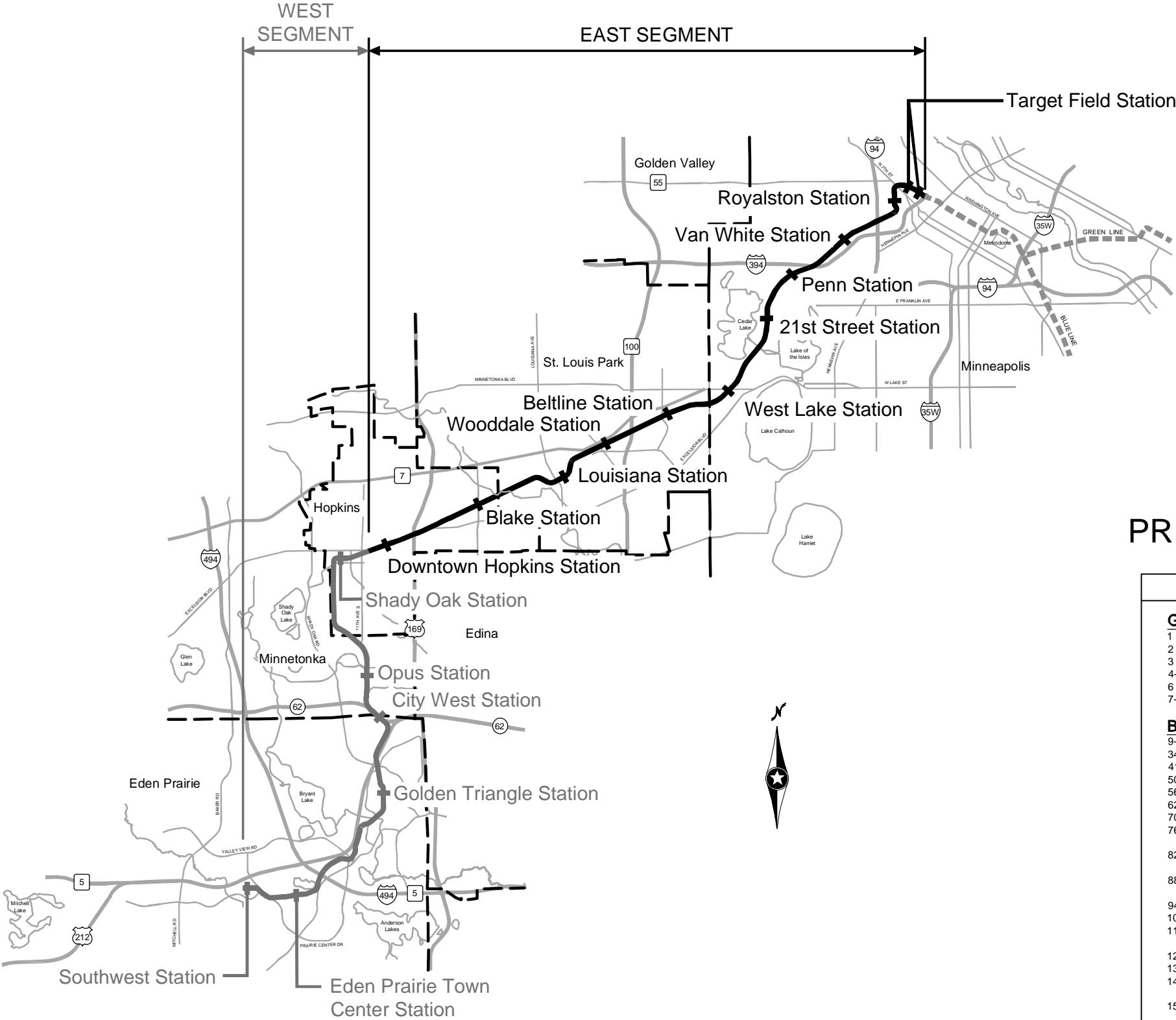




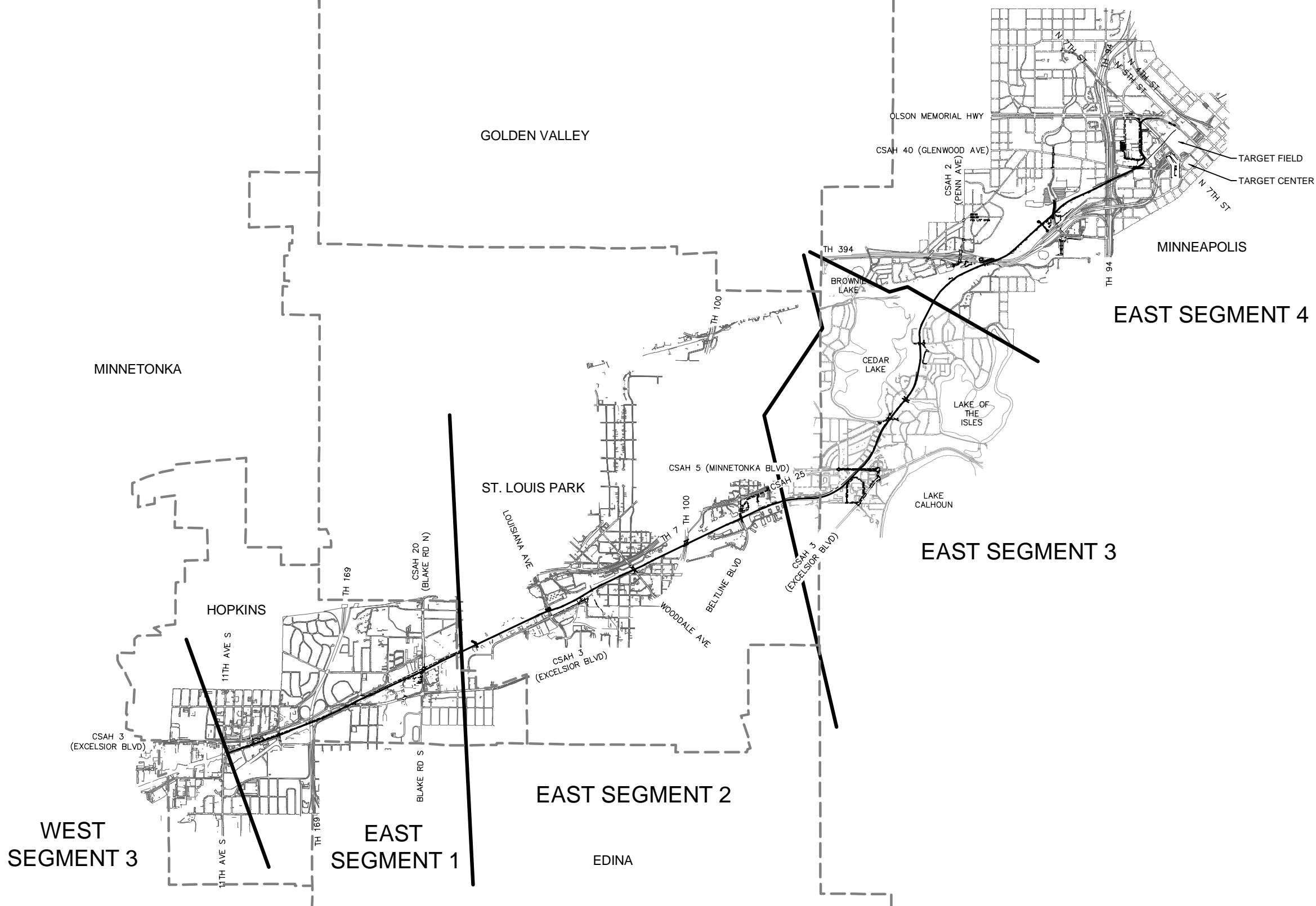
EAST - VOLUME 2 (STRUCTURES)

PRELIMINARY ENGINEERING (SEPTEMBER 2014)



INDEX	INDEX
GENERAL 1 COVER SHEET 2 EAST SEGMENT KEY MAP 3 EAST SEGMENT 1 - LAYOUT INDEX 4-5 EAST SEGMENT 2 - LAYOUT INDEX 6 EAST SEGMENT 3 - LAYOUT INDEX 7-8 EAST SEGMENT 4 - LAYOUT INDEX	TUNNEL PLANS 207-225 KENILWORTH CORRIDOR TUNNEL (TUN)
BRIDGE PLANS 9-33 EXCELSIOR BOULEVARD BRIDGE (EXCL-LRT) 34-40 MINNEHAHA CREEK BRIDGE-TRAIL (MNHA-TRL) 41-49 MINNEHAHA CREEK BRIDGE-FREIGHT (MNHA-FRT) 50-55 MINNEHAHA CREEK BRIDGE-LRT (MNHA-LRT) 56-61 LOUISIANA AVENUE BRIDGE-TRAIL (LOIS-TRL) 62-69 LOUISIANA AVENUE BRIDGE-FREIGHT (LOIS-FRT) 70-75 LOUISIANA AVENUE BRIDGE-LRT (LOIS-LRT) 76-81 LOUISIANA STATION PEDESTRIAN UNDERPASS (PUPS-PED) 82-87 SOUTHERLY CONNECTOR BRIDGE OVER LRT (SOCO-FRT) 88-93 SOUTHERLY CONNECTOR BRIDGE AT OXFORD (SCOX-FRT) 94-103 TH 100 FREIGHT RAIL BRIDGE RELOCATION (T100-FRT) 104-113 TH 100 LRT BRIDGE (T100-LRT) 114-125 CEDAR LAKE TRAIL BRIDGE (CLTR-TRL) BELTLINE STATION 126-132 CEDAR LAKE CHANNEL RAILROAD BRIDGE (CLCH-FRT) 133-139 CEDAR LAKE CHANNEL LRT/TRAIL BRIDGE (CLCH-LRT) 140-156 NORTH CEDAR LAKE TRAIL BRIDGE (NCDL-TRL) PENN STATION 157-167 LUCE LINE TRAIL BRIDGE (VNWHT-TRL) VAN WHITE STATION 168-174 GLENWOOD AVENUE BRIDGE-WEST (GLAW-VEH) 175-181 GLENWOOD AVENUE BRIDGE-EAST (GLAE-VEH) 182-188 LRT BRIDGE OVER BNSF TRACK (TRK2-LRT) 189-206 LRT BRIDGE OVER 5TH AVENUE & 7TH STREET (5A7S-LRT)	RETAINING WALL PLANS 226 EAST SEGMENT 1 - LAYOUT INDEX 227-229 EAST SEGMENT 1 - RTW PLAN AND PROFILES 230-231 EAST SEGMENT 2 - LAYOUT INDEX 232-242 EAST SEGMENT 2 - RTW PLAN AND PROFILES 243 EAST SEGMENT 3 - LAYOUT INDEX 244-250 EAST SEGMENT 3 - RTW PLAN AND PROFILES 251-252 EAST SEGMENT 4 - LAYOUT INDEX 253-258 EAST SEGMENT 4 - RTW PLAN AND PROFILES
	EXISTING BRIDGE MODIFICATIONS 259 EAST SEGMENTS OVERALL - LAYOUT 260-268 PIER PROTECTION 269-271 WEST LAKE STREET BRIDGE 27037 MODIFICATIONS 272-274 PENN AVE BRIDGE 27758 MODIFICATIONS

Aug. 25 2014 04:59 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E0-STU-KEY.dwg By: hope.wedge



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



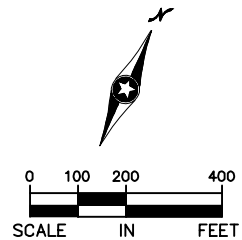
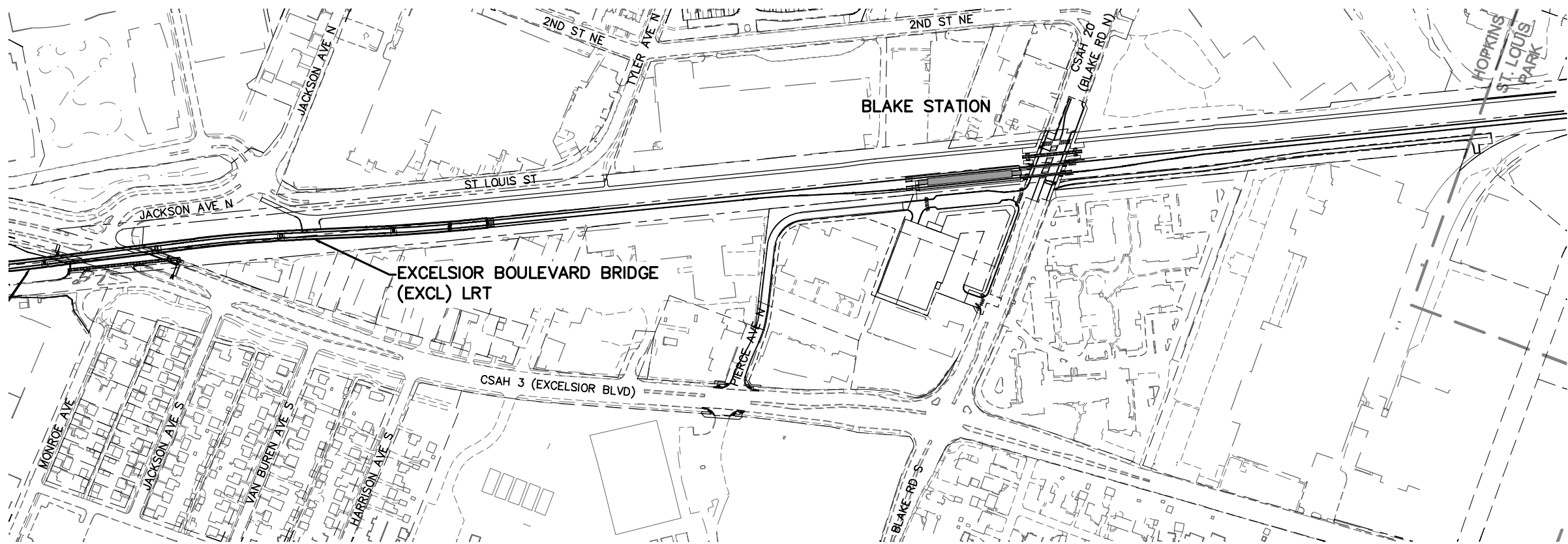
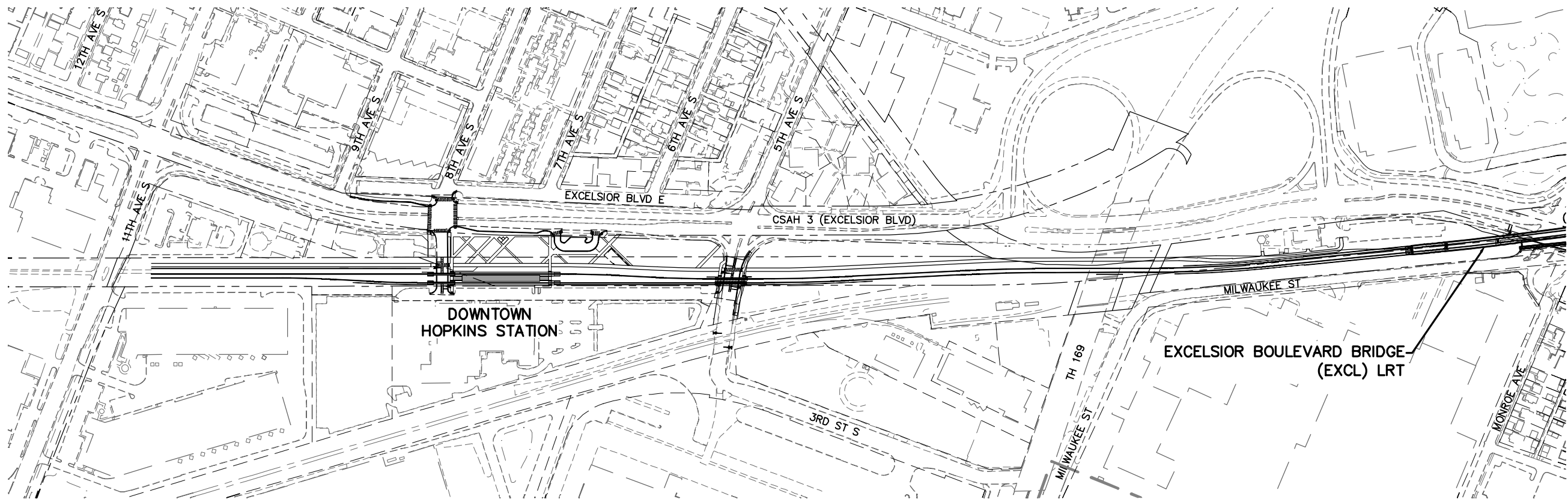
EAST - VOLUME 2 (STRUCTURES)
EAST SEGMENT KEY MAP

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E0-STU-KEY-001**


SHEET
2
OF
274

Aug. 25 2014 04:59 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E1-STU-IDX.dwg By: hope.wedge



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



Kimley»Horn

TKDA

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension

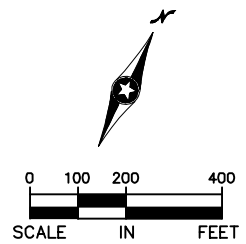
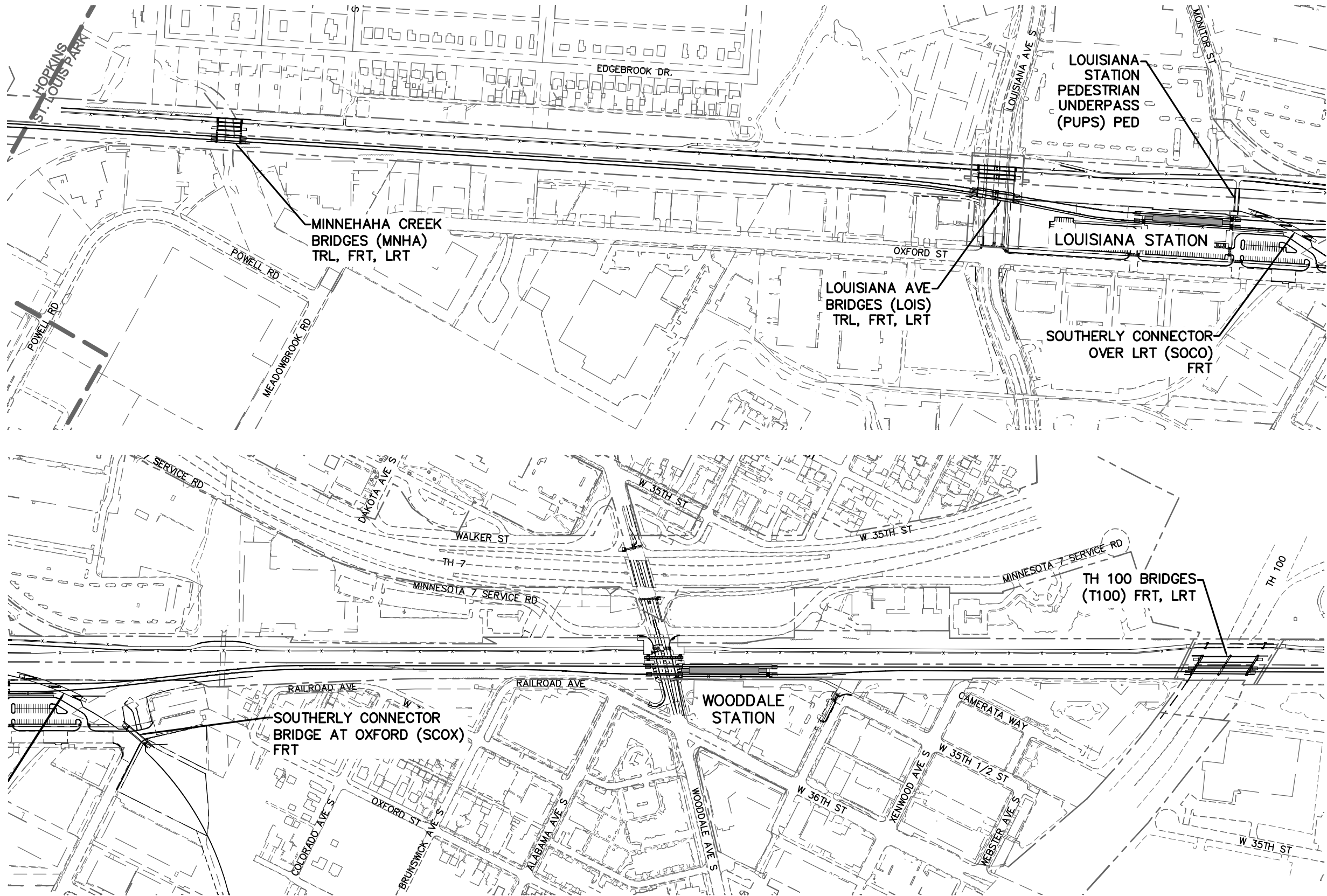


EAST - VOLUME 2 (STRUCTURES)
EAST SEGMENT 1
LAYOUT INDEX

DISCIPLINE: **STRUCTURES**
SHEET NAME: **E1-STU-IDX-001**

SHEET
3
OF
274

Aug. 25 2014 04:59 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2-STU-IDX.dwg By: hope.wedge



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





Kimley»Horn

TKDA

PRELIMINARY ENGINEERING



METROPOLITAN COUNCIL

SOUTHWEST

EAST - VOLUME 2 (STRUCTURES)

EAST SEGMENT 2

LAYOUT INDEX (1 OF 2)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-IDX-001**

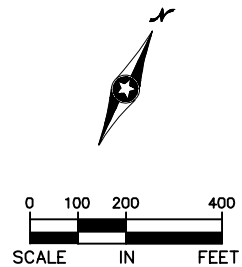
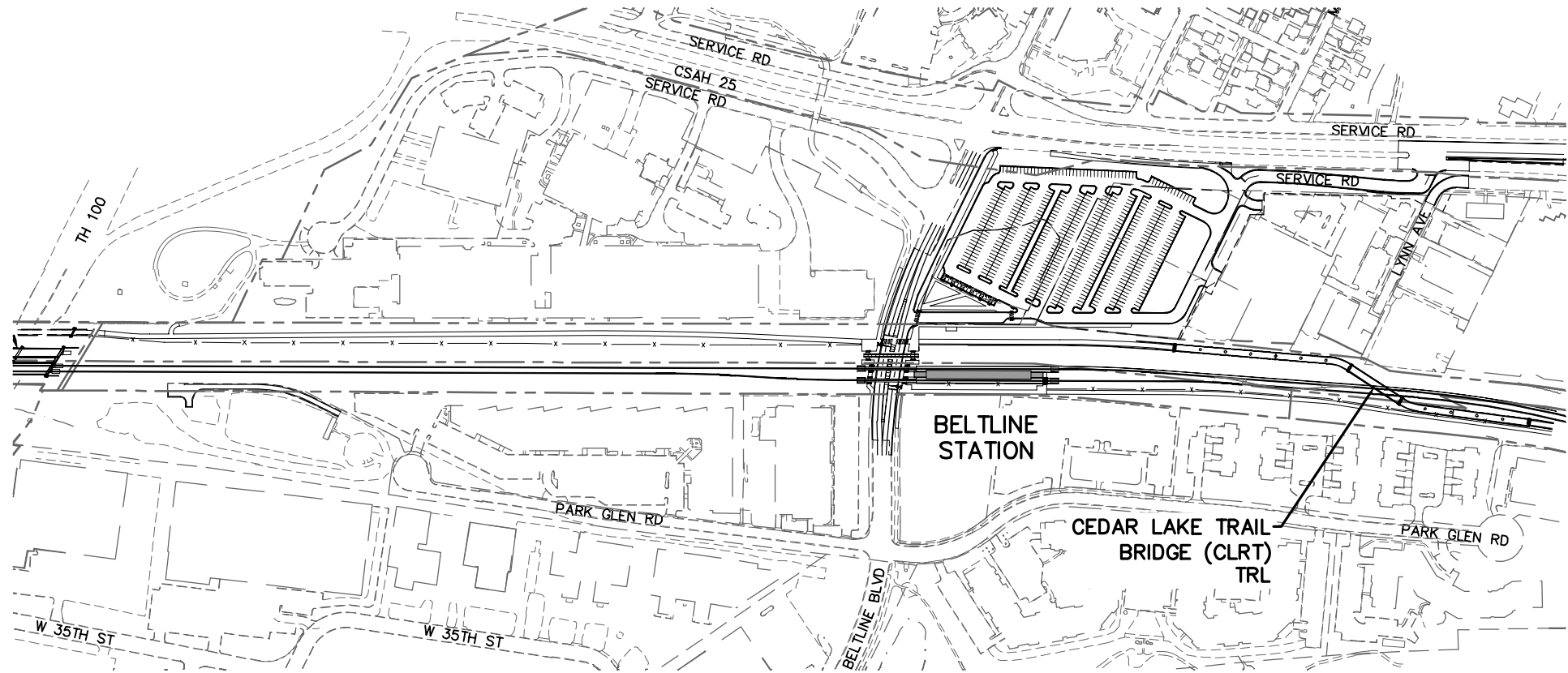
SHEET

4

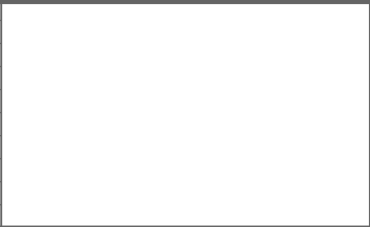
OF


274

Aug. 25 2014 04:59 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2-STU-IDX.dwg By: hope.wedge



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



Kimley»Horn

TKDA

PRELIMINARY ENGINEERING

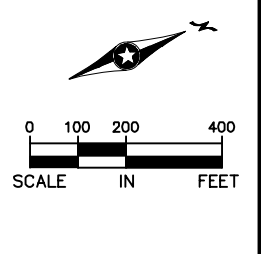
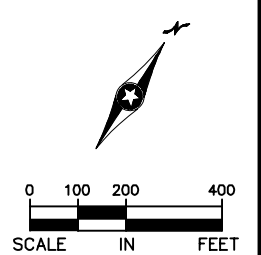
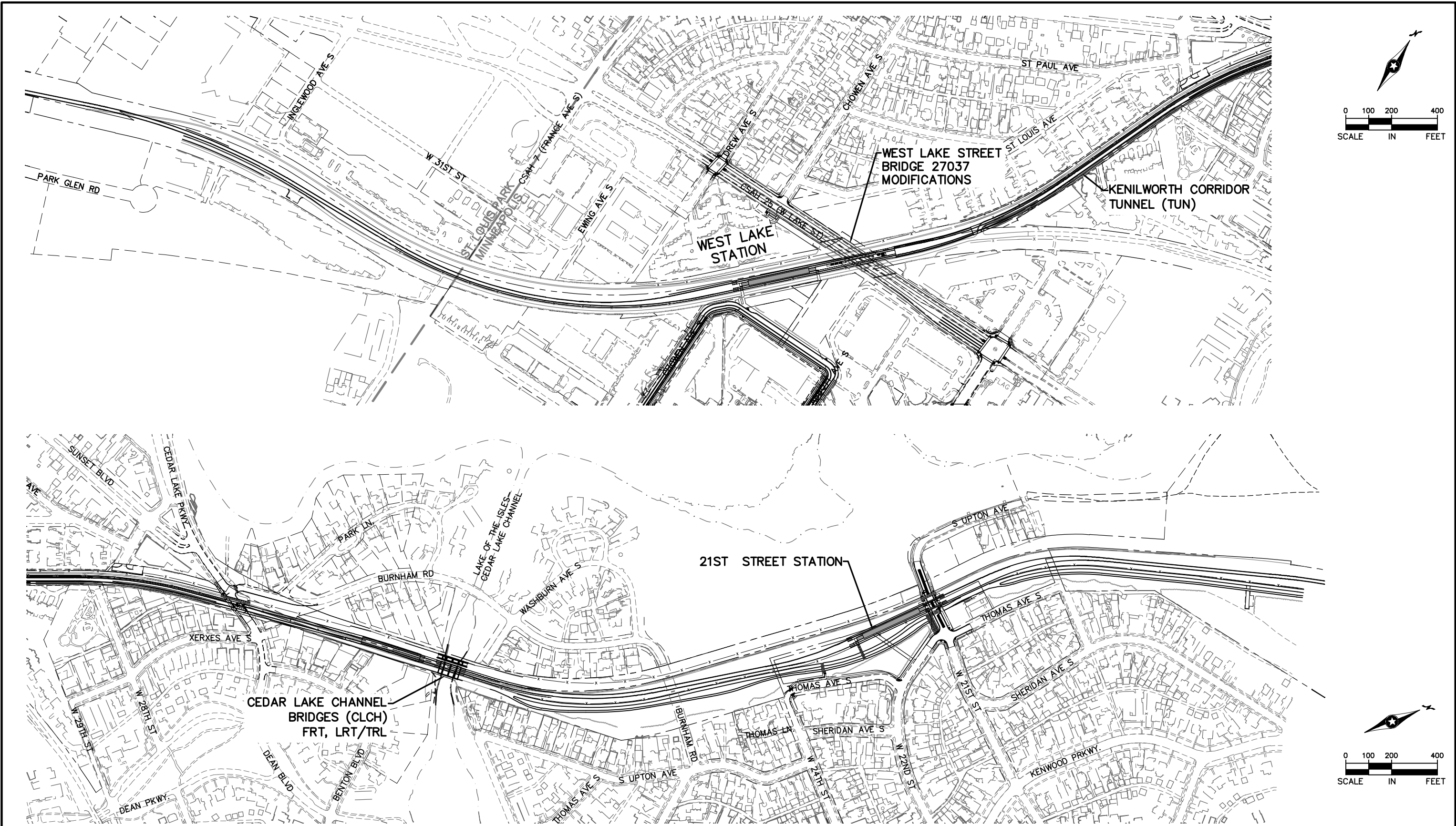


EAST - VOLUME 2 (STRUCTURES)
EAST SEGMENT 2
LAYOUT INDEX (2 OF 2)

DISCIPLINE: **STRUCTURES**
SHEET NAME: **E2-STU-IDX-002**


SHEET
5
OF
274

Aug. 25 2014 04:59 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E3-STU-IDX.dwg By: hope.wedge



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



Kimley»Horn

TKDA

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension

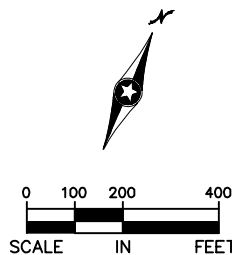
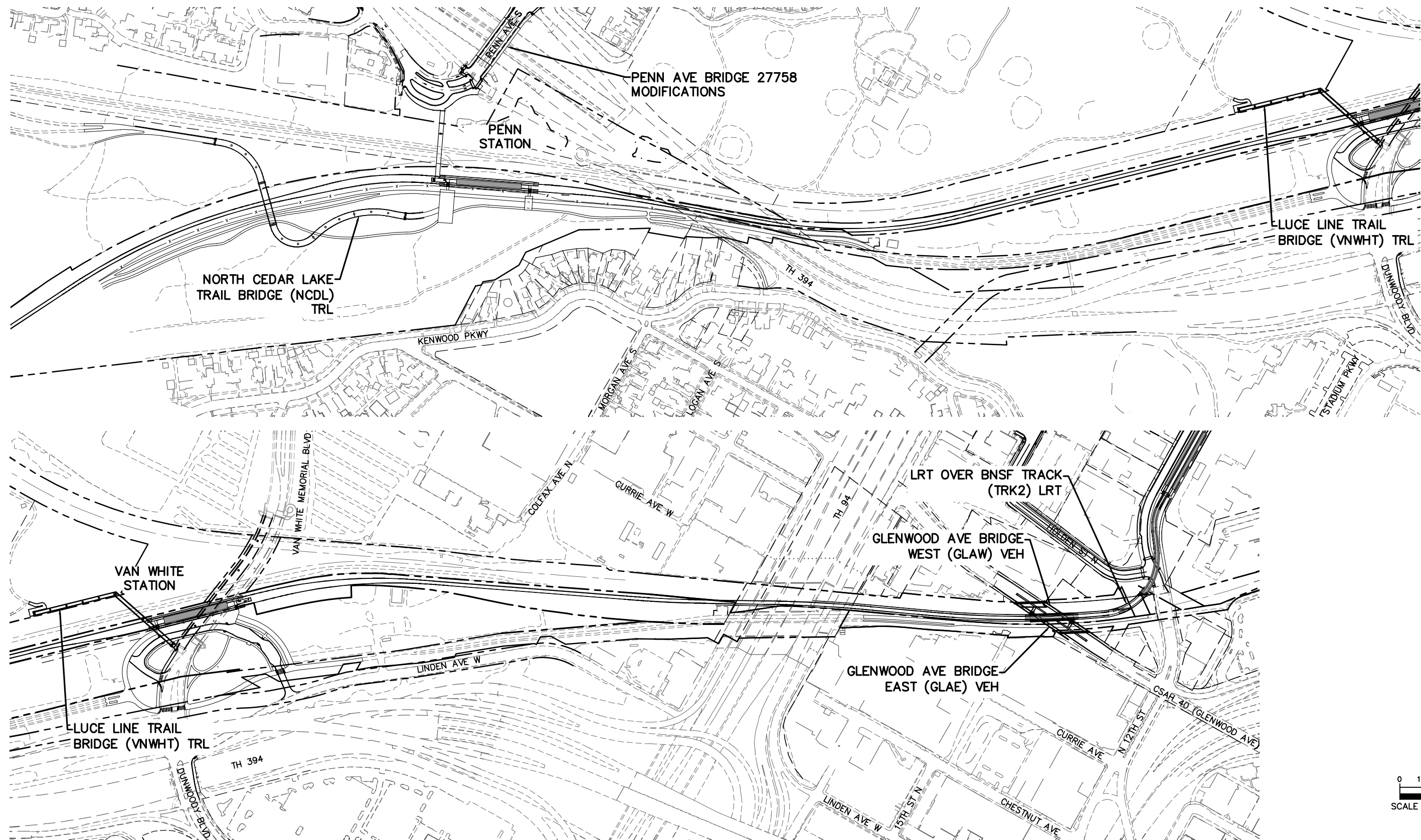


EAST - VOLUME 2 (STRUCTURES)
EAST SEGMENT 3
LAYOUT INDEX

DISCIPLINE: **STRUCTURES**
SHEET NAME: **E3-STU-IDX-001**


SHEET
6
OF
274

Aug. 25 2014 05:00 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E4-STU-IDX.dwg By: hope.wedge



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



Kimley»Horn

TKDA

PRELIMINARY ENGINEERING

**METROPOLITAN
COUNCIL**

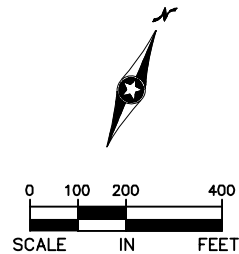
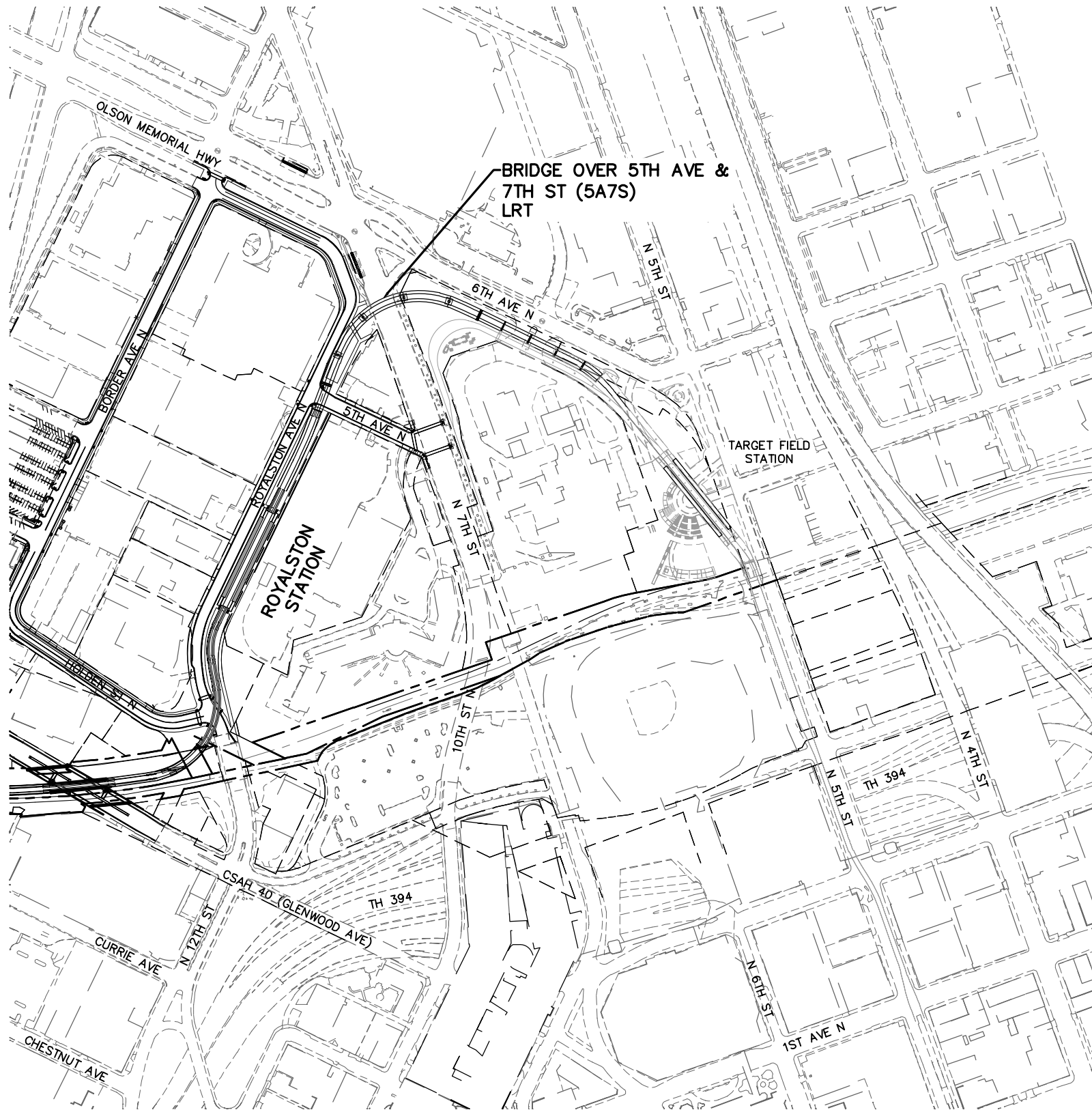
**SOUTHWEST**
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
EAST SEGMENT 4
LAYOUT INDEX (1 OF 2)

DISCIPLINE: STRUCTURES
SHEET NAME: E4-STU-IDX-001

SHEET
7
OF
274

Aug. 25 2014 05:00 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E4--STU-IDX.dwg By: hope.wedge



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



Kimley»Horn

TKDA

PRELIMINARY ENGINEERING

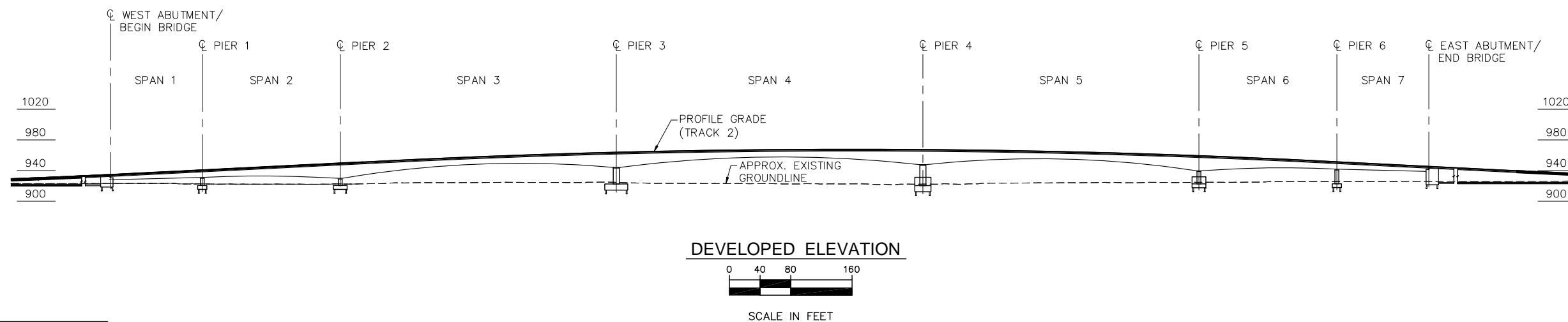
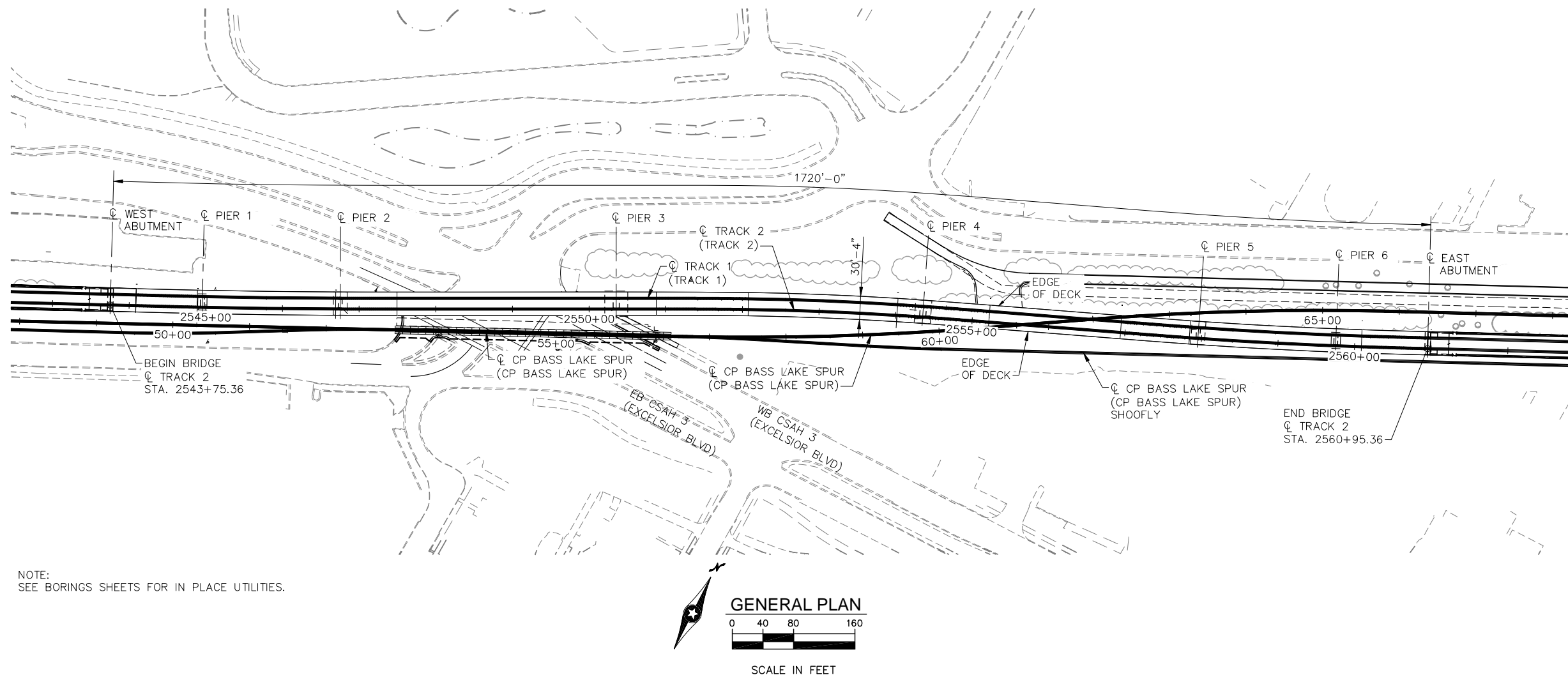
METROPOLITAN COUNCIL

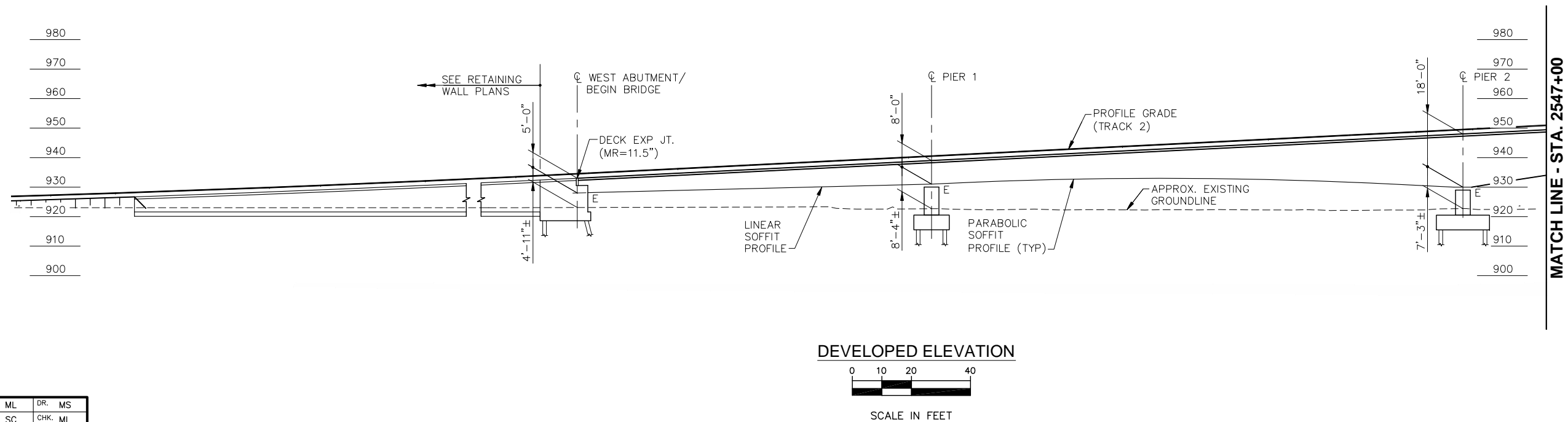
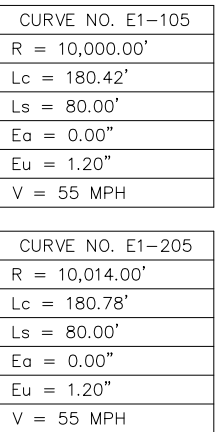
SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
EAST SEGMENT 4
LAYOUT INDEX (2 OF 2)

DISCIPLINE: **STRUCTURES**
SHEET NAME: **E4-STU-IDX-002**

SHEET
8
OF
274

[illegible]

[illegible][illegible]

Kimley»»Horn
TY·LININTERNATIONAL

PRELIMINARY PLANS

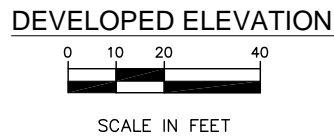


**EAST - VOLUME 2 (STRUCTURES)
EXCELSIOR BLVD
BRIDGE XXXXX
PLAN AND ELEVATION (1 OF 4)**

DISCIPLINE: **STRUCTURES**

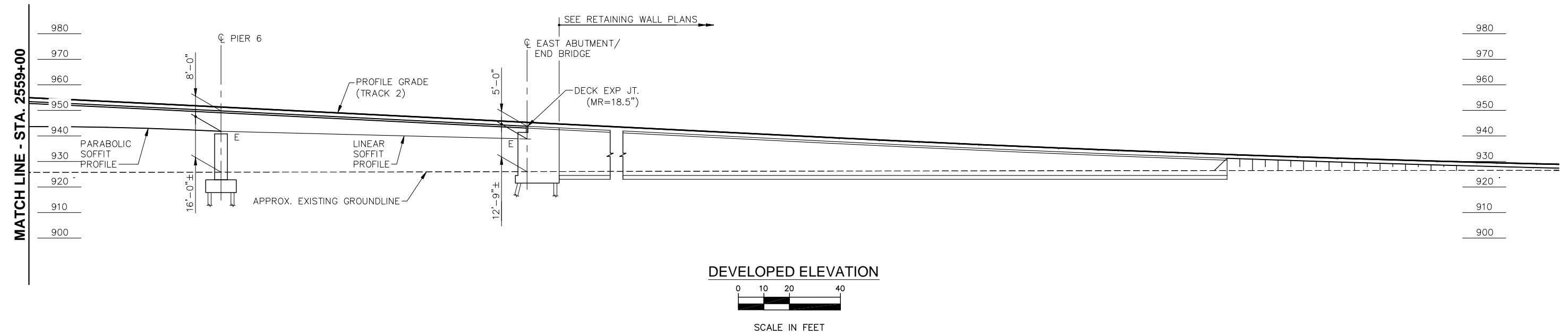
SHEET NAME:	E1-STU-BRG-EXCL-LRT-GPE-002
-------------	-----------------------------

HEET
10
OF
274



CURVE NO. E1-106	CURVE NO. E1-206
R = 4,014.00'	R = 4,000.00'
Lc = 195.26'	Lc = 194.16'
Ls = 120.00'	Ls = 120.00'
Ea = 1.25"	Ea = 1.25"
Eu = 1.73"	Eu = 1.74"
V = 55 MPH	V = 55 MPH

[illegible]

[illegible]

PRELIMINARY PLANS

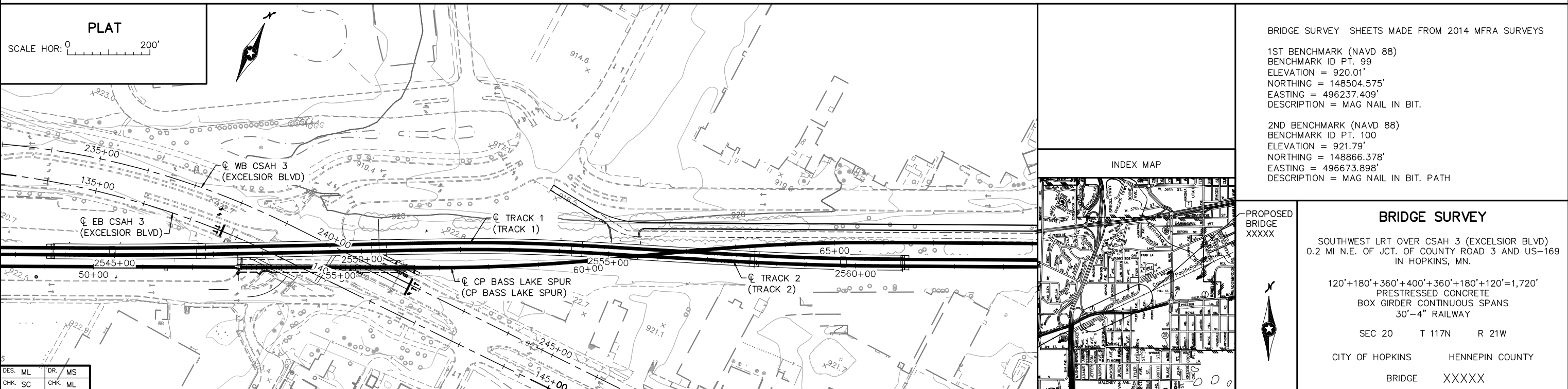


DISCIPLINE:	STRUCTURES	SHEET NAME:	E1-STU-BRG-EXCL-LRT-GPE-005
-------------	-------------------	-------------	------------------------------------

SHEET
13
OF
274

SCALE HOR: 0 100' 200'

SCALE VER: 0 20' 40'

[illegible]

PRELIMINARY PLANS

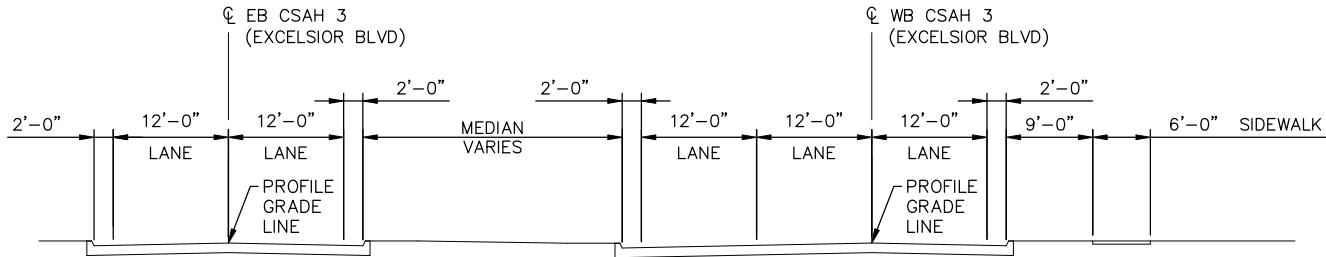


DISCIPLINE: **STRUCTURES**

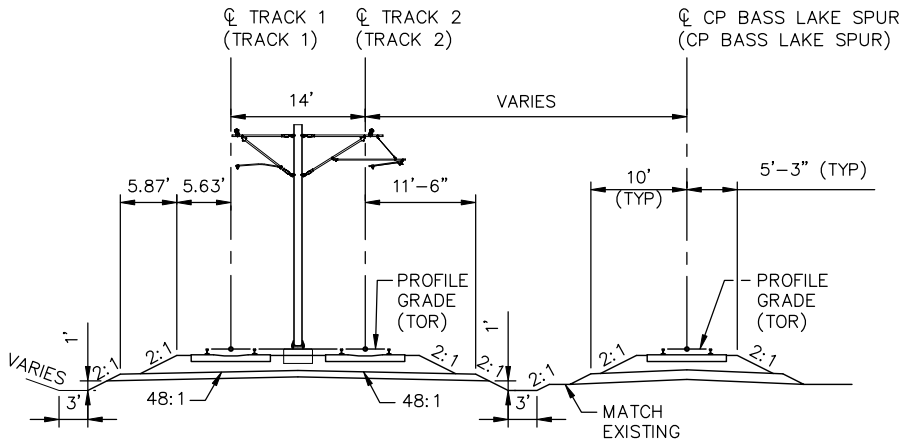
SHEET NAME:
E1-STU-BRG-EXCL-LRT-SUR-001

SHEET
14
OF
274

Aug. 25 2014 08:59 am V:\3300_PEC-E\CAD\SEGMENT E1\PLAN SHEETS\STRUCTURES\E1-STU-BRG-EXCL-LRT-SUR.dwg By: muellerj



TYPICAL SECTION EXCELSIOR BLVD



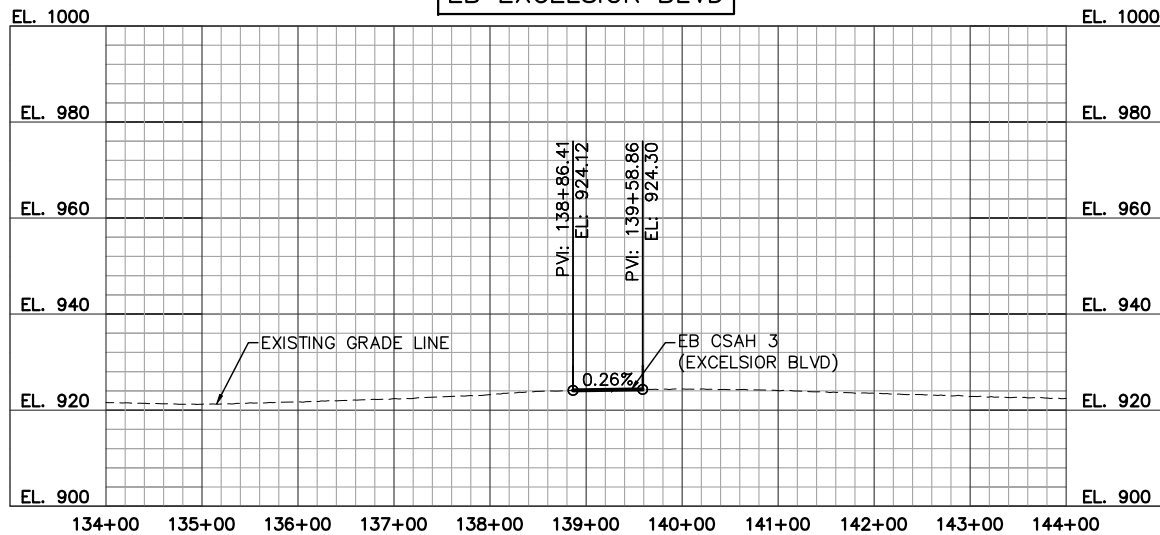
TYPICAL APPROACH SECTION EXCELSIOR BLVD

CONTRACTED PROFILE

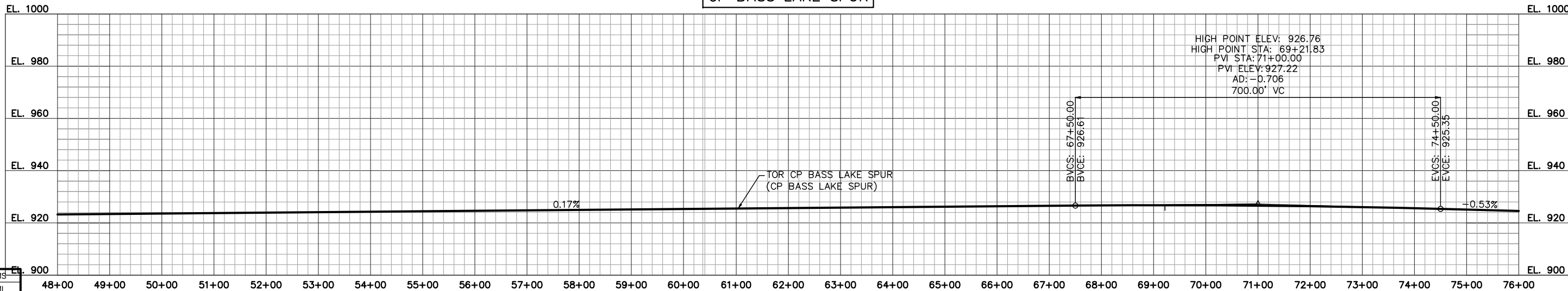
SCALE HOR: 0 100' 200'

SCALE VER: 0 20' 40'

EB EXCELSIOR BLVD



CP BASS LAKE SPUR



DES. ML	DR. MS
CHK. SC	CHK. ML

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn
TYLIN INTERNATIONAL

PRELIMINARY PLANS



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
EXCELSIOR BLVD
BRIDGE XXXXX
BRIDGE SURVEY (2 OF 2)

DISCIPLINE: STRUCTURES

SHEET NAME: E1-STU-BRG-EXCL-LRT-SUR-002

SHEET
15
OF
274

LOCATION ENGINEER'S OBSERVATIONS
AT BRIDGE SITE

- SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.
- OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
- APPARENT HIGHWATER ELEVATION OBTAINED FROM:
- OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

HYDRAULIC ENGINEER'S RECOMMENDATION

DATE:

STREAM OR DITCH DESIGNATION

DRAINAGE AREA

MAX FLOOD ON RECORD

DESIGN FLOOD (YR. FREQ.): C.F.S.
HEADWATER ELEVATION: FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE F.P.S.
TOTAL STAGE INCREASE FT.
LOW MEMBER AT OR ABOVE ELEVATION FT.

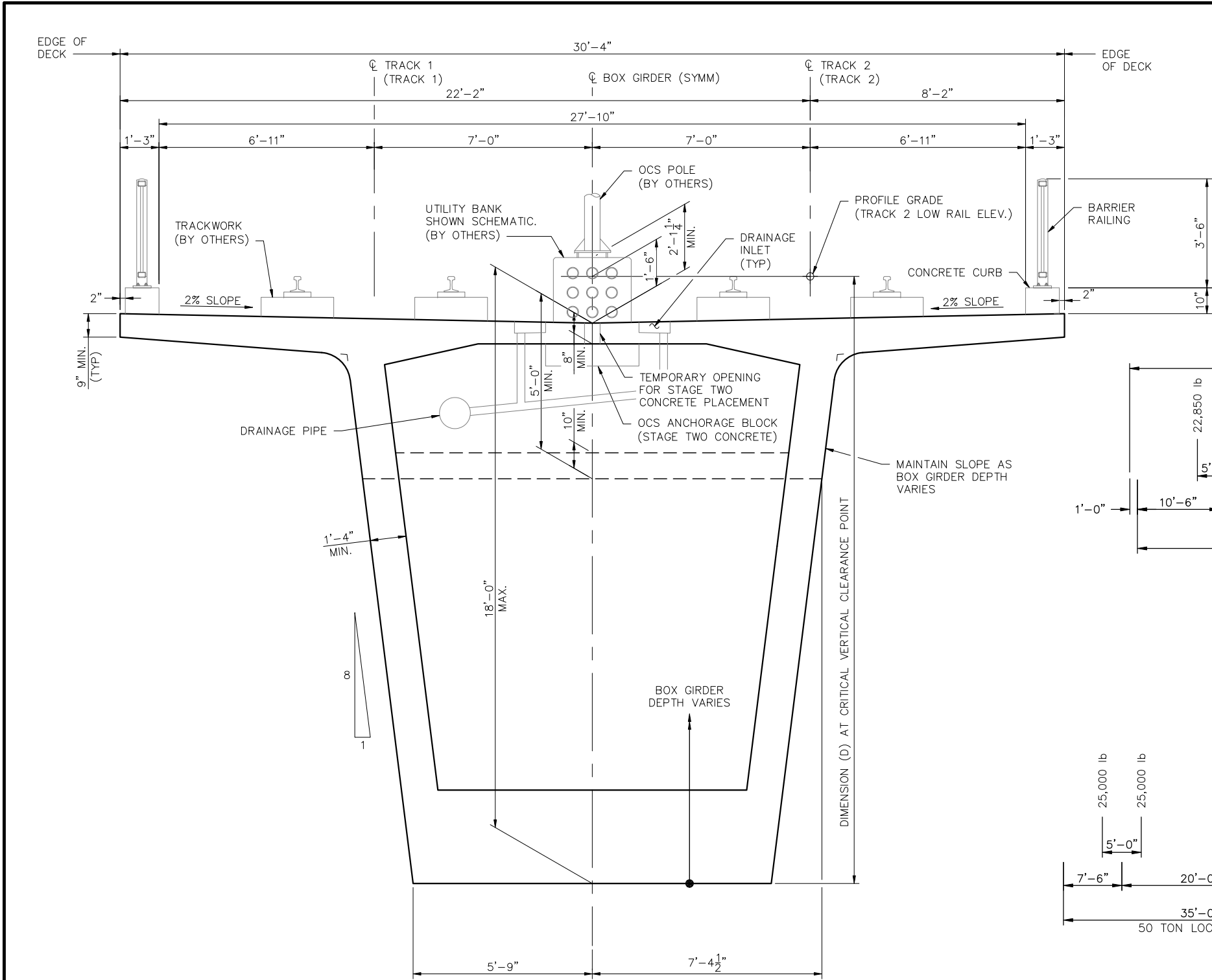
WATERWAY AREA REQUIRED BELOW ELEV. = SQ. FT.
AT RIGHT ANGLES TO CHANNEL

BASIC FLOOD (100 YR. FREQ.) C.F.S.
HEADWATER ELEVATION: FT.
TOTAL STAGE INCREASE FT.
MEAN VELOCITY THROUGH STRUCTURE

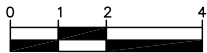
FLOWLINE ELEVATION: FT. SKEW ANGLE:

ESTIMATED PRELIMINARY TOTAL SCOUR AT PIER EL.
(500 OR OT YR. FREQ.)

Aug. 25 2014 08:59 am v:\3300_PEC-E\CAD\SEGMENT E1\PLAN SHEETS\STRUCTURES\E1-STU-BRG-EXCL-LRT-SUP.dwg By: muellerj

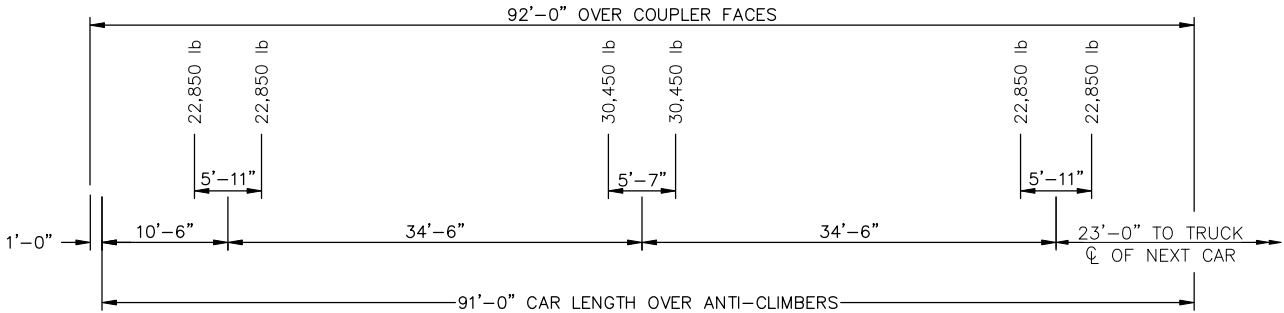


TRANSVERSE SECTION



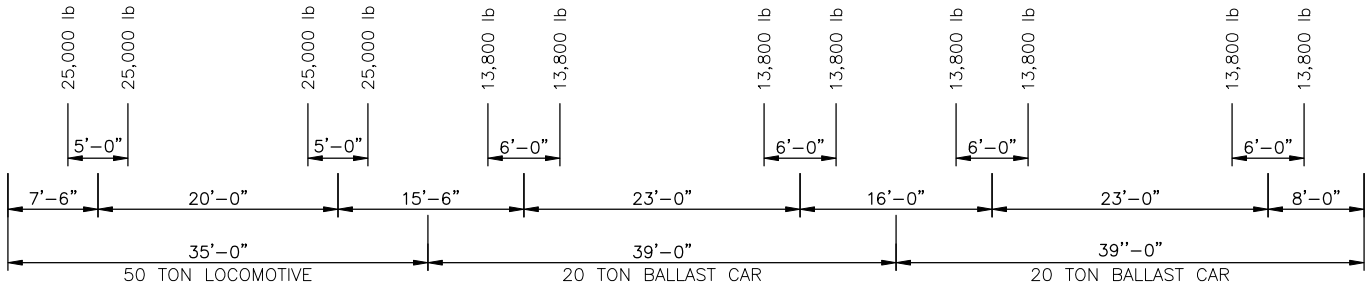
SCALE IN FEET

CRITICAL VERTICAL CLEARANCE POINT	D
EB CSAH 3 (EXCELSIOR BLVD)	13'-2"
WB CSAH 3 (EXCELSIOR BLVD)	15'-10"
CP BASS LAKE SPUR (CP BASS LAKE SPUR)	12'-8"



LIGHT RAIL VEHICLE LOADING DIAGRAM

- NOTES:
1. THE LRT TRAIN SHALL CONSIST OF EITHER ONE, TWO OR THREE CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
 2. AXLE LOAD IN POUNDS.
- LOADING DIAGRAM REPRESENTS MAXIMUM LOAD AT EACH TRUCK.



MAINTENANCE TRAIN LOADING DIAGRAM

- NOTES:
1. THE MAINTENANCE TRAIN SHALL CONSIST OF ONE LOCOMOTIVE AND ONE, TWO, THREE OR FOUR BALLAST CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
 2. AXLE LOAD IN POUNDS.
 3. WEIGHT OF EMPTY BALLAST CAR IS 15,000 POUNDS.

DES. ML	DR. MS
CHK. SC	CHK. ML

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn
TYLIN INTERNATIONAL

PRELIMINARY PLANS



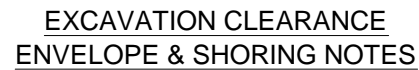
EAST - VOLUME 2 (STRUCTURES)
EXCELSIOR BLVD
BRIDGE XXXXX
TRANSVERSE SECTION

DISCIPLINE:	SHEET NAME:
STRUCTURES	E1-STU-BRG-EXCL-LRT-SUP-001

SHEET
16
OF
274



1. < 25' PIER PROTECTION WALL REQUIRED UNLESS EXEMPTED BY CP RAILWAY FOR PIERS MEETING AREMA'S "HEAVY DUTY" PIER CROSS-SECTIONAL AREA.
2. BETWEEN 9' TO LESS THAN 25', CP RAILWAY PERMISSION AND POSSIBLY FLAGGING REQUIRED.

