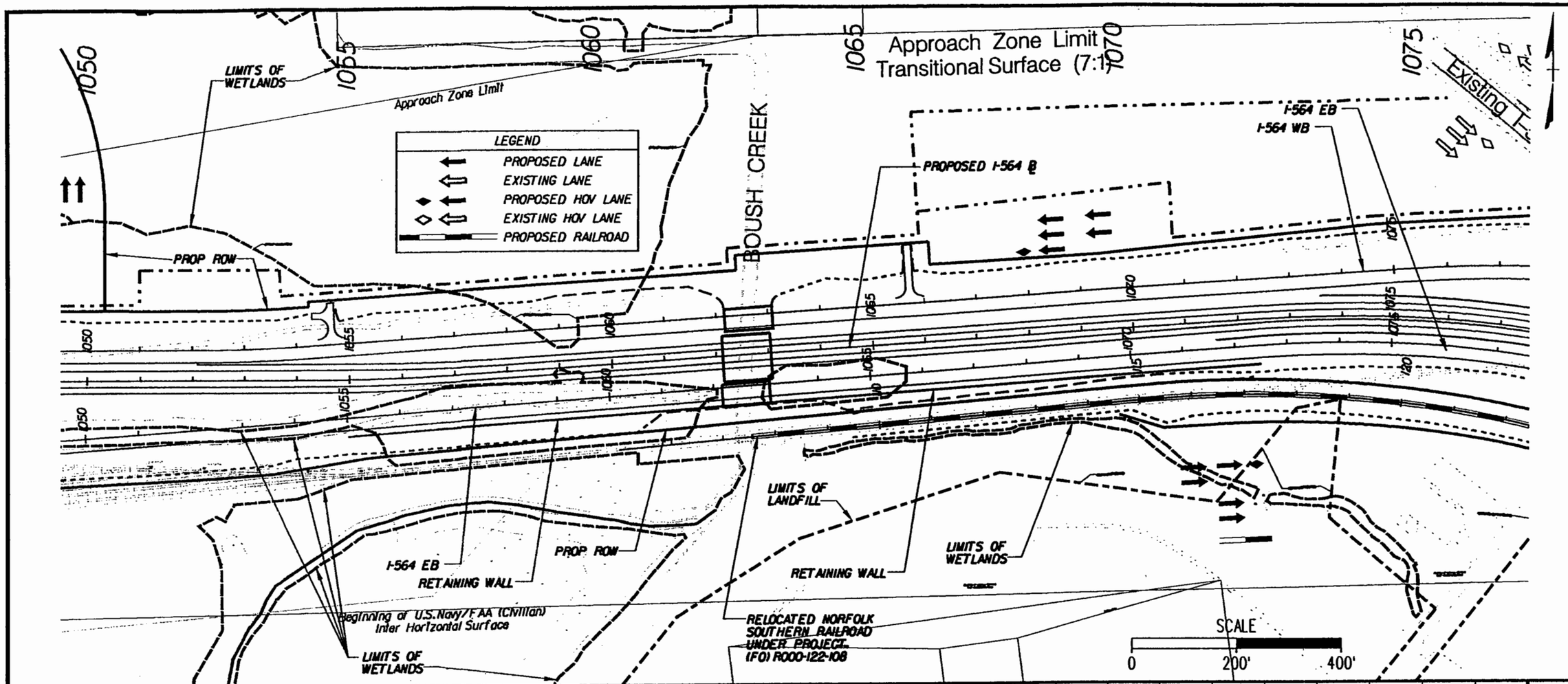
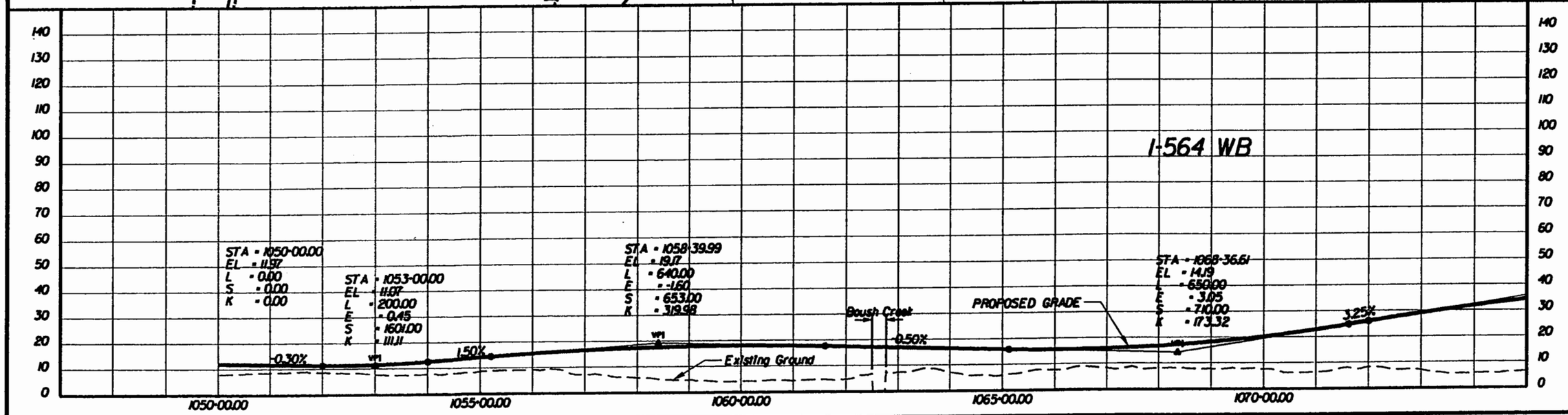
DESIGN	AAA	DRAWN	BBB
CHECK	CCC	APPR.	
DATE	DATE	DATE	DATE
DATE	DATE	DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2A-017A





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CHECK	CCC	DATE
APPR		DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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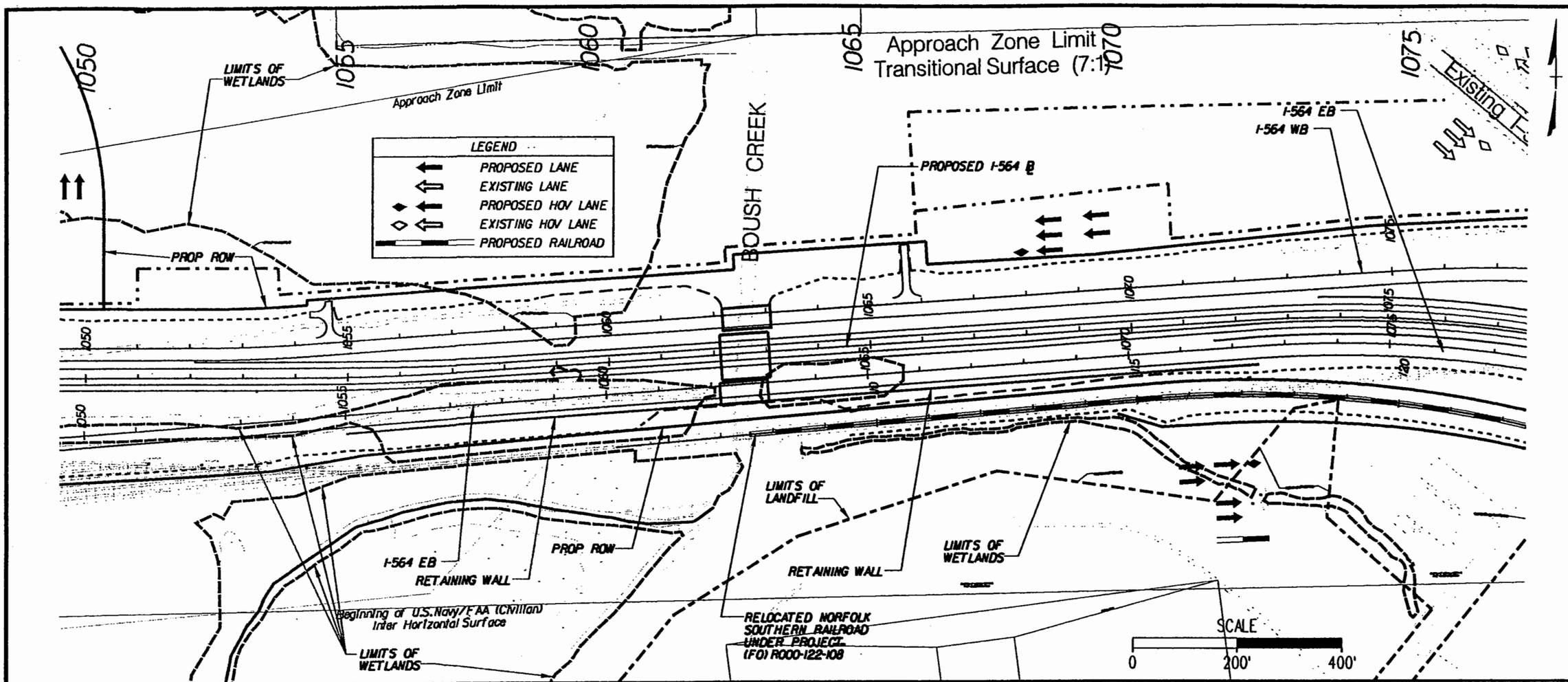

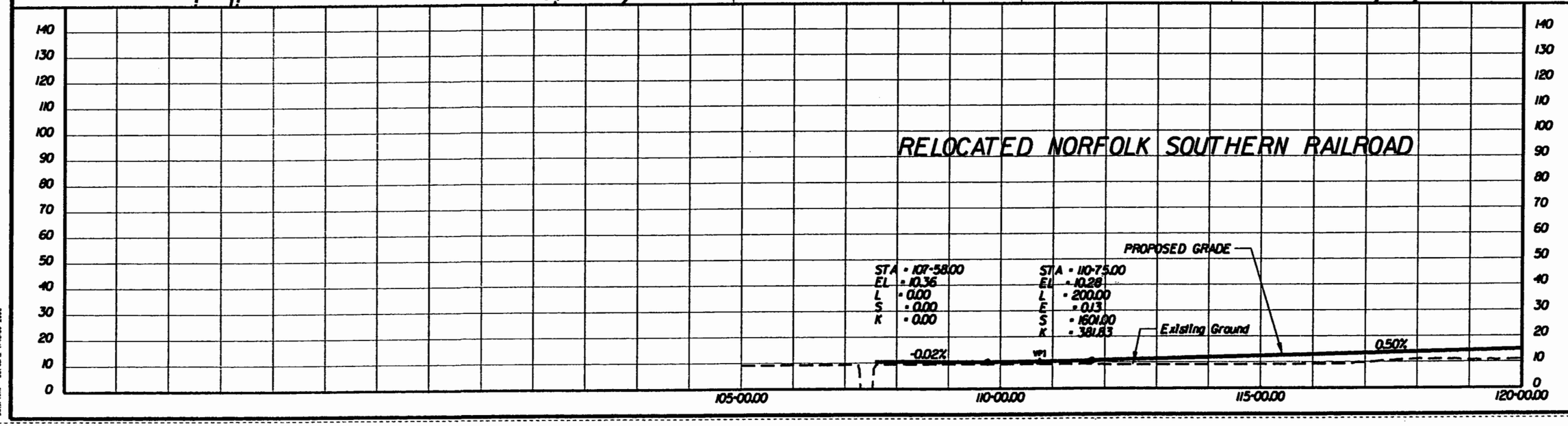

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2A-017D

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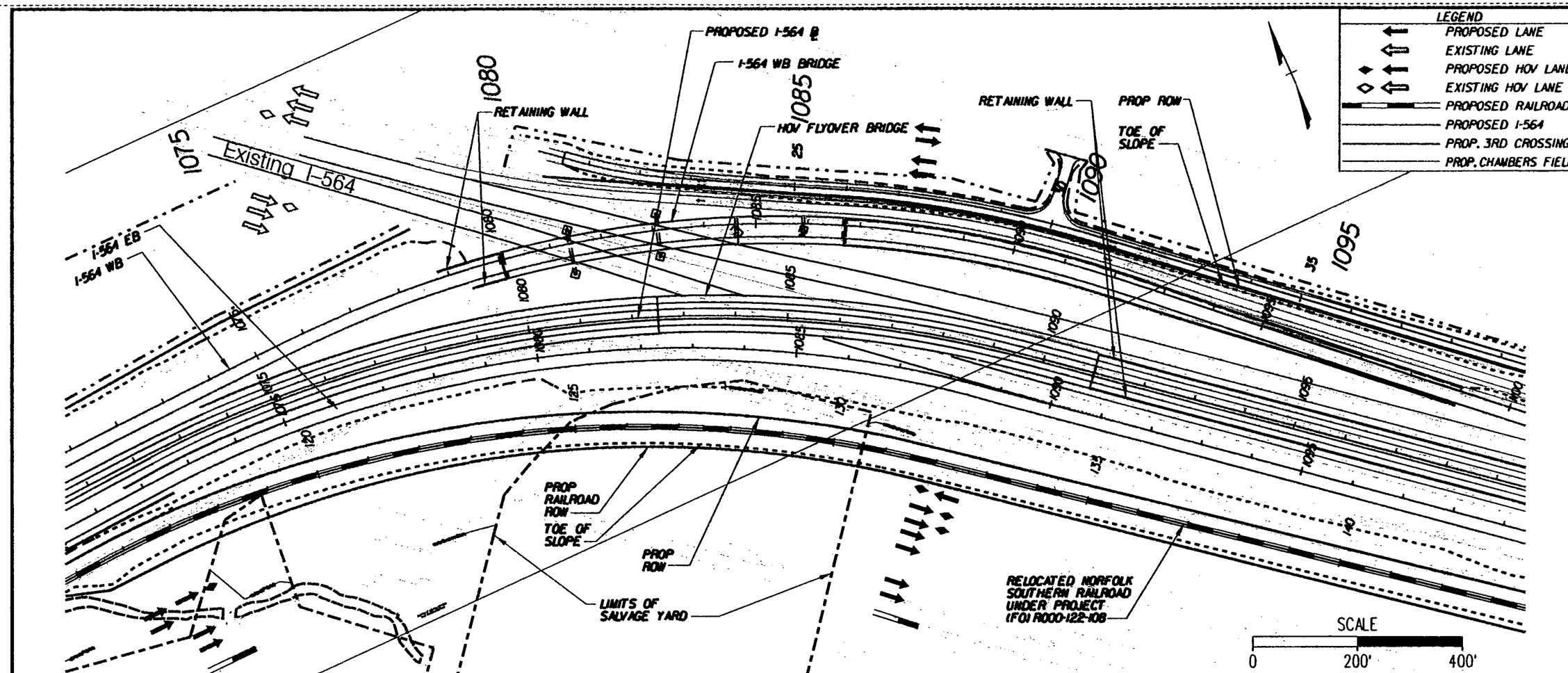

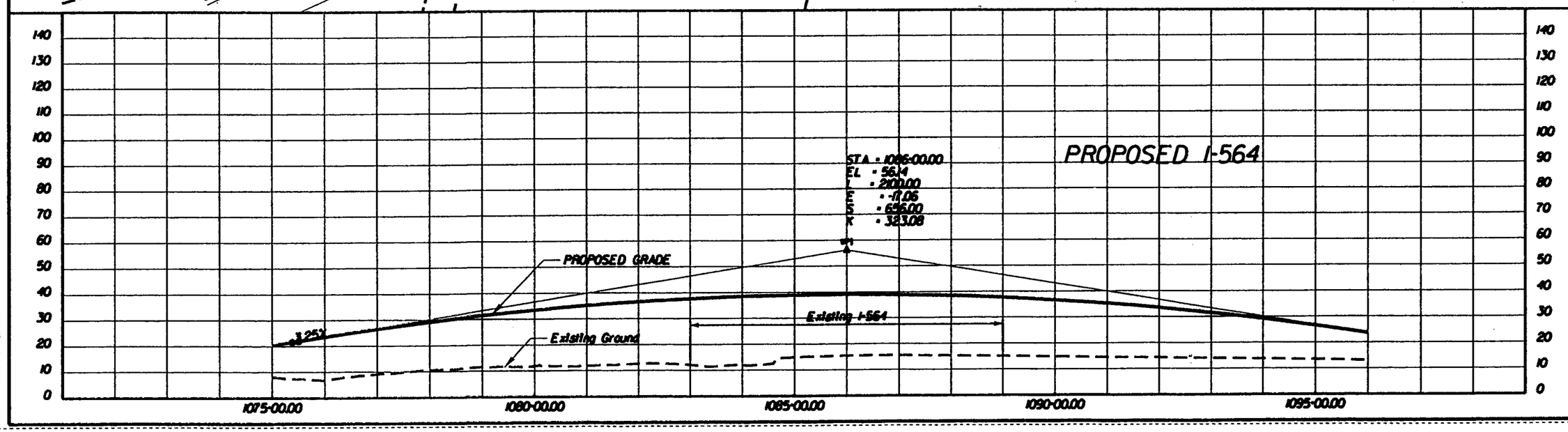

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DESIGN	DRAWN	CHKD	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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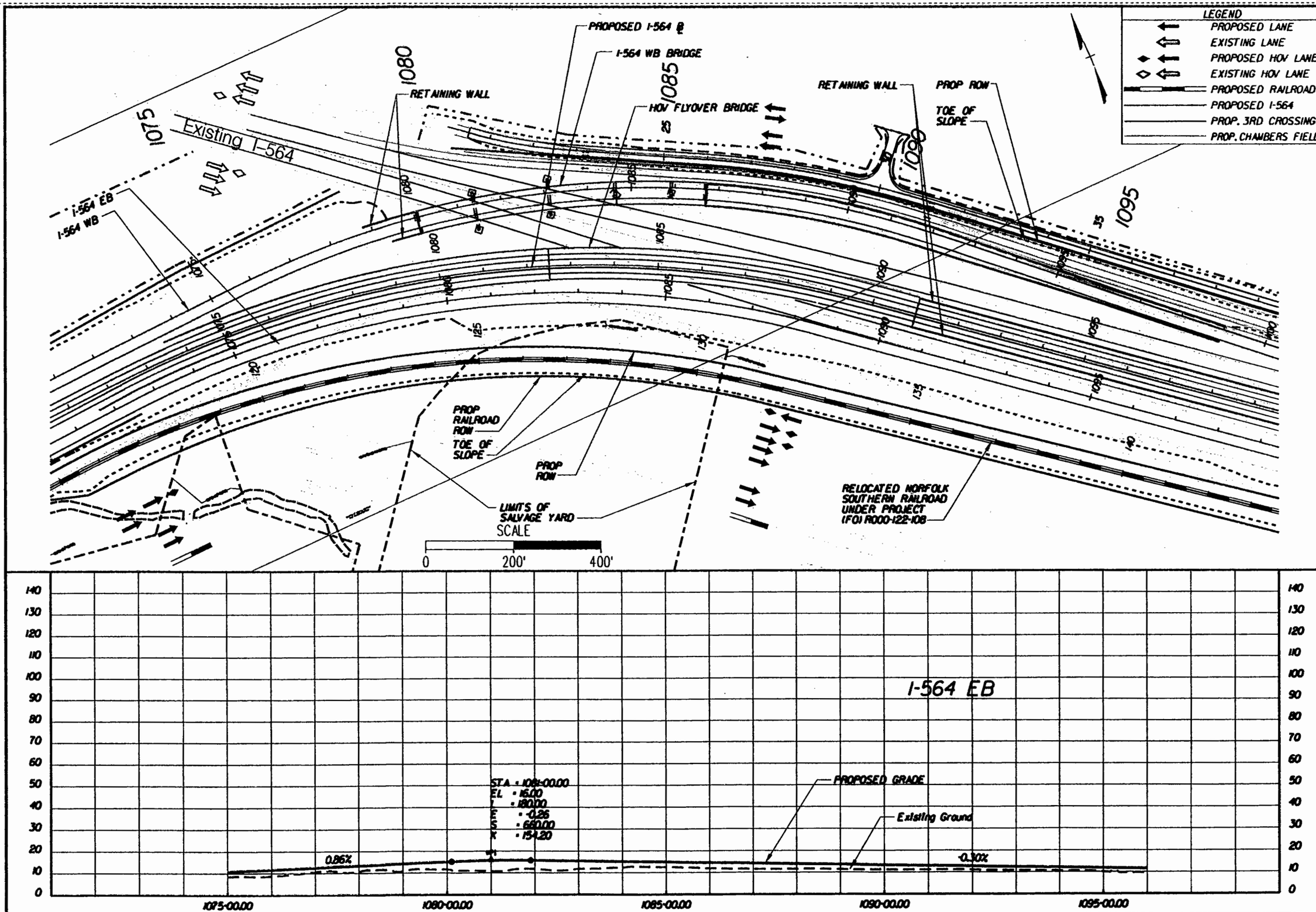