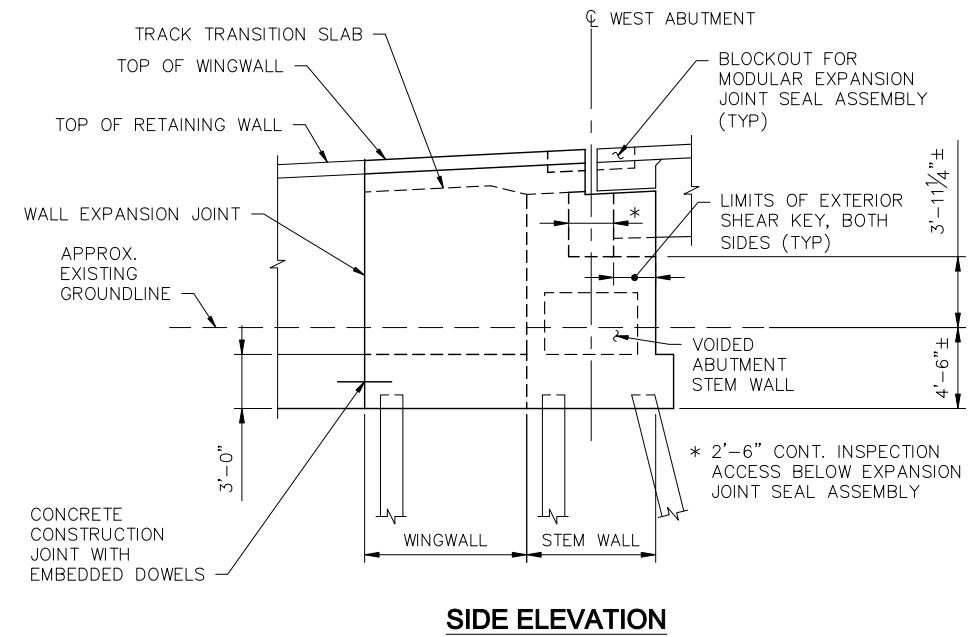
[illegible][illegible]

PRELIMINARY PLANS



DISCIPLINE:	STRUCTURES	SHEET NAME:	E1-STU-BRG-EXCL-LRT-SUP-002
-------------	-------------------	-------------	------------------------------------

SHEET
17
OF
274



7'-0"

16'-10"

7'-0"

WINGWALL FOOTING

WINGWALL FOOTING

ABUTMENT

WINGWALL (TYP)

RETAINING WALL (TYP)

9'-0"

WINGWALL & FOOTING (TYP)

7'-2"

LIMITS OF ABUTMENT STEM WALL

3'-7"

3'-7"

ABUTMENT BACK WALL

BLOCKOUT

1'-0"

LIMITS OF BOX GIRDER

ACCESS HOLE

EXTERIOR SHEAR KEY (TYP)

28'-10"

LIMITS OF ABUTMENT STEM WALL

ABUTMENT BACK WALL

BOX GIRDER

ABUTMENT

SEE RETAINING WALL PLANS (TYP)

1'-0" (TYP)

STRUCTURE APPROACH SLAB NOT SHOWN

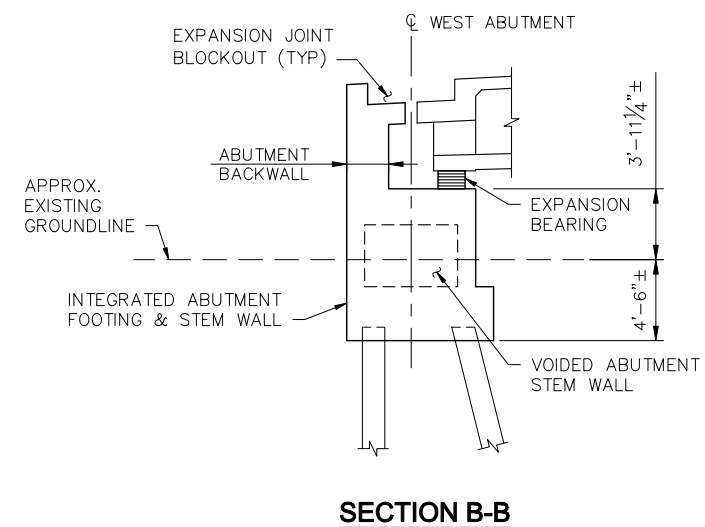
ABUTMENT SIDEWALL (TYP)

WEST ABUTMENT

ABUTMENT SIDEWALL

SECTION A-A

(HP PILE SECTION SHOWN FOR ILLUSTRATIVE PURPOSES ONLY, (TYP))



DES. ML	DR. MS
CHK. SC	CHK. ML

[illegible]

Kimley»»Horn
TY·LIN INTERNATIONAL



METROPOLITAN
COUNCIL

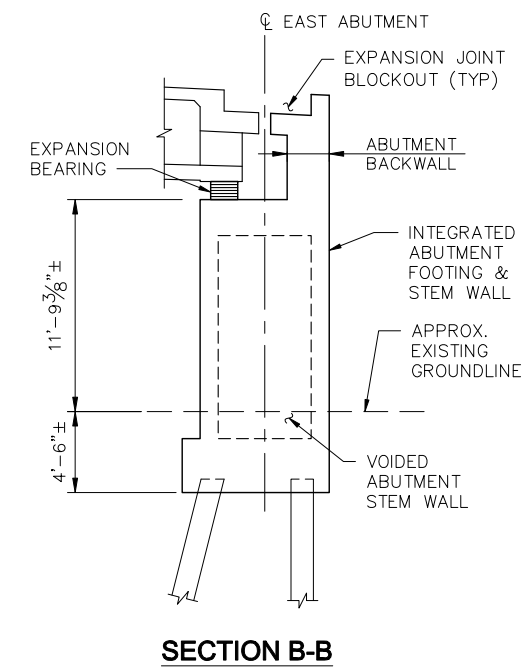
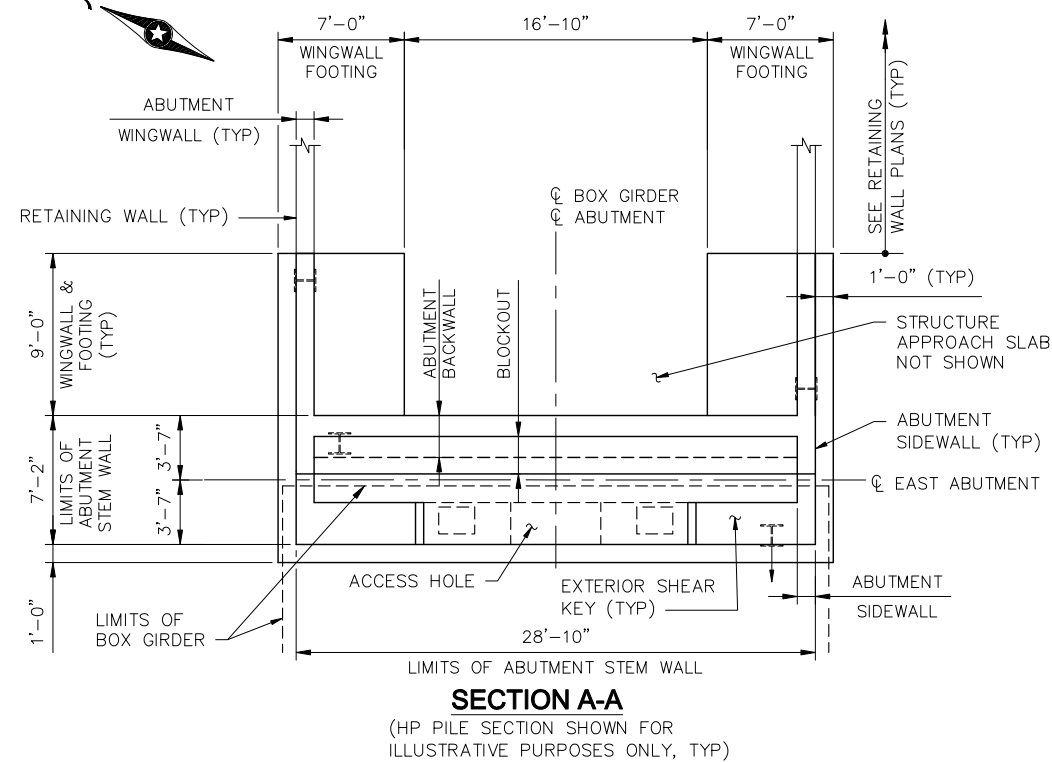
SOUTHWEST

**EAST - VOLUME 2 (STRUCTURES)
EXCELSIOR BLVD
BRIDGE XXXXX
WEST ABUTMENT LAYOUT**

DISCIPLINE: **STRUCTURES**

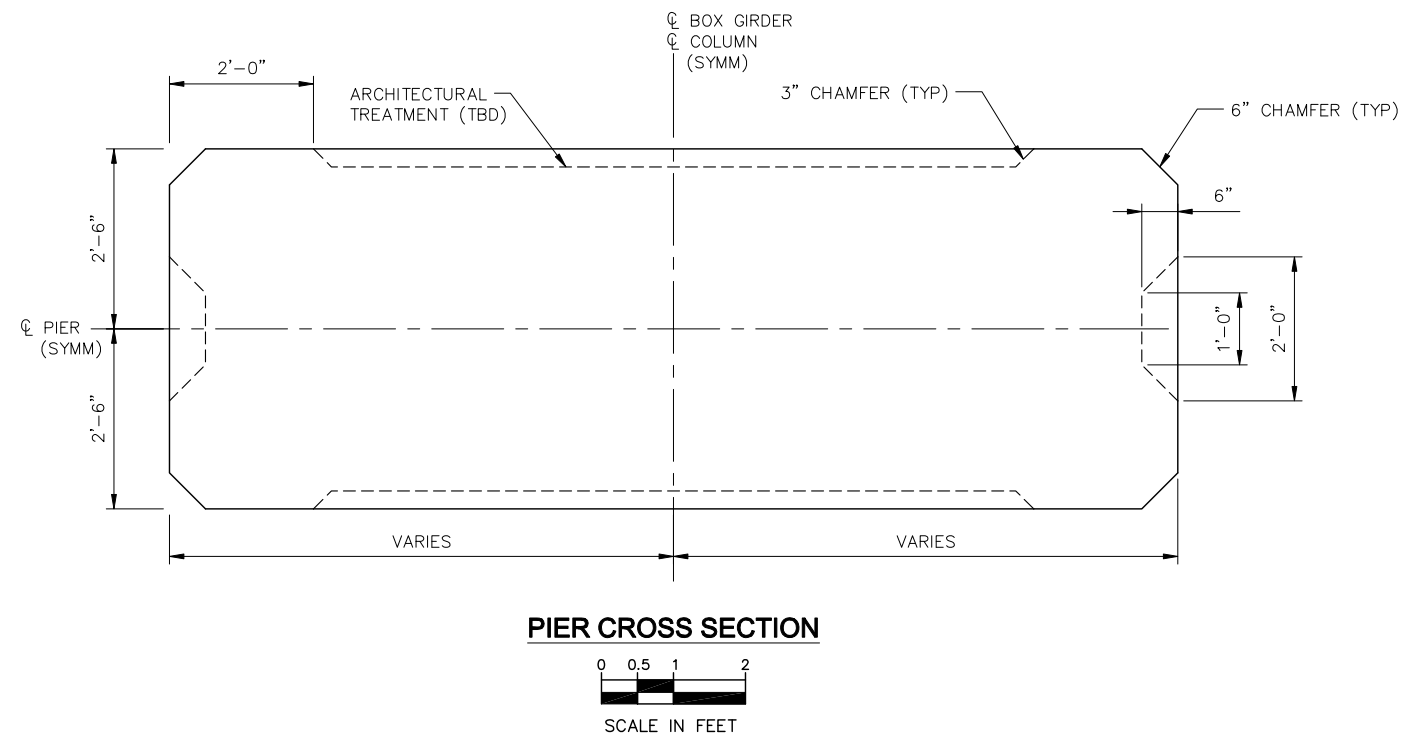
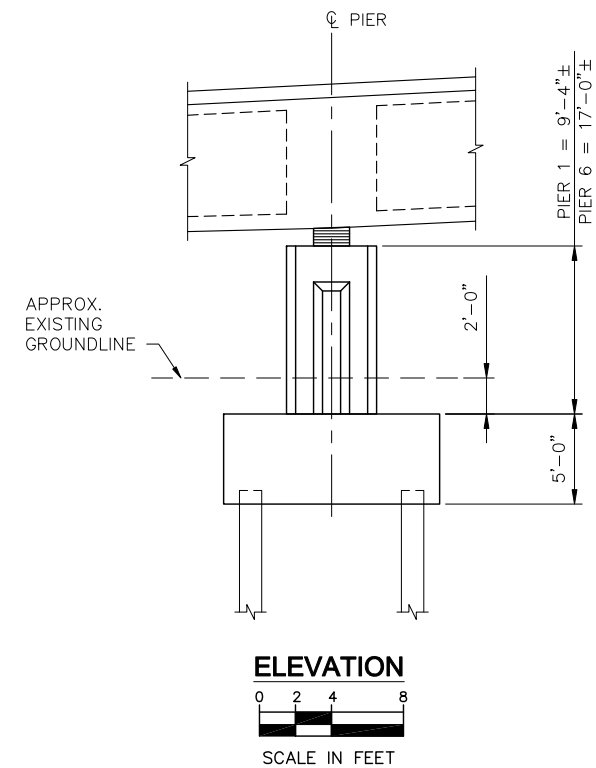
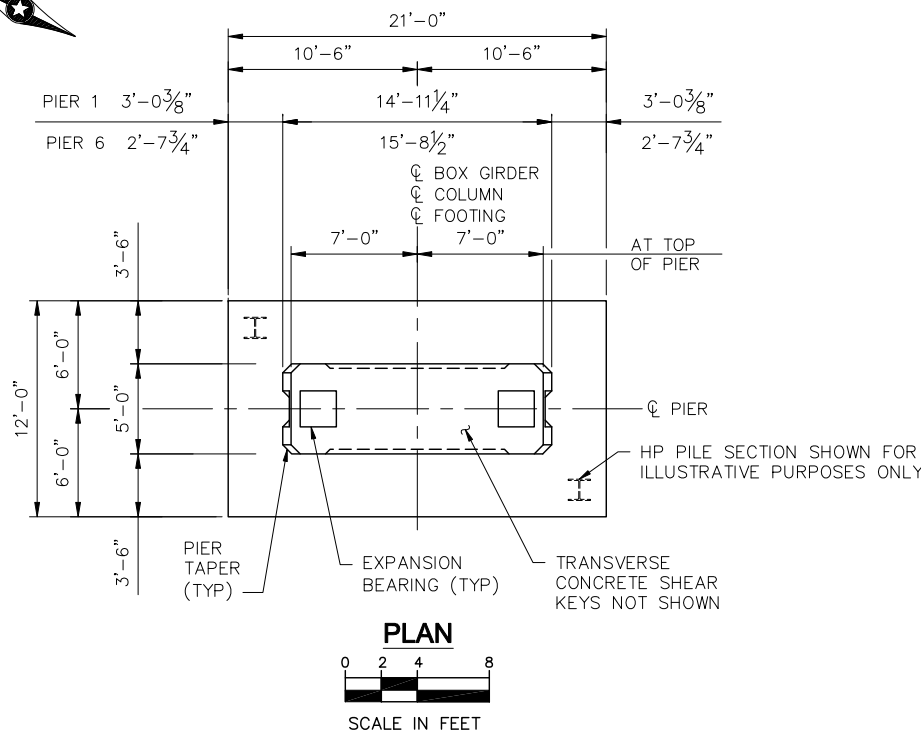
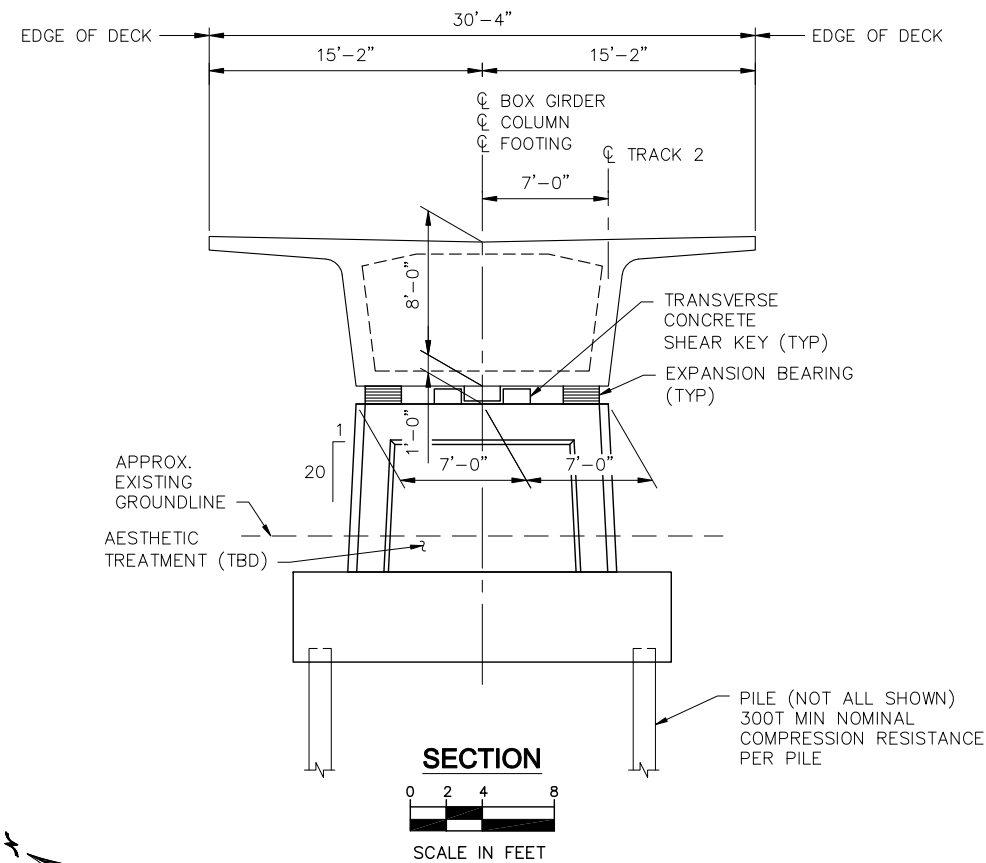
SHEET NAME:
E1-STU-BRG-EXCL-LRT-DET-001

SHEET
18
OF
274



SHEET	
19	
OF	
274	

Aug. 25 2014 08:59 am V:\3300_pcc-e\CAD\segment e1\plan sheets\structures\E1-STU-BRG-EXCL-LRT-DET.dwg By: muellerj



NOTE:
PIER GEOMETRY HAS BEEN SELECTED TO
SUPPORT THE SUPERSTRUCTURE AND
ANTICIPATED LONGITUDINAL FORCES.
CHAMFERS, INSETS AND OTHER
ARCHITECTURAL TREATMENTS FOR PIERS
WILL BE DETERMINED DURING ADVANCED
DESIGN.

DES.	ML	DR.	MS
CHK.	SC	CHK.	ML

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn
TYLIN INTERNATIONAL

PRELIMINARY PLANS



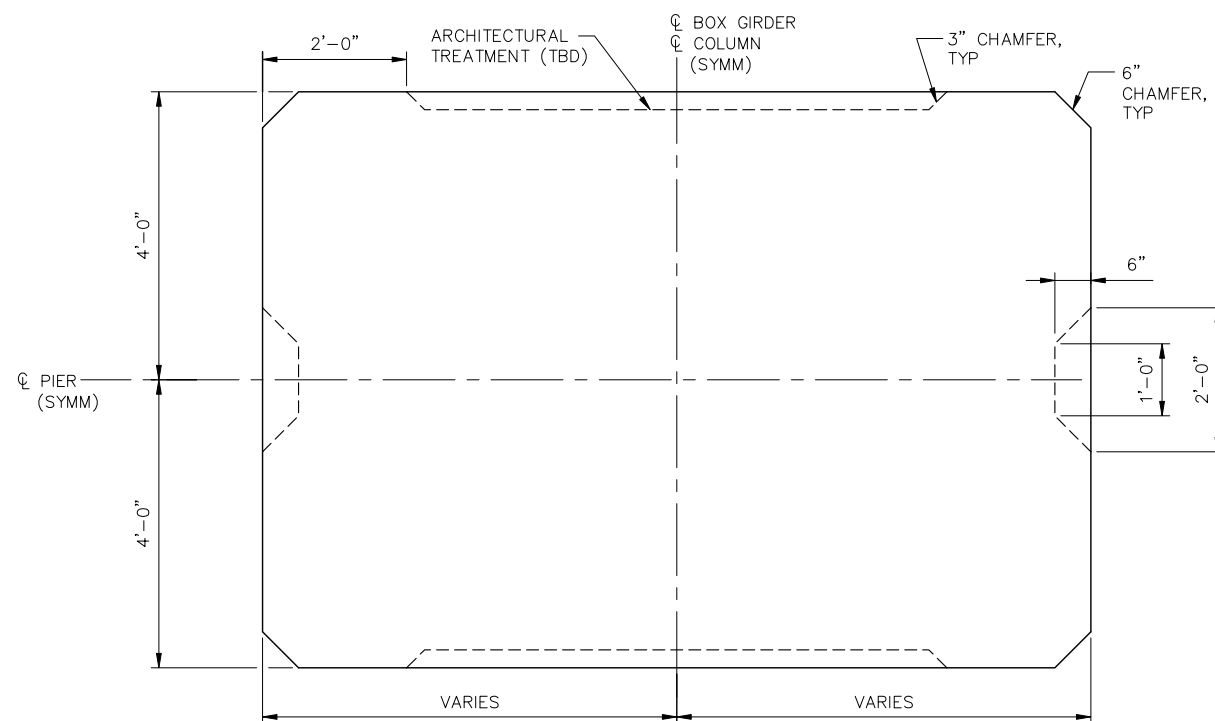
EAST - VOLUME 2 (STRUCTURES)
EXCELSIOR BLVD
BRIDGE XXXXX
PIERS 1 AND 6 LAYOUT

DISCIPLINE: **STRUCTURES**

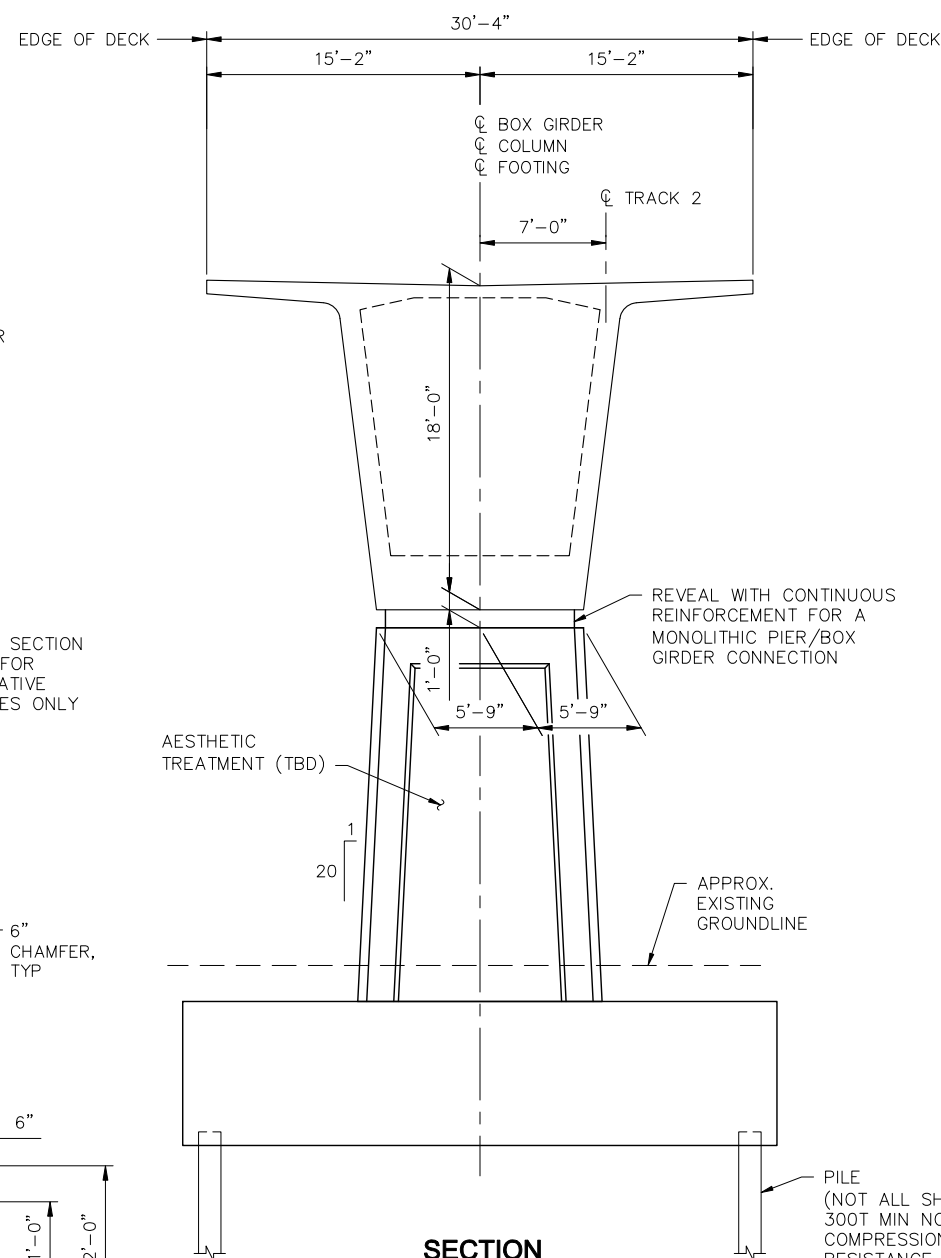
SHEET NAME: **E1-STU-BRG-EXCL-LRT-DET-003**

SHEET
20
OF
274

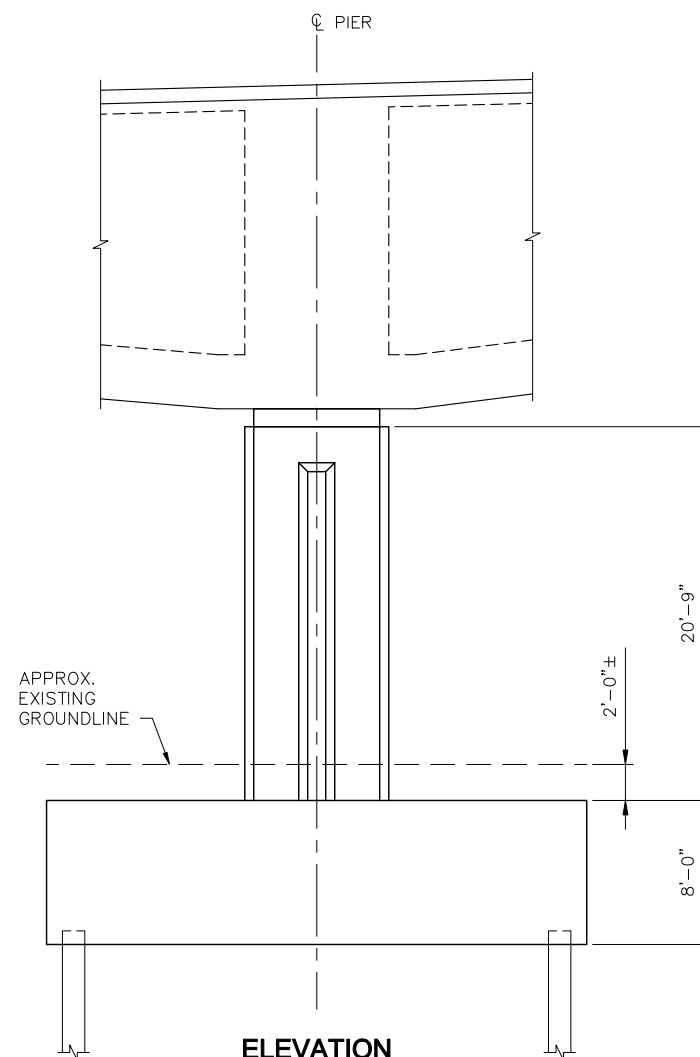
SCALE IN FEET



SCALE IN FEET



SCALE IN FEET



SCALE IN FEET

[illegible]

PRELIMINARY PLANS



EAST - VOLUME 2 (STRUCTURES)
EXCELSIOR BLVD
BRIDGE XXXXX
PIER 3 LAYOUT

DISCIPLINE:

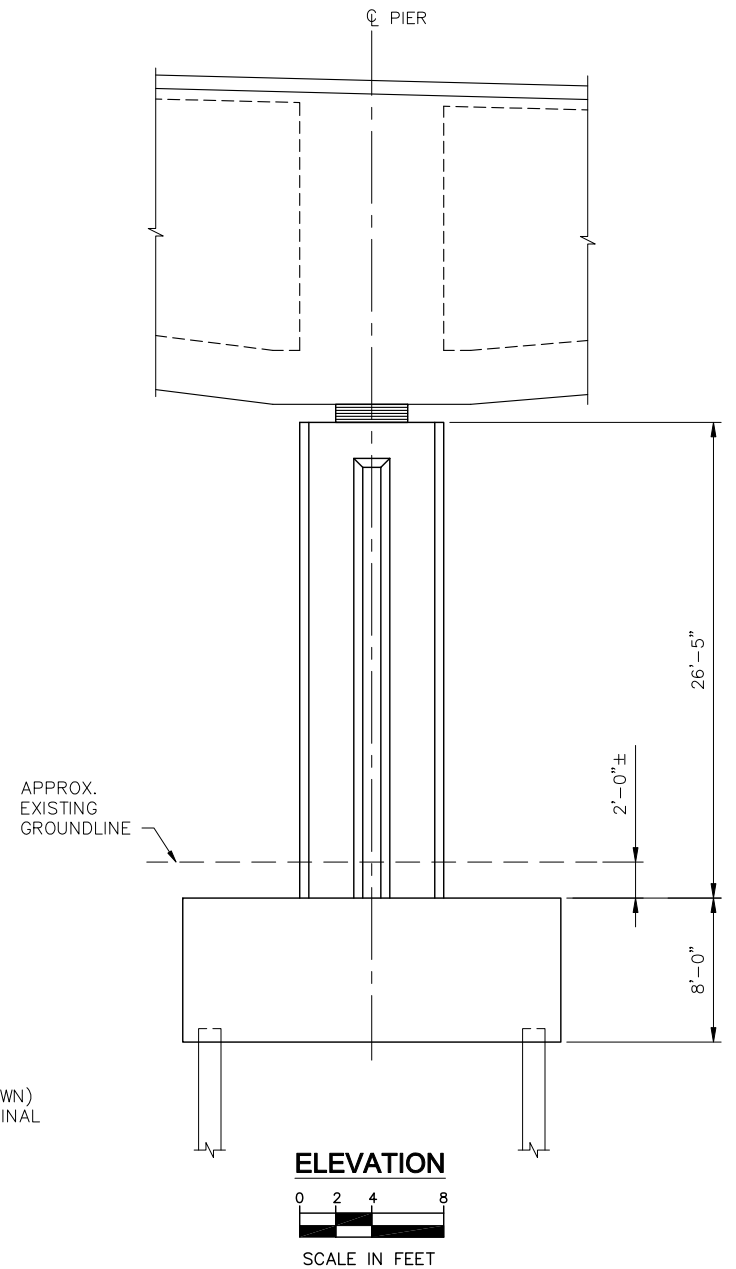
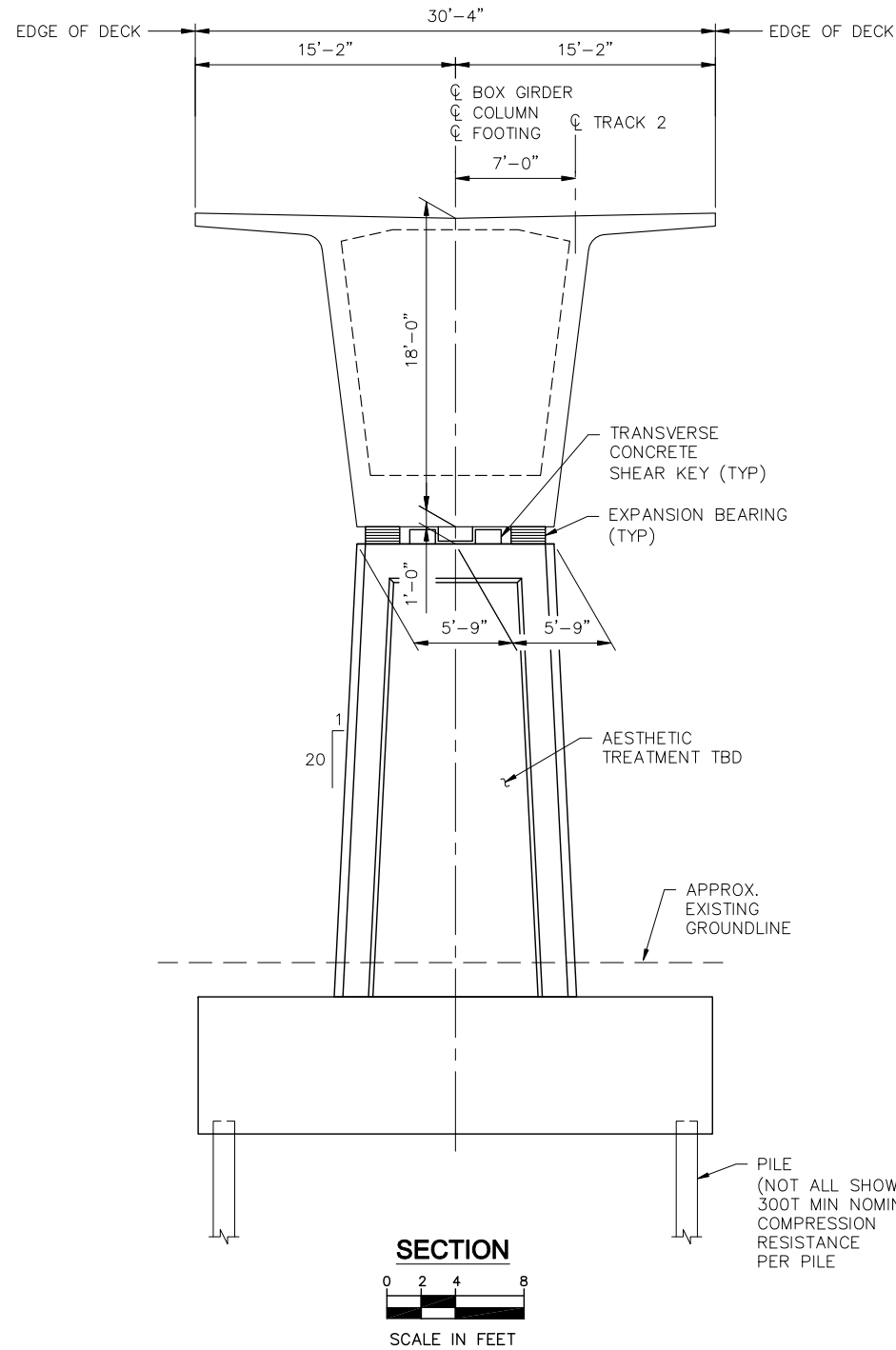
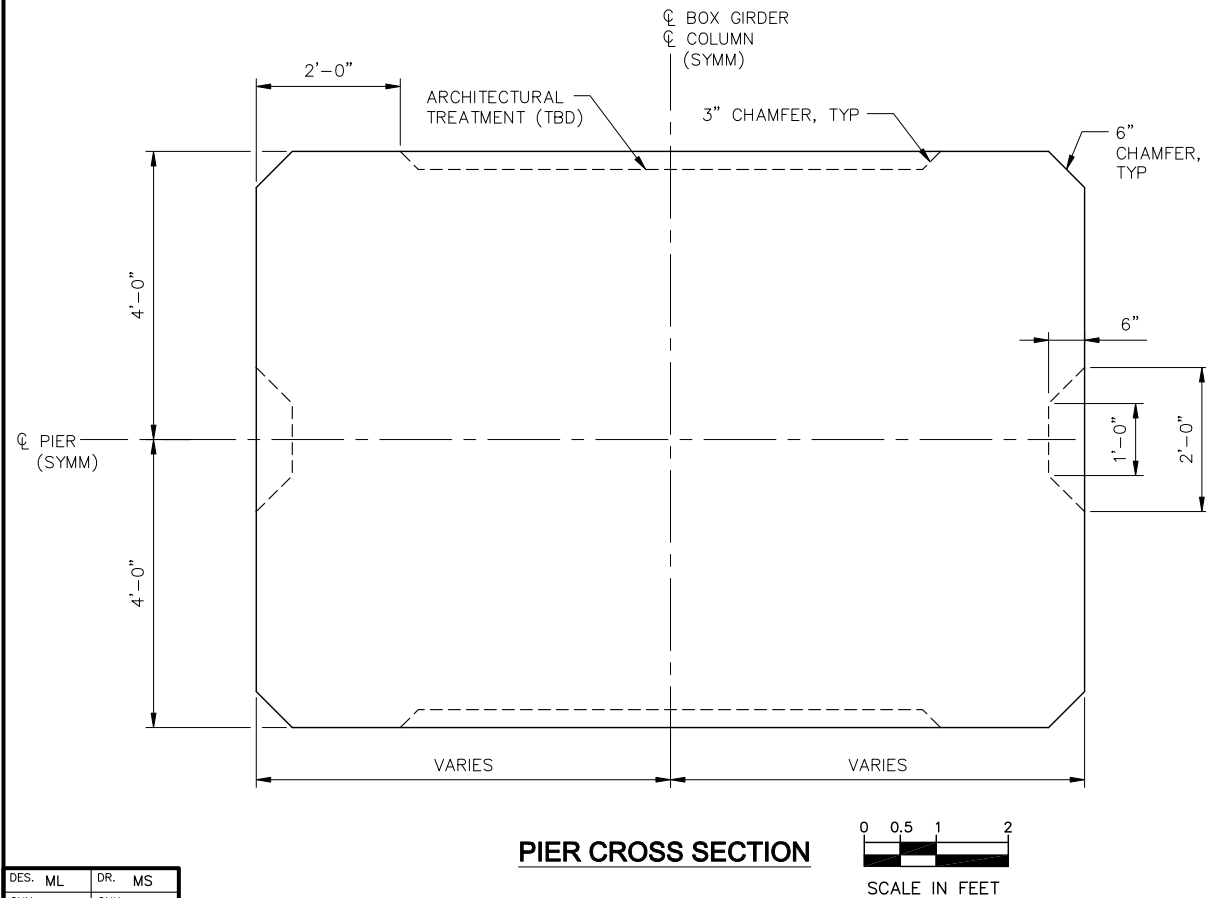
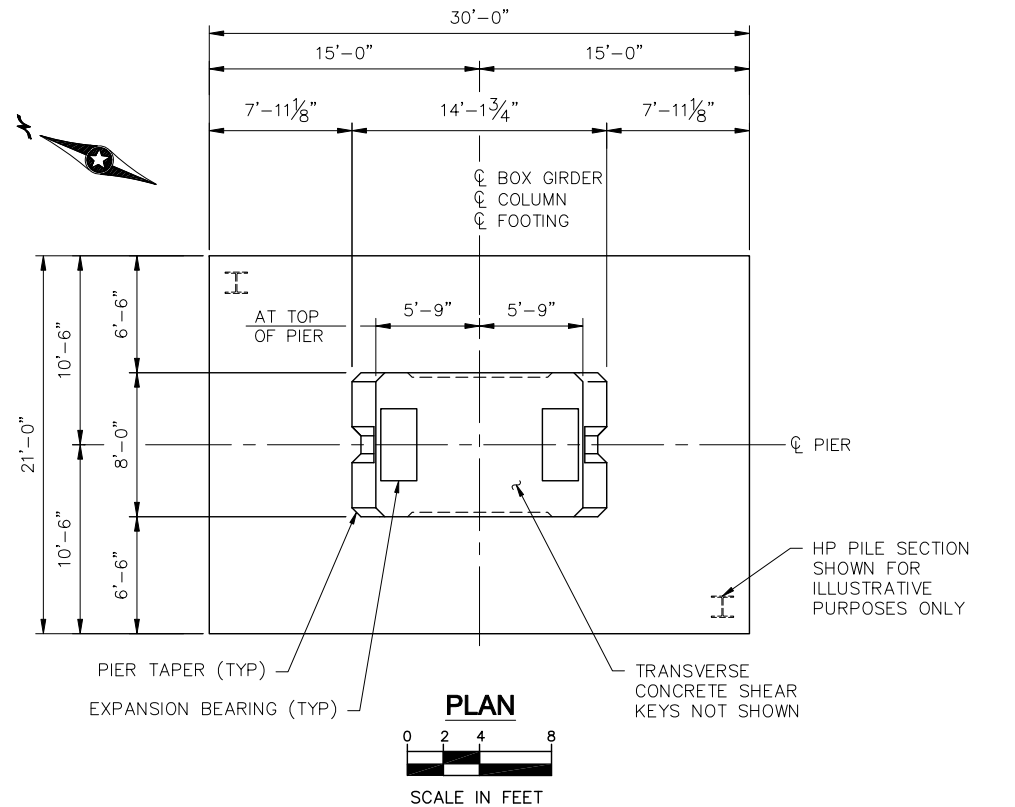
STRUCTURES

	SHEET NAME:
--	--------------------

E1-STU-BRG-EXCL-LRT-DET-005

274

Aug. 25 2014 08:59 am V:\3300_pcc-e\CAD\segment e1\plan sheets\structures\E1-STU-BRG-EXCL-LRT-DET.dwg By: muellerj



NOTE:
PIER GEOMETRY HAS BEEN SELECTED TO
SUPPORT THE SUPERSTRUCTURE AND
ANTICIPATED LONGITUDINAL FORCES.
CHAMFERS, INSETS AND OTHER
ARCHITECTURAL TREATMENTS FOR PIERS
WILL BE DETERMINED DURING ADVANCED
DESIGN.

DES. ML	DR. MS
CHK. SC	CHK. ML

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn
TYLIN INTERNATIONAL
PRELIMINARY PLANS

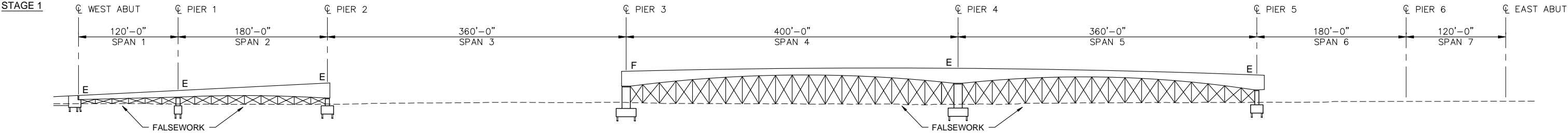


EAST - VOLUME 2 (STRUCTURES)
EXCELSIOR BLVD
BRIDGE XXXXX
PIER 4 LAYOUT

DISCIPLINE: **STRUCTURES** SHEET NAME: **E1-STU-BRG-EXCL-LRT-DET-006**

SHEET
23
OF
274

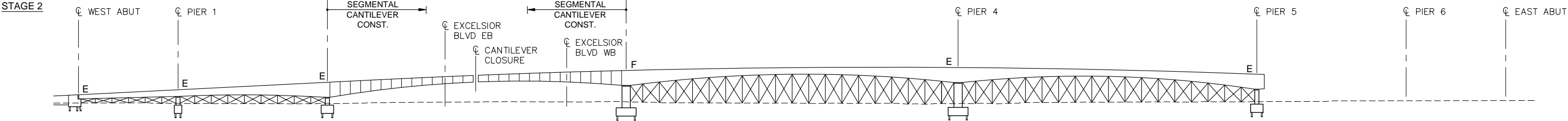
Aug. 25 2014 08:59 am V:\3300_PEC-E\CAD\SEGMENT E1\PLAN SHEETS\STRUCTURES\E1-STU-BRG-EXCL-LRT-DTL.dwg By: muellerj



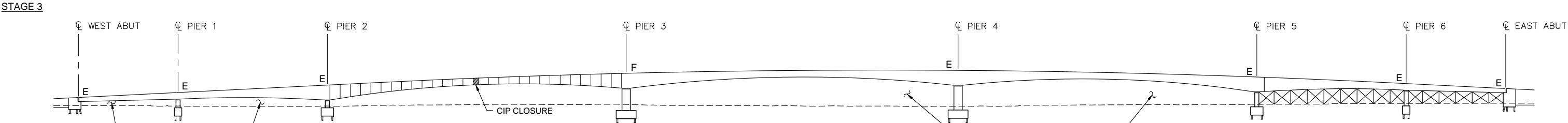
1. TEMPORARILY CLOSE EXCELSIOR BLVD TO REALIGN CP BASS LAKE SPUR AT-GRADE TRACKS.
2. AFTER REALIGNMENT OF CP BASS LAKE SPUR AT-GRADE TRACKS, REOPEN EXCELSIOR BLVD TO ROADWAY/PEDESTRIAN TRAFFIC.
3. CONSTRUCT CP BASS LAKE SPUR SHOOFLY TRACK ON THE SOUTH SIDE OF BRIDGE.
4. TIE-IN SHOOFLY TO NEWLY REALIGNED CP BASS LAKE SPUR AT-GRADE TRACKS.
5. DRIVE PILES AND CONSTRUCT FOOTINGS FOR WEST ABUTMENT AND PIERS 1 THRU 5.
6. CONSTRUCT WEST ABUTMENT AND PIERS 1 THRU 5 SUBSTRUCTURES.
7. CONSTRUCT THE RETAINING WALLS ON THE WEST END OF BRIDGE
8. ERECT FALSEWORK FOR SPANS 1, 2, 4 AND 5.
9. CONSTRUCT SPANS 1, 2, 4 AND 5 BOX GIRDER CONCRETE.
10. STRESS BOX GIRDER PT FOR SPANS 1, 2, 4 AND 5.

**TOP OF PIER / ABUTMENT
CONNECTION TYPES-LONGITUDINAL BEHAVIOR:**

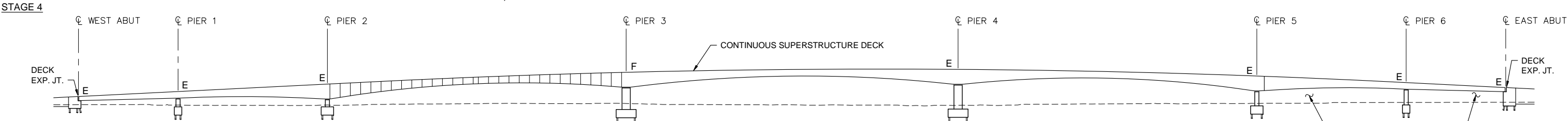
E = EXPANSION / SLIDING BEARING
F = FIXED (SHEAR & MOMENT CONTINUITY)



1. PREPARE FORM TRAVELERS FOR SPAN 3 CIP SEGMENTAL CANTILEVER CONSTRUCTION
2. CONSTRUCT SPAN 3 SEGMENTAL BOX GIRDER USING FORM TRAVELERS (CANTILEVER MOMENTS ON TOP OF PIERS 2 AND 3 ARE RESISTED AGAINST COUNTERWEIGHT DEAD LOADS OF SPANS 2 AND 4, RESPECTIVELY).



1. CAST CANTILEVER CLOSURE AT C SPAN 3.
2. STRESS BOX GIRDER CONTINUITY PT FOR SPAN 3.
3. REMOVE FALSEWORK AT SPANS 1, 2, 4 AND 5.
4. CONSTRUCT NEW PERMANENT CP BASS LAKE SPUR TRACK TRANSITION BELOW SPAN 5. RELOCATE RR TRAFFIC FROM SHOOFLY TO PERMANENT TRACK. (RR TRAFFIC NOW PASSES UNDERNEATH SPAN 5, TRANSITIONING FROM THE SOUTH SIDE TO THE NORTH SIDE OF THE BRIDGE TO COMPLETE CONSTRUCTION OF SPANS 6 AND 7.)
5. DRIVE PILES AND CONSTRUCT FOOTINGS FOR PIER 6 AND EAST ABUTMENT.
6. CONSTRUCT PIER 6 AND EAST ABUTMENT SUBSTRUCTURES.
7. ERECT FALSEWORK FOR SPANS 6 AND 7.
8. CONSTRUCT SPANS 6 AND 7 BOX GIRDER CONCRETE.
9. STRESS BOX GIRDER PT FOR SPANS 6 AND 7.
10. CONSTRUCT THE RETAINING WALLS ON THE EAST END OF THE BRIDGE.



1. REMOVE FALSEWORK FROM SPANS 6 AND 7.
2. COMPLETE DECK PARAPET RAILING, DUCT BANKS AND TRACK WORK.

DES. ML	DR. MS
CHK. SC	CHK. ML

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

EAST - VOLUME 2 (STRUCTURES)
EXCELSIOR BLVD
BRIDGE XXXXX
CONSTRUCTION SEQUENCE SCHEMATIC

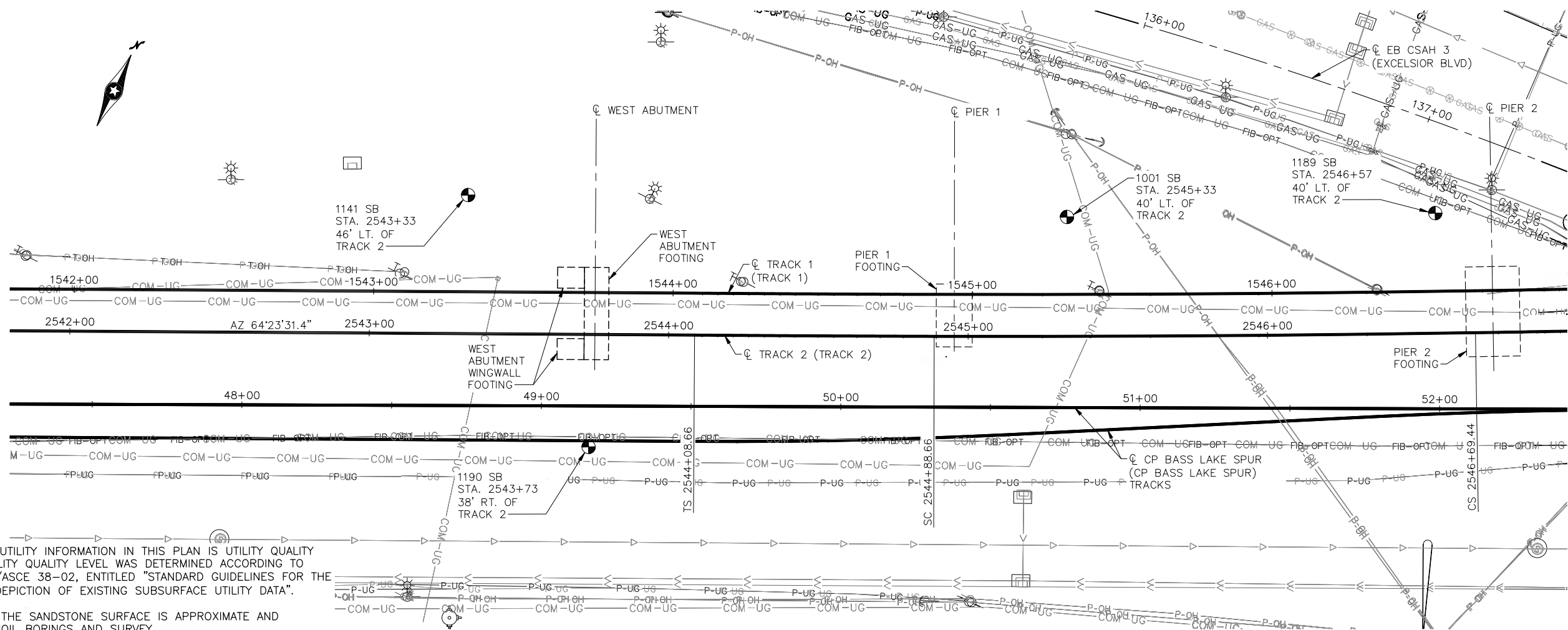
DISCIPLINE: **STRUCTURES**

SHEET NAME: **E1-STU-BRG-EXCL-LRT-DTL**

SHEET
24
OF
274

PRELIMINARY PLANS

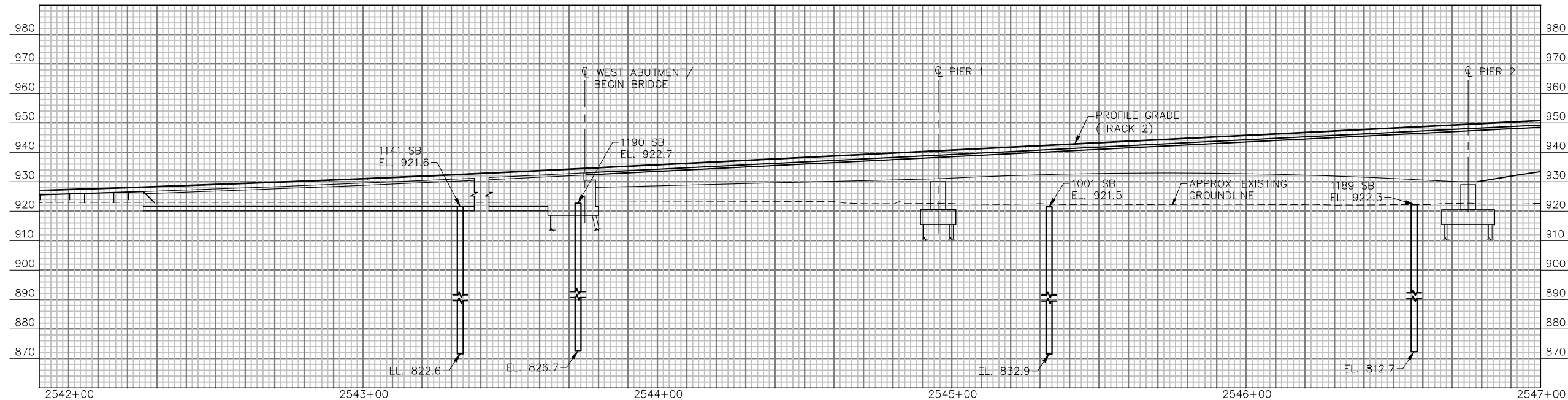
Aug. 25 2014 09:01 am V:\3300_pec-e\CAD\segment e1\plan sheets\structures\E1-STU-BRG-EXCL-LRT-BOR (1-4).dwg By: muellerj



NOTES:

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".

THE LOCATION OF THE SANDSTONE SURFACE IS APPROXIMATE AND ESTIMATED FROM SOIL BORINGS AND SURVEY.



DES. ML	DR. MS
CHK. SC	CHK. ML

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

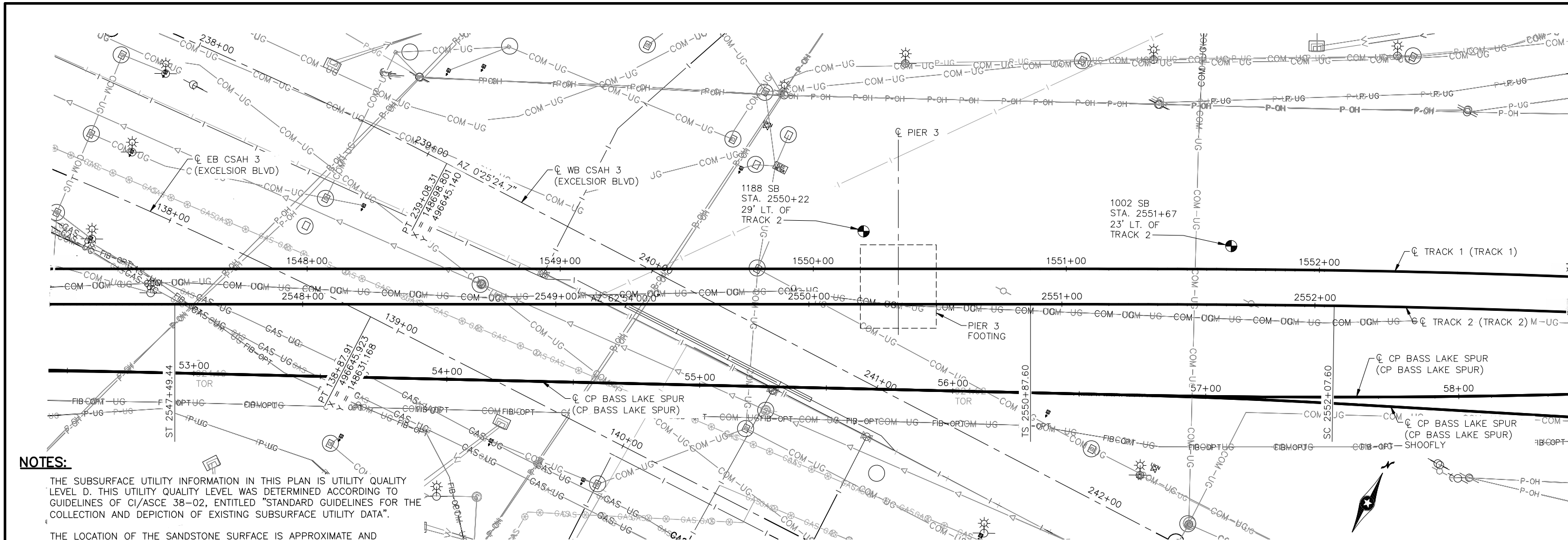
Kimley»Horn
TYLIN INTERNATIONAL
PRELIMINARY PLANS



EAST - VOLUME 2 (STRUCTURES)
EXCELSIOR BLVD
BRIDGE XXXXX
BORINGS (1 OF 8)

DISCIPLINE: **STRUCTURES** SHEET NAME: **E1-STU-BRG-EXCL-LRT-BOR-001**

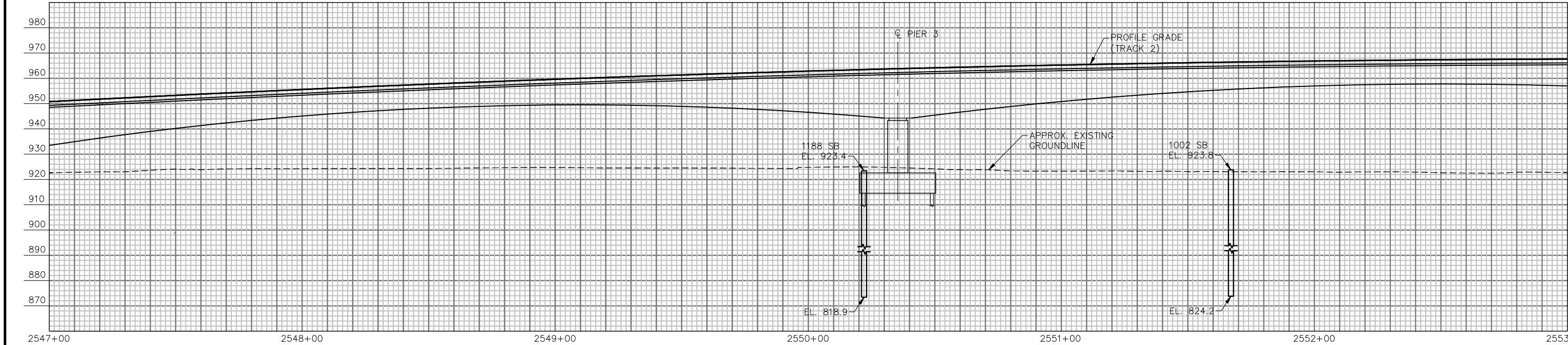
SHEET
25
OF
274



NOTES:

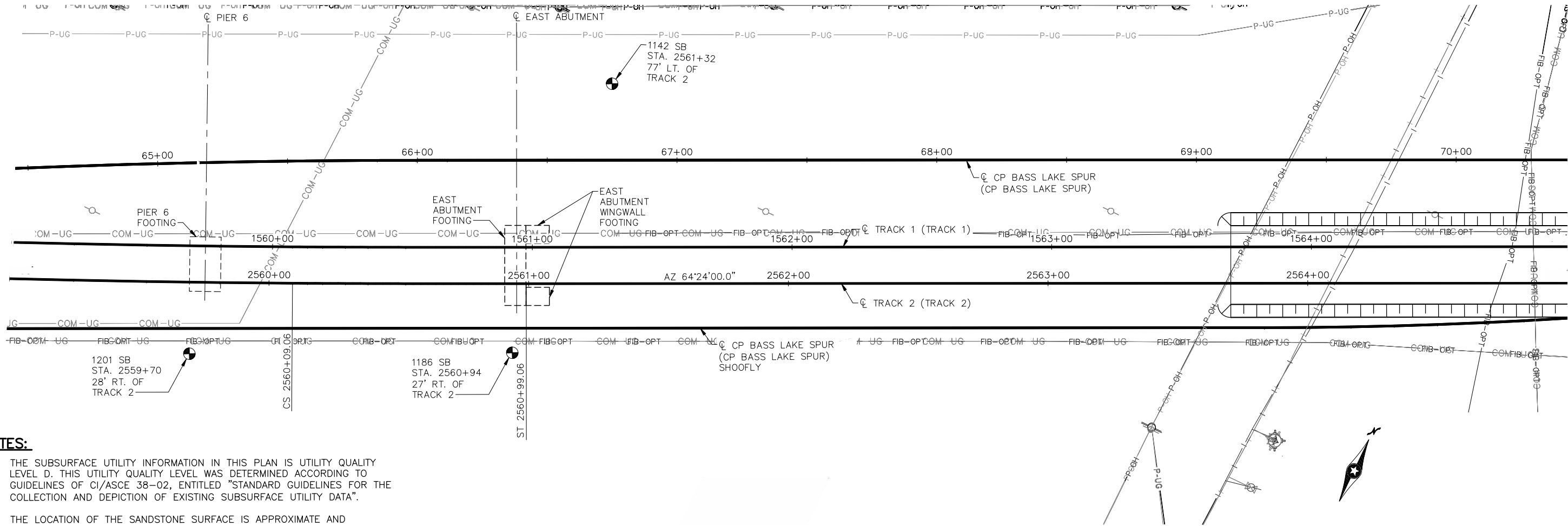
THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF C/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".

THE LOCATION OF THE SANDSTONE SURFACE IS APPROXIMATE AND ESTIMATED FROM SOIL BORINGS AND SURVEY.



DES. ML	DR. MS										
CHK. SC	CHK. ML										
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL	 TYLIN INTERNATIONAL		 METROPOLITAN COUNCIL	 SOUTHWEST Green Line LRT Extension	EAST - VOLUME 2 (STRUCTURES) EXCELSIOR BLVD BRIDGE XXXXX BORINGS (2 OF 8)	
						PRELIMINARY PLANS				DISCIPLINE: STRUCTURES	SHEET NAME: E1-STU-BRG-EXCL-LRT-BOR-002

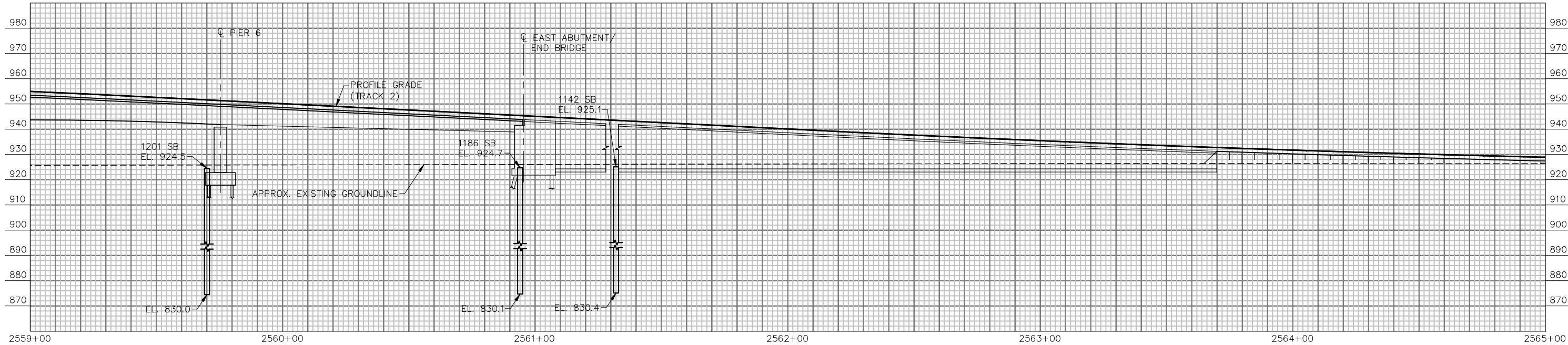
Aug. 25 2014 09:05 am V:\3300_pec-e\CAD\segment e1\plan sheets\structures\E1-STU-BRG-EXCL-LRT-BOR (1-4).dwg By: muellerj



NOTES:

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".

THE LOCATION OF THE SANDSTONE SURFACE IS APPROXIMATE AND ESTIMATED FROM SOIL BORINGS AND SURVEY.



DES. ML	DR. MS
CHK. SC	CHK. ML

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn
TYLIN INTERNATIONAL

PRELIMINARY PLANS



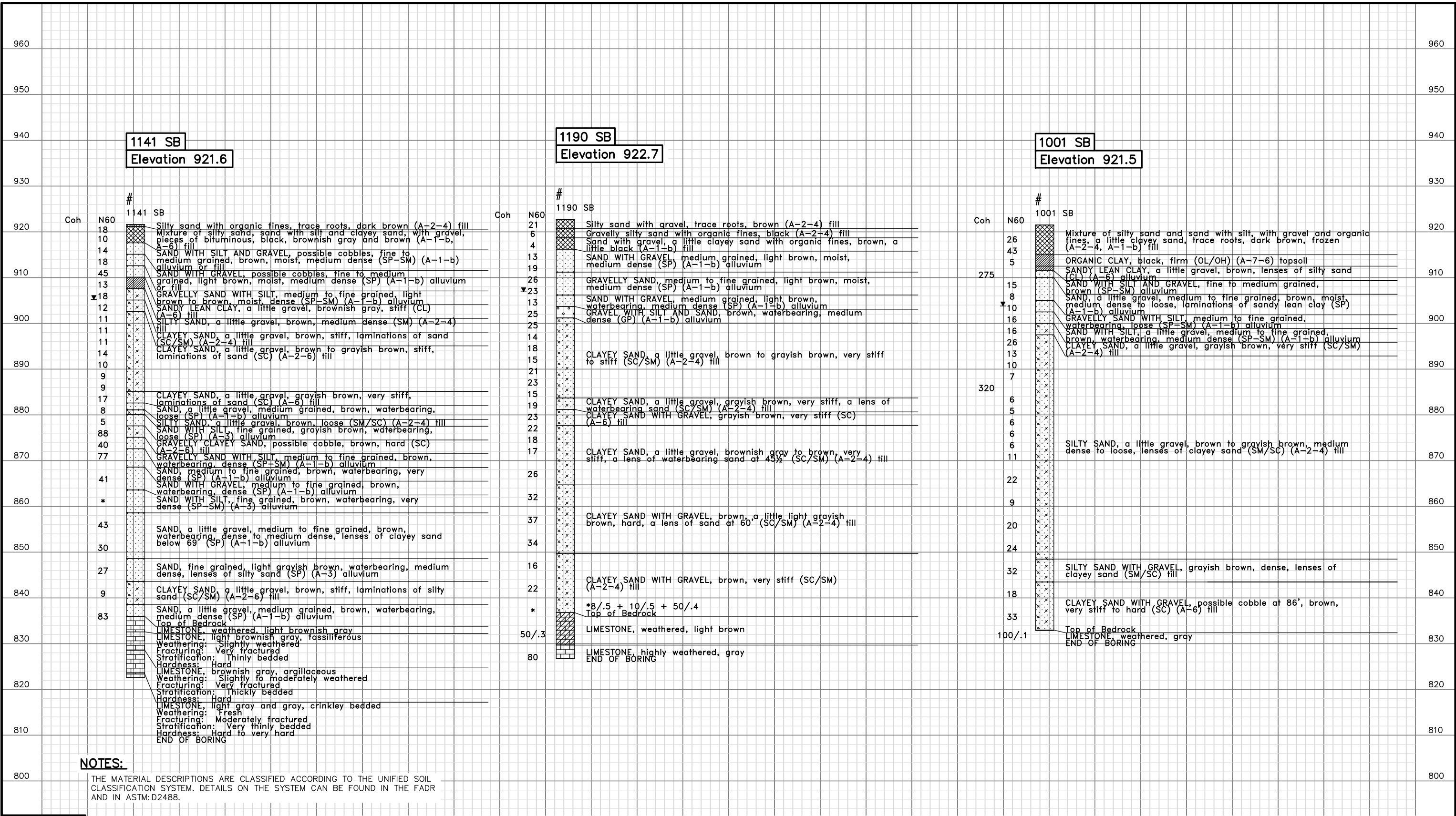
EAST - VOLUME 2 (STRUCTURES)
EXCELSIOR BLVD
BRIDGE XXXXX
BORINGS (4 OF 8)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E1-STU-BRG-EXCL-LRT-BOR-004**

SHEET
28
OF
274

Aug, 25 2014 09:05 am V:\3300_pcc-e\CAD\segment e1\plan sheets\structures\E1-STU-BRG-EXCL-LRT-BOR (5-8).dwg By: muelerj



NOTES:

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488.