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AAA	BBB	CCC	
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ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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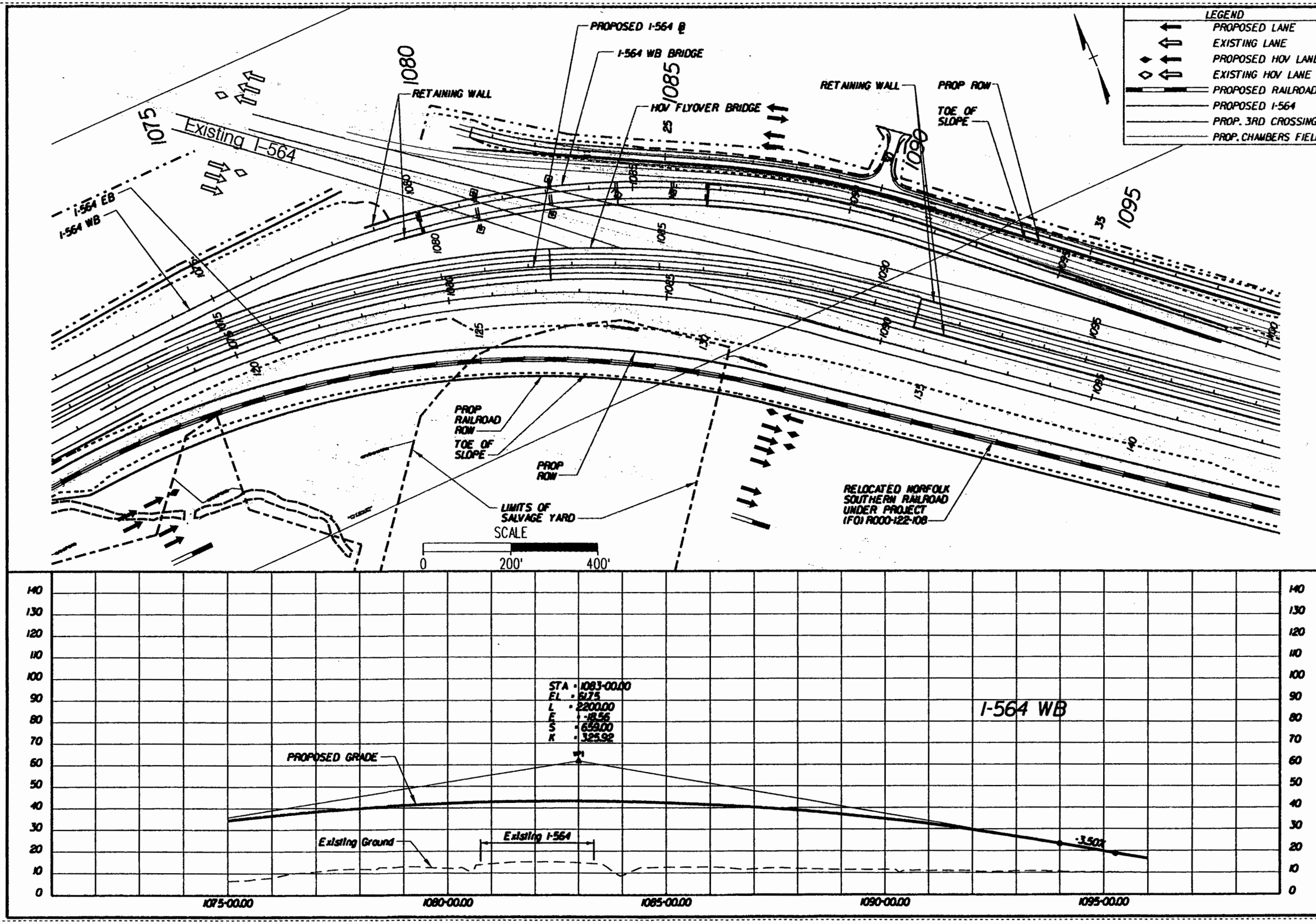

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DESIGN	DRAWN	CHECK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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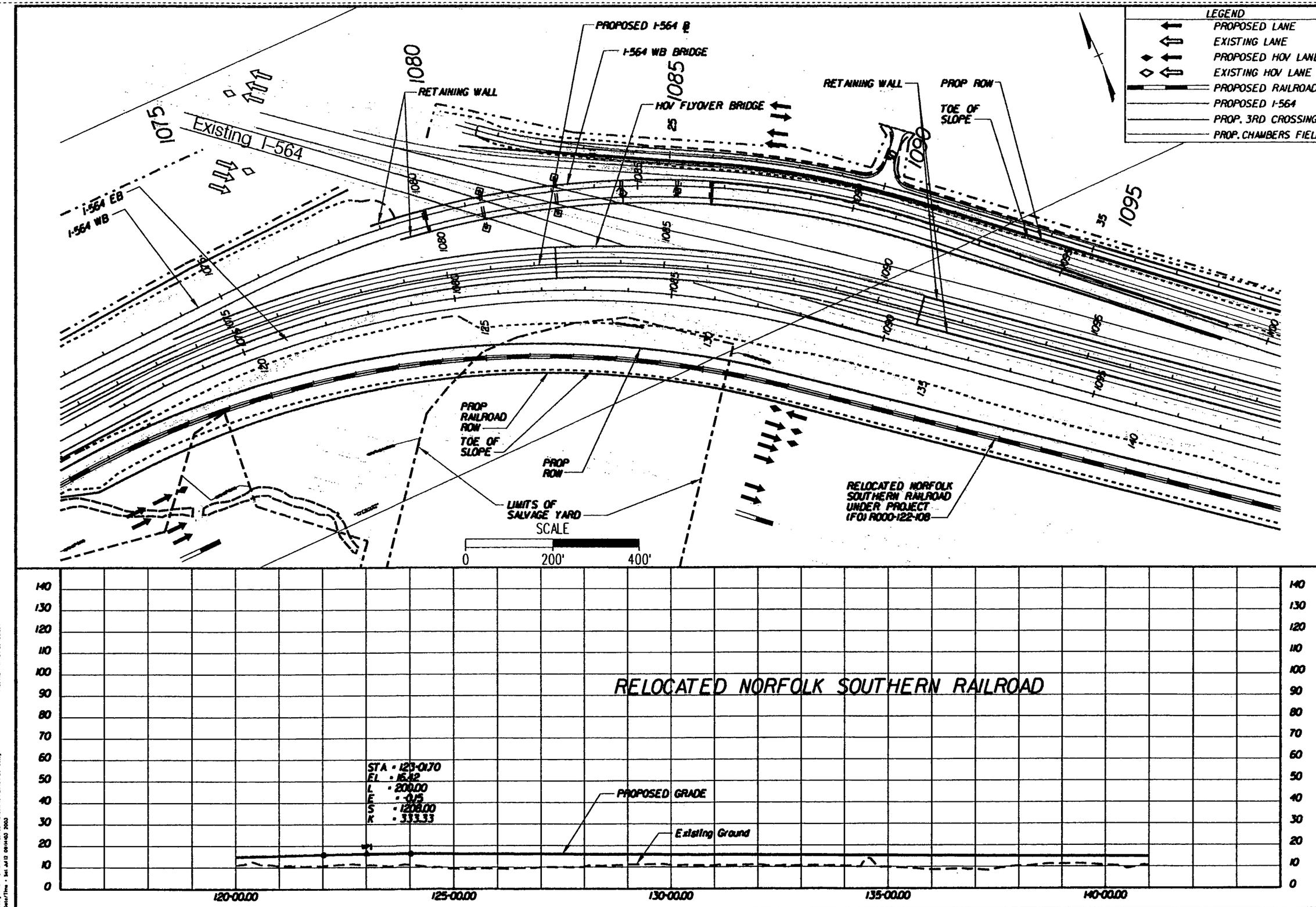

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MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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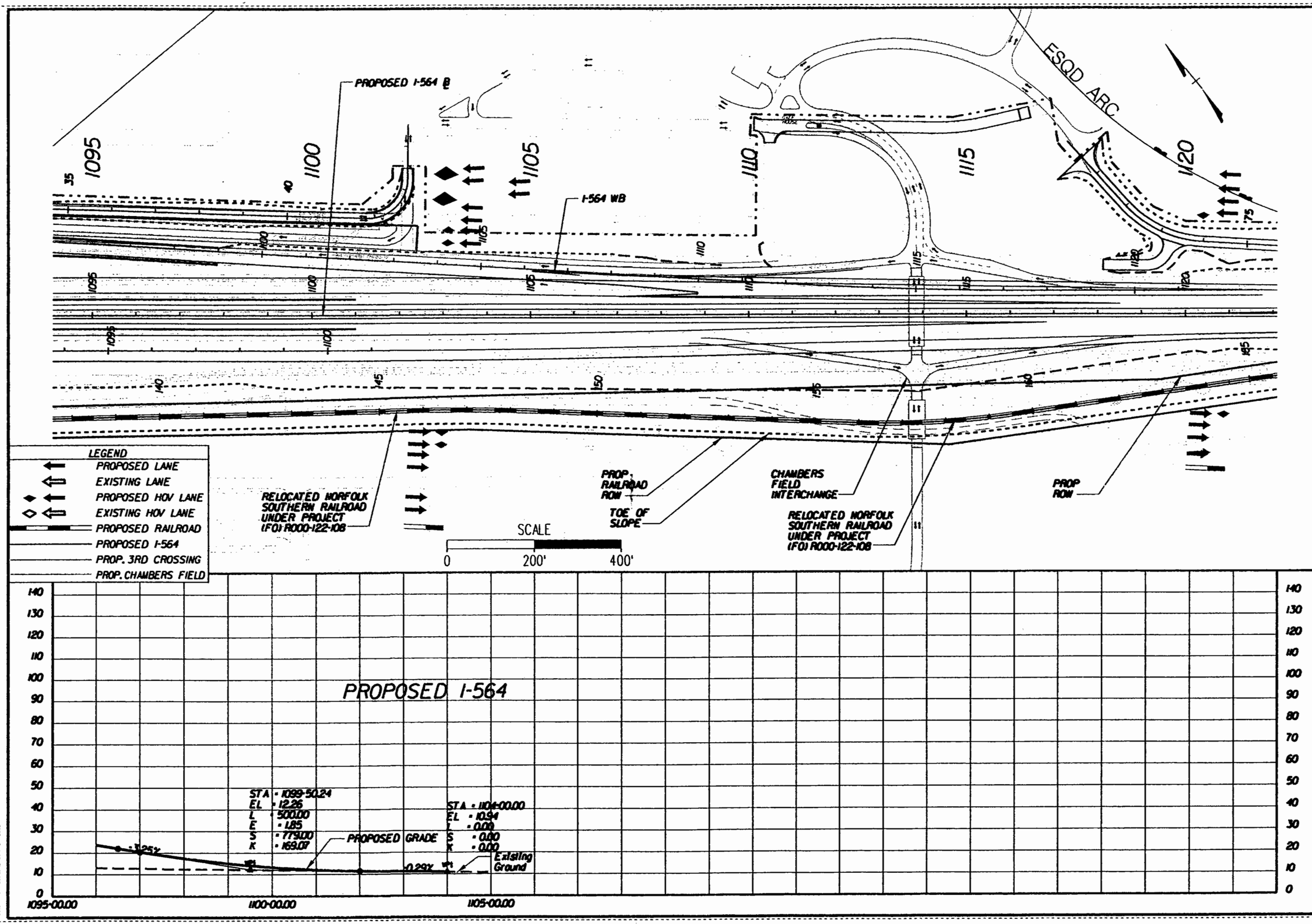

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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
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ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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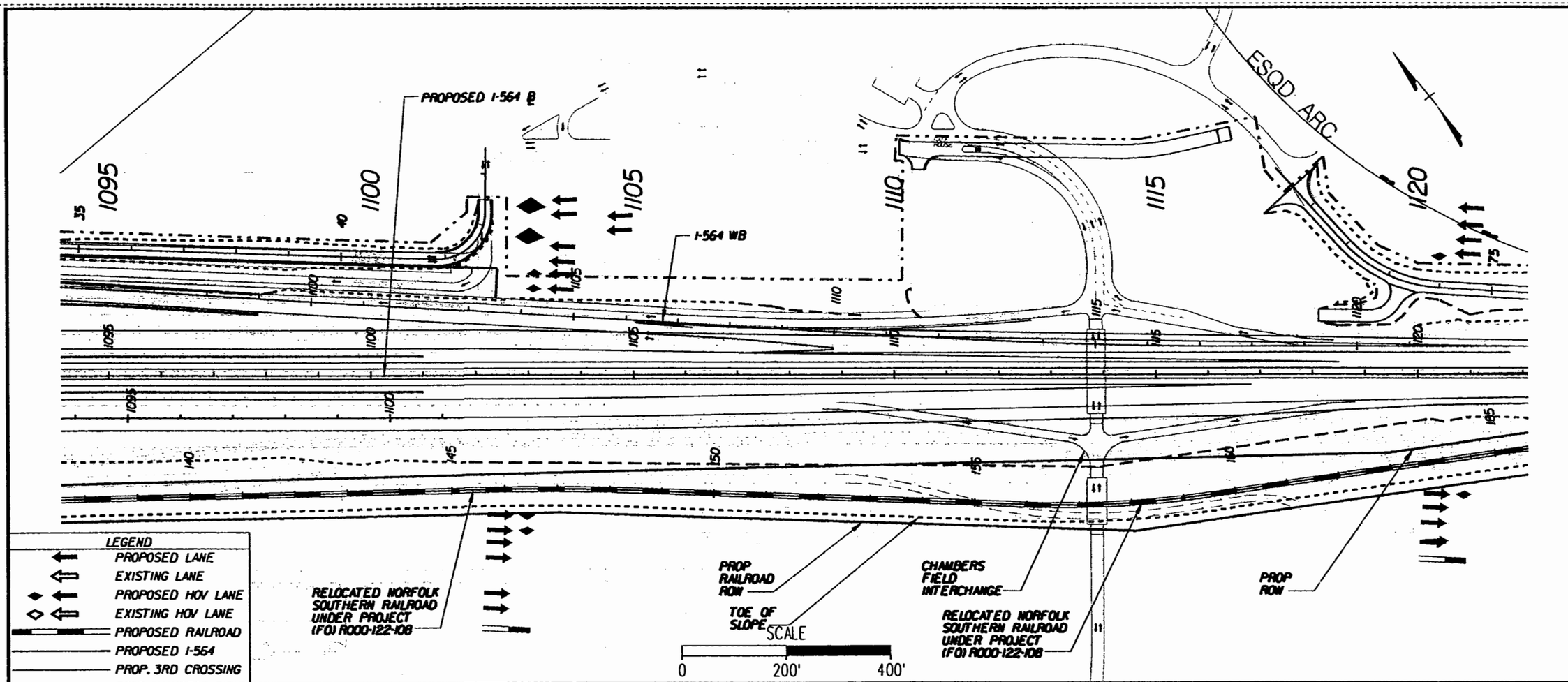

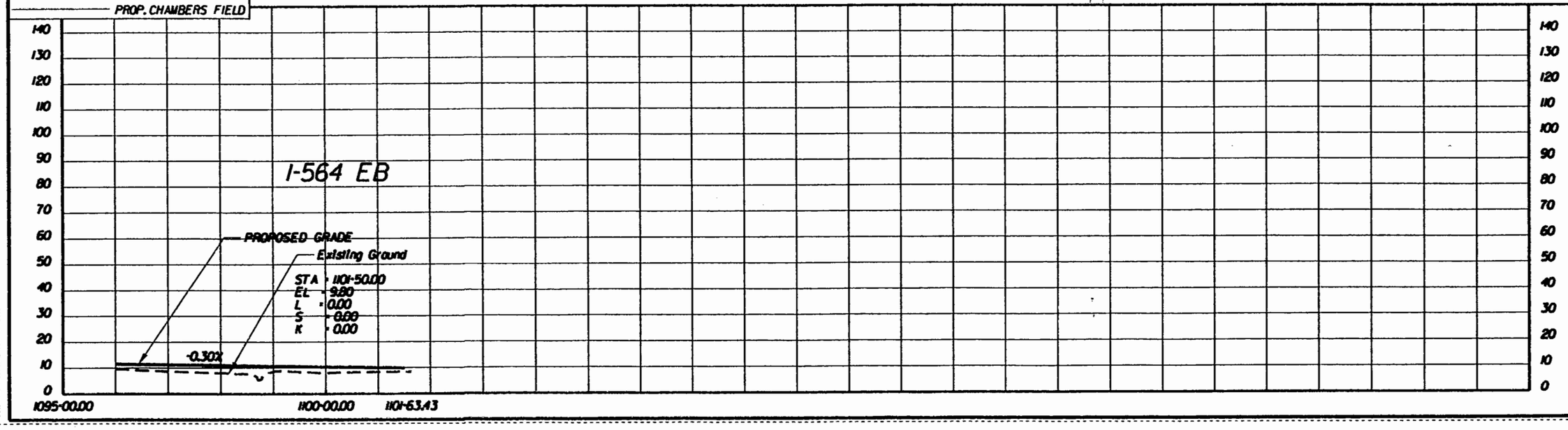

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DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
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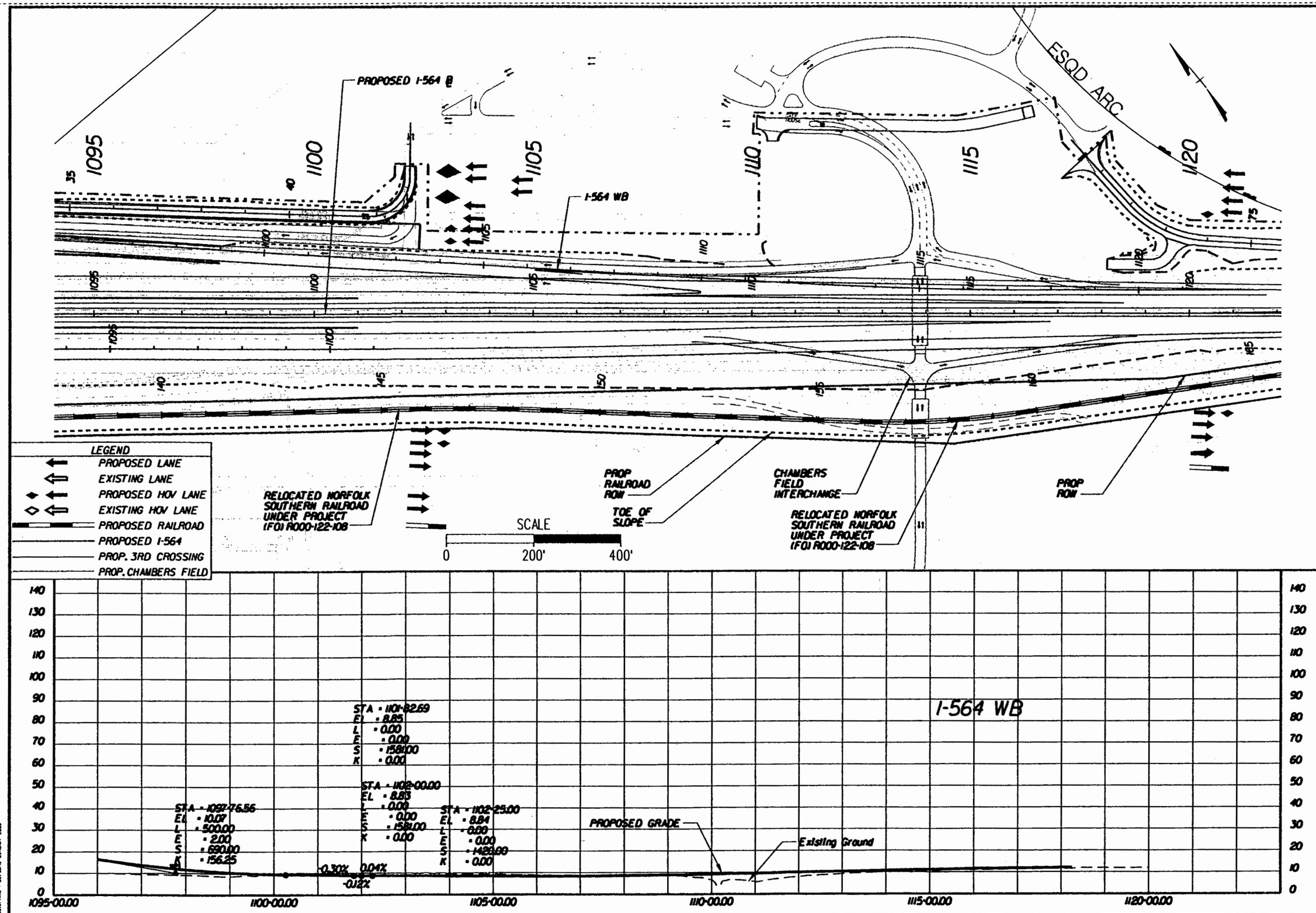
ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2A-019A



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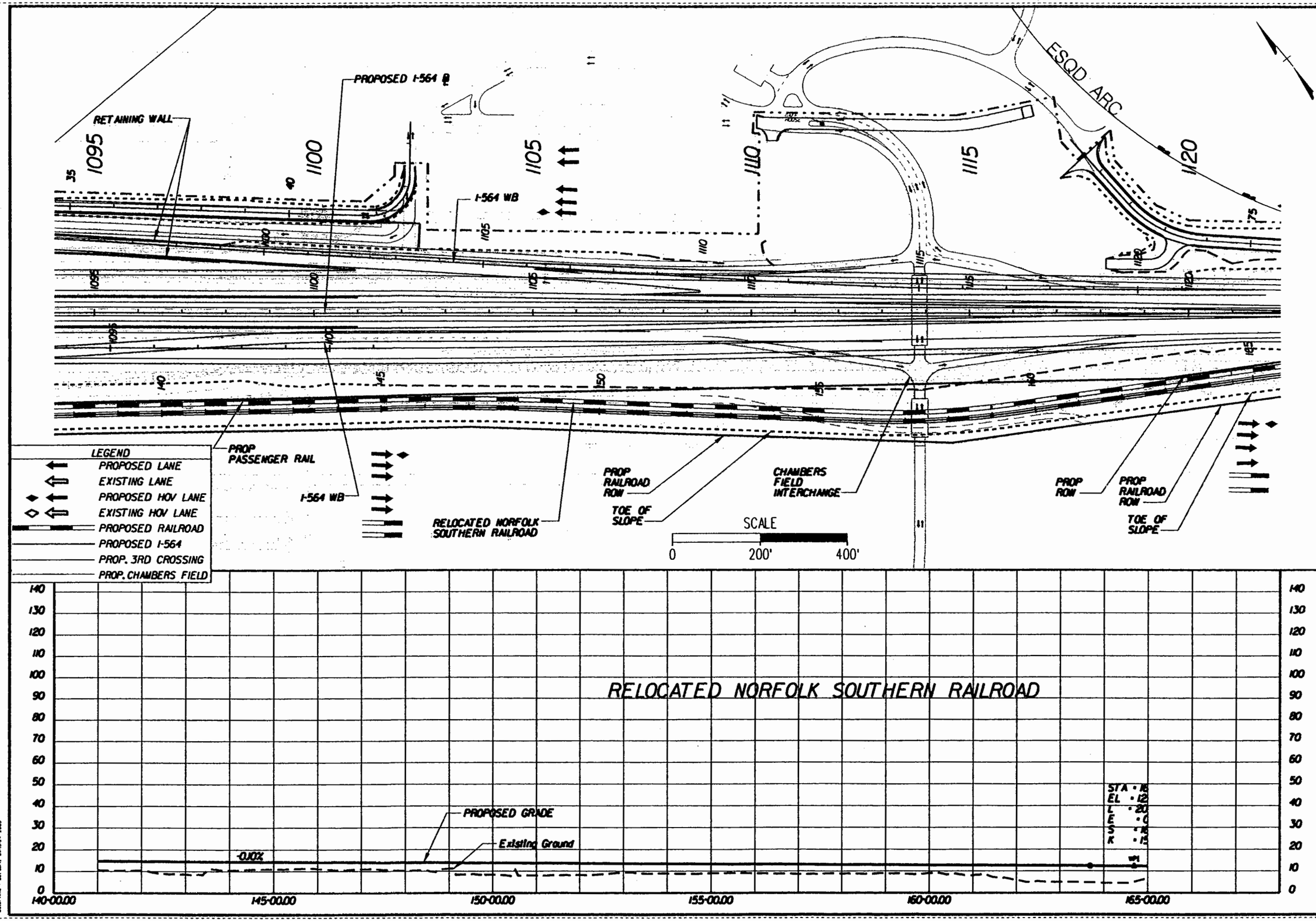
DESIGN	DRAWN	CHK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2A-019C



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MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2A
PROVISION FOR HOV LANES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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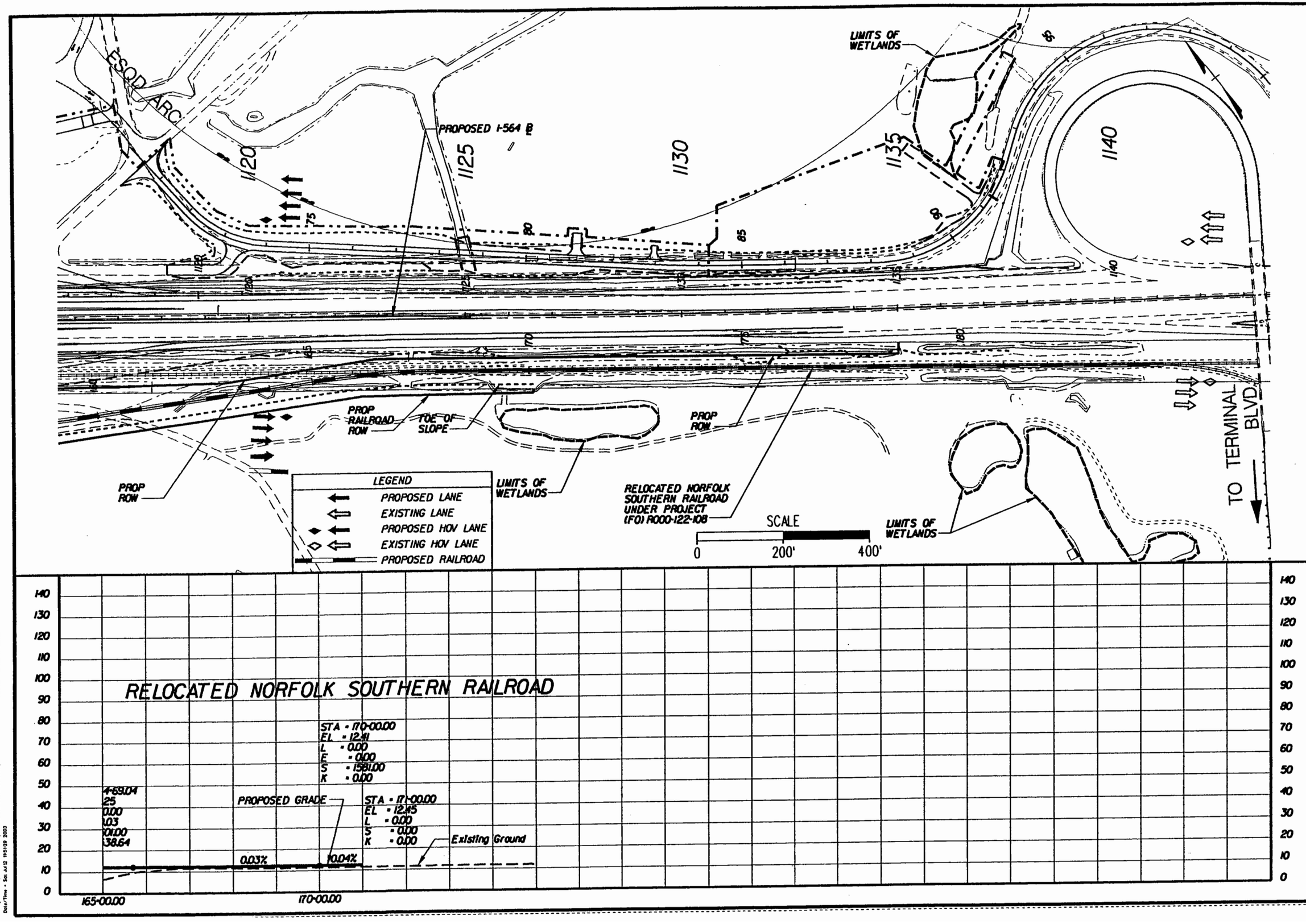

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CHCK	CCC	DATE
APPR		DATE

ALTERNATIVE-2A

PROVISION FOR HOV LANES SOUTHERN BORE

I-564 INTERMODAL CONNECTOR

Rail Connection Study

(FO) R000-122-108, PE-101

DWG. NO

ALT-2A-020B

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SHEET NO. 14A	ALIGNMENT PASSENGER RAIL PLAN AND PROFILE
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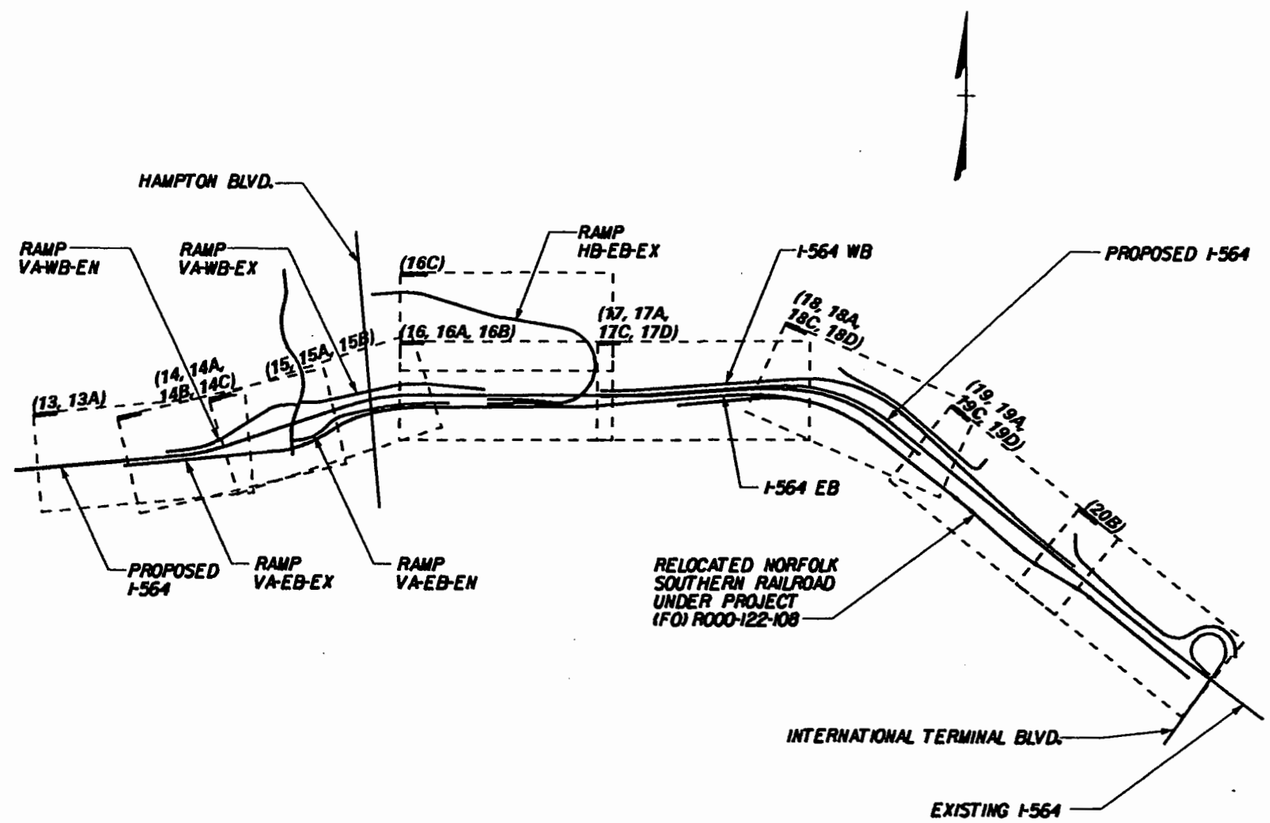
SHEET NO. 20	NOT USED
SHEET NO. 20A	NOT USED
SHEET NO. 20B	ALIGNMENT RELOCATED NORFOLK SOUTHERN RAILROAD PLAN AND PROFILE

ALTERNATIVE-2B ON SHORE



SCALE

0 2000' 4000'

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DRAWN	BBB	DATE	DATE
CHECK	CCC	DATE	DATE
APPR		DATE	DATE

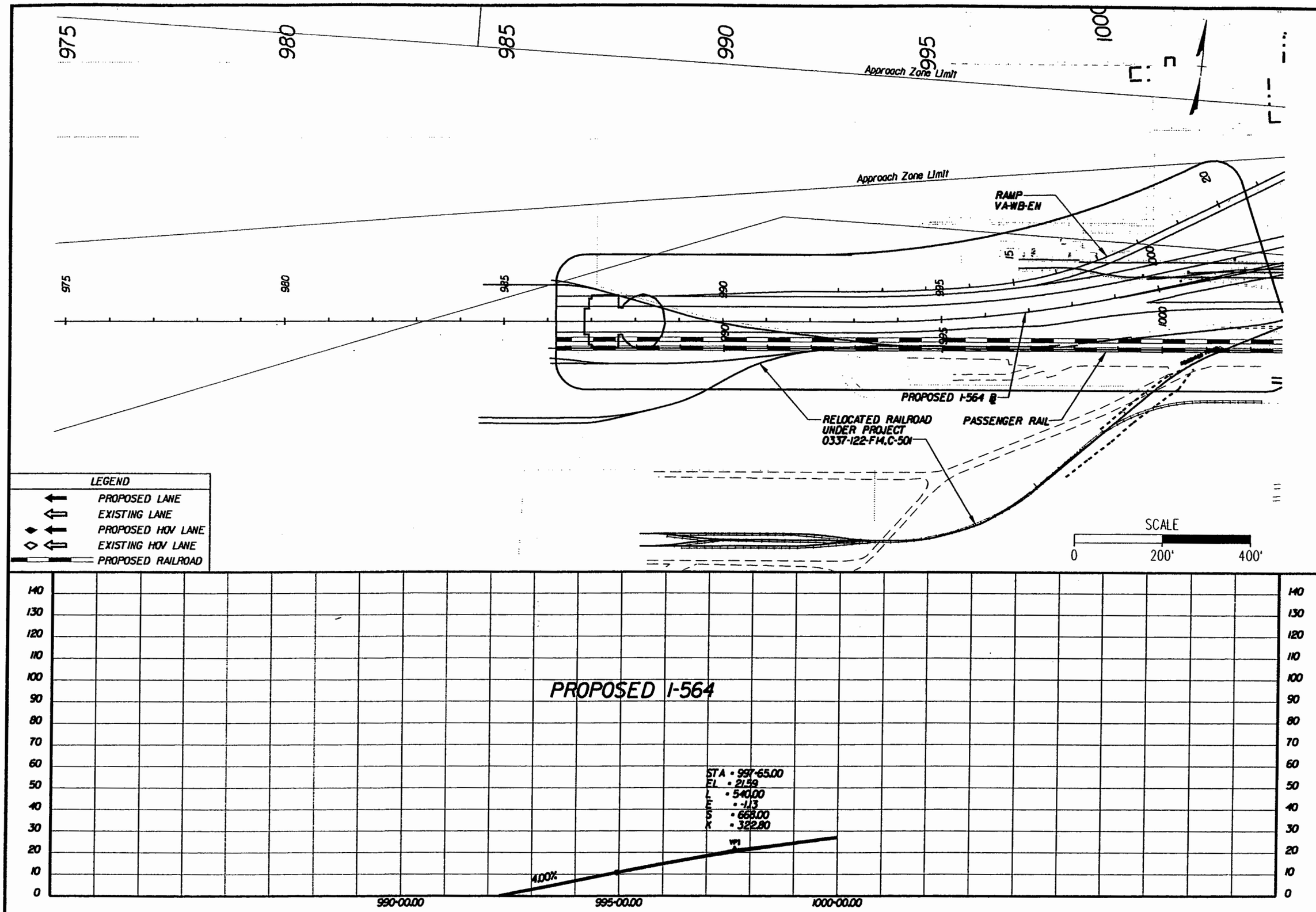
ALTERNATIVE-2B ON SHORE

KEYMAP

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT2B-KEY



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ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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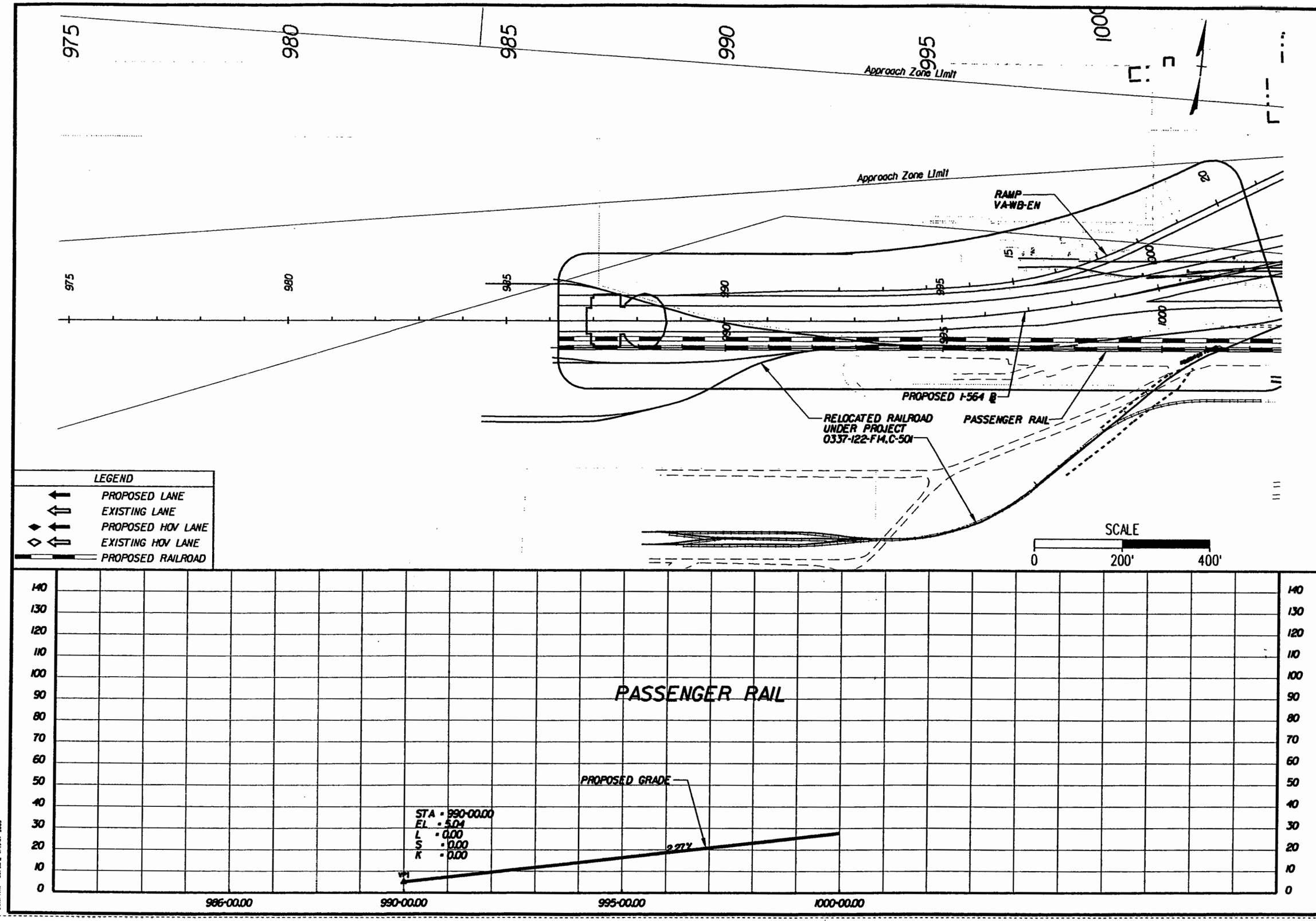

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MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE
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CHCK	CCC	DATE
APPR		DATE

ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2B-013A

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

Approach Zone Limit

Approach Zone Limit

RAMP VA-WB-EN

RAMP VA-WB-EN

RAMP VA-WB-EX

VIRGINIA AVE.