DES. ML	DR. MS
CHK. SC	CHK. ML

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

PRELIMINARY PLANS

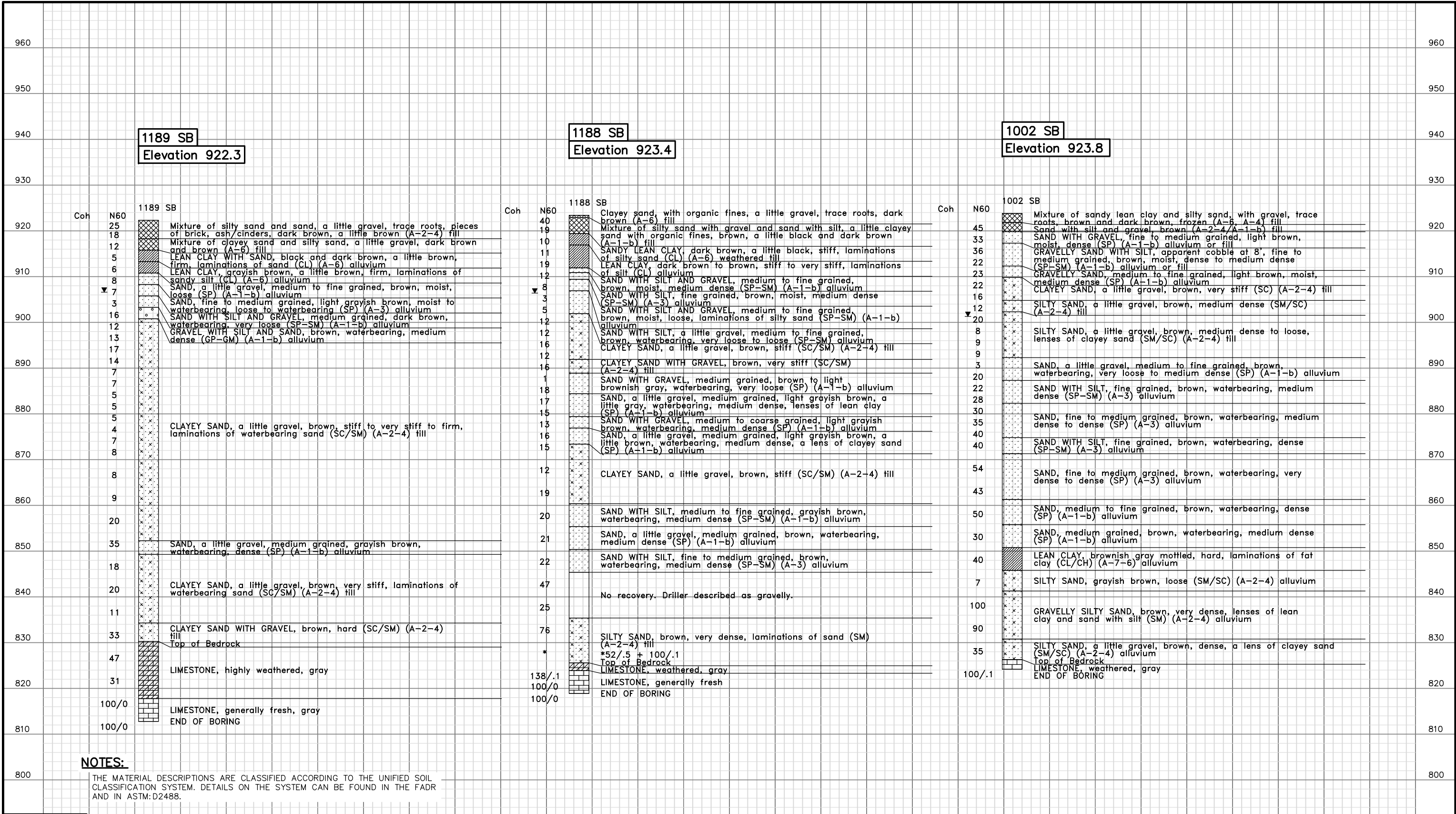
SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
EXCELSIOR BLVD
BRIDGE XXXXX
BORINGS (5 OF 8)

DISCIPLINE: STRUCTURES
SHEET NAME: E1-STU-BRG-EXCL-LRT-BOR-005

SHEET
29
OF
277

Aug. 25 2014 09:05 am V:\3300_pcc-e\CAD\segment e1\plan sheets\structures\E1-STU-BRG-EXCL-LRT-BOR (5-8).dwg By: muelierj



NOTES:

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488.

DES. ML	DR. MS
CHK. SC	CHK. ML

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY PLANS

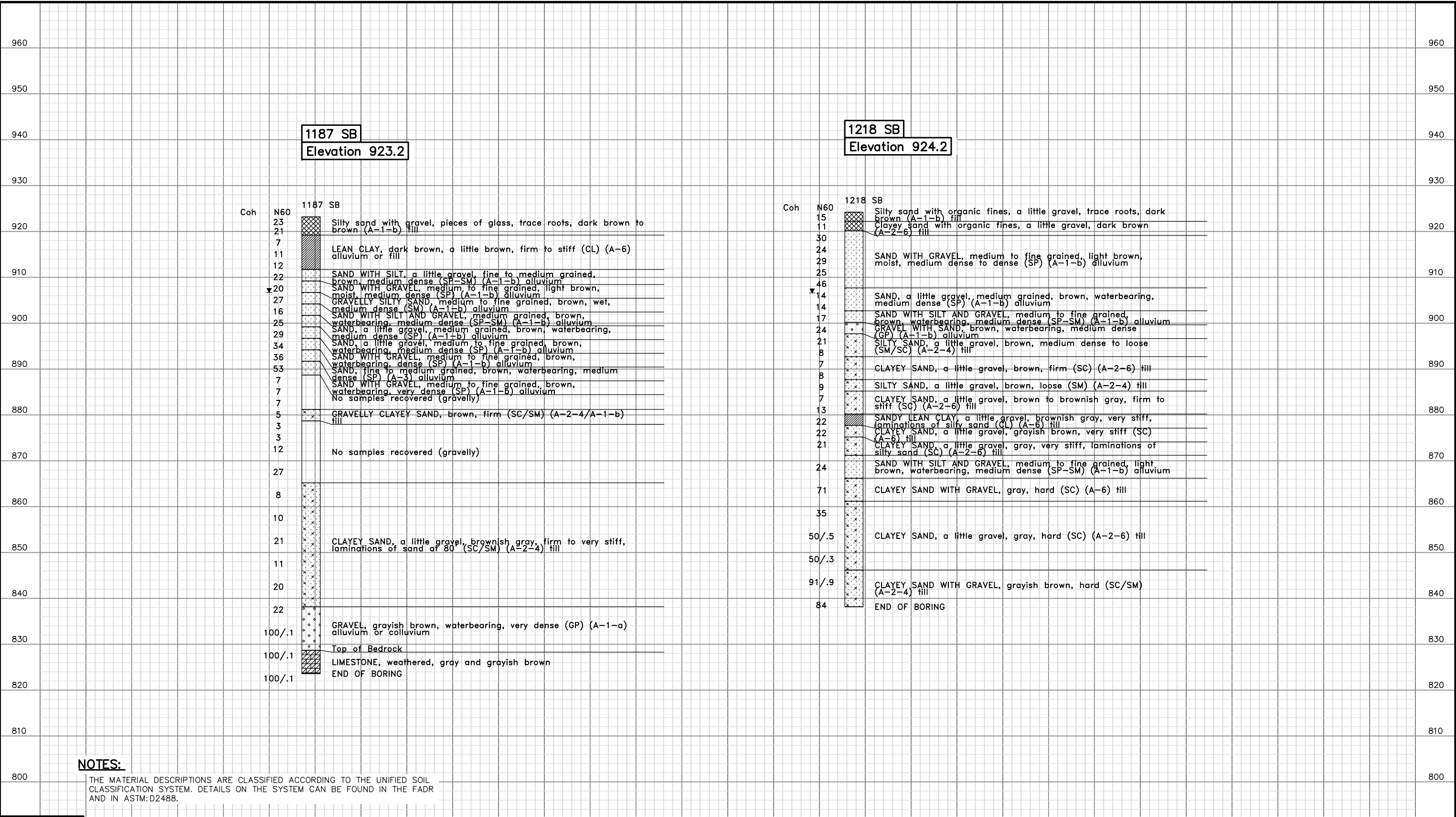


EAST - VOLUME 2 (STRUCTURES)
EXCELSIOR BLVD
BRIDGE XXXXX
BORINGS (6 OF 8)

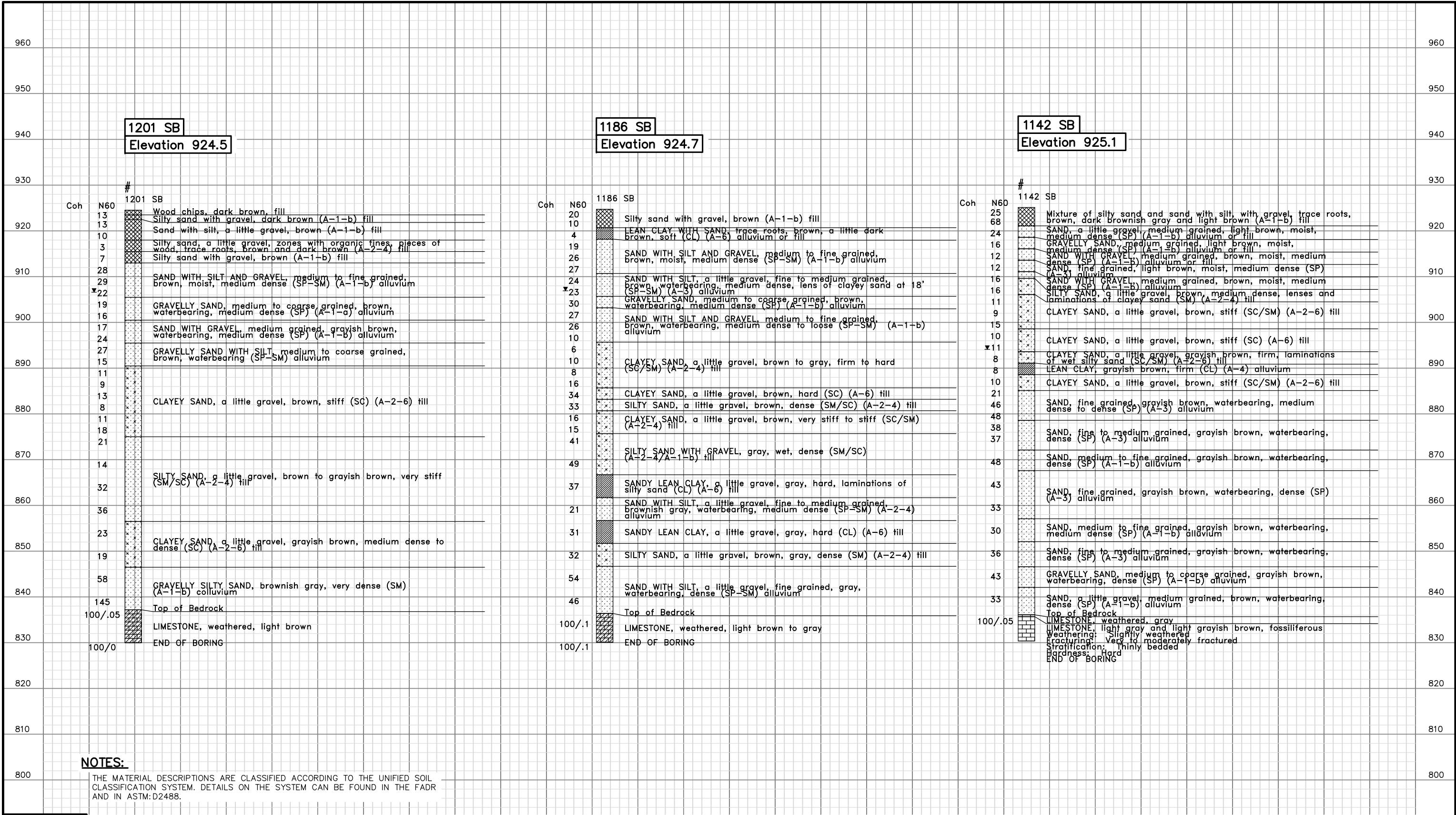
DISCIPLINE: STRUCTURES
SHEET NAME: E1-STU-BRG-EXCL-LRT-BOR-006

SHEET
30
OF
274

Aug. 25 2014 09:05 am V:\3300_pcc-e\CAD\segment e1\plan sheets\structures\E1-STU-BRG-EXCL-LRT-BOR (5-8).dwg By: muelerj




Aug. 25 2014 09:05 am V:\3300_pcc-e\CAD\segment e1\plan sheets\structures\E1-STU-BRG-EXCL-LRT-BOR (5-8).dwg By: muellerj



AESTHETICS DETAILS TO BE DETERMINED DURING ADVANCED DESIGN

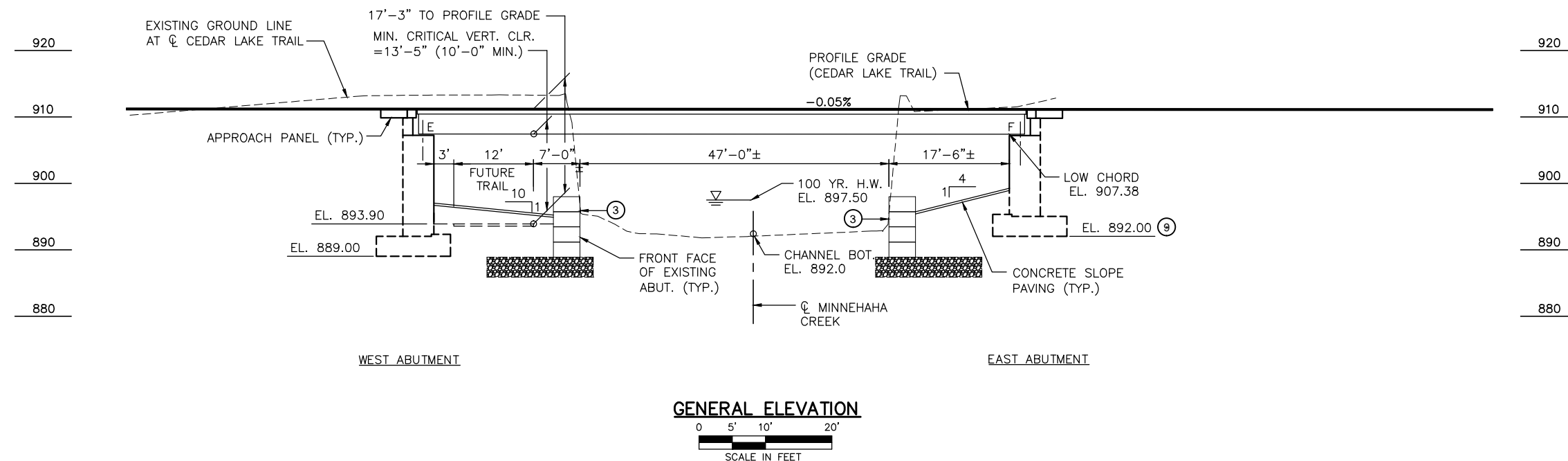
1. ABUTMENT SURFACE
2. ABUTMENT WALL/CORNER DETAIL
3. EXPOSED EDGE OF DECK
4. EXPOSED BARRIER
5. EXPOSED SIDE FACE OF BOX GIRDER
6. PIER COLUMN GEOMETRY AND SURFACE
7. RAILING AND SCREENING

DES. ML		DR. MS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
CHK. SC		CHK. ML																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL	<div><div><div>Kimley»Horn</div><div>TYLIN INTERNATIONAL</div></div></div>				<div><div><div><div></div><div><div>SOUTHWEST</div><div>Green Line LRT Extension</div></div></div><div></div></div></div>				<div><div>EAST - VOLUME 2 (STRUCTURES)</div><div>EXCELSIOR BLVD</div><div>BRIDGE XXXXX</div><div>AESTHETICS</div></div>				SHEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

Aug. 26 2014 11:21 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-TRL-GPE.dwg By: ronald.dee

NOTES:

- CONTROL POINT
CL CEDAR LAKE TRAIL (CEDAR LAKE TRAIL) STA. 206+88.63=
CL MINNEHAHA CREEK STA. 1+79.18
X =501332.876
Y =50948.820
- END OF BRIDGE SUBSTRUCTURE AND BEGINNING OF
RETAINING WALL TO BE COORDINATED DURING
ADVANCED DESIGN.
- BOTTOM PORTION OF EXISTING ABUTMENTS TO REMAIN.
REMOVE EXISTING ABUTMENT TO ELEVATION 898.0±
VERIFY REMOVAL LIMITS WITH CAR.
- SEE MINNEHAHA CREEK (FRT)
BRIDGE PLANS FOR CONSTRUCTION
SEQUENCING INFORMATION.
- MINNEHAHA CREEK WATERSHED
DISTRICT HAS PROVIDED HYDRAULIC
MODELING FOR MINNEHAHA CREEK.
ADDITIONAL COORDINATION TO BE
COMPLETED DURING ADVANCED DESIGN.
- SEE BORING SHEET FOR IN-PLACE UTILITIES.
- SUBSTRUCTURE SET PARALLEL AT AZ 154°24'00.00"
- EXISTING BRIDGE, SINGLE SPAN 48' LONG AND
15' WIDE STEEL DECK PLATE GIRDER BRIDGE.
SUPERSTRUCTURE AND PORTION OF
SUBSTRUCTURE TO BE REMOVED.
- EAST ABUTMENT FOUNDATION IS PLACED AT EL. 892.0
TO PENETRATE A CLAY LAYER. SEE FOUNDATION ANALYSIS
AND DESIGN REPORT FOR ADDITIONAL INFORMATION.



DESIGN DATA

2012 AND CURRENT INTERIM AASHTO LRFD
BRIDGE DESIGN SPECIFICATIONS

2009 AASHTO LRFD GUIDE SPECIFICATIONS FOR THE
DESIGN OF PEDESTRIAN BRIDGES

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA
(REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD

90 PSF PEDESTRIAN LIVE LOAD
H 10 MAINTENANCE VEHICLE LIVE LOAD

MATERIAL DESIGN PROPERTIES:
REINFORCED CONCRETE:
f'c = 4000 PSI n = 8
fy = 60000 PSI REINFORCEMENT

PRESTRESSED CONCRETE:
f'c = 9000 PSI n = 1
fpu = 270 KSI LOW RELAXATION STRANDS
0.75 fpu FOR INITIAL PRESTRESS

DESIGN SPEED: OVER = 20 MPH

APPROXIMATE DECK AREA 1750 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
34	GENERAL PLAN AND ELEVATION
35	BRIDGE SURVEY
36	TRANSVERSE SECTION
37-39	BORINGS
40	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK:
SINGLE SPAN - 2 LINES OF 36M PRESTRESSED
CONCRETE BEAMS - SIMPLE SPAN

ALL BARS EPOXY COATED

SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON
SPREAD FOOTINGS

DEPTH OF STRUCTURE:
3'-10"± PROFILE GRADE TO LOW BRIDGE

AESTHETICS: LEVEL -

PRELIMINARY PLAN BRIDGE NO. XXXXX

CEDAR LAKE TRAIL OVER MINNEHAHA CREEK
1.5 MI. S.W. OF JCT. OF T.H. 7 & HWY 100
IN ST. LOUIS PARK

94'-8" PRESTRESSED CONCRETE BEAM SPAN
16'-0" TRAIL
00'-00'-00.00" SKEW

BRIDGE I.D. NO. 501

GENERAL PLAN AND ELEVATION

SEC 20 T 117N R 21W
CITY OF ST LOUIS PARK HENNEPIN COUNTY

APPROVED: _____ DATE _____
STATE BRIDGE ENGINEER

DES. EJT DR. PHH
CHK. CPE CHK. JDP
JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



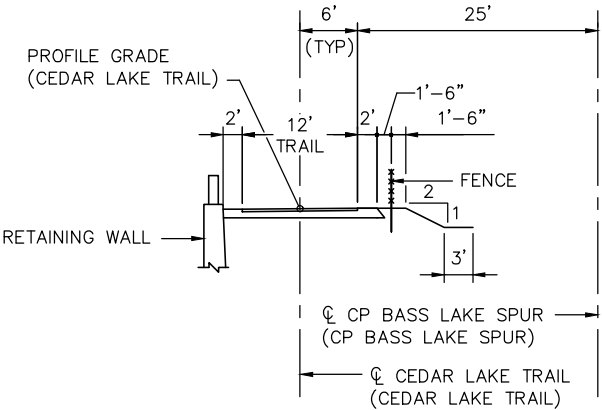
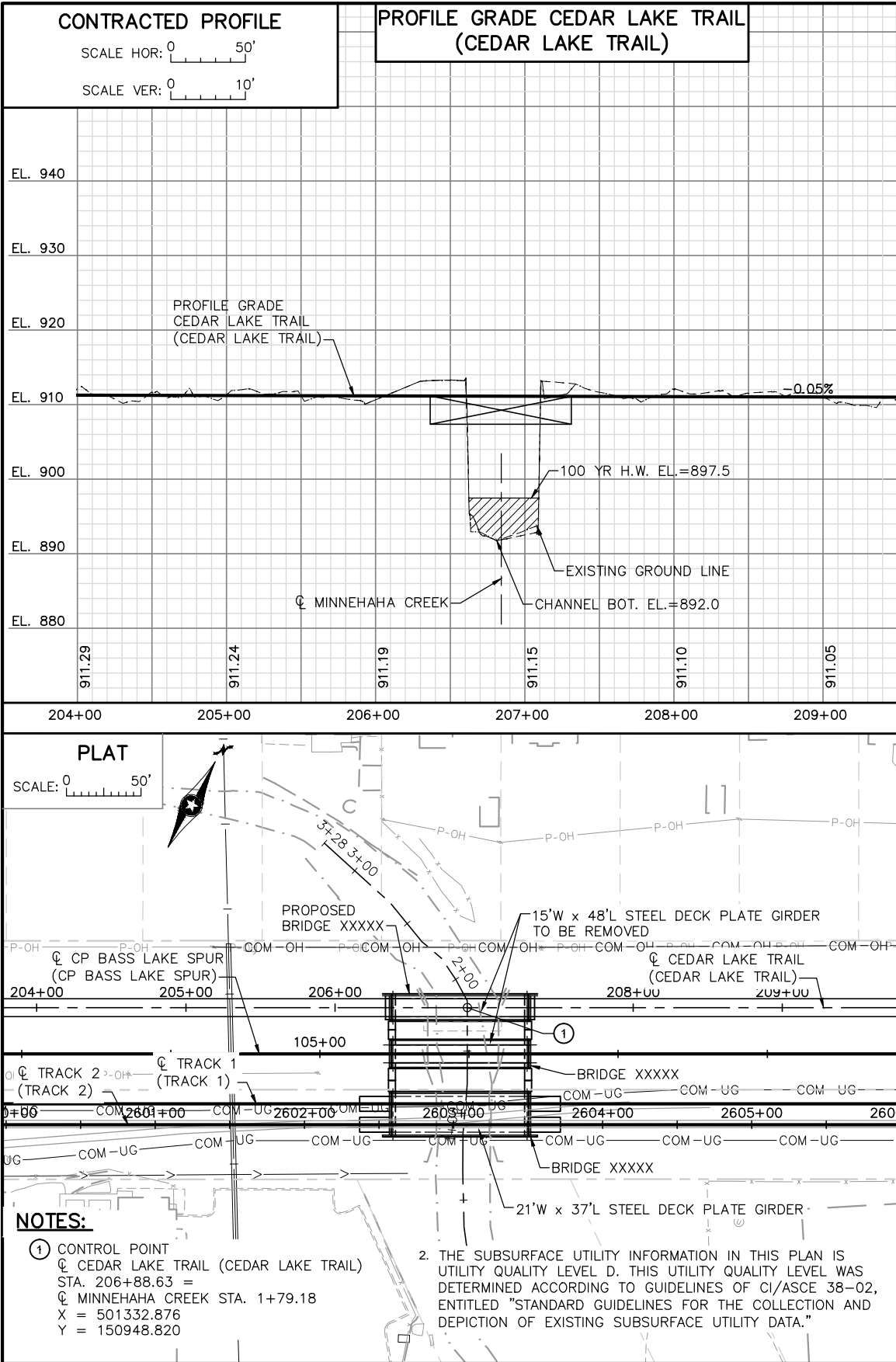
**EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (TRL)
GENERAL PLAN AND ELEVATION**

DISCIPLINE: **STRUCTURES**

SHEET NAME:
E2-STU-BRG-MNHA-TRL-GPE

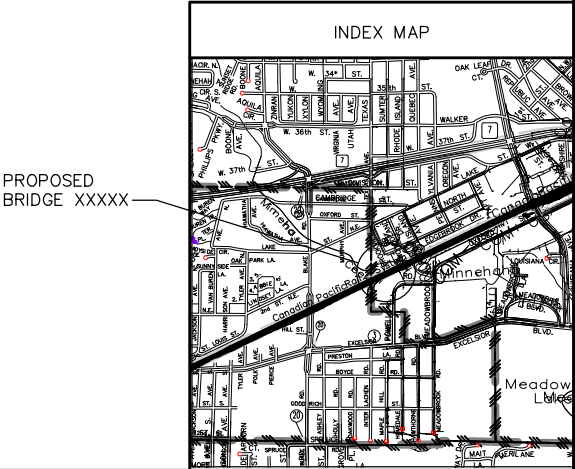
**SHEET
34
OF
274**

Aug. 26 2014 11:25 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-TRL-SUR-001.dwg By: ronald.d.dee



TYPICAL SECTION
CEDAR LAKE TRAIL

MINNEHAHA CREEK PROFILE
TO BE ADDED IN ADVANCED DESIGN



LOCATION ENGINEER'S OBSERVATIONS
AT BRIDGE SITE

1. SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.
2. OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
3. APPARENT HIGHWATER ELEVATION OBTAINED FROM:
4. OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

HYDRAULIC ENGINEER'S RECOMMENDATION

DATE: 5-19-2014

STREAM OR DITCH DESIGNATION: MINNEHAHA CREEK

DRAINAGE AREA: 138 SQ. MI.

MAX FLOOD ON RECORD: UNKNOWN

DESIGN FLOOD (100 YR. FREQ.): 680 C.F.S.
HEADWATER ELEVATION: 897.50 FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE 4.4 F.P.S.
TOTAL STAGE INCREASE 0.0 FT.
LOW MEMBER AT OR ABOVE ELEVATION 898.50 FT.

WATERWAY AREA REQUIRED BELOW ELEV. 897.50 =
220 SQ. FT. AT RIGHT ANGLES TO CHANNEL

BASIC FLOOD (100 YR. FREQ.) 680 C.F.S.
HEADWATER ELEVATION: 897.50 FT.
TOTAL STAGE INCREASE FT. 0.0
MEAN VELOCITY THROUGH STRUCTURE 4.4 F.P.S.

FLOWLINE ELEVATION: 891.80 FT. SKEW ANGLE: 0 DEG.

ESTIMATED PRILIMINARY TOTAL SCOUR AT ABUTMENT EL. TBD
(500 YR. FREQ.)

SCOUR CONFIRMATION RECOMMENDATION

DATE: PENDING

TOTAL SCOUR AT ABUTMENT EL. TBD (500 YR. FREQ.)
SCOUR CODE: L-STABLE-EVAL

BRIDGE SURVEY SHEETS MADE FROM 2014 MFRA SURVEYS

1ST BENCH MARK
ELEVATION: 913.20
NORTHING: 150917.04
EASTING: 501306.42
DESCRIPTION: MAG NAIL IN BIT.

2ND BENCH MARK
ELEVATION: 912.78
NORTHING: 150966.60
EASTING: 501408.21
DESCRIPTION: MAG NAIL IN BIT.

BRIDGE SURVEY

CEDAR LAKE TRAIL OVER MINNEHAHA CREEK
IN ST LOUIS PARK

SEC 20 T 117N R 21W
CITY OF ST LOUIS PARK HENNEPIN COUNTY

BRIDGE XXXXX

EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (TRL)
BRIDGE SURVEY

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-MNHA-TRL-SUR-001

SHEET

35

OF

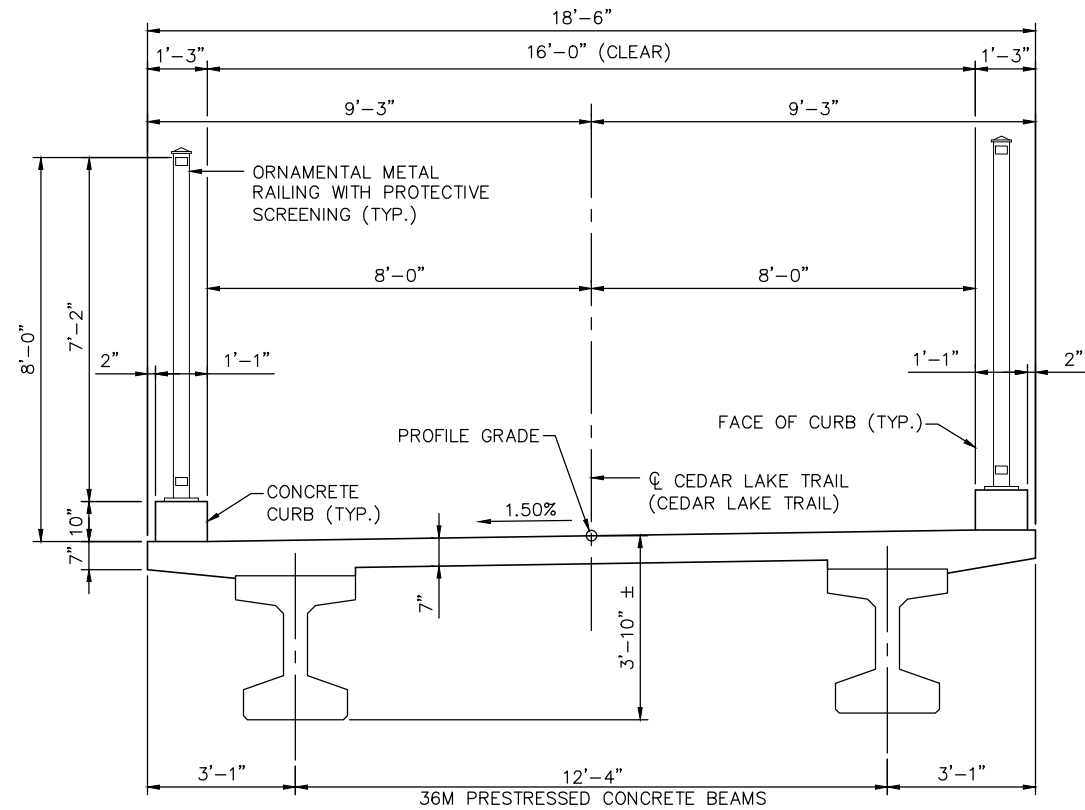
274

Kimley»Horn

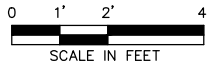
PRELIMINARY ENGINEERING



Aug. 26 2014 11:25 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-TRL-SUP.dwg By: ronald.dee



TRANSVERSE SECTION



NOTES:

1. NUMBER AND SPACING OF BEAMS IS APPROXIMATE AND WILL BE SET DURING ADVANCED DESIGN.

DES. EJT	DR. PHH	
CHK. CPE	CHK. JDP	
NO.	DATE	BY



PRELIMINARY ENGINEERING

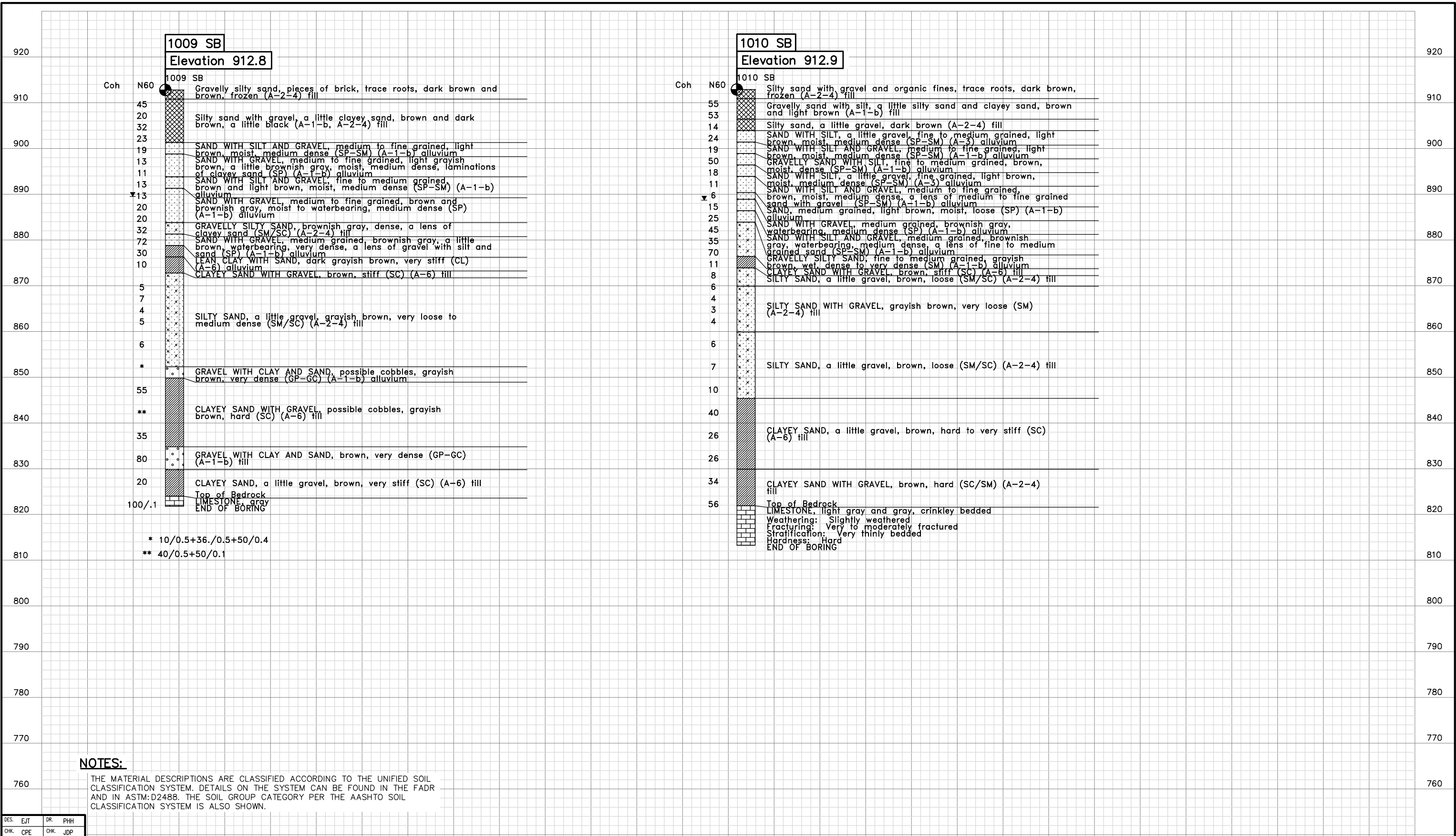


EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (TRL)
TRANSVERSE SECTION

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-MNHA-TRL-SUP

Aug. 26 2014 11:27 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-TRL-BOR.dwg By: ronald.dee



NOTES:

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (TRL)
BORINGS (2 OF 3)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-BRG-MNHA-TRL-BOR-002**

SHEET
38
OF
274

PRELIMINARY ENGINEERING

1258 CB
Elevation 913.3

920
910
900
890
880
870
860
850
840
830
820
810
800
790
780
770
760

Tip Stress (psi)

4000
8000



1259 CB
Elevation 913.2

920
910
900
890
880
870
860
850
840
830
820
810
800
790
780
770
760

Tip Stress (psi)

4000
8000

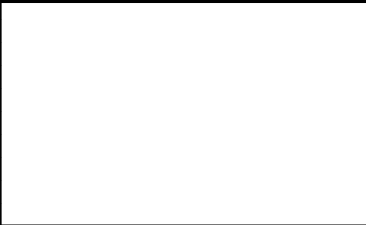
DES.	EJT	DR.	PHH
CHK.	CPE	CHK.	JDP

DES. EJT	DR. PHH											750		
CHK. CPE	CHK. JDP													
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL							EAST - VOLUME 2 (STRUCTURES) MINNEHAHA CREEK BRIDGE XXXXX (TRL) BORINGS (3 OF 3)		SHEET 39 OF 274
								PRELIMINARY ENGINEERING				DISCIPLINE: STRUCTURES SHEET NAME: E2-STU-BRG-MNHA-TRL-BOR-003		

Aug. 26 2014 11:27 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-TRL-AES.dwg By: ronald.dee

DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



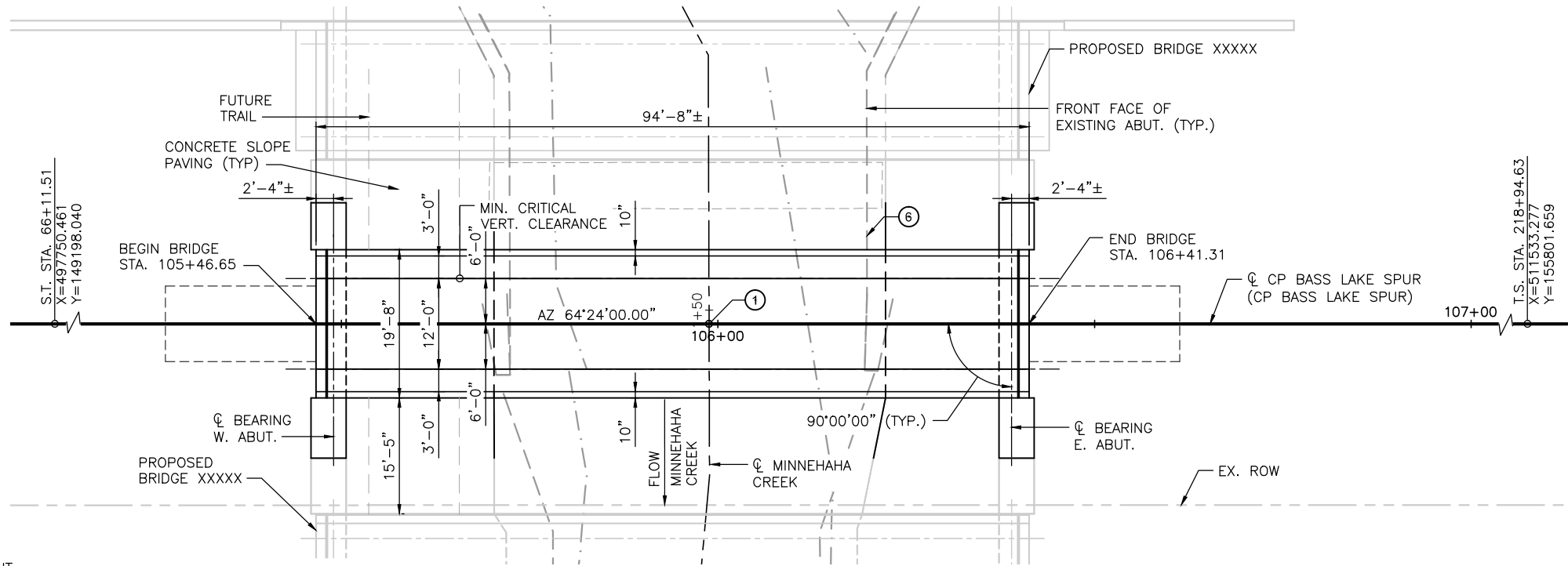
EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (TRL)
AESTHETICS

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-MNHA-TRL-AES

SHEET
40
OF
274

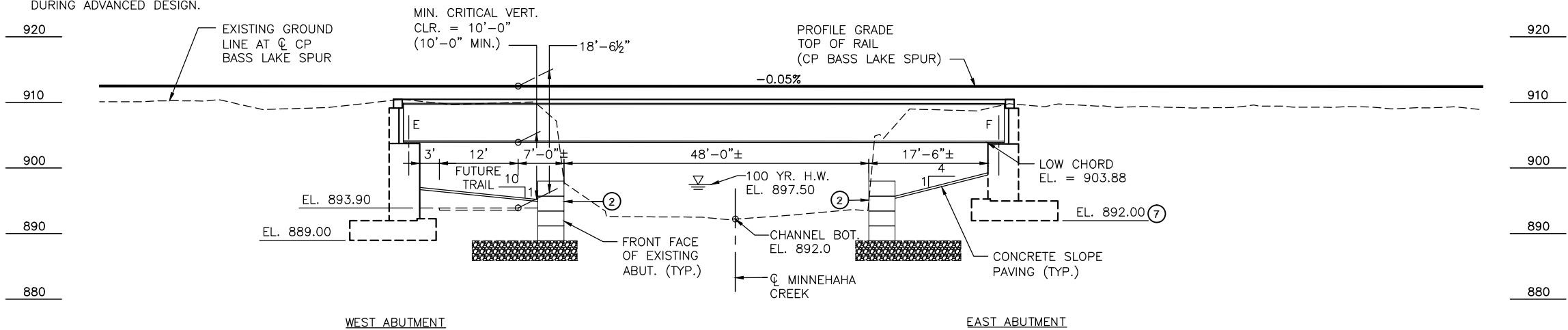
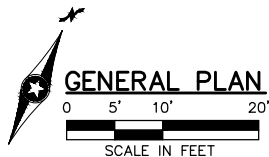
Aug. 26 2014 11:23 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-FRT-GPE.dwg By: ronald.dee



NOTES:

- CONTROL POINT
CP BASS LAKE SPUR (CP BASS LAKE SPUR) STA. 105+98.82=
MINNEHAHA CREEK STA. 1+48.18
X = 501346.351
Y = 150920.901
- BOTTOM PORTION OF EXISTING ABUTMENTS TO REMAIN. REMOVE EXISTING ABUTMENTS TO ELEVATION 898.0± VERIFY REMOVAL LIMITS WITH CAR.
- MINNEHAHA CREEK WATERSHED DISTRICT HAS PROVIDED HYDRAULIC MODELING FOR MINNEHAHA CREEK. ADDITIONAL COORDINATION TO BE COMPLETED DURING ADVANCED DESIGN.

- SEE BORING SHEET FOR IN-PLACE UTILITIES.
- SUBSTRUCTURE SET PARALLEL AT AZ 154°24'00.00"
- EXISTING BRIDGE, SINGLE SPAN 48' LONG AND 15' WIDE STEEL DECK PLATE GIRDER BRIDGE. SUPERSTRUCTURE AND PORTION OF SUBSTRUCTURE TO BE REMOVED.
- EAST ABUTMENT FOUNDATION IS PLACED AT EL. 892.0 TO PENETRATE A CLAY LAYER. SEE FOUNDATION ANALYSIS AND DESIGN REPORT FOR ADDITIONAL INFORMATION.



GENERAL ELEVATION

DESIGN DATA

2013 AREMA MANUAL FOR RAILWAY ENGINEERING
SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA (REVISION 2.0)
ALLOWABLE STRESS DESIGN METHOD
COOPER E 90 LIVE LOAD
MATERIAL DESIGN PROPERTIES:
REINFORCED CONCRETE:
f'c = 4000 PSI n = 8
fy = 60000 PSI REINFORCEMENT
STRUCTURAL STEEL:
fy = 50,000 PSI
DESIGN SPEED: OVER = 15 MPH (FRT)
APPROXIMATE DECK AREA 1860 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
41	GENERAL PLAN AND ELEVATION
42	BRIDGE SURVEY
43	TRANSVERSE SECTION
44-45	CONSTRUCTION SEQUENCING
46-48	BORINGS
49	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK:
SINGLE SPAN - BALLASTED REINFORCED CONCRETE DECK ON 5 LINES OF WELDED STEEL PLATE GIRDERS. COMPOSITE STEEL DESIGN.
ALL BARS EPOXY COATED
SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON SPREAD FOOTINGS
DEPTH OF STRUCTURE:
8'-6½"± TOP OF RAIL TO LOW STEEL
AESTHETICS: LEVEL _

PRELIMINARY PLAN
BRIDGE NO. XXXXX

CP BASS LAKE SPUR OVER MINNEHAHA CREEK
1.5 MI. S.W. OF JCT. OF T.H. 7 & HWY 100
IN ST. LOUIS PARK
94'-8" STEEL WELDED PLATE GIRDER SPAN
13'-0" RAILWAY
00'-00'-00.00" SKEW

BRIDGE I.D. NO. 301
GENERAL PLAN AND ELEVATION

SEC 20 T 117N R 21W
CITY OF ST LOUIS PARK HENNEPIN COUNTY

APPROVED: _____ DATE _____
STATE BRIDGE ENGINEER

DES. EJT DR. PHH
CHK. CPE CHK. JDP
JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



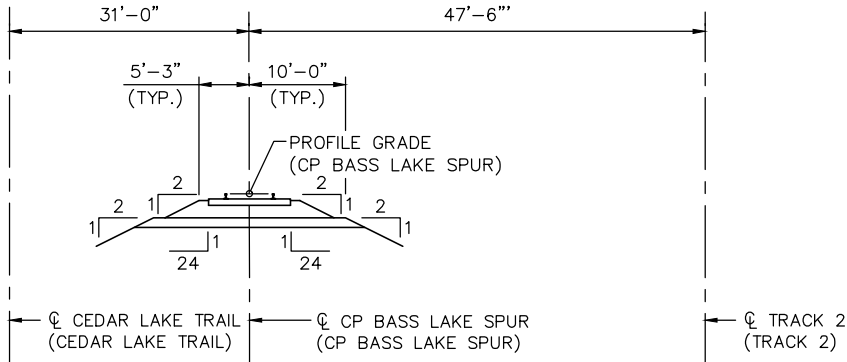
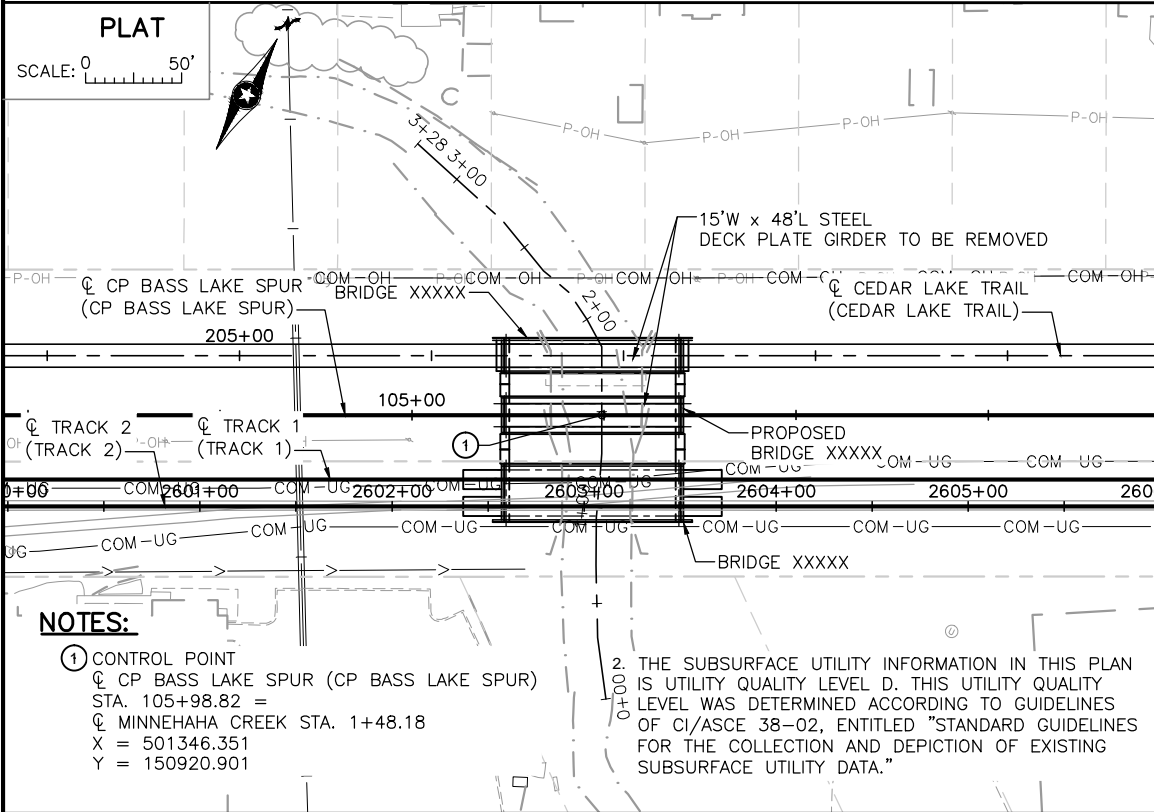
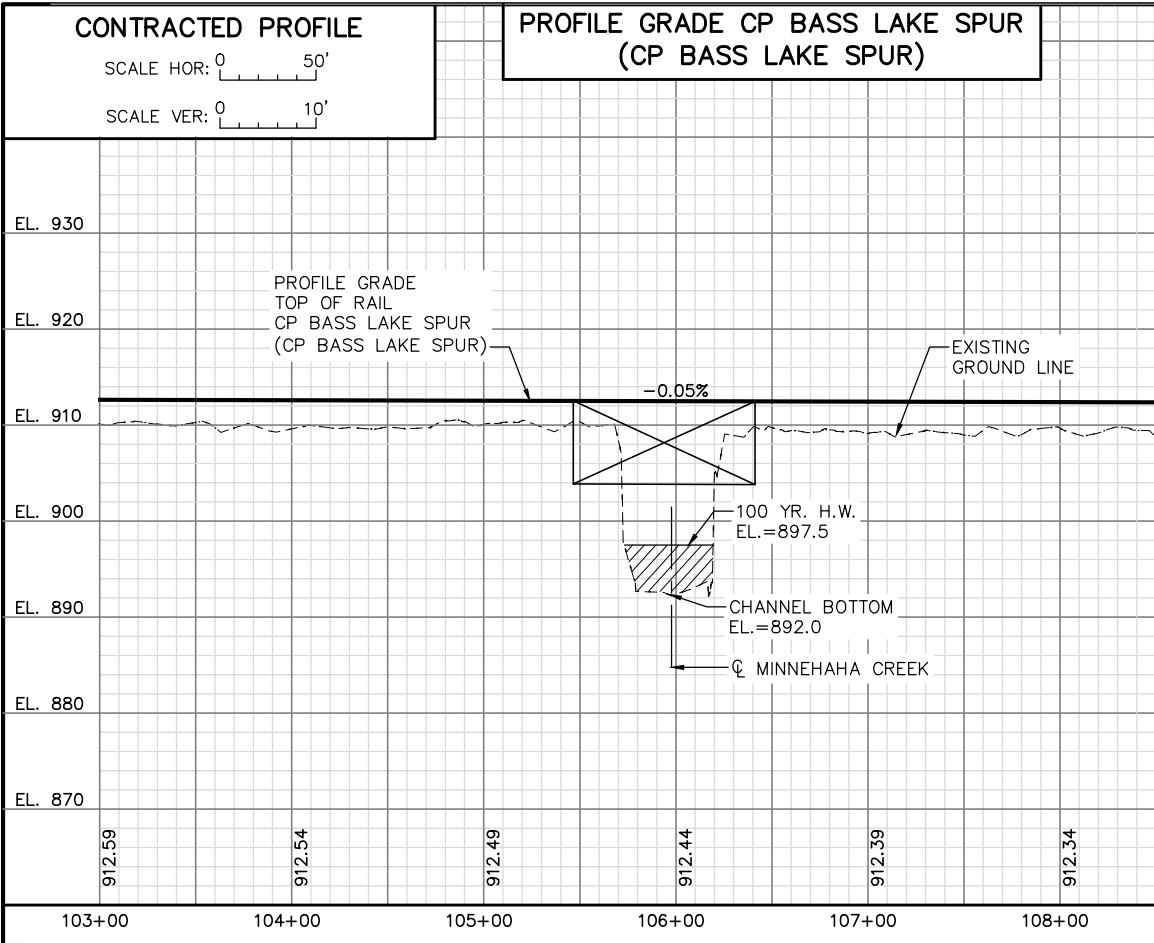
EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (FRT)
GENERAL PLAN AND ELEVATION

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-MNHA-FRT-GPE

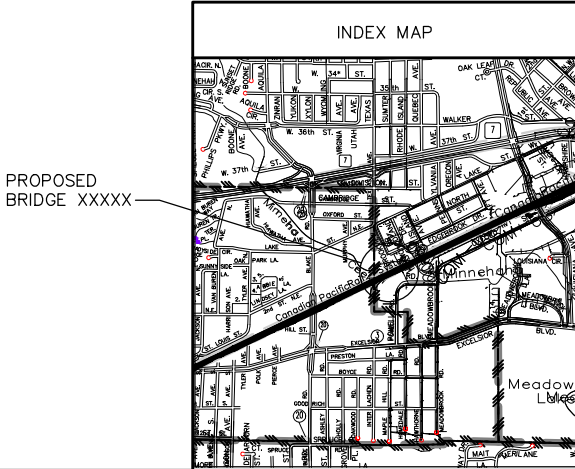
SHEET
41
OF
274

Aug. 26 2014 11:27 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-FRT-SUR-001.dwg By: ronald.dee



TYPICAL SECTION
CP BASS LAKE SPUR

MINNEHAHA CREEK PROFILE
TO BE ADDED IN ADVANCED DESIGN



LOCATION ENGINEER'S OBSERVATIONS
AT BRIDGE SITE

1. SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.
2. OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
3. APPARENT HIGHWATER ELEVATION OBTAINED FROM:
4. OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

HYDRAULIC ENGINEER'S RECOMMENDATION

DATE: 5-19-2014

STREAM OR DITCH DESIGNATION: MINNEHAHA CREEK

DRAINAGE AREA: 138 SQ. MI.

MAX FLOOD ON RECORD: UNKNOWN

DESIGN FLOOD (100 YR. FREQ.): 680 C.F.S.
HEADWATER ELEVATION: 897.50 FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE 4.4 F.P.S.
TOTAL STAGE INCREASE 0.0 FT.
LOW MEMBER AT OR ABOVE ELEVATION 898.50 FT.

WATERWAY AREA REQUIRED BELOW ELEV. 897.50 =
200 SQ. FT. AT RIGHT ANGLES TO CHANNEL

BASIC FLOOD (100 YR. FREQ.) 680 C.F.S.
HEADWATER ELEVATION: 897.50 FT.
TOTAL STAGE INCREASE FT. 0.0
MEAN VELOCITY THROUGH STRUCTURE 4.4 F.P.S.

FLOWLINE ELEVATION: 891.80 FT. SKEW ANGLE: 0 DEG.

ESTIMATED PRILIMINARY TOTAL SCOUR AT ABUTMENT EL. TBD
(500 YR. FREQ.)

SCOUR CONFIRMATION RECOMMENDATION

DATE: PENDING

TOTAL SCOUR AT ABUTMENT EL. TBD (500 YR. FREQ.)
SCOUR CODE: L-STABLE-EVAL

BRIDGE SURVEY SHEETS MADE FROM 2014 MFRA SURVEYS

1ST BENCH MARK
ELEVATION: 913.20
NORTHING: 150917.04
EASTING: 501306.42
DESCRIPTION: MAG NAIL IN BIT.

2ND BENCH MARK
ELEVATION: 912.78
NORTHING: 150966.60
EASTING: 501408.21
DESCRIPTION: MAG NAIL IN BIT.

BRIDGE SURVEY

CP BASS LAKE SPUR OVER MINNEHAHA CREEK
IN ST LOUIS PARK

SEC 20 T 117N R 21W
CITY OF ST LOUIS PARK HENNEPIN COUNTY
BRIDGE XXXXX

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (FRT)
BRIDGE SURVEY

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-MNHA-FRT-SUR-001


SHEET
42
OF
274

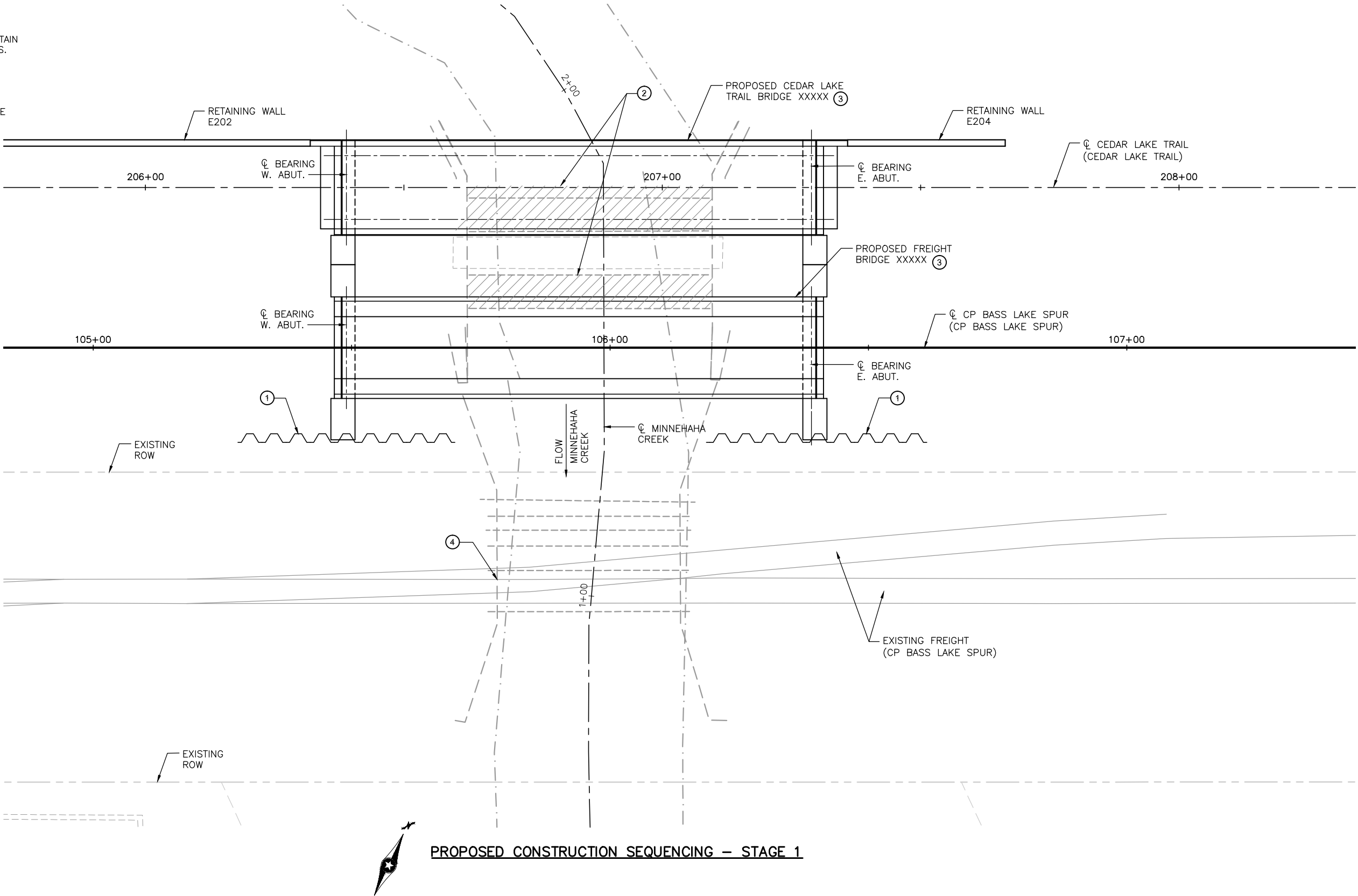
1. NUMBER AND SPACING OF BEAMS IS APPROXIMATE AND WILL BE SET DURING ADVANCED DESIGN.

SHEET
43
OF
274

Aug. 26 2014 11:29 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-FRT-DTL.dwg By: ronald.dee

NOTES:

- 1 INSTALL TEMPORARY SHEET PILE WALL.
- 2  REMOVE EXISTING SUPERSTRUCTURE. RETAIN LOWER PORTION OF EXISTING ABUTMENTS.
- 3 CONSTRUCT CEDAR LAKE TRAIL BRIDGE OVER MINNEHAHA CREEK AND CP BASS LAKE SPUR BRIDGE OVER MINNEHAHA CREEK.
- 4 EXISTING FREIGHT BRIDGE TO REMAIN IN SERVICE FOR CP BASS LAKE SPUR DURING STAGE 1.



PROPOSED CONSTRUCTION SEQUENCING – STAGE 1

DES. EJT	DR. PHH
CHK. JDP	CHK. CPE

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (FRT)
CONSTRUCTION SEQUENCING (1 OF 2)


DISCIPLINE: STRUCTURES

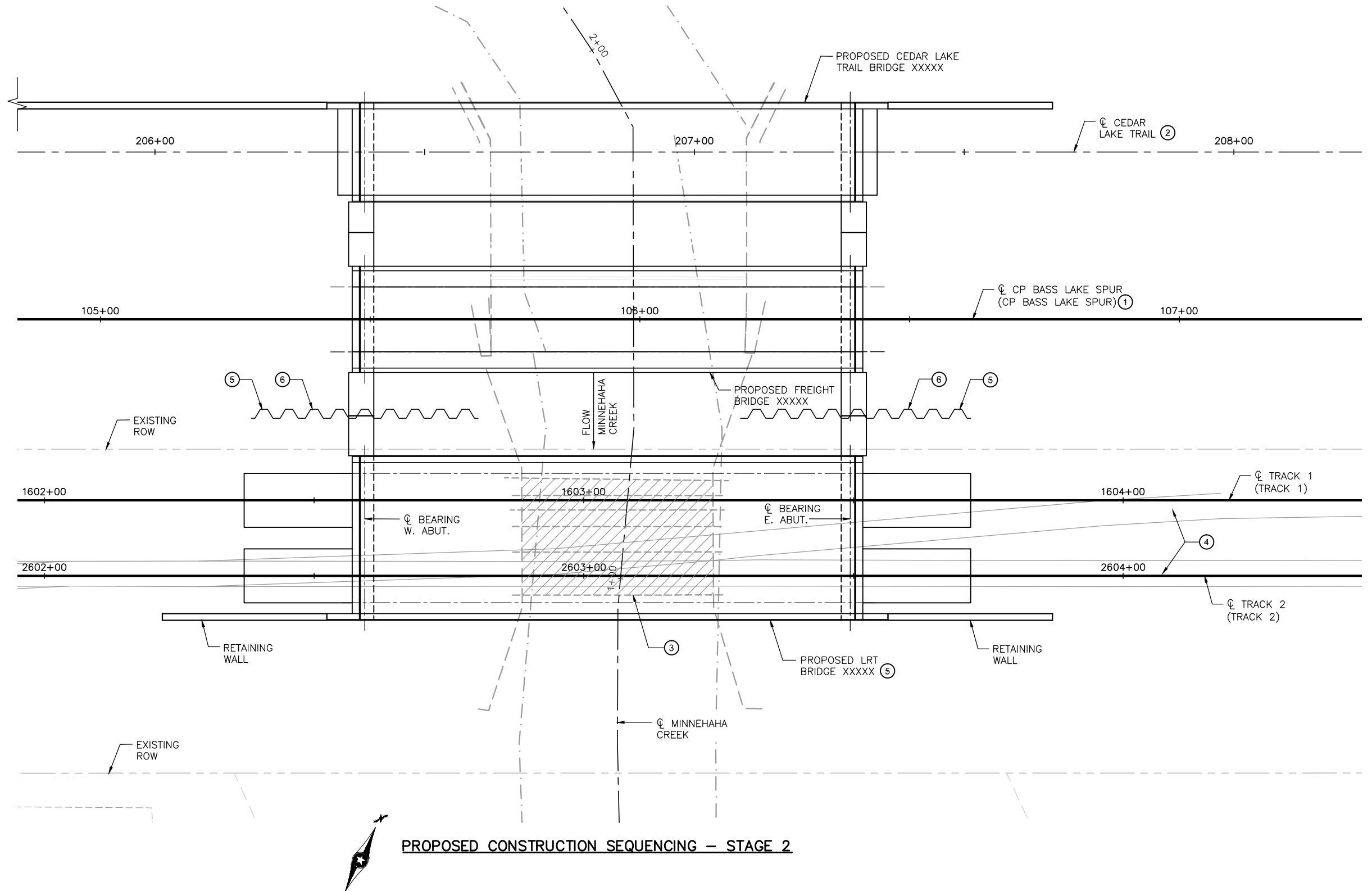
SHEET NAME: E2-STU-BRG-MNHA-FRT-DTL-001

SHEET
44
OF
274

Aug. 26 2014 11:30 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-FRT-DTL.dwg By: ronald.dee

NOTES:

- 1 MOVE CP BASS LAKE SPUR ONTO NEW FREIGHT BRIDGE
- 2 RELOCATE CEDAR LAKE TRAIL ONTO NEW TRAIL BRIDGE.
- 3  REMOVE EXISTING SUPERSTRUCTURE. RETAIN LOWER PORTION OF EXISTING ABUTMENTS.
- 4 REMOVE EXISTING CP BASS LAKE SPUR TRACKS.
- 5 CONSTRUCT LRT BRIDGE OVER MINNEHAHA CREEK. ADJUST LOCATION OF TEMPORARY SHEET PILE WALLS AS NECESSARY TO ALLOW FOR CONSTRUCTION OF BRIDGE.
- 6 REMOVE TEMPORARY SHEET PILE WALLS.