PROPOSED I-564 ℄

RETAINING WALL

RETAINING WALL

RAMP VA-EB-EN

PROPOSED I-564 ℄

RELOCATED RAILROAD UNDER PROJECT 0337-122-F14,C-501

PASSENGER RAIL

RAMP VA-EB-EX

RETAINING WALL

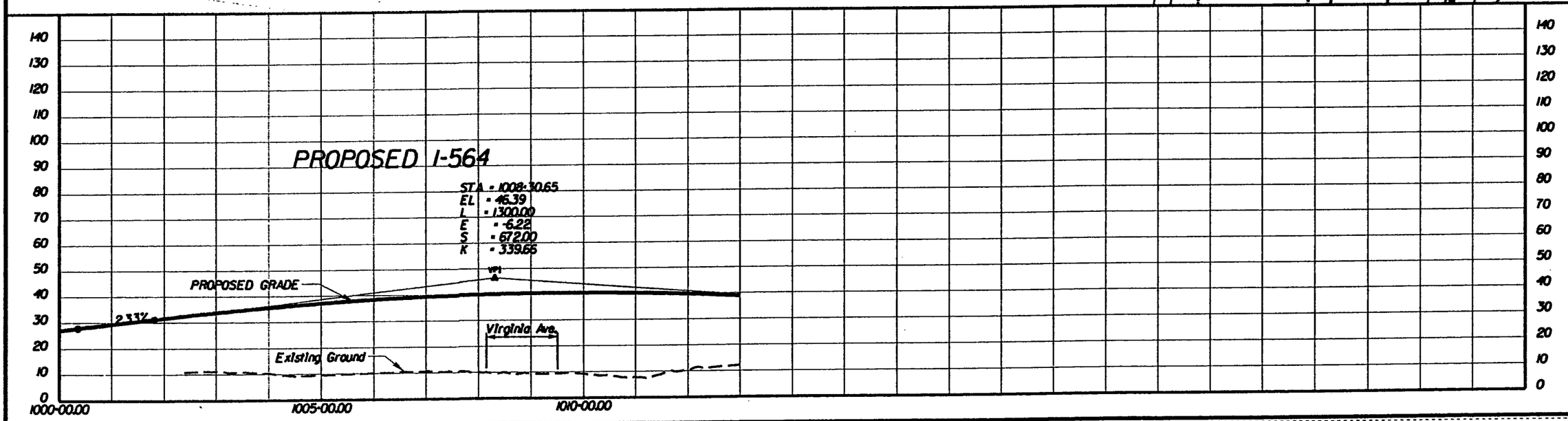
PASSENGER RAIL

PROP ROW

LIMITS OF WETLANDS

SCALE

0 200' 400'



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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2B

PROVISION FOR PASSENGER RAIL LINES SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

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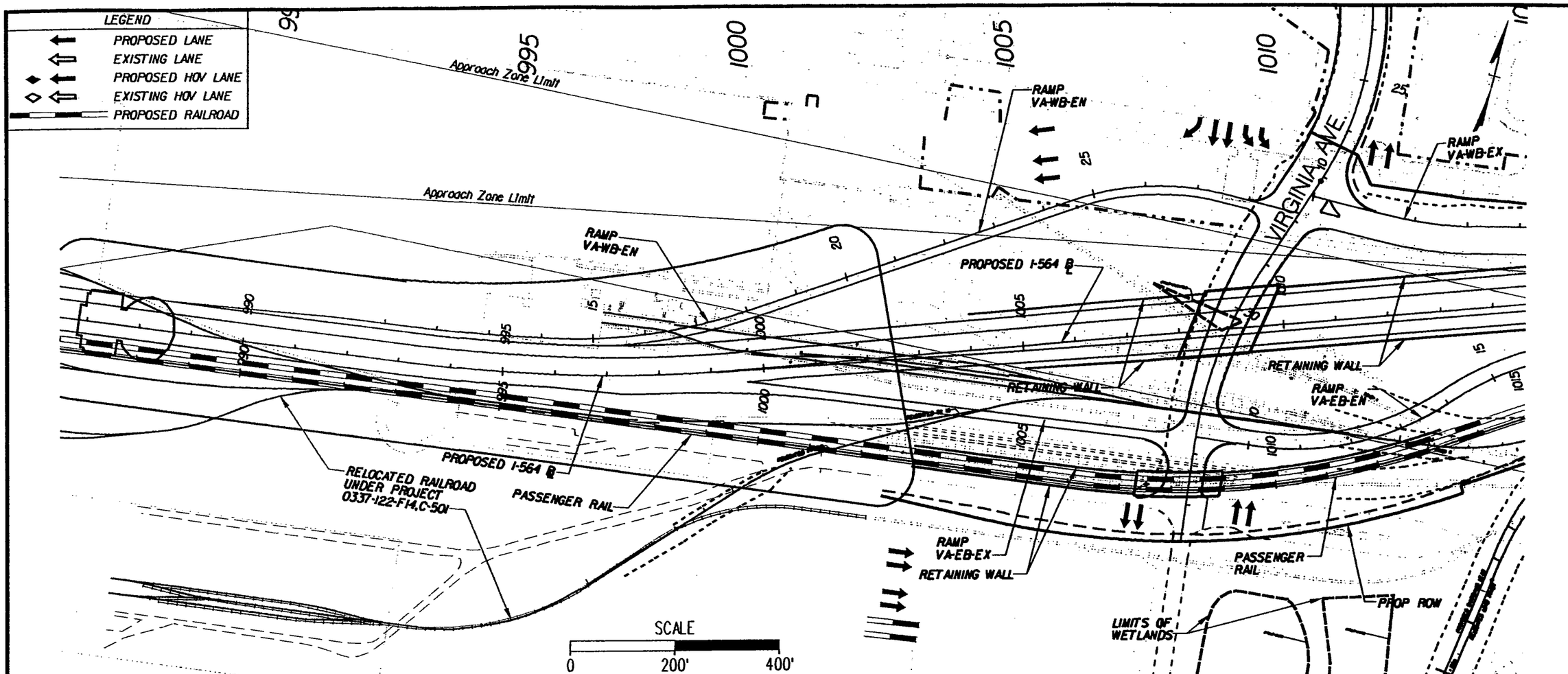

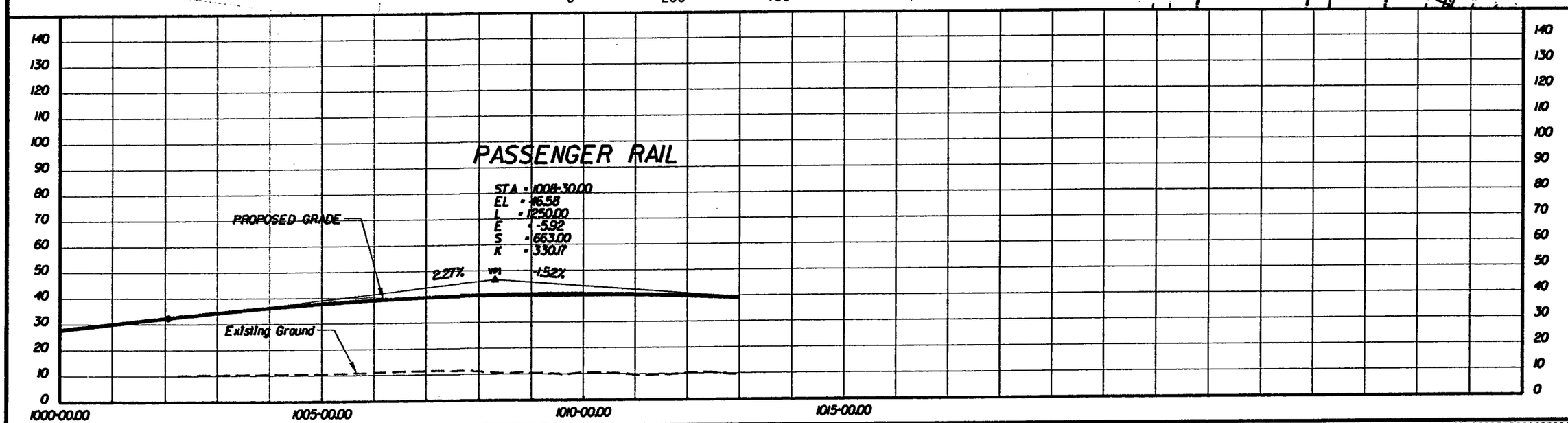

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DESIGN	AAA	DATE	DATE
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CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2B-014A

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

Approach Zone Limit

Approach Zone Limit

RAMP VA-WB-EN

RAMP VA-WB-EN

PROPOSED I-564 ℄

VIRGINIA AVE.

RAMP VA-WB-EX

RETAINING WALL

RETAINING WALL

RAMP VA-EB-EN

PROPOSED I-564 ℄

RELOCATED RAILROAD UNDER PROJECT 0337-122-F14,C-501

PASSENGER RAIL

RAMP VA-EB-EX

RETAINING WALL

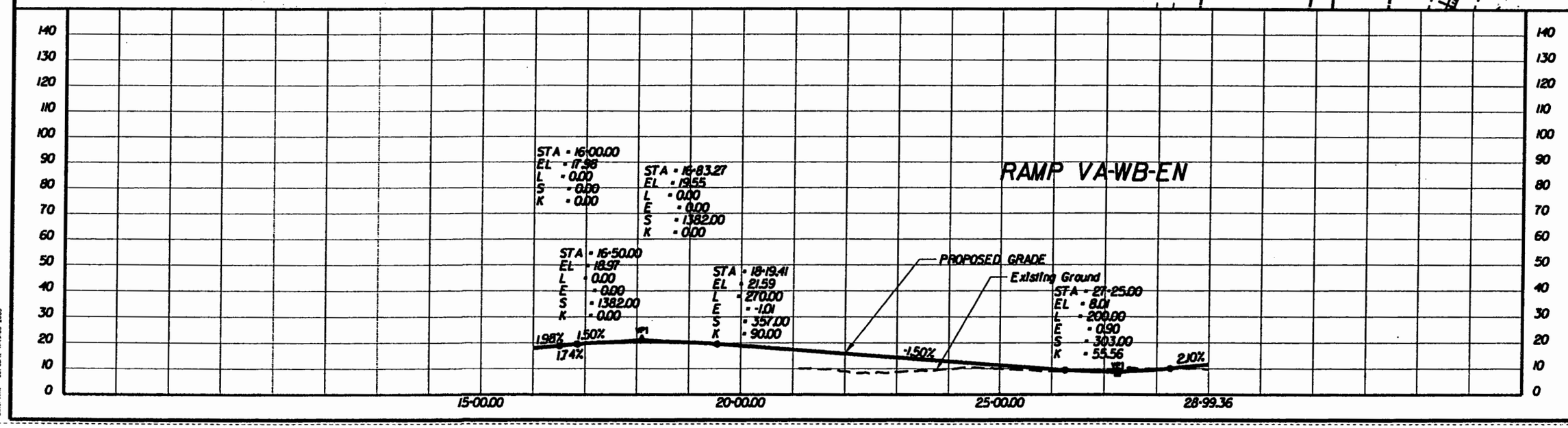
PASSENGER RAIL

PROP ROW

LIMITS OF WETLANDS

SCALE

0 200' 400'



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DESIGN	AAA	DATE	DATE
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CHECK	CCC	DATE	DATE
APPR.		DATE	DATE

ALTERNATIVE-2B

PROVISION FOR PASSENGER RAIL LINES SOUTHERN BORE

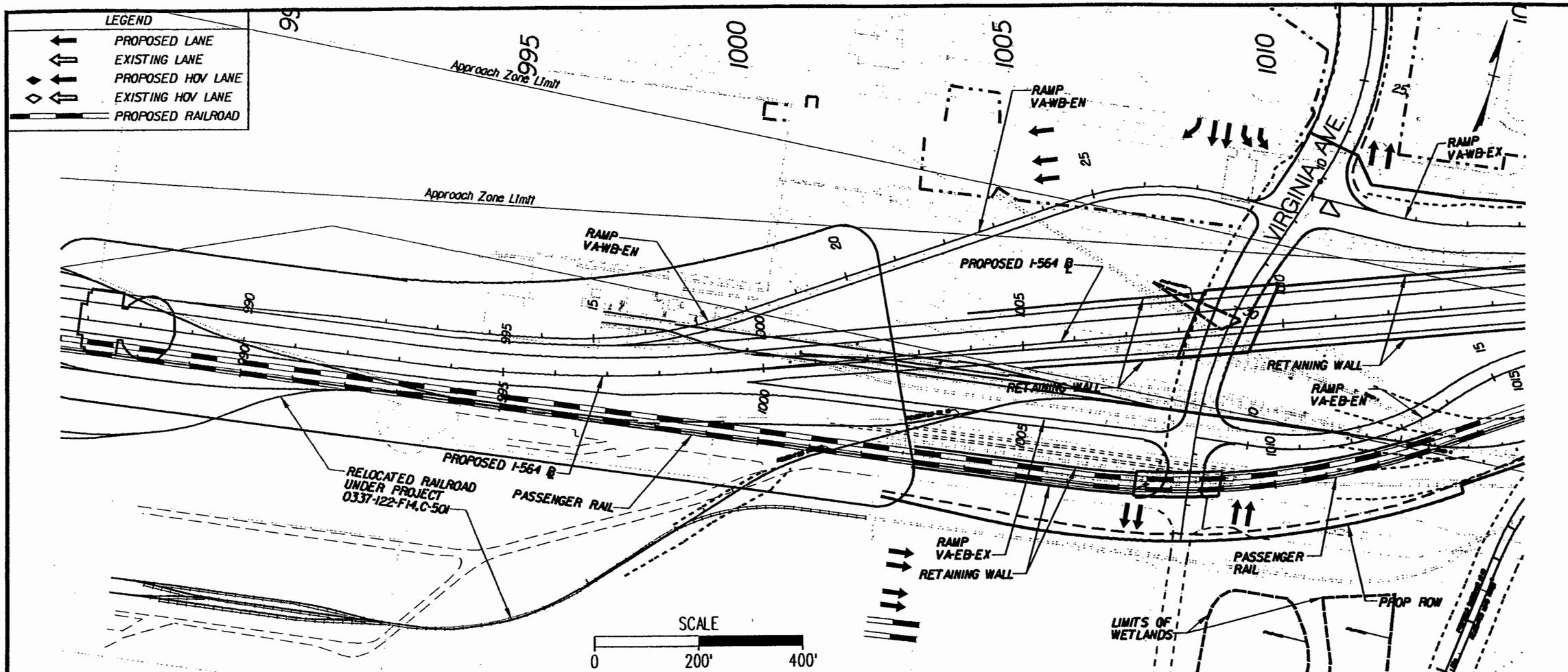
I-564 INTERMODAL CONNECTOR

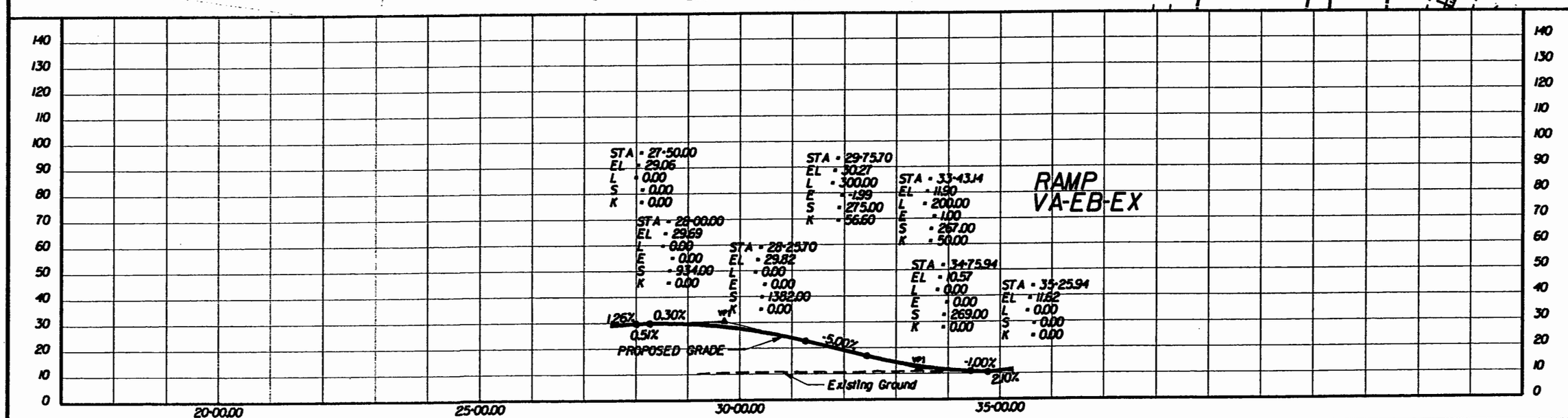
Rail Connection Study

(FO) R000-122-108, PE-101

DWG. NO

ALT-2B-014B





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DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES
SOUTHERN BORE

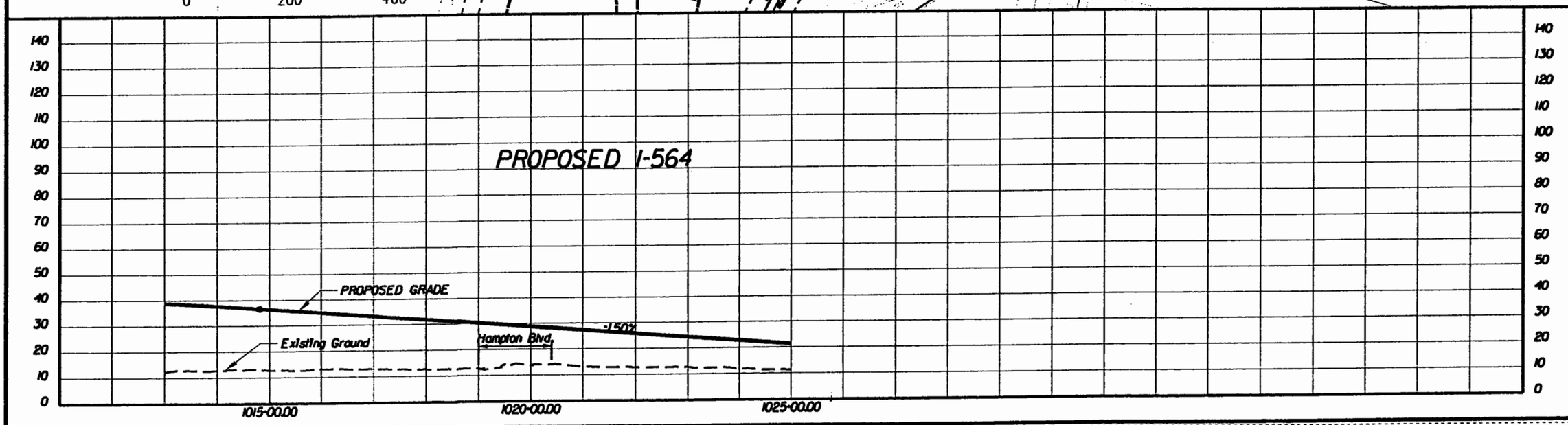
I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2B-014C

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

RAMP VA-WB-EN
RAMP VA-WB-EX
PROPOSED I-564 ℄
RAMP VA-WB-EX
PROPOSED I-564 ℄
VIRGINIA BEACH AVE
P AVE
HAMPTON BLVD
TOE OF SLOPE
PROP ROW
RETAINING WALL
RETAINING WALL
RAMP VA-EB-EN
RAMP VA-EB-EX
RETAINING WALL
PASSENGER RAIL
LIMITS OF WETLANDS
PROP ROW
Beginning of U.S. Navy/FAA (Clyville) Horizontal Surface
RAMP VA-EB-EN
RETAINING WALL
RELOCATED RAILROAD UNDER PROJECT 0337-122-F14,C-501
RAMP VA-EB-EN
SCALE
0 200' 400'



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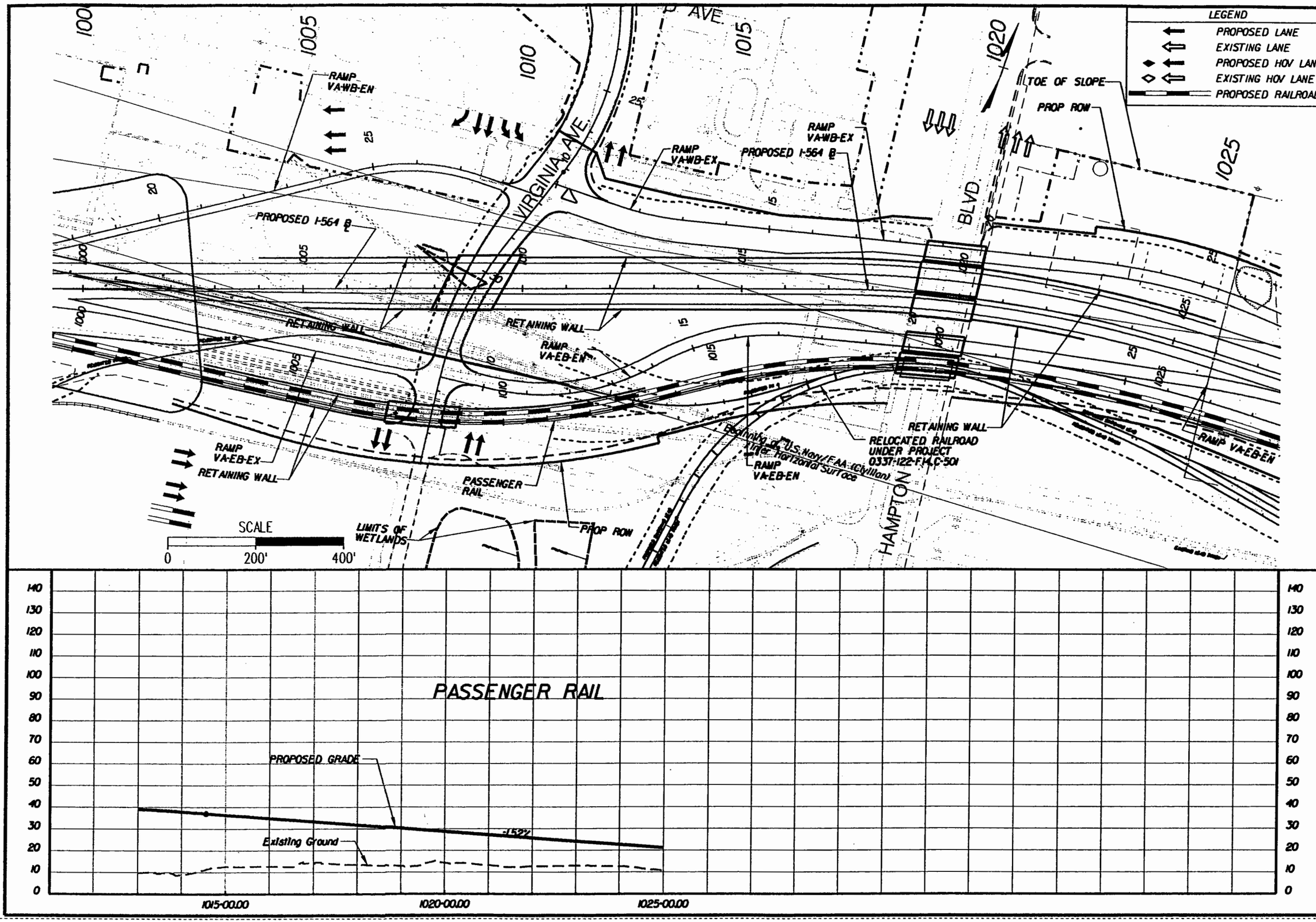
DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2B-015



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DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHECK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
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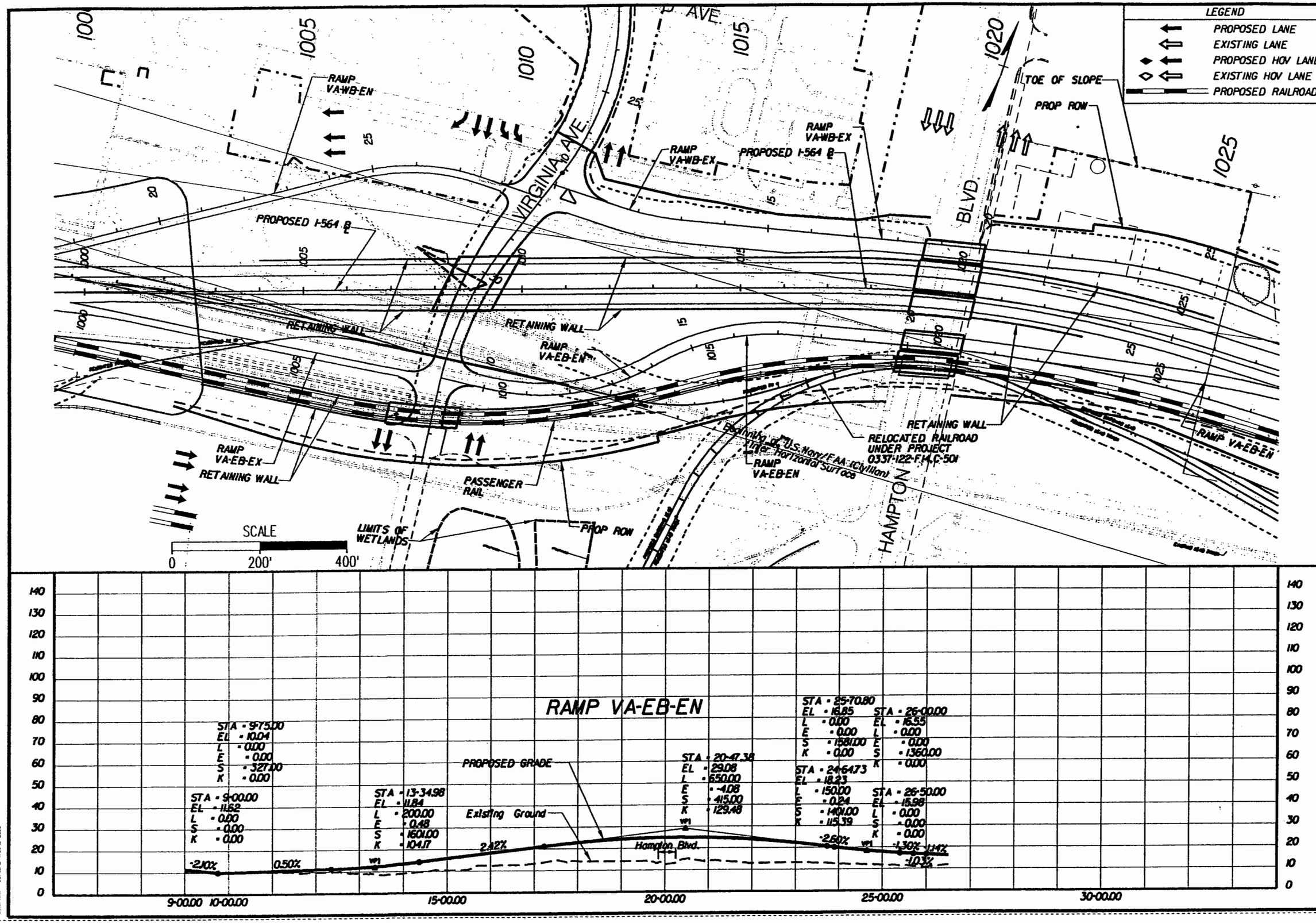

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ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2B-015B

LEGEND

- PROPOSED LANE
- EXISTING LANE
- PROPOSED HOV LANE
- EXISTING HOV LANE
- PROPOSED RAILROAD

1025 1030 1035 1040 1045 1050

RAMP HB-WB-EN

LIMITS OF WETLANDS

RAMP HB-EB-EX

Approach Zone Limit

2070

RAMP VA-WB-EX

PROPOSED I-564 ℄

RETAINING WALL

RETAINING WALL

RAMP VA-EB-EN

I-564 EB

TOE OF SLOPE

PROP ROW

PASSENGER RAIL

LIMITS OF WETLANDS

RELOCATED RAILROAD UNDER PROJECT 0337-122-F14,C-501

Beginning of U.S.Navy/FAA (Civilian) Inter Horizontal Surface

SCALE

0 200' 400'

PROPOSED I-564

STA = 1029+00.00
EL = 15.35
L = 200.00
E = 0.28
S = 1601.00
K = 181.82

PROPOSED GRADE

Existing Ground

-1.50%

-0.40%

STA = 1039+25.00
EL = 11.25
L = 200.00
E = 0.25
S = 1601.00
K = 200.00

0.60%

STA = 1045+00.00
EL = 14.70
L = 300.00
E = -0.34
S = 889.00
K = 333.33

-0.30%

VPI

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

1025+00.00 1030+00.00 1035+00.00 1040+00.00 1045+00.00 1050+00.00

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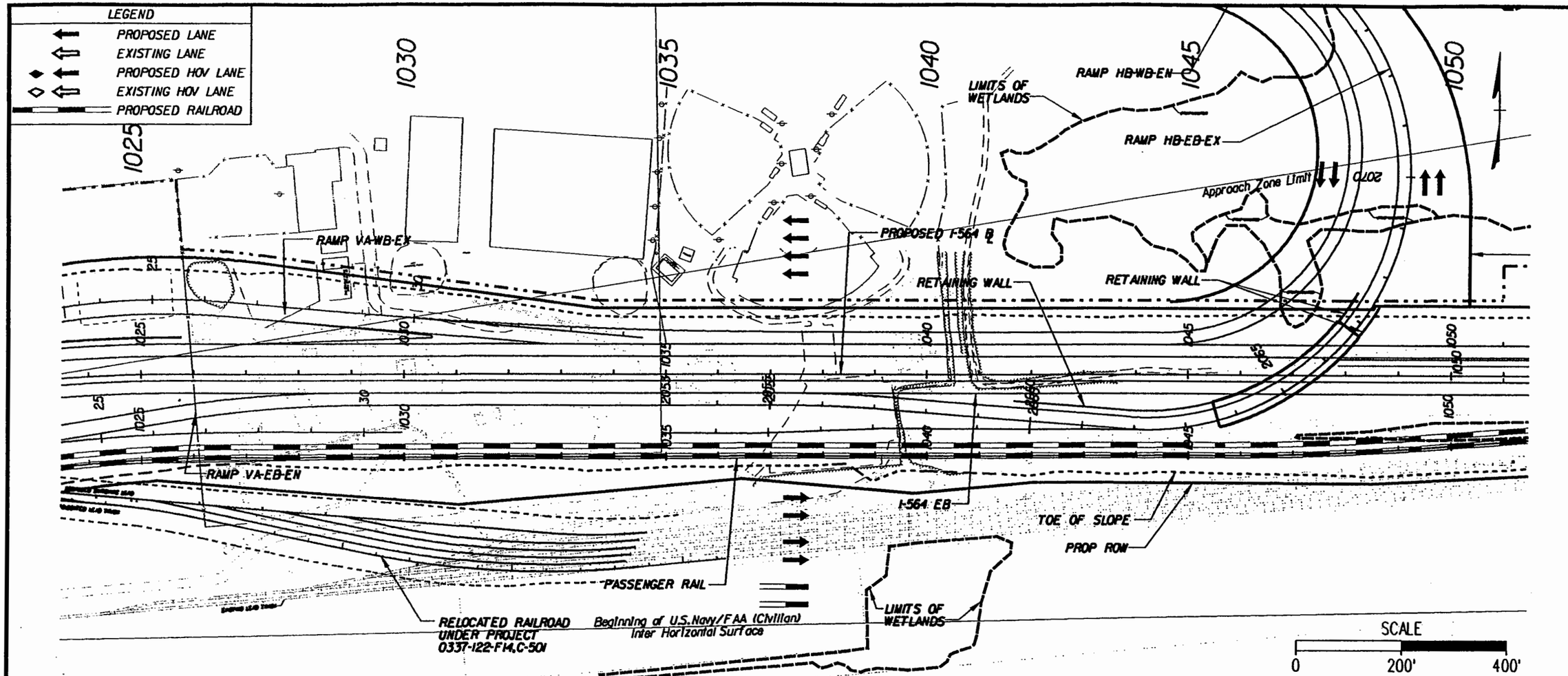
DATE	DATE	DATE	DATE

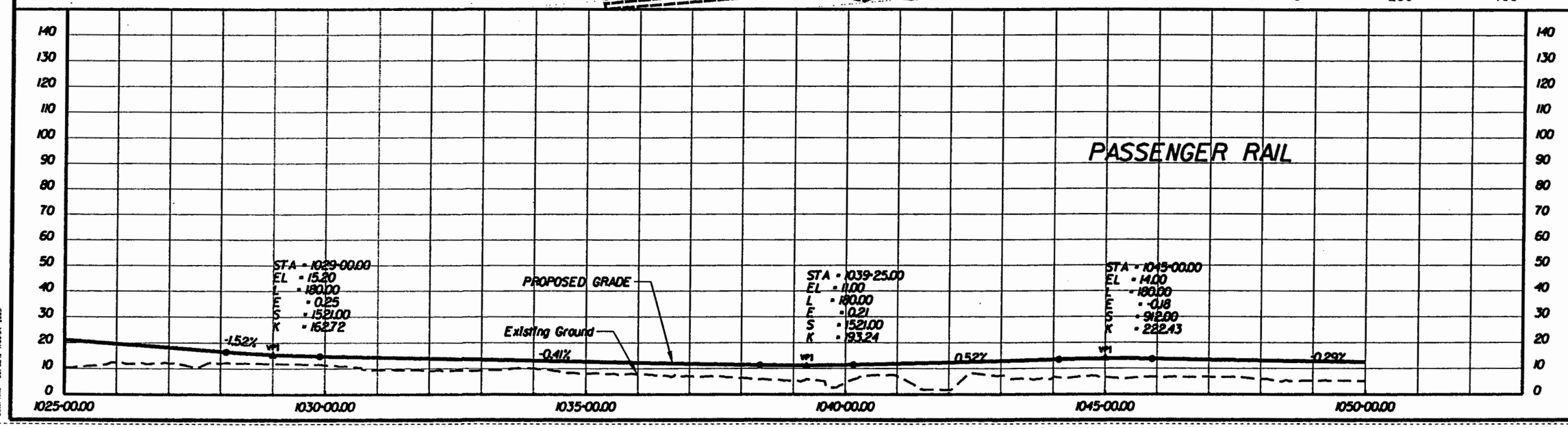
ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT-2B-016





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CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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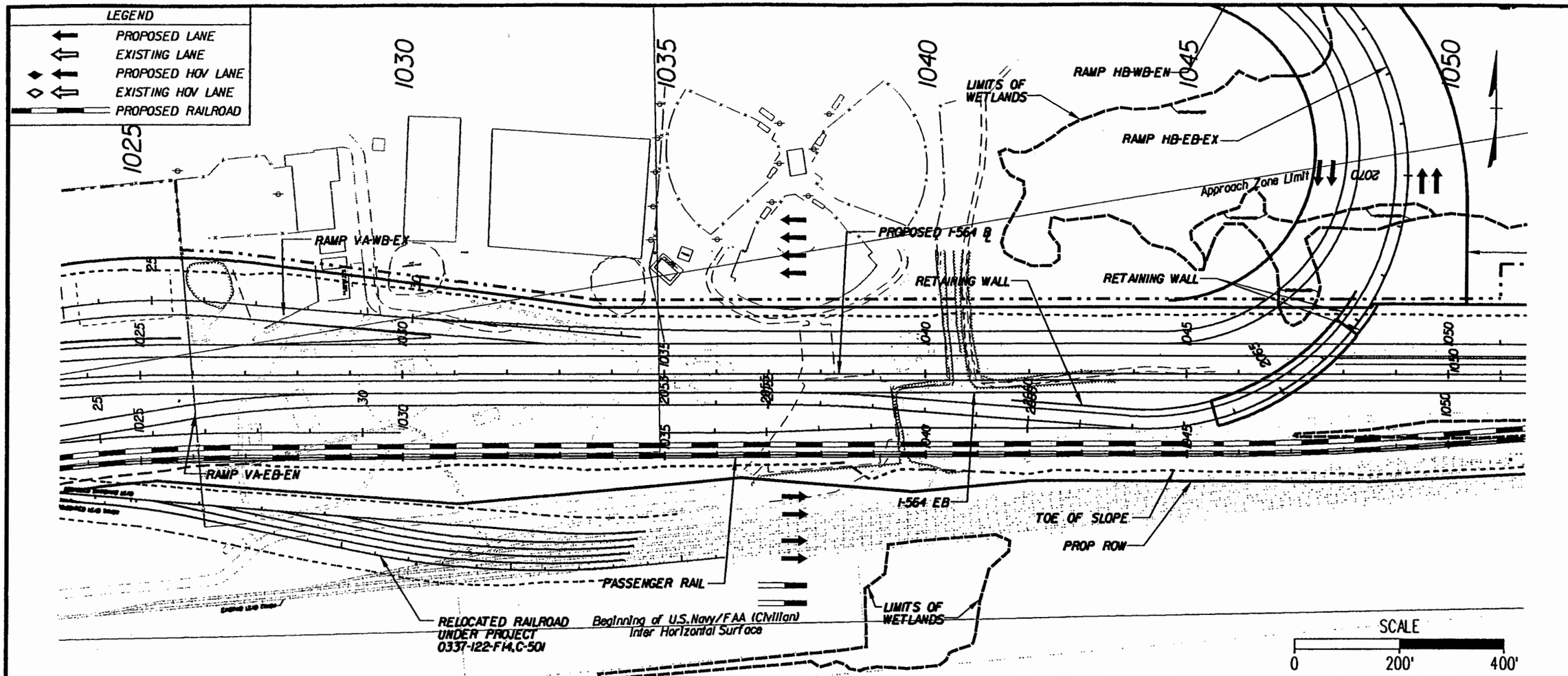