DES. EJT	DR. PHH
CHK. JDP	CHK. CPE

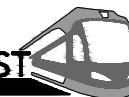
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



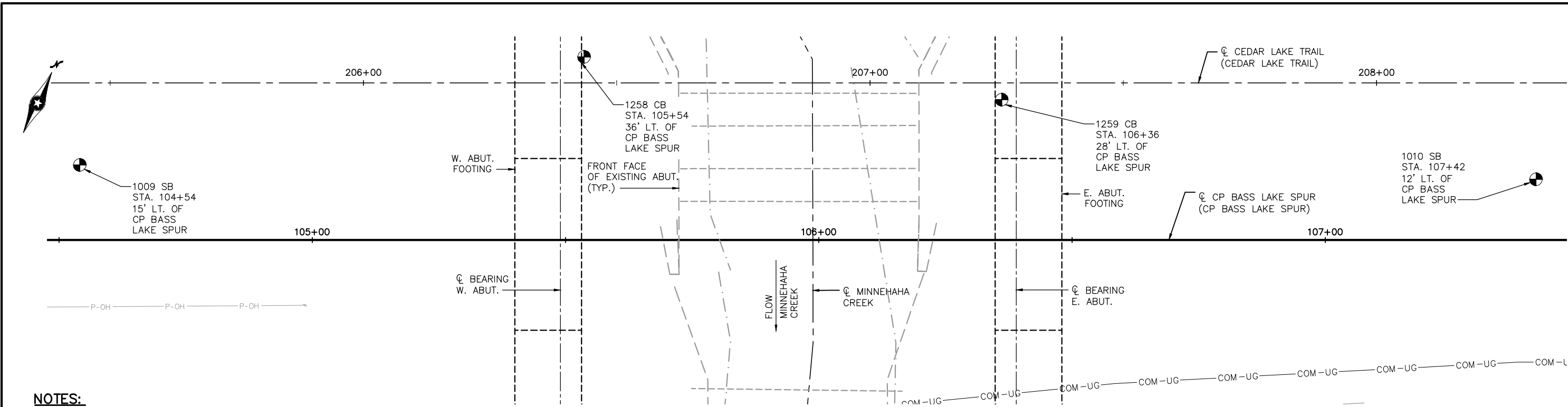
EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (FRT)
CONSTRUCTION SEQUENCING (2 OF 2)

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-MNHA-FRT-DTL-002

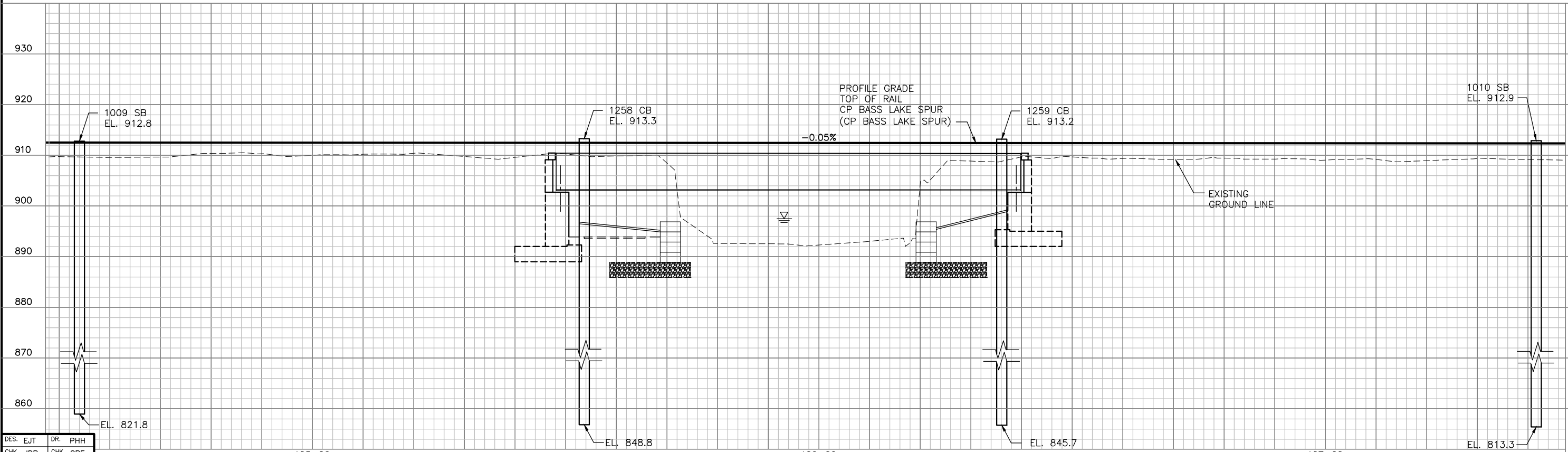
SHEET
45
OF
274

Aug. 26 2014 11:32 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-FRT-SUR-002.dwg By: ronald.dee



NOTES:

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".



DES.	EJT	DR.	PHH											
CHK.	JDP	CHK.	CPE	105+00										
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL									

Kimley»Horn

PRELIMINARY ENGINEERING

METROPOLITAN COUNCIL

SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)

MINNEHAHA CREEK

BRIDGE XXXXX (FRT)

BORINGS (1 OF 3)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-BRG-MNHA-FRT-BOR-001**

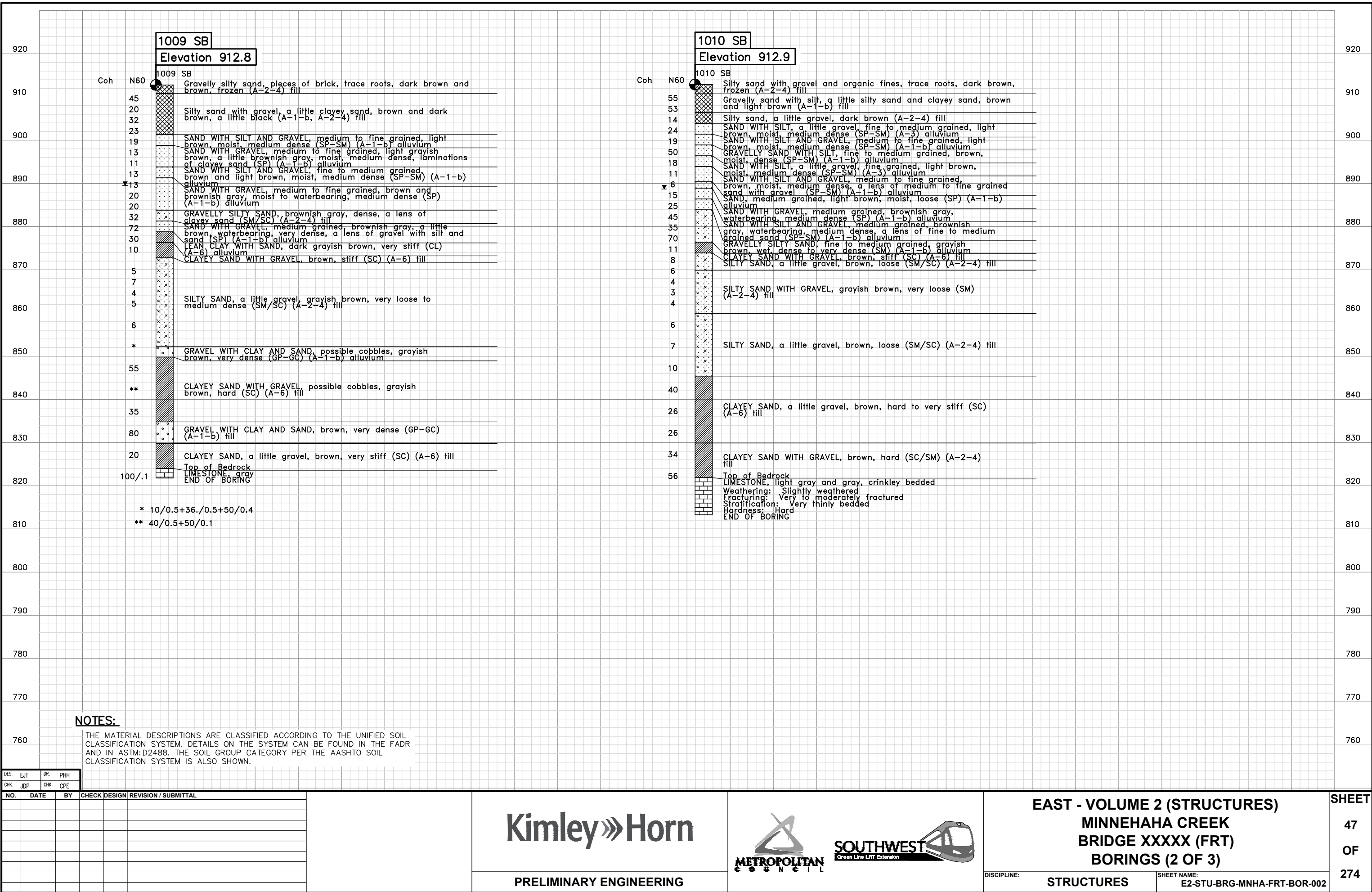
SHEET

46

OF

274

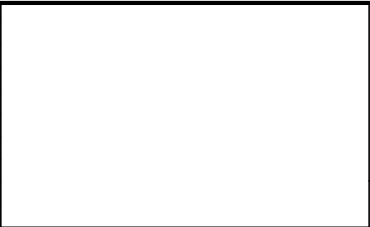
Aug. 26 2014 11:32 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-FRT-BOR.dwg By: ronald.dee



Aug. 26 2014 11:32 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-FRT-AES.dwg By: ronald.dee

DES. EJT	DR. PHH
CHK. JDP	CHK. CPE

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



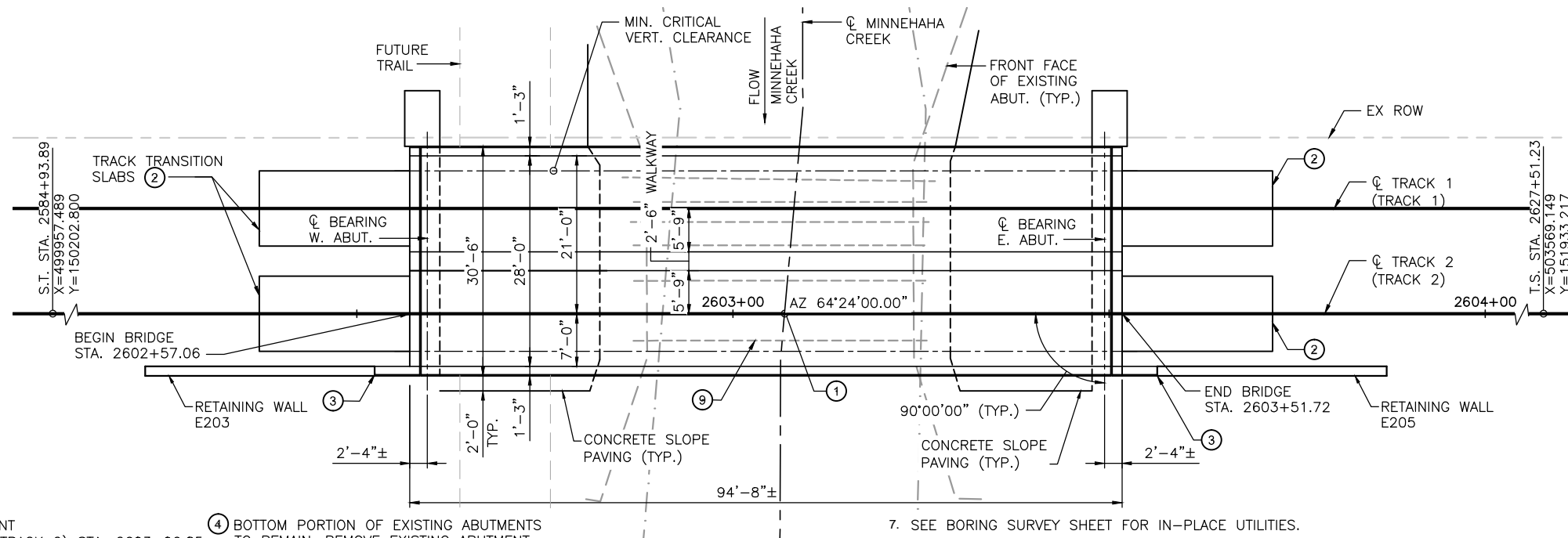
EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (FRT)
AESTHETICS

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-MNHA-FRT-AES

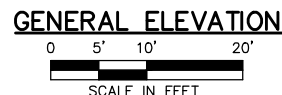
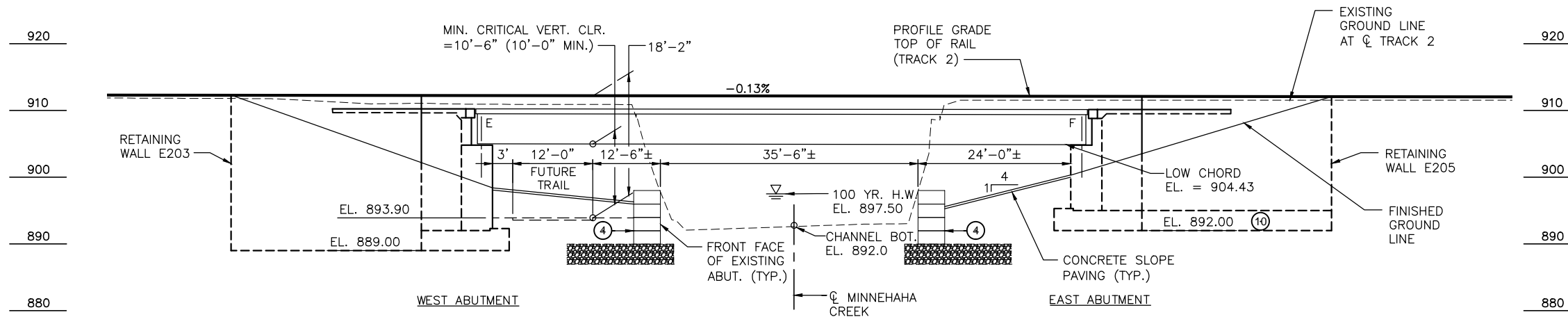
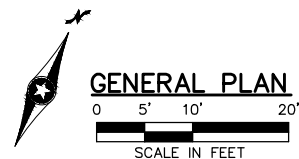
SHEET
49
OF
274

Aug. 26 2014 11:31 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-LRT-GPE.dwg By: ronald.dee



NOTES:

- CONTROL POINT
CL TRACK 2 (TRACK 2) STA. 2603+06.85=
CL MINNEHAHA CREEK STA. 1+00.57
X = 501364.731
Y = 150877.041
- SEE TRACK PLANS FOR TRANSITION SLAB DETAILS.
- END OF BRIDGE SUBSTRUCTURE AND BEGINNING OF RETAINING WALL TO BE COORDINATED DURING ADVANCED DESIGN.
- BOTTOM PORTION OF EXISTING ABUTMENTS TO REMAIN. REMOVE EXISTING ABUTMENT TO ELEVATION 898.0± VERIFY REMOVAL LIMITS WITH CAR.
- SEE MINNEHAHA CREEK (FRT) BRIDGE PLANS FOR CONSTRUCTION SEQUENCING INFORMATION.
- MINNEHAHA CREEK WATERSHED DISTRICT HAS PROVIDED HYDRAULIC MODELING FOR MINNEHAHA CREEK. ADDITIONAL COORDINATION TO BE COMPLETED DURING ADVANCED DESIGN.
- SEE BORING SURVEY SHEET FOR IN-PLACE UTILITIES.
- SUBSTRUCTURE SET PARALLEL AT AZ 154° 24' 00.00"
- EXISTING BRIDGE, SINGLE SPAN, 37' LONG AND 21' WIDE STEEL DECK PLATE GIRDER BRIDGE. SUPERSTRUCTURE AND PORTION OF SUBSTRUCTURE TO BE REMOVED.
- EAST ABUTMENT FOUNDATION IS PLACED AT EL. 892.0 TO PENETRATE A CLAY LAYER. SEE FOUNDATION ANALYSIS AND DESIGN REPORT FOR ADDITIONAL INFORMATION.



DESIGN DATA

2012 AND CURRENT INTERIM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA (REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD

LRV & MV LOAD DIAGRAM SHOWN ON TRANSVERSE SECTION SHEET

MATERIAL DESIGN PROPERTIES:
REINFORCED CONCRETE:
f_c = 4000 PSI n = 8
f_y = 60000 PSI REINFORCEMENT

PRESTRESSED CONCRETE:
f_c = 9000 PSI n = 1
f_{pu} = 270 KSI LOW RELAXATION STRANDS
0.75 f_{pu} FOR INITIAL PRESTRESS

DESIGN SPEED: OVER = 30 MPH (LRT)

APPROXIMATE DECK AREA 2890 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
50	GENERAL PLAN AND ELEVATION
51	BRIDGE SURVEY
52	TRANSVERSE SECTION
53-54	BORINGS
55	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK:
SINGLE SPAN - 4 LINES OF MN54 PRESTRESSED CONCRETE BEAMS - SIMPLE SPAN

ALL BARS EPOXY COATED

SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON SPREAD FOOTINGS

DEPTH OF STRUCTURE:
7'-8"± TOP OF RAIL TO LOW BRIDGE

AESTHETICS: LEVEL _

PRELIMINARY PLAN BRIDGE NO. XXXXX

SOUTHWEST LRT OVER MINNEHAHA CREEK
1.5 MI. S.W. OF JCT. OF T.H. 7 & HWY 100
IN ST. LOUIS PARK

94'-8" PRESTRESSED CONCRETE BEAM SPAN
28'-0" LRT
00'-00'-00.00" SKEW

BRIDGE I.D. NO. 501 GENERAL PLAN AND ELEVATION

SEC 20 T 117N R 21W
CITY OF ST LOUIS PARK HENNEPIN COUNTY

APPROVED: _____ STATE BRIDGE ENGINEER DATE _____

DES. EJT DR. PHH
CHK. CPE CHK. JDP
JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (LRT)
GENERAL PLAN AND ELEVATION

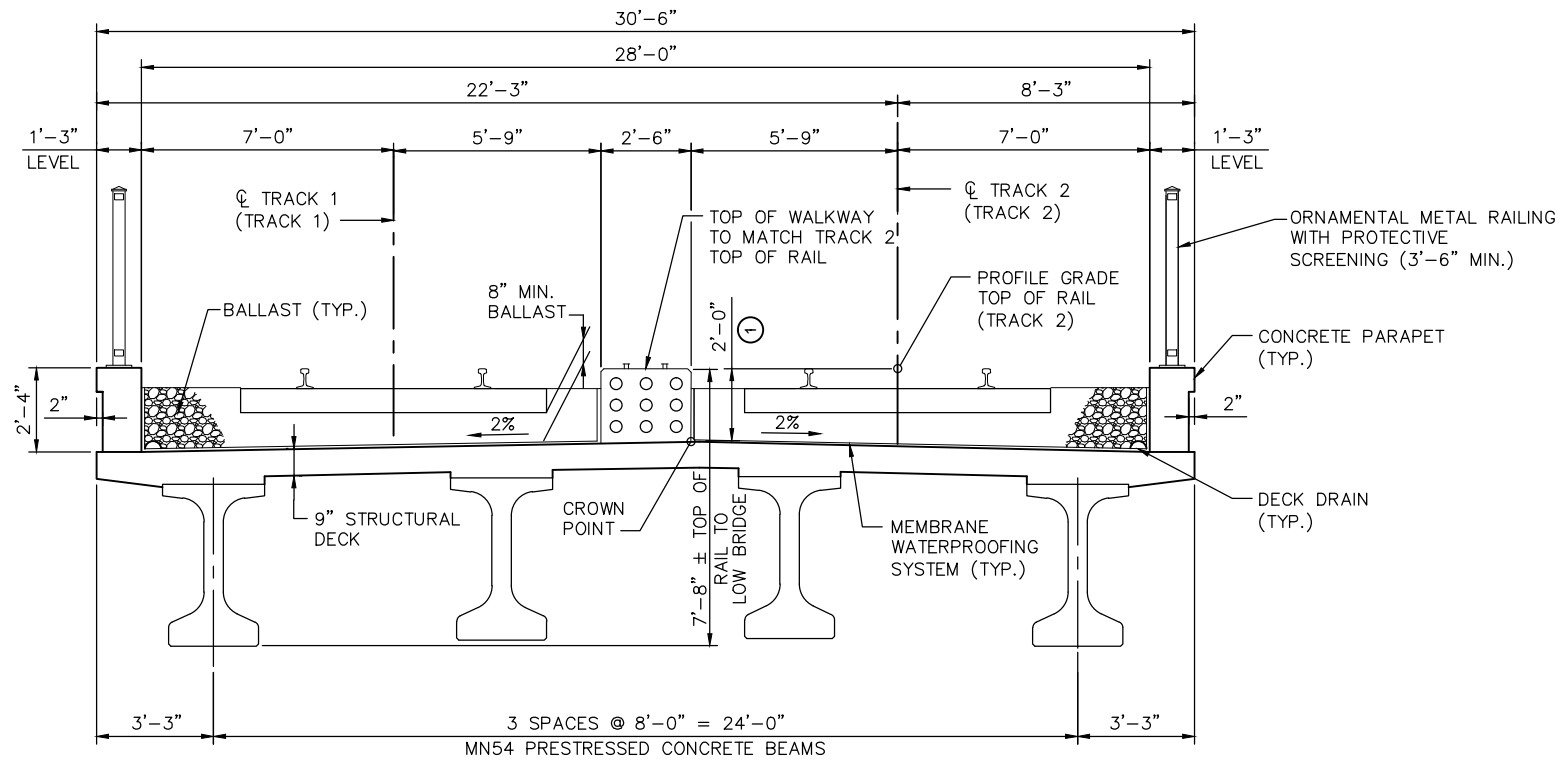
DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-MNHA-LRT-GPE

SHEET
50
OF
274

SEC 20 T 117N R 21W
CITY OF ST LOUIS PARK HENNEPIN COUNTY
BRIDGE XXXXXX

Aug. 26 2014 11:35 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-LRT-SUP.dwg By: ronald.dee



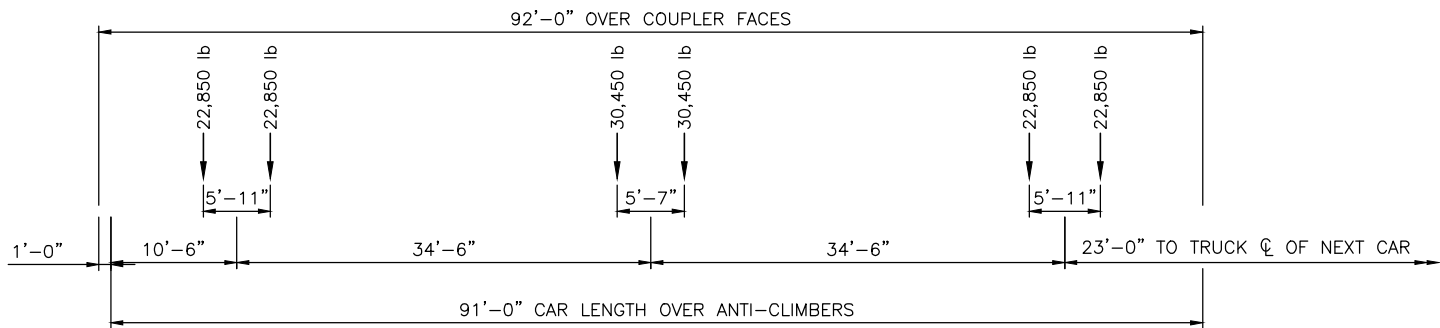
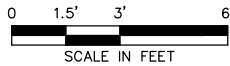
NOTES:

1. NUMBER AND SPACING OF BEAMS IS APPROXIMATE AND WILL BE SET DURING ADVANCED DESIGN.

NOTES:

- ① TOP OF RAIL TO CROWN POINT.

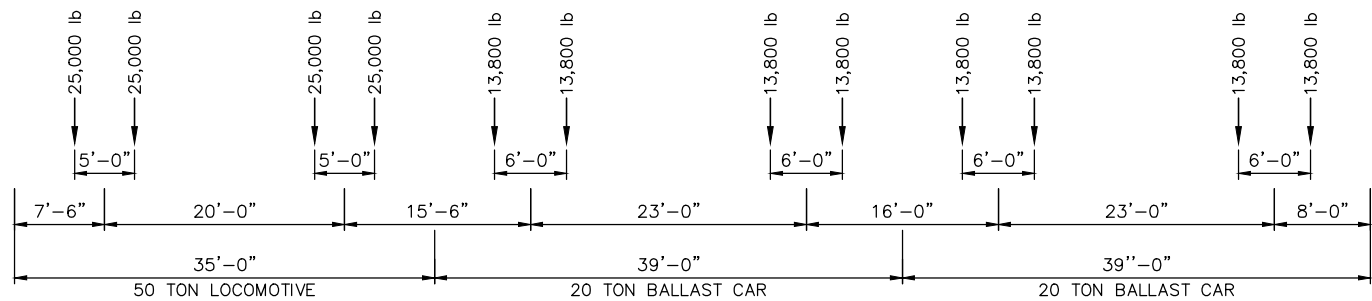
TRANSVERSE SECTION



LIGHT RAIL VEHICLE LOADING DIAGRAM

NOTES:

1. THE LRT TRAIN SHALL CONSIST OF EITHER ONE, TWO OR THREE CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
2. AXLE LOAD IN POUNDS.
3. LOADING DIAGRAM REPRESENTS MAXIMUM LOAD AT EACH TRUCK.



MAINTENANCE TRAIN LOADING DIAGRAM

NOTES:

1. THE MAINTENANCE TRAIN SHALL CONSIST OF ONE LOCOMOTIVE AND ONE, TWO, THREE OR FOUR BALLAST CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
2. AXLE LOAD IN POUNDS.
3. WEIGHT OF EMPTY BALLAST CAR IS 15,000 POUNDS.

DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



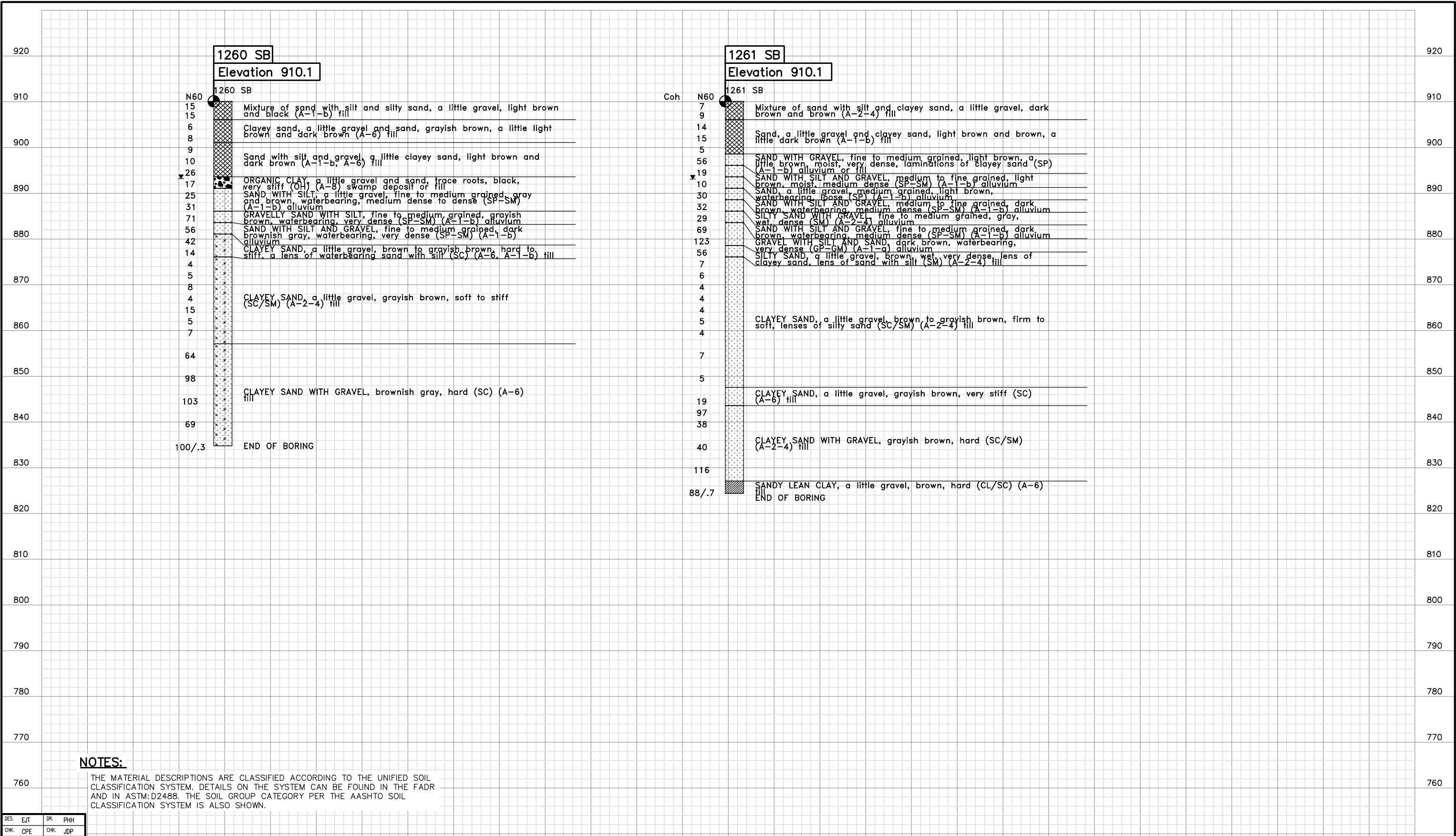
EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (LRT)
TRANSVERSE SECTION

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-MNHA-LRT-SUP

SHEET
52
OF
274

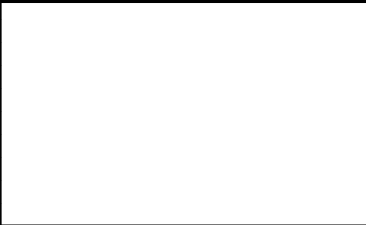
Aug. 26 2014 11:37 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-LRT-BOR.dwg By: ronald.dee



Aug. 26 2014 11:37 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-MNHA-LRT-AES.dwg By: ronald.dee

DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



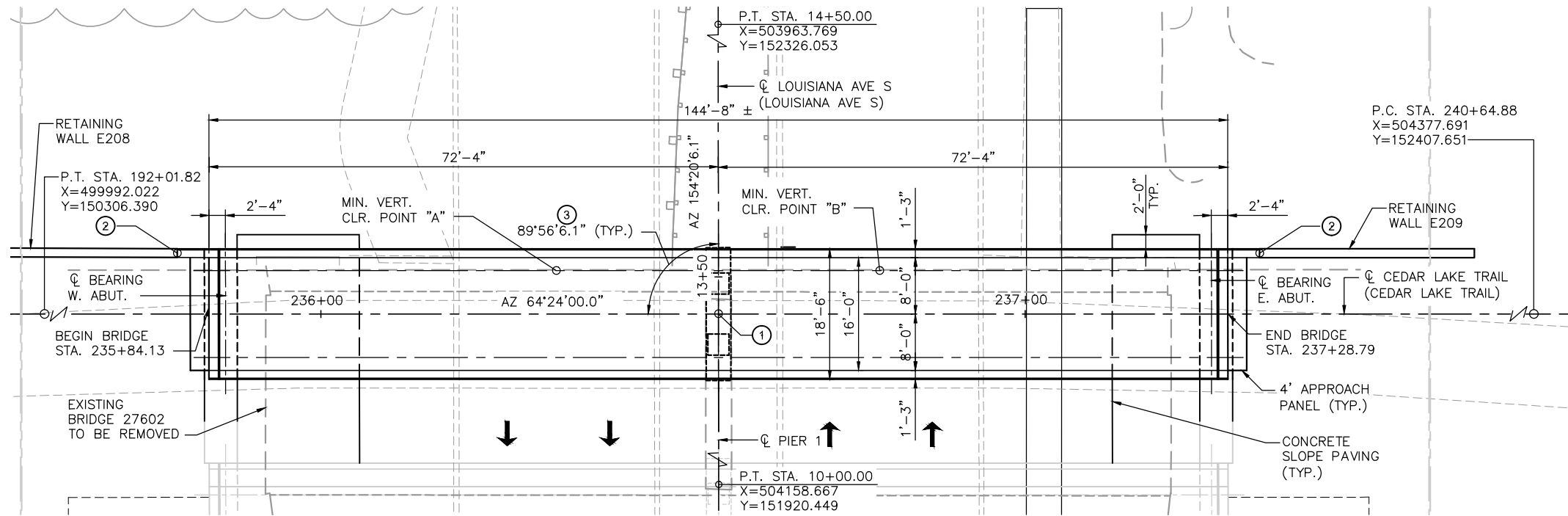
EAST - VOLUME 2 (STRUCTURES)
MINNEHAHA CREEK
BRIDGE XXXXX (LRT)
AESTHETICS

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-MNHA-LRT-AES

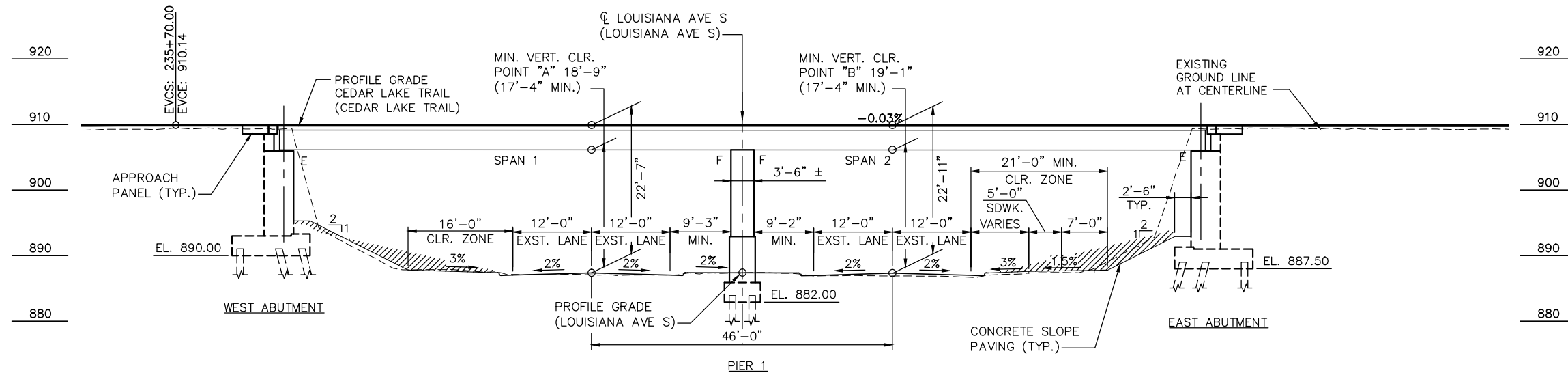
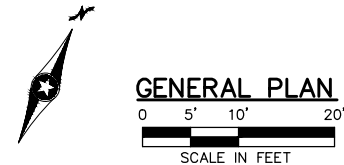
SHEET
55
OF
274

Aug. 26 2014 11:36 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-TRL-GPE.dwg By: ronald.dee



NOTES:

- CONTROL POINT CEDAR LAKE TRAIL STA. (CEDAR LAKE TRAIL) 236+56.46= LOUISIANA AVE S (LOUISIANA AVE S) STA. 13+44.74
X = 504009.359
Y = 152231.175
ANGLE = 89°56'6.0"
- END OF BRIDGE SUBSTRUCTURE AND BEGINNING OF RETAINING WALL TO BE DETERMINED DURING FINAL DESIGN.
- SKUEW TYPICAL FOR ALL SUBSTRUCTURES.
- SUBSTRUCTURES SET PARALLEL AT AZ=154°20'6.1"
- SEE LOUISIANA AVENUE S. (FRT) BRIDGE PLANS FOR CONSTRUCTION SEQUENCING INFORMATION.
- SEE BORING SURVEY SHEET FOR IN PLACE UTILITIES.
- IN PLACE BRIDGE 27602 A TWO SPAN STEEL BRIDGE CONSTRUCTED IN 1979 SUPPORTED BY STEEL H-PILES TO BE REMOVED.
- TRAFFIC DETOUR DURING CONSTRUCTION TO BE DETERMINED IN ADVANCED DESIGN.
- SPAN SET TO APPROXIMATE EXISTING CORRIDOR AESTHETICS.
- USE OF EXISTING PILES IN FOUNDATIONS TO BE EVALUATED IN ADVANCED DESIGN.



GENERAL ELEVATION
0 5' 10' 20'
SCALE IN FEET

DESIGN DATA

2012 AND CURRENT INTERIM AASHTO LRFD
BRIDGE DESIGN SPECIFICATIONS

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA
(REVISION 2.0)

2009 AASHTO LRFD GUIDE SPECIFICATIONS FOR THE
DESIGN OF PEDESTRIAN BRIDGES

LOAD AND RESISTANCE FACTOR DESIGN METHOD

90 PSF PEDESTRIAN LIVE LOAD
H 10 MAINTENANCE VEHICLE LIVE LOAD

MATERIAL DESIGN PROPERTIES:
REINFORCED CONCRETE:
f_c = 4000 PSI n = 8
f_y = 60000 PSI REINFORCEMENT

PRESTRESSED CONCRETE:
f_c = 8000 PSI n = 1
f_{pu} = 270 KSI LOW RELAXATION STRANDS
0.75 f_{pu} FOR INITIAL PRESTRESS

DESIGN SPEED: OVER = 20 MPH
UNDER = 30 MPH

APPROXIMATE DECK AREA 2680 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
56	GENERAL PLAN AND ELEVATION
57	BRIDGE SURVEY
58	TRANSVERSE SECTION
59-60	SOIL BORINGS
61	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK:
2 SPANS - 2 LINES OF 36M PRESTRESSED
CONCRETE BEAMS - SIMPLE SPANS

ALL BARS EPOXY COATED

SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON STEEL H-PILES
TWO COLUMN PIER SUPPORTED ON STEEL H-PILES

DEPTH OF STRUCTURE:
3'-10"± PROFILE GRADE LINE TO LOW BRIDGE

AESTHETICS: LEVEL _

2030 PROJECTED TRAFFIC VOLUMES

ROADWAY OVER		ROADWAY UNDER
NA	A.D.T.	16,300
NA	D.H.V.	1,300
NA	A.D.T.T.	600

PRELIMINARY PLAN BRIDGE NO. XXXXX

CEDAR LAKE TRAIL OVER LOUISIANA AVE S
0.3 MI. SOUTH OF JCT. T.H. 7 AND LOUISIANA AVE S
IN ST. LOUIS PARK

72'-4"-72'-4" PRESTRESSED CONCRETE BEAM SPANS
16'-0" TRAIL
00'-03'-53.9" SKEW

BRIDGE I.D. NO. 501 GENERAL PLAN AND ELEVATION

SEC 20 T 117N R 21W
CITY OF ST LOUIS PARK HENNEPIN COUNTY

APPROVED: _____ DATE _____
STATE BRIDGE ENGINEER

DES. EJT DR. PHH
CHK. CPE CHK. JDP
JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



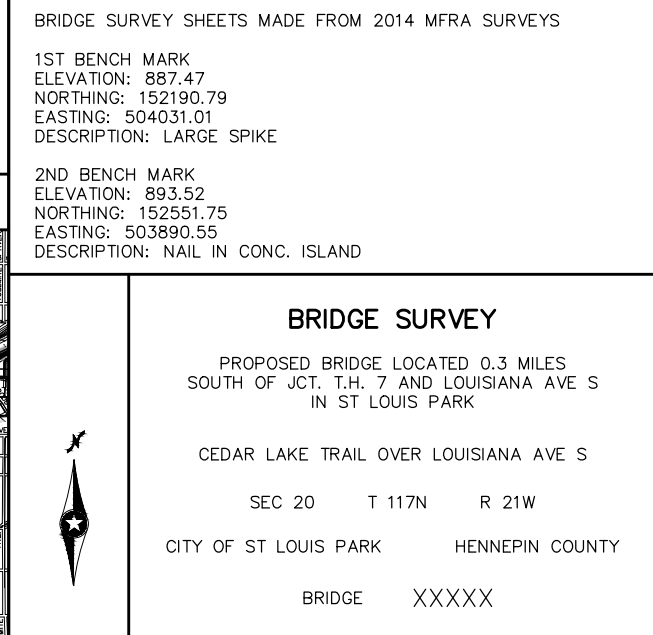
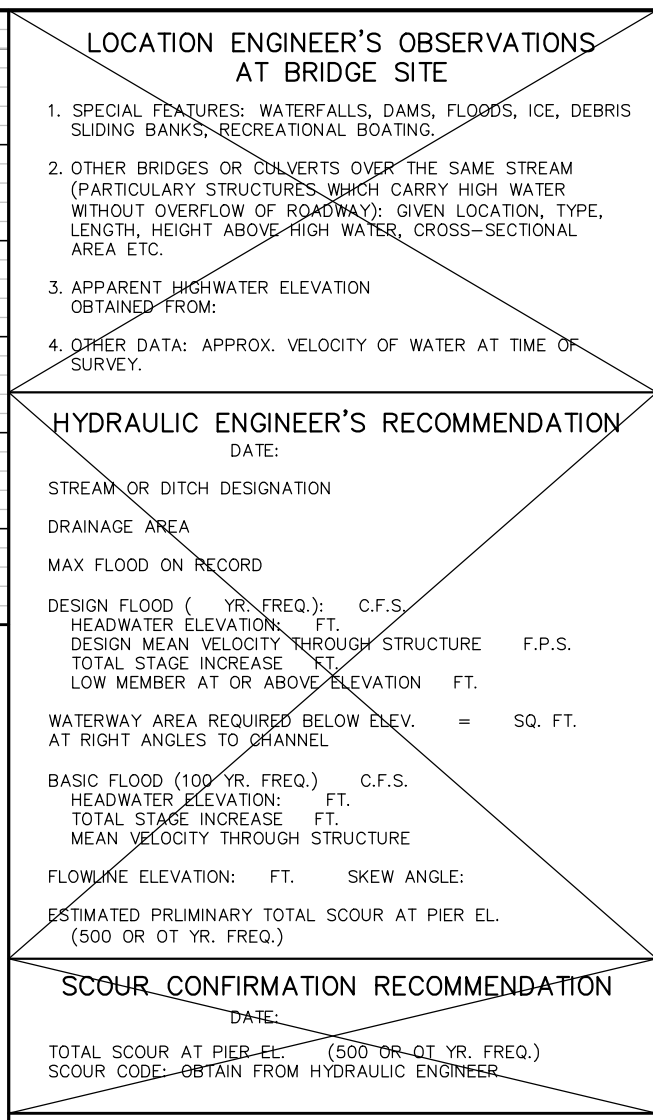
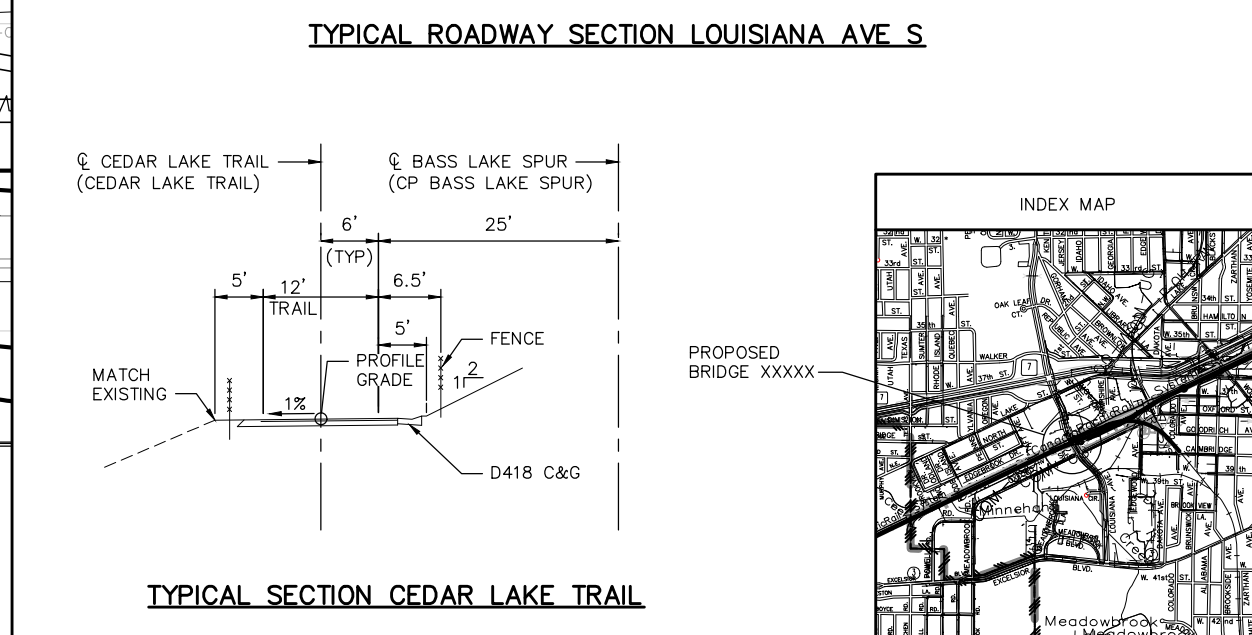
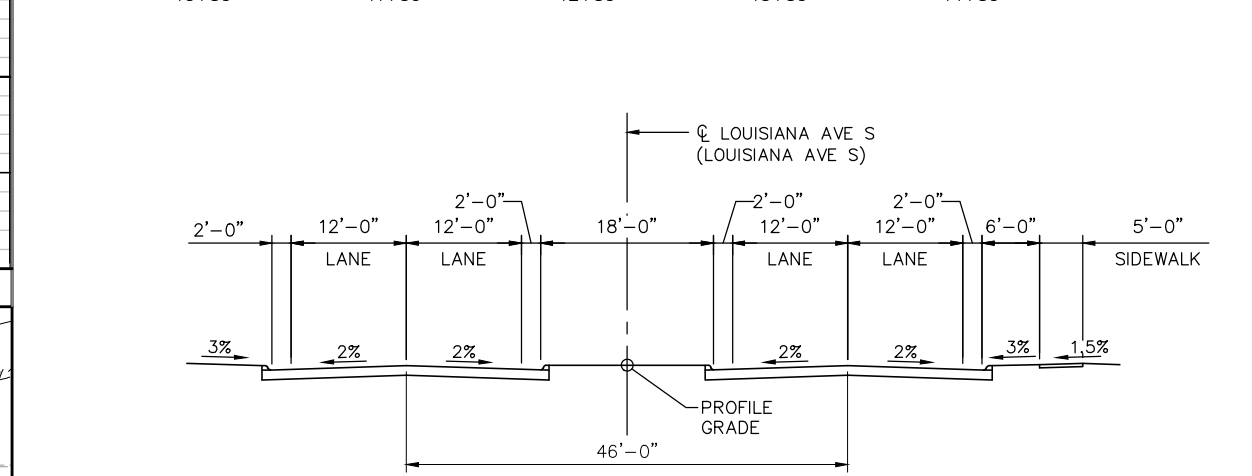
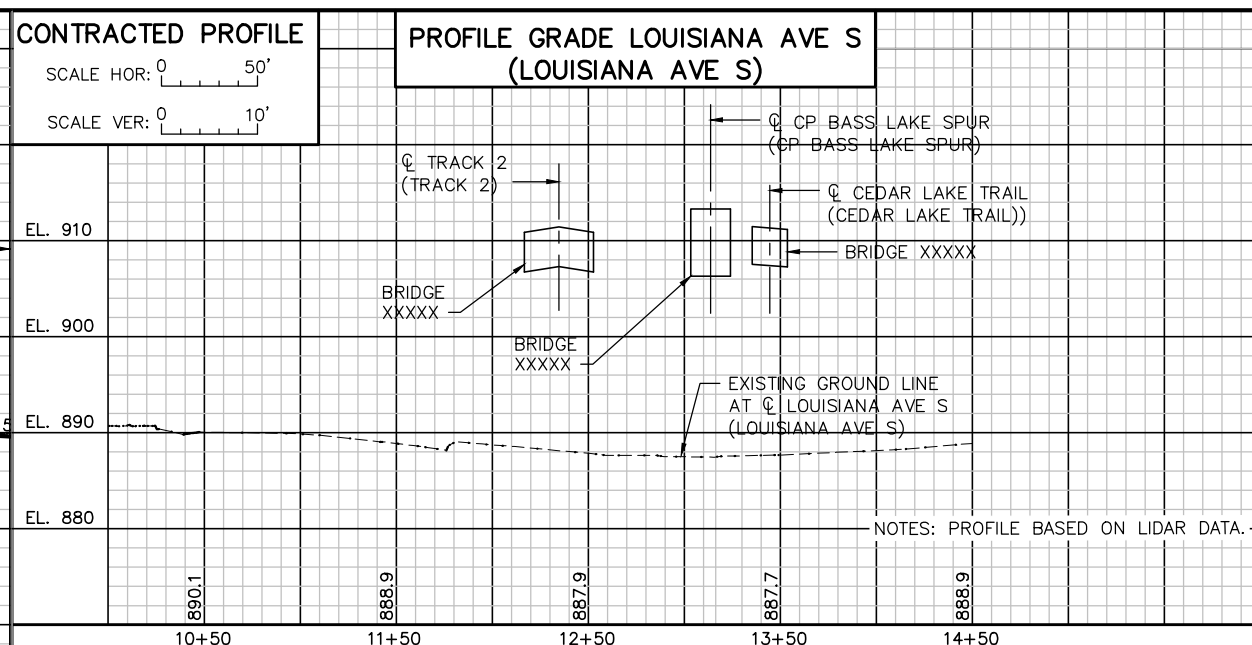
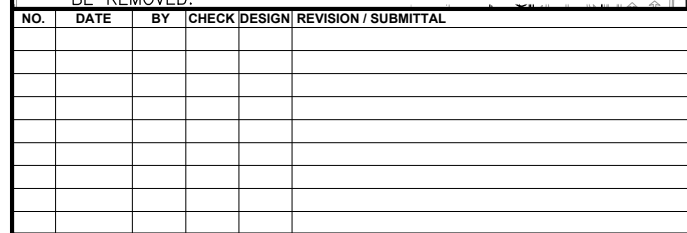
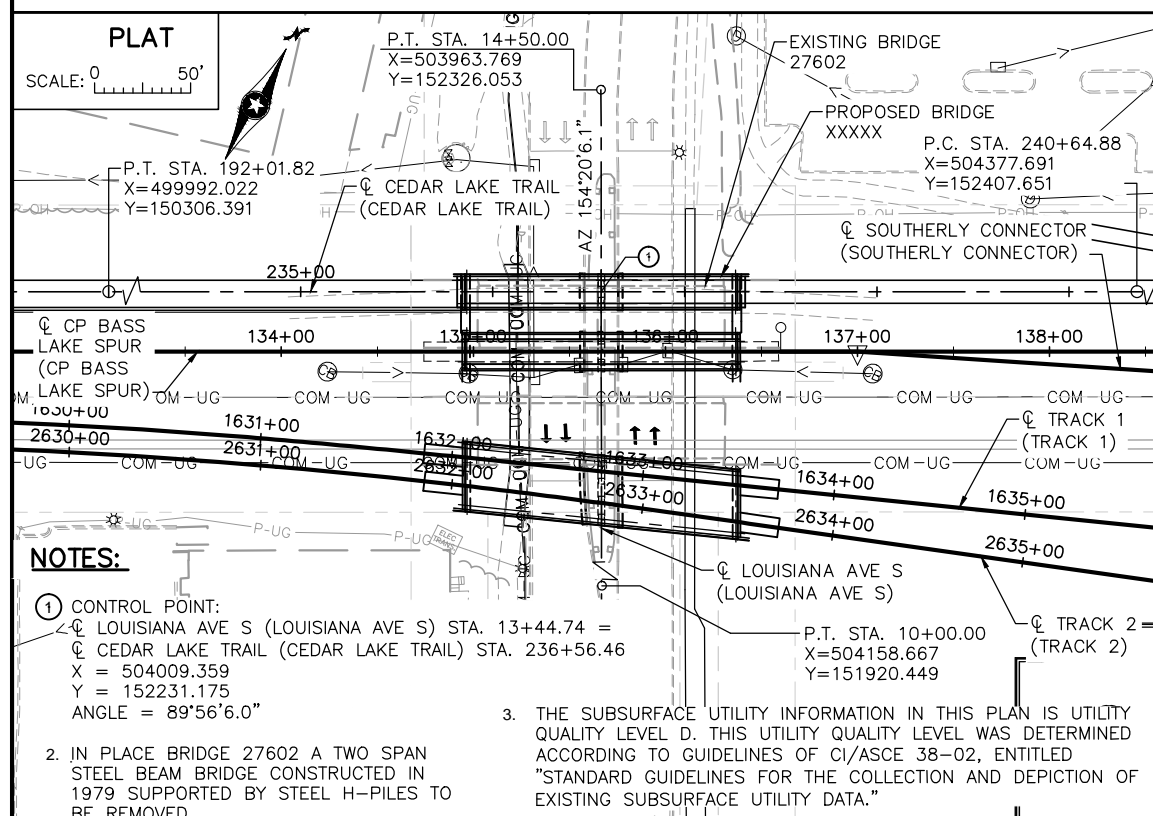
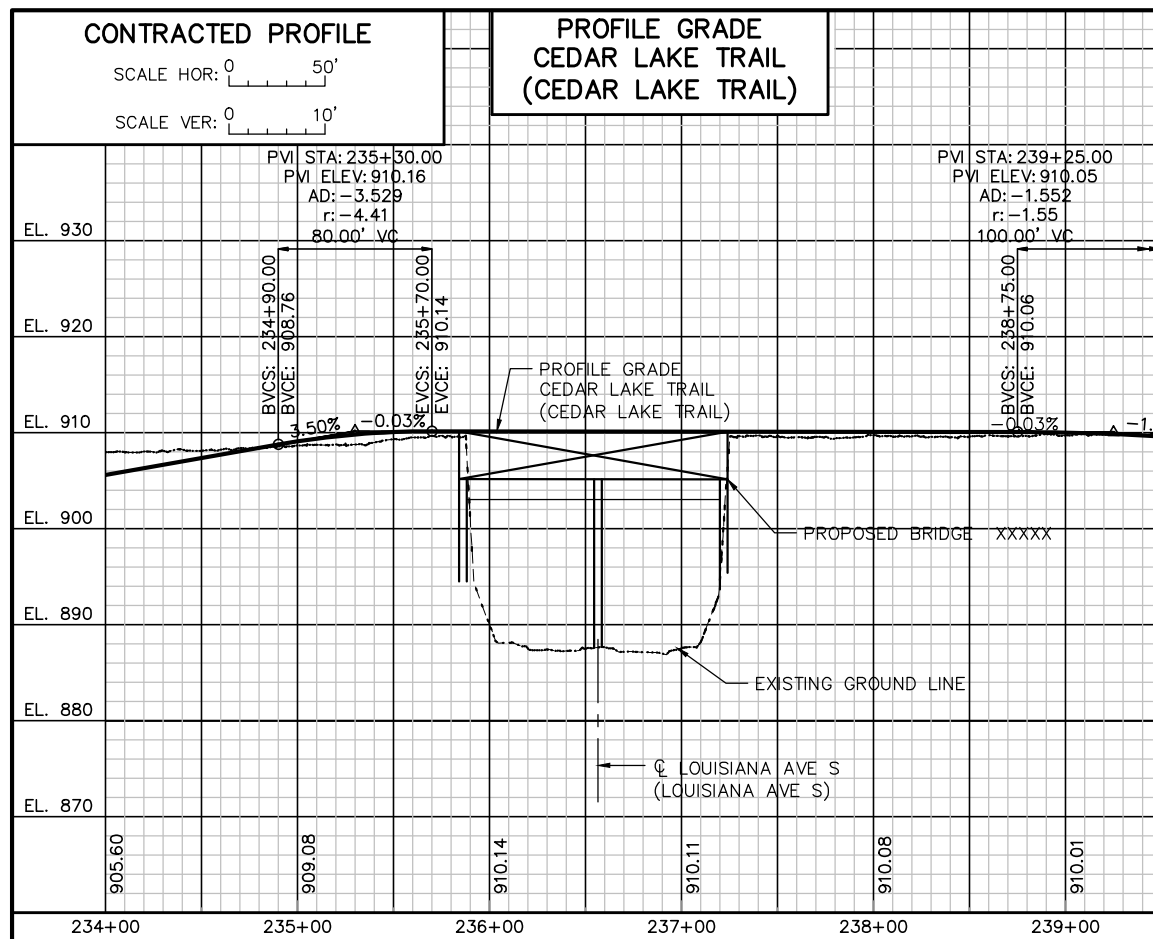
SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (TRL)
GENERAL PLAN AND ELEVATION

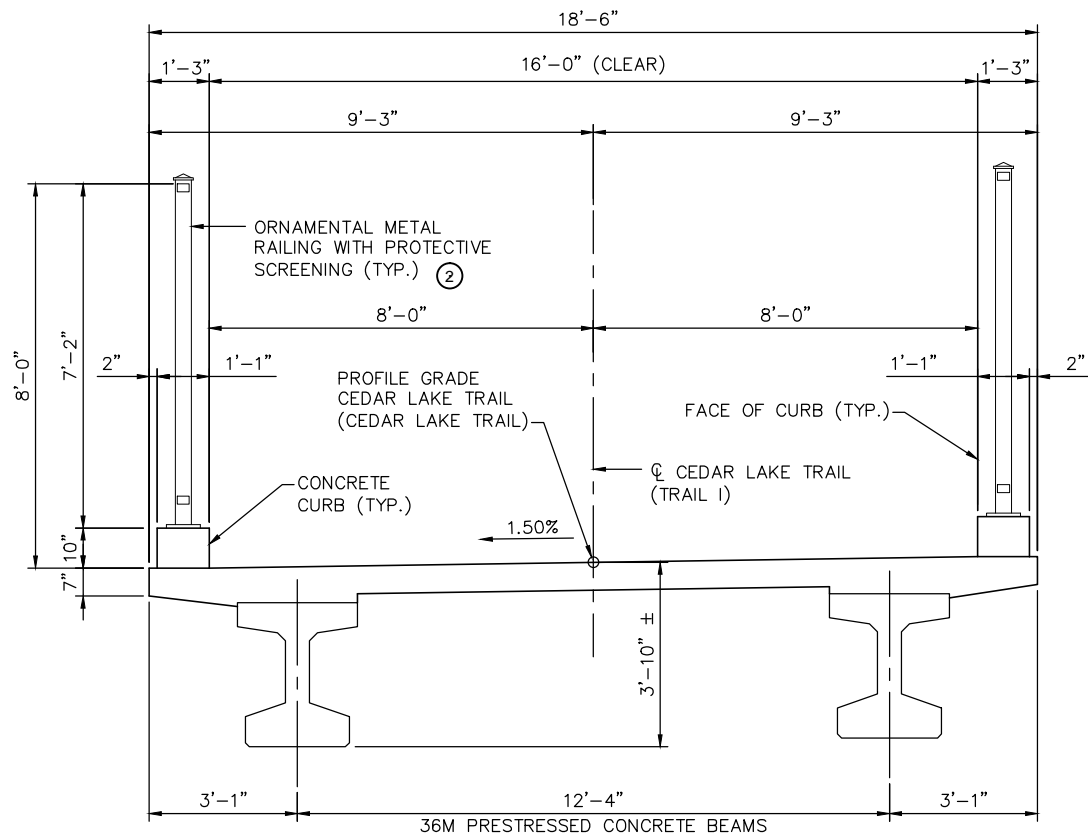
DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-LOIS-TRL-GPE

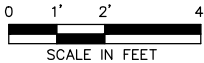
SHEET
56
OF
274



Aug. 26 2014 11:40 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-TRL-SUP.dwg By: ronald.dee



TRANSVERSE SECTION

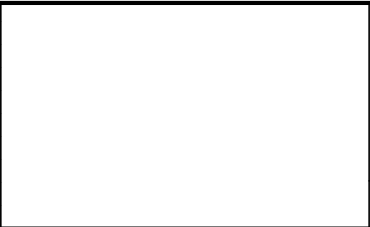


NOTES:

1. NUMBER AND SPACING OF BEAMS IS APPROXIMATE AND WILL BE SET IN ADVANCED DESIGN
2. METAL RAILING TO MEET REQUIREMENTS FOR PROTECTIVE SCREENING PER LRFD BRIDGE DESIGN MANUAL 13.2.5

DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING

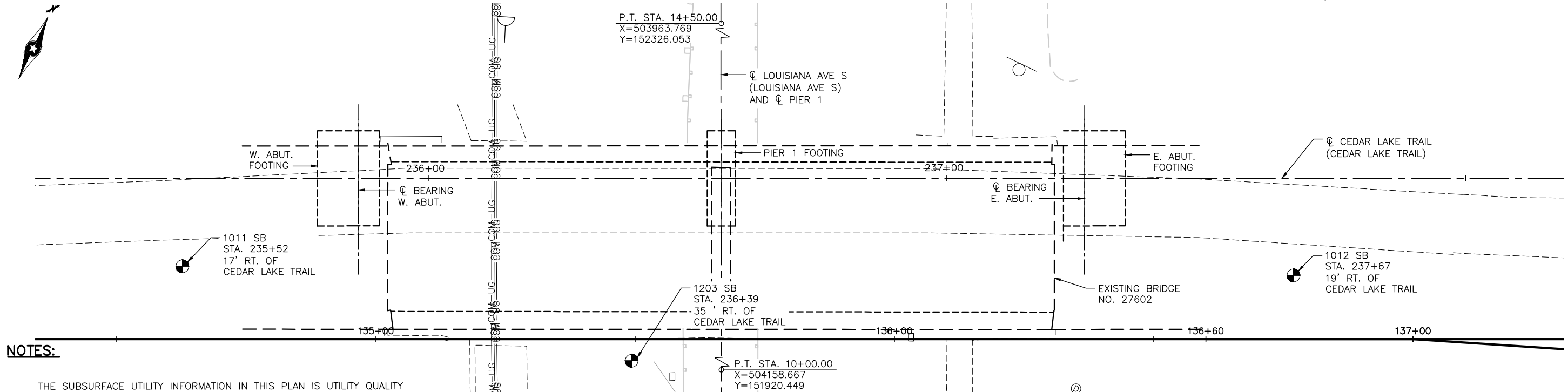


EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (TRL)
TRANSVERSE SECTION

DISCIPLINE: STRUCTURES

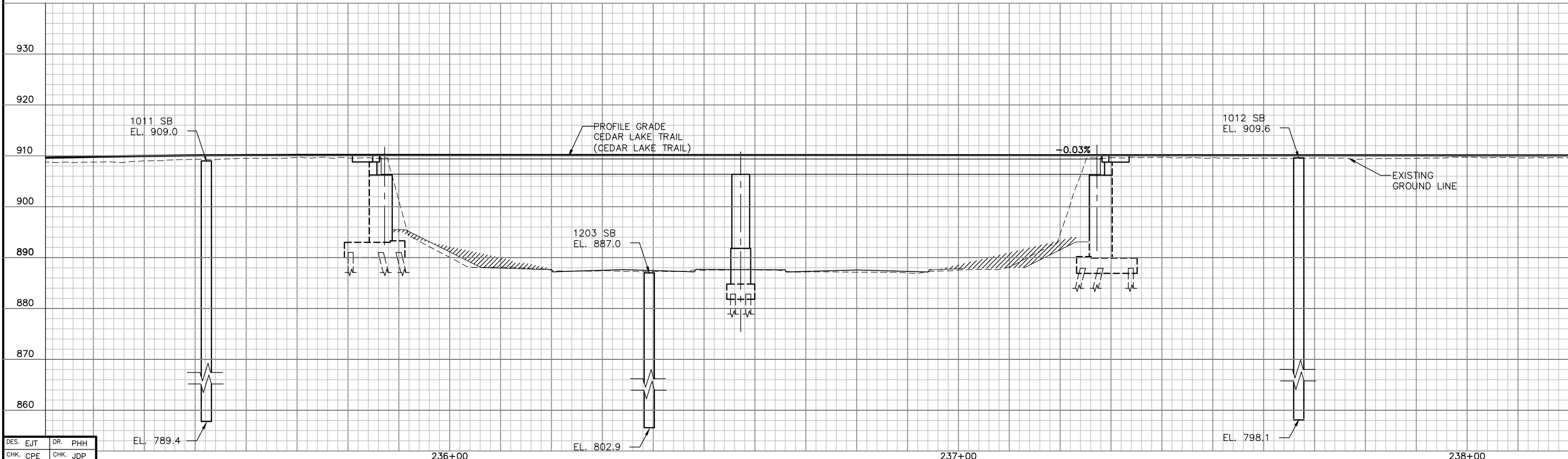
SHEET NAME:
E2-STU-BRG-LOIS-TRL-SUP

Aug. 26 2014 11:43 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-TRL-SUR-002.dwg By: ronald.dee



NOTES:

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".



DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension

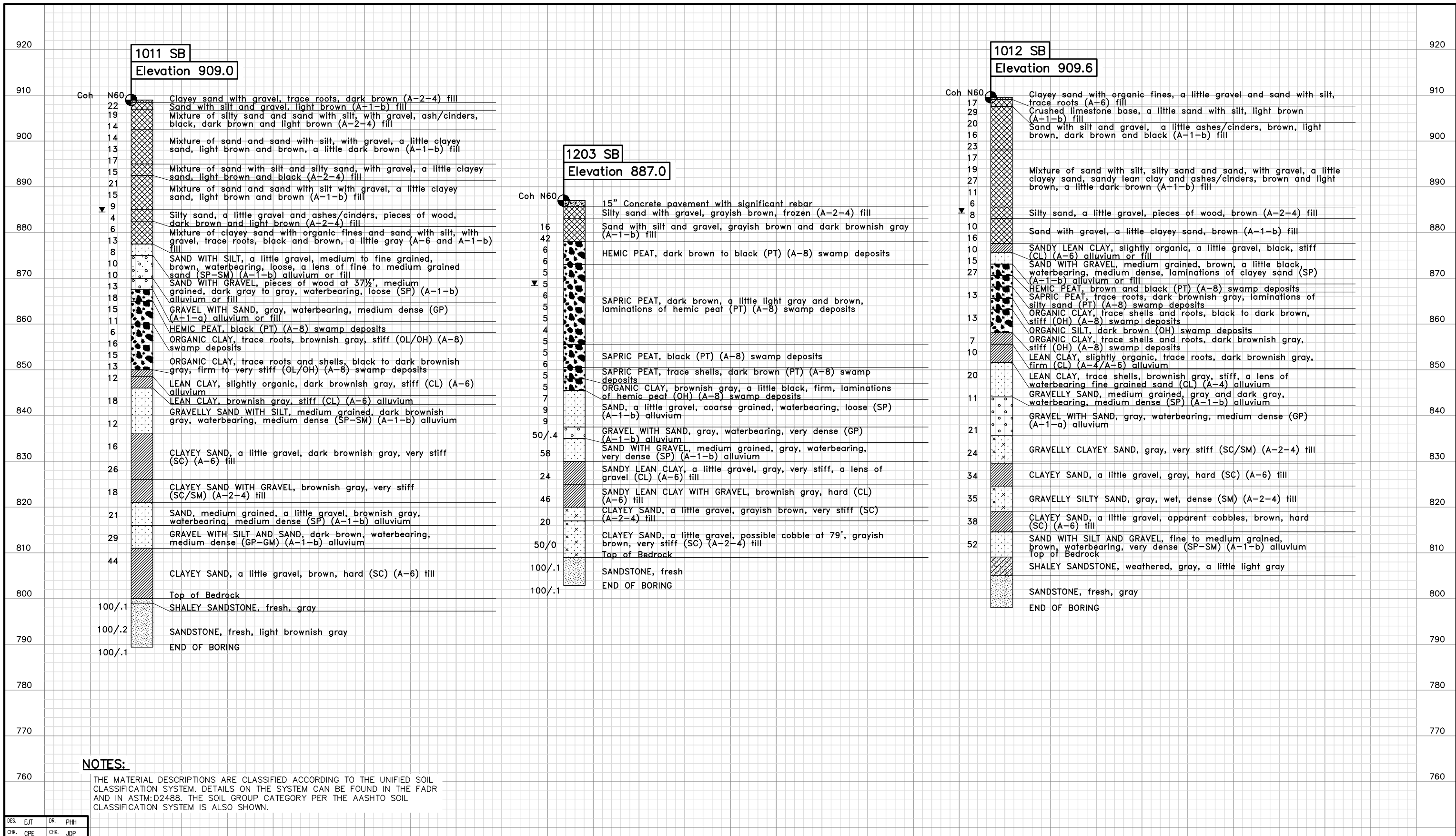


EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (TRL)
BORINGS (1 OF 2)

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-LOIS-TRL-BOR-001

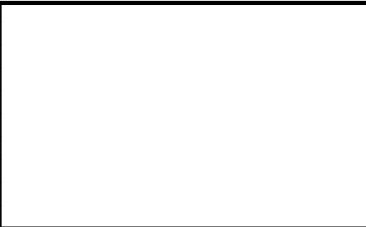
SHEET
59
OF
274

[illegible]

Aug. 26 2014 11:43 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-TRL-AES.dwg By: ronald.dee

DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



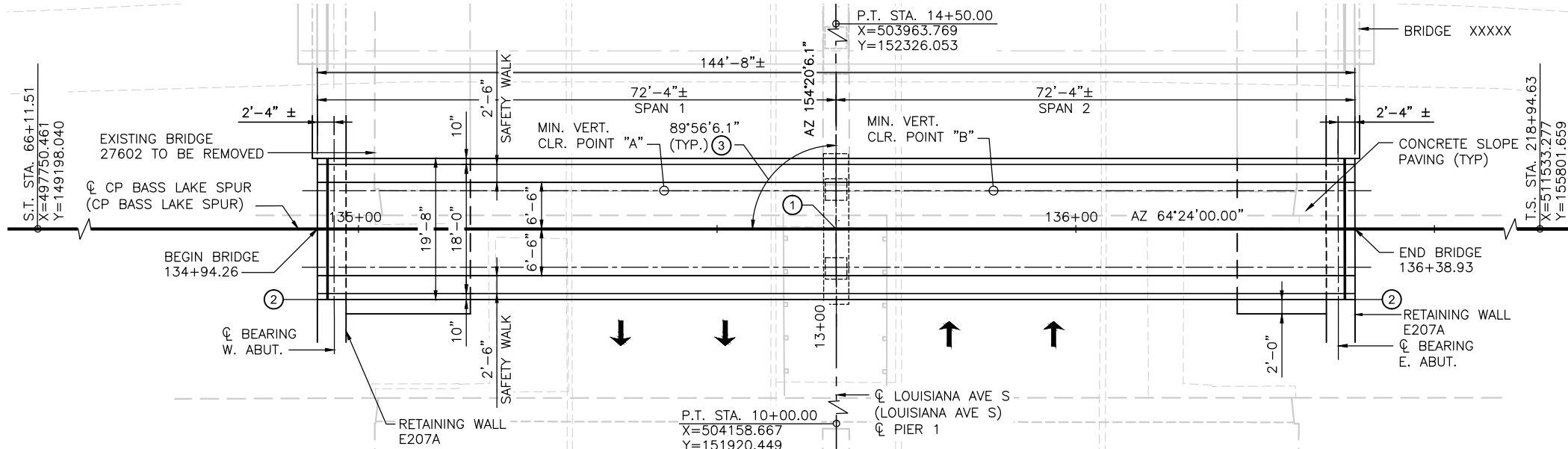
EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (TRL)
AESTHETICS

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-LOIS-TRL-AES

SHEET
61
OF
274

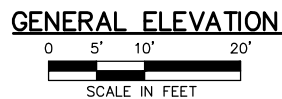
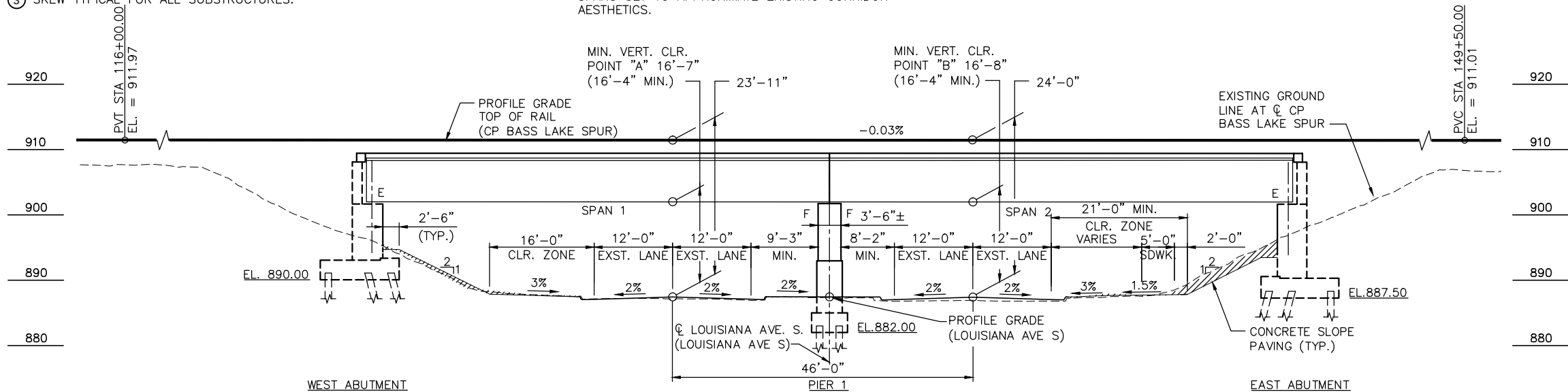
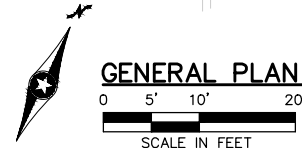
Aug. 26 2014 11:42 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-FRT-GPE.dwg By: ronald.dee



NOTES:

- CONTROL POINT
CL LOUISIANA AVE S (LOUISIANA AVE S) STA. 13+13.74 =
CL CP BASS LAKE SPUR (CP BASS LAKE SPUR) STA. 135+66.59
X = 504022.785
Y = 152203.234
ANGLE = 89°56'6.09"
- END OF BRIDGE SUBSTRUCTURE AND BEGINNING OF RETAINING WALL TO BE COORDINATED DURING FINAL DESIGN.
- SKREW TYPICAL FOR ALL SUBSTRUCTURES.

- SUBSTRUCTURES SET PARALLEL AT AZ 154°20'6.1".
- SEE BORING SHEET FOR IN-PLACE UTILITIES.
- IN PLACE BRIDGE 27602 A TWO SPAN STEEL BEAM STRUCTURE BUILT IN 1979 SUPPORTED BY STEEL H-PILES TO BE REMOVED.
- TRAFFIC DETOUR DURING CONSTRUCTION TO BE DETERMINED IN ADVANCED DESIGN.
- SPANS SET TO APPROXIMATE EXISTING CORRIDOR AESTHETICS.



DESIGN DATA

2013 AREMA MANUAL FOR RAILWAY ENGINEERING
SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA (REVISION 2.0)
ALLOWABLE STRESS DESIGN METHOD
COOPER E 90 LIVE LOAD
MATERIAL DESIGN PROPERTIES:
REINFORCED CONCRETE:
f'c = 4000 PSI n = 8
fy = 60000 PSI REINFORCEMENT
STRUCTURAL STEEL:
fy = 50,000 PSI
DESIGN SPEED: OVER = 15 MPH
UNDER = 30 MPH
APPROXIMATE DECK AREA 2850 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
62	GENERAL PLAN AND ELEVATION
63	BRIDGE SURVEY
64	TRANSVERSE SECTION
65-66	CONSTRUCTION SEQUENCING
67-68	BORINGS
69	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK:
2 SPANS OF BALLASTED REINFORCED CONCRETE
DECK ON 4 LINES OF WELDED STEEL PLATE GIRDERS (SIMPLE SPANS). COMPOSITE STEEL DESIGN
SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON STEEL H-PILES
TWO COLUMN PIER SUPPORTED ON STEEL H-PILES
DEPTH OF STRUCTURE:
7'-4½"± TOP OF RAIL TO LOW STEEL
AESTHETICS: LEVEL _

2030 PROJECTED TRAFFIC VOLUMES

ROADWAY OVER		ROADWAY UNDER
NA	A.D.T.	16,300
NA	D.H.V.	1,300
NA	A.D.T.T.	600

PRELIMINARY PLAN BRIDGE NO. XXXXX

CP BASS LAKE SPUR OVER LOUISIANA AVE S
0.3 MI. SOUTH OF JCT. T.H. 7 AND LOUISIANA AVE S
IN ST. LOUIS PARK
72'-4"-72'-4" STEEL WELDED PLATE GIRDER SPANS
13'-0" RAILWAY
00'-03'-53.91" SKEW

BRIDGE I.D. NO. 301 GENERAL PLAN AND ELEVATION

SEC 20 T 117N R 21W
CITY OF ST LOUIS PARK HENNEPIN COUNTY

APPROVED: _____ DATE _____
STATE BRIDGE ENGINEER

DES. EJT DR. PHH
CHK. CPE CHK. JDP
JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

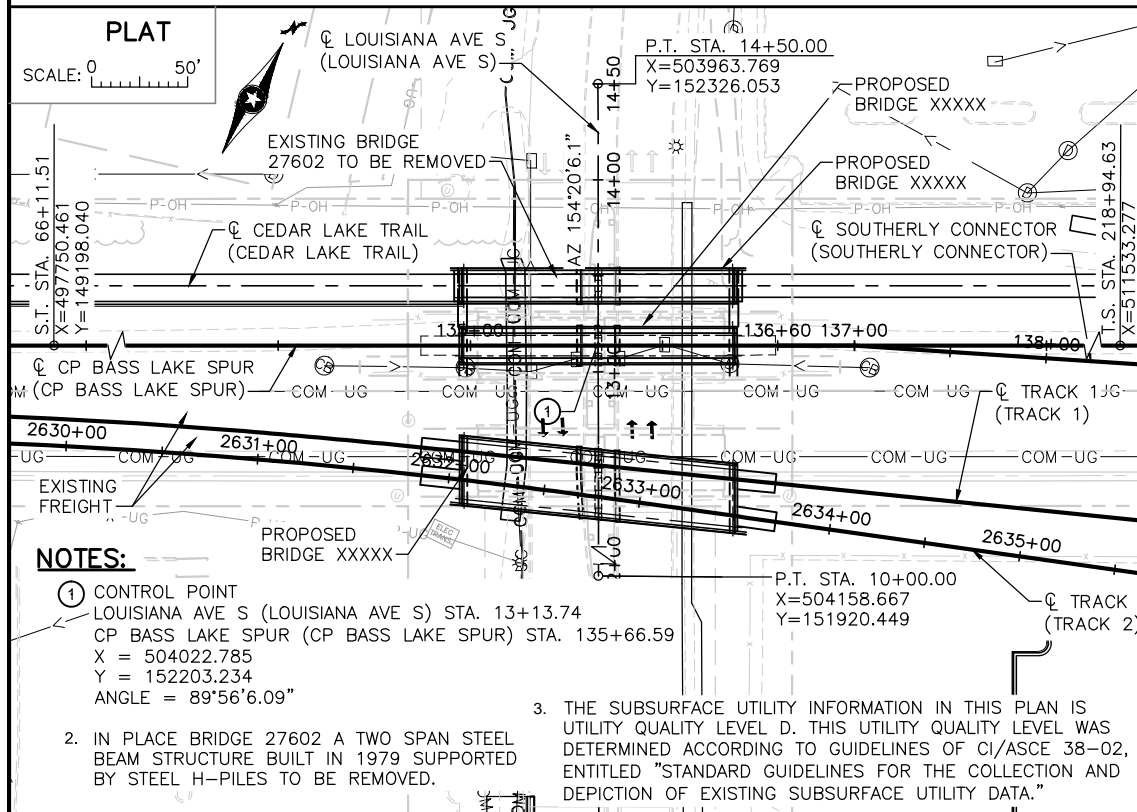
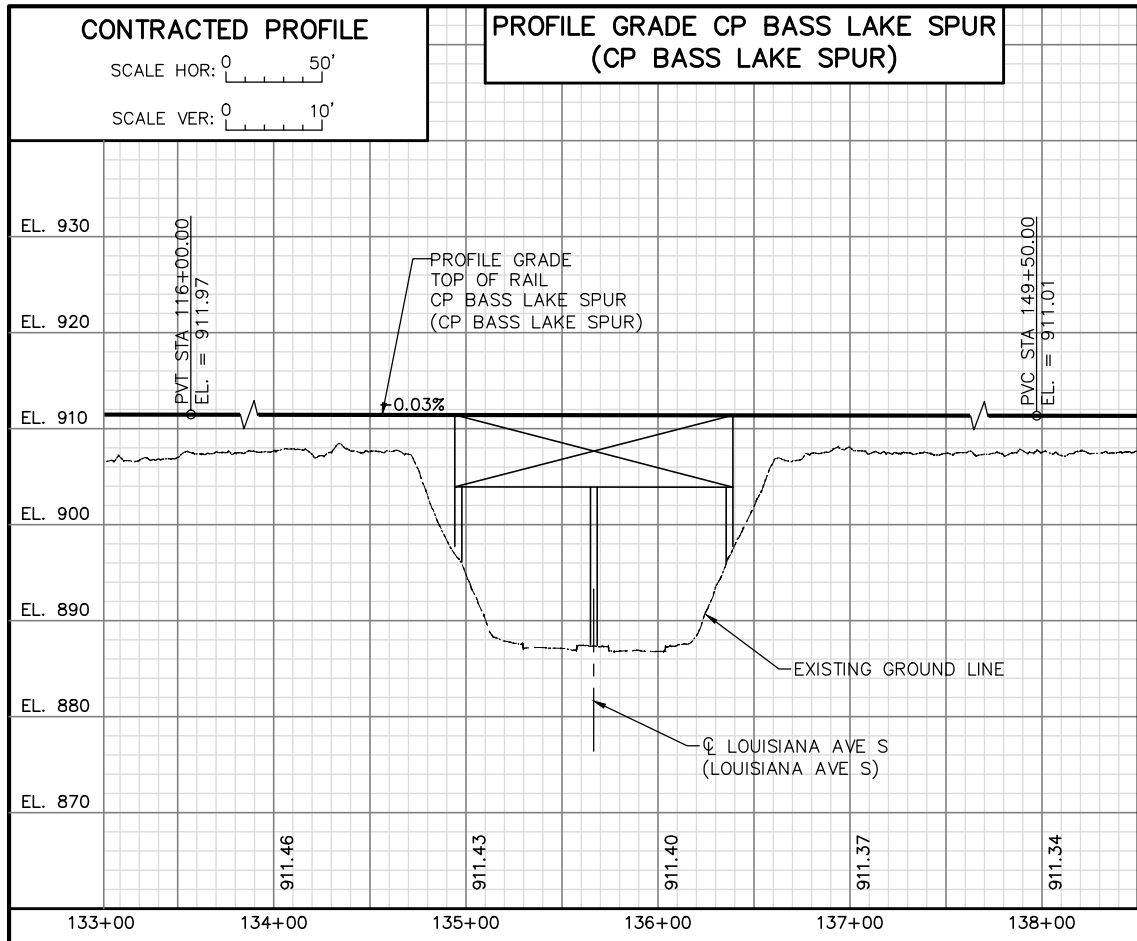
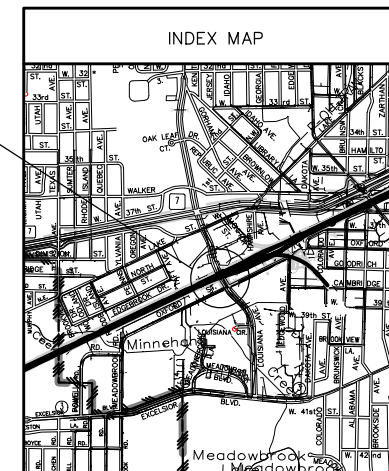
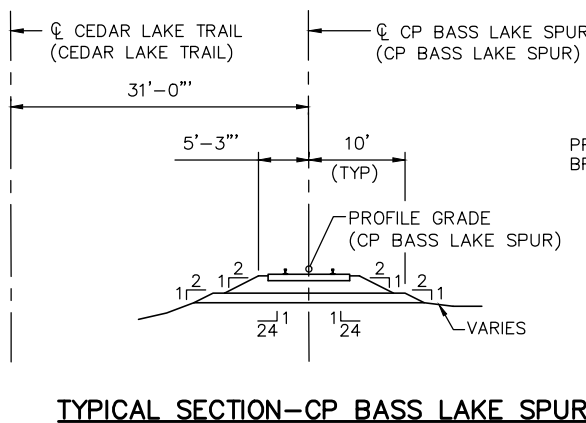
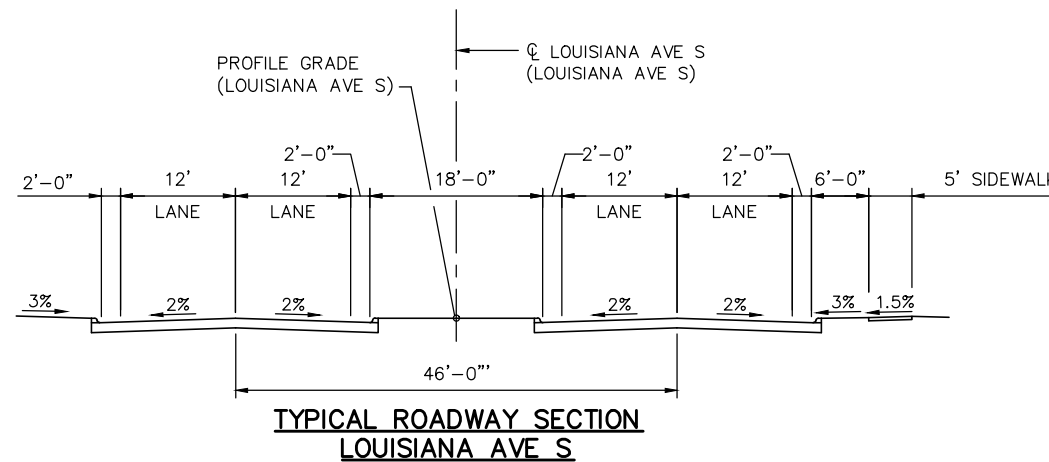
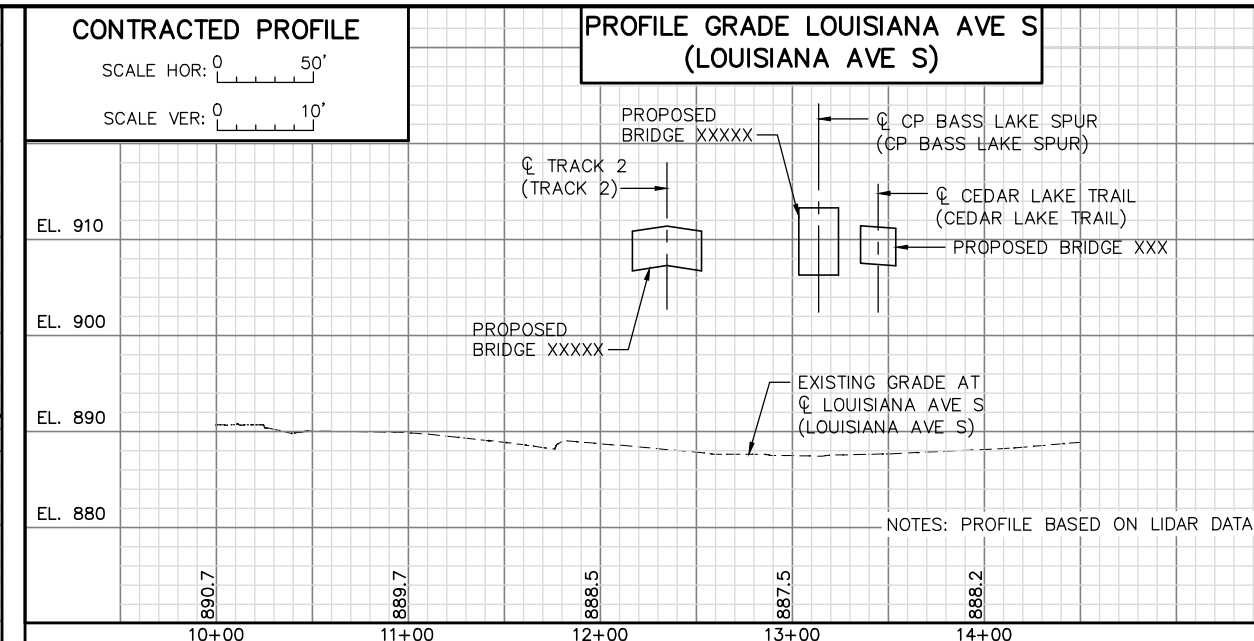
PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (FRT)
GENERAL PLAN AND ELEVATION

DISCIPLINE: STRUCTURES SHEET NAME: E2-STU-BRG-LOIS-FRT-GPE

SHEET
62
OF
274

[illegible]

LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE

1. SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.
2. OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULAR STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
3. APPARENT HIGHWATER ELEVATION OBTAINED FROM:
4. OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

~~HYDRAULIC ENGINEER'S RECOMMENDATION~~

DATE:

STREAM OR DITCH DESIGNATION

~~DRAINAGE AREA~~

MAX FLOOD ON RECORD

DESIGN FLOOD (YR. FREQ.): C.F.S.
HEADWATER ELEVATION: FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE F.P.S.
TOTAL STAGE INCREASE FT.
LOW MEMBER AT OR ABOVE ELEVATION FT.

~~WATERWAY AREA REQUIRED BELOW ELEV. = SQ. FT.
AT RIGHT ANGLES TO CHANNEL~~

BASIC FLOOD (100 YR. FREQ.) C.F.S.
HEADWATER ELEVATION: FT.
TOTAL STAGE INCREASE FT.
MEAN VELOCITY THROUGH STRUCTURE

FLOWLINE ELEVATION: FT. SKEW ANGLE:

ESTIMATED PRELIMINARY TOTAL SCOUR AT PIER EL.
(500 OR OT YR. FREQ.)

~~SCOUR CONFIRMATION RECOMMENDATION~~

~~DATE:~~

~~TOTAL SCOUR AT PIER EL. (500 OR QT YR. FREQ.)~~
~~SCOUR CODE: OBTAIN FROM HYDRAULIC ENGINEER~~

BRIDGE SURVEY SHEETS MADE FROM 2014 MFRA SURVEYS

1ST BENCH MARK
ELEVATION: 887.47
NORTHING: 152190.79
EASTING: 504031.01
DESCRIPTION: LARGE SPIKE

2ND BENCH MARK
ELEVATION: 893.52
NORTHING: 152551.75
EASTING: 503890.55
DESCRIPTION: NAIL IN CONC. ISLAND

BRIDGE SURVEY

PROPOSED BRIDGE LOCATED 0.3 MILES
SOUTH OF JCT T.H. 7 AND LOUISIANA AVE S IN
ST LOUIS PARK

CP BASS LAKE SPUR OVER LOUISIANA AVE S

SEC 20 T 117N R 21W

CITY OF ST LOUIS PARK HENNEPIN COUNTY

BRIDGE XXXXX

EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (FRT)
BRIDGE SURVEY

DISCIPLINE: **STRUCTURES**

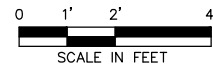
SHEET NAME:
E2-STU-BRG-LOIS-FRT-SUR-001

SHEET

63

OF

74



1. NUMBER AND SPACING OF BEAMS IS APPROXIMATE AND WILL BE SET IN ADVANCED DESIGN.
- ② METAL RAILING TO MEET REQUIREMENTS FOR PROTECTIVE SCREENING PER LRFD BRIDGE DESIGN MANUAL 13.2.5.

[illegible][illegible]

PRELIMINARY ENGINEERING




DISCIPLINE: **STRUCTURES**

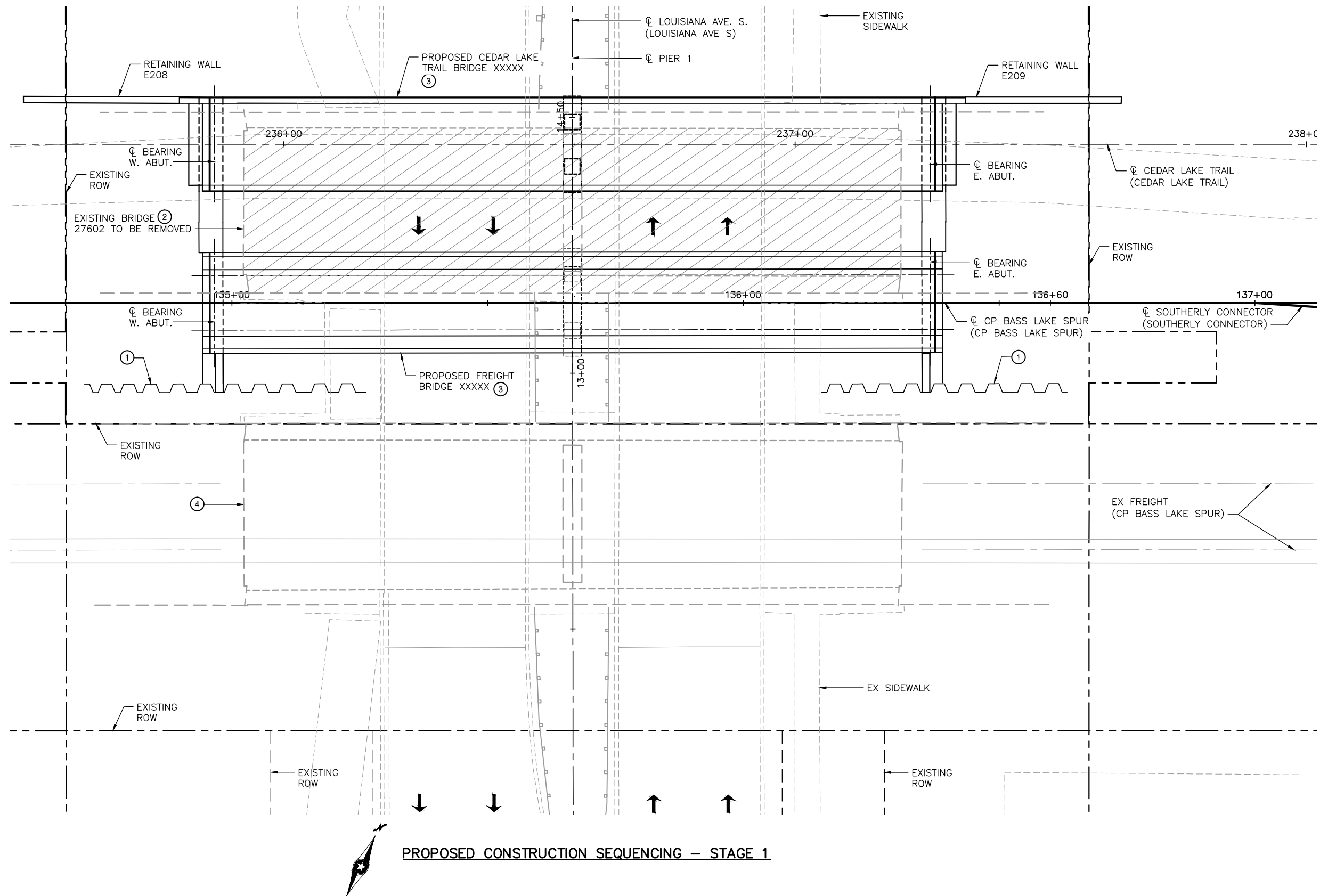
SHEET NAME:
E2-STU-BRG-LOIS-FRT-SUP

SHEET
64
OF
274

Aug. 26 2014 11:48 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-FRT-DTL.dwg By: ronald.dee

NOTES:

- 1 INSTALL TEMPORARY SHEET PILE WALL.
- 2  REMOVE EXISTING BRIDGE 27602.
- 3 CONSTRUCT CEDAR LAKE TRAIL BRIDGE OVER LOUISIANA AVENUE AND CP BASS LAKE SPUR BRIDGE OVER LOUISIANA AVENUE.
- 4 EXISTING BRIDGE 27601 TO REMAIN IN SERVICE FOR CP BASS LAKE SPUR DURING STAGE 1.



PROPOSED CONSTRUCTION SEQUENCING - STAGE 1

DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (FRT)
CONSTRUCTION SEQUENCING (1 OF 2)


DISCIPLINE: STRUCTURES

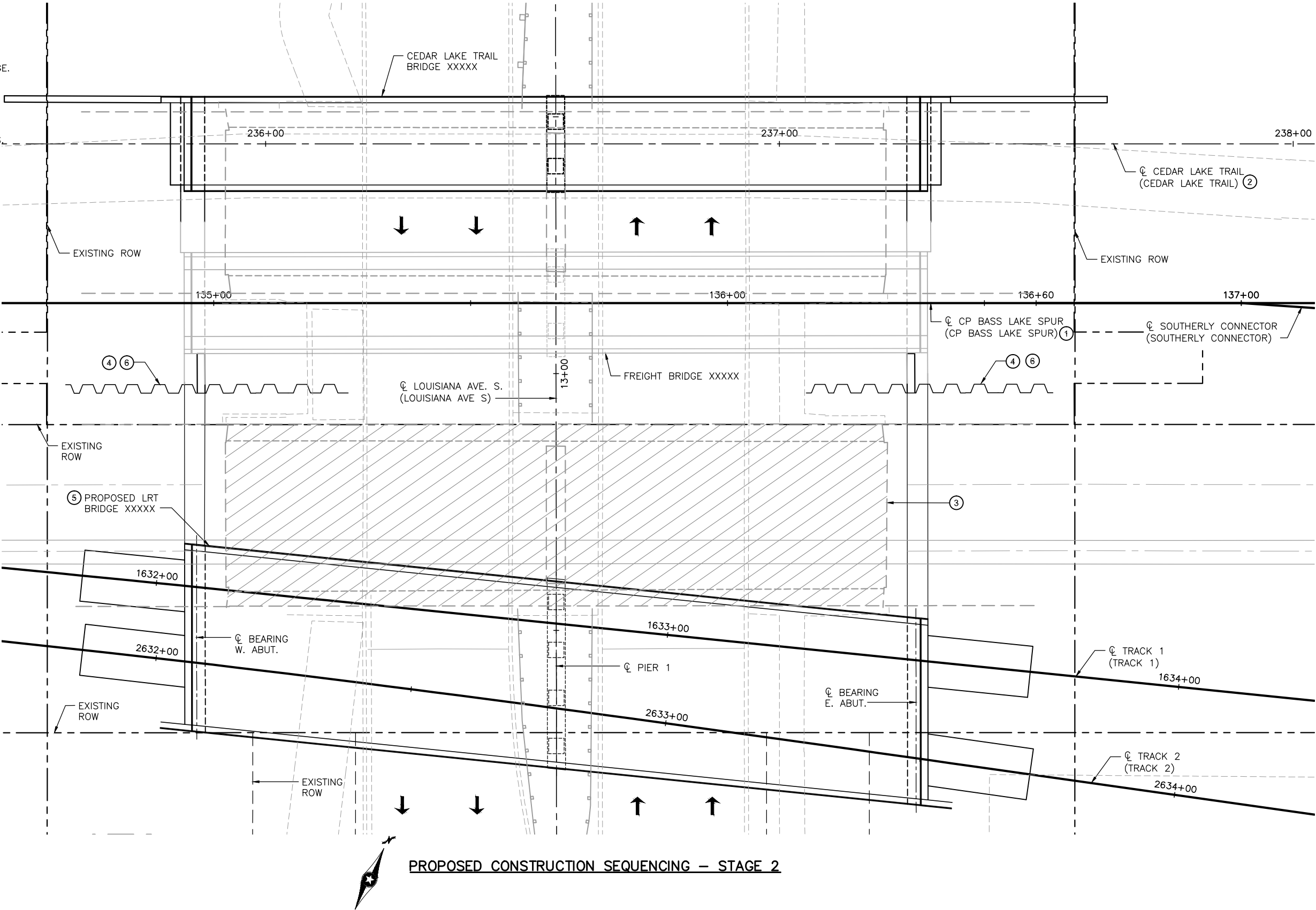
SHEET NAME: E2-STU-BRG-LOIS-FRT-DTL-001

SHEET
65
OF
274

Aug. 26 2014 11:49 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-FRT-DTL.dwg By: ronald.dee

NOTES:

- ① REALIGN CP BASS LAKE SPUR ONTO NEW FREIGHT BRIDGE
- ② REALIGN CEDAR LAKE TRAIL ONTO NEW TRAIL BRIDGE.
- ③  REMOVE EXISTING BRIDGE 27601.
- ④ MODIFY TEMPORARY SHEET PILE WALLS AS NECESSARY.
- ⑤ CONSTRUCT LRT BRIDGE OVER LOUISIANA AVENUE S.
- ⑥ REMOVE TEMPORARY SHEET PILE WALLS.



DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



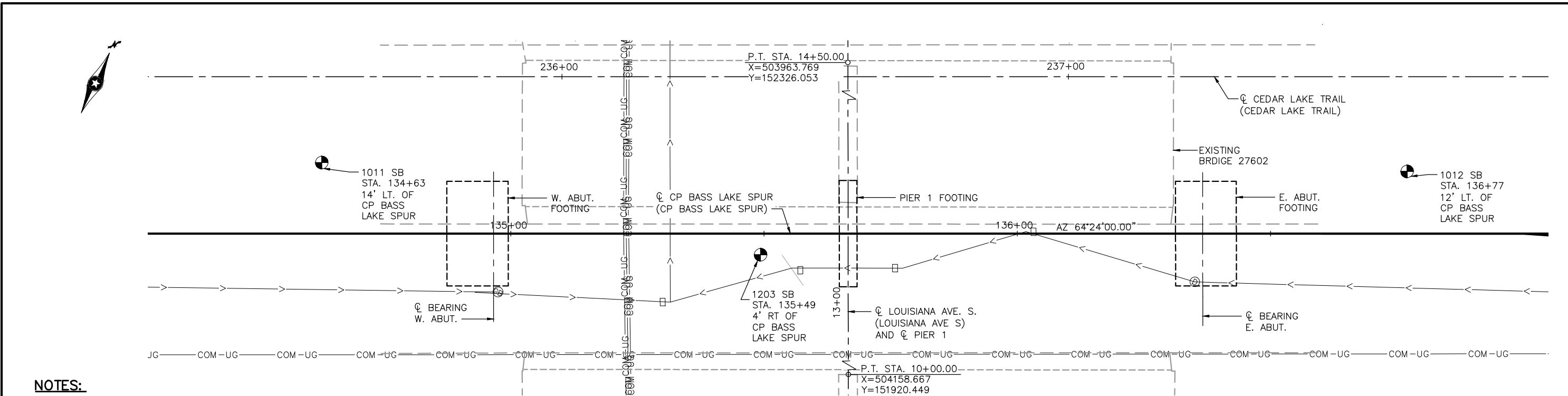
EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (FRT)
CONSTRUCTION SEQUENCING (2 OF 2)

DISCIPLINE: STRUCTURES

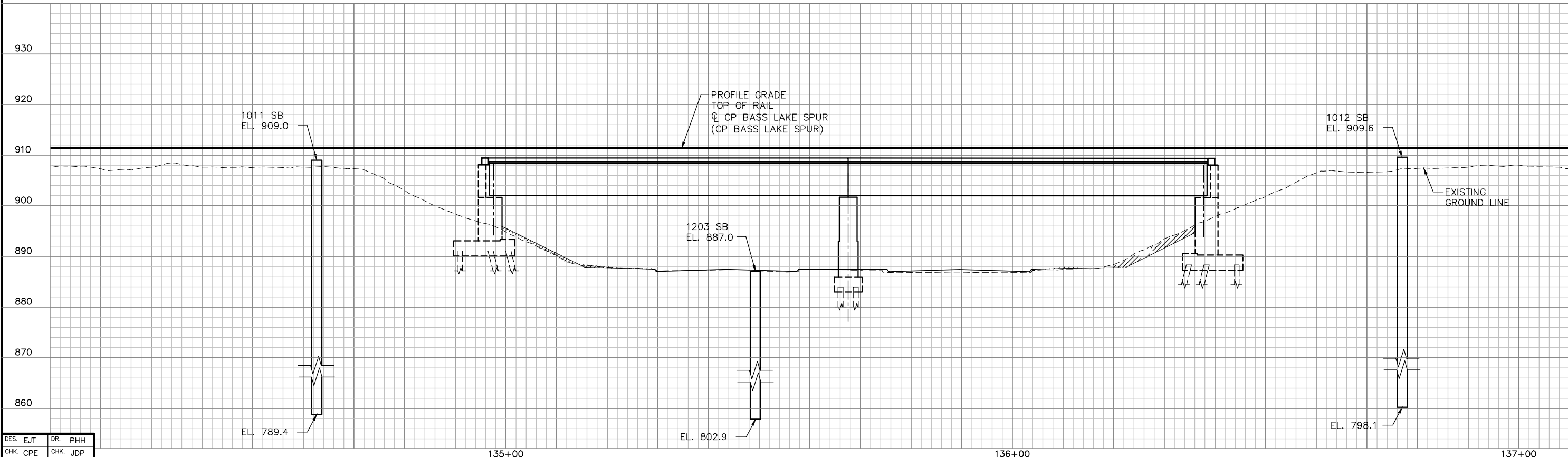
SHEET NAME: E2-STU-BRG-LOIS-FRT-DTL-002

SHEET
66
OF
274

Aug. 26 2014 11:51 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-FRT-SUR-002.dwg By: ronald.dee



NOTES:
THE SUBSTRUCTURE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".



DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

METROPOLITAN COUNCIL

SOUTHWEST
Green Line LRT Extension

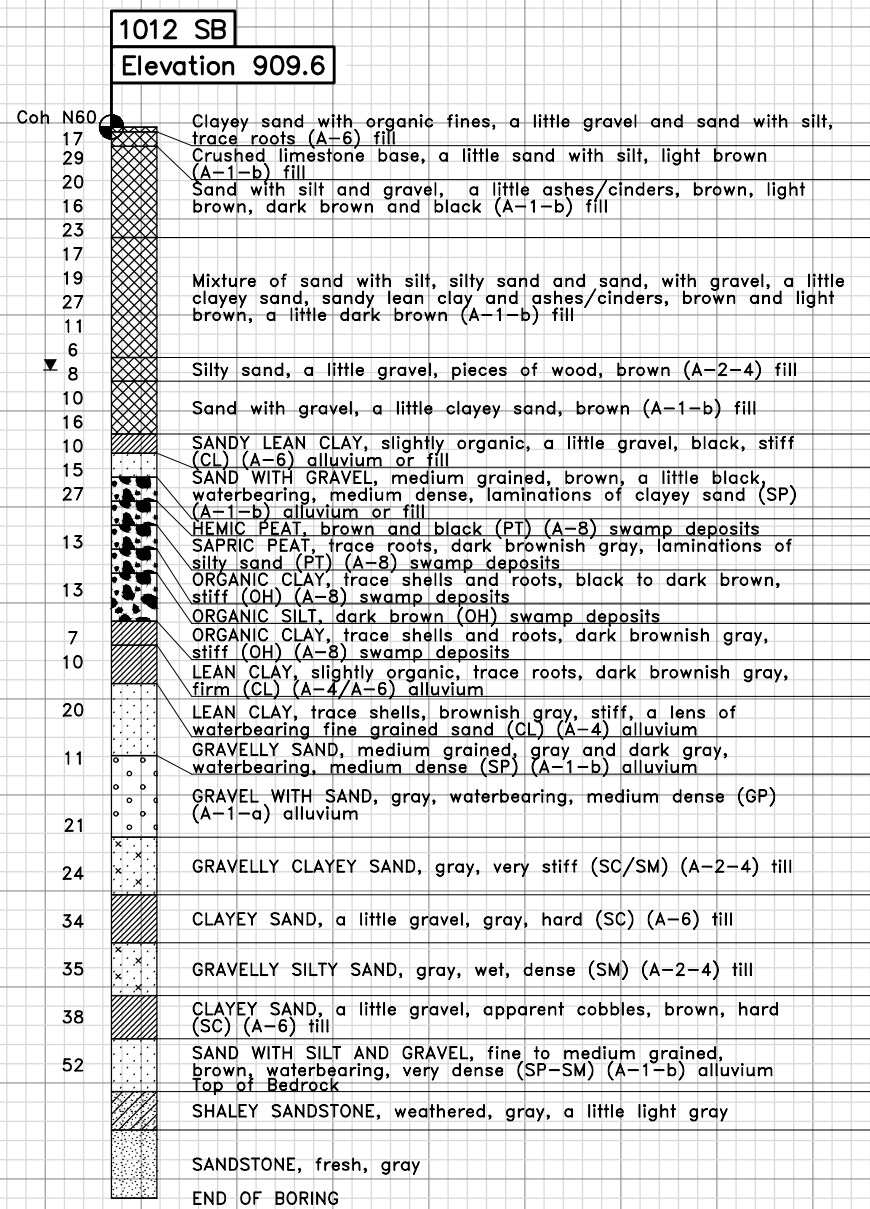
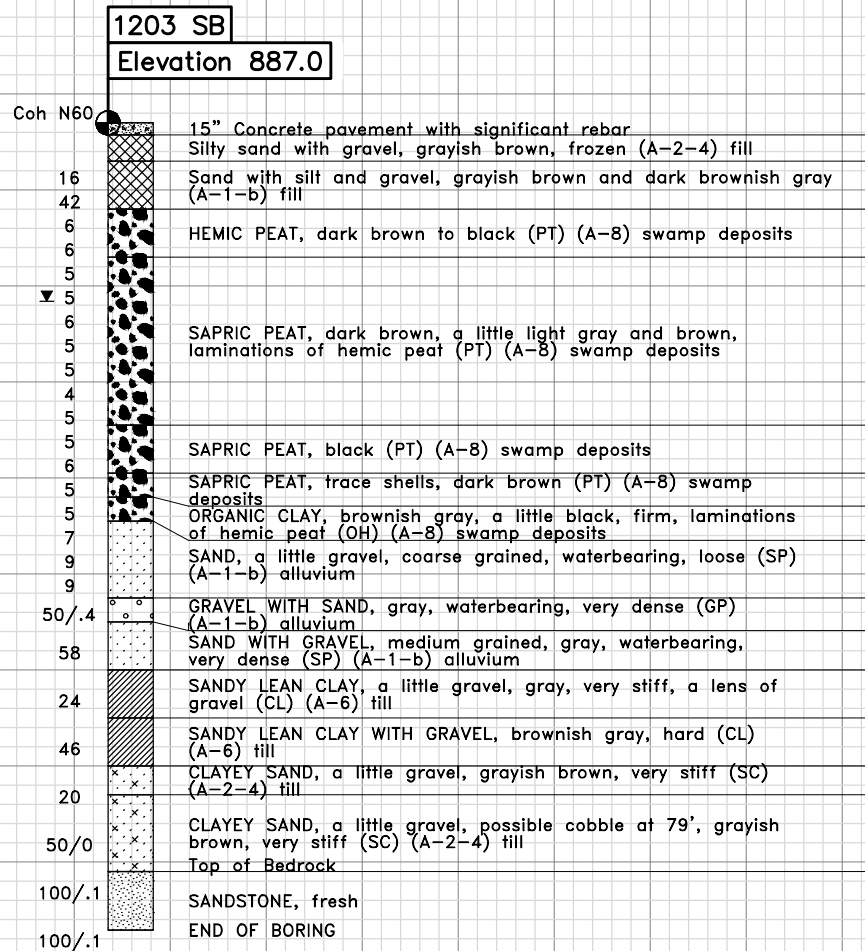
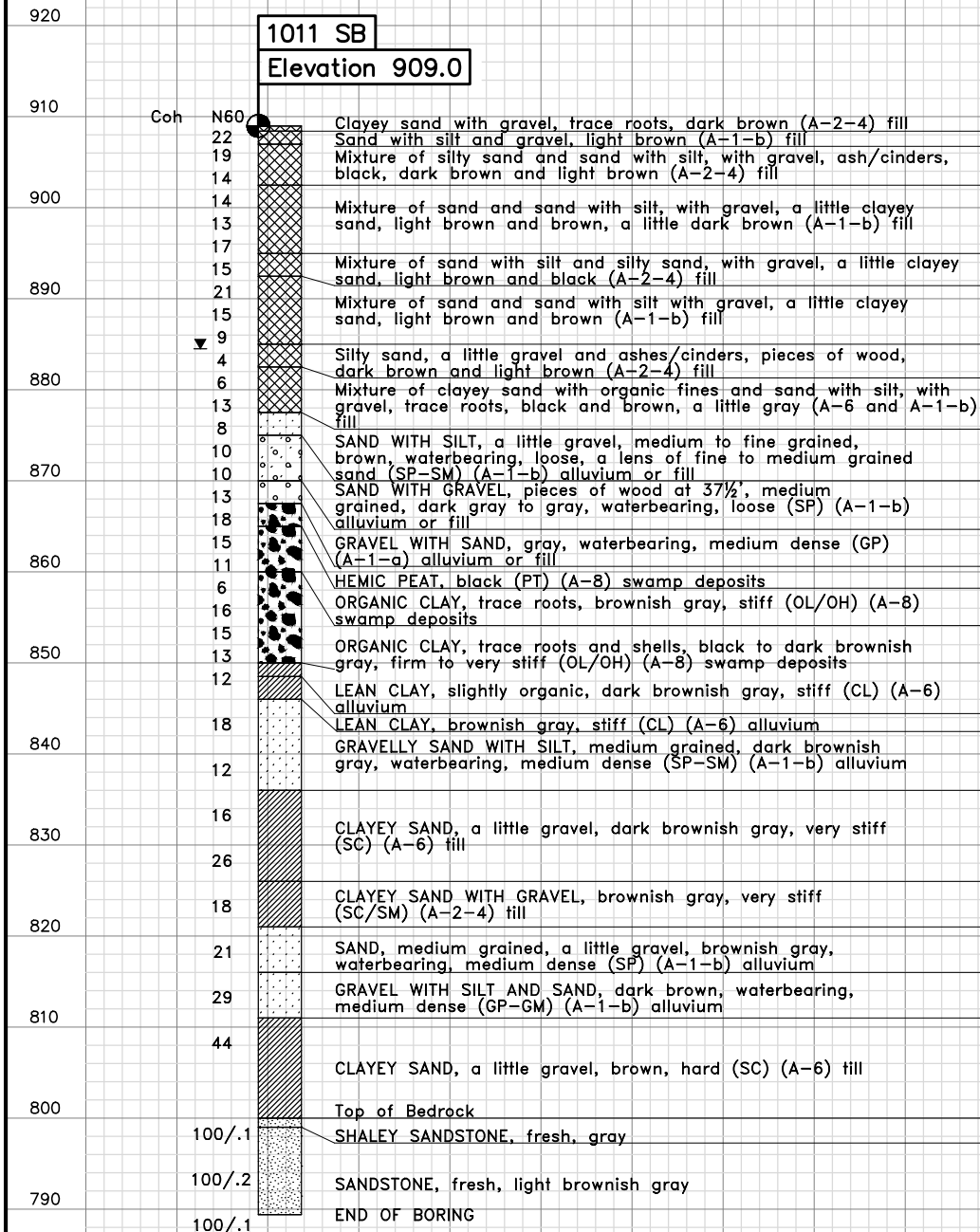
EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (FRT)
BORINGS (1 OF 2)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-BRG-LOIS-FRT-BOR-001**

SHEET
67
OF
274

Aug. 26 2014 11:51 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-FRT-BOR.dwg By: ronald.dee



NOTES:

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (FRT)
BORINGS (2 OF 2)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-BRG-LOIS-FRT-BOR-002**

SHEET
68
OF
274

AESTHETIC DETAILS TO BE DETERMINED DURING ADVANCED DESIGN

- 1. ABUTMENT SURFACE
- 2. ABUTMENT/WALL CORNER DETAIL
- 3. EXPOSED EDGE OF DECK/WALKWAY
- 4. EXPOSED FASCIA BEAM
- 5. BOTTOM OF BEAMS
- 6. PIER COLUMN GEOMETRY AND SURFACE
- 7. RAILING AND SCREENING

Aug. 26 2014 11:51 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-FRT-AES.dwg By: ronald.dee

DES. EJT	DR. PHH	
CHK. CPE	CHK. JDP	
NO.	DATE	BY



PRELIMINARY ENGINEERING

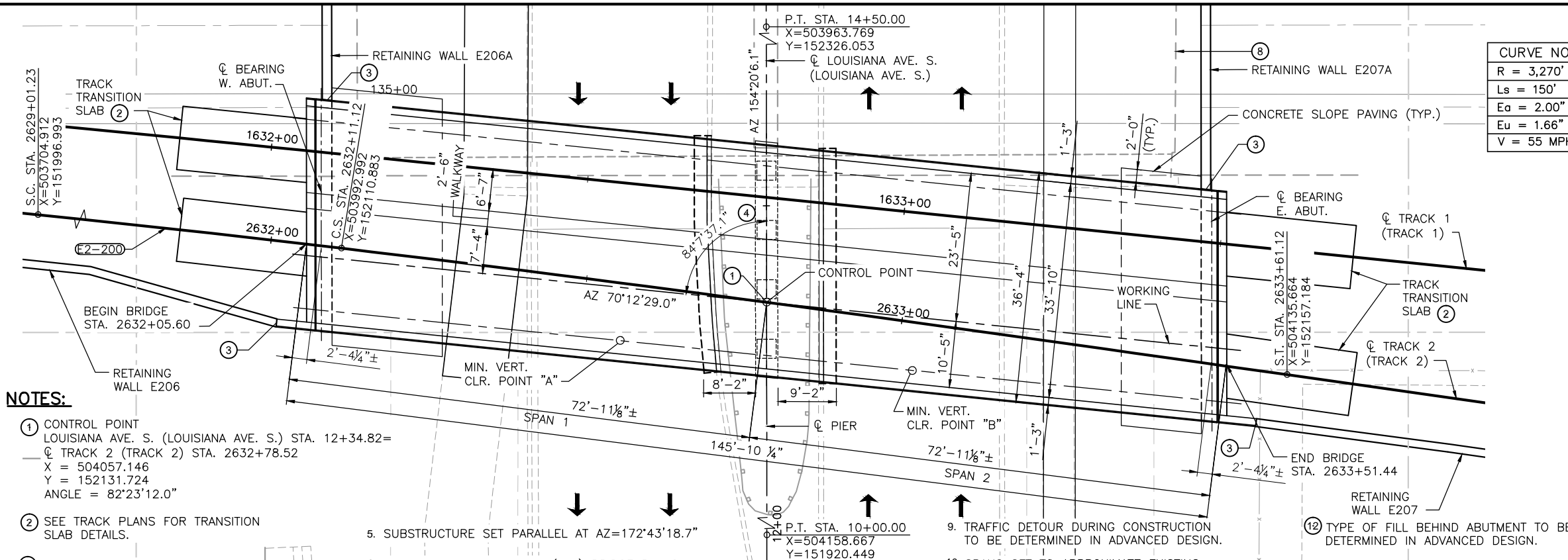


EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (FRT)
AESTHETICS

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-LOIS-FRT-AES

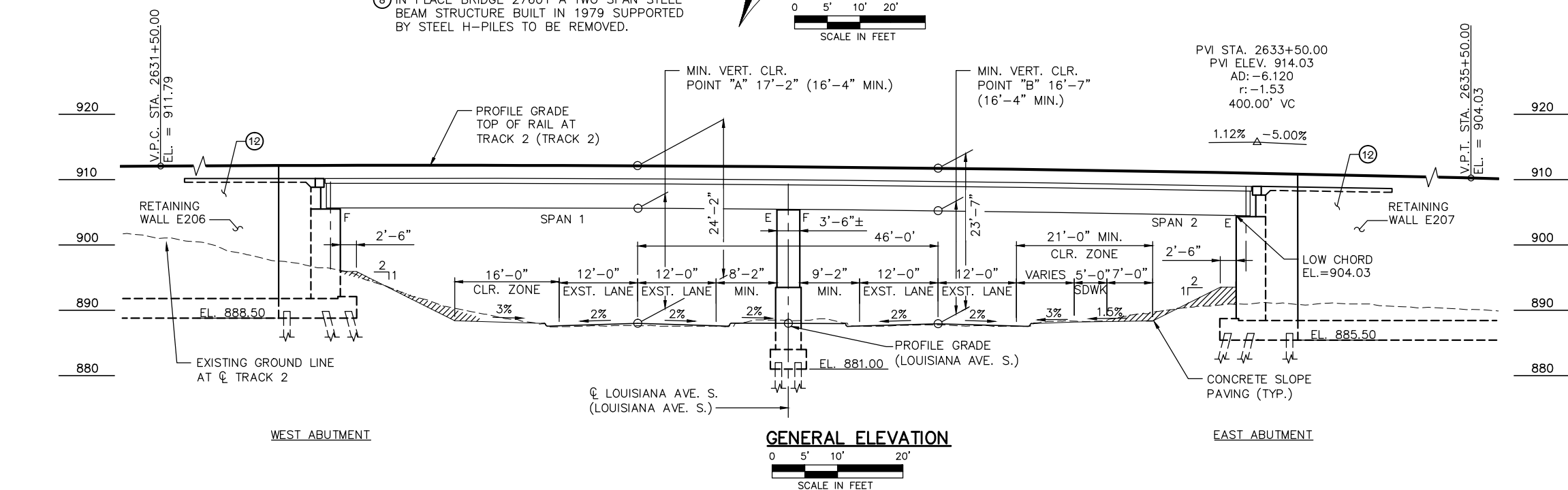
Aug. 26 2014 11:48 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-LRT-GPE.dwg By: ronald.dee



NOTES:

- CONTROL POINT
LOUISIANA AVE. S. (LOUISIANA AVE. S.) STA. 12+34.82=
CL TRACK 2 (TRACK 2) STA. 2632+78.52
X = 504057.146
Y = 152131.724
ANGLE = 82°23'12.0"
- SEE TRACK PLANS FOR TRANSITION
SLAB DETAILS.
- END OF BRIDGE SUBSTRUCTURE
AND BEGINNING OF RETAINING
WALL TO BE COORDINATED DURING
ADVANCED DESIGN.
- SKREW TYPICAL FOR ALL SUBSTRUCTURES.
- SUBSTRUCTURE SET PARALLEL AT AZ=172°43'18.7"
- SEE LOUISIANA AVENUE S. (FRT) BRIDGE PLANS
FOR CONSTRUCTION SEQUENCING INFORMATION.
- SEE BORING SURVEY SHEET FOR IN
PLACE UTILITIES.
- IN PLACE BRIDGE 27601 A TWO SPAN STEEL
BEAM STRUCTURE BUILT IN 1979 SUPPORTED
BY STEEL H-PILES TO BE REMOVED.
- TRAFFIC DETOUR DURING CONSTRUCTION
TO BE DETERMINED IN ADVANCED DESIGN.
- SPANS SET TO APPROXIMATE EXISTING
CORRIDOR AESTHETICS.
- USE OF EXISTING PILES IN FOUNDATION
TO BE EVALUATED IN ADVANCED DESIGN.
- TYPE OF FILL BEHIND ABUTMENT TO BE
DETERMINED IN ADVANCED DESIGN.

CURVE NO. E2-200
R = 3,270'
Ls = 150'
Ea = 2.00"
Eu = 1.66"
V = 55 MPH



DESIGN DATA

2012 AND CURRENT INTERIM AASHTO LRFD
BRIDGE DESIGN SPECIFICATIONS

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA
(REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD

LRV & MV LOAD DIAGRAM SHOWN ON TRANSVERSE
SECTION SHEET

MATERIAL DESIGN PROPERTIES:
REINFORCED CONCRETE:
f_c = 4000 PSI n = 8
f_y = 60000 PSI REINFORCEMENT

PRESTRESSED CONCRETE:
f_c = 8000 PSI n = 1
f_{pu} = 270 KSI LOW RELAXATION STRANDS
0.75 f_{pu} FOR INITIAL PRESTRESS

DESIGN SPEED: OVER = 30 MPH (LRT)
UNDER = 30 MPH

APPROXIMATE DECK AREA 5300 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
70	GENERAL PLAN AND ELEVATION
71	BRIDGE SURVEY
72	TRANSVERSE SECTION
73-74	BORINGS
75	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK:
2 SPANS - 4 LINES OF MN45 PRESTRESSED
CONCRETE BEAMS - SIMPLE SPANS

SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON STEEL H-PILES
FOUR COLUMN PIER SUPPORTED ON STEEL H-PILES

DEPTH OF STRUCTURE:
7'-0"± TOP OF RAIL TO LOW BRIDGE

AESTHETICS: LEVEL -

2030 PROJECTED TRAFFIC VOLUMES

ROADWAY OVER		ROADWAY UNDER
NA	A.D.T.	16,300
NA	D.H.V.	1,300
NA	A.D.T.T.	600

**PRELIMINARY PLAN
BRIDGE NO. XXXXX**

SOUTHWEST LRT OVER LOUISIANA AVE S
0.3 MI. SOUTH OF JCT. OF T.H. 7 AND LOUISIANA
AVE S IN ST. LOUIS PARK

72'-11"-72'-11" PRESTRESSED CONCRETE BEAM SPANS
33'-10" RAILWAY
5' 52' 22.9" SKEW

GENERAL PLAN AND ELEVATION

SEC 20 T 117N R 21W
CITY OF ST LOUIS PARK HENNEPIN COUNTY

APPROVED: _____ DATE _____
STATE BRIDGE ENGINEER

DES. KAE		DR. PHH		JOB NO. T9N635	
CHK. CPE		CHK. JDP			
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL
					</

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

Kimley»Horn

PRELIMINARY ENGINEERING

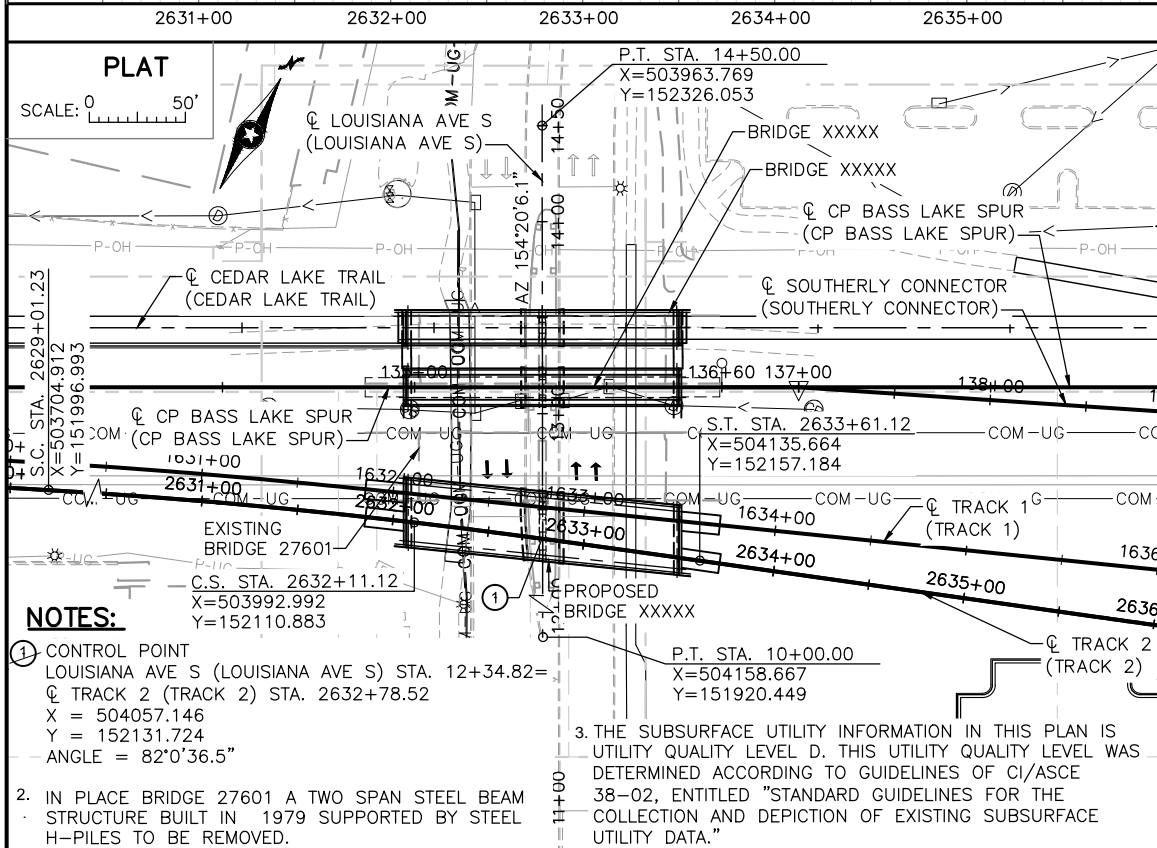
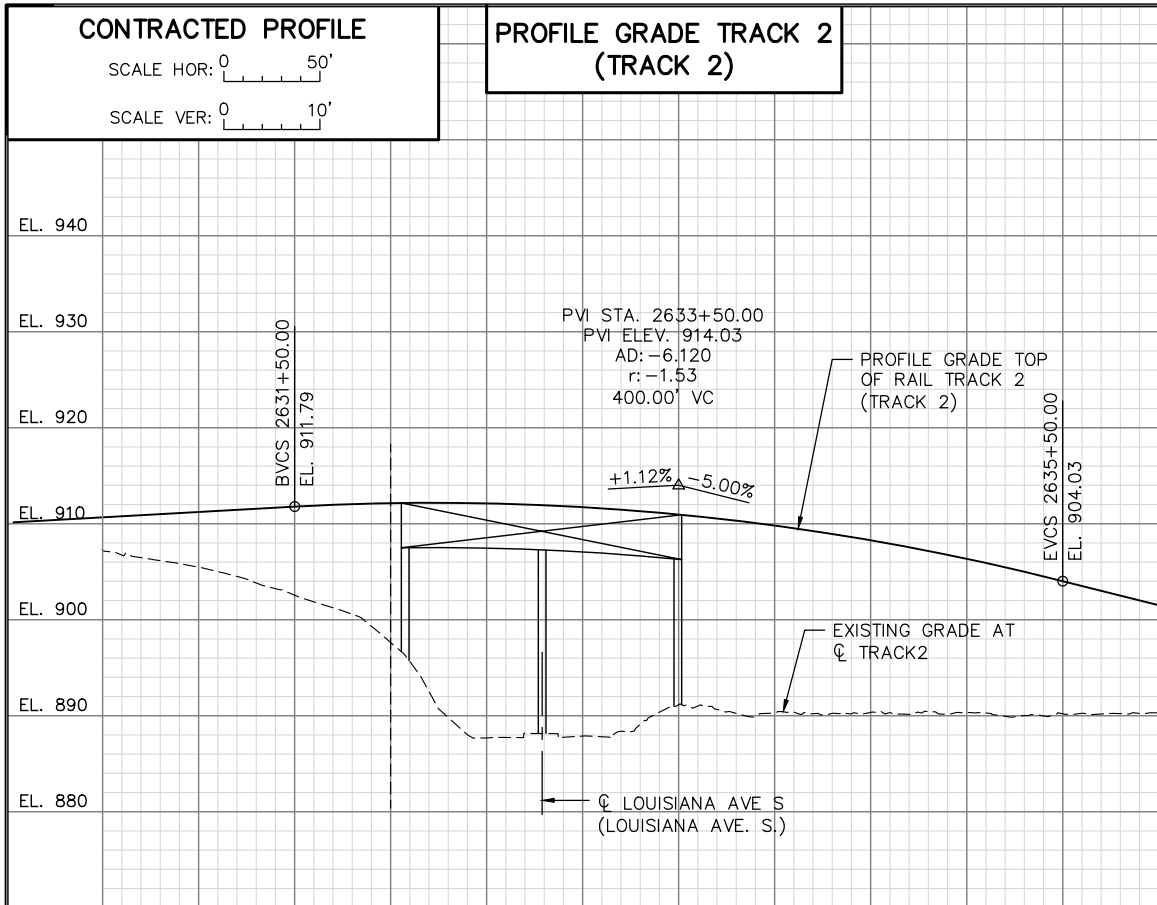


**EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (LRT)
GENERAL PLAN AND ELEVATION**

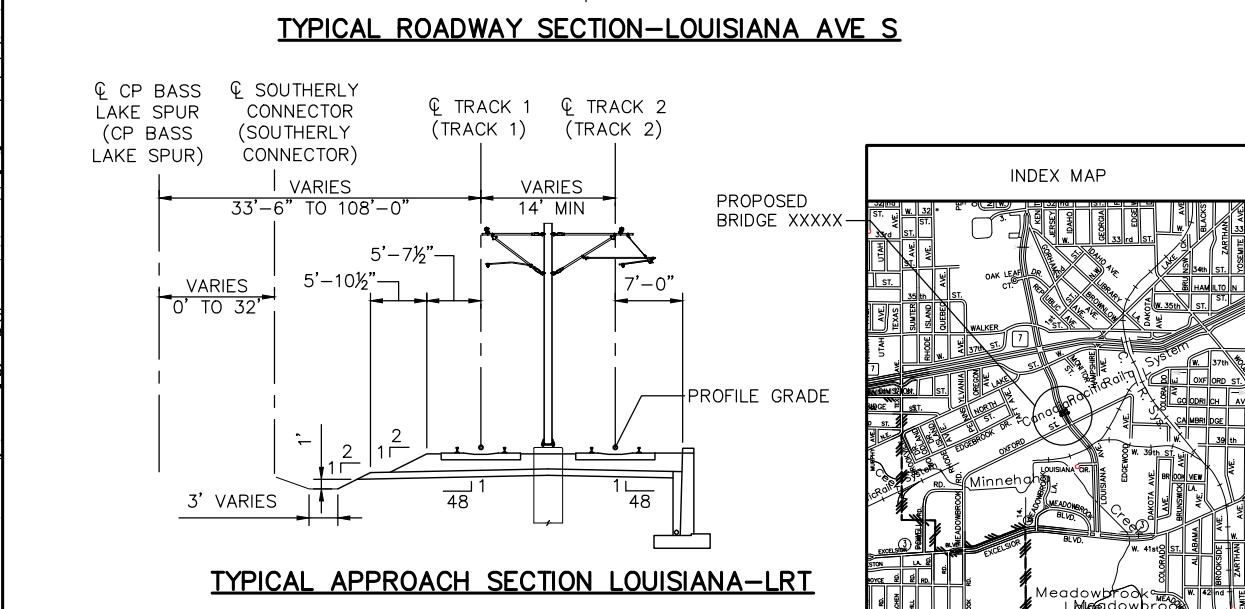
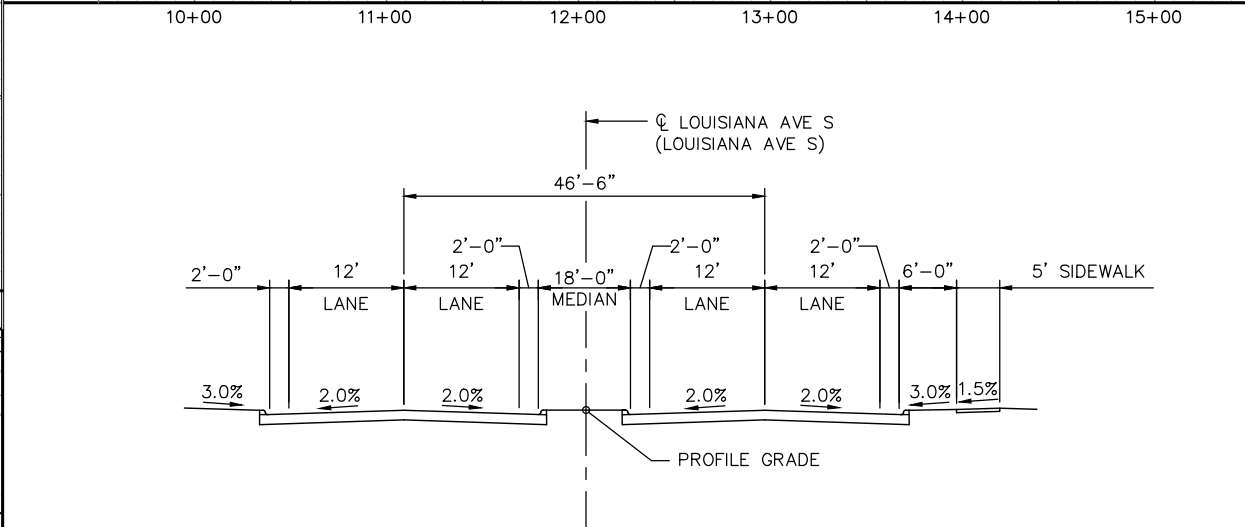
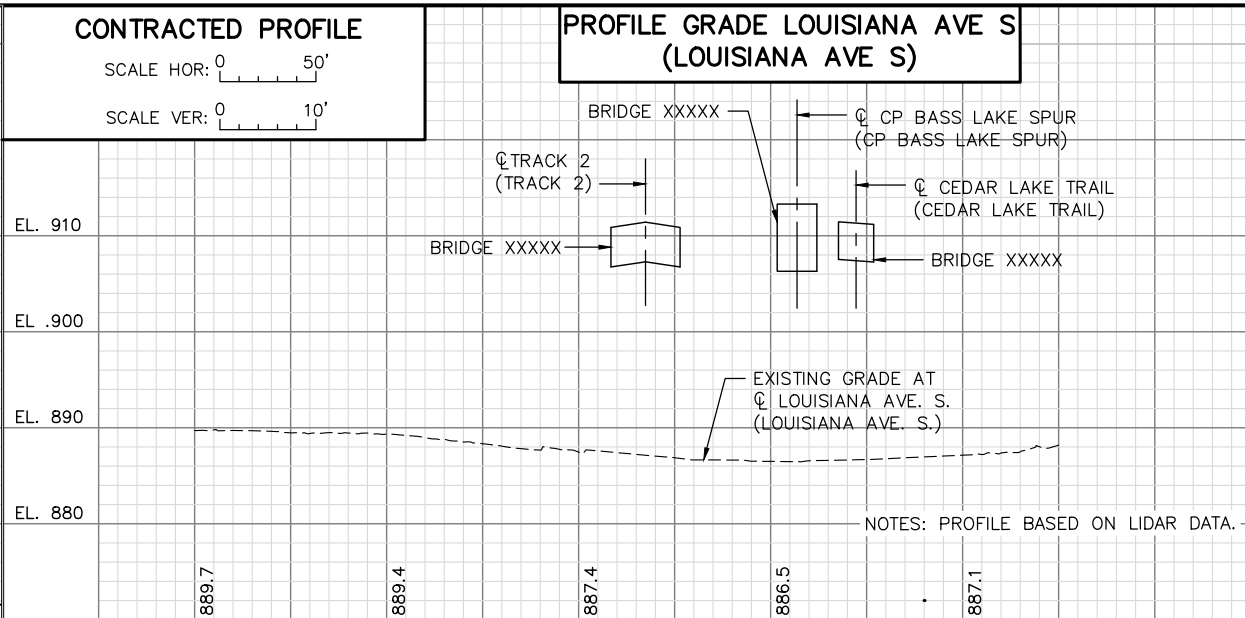
DISCIPLINE: **STRUCTURES** SHEET NAME: **E2-STU-BRG-LOIS-LRT-GPE**

**SHEET
70
OF
274**

Aug. 28 2014 09:03 am V:\3300_pcc-e\CAD\segment e2\plan sheets\structures\E2-STU-BRG-LOIS-LRT-SUR-001.dwg By: Katie Ellis



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE

- SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.
- OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
- APPARENT HIGHWATER ELEVATION OBTAINED FROM:
- OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

HYDRAULIC ENGINEER'S RECOMMENDATION
DATE:

STREAM OR DITCH DESIGNATION

DRAINAGE AREA

MAX FLOOD ON RECORD

DESIGN FLOOD (YR. FREQ.): C.F.S.
HEADWATER ELEVATION: FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE F.P.S.
TOTAL STAGE INCREASE FT.
LOW MEMBER AT OR ABOVE ELEVATION FT.