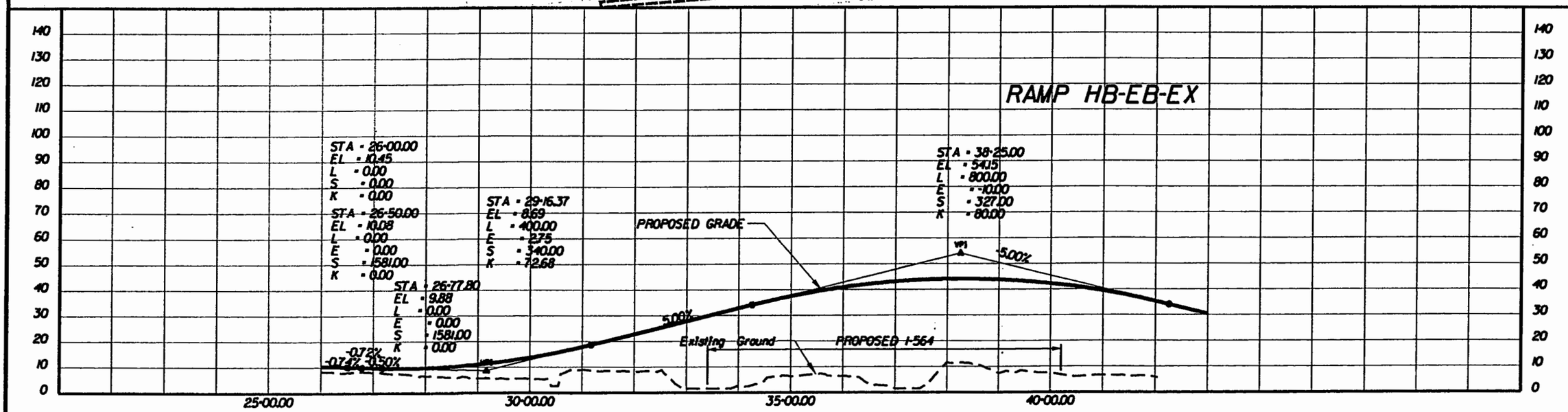

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CHCK	CCC	DATE	DATE
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ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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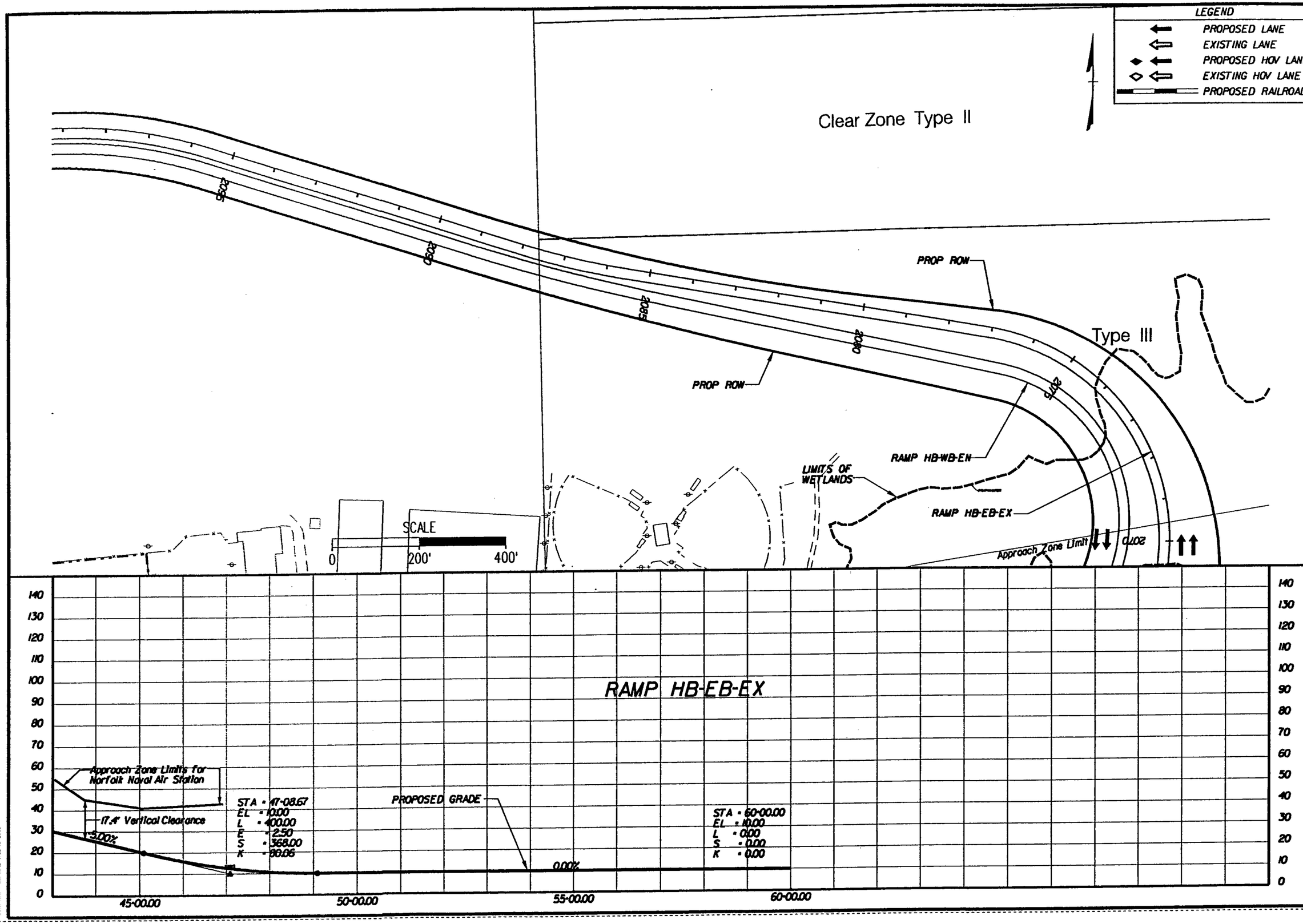

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MICHAEL BAKER JR., INC.

DESIGN	DRAWN	CHCK	APPR
AAA	BBB	CCC	
DATE	DATE	DATE	DATE

ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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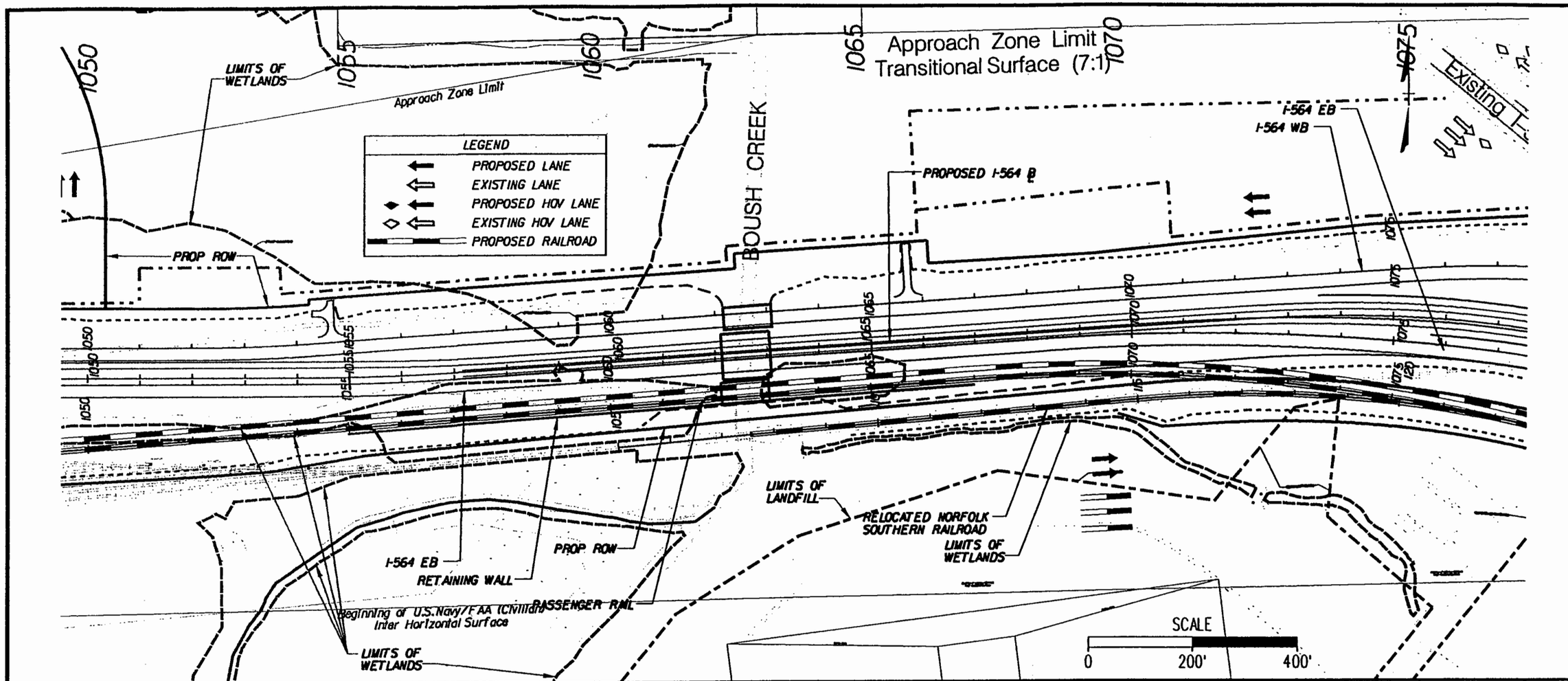

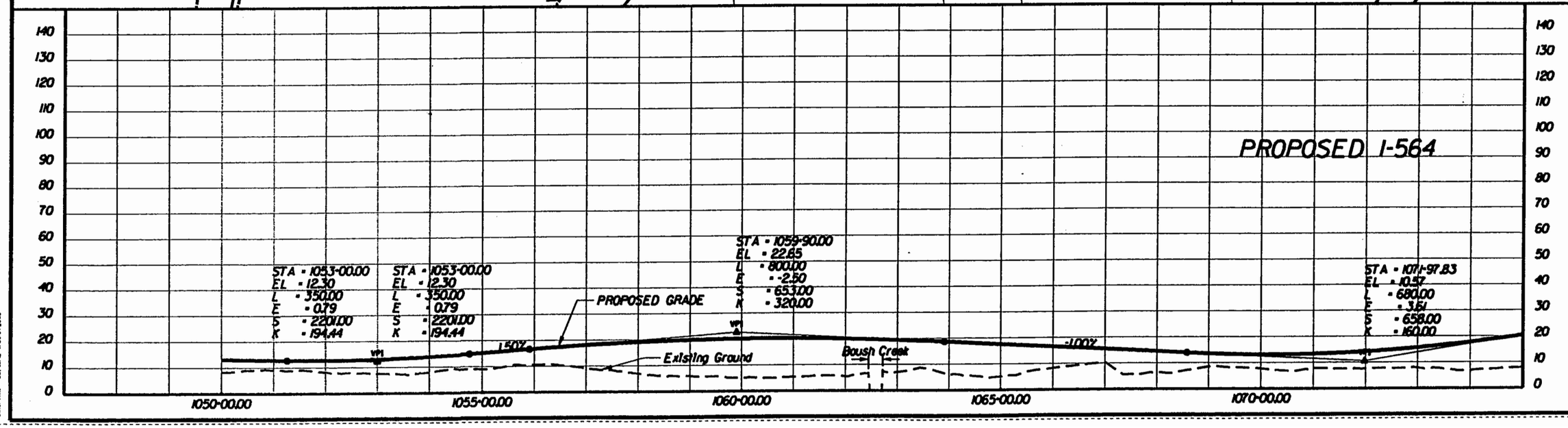

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DESIGN	DRAWN	CHECK	APPR.
AAA	BBB	CCC	
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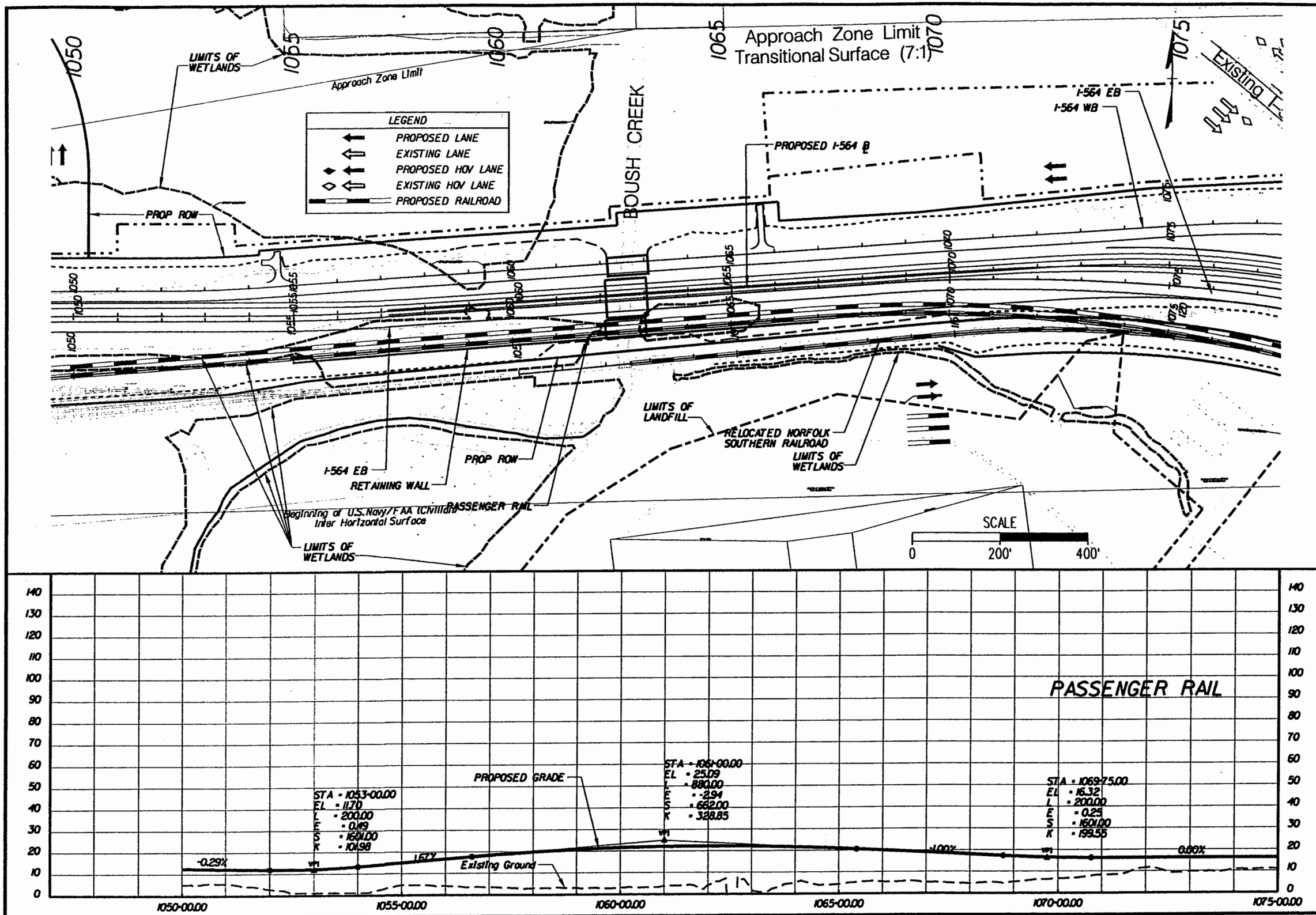
ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO
ALT-2B-017



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AAA	BBB	CCC	
DATE	DATE	DATE	DATE

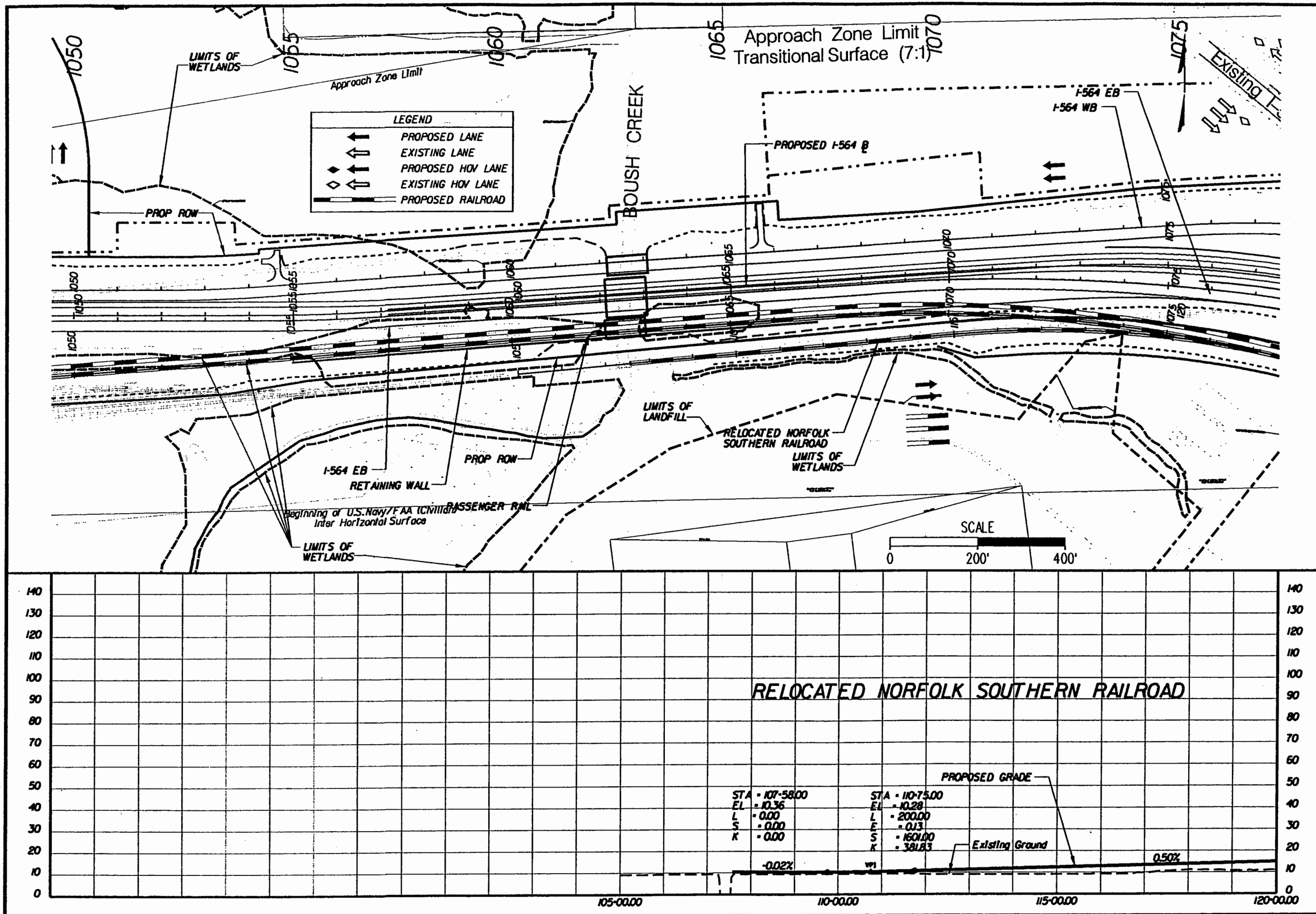
ALTERNATIVE-2B

PROVISION FOR PASSENGER RAIL LINES SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

DWG. NO

ALT-2B-017A



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MICHAEL BAKER JR., INC.