WATERWAY AREA REQUIRED BELOW ELEV. = SQ. FT.
AT RIGHT ANGLES TO CHANNEL

BASIC FLOOD (100 YR. FREQ.) C.F.S.
HEADWATER ELEVATION: FT.
TOTAL STAGE INCREASE FT.
MEAN VELOCITY THROUGH STRUCTURE

FLOWLINE ELEVATION: FT. SKEW ANGLE:

ESTIMATED PRELIMINARY TOTAL SCOUR AT PIER EL. (500 OR OT YR. FREQ.)

SCOUR CONFIRMATION RECOMMENDATION
DATE:

TOTAL SCOUR AT PIER EL. (500 OR OT YR. FREQ.)

SCOUR CODE: OBTAIN FROM HYDRAULIC ENGINEER

BRIDGE SURVEY SHEETS MADE FROM 2014 MFRA SURVEYS

1ST BENCH MARK
ELEVATION: 887.47
NORTHING: 152190.79
EASTING: 504031.01
DESCRIPTION: LARGE SPIKE

2ND BENCH MARK
ELEVATION: 892.05
NORTHING: 151747.10
EASTING: 504275.16
DESCRIPTION: MAG NAIL IN BIT. ISLAND

BRIDGE SURVEY

PROPOSED BRIDGE LOCATED 0.3 MILES SOUTH OF JCT. OF T.H. 7 AND LOUISIANA AVE S IN ST LOUIS PARK

SOUTHWEST LRT OVER LOUISIANA AVE S

SEC 20 T 117N R 21W

CITY OF ST LOUIS PARK HENNEPIN COUNTY

BRIDGE XXXXX

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



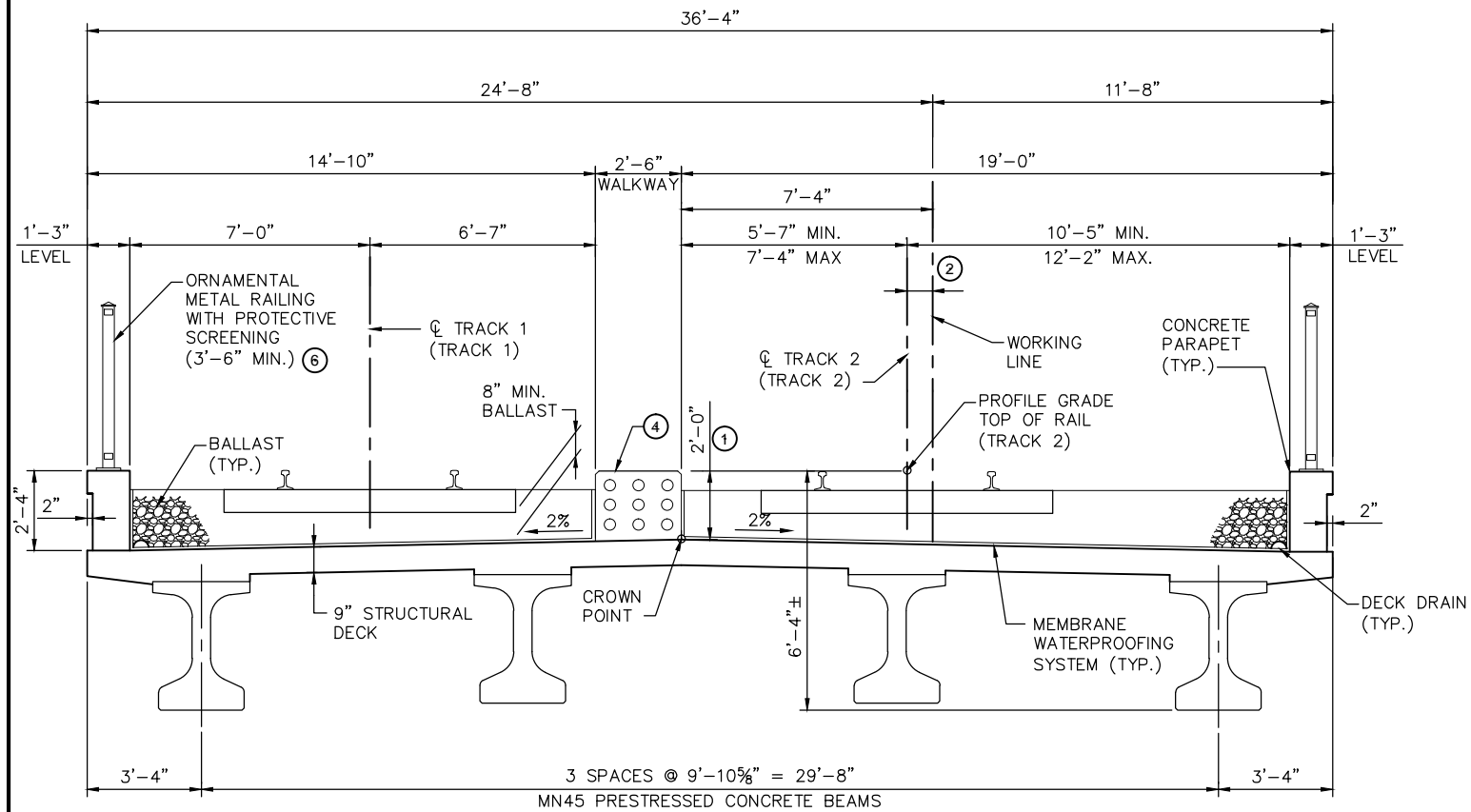
**EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (LRT)
BRIDGE SURVEY**

DISCIPLINE: **STRUCTURES**

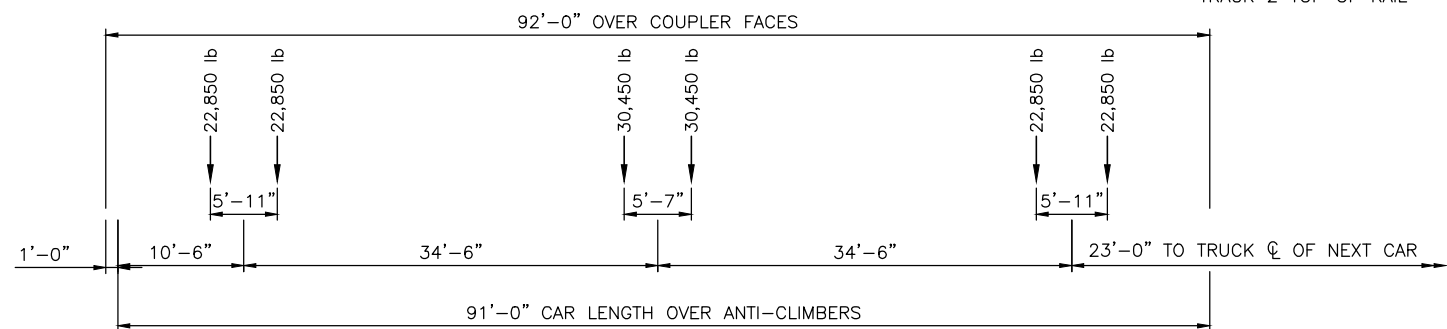
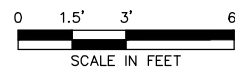
SHEET NAME: **E2-STU-BRG-LOIS-LRT-SUR-001**

SHEET
71
OF
274

Aug. 26 2014 11:52 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-LRT-SUP.dwg By: ronald.dee



TRANSVERSE SECTION SPAN 1



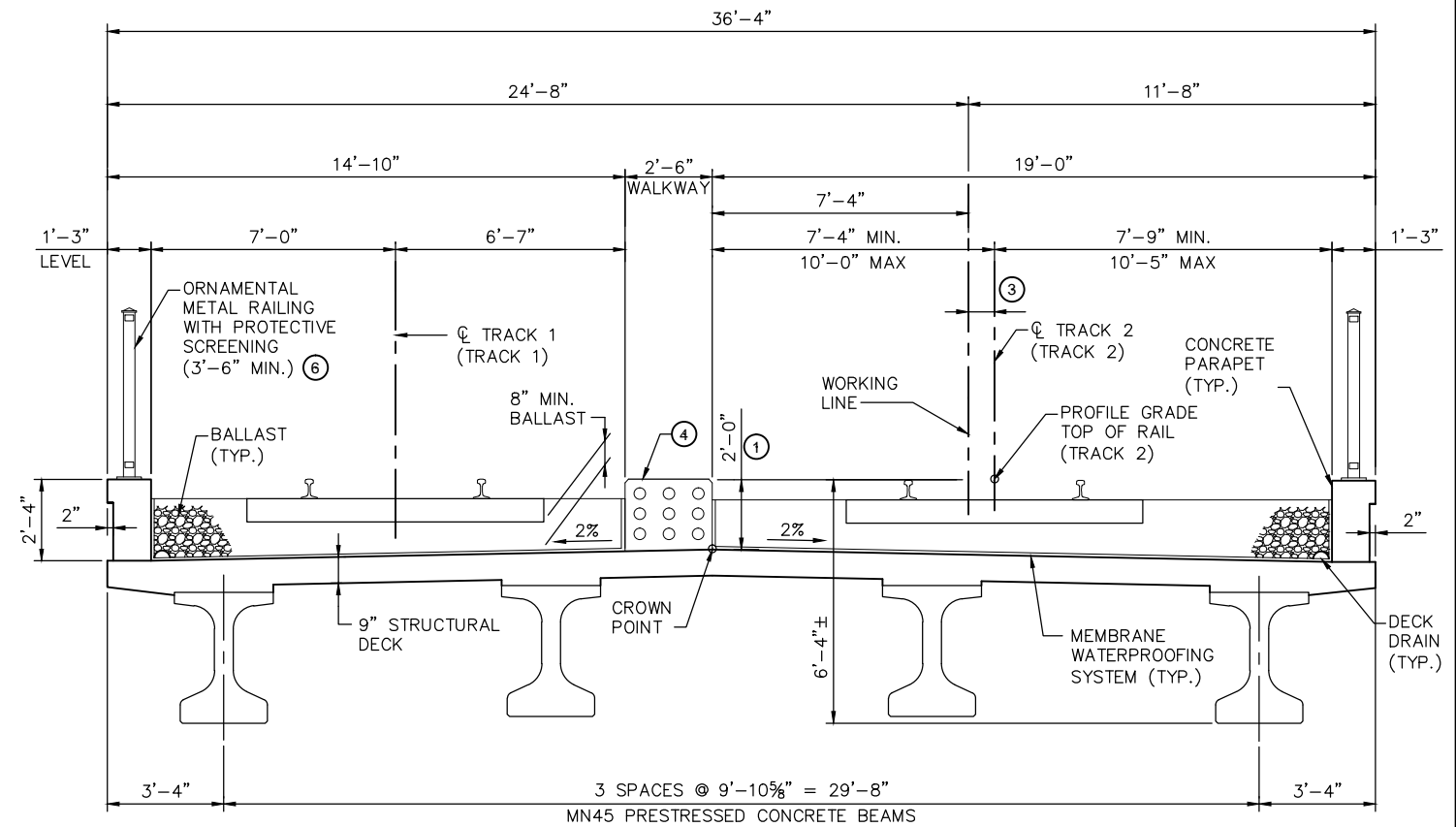
LIGHT RAIL VEHICLE LOADING DIAGRAM

NOTES:

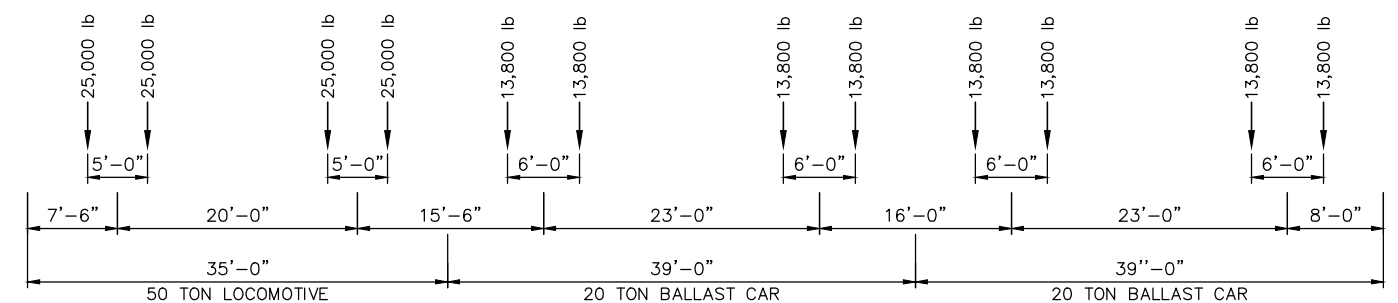
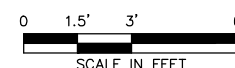
1. THE LRT TRAIN SHALL CONSIST OF EITHER ONE, TWO OR THREE CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
2. AXLE LOAD IN POUNDS.
3. LOADING DIAGRAM REPRESENTS MAXIMUM LOAD AT EACH TRUCK.

NOTES:

- ① TOP OF RAIL TO CROWN POINT
- ② VARIES 0" TO 1'-9¼".
- ③ VARIES 0" TO 2'-2⅝".
- ④ TOP OF WALKWAY TO MATCH TRACK 2 TOP OF RAIL



TRANSVERSE SECTION SPAN 2



MAINTENANCE TRAIN LOADING DIAGRAM

NOTES:

1. THE MAINTENANCE TRAIN SHALL CONSIST OF ONE LOCOMOTIVE AND ONE, TWO, THREE OR FOUR BALLAST CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
2. AXLE LOAD IN POUNDS.
3. WEIGHT OF EMPTY BALLAST CAR IS 15,000 POUNDS.

DES. KAE	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (LRT)
TRANSVERSE SECTION

DISCIPLINE:

STRUCTURES

SHEET NAME:

E2-STU-BRG-LOIS-LRT-SUP

SHEET

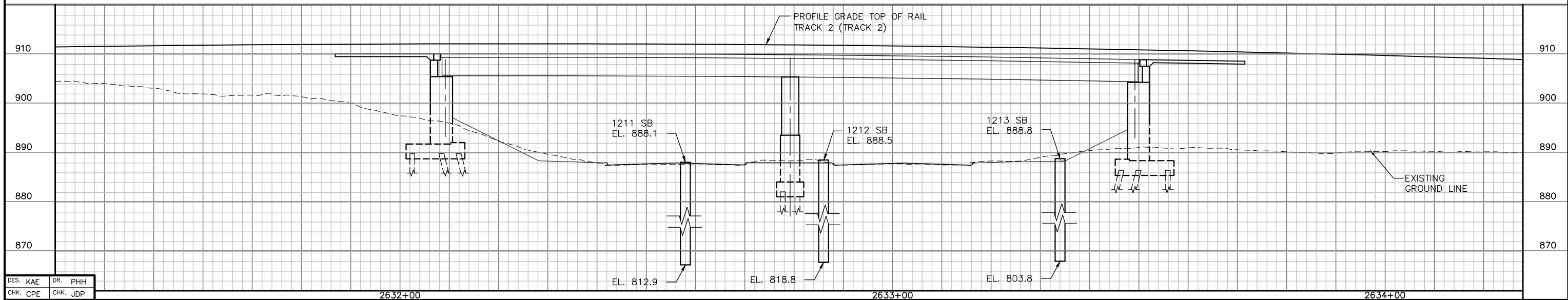
72

OF

274



THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF C/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".

[illegible]

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST

Green Line LRT Extension



**EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (LRT)
BORINGS (1 OF 2)**

DISCIPLINE: **STRUCTURES**

SHEET NAME:
E2-STU-BRG-LOIS-LRT-BOR-001

SHEET
73
OF
274

[illegible]

SOUTHWEST

Green Line LRT Extension



DISCIPLINE: **STRUCTURES**

SHEET NAME:	E2-STU-BRG-LOIS-LRT-BOR-002
-------------	-----------------------------

Aug. 26 2014 11:55 am V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-LOIS-LRT-AES.dwg By: ronald.dee

DES.	KAE	DR.	PHH
CHK.	CPE	CHK.	JDP
NO.	DATE	BY	

AESTHETIC DETAILS TO BE DETERMINED DURING ADVANCED DESIGN

- 1. ABUTMENT SURFACE
- 2. ABUTMENT/WALL CORNER DETAIL
- 3. EXPOSED EDGE OF DECK
- 4. EXPOSED BARRIER
- 5. EXPOSED FASCIA BEAM
- 6. BOTTOM OF BEAMS
- 7. PIER COLUMN GEOMETRY AND SURFACE
- 8. RAILING AND SCREENING



PRELIMINARY ENGINEERING



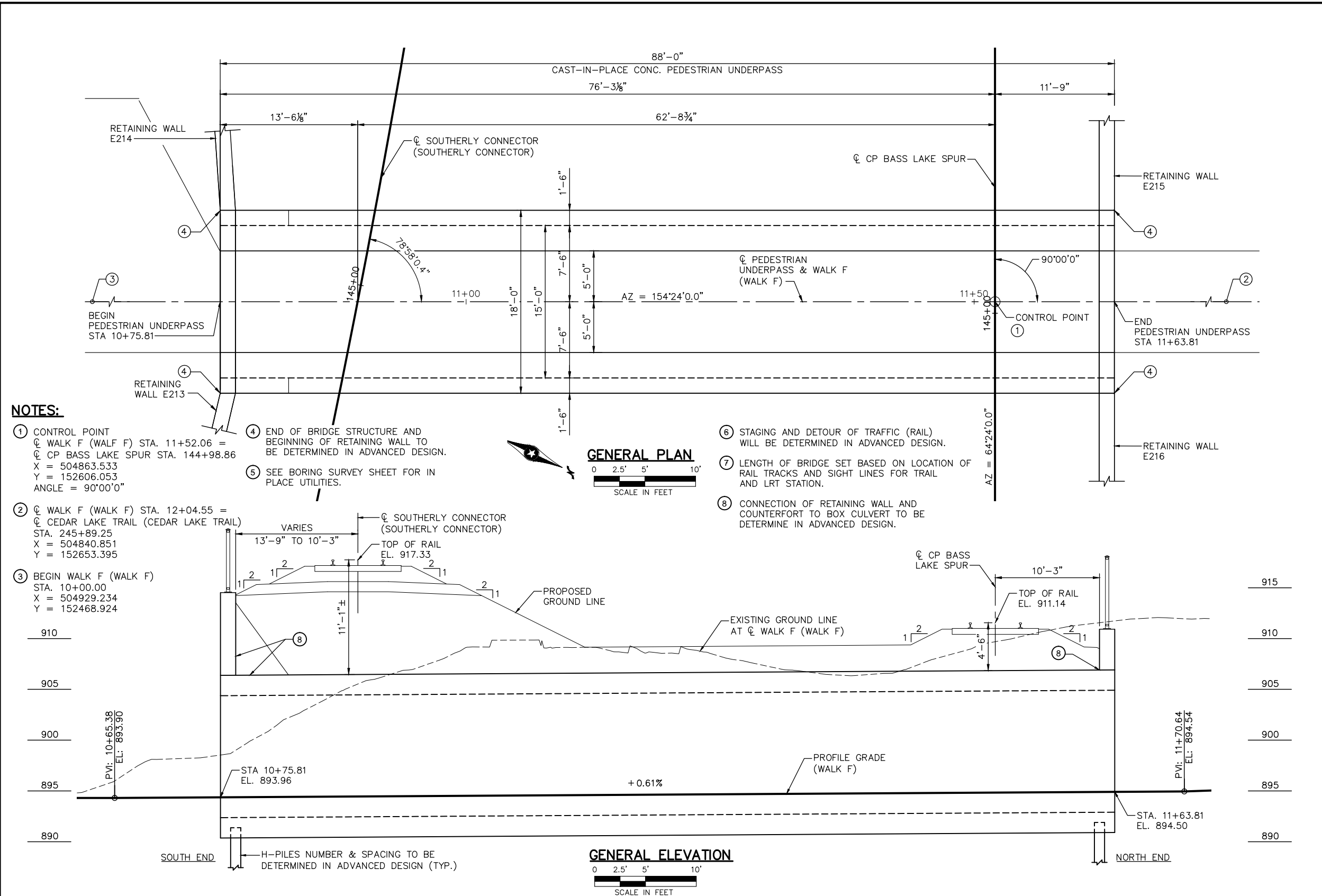
EAST - VOLUME 2 (STRUCTURES)
LOUISIANA AVENUE S.
BRIDGE XXXXX (LRT)
AESTHETICS

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-LOIS-LRT-AES

SHEET
75
OF
274

Aug. 26 2014 03:48 pm V:\3300_pec-e\CAD\segment e2\plan sheets\structures\E2-STU-BRG-PUPS-PED-GPE.dwg By: phil.horton



NOTES:

- ① CONTROL POINT
CL WALK F (WALK F) STA. 11+52.06 =
CL CP BASS LAKE SPUR STA. 144+98.86
X = 504863.533
Y = 152606.053
ANGLE = 90°00'0"
- ② CL WALK F (WALK F) STA. 12+04.55 =
CL CEDAR LAKE TRAIL (CEDAR LAKE TRAIL)
STA. 245+89.25
X = 504840.851
Y = 152653.395
- ③ BEGIN WALK F (WALK F)
STA. 10+00.00
X = 504929.234
Y = 152468.924
- ④ END OF BRIDGE STRUCTURE AND
BEGINNING OF RETAINING WALL TO
BE DETERMINED IN ADVANCED DESIGN.
- ⑤ SEE BORING SURVEY SHEET FOR IN
PLACE UTILITIES.

- ⑥ STAGING AND DETOUR OF TRAFFIC (RAIL)
WILL BE DETERMINED IN ADVANCED DESIGN.
- ⑦ LENGTH OF BRIDGE SET BASED ON LOCATION OF
RAIL TRACKS AND SIGHT LINES FOR TRAIL
AND LRT STATION.
- ⑧ CONNECTION OF RETAINING WALL AND
COUNTERFORT TO BOX CULVERT TO BE
DETERMINE IN ADVANCED DESIGN.

DESIGN DATA

2012 AND CURRENT INTERIM AASHTO LRFD BRIDGE
DESIGN SPECIFICATIONS

2013 AREMA MANUAL FOR RAILWAY ENGINEERING

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA
(REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD

COOPER E 90 LIVE LOAD

MATERIAL DESIGN PROPERTIES:
REINFORCED CONCRETE:
f'c = 4000 PSI n = 8
fy = 60000 PSI REINFORCEMENT

DESIGN FILL HEIGHT = 2'-0" (MIN.)
UNIT WEIGHT OF FILL = 130 PCF

INSIDE CULVERT HEIGHT = 12'-0"
INSIDE CULVERT WIDTH = 15'-0"

LIST OF SHEETS

NO.	DESCRIPTION
76	GENERAL PLAN AND ELEVATION
77	BRIDGE SURVEY
78	TRANSVERSE SECTION
79-80	BORINGS
81	AESTHETICS

PROPOSED TYPE OF STRUCTURE

BOX CULVERT:
15'-0" X 12'-0" SINGLE BARREL

ALL BARS EPOXY COATED

AESTHETICS: LEVEL

CULVERT SUPPORTED ON STEEL H-PILES. NUMBER
AND SPACING TO BE DETERMINED IN ADVANCED
DESIGN.

PRELIMINARY PLAN
BRIDGE NO. XXXXX

CP BASS LAKE SPUR & SOUTHERLY CONNECTOR OVER
WALK F 0.3 MI. S.E. OF JCT. OF T.H. 7 &
LOUISIANA AVE. S. IN ST. LOUIS PARK

88'-0" SINGLE BARREL CONCRETE CULVERT 10'-0"
TRAIL

00'-00'-00.00" SKEW

CONCRETE BOX CULVERT I.D. NO. 113
GENERAL PLAN AND ELEVATION

SEC 17/20 T 117N R 21W
CITY OF ST LOUIS PARK HENNEPIN COUNTY

APPROVED: _____ DATE _____
STATE BRIDGE ENGINEER

DES. KAE DR. PHH
CHK. CPE CHK. JDP
JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)
LOUISIANA STATION PEDESTRIAN
UNDERPASS - BRIDGE XXXXX (PED)
GENERAL PLAN AND ELEVATION

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-PUPS-PED-GPE

SHEET
76
OF
274

1. SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.
2. OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULAR STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
3. APPARENT HIGHWATER ELEVATION OBTAINED FROM:
4. OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

STREAM OR DITCH DESIGNATION
DRAINAGE AREA
MAX FLOOD ON RECORD
DESIGN FLOOD (YR. FREQ.): C.F.S.
HEADWATER ELEVATION: FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE F.P.S.
TOTAL STAGE INCREASE FT.
LOW MEMBER AT OR ABOVE ELEVATION FT.
WATERWAY AREA REQUIRED BELOW ELEV. = SQ. FT.
AT RIGHT ANGLES TO CHANNEL
BASIC FLOOD (100 YR. FREQ.) C.F.S.
HEADWATER ELEVATION: FT.
TOTAL STAGE INCREASE FT.
MEAN VELOCITY THROUGH STRUCTURE
FLOWLINE ELEVATION: FT. SKEW ANGLE:
ESTIMATED PRELIMINARY TOTAL SCOUR AT PIER EL.
(500 OR OT YR. FREQ.)

DATE: _____

TOTAL SCOUR AT PIER EL. (500 OR OT YR. FREQ.) _____

SCOUR CODE: OBTAIN FROM HYDRAULIC ENGINEER _____

1ST BENCH MARK
ELEVATION: 912.98
NORTHING: 152946.50
EASTING: 505533.45
DESCRIPTION: MAG NAIL IN BIT. PATH

2ND BENCH MARK
ELEVATION: 887.47
NORTHING: 152190.79
EASTING: 504031.01
DESCRIPTION: LARGE SPIKE

PROPOSED BRIDGE LOCATED 0.3 MILES SE OF
JCT OF T.H. 7 AND LOUISIANA AVE. S.
IN ST. LOUIS PARK
CP BASS LAKE SPUR AND SOUTHERLY
CONNECTOR OVER WALK F

SEC 17/20 T 117N R 21W
CITY OF ST LOUIS PARK HENNEPIN COUNTY

**EAST - VOLUME 2 (STRUCTURES)
LOUISIANA STATION PEDESTRIAN
UNDERPASS - BRIDGE XXXXX (PED)
BRIDGE SURVEY**

DISCIPLINE: **STRUCTURES**

SHEET NAME:	E2-STU-BRG-PUPS-PED-SUR-001
-------------	-----------------------------

SHEET
77
OF
274

Kimley»Horn

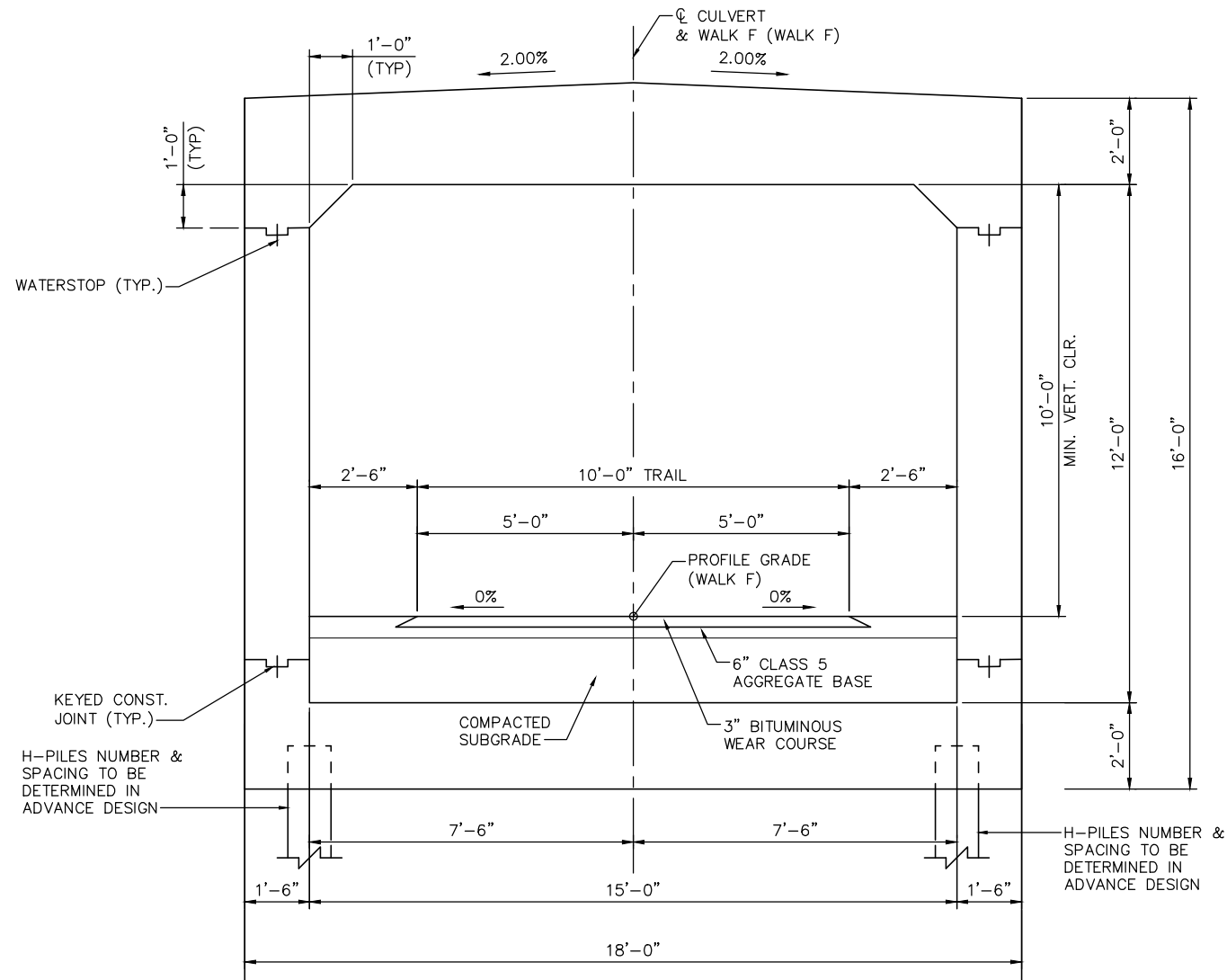
PRELIMINARY ENGINEERING



SOUTHWEST



Aug. 26 2014 01:42 pm v:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-PUPS-PED-SUP.dwg By: ronald.dee



TRANSVERSE SECTION
0 1.5' 2' 4'
SCALE IN FEET

NOTES:

1. BOX CULVERT TO BE CONSTRUCTED IN PHASES.
2. PHASES WILL BE DETERMINED IN ADVANCED DESIGN AND COORDINATED WITH RELOCATION OF CP BASS LAKE SPUR AND CONSTRUCTION OF SOUTHERLY CONNECTOR.

DES. KAE	DR. PHH	
CHK. CPE	CHK. JDP	
NO.	DATE	BY

Kimley»Horn

PRELIMINARY ENGINEERING



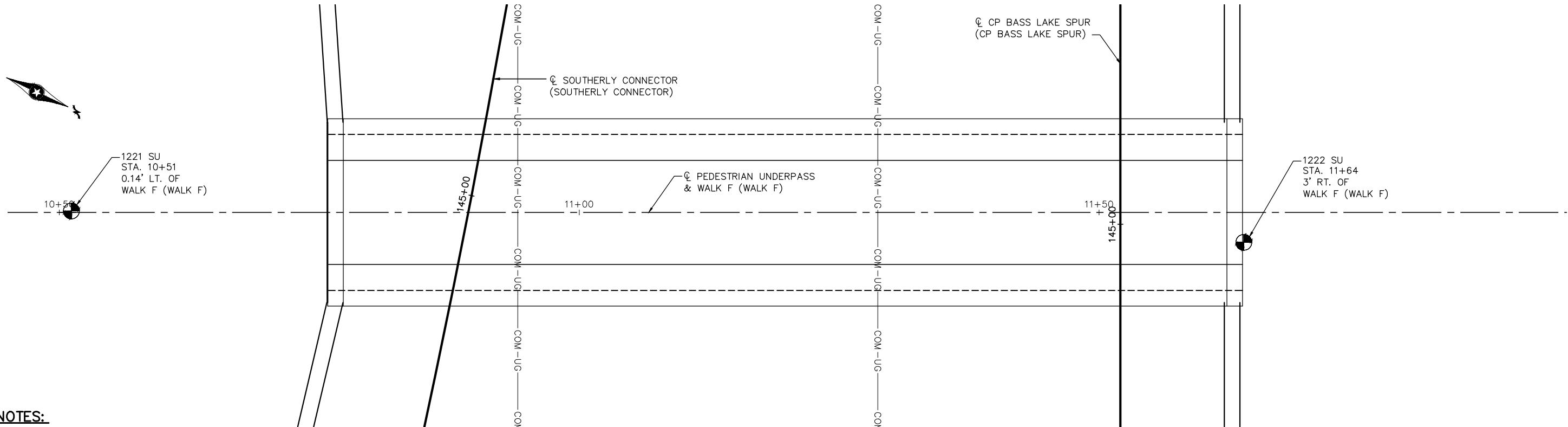
EAST - VOLUME 2 (STRUCTURES)
LOUISIANA STATION PEDESTRIAN
UNDERPASS - BRIDGE XXXXX (PED)
TRANSVERSE SECTION

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-PUPS-PED-SUP

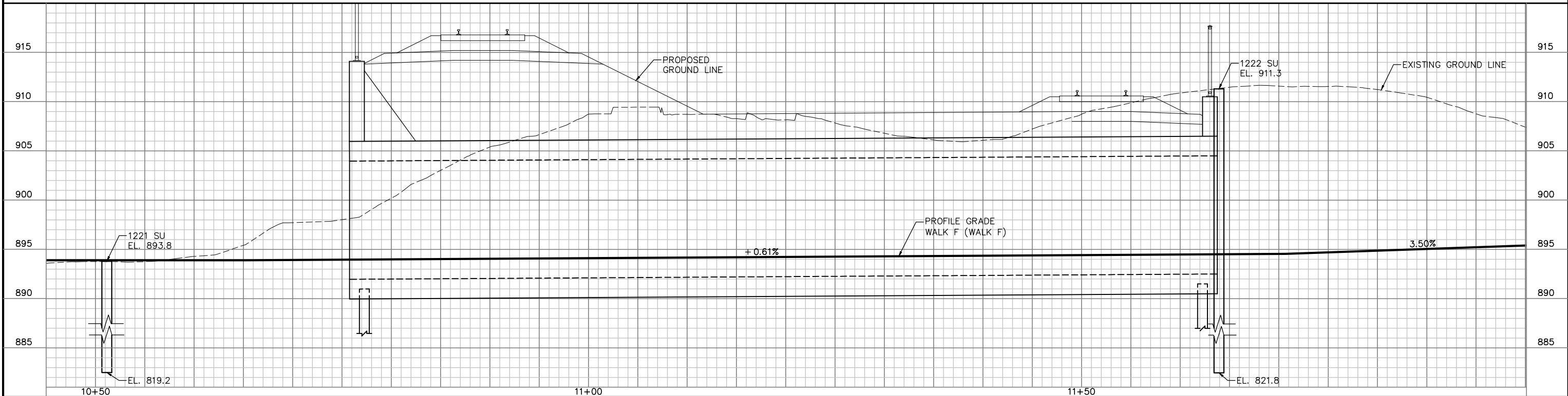
SHEET
78
OF
274

Aug. 26 2014 01:43 pm V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-PUPS-PED-SUR-002.dwg By: ronald.dee



NOTES:

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)
LOUISIANA STATION PEDESTRIAN
UNDERPASS - BRIDGE XXXXX (PED)
BORINGS (1 OF 2)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-BRG-PUPS-PED-BOR-001**

SHEET
79
OF
274

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADP AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

[illegible]

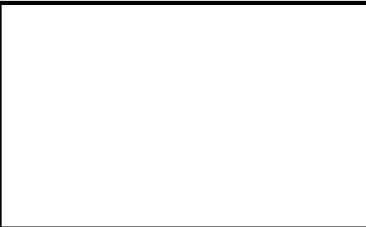
AESTHETIC DETAILS TO BE DETERMINED DURING ADVANCED DESIGN

- 1. INTERIOR WALL AND CEILING SURFACES
- 2. PORTAL TREATMENTS
- 3. LIGHTING
- 4. SIGNING
- 5. EXPOSED EDGE OF CULVERT
- 6. EXPOSED BARRIER
- 7. RAILING AND SCREENING

Aug. 26 2014 01:43 pm V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-PUPS-PED-AES.dwg By: ronald.dee

DES. CPE	DR. PHH
CHK. JDP	CHK. CPE

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING

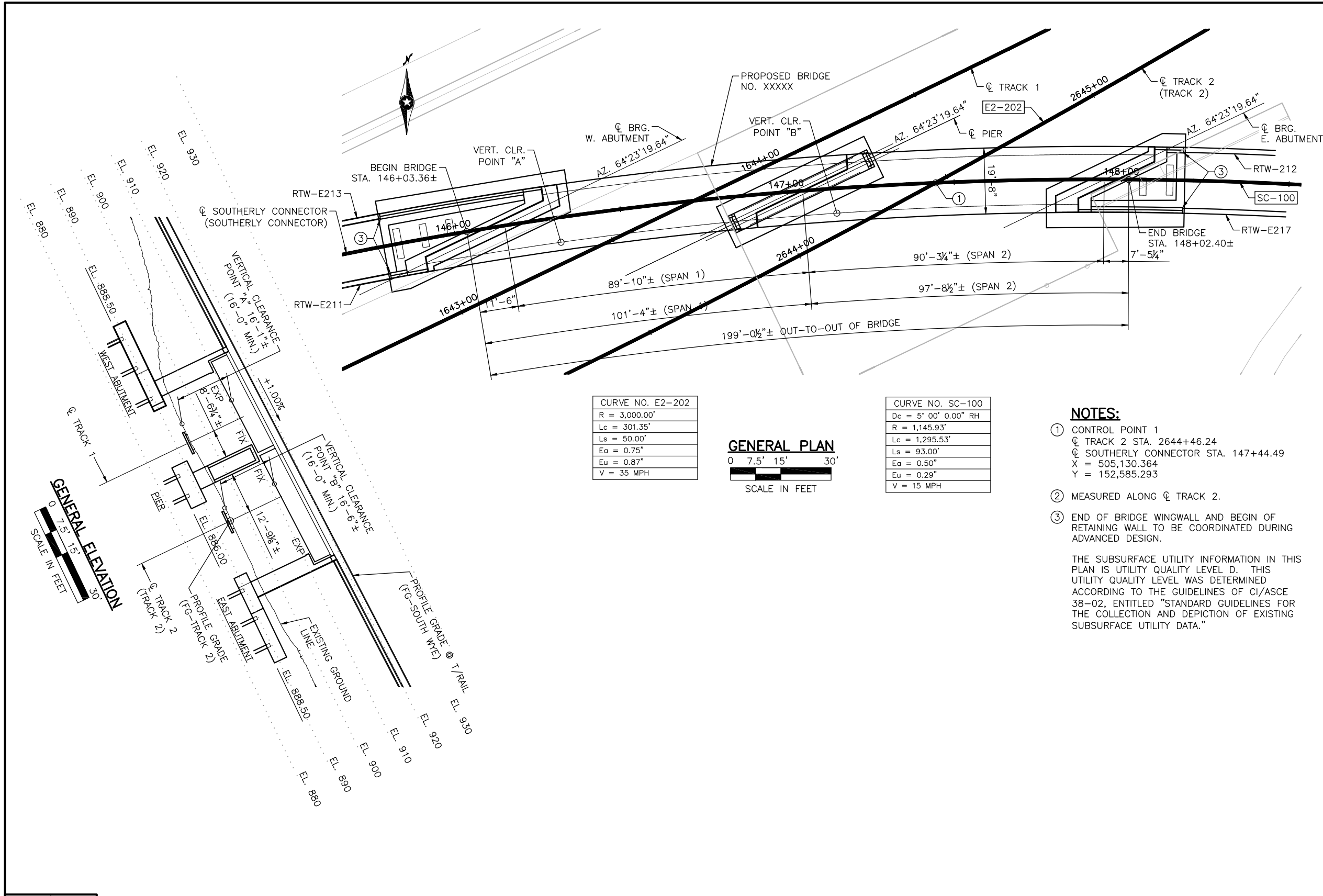


EAST - VOLUME 2 (STRUCTURES)
LOUISIANA STATION PEDESTRIAN
UNDERPASS - BRDIGE XXXXX (PED)
AESTHETICS

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-PUPS-PED-AES

Aug. 25 2014 10:52 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-SOCO-FRT-GPE.dwg By: muellerj



CURVE NO. E2-202
R = 3,000.00'
Lc = 301.35'
Ls = 50.00'
Ea = 0.75"
Eu = 0.87"
V = 35 MPH

CURVE NO. SC-100
Dc = 5' 00' 0.00" RH
R = 1,145.93'
Lc = 1,295.53'
Ls = 93.00'
Ea = 0.50"
Eu = 0.29"
V = 15 MPH

- NOTES:**
- CONTROL POINT 1
CL TRACK 2 STA. 2644+46.24
CL SOUTHERLY CONNECTOR STA. 147+44.49
X = 505,130.364
Y = 152,585.293

- MEASURED ALONG CL TRACK 2.

- END OF BRIDGE WINGWALL AND BEGIN OF RETAINING WALL TO BE COORDINATED DURING ADVANCED DESIGN.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

DESIGN DATA

2013 AREMA DESIGN SPECIFICATIONS
COOPER E 90 LIVE LOAD OR 100 KIP (4 AXLES)
ALTERNATE LOAD WITH DIESEL IMPACT

MAXIMUM BALLAST DEPTH = 2'-0" (FOR DESIGN)

WORKING STRESS DESIGN METHOD (STEEL)

LOAD FACTOR DESIGN METHOD (CONCRETE)

MATERIAL DESIGN PROPERTIES
REINFORCED CONCRETE:
f'c = 4000 PSI n = 8
fy = 60000 PSI REINFORCEMENT

STRUCTURAL STEEL:
fs = 27,500 PSI, fy = 50,000 PSI
ASTM A709 GRADE 50WT3 (MnDOT 3309)

DESIGN SPEED: UNDER = 30 MPH

APPROXIMATE DECK AREA 3915 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
82	GENERAL PLAN AND ELEVATION
83	BRIDGE SURVEY
84	TRANSVERSE SECTION
85-86	BORINGS
87	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK:
2 SPANS OF BALLASTED REINFORCED CONCRETE
DECK ON 4 LINES OF WELDED STEEL PLATE
GIRDERS (SIMPLE SPANS).

SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON STEEL
H-PILES.

PIER WALL SUPPORTED SUPPORTED ON STEEL
H-PILES.

DEPTH OF STRUCTURE:
8'-1"± T/RAIL TO LOW STEEL

AESTHETICS: LEVEL _

PRELIMINARY PLAN BRIDGE NO. XXXXX

CP RAILWAY OVER SOUTHWEST LRT TRACKS
0.3 MILES SOUTHEAST OF JCT. T.H. 7 AND LOUISIANA
AVENUE SOUTH.

CP RAILWAY MILEPOST 429.00
ON THE MERRIAM PARK SUBDIVISION

89'-10" & 90'-3" WELDED STEEL PLATE GIRDER
SPANS; 19'-8" RAILWAY; 70'52'36.1" SKEW (SPAN 1)
AND 65'56'31.3" SKEW (SPAN 2).

BRIDGE ID NO. 301

GENERAL PLAN AND ELEVATION

SEC 17 T 117N R 21W
CITY OF ST. LOUIS PARK HENNEPIN COUNTY

APPROVED: _____
STATE BRIDGE ENGINEER DATE

DES. JRM DR. JRM
CHK. GM CHK. GM

JOB NO.: T9N635

STATE PROJ. NO.: 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
SOUTHERLY CONNECTOR OVER LRT
BRIDGE XXXXX (FRT)
GENERAL PLAN AND ELEVATION

DISCIPLINE:

STRUCTURES

SHEET NAME:

E2-STU-BRG-SOCO-FRT-GPE

SHEET

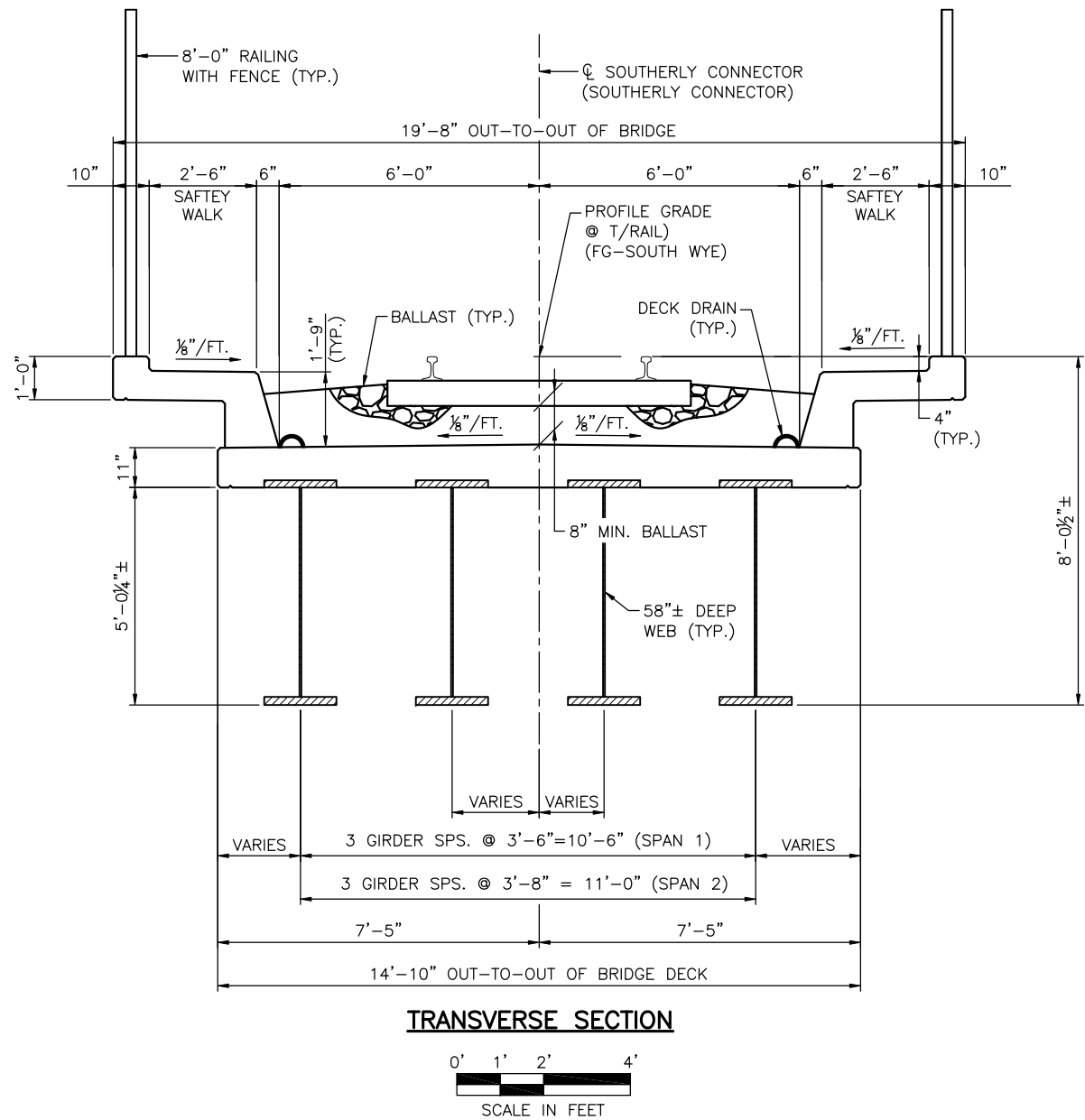
82

OF

274

EAST - VOLUME 2 (STRUCTURES) SOUTHERLY CONNECTOR OVER LRT BRIDGE XXXXX (FRT) BRIDGE SURVEY		SHEET 83 OF 274
DISCIPLINE: STRUCTURES	SHEET NAME: E2-STU-BRG-SOCO-FRT-SUR-001	

Aug. 25 2014 10:56 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-SOCO-FRT-SUP.dwg By: muellerj



DES.	JRM	DR.	JRM
CHK.	GM	CHK.	GM
NO.	DATE	BY	



PRELIMINARY ENGINEERING

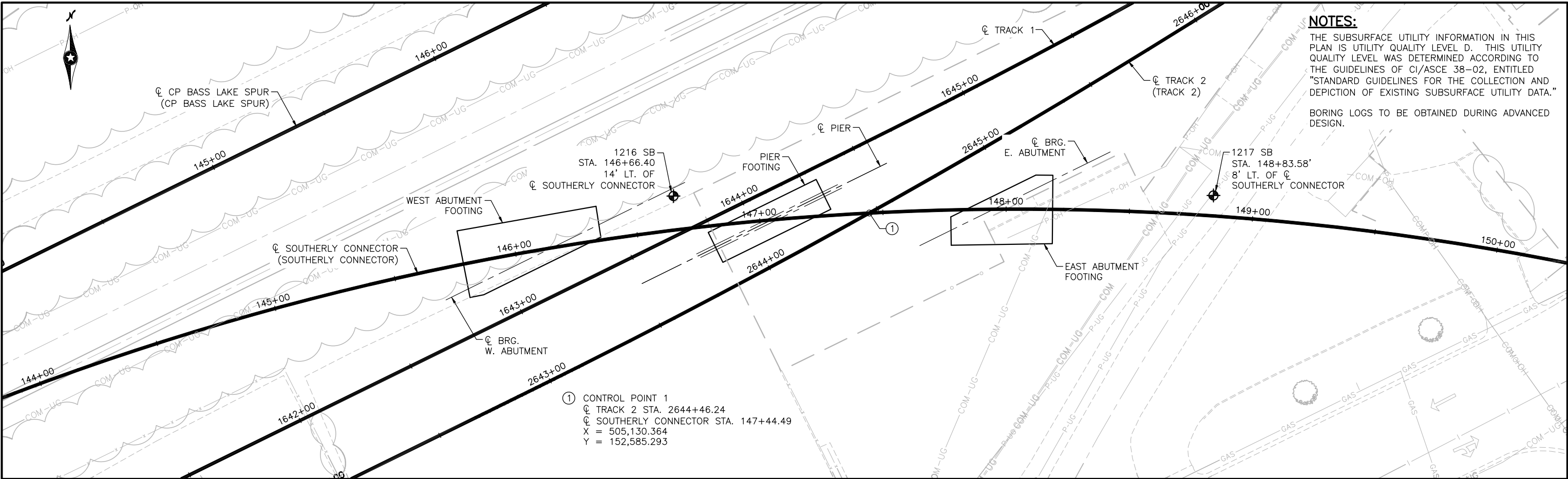


EAST - VOLUME 2 (STRUCTURES)
SOUTHERLY CONNECTOR OVER LRT
BRIDGE XXXXX (FRT)
TRANSVERSE SECTION

DISCIPLINE: STRUCTURES
SHEET NAME: E2-STU-BRG-SOCO-FRT-SUP

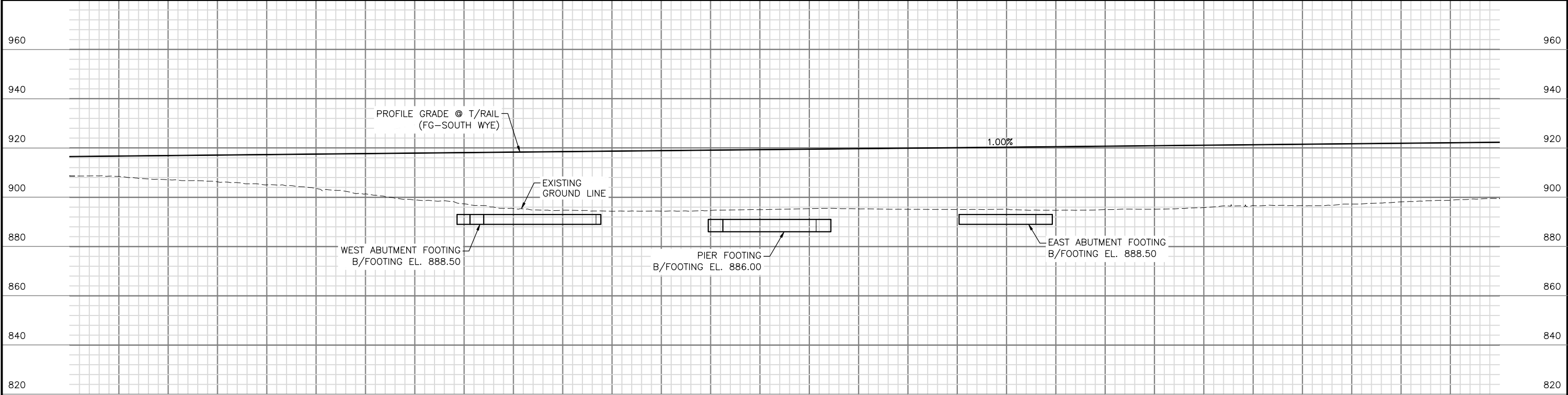
SHEET
84
OF
274

Aug. 25 2014 10:59 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-SOCO-FRT-BOR-001.dwg By: muellerj



NOTES:
THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF C1/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

BORING LOGS TO BE OBTAINED DURING ADVANCED DESIGN.



DES. JRM	DR. JRM
CHK. GM	CHK. GM

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn
TKDA

METROPOLITAN COUNCIL

SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
SOUTHERLY CONNECTOR OVER LRT
BRIDGE XXXXX (FRT)
BORINGS (1 OF 2)

DISCIPLINE: **STRUCTURES**
SHEET NAME: **E2-STU-BRG-SOCO-FRT-BOR-001**

SHEET
85
OF
274

1. ABUTMENT SURFACE
2. ABUTMENT/WALL CORNER DETAIL
3. EXPOSED EDGE OF DECK/WALKWAY
4. EXPOSED FASICA BEAM
5. BOTTOM OF BEAMS
6. PIER COLUMN GEOMETRY AND SURFACE
7. RAILING AND SCREENING

[illegible][illegible]

PRELIMINARY ENGINEERING



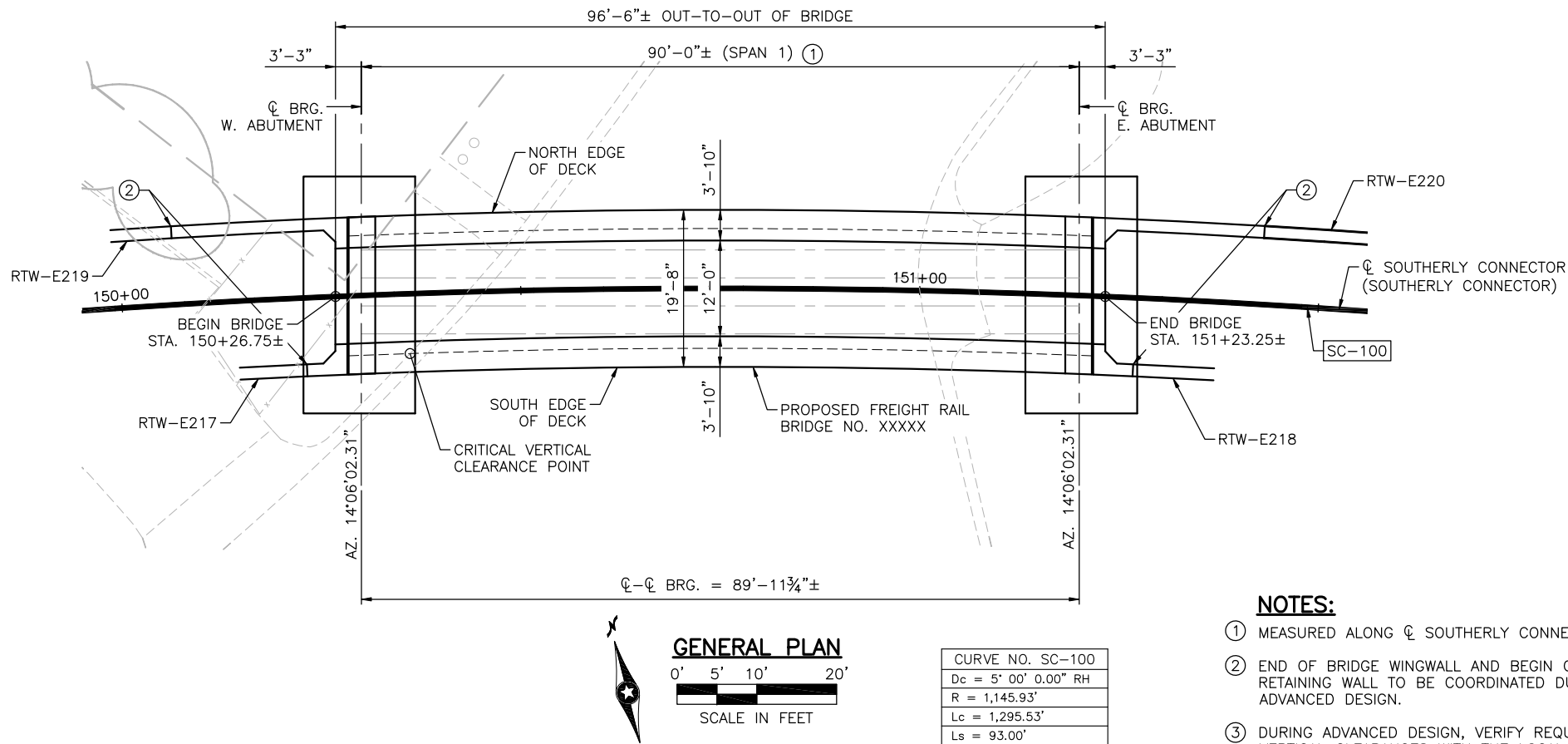
**EAST - VOLUME 2 (STRUCTURES)
SOUTHERLY CONNECTOR OVER LRT
BRIDGE XXXXX (FRT)
AESTHETICS**

DISCIPLINE: **STRUCTURES**

SHEET NAME:	E2-STU-BRG-SOCO-FRT-AES
-------------	-------------------------

SHEET
87
OF
274

Aug. 25 2014 09:50 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-SCOX-FRT-GPE.dwg By: muellerj



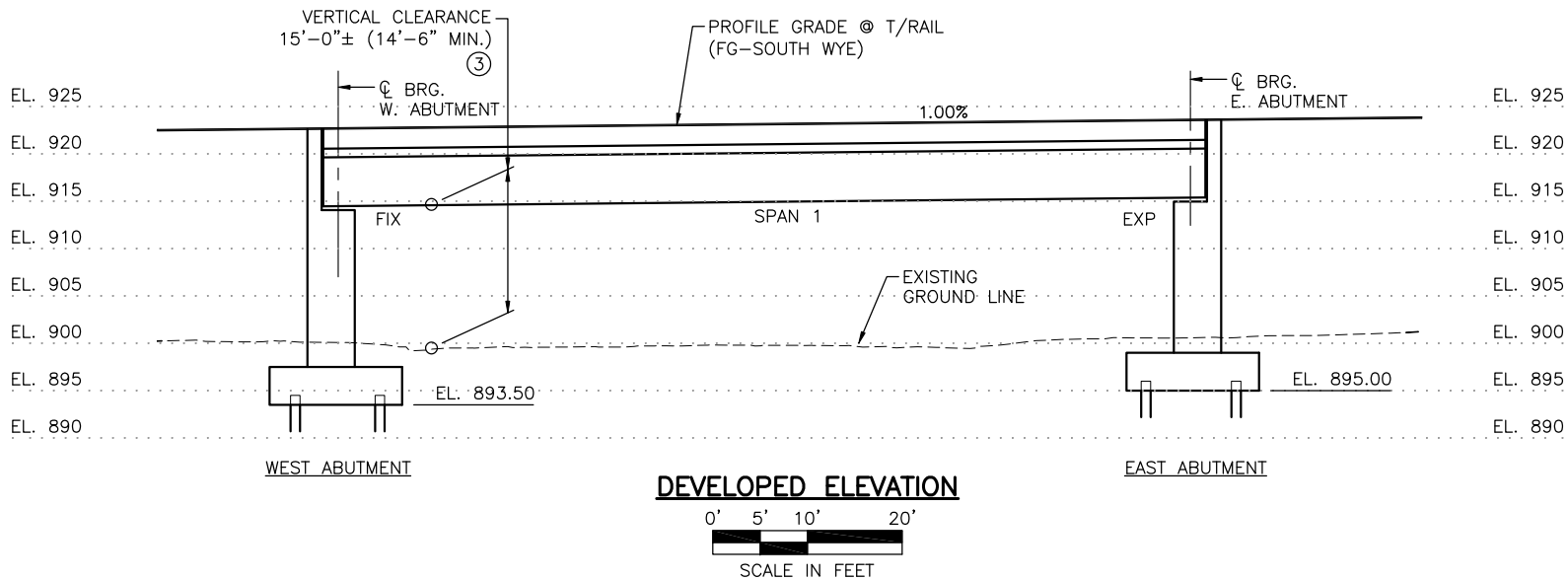
NOTES:

① MEASURED ALONG CL SOUTHERLY CONNECTOR

② END OF BRIDGE WINGWALL AND BEGIN OF RETAINING WALL TO BE COORDINATED DURING ADVANCED DESIGN.

③ DURING ADVANCED DESIGN, VERIFY REQUIRED VERTICAL CLEARANCES WITH THE LOCAL USERS.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."



DESIGN DATA

2013 A.R.E.M.A. MANUAL FOR RAILWAY ENGINEERING

COOPER E90 LIVE LOAD OR 100 KIP (4 AXLES)
ALTERNATE LOAD WITH DIESEL IMPACT

MAXIMUM BALLAST DEPTH = 2'-0" (FOR DESIGN)

WORKING STRESS DESIGN METHOD (STEEL)

LOAD FACTOR DESIGN METHOD (CONCRETE)

MAXIMUM ALLOWABLE DESIGN STRESSED REINFORCED CONCRETE:

$f'_c = 4000$ PSI $n = 8$
 $f_y = 60000$ PSI REINFORCEMENT

STRUCTURAL STEEL:

$f_s = 27500$ PSI $f_y = 50,000$ PSI
ASTM A709 GRADE 50WT3 (MN/DOT 3309)

DESIGN SPEED: UNDER = 20 MPH (VEH)

APPROXIMATE DECK AREA 1898 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
88	GENERAL PLAN AND ELEVATION
89	BRIDGE SURVEY
90	TRANSVERSE SECTION
91-92	BORINGS
93	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK:
SINGLE SPAN - BALLASTED REINFORCED CONCRETE DECK ON 4 LINES OF WELDED STEEL PLATE GIRDERS. COMPOSITE STEEL DESIGN.

SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON STEEL H-PILING
PIER WALL SUPPORTED ON STEEL H-PILING.

DEPTH OF STRUCTURE:
8'-2 1/2"± TOP OF RAIL TO LOW STEEL.

AESTHETICS: LEVEL _

PRELIMINARY PLAN BRIDGE NO. XXXXX

CP RAILWAY OVER OXFORD STREET
0.3 MILES SOUTHEAST OF JCT. T.H. 7 AND LOUISIANA AVENUE SOUTH.

CP RAILWAY MILEPOST 429.00
ON THE MERRIAM PARK SUBDIVISION

90'-0" - WELDED STEEL PLATE GIRDER SPAN
19'-8" RAILWAY; 00°00'00.00" SKEW

BRIDGE ID NO. 301

GENERAL PLAN AND ELEVATION

SEC 17 T 117 N R 21 W
CITY OF ST. LOUIS PARK HENNEPIN COUNTY

APPROVED: _____
STATE BRIDGE ENGINEER DATE

DES. JRM	DR. JRM
CHK. GM	CHK. GM

JOB NO.: T9N635

STATE PROJ. NO.: 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
SOUTHERLY CONNECTOR AT OXFORD
BRIDGE XXXXX (FRT)
GENERAL PLAN AND ELEVATION

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-SCOX-FRT-GPE

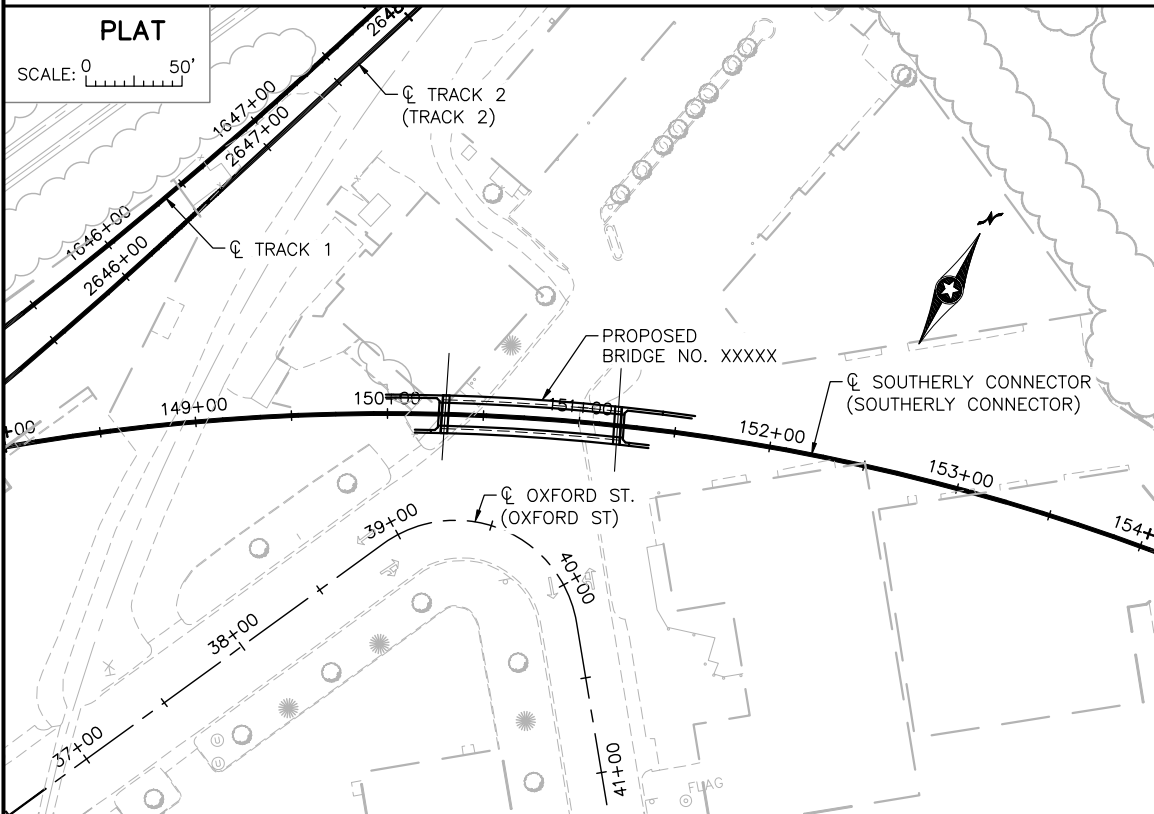
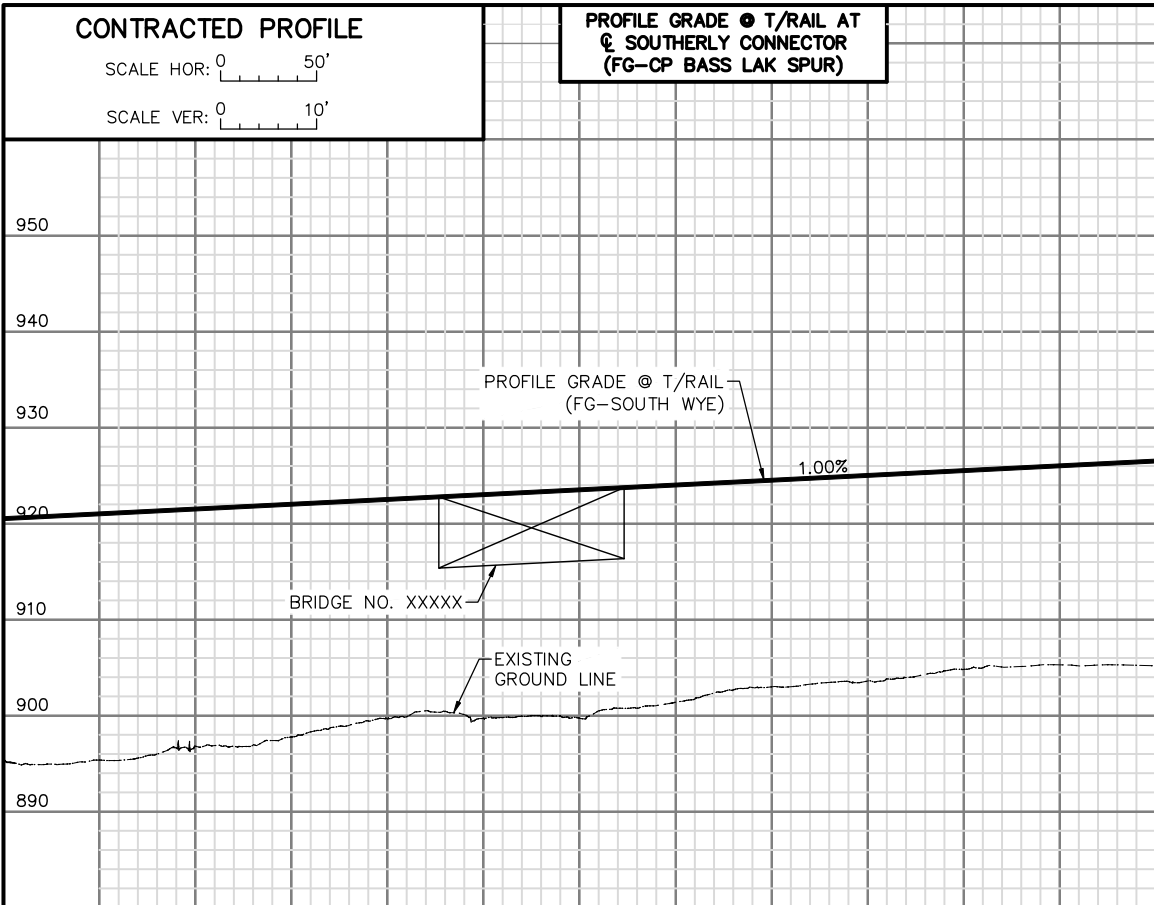
SHEET

88

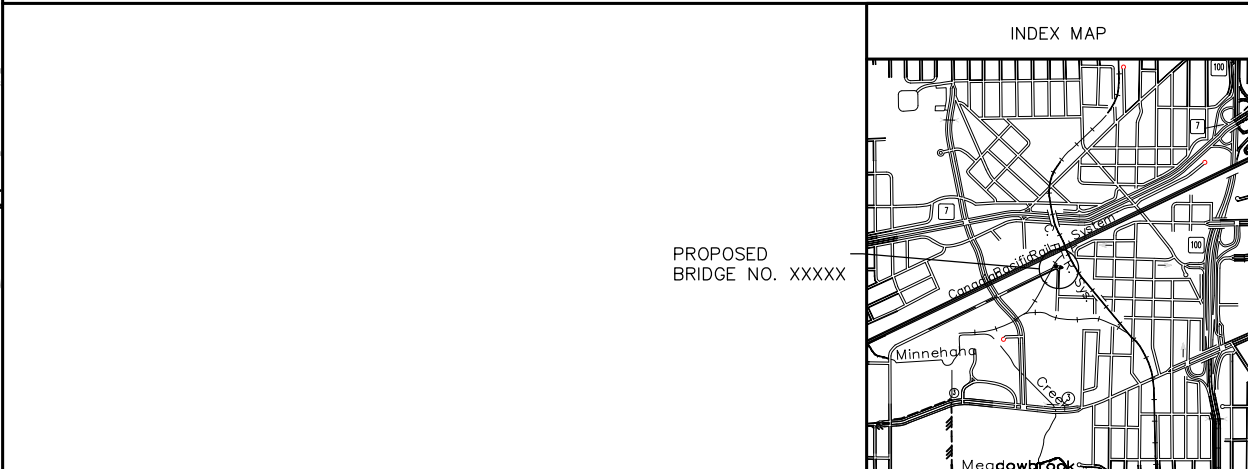
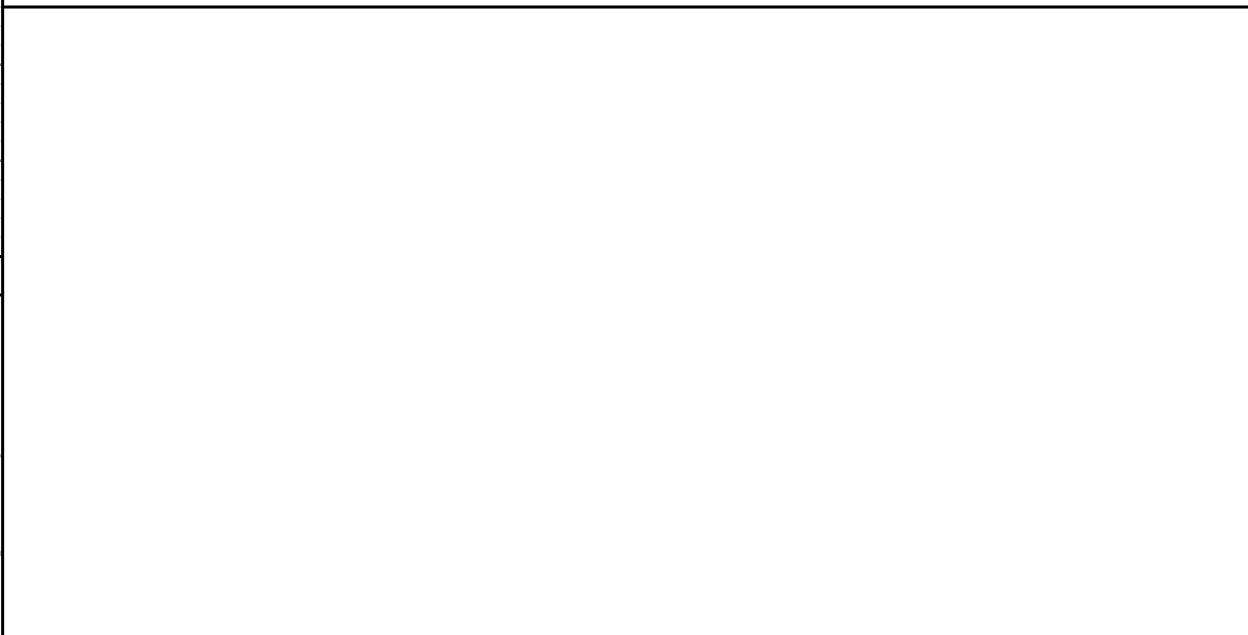
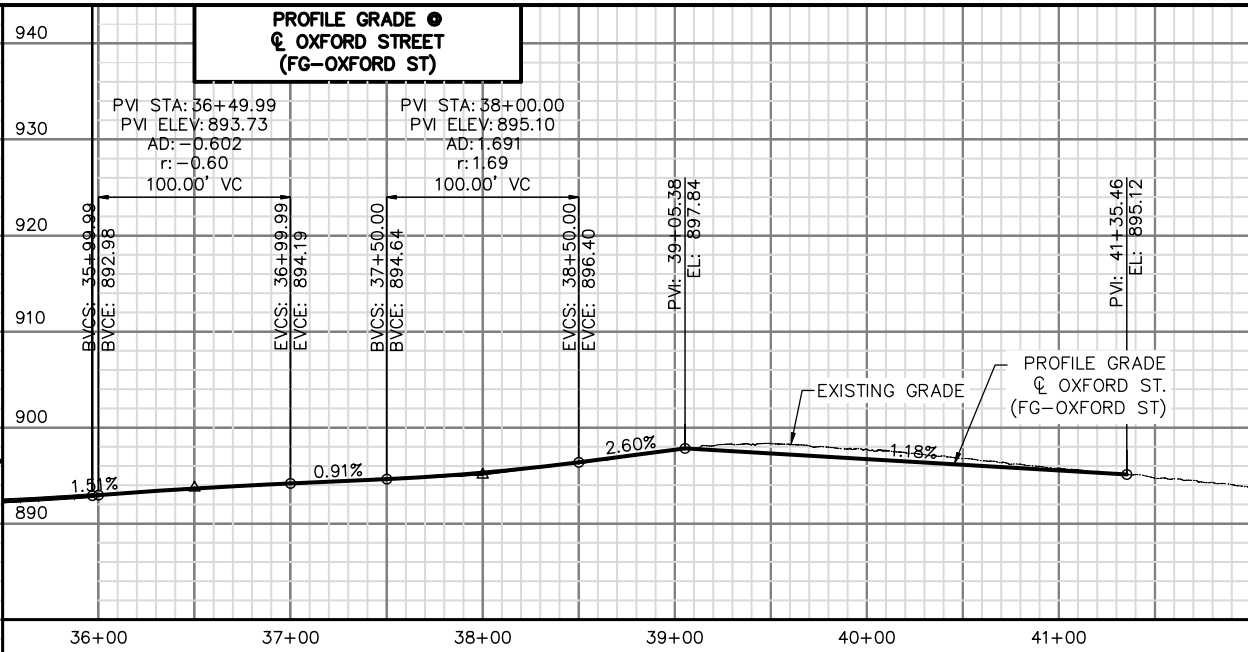
OF

274

Aug. 25 2014 09:55 am K:\g-m\Kimley-Horn\15277000\3300_PEG-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-SCOX-FRT-SUR-001.dwg By: muellerj



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



**LOCATION ENGINEER'S OBSERVATIONS
AT BRIDGE SITE**

- SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.
- OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
- APPARENT HIGHWATER ELEVATION OBTAINED FROM:
- OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

HYDRAULIC ENGINEER'S RECOMMENDATION

DATE:

STREAM OR DITCH DESIGNATION

DRAINAGE AREA

MAX FLOOD ON RECORD

DESIGN FLOOD (YR. FREQ.): C.F.S.
HEADWATER ELEVATION: FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE F.P.S.
TOTAL STAGE INCREASE FT.
LOW MEMBER AT OR ABOVE ELEVATION FT.

WATERWAY AREA REQUIRED BELOW ELEV. = SQ. FT.
AT RIGHT ANGLES TO CHANNEL

BASIC FLOOD (100 YR. FREQ.) C.F.S.
HEADWATER ELEVATION: FT.
TOTAL STAGE INCREASE FT.
MEAN VELOCITY THROUGH STRUCTURE

FLOWLINE ELEVATION: FT. SKEW ANGLE:

ESTIMATED PRILIMINARY TOTAL SCOUR AT PIER EL.
(500 OR OT YR. FREQ.)

SCOUR CONFIRMATION RECOMMENDATION

DATE:

TOTAL SCOUR AT PIER EL. (500 OR OT YR. FREQ.)

SCOUR CODE: OBTAIN FROM HYDRAULIC ENGINEER

BRIDGE SURVEY SHEETS MADE FROM 2014 MFRA SURVEYS

1ST BENCH MARK (NAVD 88)
BENCHMARK ID PT. 175
ELEVATION = 896.03
N = 152982.35, E = 505138.46
DESCRIPTION = MAG NAIL IN BIT.

2ND BENCH MARK (NAVD 88)
BENCHMARK ID PT. 167
ELEVATION = 899.33
N = 151921.95, E = 505886.04
DESCRIPTION = 1/2" PIPE W/ CAP

BRIDGE SURVEY

CP RAILWAY OVER OXFORD STREET
0.3 MILES SOUTHEAST OF JCT. T.H. 7 AND LOUISIANA AVENUE SOUTH.

SEC 17 T 117 N R 21 W

ST. LOUIS PARK HENNEPIN COUNTY

BRIDGE NO. XXXXX

Kimley»Horn

TKDA

PRELIMINARY ENGINEERING

METROPOLITAN
C O U N C I L

SOUTHWEST
Green Line LRT Extension

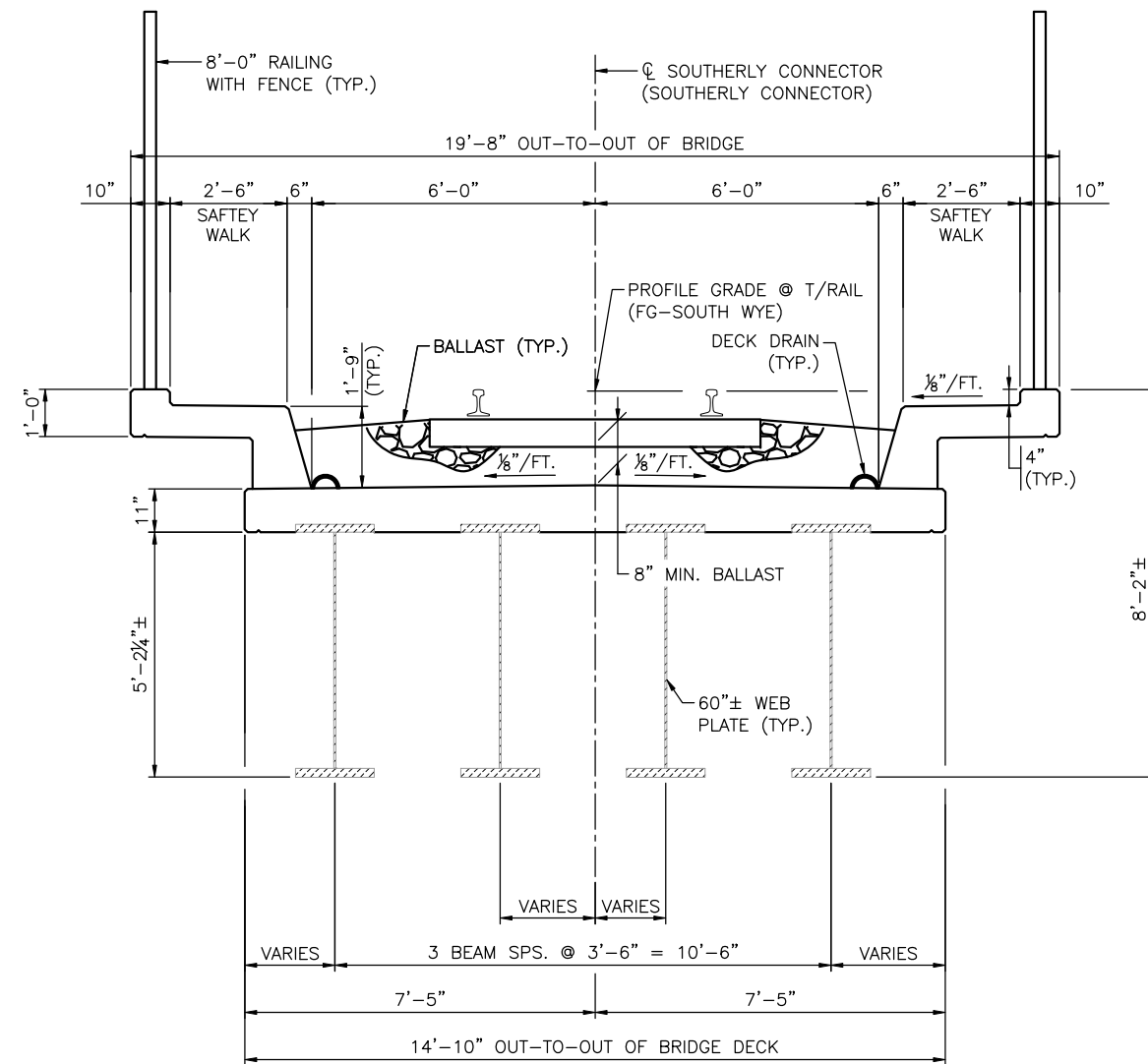
**EAST - VOLUME 2 (STRUCTURES)
SOUTHERLY CONNECTOR AT OXFORD
BRIDGE XXXXX (FRT)
BRIDGE SURVEY**

DISCIPLINE: **STRUCTURES**

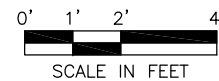
SHEET NAME: **E2-STU-BRG-SCOX-FRT-SUR-001**

SHEET
89
OF
274

Aug. 25 2014 09:56 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-SCOX-FRT-SUP.dwg By: muellerj



TRANSVERSE SECTION



DES. JRM	DR. JRM
CHK. GM	CHK. GM

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING

METROPOLITAN COUNCIL

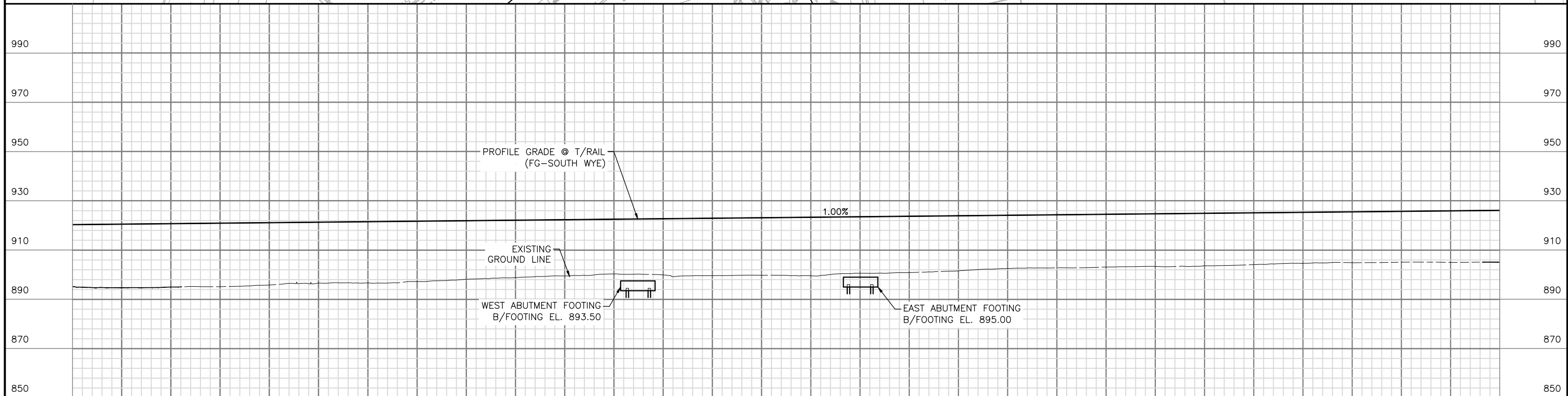
SOUTHWEST
Green Line LRT Extension





EAST - VOLUME 2 (STRUCTURES)
SOUTHERLY CONNECTOR AT OXFORD
BRIDGE XXXXX (FRT)
TRANSVERSE SECTION





DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-BRG-SCOX-FRT-SUP**

BORING LOGS TO BE OBTAINED DURING ADVANCED DESIGN.



DES. JRM		148+40		149+00		150+00		151+00		152+00		153+00	
CHK. GM													
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL	<div>  PRELIMINARY ENGINEERING</div>		<div> SOUTHWEST <small>Green Line LRT Extension</small></div>		<div>EAST - VOLUME 2 (STRUCTURES) SOUTHERLY CONNECTOR AT OXFORD BRIDGE XXXXX (FRT) BORINGS (1 OF 2)</div> <div>DISCIPLINE: STRUCTURES</div> <div>SHEET NAME: E2-STU-BRG-SCOX-FRT-BOR-001</div>		<div>SHEET 91 OF 274</div>	

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL	<div><div>  TKDA</div><div>PRELIMINARY ENGINEERING</div></div>	<div><div> METROPOLITAN COUNCIL</div><div></div></div>	<div>EAST - VOLUME 2 (STRUCTURES) SOUTHERLY CONNECTOR AT OXFORD BRIDGE XXXXX (FRT) BORINGS (2 OF 2)</div>		<div>SHEET 92 OF 274</div>
DISCIPLINE: STRUCTURES										
SHEET NAME: E2-STU-BRG-SCOX-FRT-BOR-002										

1. ABUTMENT SURFACE
2. ABUTMENT/WALL CORNER DETAIL
3. EXPOSED EDGE OF DECK/WALKWAY
4. EXPOSED FASCIA BEAM
5. BOTTOM OF BEAMS
6. RAILING AND SCREENING

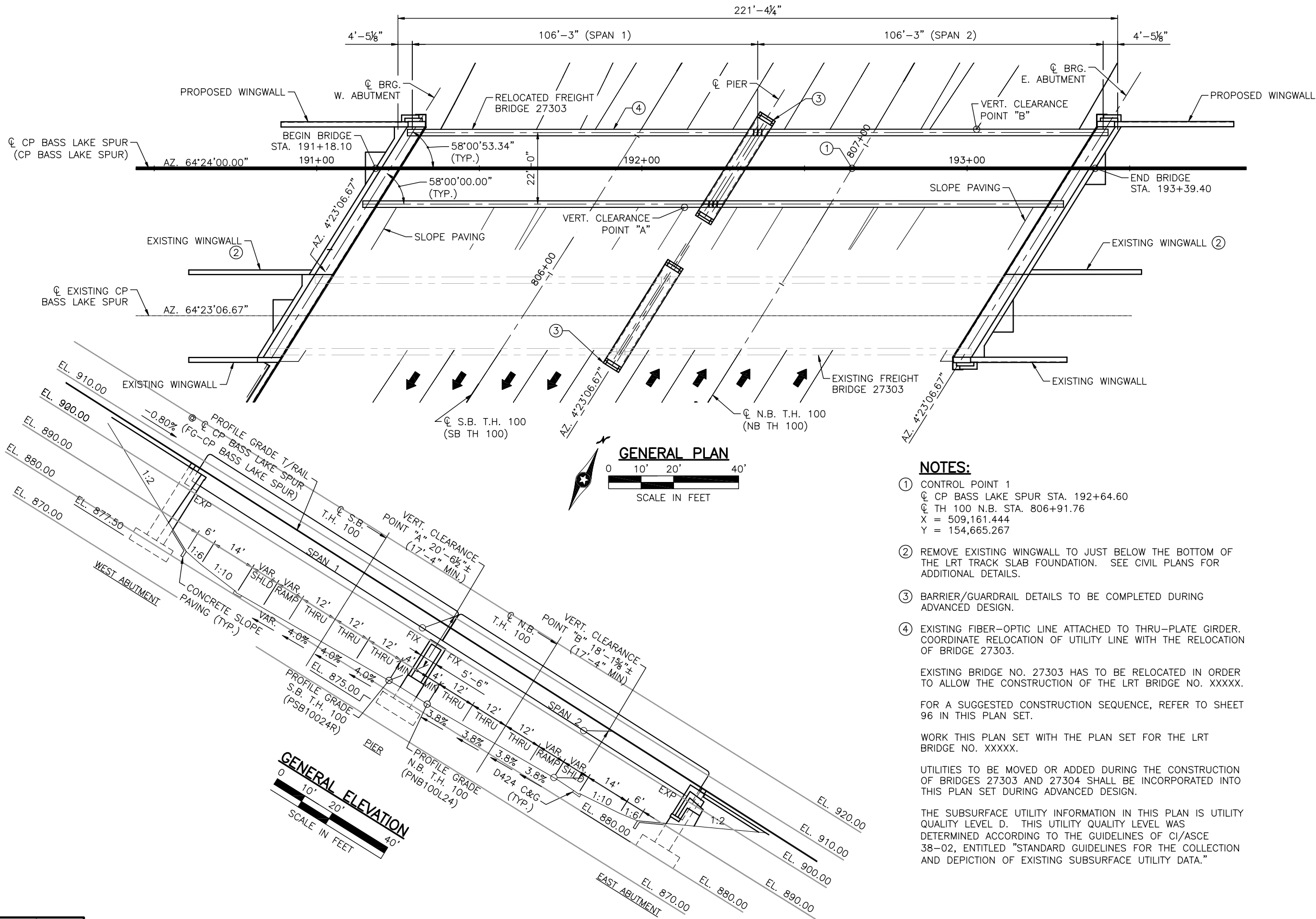
[illegible]

**EAST - VOLUME 2 (STRUCTURES)
SOUTHERLY CONNECTOR AT OXFORD
BRIDGE XXXXX (FRT)
AESTHETICS**

SHEET NAME:	E2-STU-BRG-SCOX-FRT-AES
-------------	-------------------------

SHEET
93
OF
274

Aug. 25 2014 09:59 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-FRT-GPE.dwg By: muellerj



NOTES:

- CONTROL POINT 1
CP BASS LAKE SPUR STA. 192+64.60
TH 100 N.B. STA. 806+91.76
X = 509,161.444
Y = 154,665.267
- REMOVE EXISTING WINGWALL TO JUST BELOW THE BOTTOM OF THE LRT TRACK SLAB FOUNDATION. SEE CIVIL PLANS FOR ADDITIONAL DETAILS.
- BARRIER/GUARDRAIL DETAILS TO BE COMPLETED DURING ADVANCED DESIGN.
- EXISTING FIBER-OPTIC LINE ATTACHED TO THRU-PLATE GIRDER. COORDINATE RELOCATION OF UTILITY LINE WITH THE RELOCATION OF BRIDGE 27303.

EXISTING BRIDGE NO. 27303 HAS TO BE RELOCATED IN ORDER TO ALLOW THE CONSTRUCTION OF THE LRT BRIDGE NO. XXXXX.

FOR A SUGGESTED CONSTRUCTION SEQUENCE, REFER TO SHEET 96 IN THIS PLAN SET.

WORK THIS PLAN SET WITH THE PLAN SET FOR THE LRT BRIDGE NO. XXXXX.

UTILITIES TO BE MOVED OR ADDED DURING THE CONSTRUCTION OF BRIDGES 27303 AND 27304 SHALL BE INCORPORATED INTO THIS PLAN SET DURING ADVANCED DESIGN.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

DESIGN DATA

2013 A.R.E.M.A. MANUAL FOR RAILWAY ENGINEERING

COOPER E90 LIVE LOAD OR 100 KIP (4 AXLES)
ALTERNATE LOAD WITH DIESEL IMPACT

MAXIMUM BALLAST DEPTH = 2'-0" (FOR DESIGN)

WORKING STRESS DESIGN METHOD (STEEL)

LOAD FACTOR DESIGN METHOD (CONCRETE)

MAXIMUM ALLOWABLE DESIGN STRESSED
REINFORCED CONCRETE:

$f'_c = 4000$ PSI $n = 8$
 $f_y = 60000$ PSI REINFORCEMENT

STRUCTURAL STEEL:

$f_s = 27500$ PSI $f_y = 50,000$ PSI
ASTM A709 GRADE 50WT3 & GRADE 50WF3
(MN/DOT 3309)

DESIGN SPEED: OVER = PER CP RAIL
UNDER = 60 MPH (VEH)

APPROXIMATE DECK AREA 4870 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
94	GENERAL PLAN AND ELEVATION
95	BRIDGE SURVEY
96	TRANSVERSE SECTION
97	TRAFFIC STAGING PLAN
98	CONSTRUCTION SEQUENCING
99-101	BORINGS
102-103	AESTHETICS

PROPOSED TYPE OF STRUCTURE

EXISTING SUPERSTRUCTURE:
2 SPANS - 2 STEEL THRU PLATE GIRDERS
WITH STEEL BALLAST PLATE DECK

SUBSTRUCTURE:
NEW PARAPET ABUTMENTS SUPPORTED ON
SPREAD FOOTINGS

NEW PIER WALL SUPPORTED ON A SPREAD
FOOTING

DEPTH OF STRUCTURE:
4'-7 1/4" TOP OF RAIL TO LOW BRIDGE

AESTHETICS LEVEL: ____

PRELIMINARY PLAN FOR RELOCATED BRIDGE NO. 27303

CP RAILWAY OVER T.H. 100
0.2 MILES SOUTH OF JCT. T.H. 7 IN ST. LOUIS PARK
CP RAILWAY MILEPOST 429.00
ON THE MERRIAM PARK SUBDIVISION

106'-3" - 106'-3" STEEL THRU PLATE GIRDER
22'-0" RAILWAY; 32'00"00.00" SKEW
BRIDGE ID NO. 305

GENERAL PLAN AND ELEVATION

SEC 6 T 28N R 24W
CITY OF ST. LOUIS PARK HENNEPIN COUNTY

APPROVED: _____
STATE BRIDGE ENGINEER DATE

DES. JRM DR. JRM
CHK. GM CHK. GM
JOB NO.: T9N635

STATE PROJ. NO.: 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK/DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
TH 100 FREIGHT RAIL BRIDGE RELOCATION
BRIDGE 27303 (FRT)
GENERAL PLAN AND ELEVATION

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-T100-FRT-GPE

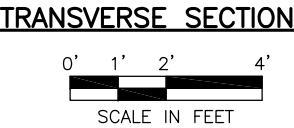
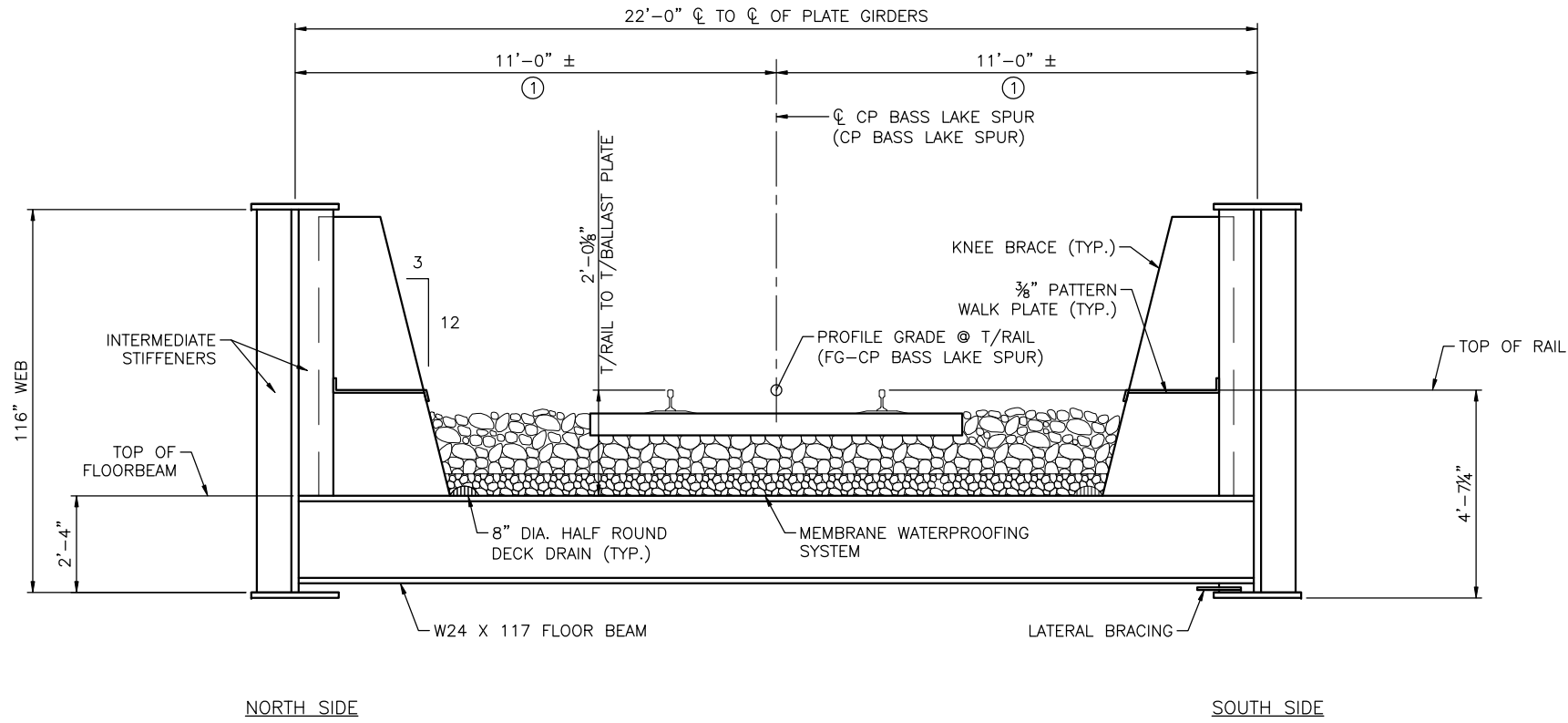
SHEET

94

OF

274

Aug. 28 2014 08:05 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-FRT-SUP.dwg By: muellerj



- NOTES:**
- ① DIMENSION VARIES SLIGHTLY DUE TO THE FACT THAT THE AZIMUTHS OF THE EXISTING AND THE PROPOSED ALIGNMENTS OF ϕ CP BASS LAKE SPUR ARE NOT IDENTICAL

DES.	JRM	DR.	JRM
CHK.	GM	CHK.	GM
NO.	DATE	BY	






PRELIMINARY ENGINEERING



**EAST - VOLUME 2 (STRUCTURES)
TH 100 FREIGHT RAIL BRIDGE RELOCATION
BRIDGE 27303 (FRT)
TRANSVERSE SECTION**

DISCIPLINE: **STRUCTURES** SHEET NAME: **E2-STU-BRG-T100-FRT-SUP**

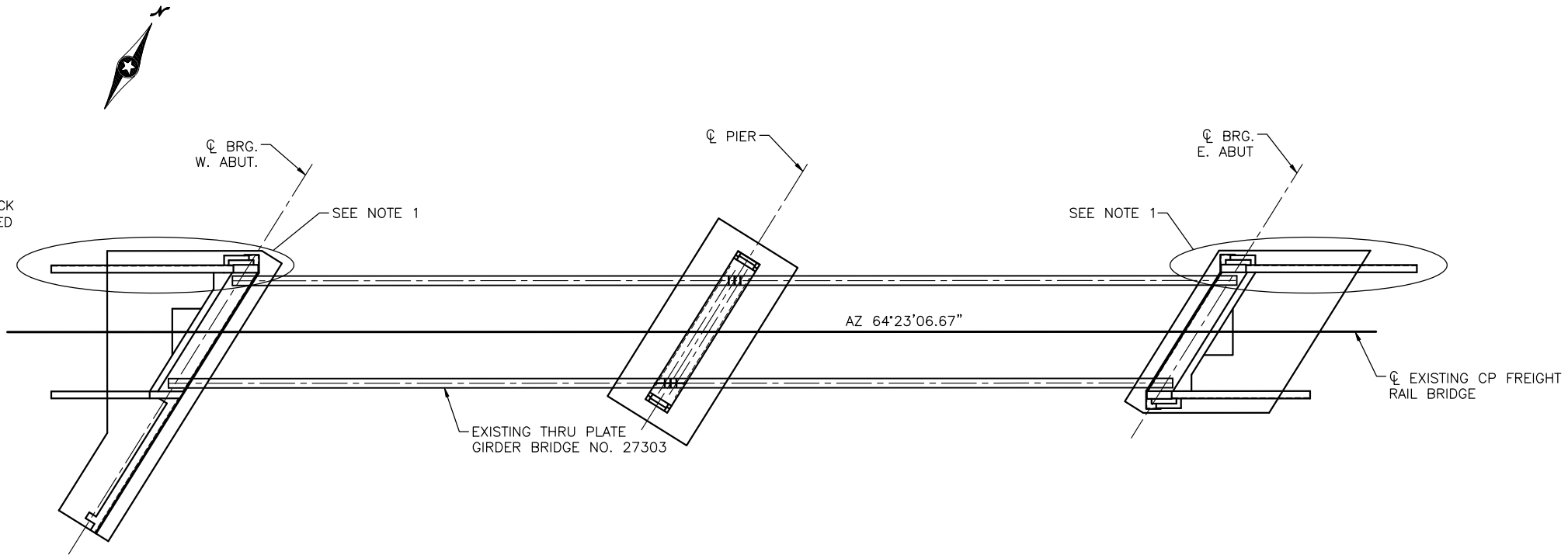
SHEET
96
OF
274

DES. JRM	DR. JRM														
CHK. GM	CHK. GM														
NO.	DATE	BY	CHECK/DESIGN	REVISION / SUBMITTAL											
					<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>Kimley»Horn</p> <p>TKDA</p> </div> <div style="text-align: center;">  <p>METROPOLITAN COUNCIL</p> </div> <div style="text-align: center;">  <p>SOUTHWEST Green Line LRT Extension</p> </div> <div style="text-align: center;"> <p>EAST - VOLUME 2 (STRUCTURES) TH 100 FREIGHT RAIL BRIDGE RELOCATION BRIDGE 27303 (FRT) TRAFFIC STAGING PLAN</p> </div> </div>										
					PRELIMINARY ENGINEERING					<div style="display: flex; justify-content: space-between;"> <div>DISCIPLINE:</div> <div>STRUCTURES</div> </div> <div style="display: flex; justify-content: space-between;"> <div>SHEET NAME:</div> <div>E2-STU-BRG-T100-FRT-DTL-001</div> </div>					SHEET 97 OF 274

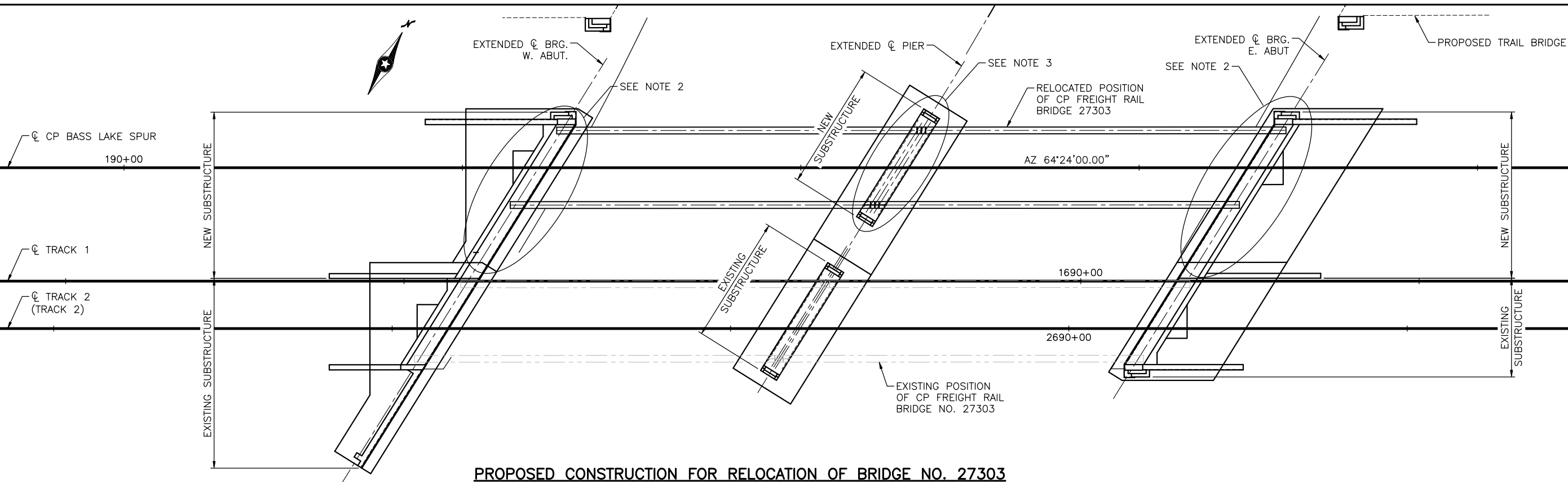
Aug. 28 2014 08:42 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-FRT-DTL-002.dwg By: muellerj

SUGGESTED CONSTRUCTION SEQUENCE FOR BRIDGE RE-LOCATION:

1. REMOVE CONCRETE BRIDGE HEADS TO TOP OF FOOTING. REMOVE CONCRETE BACKWALL TO THE TOP OF THE BRIDGE SEAT. REMOVE CONCRETE WINGWALL TO BOTTOM OF SUBGRADE FOR THE LRT TRACKS.
2. CONSTRUCT NEW CONTINUOUS RAILROAD ABUTMENT AND WINGWALL WHILE ACCOUNTING FOR FUTURE LRT REQUIREMENTS.
3. CONSTRUCT NEW RAILROAD PIER. CONSTRUCT CONTINUOUS PIER FOOTING WHILE ACCOUNTING FOR ADDITIONAL REMOVALS AND MODIFICATIONS FOR THE LRT BRIDGE. CONSTRUCT NEW SEPARATE PIER SHAFT.
4. CONSTRUCT ROLLER BENTS FOR RAILROAD BRIDGE RELOCATION. JACK UP BRIDGE AND MOVE TO NEW LOCATION (BOTH SPANS TO BE MOVED SIMULTANEOUSLY).



EXISTING CP MAINLINE BRIDGE



PROPOSED CONSTRUCTION FOR RELOCATION OF BRIDGE NO. 27303

DES. JRM	DR. JRM
CHK. GM	CHK. GM

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



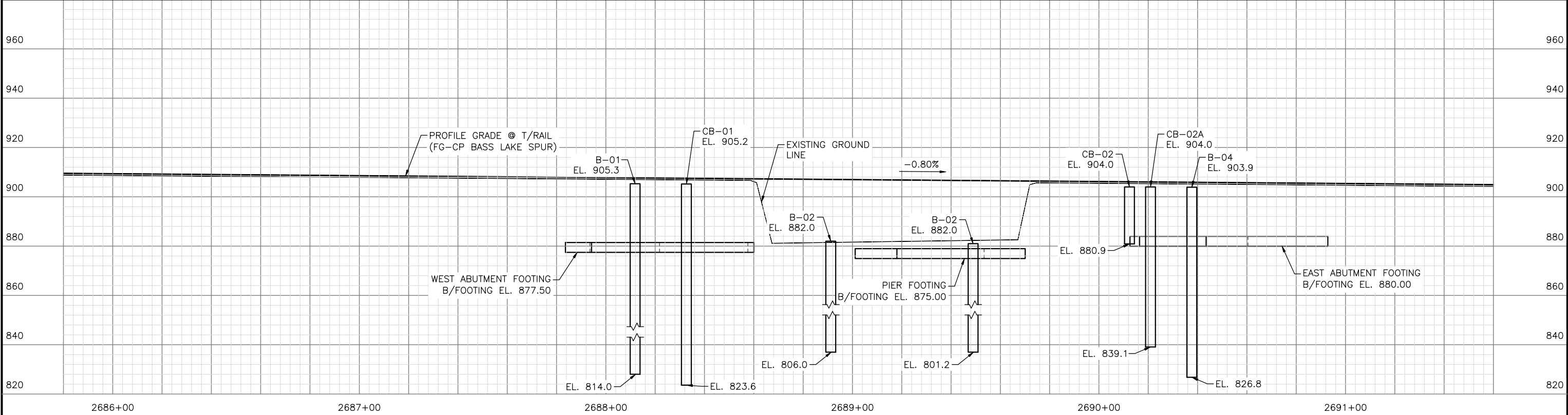
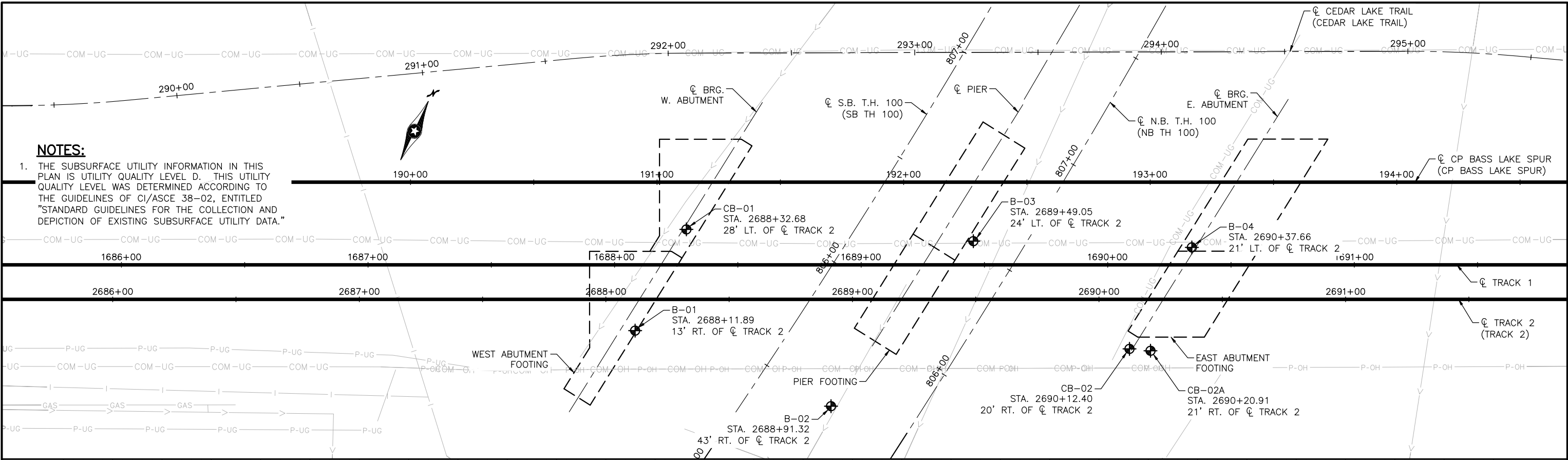
**EAST - VOLUME 2 (STRUCTURES)
TH 100 FREIGHT RAIL BRIDGE RELOCATION
BRIDGE 27303 (FRT)
CONSTRUCTION SEQUENCING**

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-BRG-T100-FRT-DTL-002**

SHEET
98
OF
274

Aug. 28 2014 08:39 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-FRT-BOR-001.dwg By: muellerj



DES.	JRM	DR.	JRM
CHK.	GM	CHK.	GM
NO.	DATE	BY	CHECK/DESIGN/REVISION / SUBMITTAL

Kimley»Horn

TKDA

PRELIMINARY ENGINEERING

METROPOLITAN

C O U N C I L

SOUTHWEST

Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)

TH 100 FREIGHT RAIL BRIDGE RELOCATION

BRIDGE XXXXX (FRT)

BORINGS (1 OF 3)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-BRG-T100-FRT-BOR-001**

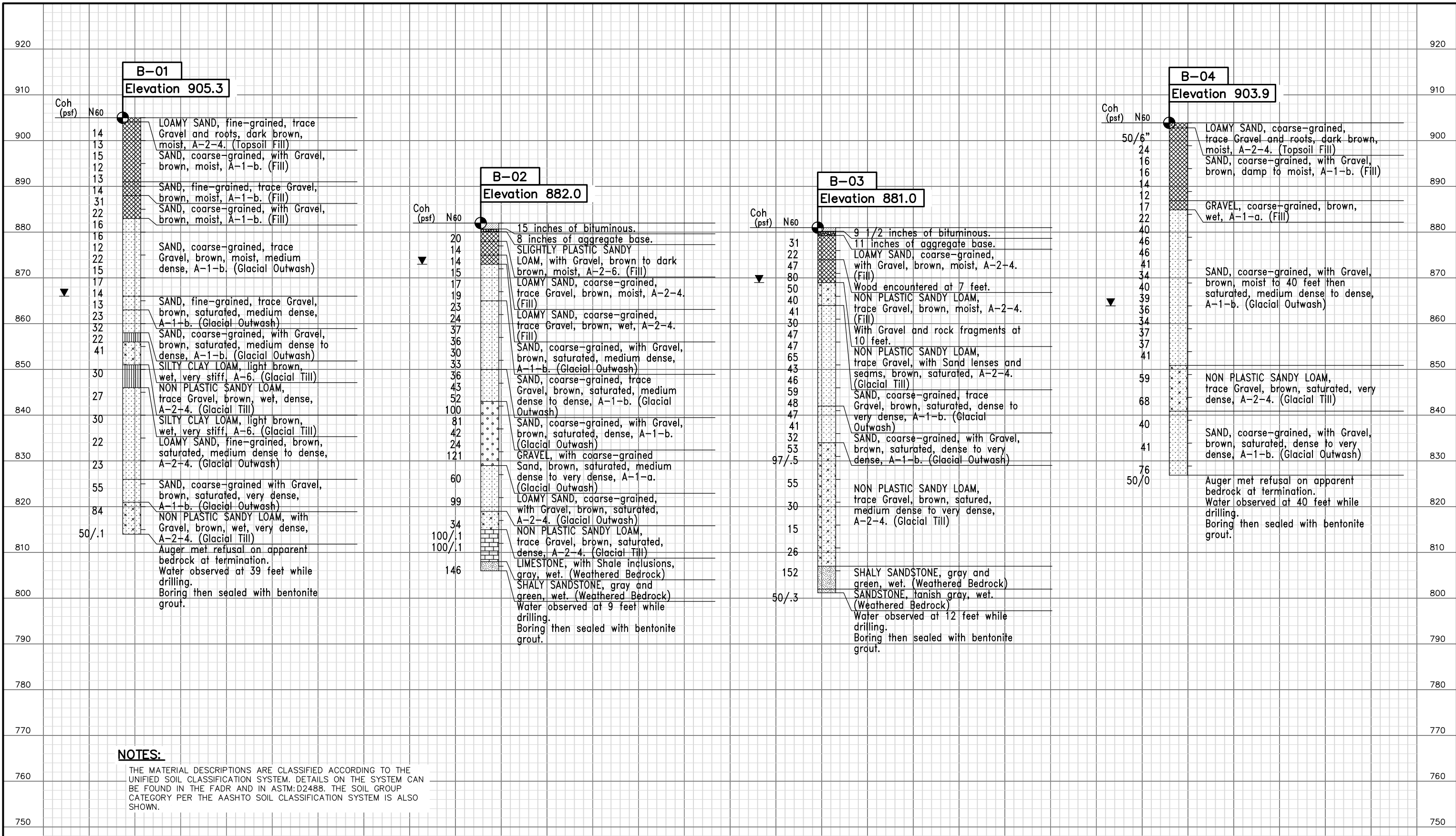
SHEET

99

OF

274

Aug. 25 2014 10:06 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-FRT-BOR-002.dwg By: muellerj



NOTES:

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

PRELIMINARY ENGINEERING

SOUTHWEST
Green Line LRT Extension

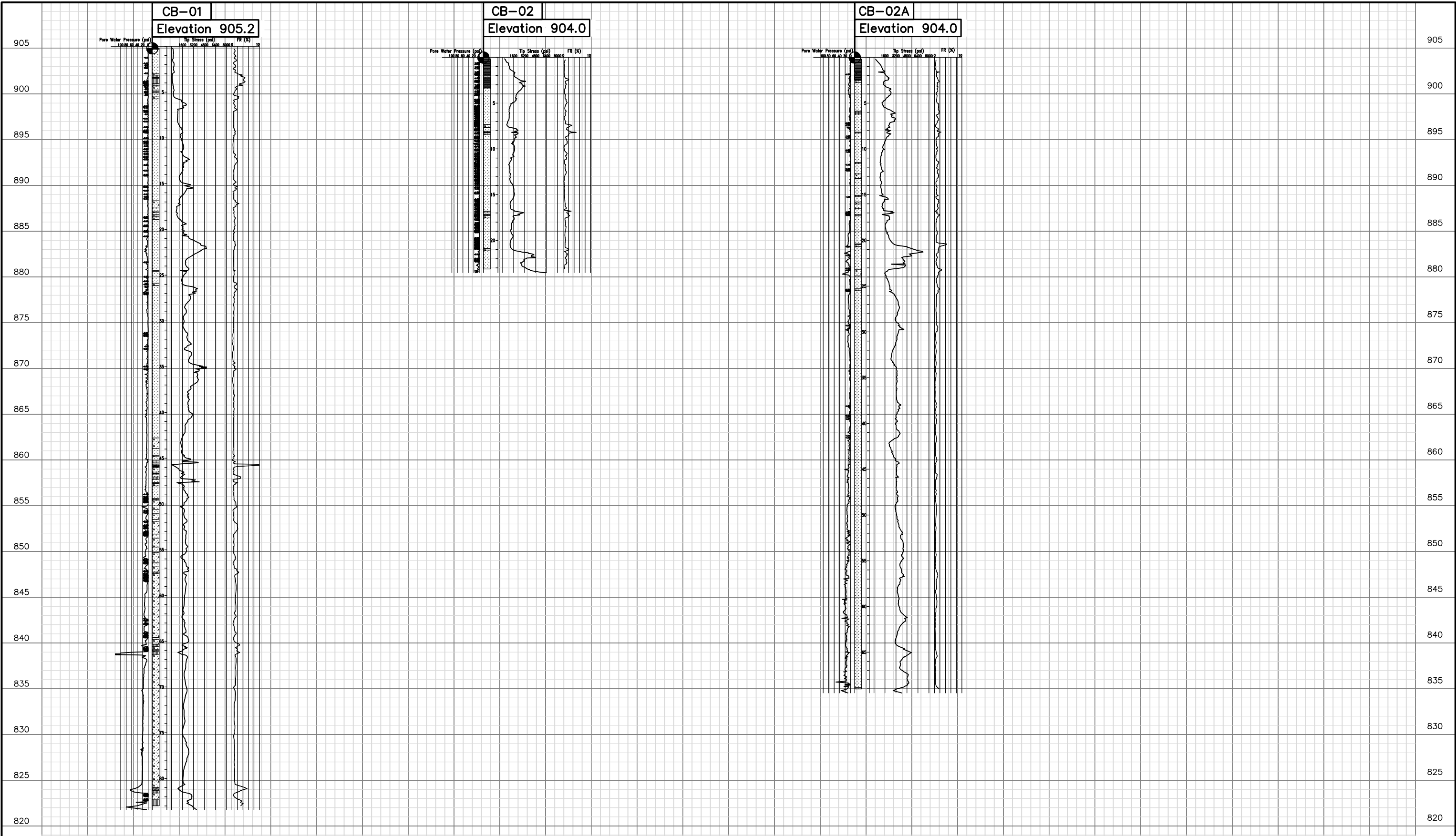
EAST - VOLUME 2 (STRUCTURES)
TH 100 FREIGHT RAIL BRIDGE RELOCATION
BRIDGE XXXXX (FRT)
BORINGS (2 OF 3)

DISCIPLINE: **STRUCTURES**

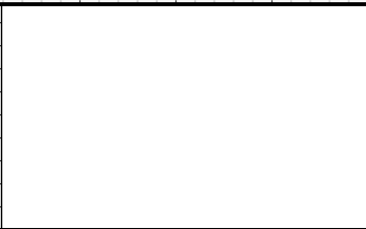
SHEET NAME: **E2-STU-BRG-T100-FRT-BOR-002**

SHEET
100
OF
274

Aug. 25 2014 10:07 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-FRT-BOR-003.dwg By: muellerj



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL






Kimley»Horn

TKDA

PRELIMINARY ENGINEERING



METROPOLITAN
COUNCIL



SOUTHWEST
Green Line LRT Extension

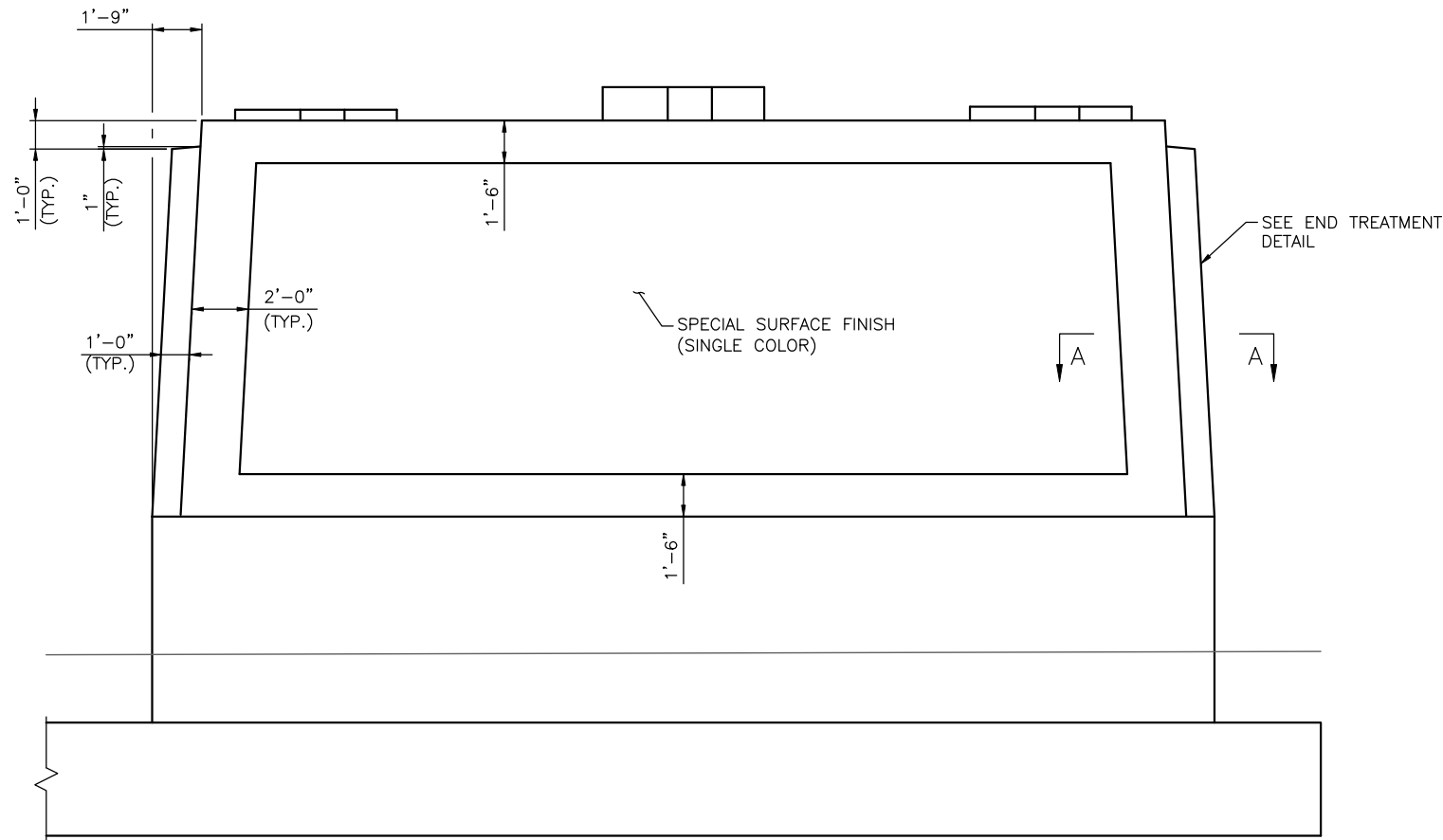
EAST - VOLUME 2 (STRUCTURES)
TH 100 FREIGHT RAIL BRIDGE RELOCATION
BRIDGE XXXXX (FRT)
BORINGS (3 OF 3)

DISCIPLINE: **STRUCTURES**

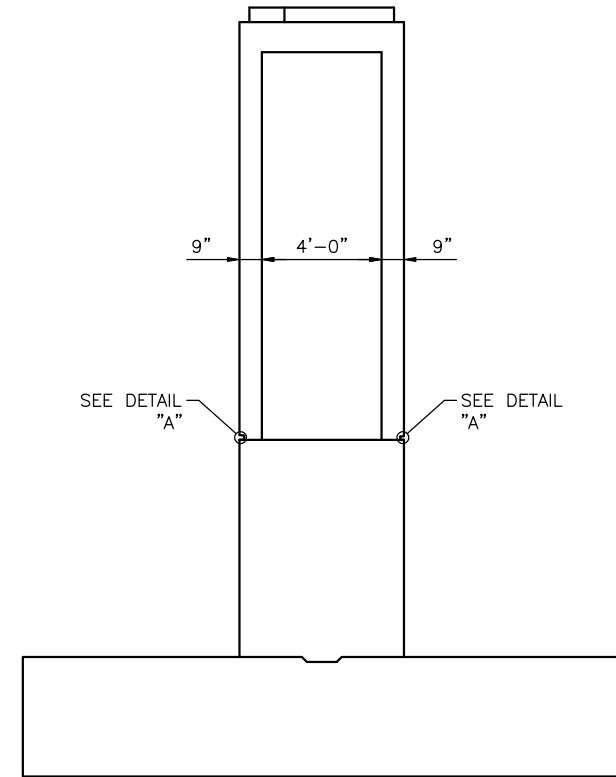
SHEET NAME: **E2-STU-BRG-T100-FRT-BOR-003**

SHEET
101
OF
274

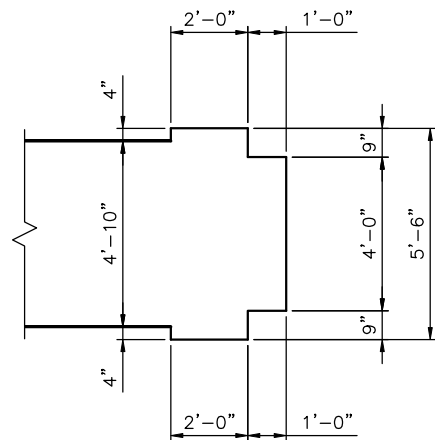
Aug. 25 2014 10:07 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-FRT-AES-002.dwg By: muellerj



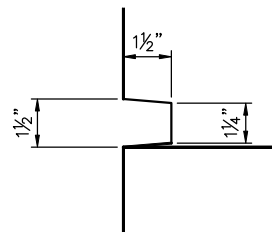
PIER WALL ELEVATION



END VIEW



PIER WALL END - SECTION A-A



DETAIL "A"

DES. JRM	DR. JRM
CHK. GM	CHK. GM

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



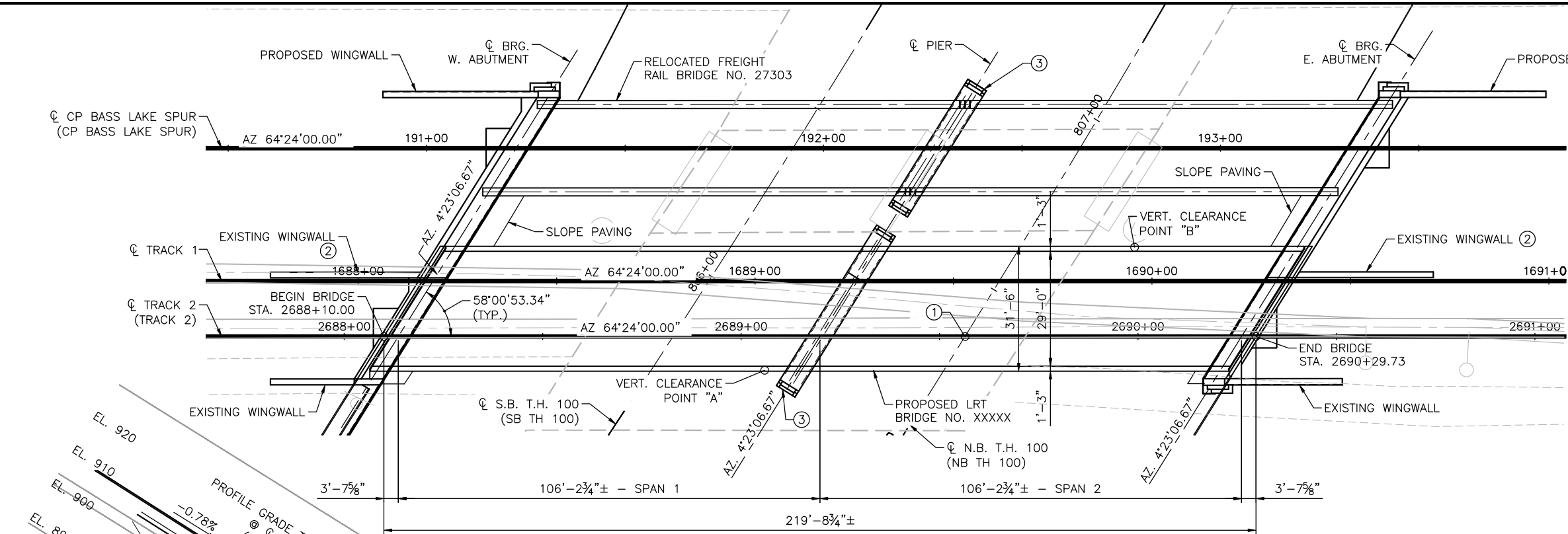
EAST - VOLUME 2 (STRUCTURES)
TH 100 FREIGHT RAIL BRIDGE RELOCATION
BRIDGE 27303 (FRT)
AESTHETICS (2 OF 2)