DESIGN	AAA	DATE	DATE
DRAWN	BBB	DATE	DATE
CHCK	CCC	DATE	DATE
APPR		DATE	DATE

ALTERNATIVE-2B
PROVISION FOR PASSENGER RAIL LINES
SOUTHERN BORE

I-564 INTERMODAL CONNECTOR
Rail Connection Study
(FO) R000-122-108, PE-101

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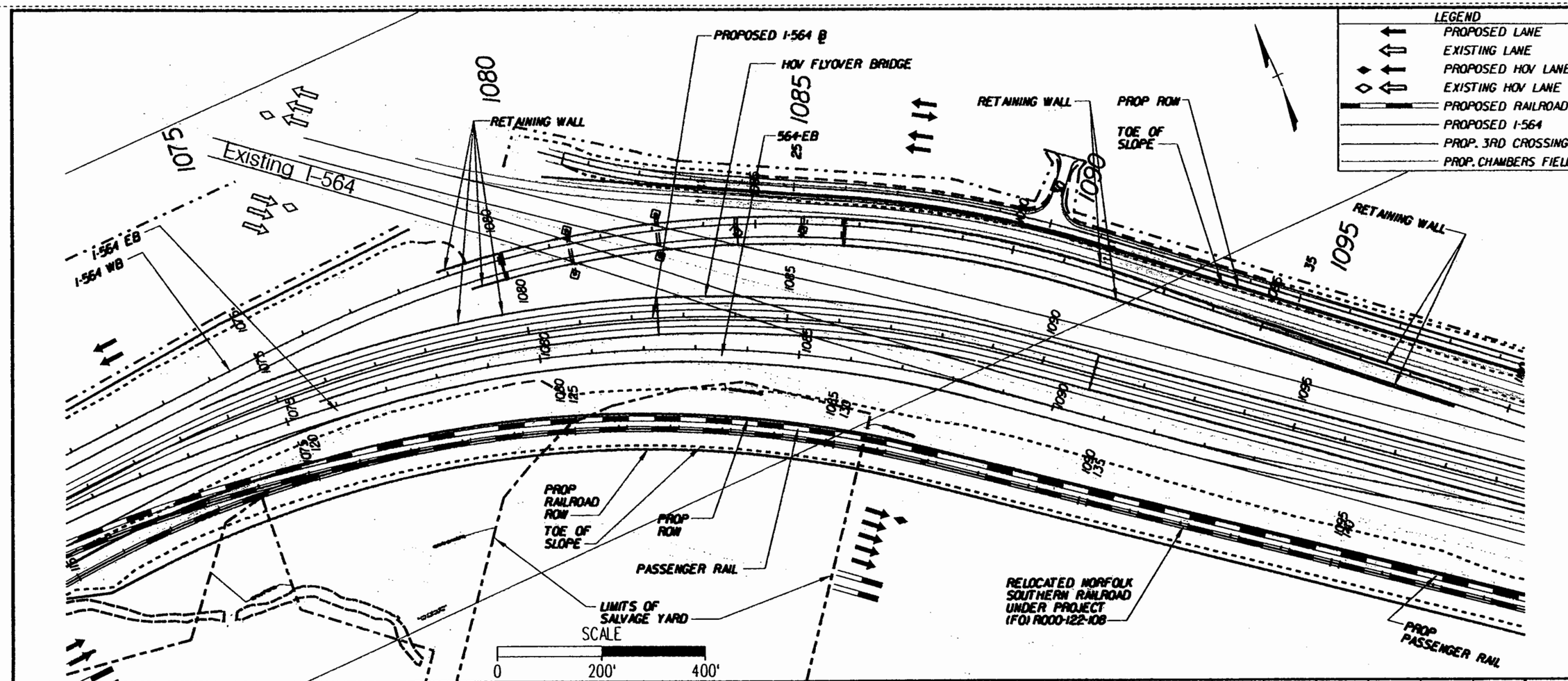

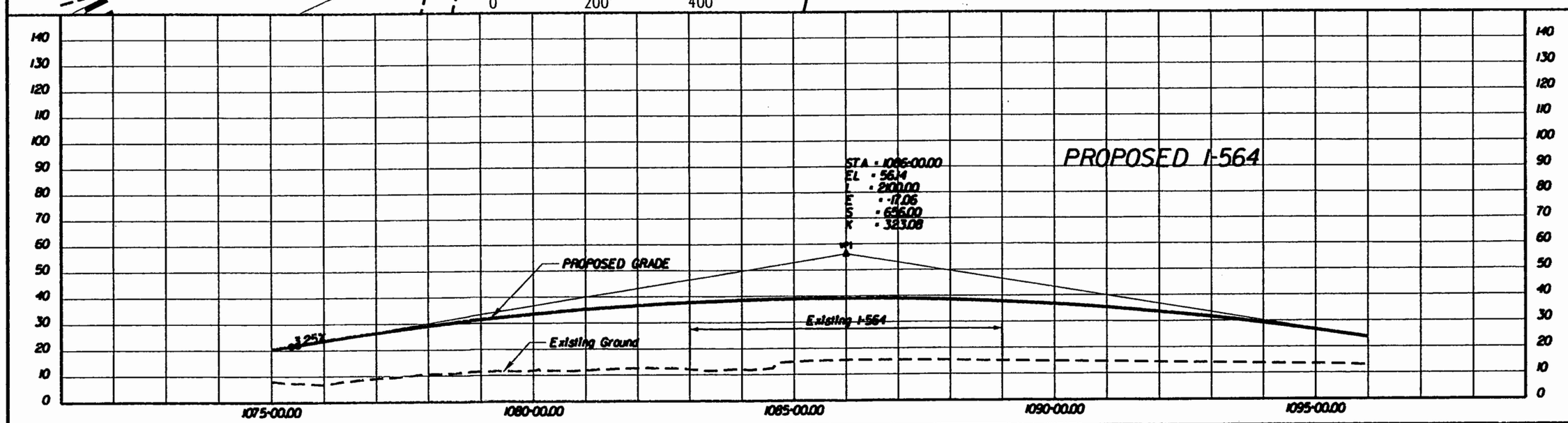

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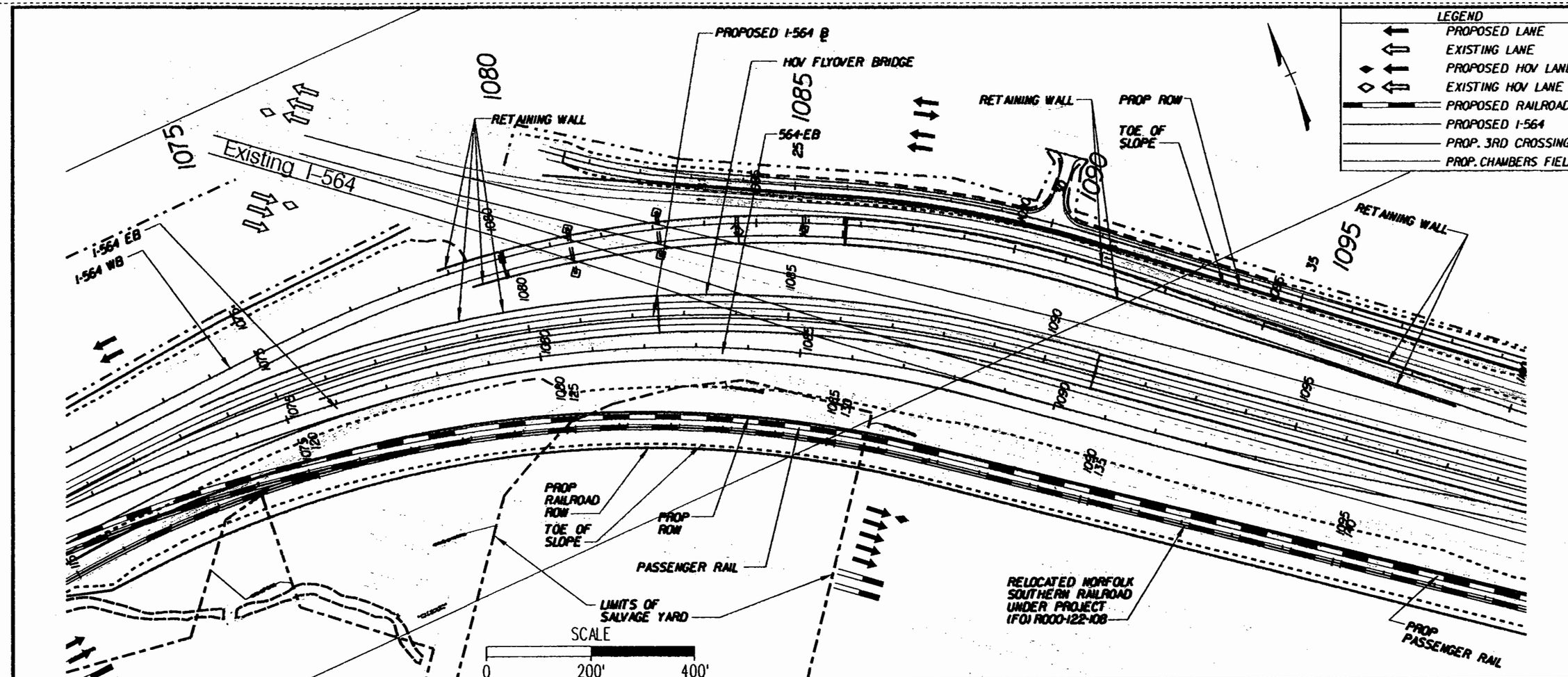

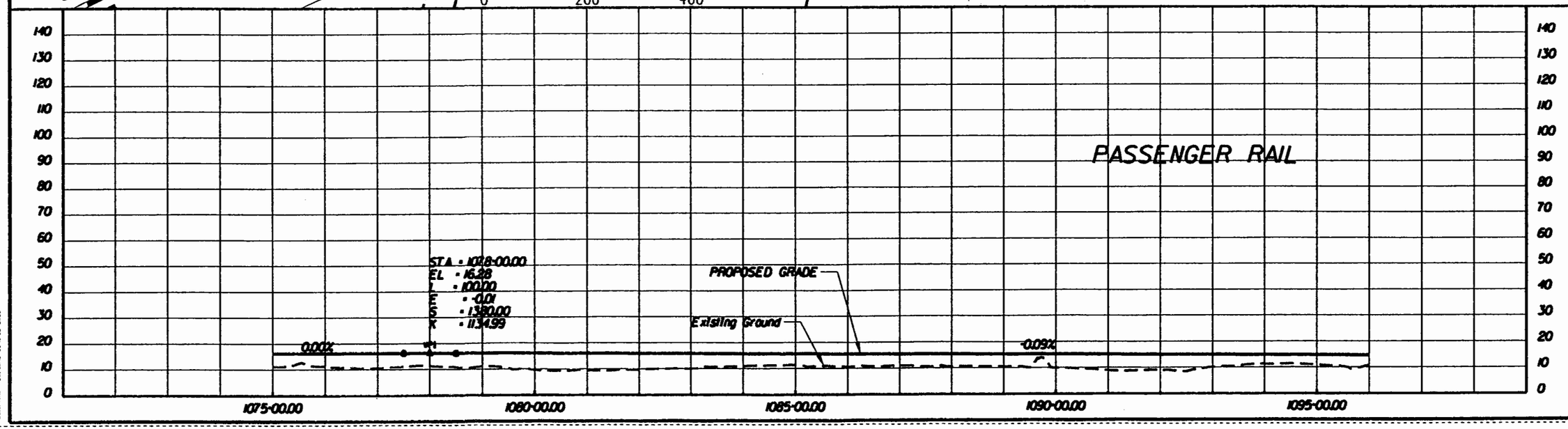

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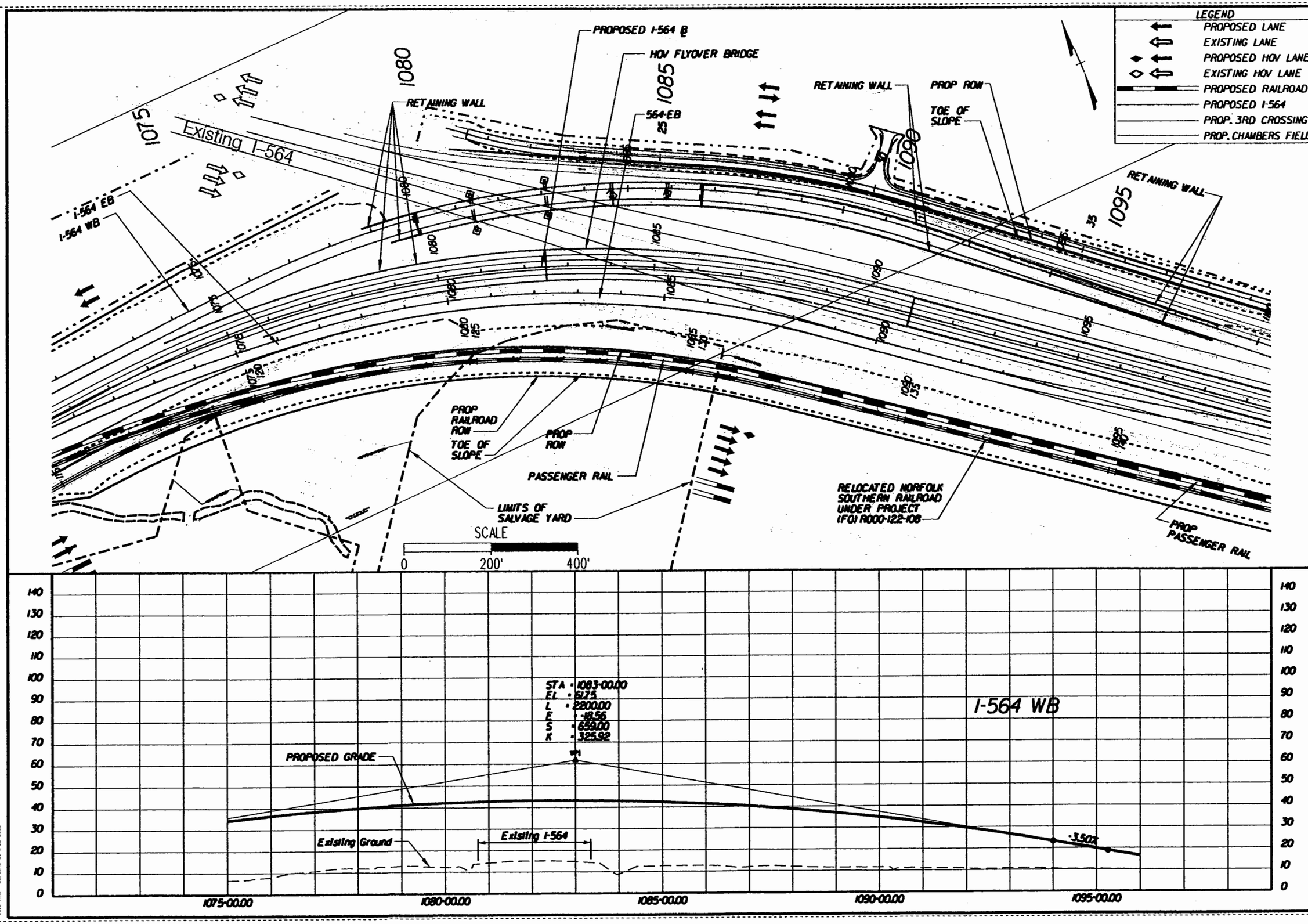

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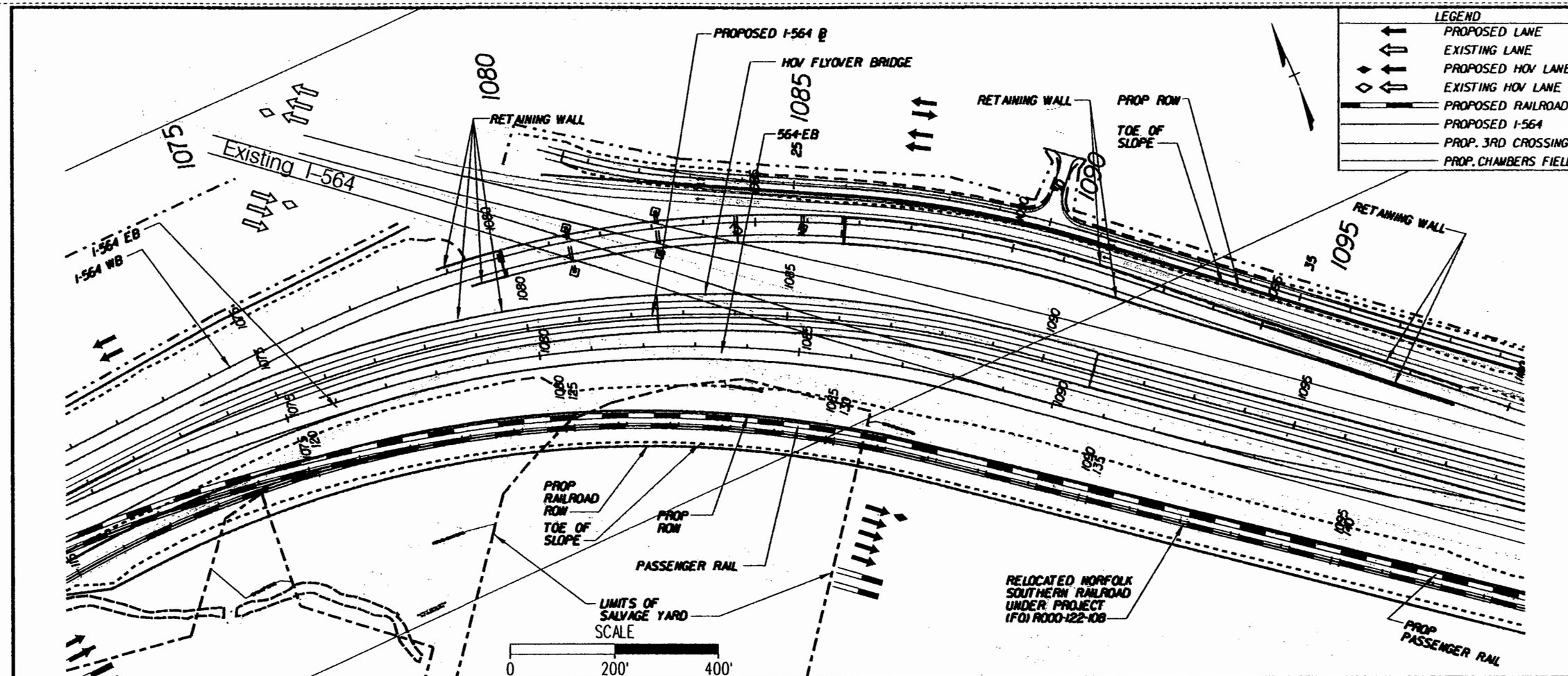

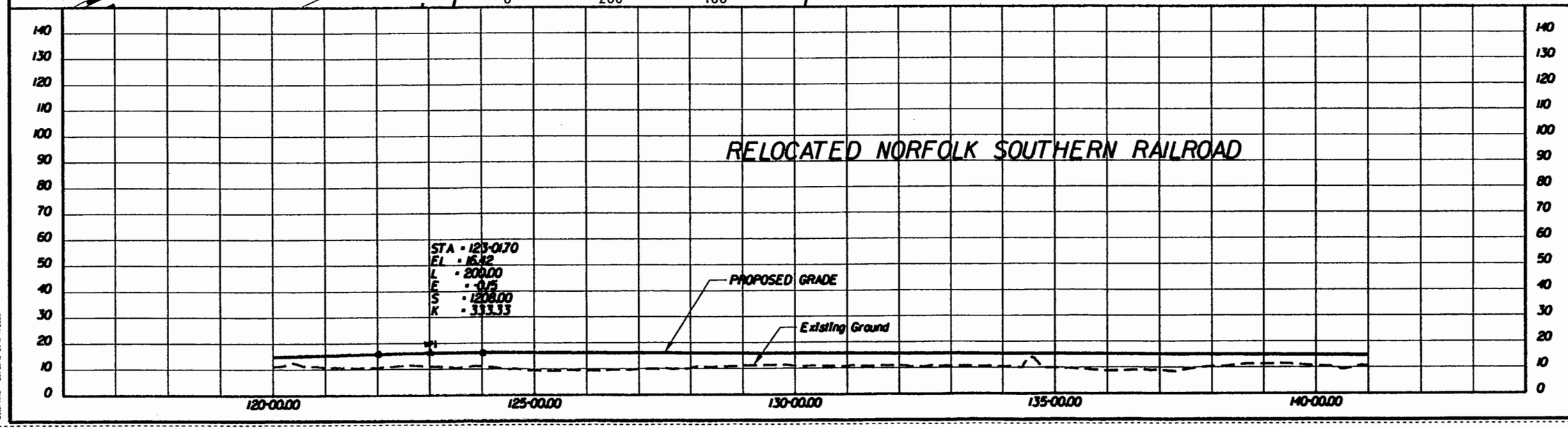

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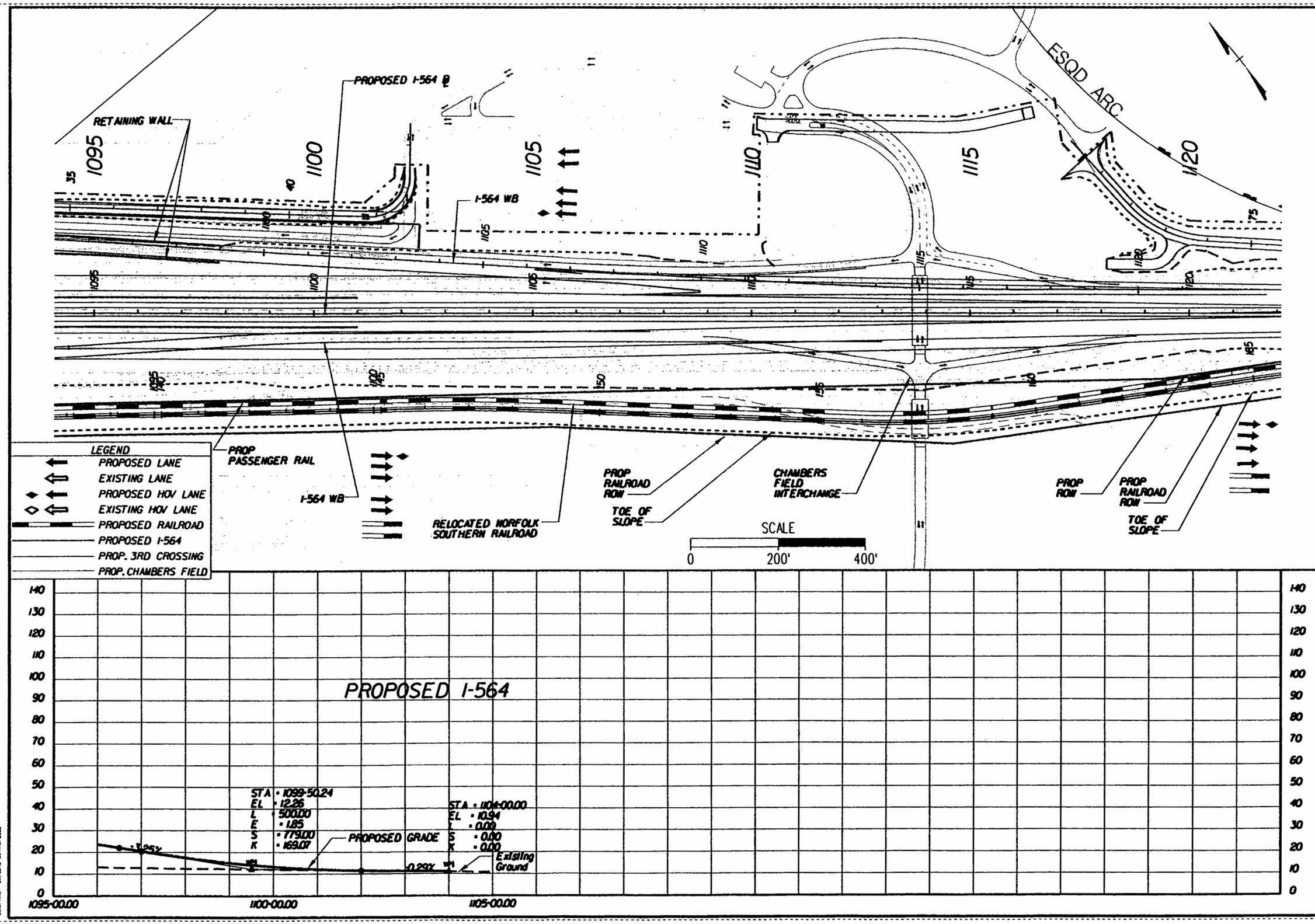

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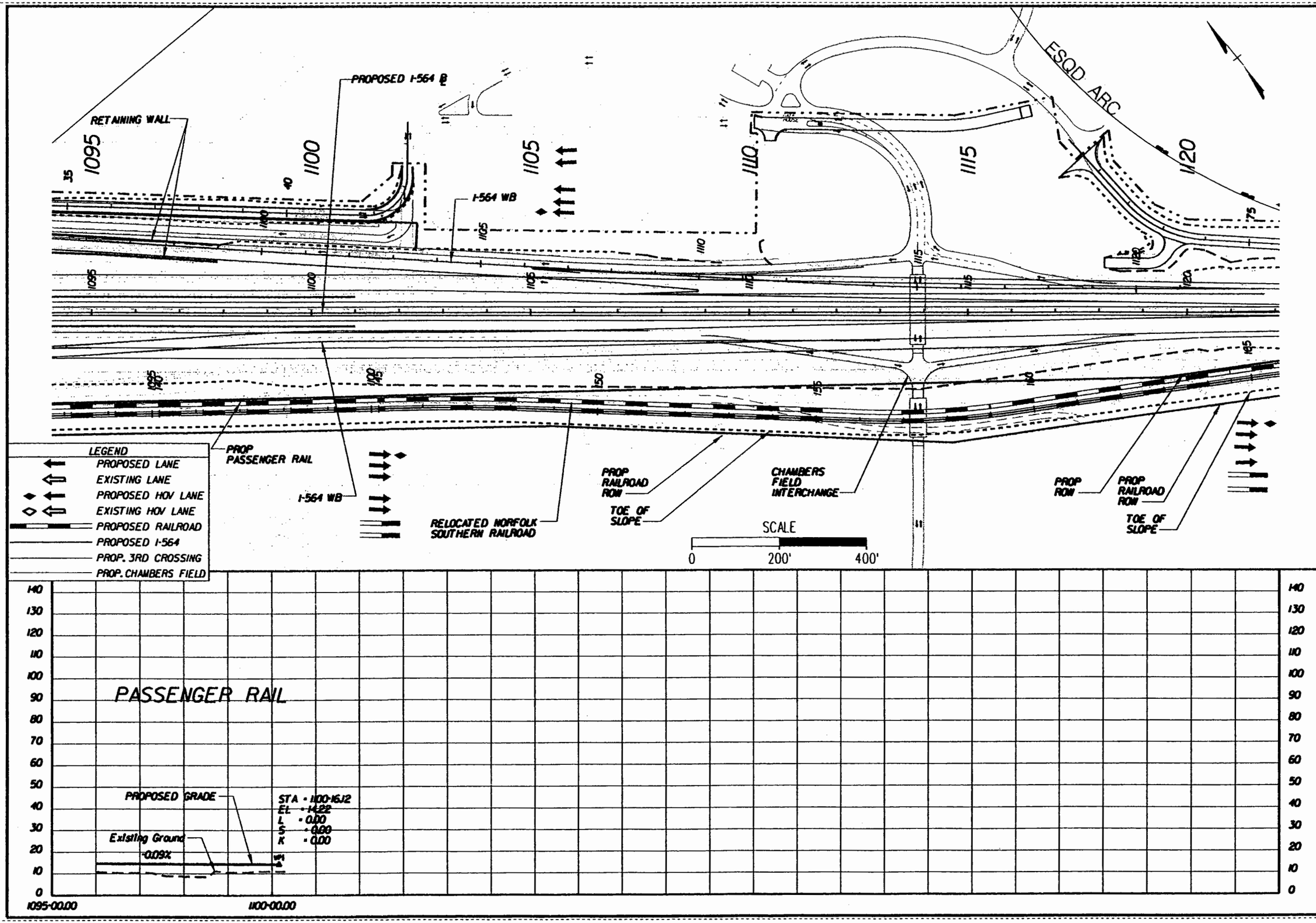

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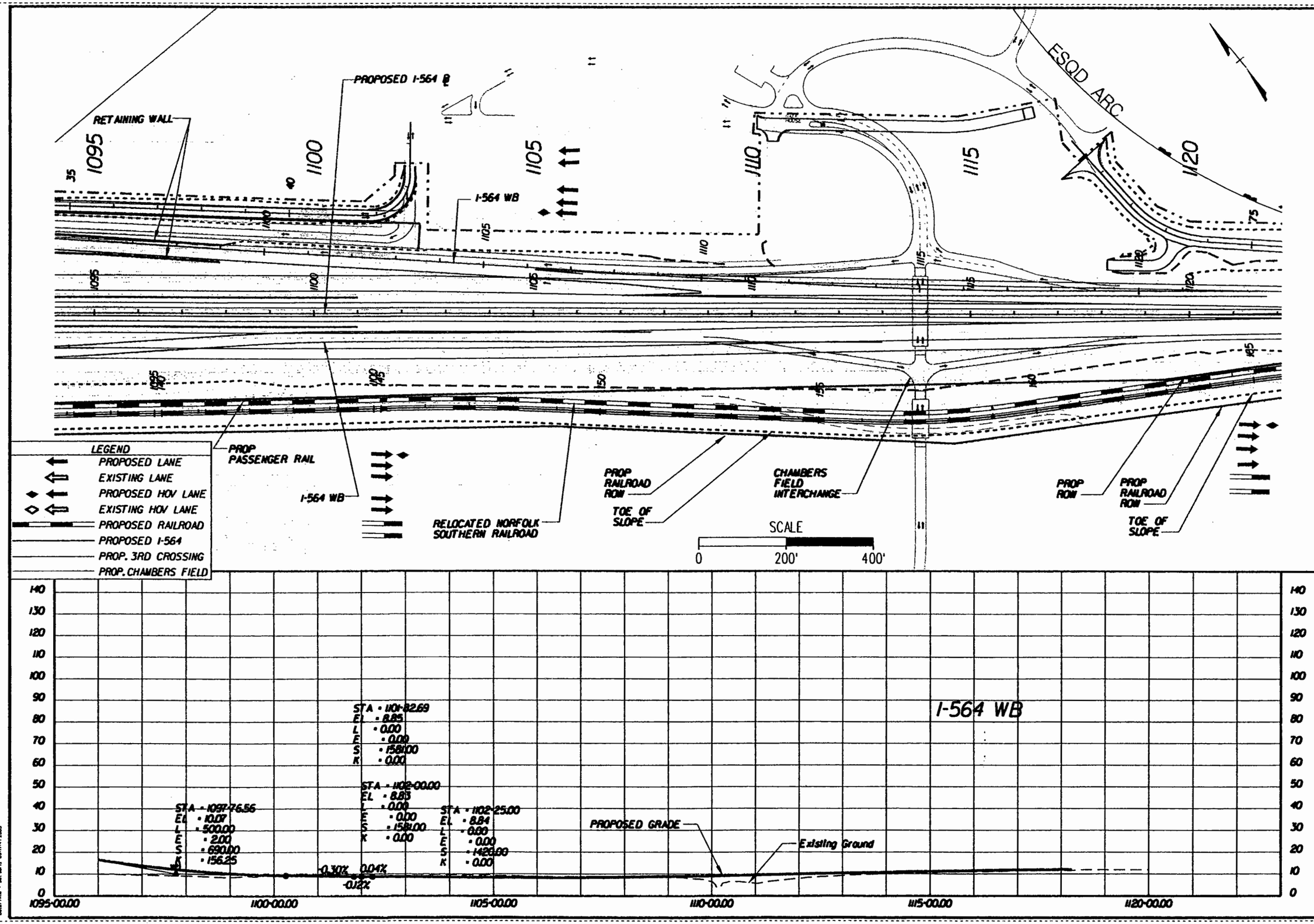

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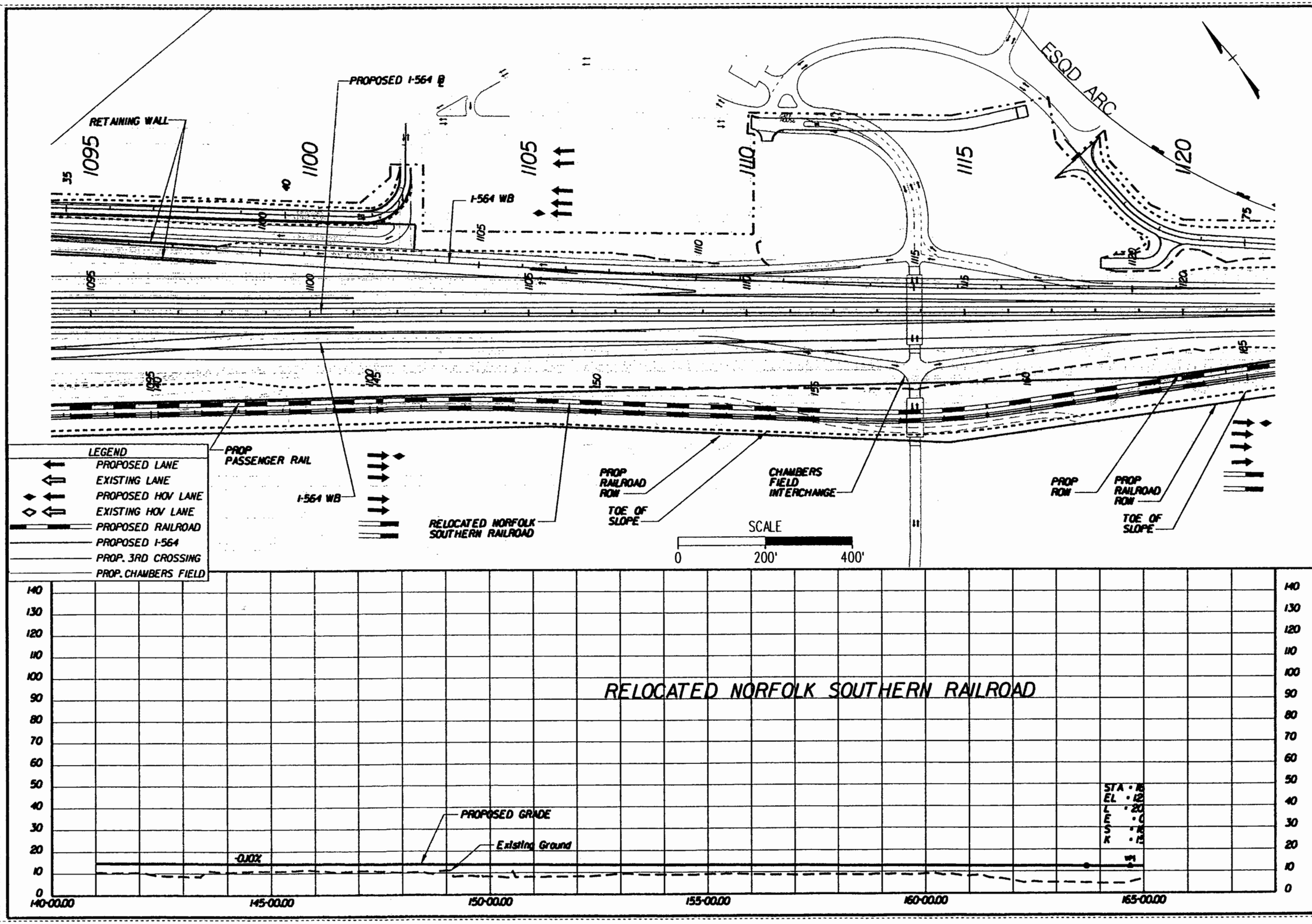

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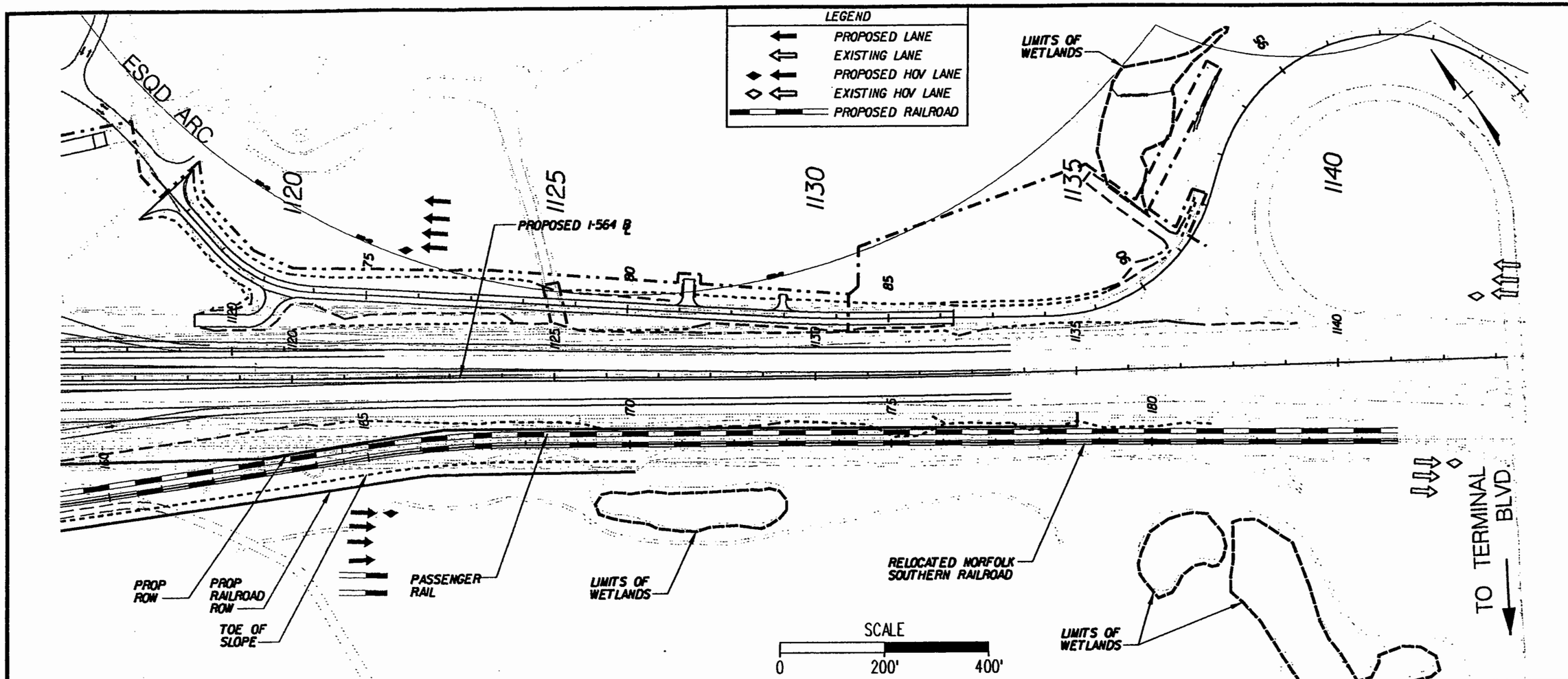

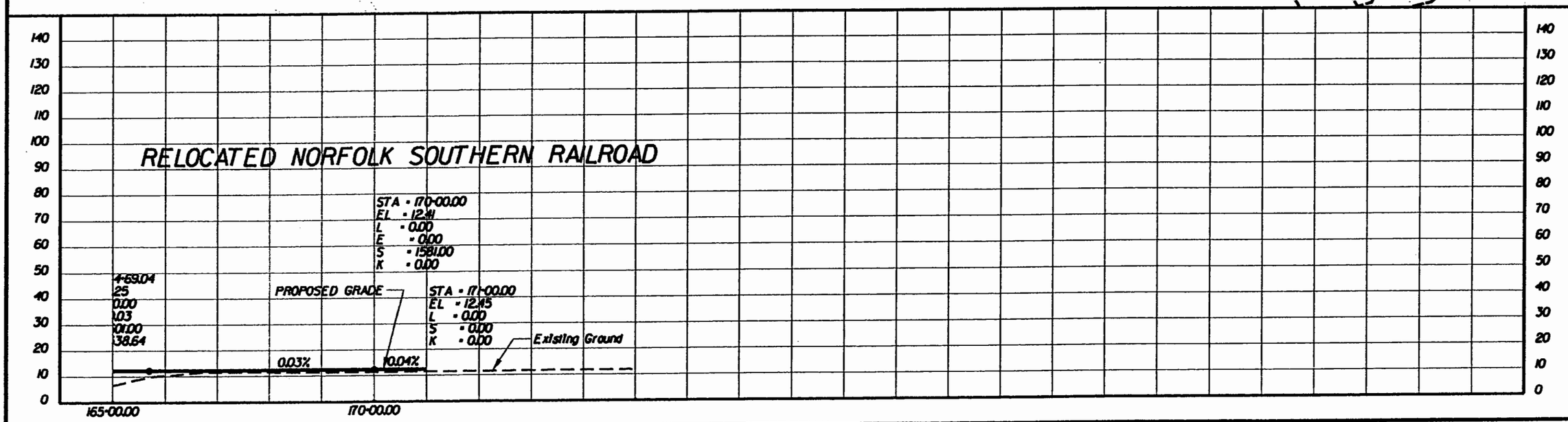

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