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-T100-FRT-AES-002

SHEET
103
OF
274

Aug. 25 2014 10:11 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-LRT-GPE.dwg By: muellerj



GENERAL PLAN



NOTES:

- CONTROL POINT 1
CL TRACK 2 STA. 2689+56.43
CL TH 100 N.B. STA. 111+36.12
X = 509,155.844
Y = 154,609.913
 - REMOVE EXISTING WINGWALL TO JUST BELOW THE BOTTOM OF THE LRT TRACK SLAB FOUNDATION. SEE CIVIL PLANS FOR ADDITIONAL DETAILS.
 - BARRIER/GUARDRAIL DETAILS TO BE COMPLETED DURING ADVANCED DESIGN.
- UTILITIES TO BE MOVED OR ADDED DURING THE CONSTRUCTION OF BRIDGES 27303 AND 27304 SHALL BE INCORPORATED INTO THIS PLAN SET DURING ADVANCED DESIGN.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

DESIGN DATA

2012 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
6TH EDITION AND CURRENT INTERIMS

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA
(REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD

LRV & MV LOADING DIAGRAM SHOWN ON SHEET 106

MATERIAL DESIGN PROPERTIES

REINFORCED CONCRETE:
 $f'_c = 4000$ PSI $n = 8$
 $f_y = 60000$ PSI REINFORCEMENT

PRESTRESSED CONCRETE:
 $f'_c = 9000$ PSI $n = 6$
 $f_{pu} = 270$ KSI LOW RELAXATION STRANDS
0.75 x f_{pu} FOR INITIAL PRESTRESS

DESIGN SPEED: OVER = 30 MPH (LRT)
UNDER = 60 MPH (VEH)

APPROXIMATE DECK AREA 6810 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
104	GENERAL PLAN AND ELEVATION
105	BRIDGE SURVEY
106	TRANSVERSE SECTION
107	TRAFFIC STAGING PLAN
108	CONSTRUCTION SEQUENCING
109-111	BORINGS
112-113	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK:
2 SPANS - 5 LINES OF MN54 PRESTRESSED CONCRETE BEAMS - SIMPLE SPANS
BALLASTED DECK

SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON SPREAD FOOTINGS

PIER WALL SUPPORTED ON A SPREAD FOOTING

DEPTH OF STRUCTURE:
7'-9"± TOP OF RAIL TO LOW BRIDGE

AESTHETICS LEVEL: __

PRELIMINARY PLAN BRIDGE NO. XXXXX

SOUTHWEST LRT OVER T.H. 100
0.2 MILES SOUTH OF JCT. T.H. 7
IN ST. LOUIS PARK

106'-9" - 106'-9" PRESTRESSED CONCRETE BEAMS
31'-0" RAILWAY
31°59'06.66" SKEW

BRIDGE ID NO. 501

GENERAL PLAN AND ELEVATION

SEC 6 T 28N R 24W
CITY OF ST. LOUIS PARK HENNEPIN COUNTY

APPROVED: _____
STATE BRIDGE ENGINEER DATE

DES. JRM DR. JRM
CHK. GM CHK. GM
JOB NO.: T9N635

STATE PROJ. NO.: 9909-01

MNDOT REVIEW:

Kimley»Horn



SOUTHWEST
Green Line LRT Extension



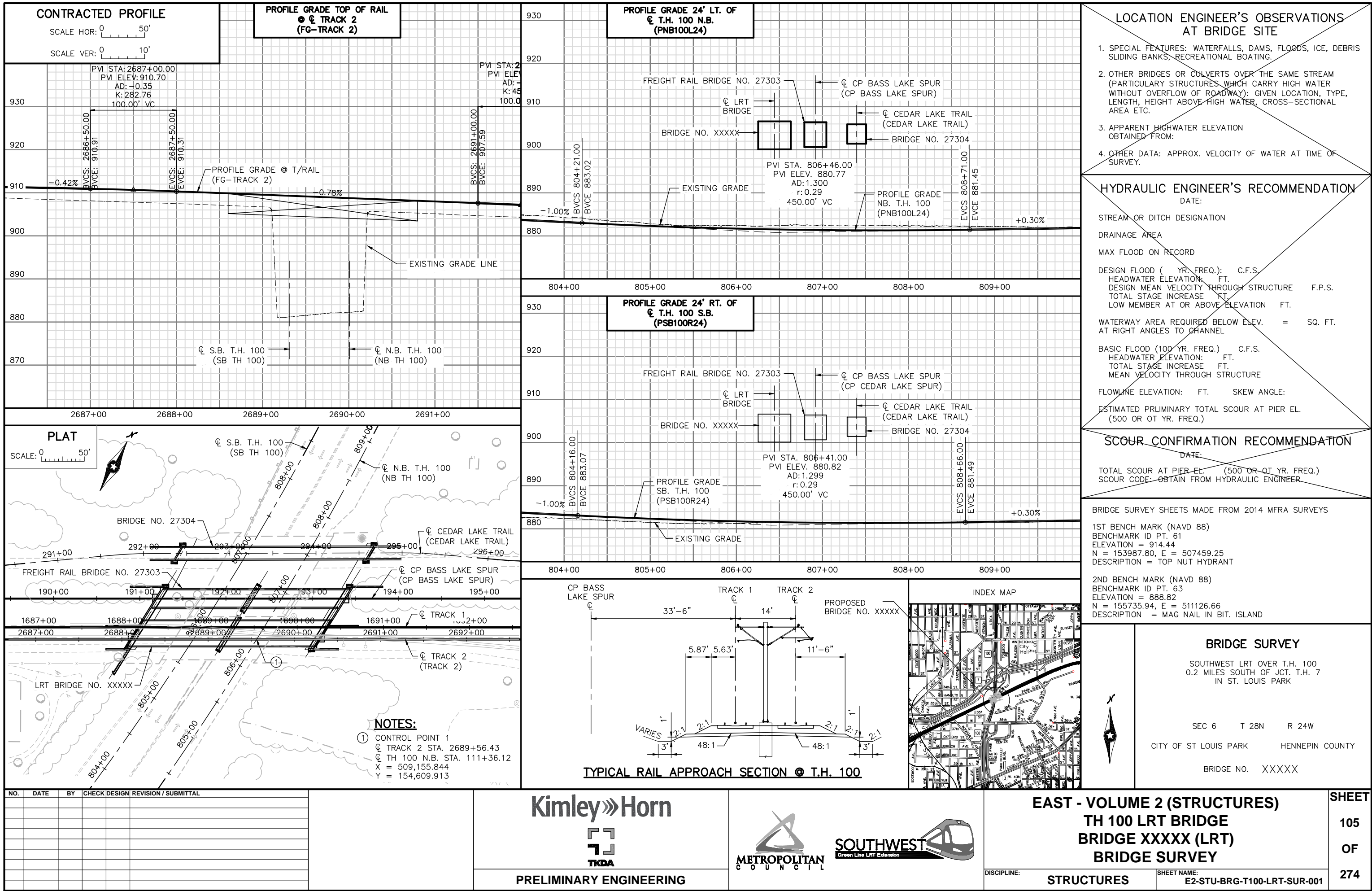
EAST - VOLUME 2 (STRUCTURES)
TH 100 LRT BRIDGE
BRIDGE XXXXX (LRT)
GENERAL PLAN AND ELEVATION

DISCIPLINE: **STRUCTURES**

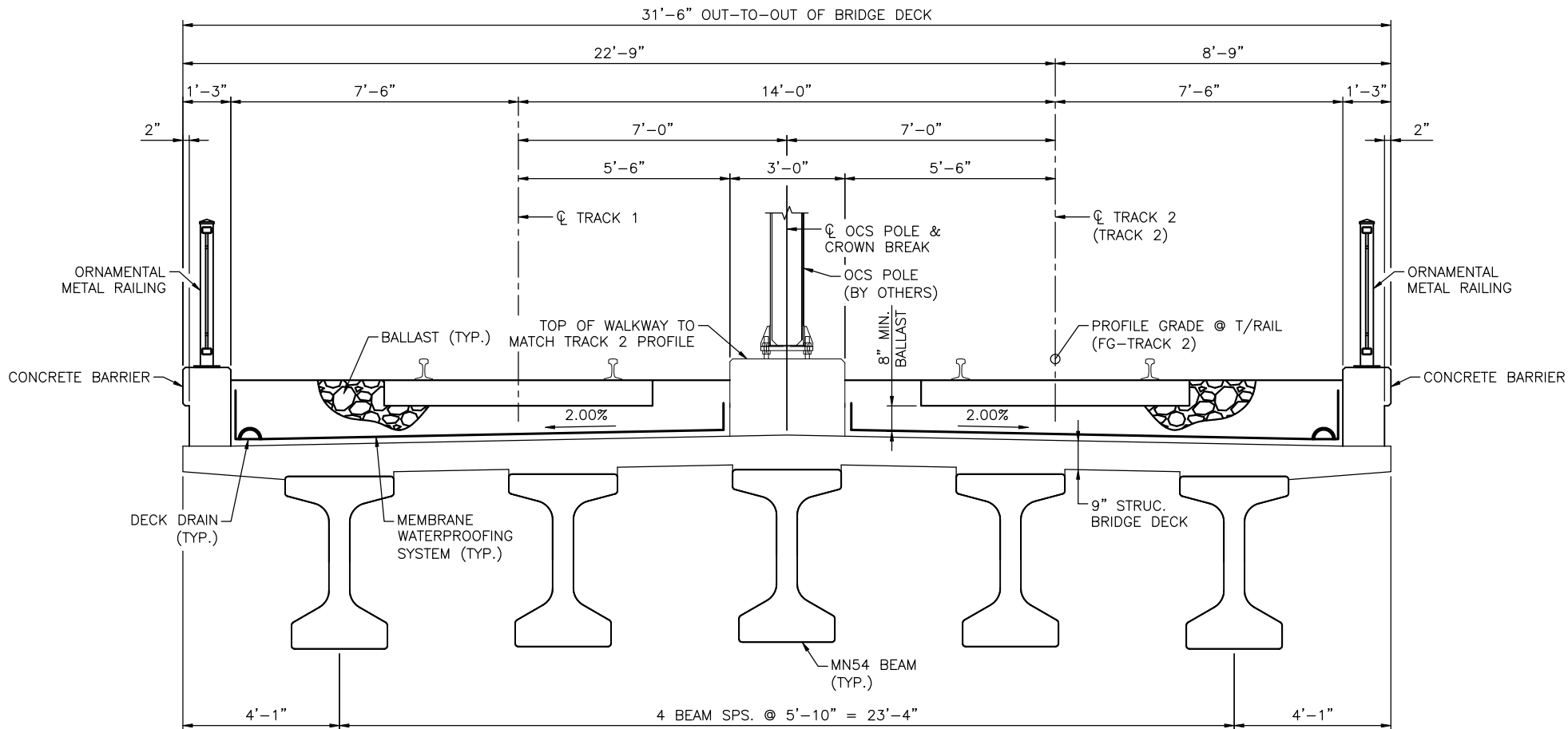
SHEET NAME: **E2-STU-BRG-T100-LRT-GPE**

SHEET
104
OF
274

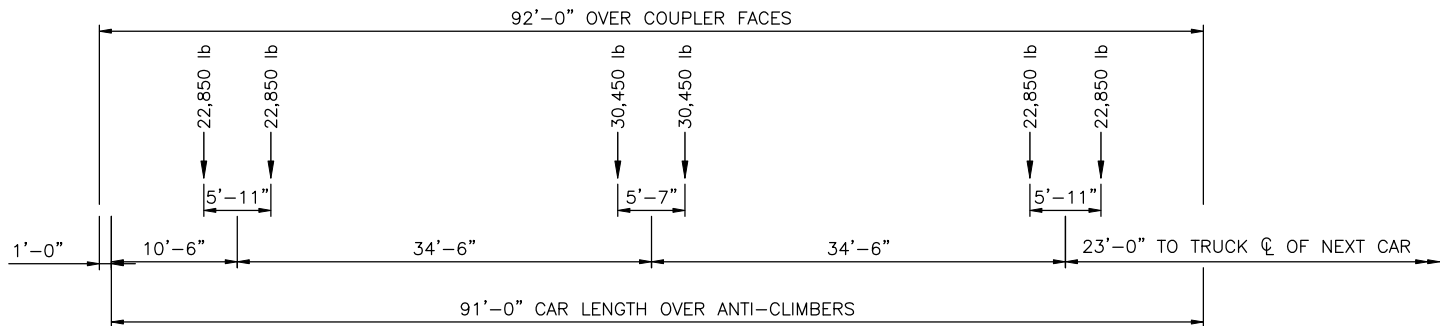
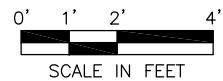
Aug. 25 2014 10:15 am k:\g-m\Kimley-Horn\15277000\3300_PEC-CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-LRT-SUR-001.dwg By: muellerj



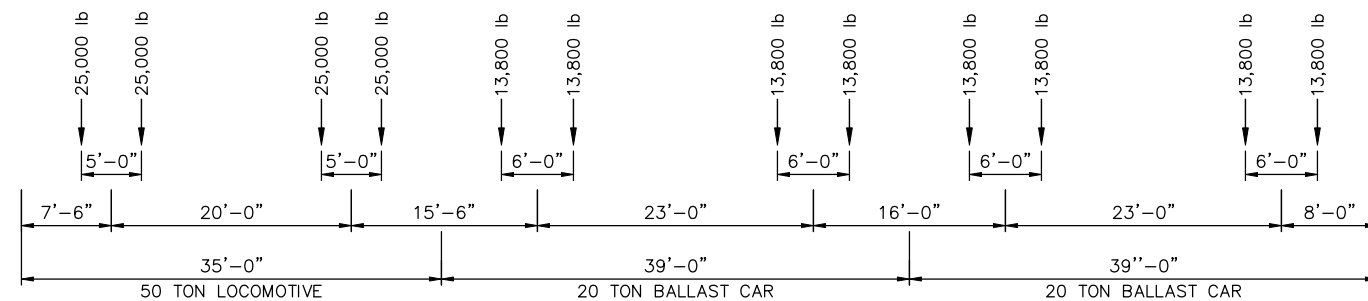
Aug. 26 2014 10:02 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-LRT-SUP.dwg By: muellerj



TRANSVERSE SECTION



LIGHT RAIL VEHICLE LOADING DIAGRAM



MAINTENANCE TRAIN LOADING DIAGRAM

NOTES:

1. THE LRT TRAIN SHALL CONSIST OF EITHER ONE, TWO OR THREE CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
2. AXLE LOAD IN POUNDS.
3. LOADING DIAGRAM REPRESENTS MAXIMUM LOAD AT EACH TRUCK.

NOTES:

1. THE MAINTENANCE TRAIN SHALL CONSIST OF ONE LOCOMOTIVE AND ONE, TWO, THREE OR FOUR BALLAST CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
2. AXLE LOAD IN POUNDS.
3. WEIGHT OF EMPTY BALLAST CAR IS 15,000 POUNDS.

DES. JRM	DR. JRM
CHK. GM	CHK. GM

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



SOUTHWEST



EAST - VOLUME 2 (STRUCTURES)
TH 100 LRT BRIDGE
BRIDGE XXXXX (LRT)
TRANSVERSE SECTION

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-T100-LRT-SUP

SHEET
106
OF
274

[illegible]

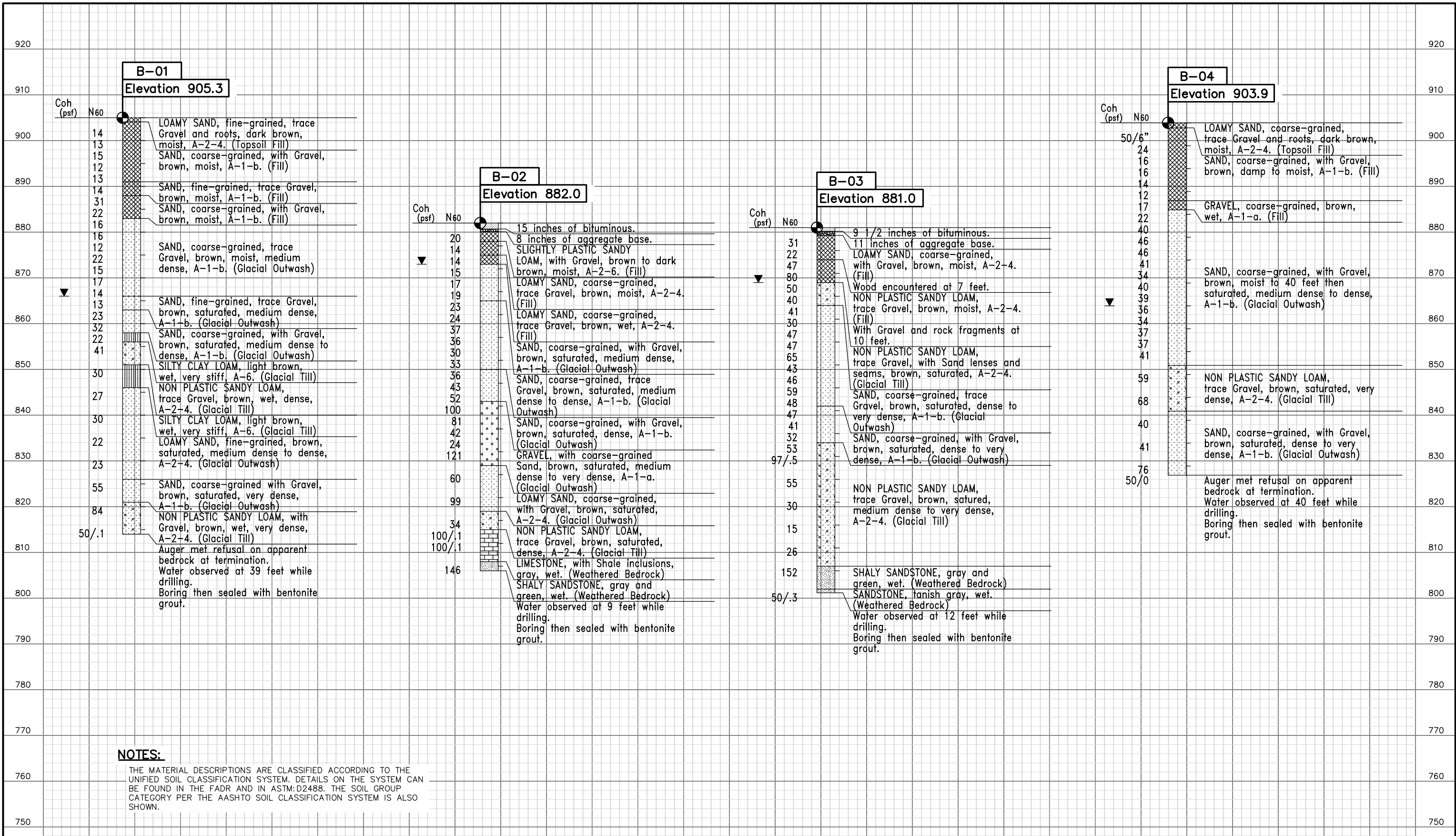
1. REMOVE TAPERED PORTION OF EXISTING PIER WALL AND CONSTRUCT PIER WALL EXTENSION FOR LRT BRIDGE.
2. REMOVE CONCRETE PEDESTALS AND CONSTRUCT NEW CONCRETE PEDESTALS FOR LRT BRIDGE.
3. CONSTRUCT NEW BACKWALLS FOR LRT BRIDGE.
4. ERECT BEAMS AND DIAPHRAGMS FOR LRT BRIDGE.
5. POUR BRIDGE DECK AND END BLOCKS FOR LRT BRIDGE.
6. INSTALL BALLAST, TIES AND RAILS FOR NEW LRT TRACKS.

[illegible]



DISCIPLINE:	STRUCTURES	SHEET NAME:	E2-STU-BRG-T100-LRT-DTL-002
-------------	-------------------	-------------	------------------------------------

SHEET
108
OF
274



Aug. 25 2014 10:18 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-LRT-BOR-002.dwg By: muellerj



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension

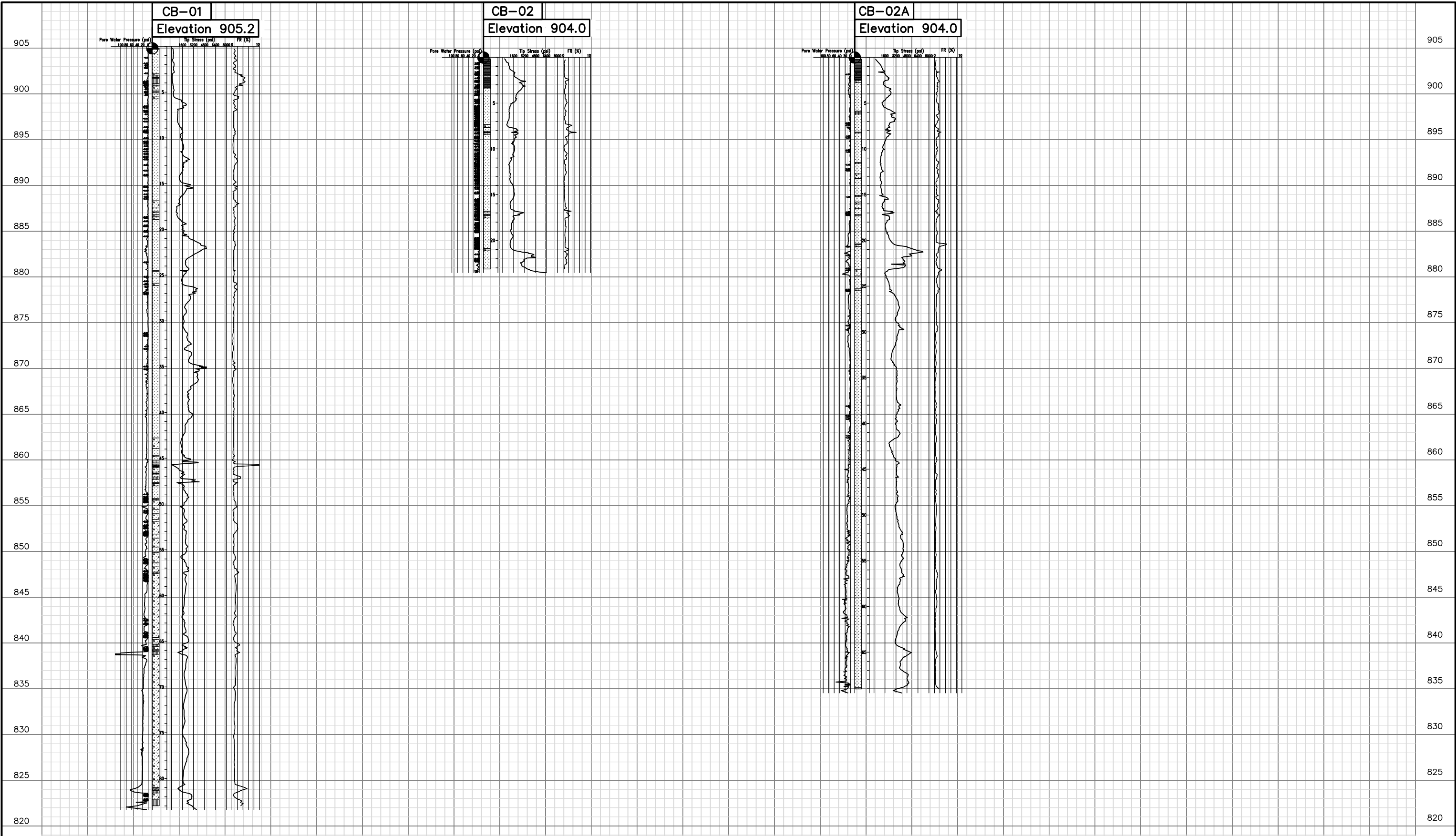
EAST - VOLUME 2 (STRUCTURES)
TH100 LRT BRIDGE
BRIDGE XXXXX (FRT)
BORINGS (2 OF 3)

DISCIPLINE: **STRUCTURES**

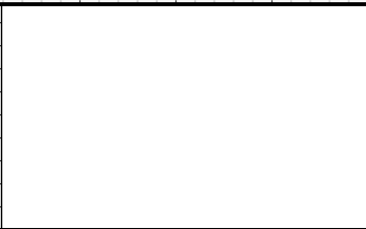
SHEET NAME:
E2-STU-BRG-T100-LRT-BOR-002

SHEET
110
OF
274

Aug. 25 2014 10:18 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-LRT-BOR-003.dwg By: muellerj




NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



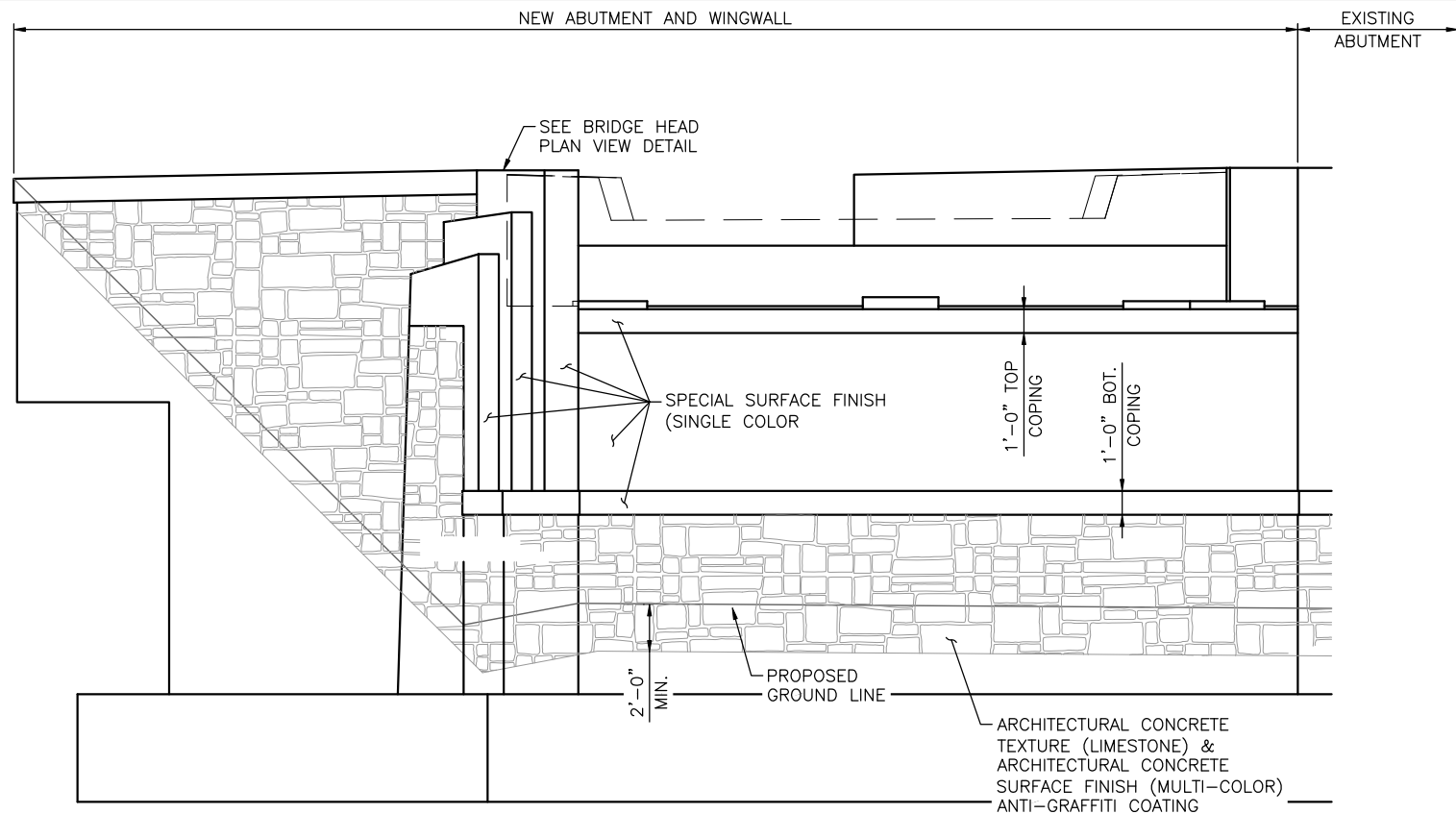
EAST - VOLUME 2 (STRUCTURES)
TH100 LRT BRIDGE
BRIDGE XXXXX (FRT)
BORINGS (3 OF 3)

DISCIPLINE:
STRUCTURES

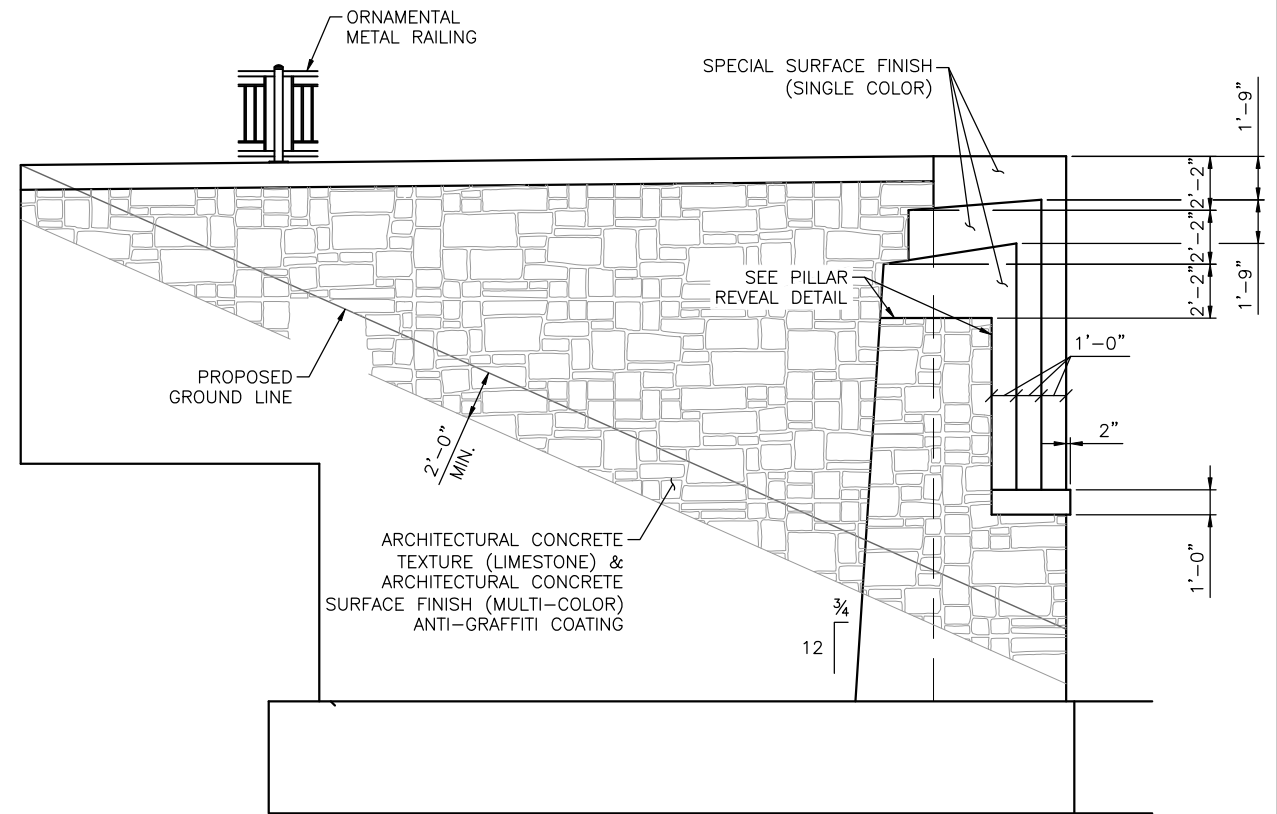
SHEET NAME:
E2-STU-BRG-T100-LRT-BOR-003

SHEET
111
OF
274

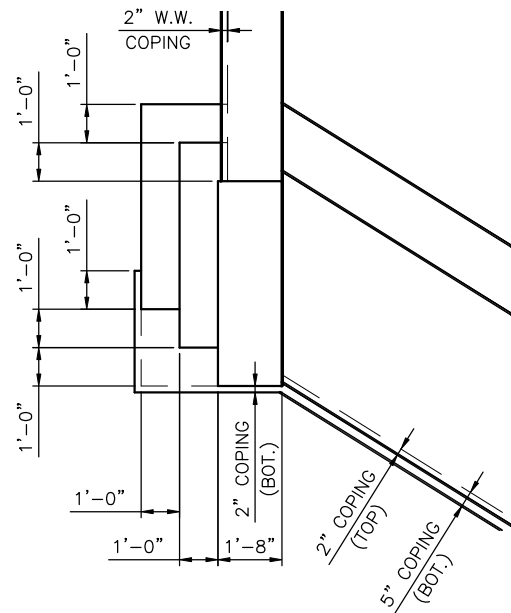
Aug. 25 2014 10:19 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-LRT-AES-001.dwg By: muellerj



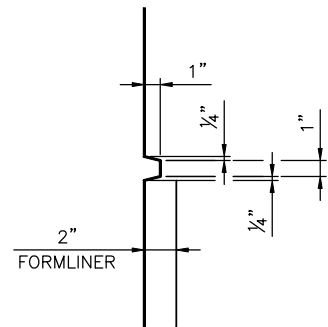
FRONT FACE OF EAST ABUTMENT
(EAST ABUTMENT SHOWN, WEST ABUTMENT SIMILAR)



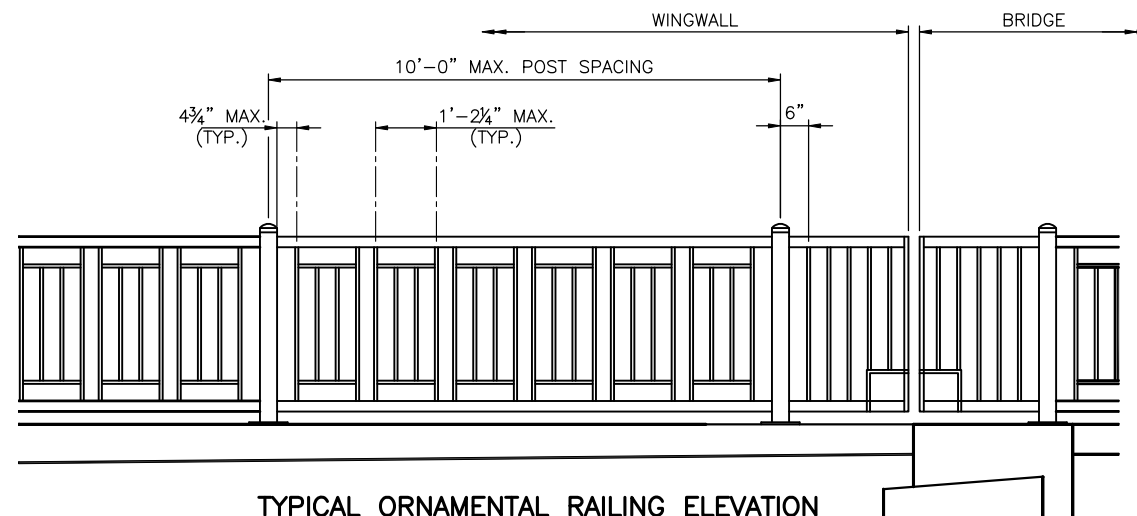
WINGWALL ELEVATION
(NORTHEAST WINGWALL SHOWN, NORTHWEST WINGWALL SIMILAR)



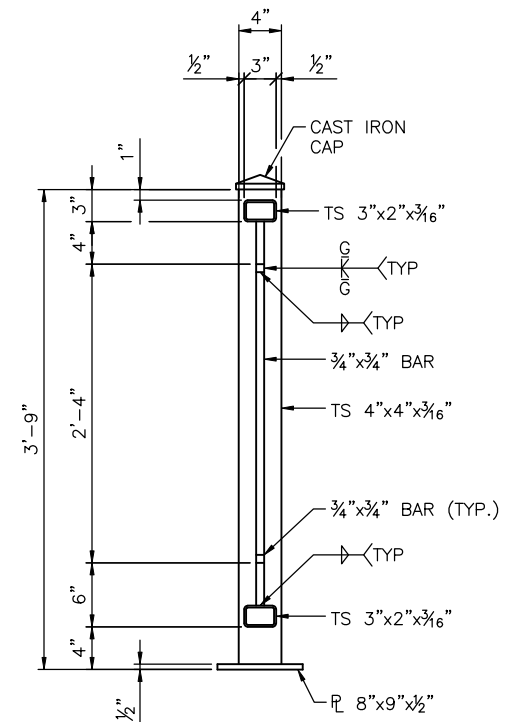
BRIDGE HEAD



PILLAR REVEAL



TYPICAL ORNAMENTAL RAILING ELEVATION



TYPICAL ORNAMENTAL RAILING SECTION

DES.	JRM	DR.	JRM
CHK.	GM	CHK.	GM
NO.	DATE	BY	CHECK/DESIGN/REVISION / SUBMITTAL

Kimley»Horn

TKDA

PRELIMINARY ENGINEERING

METROPOLITAN
C O U N C I L

SOUTHWEST
Green Line LRT Extension

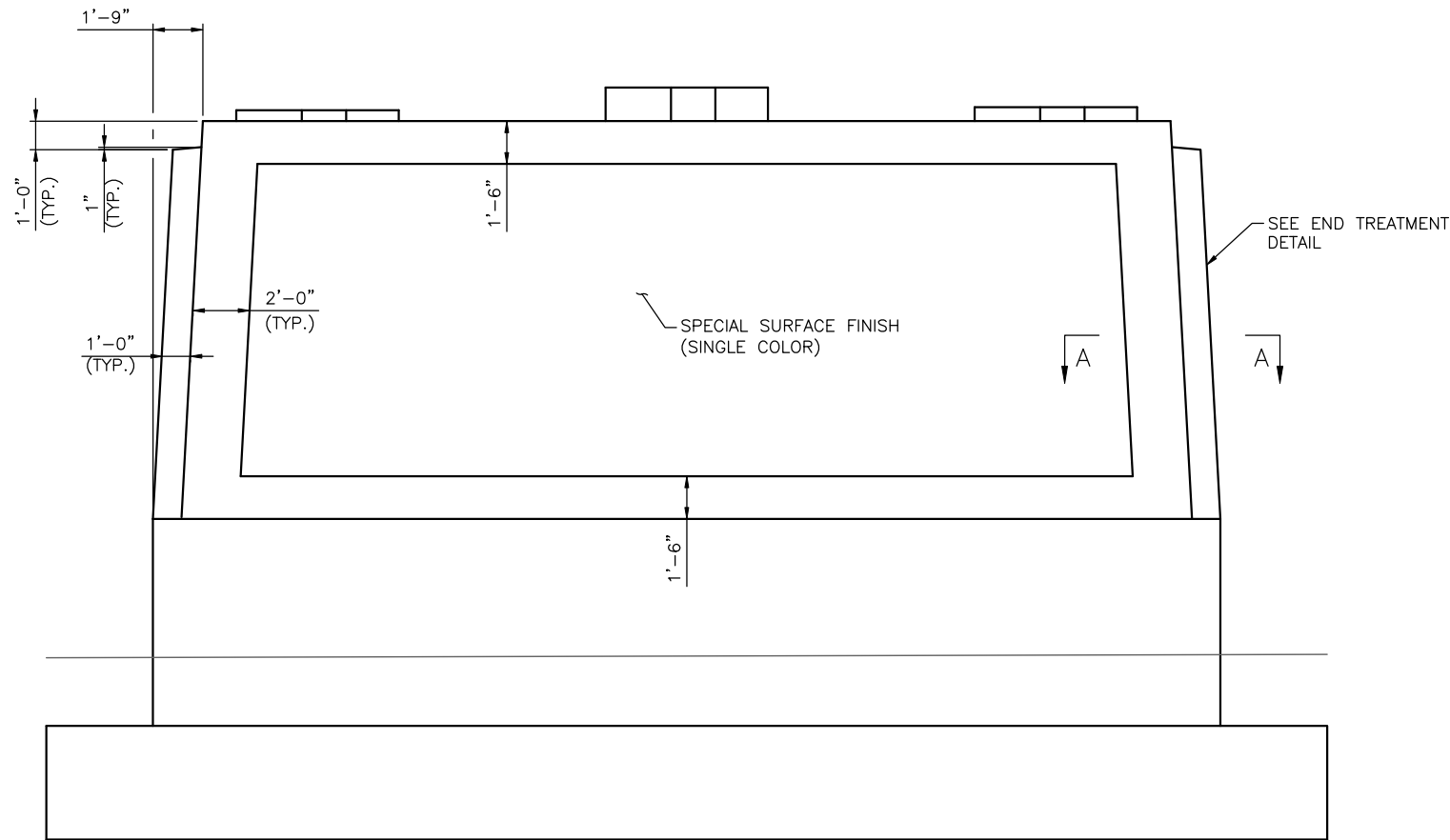
EAST - VOLUME 2 (STRUCTURES)
TH 100 LRT BRIDGE
BRIDGE XXXXX (LRT)
AESTHETICS (1 OF 2)

DISCIPLINE: **STRUCTURES**

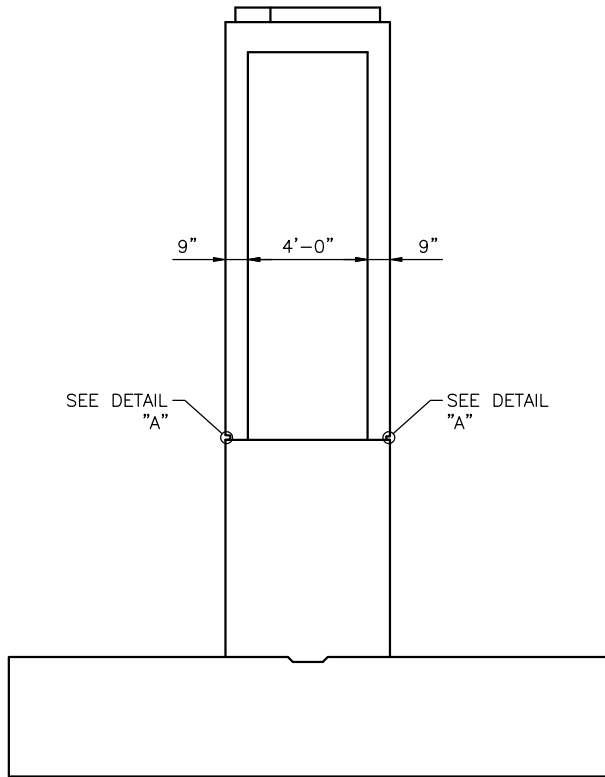
SHEET NAME: **E2-STU-BRG-T100-LRT-AES-001**

SHEET
112
OF
274

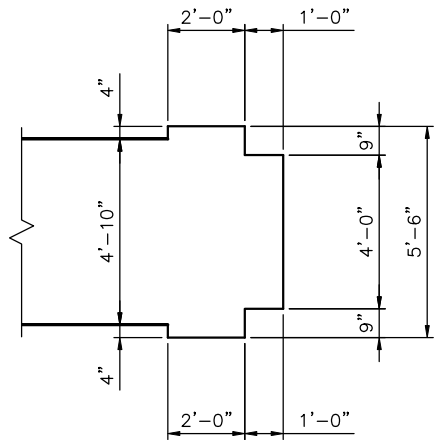
Aug. 25 2014 10:19 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-T100-LRT-AES-002.dwg By: muellerj



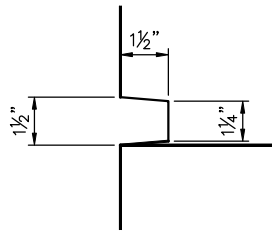
PIER WALL ELEVATION



END VIEW



PIER WALL END - SECTION A-A



DETAIL "A"

DES. JRM	DR. JRM
CHK. GM	CHK. GM

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



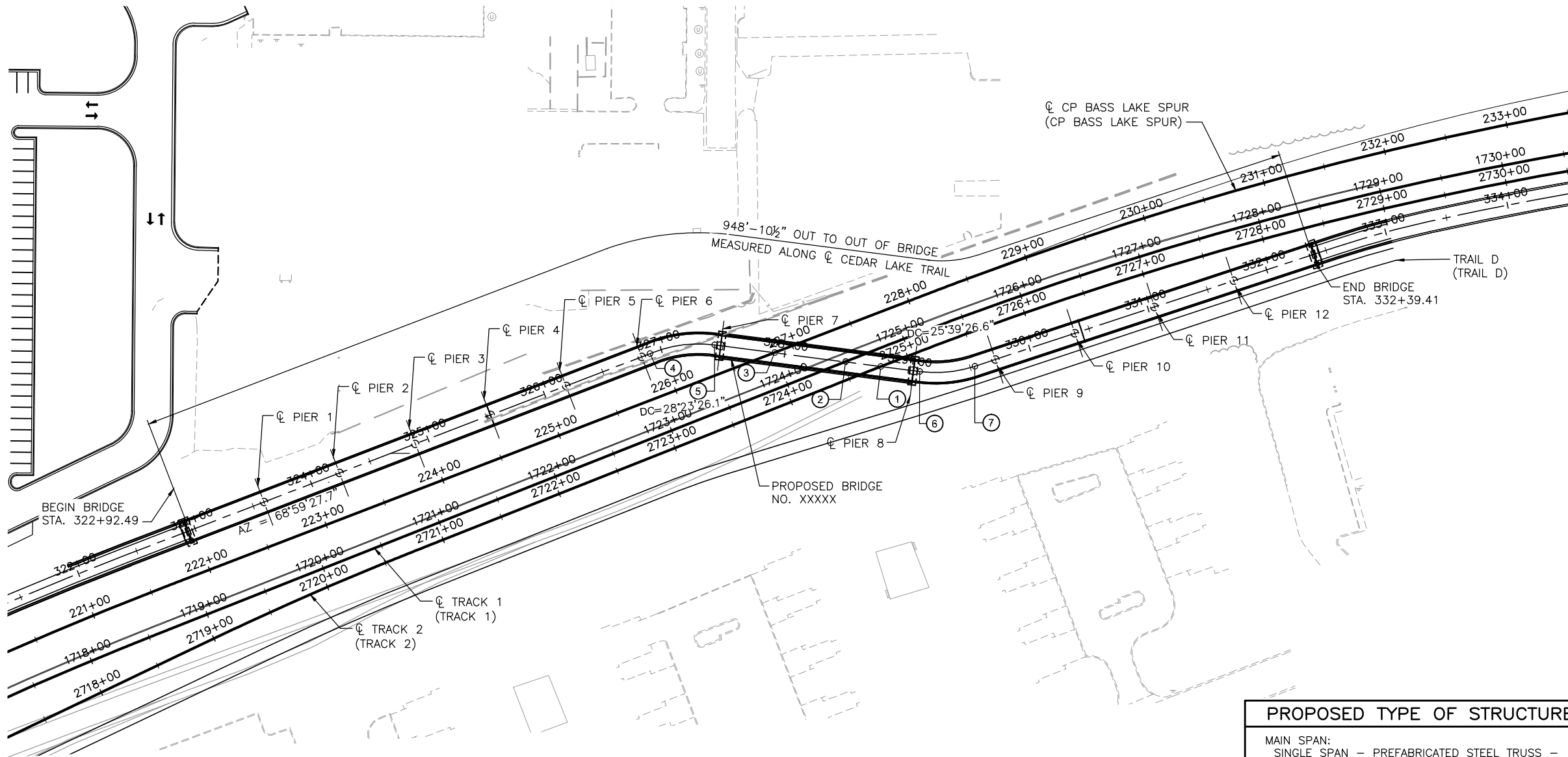
EAST - VOLUME 2 (STRUCTURES)
TH 100 LRT BRIDGE
BRIDGE XXXXX (LRT)
AESTHETICS (2 OF 2)

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-T100-LRT-AES-002

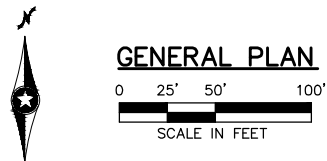
SHEET
113
OF
274

Aug. 26 2014 12:03 pm V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-CLTR-TRL-GPE-001.dwg By: ronald.dee



NOTES:

- CONTROL POINT
CL CEDAR LAKE TRAIL (CEDAR LAKE TRAIL) STA. 328+77.67
CL TRACK 2 (TRACK 2) STA 2724+77.16
X = 512351.583
Y = 156084.667
- CONTROL POINT
CL CEDAR LAKE TRAIL (CEDAR LAKE TRAIL) STA. 329+49.15
CL TRACK 1 (TRACK 1) STA 1724+50.00
X = 512323.340
Y = 156088.605
- CONTROL POINT
CL CEDAR LAKE TRAIL (CEDAR LAKE TRAIL) STA. 327+91.82
CL CP BASS LAKE SPUR (CP BASS LAKE SPUR) STA 226+84.86
X = 512266.463
Y = 156095.816
- P.C. STA. 326+90.48
X = 512166.581
Y = 156094.950
- P.T. STA. 327+43.18
X = 512218.311
Y = 156101.932
- P.C. STA. 329+08.99
X = 512382.643
Y = 156080.643
- P.T. STA. 329+53.81
X = 512426.850
Y = 156084.858



PROPOSED TYPE OF STRUCTURE

MAIN SPAN:
SINGLE SPAN - PREFABRICATED STEEL TRUSS -
SIMPLE SPAN

APPROACH SPANS:
THREE, FOUR, OR FIVE SPAN - CAST-IN-PLACE
CONCRETE DECK GIRDER - CONTINUOUS SPANS

ALL BARS EPOXY COATED

SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON SPREAD
FOOTINGS

SINGLE COLUMN PIERS SUPPORTED ON H-PILES

FOUNDATION RECOMMENDATIONS TO BE FINALIZED IN
ADVANCED DESIGN

DEPTH OF MAIN SPAN STRUCTURE:
2'-11"± PROFILE GRADE TO LOW BRIDGE

DEPTH OF APPROACH SPAN STRUCTURE:
4'-7 1/2"± PROFILE GRADE TO LOW BRIDGE

AESTHETICS: LEVEL _

DESIGN DATA

2012 AND CURRENT INTERIM AASHTO LRFD
BRIDGE DESIGN SPECIFICATIONS

2009 AASHTO LRFD GUIDE SPECIFICATIONS FOR THE
DESIGN OF PEDESTRIAN BRIDGES

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA
(REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD

90 PSF PEDESTRIAN LIVE LOAD
H 10 MAINTENANCE VEHICLE LIVE LOAD

MATERIAL DESIGN PROPERTIES:
REINFORCED CONCRETE:
f'c = 4000 PSI n = 8
fy = 60000 PSI REINFORCEMENT

STRUCTURAL STEEL:
fy = 50000 PSI

DESIGN SPEED: OVER = 20 MPH

APPROXIMATE DECK AREA: 17550 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
114	GENERAL PLAN
115-117	GENERAL PLAN AND ELEVATION
118-119	BRIDGE SURVEY
120	TRANSVERSE SECTION
121-124	BORINGS
125	AESTHETICS

PRELIMINARY PLAN
BRIDGE NO. XXXXX

CEDAR LAKE TRAIL OVER CANADIAN PACIFIC RAILWAY &
SOUTHWEST LRT 0.3 MI. SOUTH OF JCT. CSAH 5 AND
BELTLINE BLVD. IN ST. LOUIS PARK

PREFABRICATED STEEL TRUSS MAIN SPAN WITH C.I.P.
CONCRETE DECK GIRDER APPROACH SPANS
16'-0" TRAIL
00'-00"-00.00" SKEW
BRIDGE I.D. NO. 302 (MAIN SPAN)
NO. 206 (APPROACH SPANS)

GENERAL PLAN

SEC 6 T 28N R 24W
CITY OF ST LOUIS PARK HENNEPIN COUNTY

APPROVED: _____ DATE _____
STATE BRIDGE ENGINEER

DES. EJT DR. PHH
CHK. CPE CHK. JDP

JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



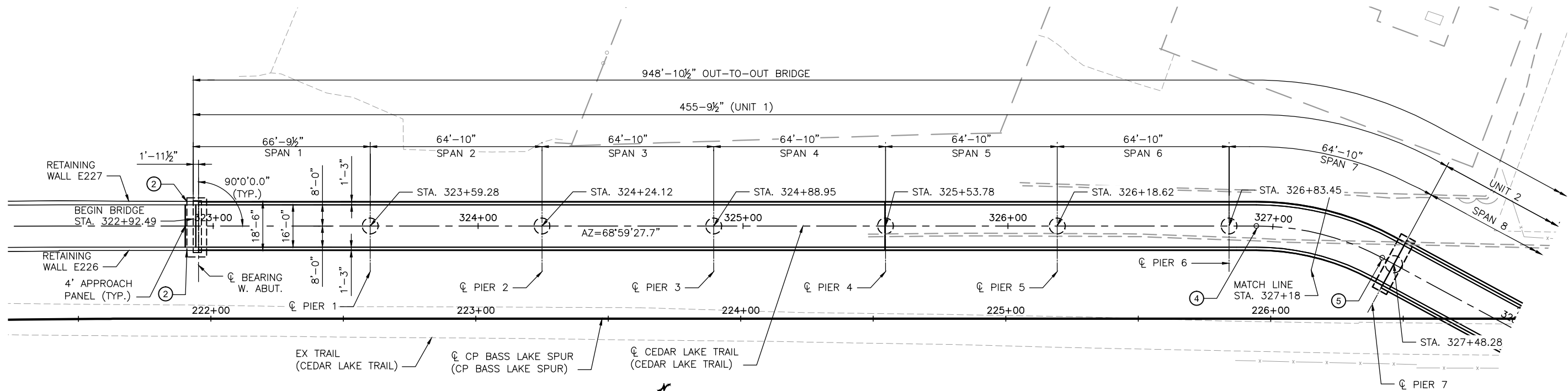
EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
GENERAL PLAN

DISCIPLINE: STRUCTURES

SHEET NAME:
E2-STU-BRG-CLTR-TRL-GPE-001

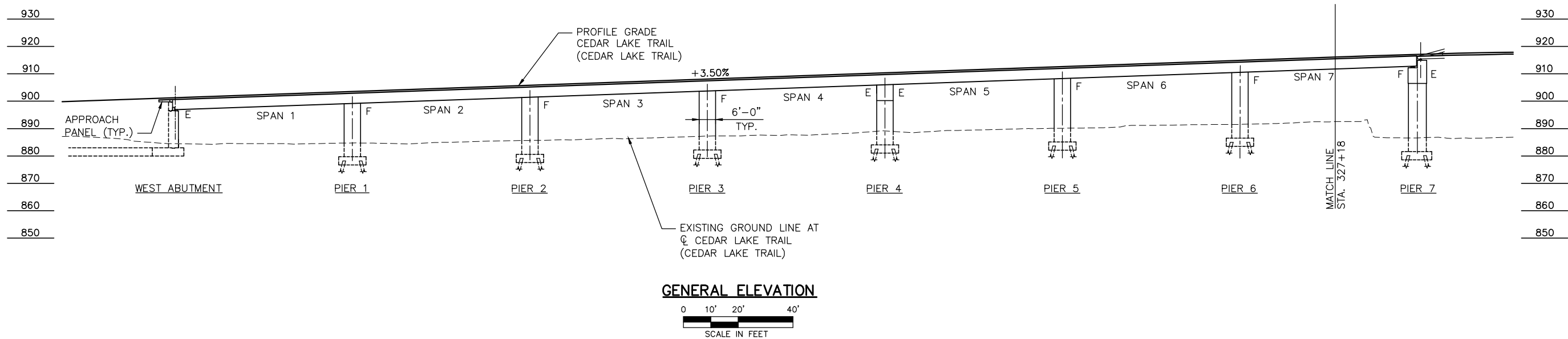
SHEET
114
OF
274

Aug. 26 2014 12:05 pm v:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-CLTR-TRL-GPE-002.dwg By: ronald.dee



NOTES:

1. W. ABUT THRU PIER 6 SET PARALLEL AT AZ =158°59'27.7".
2. END OF BRIDGE SUBSTRUCTURE AND BEGINNING OF RETAINING WALL TO BE DETERMINED IN ADVANCED DESIGN.
3. SEE BORING SURVEY SHEET FOR IN PLACE UTILITIES.
4. FOR STATIONS AND COORDINATES OF POINTS 4 AND 5, SEE GENERAL PLAN, SHEET 114.



DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING

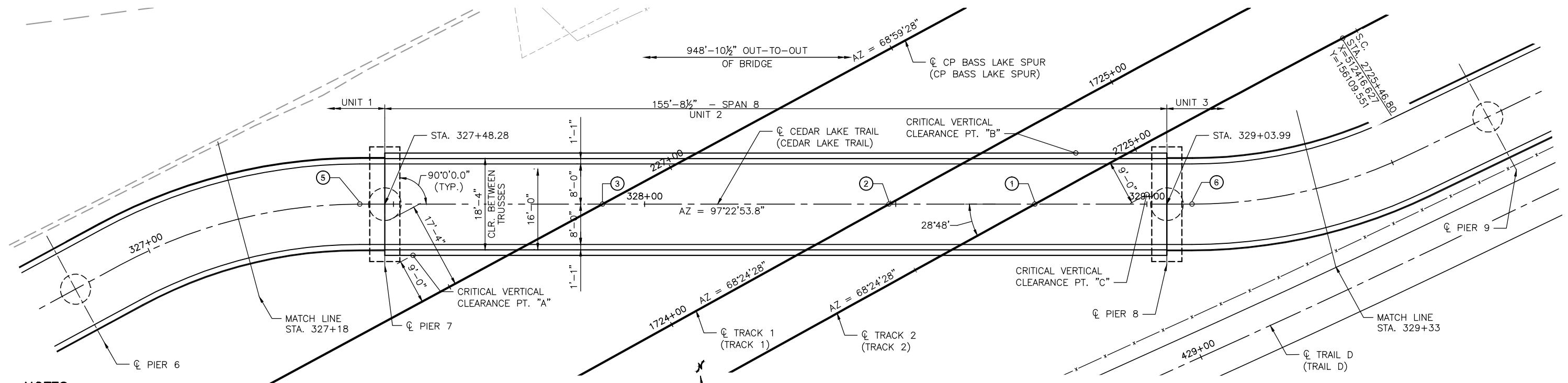


EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
GENERAL PLAN AND ELEVATION (1 OF 3)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-BRG-CLTR-TRL-GPE-002**

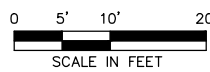
Aug. 26 2014 12:07 pm V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-CLTR-TRL-GPE-003.dwg By: ronald.dee



NOTES:

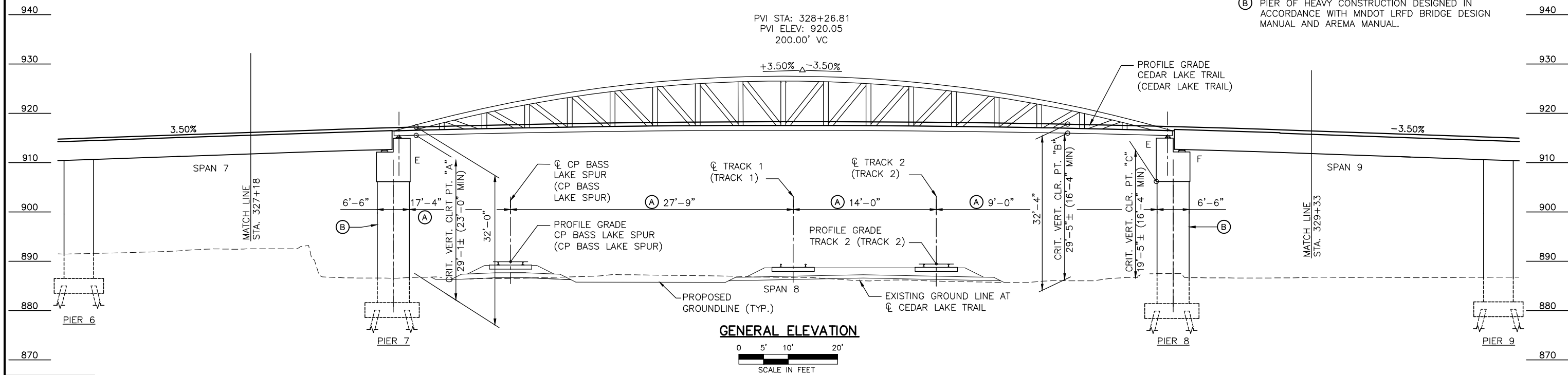
- PIERS 7 AND 8 SET PARALLEL TO AZIMUTH 7°22'53.8".
- SEE BORING SURVEY SHEET FOR IN PLACE UTILITIES.
- DESIGN COLUMNS FOR PIERS 8 AND 9 FOR THE COLLISION FORCE IN ACCORDANCE WITH AREMA AND MNDOT BRIDGE OFFICE SUBSTRUCTURE PROTECTION POLICY.
- METAL RAILING TO MEET REQUIREMENTS FOR PROTECTIVE SCREENING PER LRFD BRIDGE DESIGN MANUAL 13.2.5.
- FOR STATIONS AND COORDINATES OF POINTS ① THRU ③ AND ⑤ THRU ⑥, SEE GENERAL PLAN, SHEET 114.

GENERAL PLAN

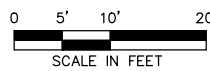


NOTES:

- MEASURED PERPENDICULAR TO TRACKS.
- PIER OF HEAVY CONSTRUCTION DESIGNED IN ACCORDANCE WITH MNDOT LRFD BRIDGE DESIGN MANUAL AND AREMA MANUAL.



GENERAL ELEVATION





DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

**METROPOLITAN**
COUNCIL

**SOUTHWEST**
Green Line LRT Extension

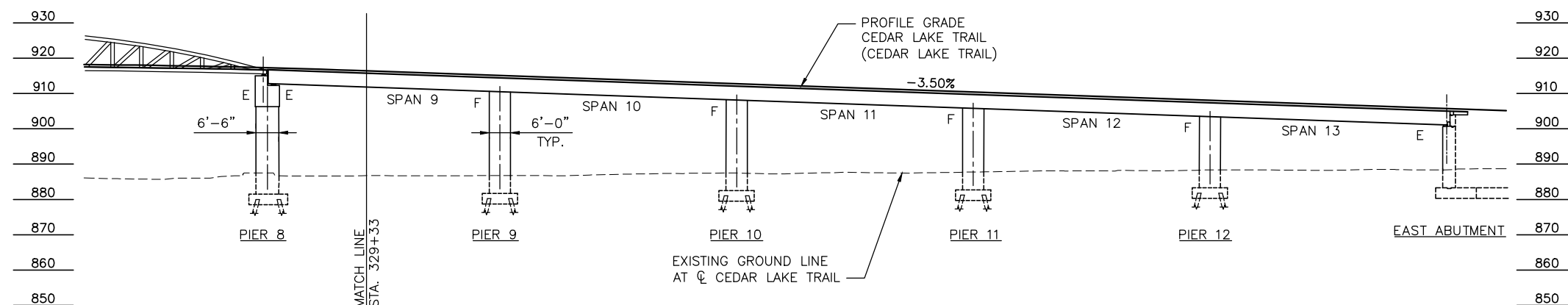
EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
GENERAL PLAN AND ELEVATION (2 OF 3)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-BRG-CLTR-TRL-GPE-003**

SHEET
116
OF
274

1. PIERS 9 THRU 12 AND EAST ABUTMENT SET PARALLEL TO AZIMUTH 161°43'27.2".
- ② END OF BRIDGE SUBSTRUCTURE AND BEGINNING OF RETAINING WALL TO BE DETERMINED IN ADVANCED DESIGN.
3. SEE BORING SURVEY SHEET FOR IN PLACE UTILITIES.
4. FOR STATIONS AND COORDINATES OF POINTS ⑥ AND ⑦, SEE GENERAL PLAN, SHEET 114.

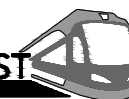
[illegible]

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST



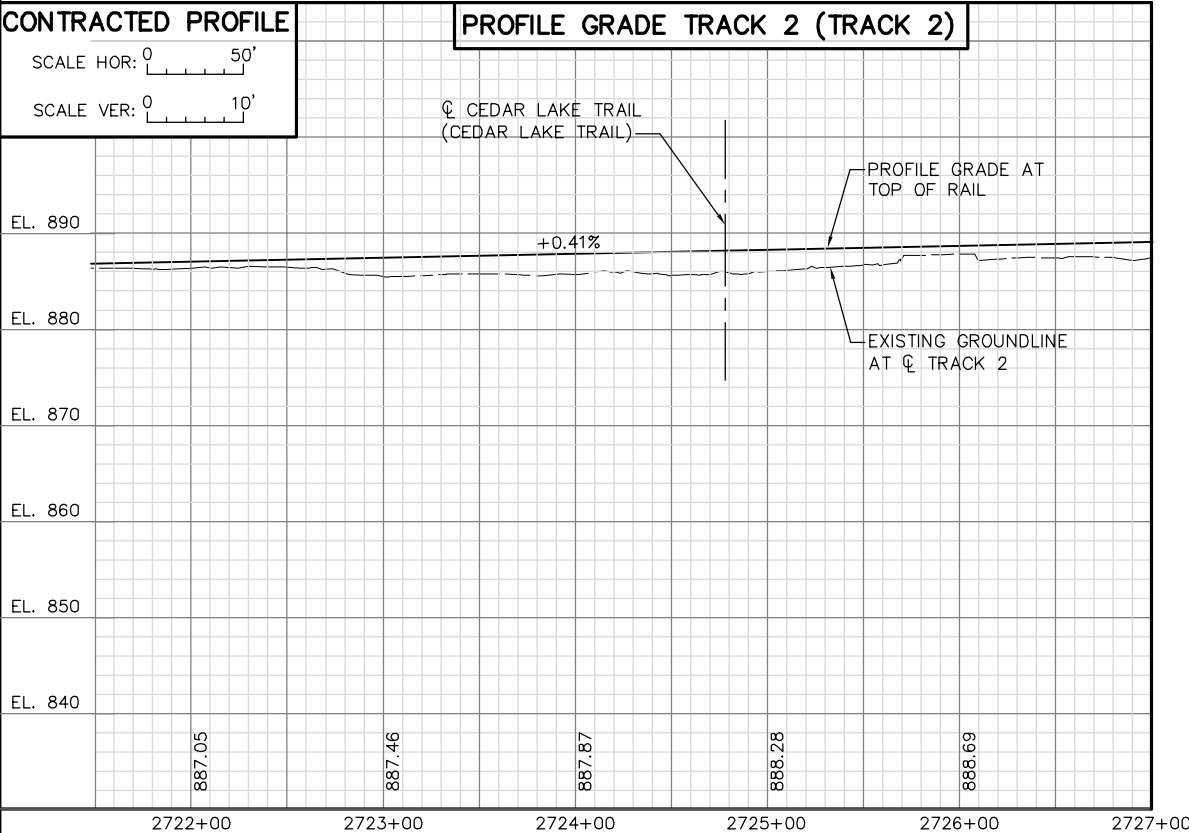
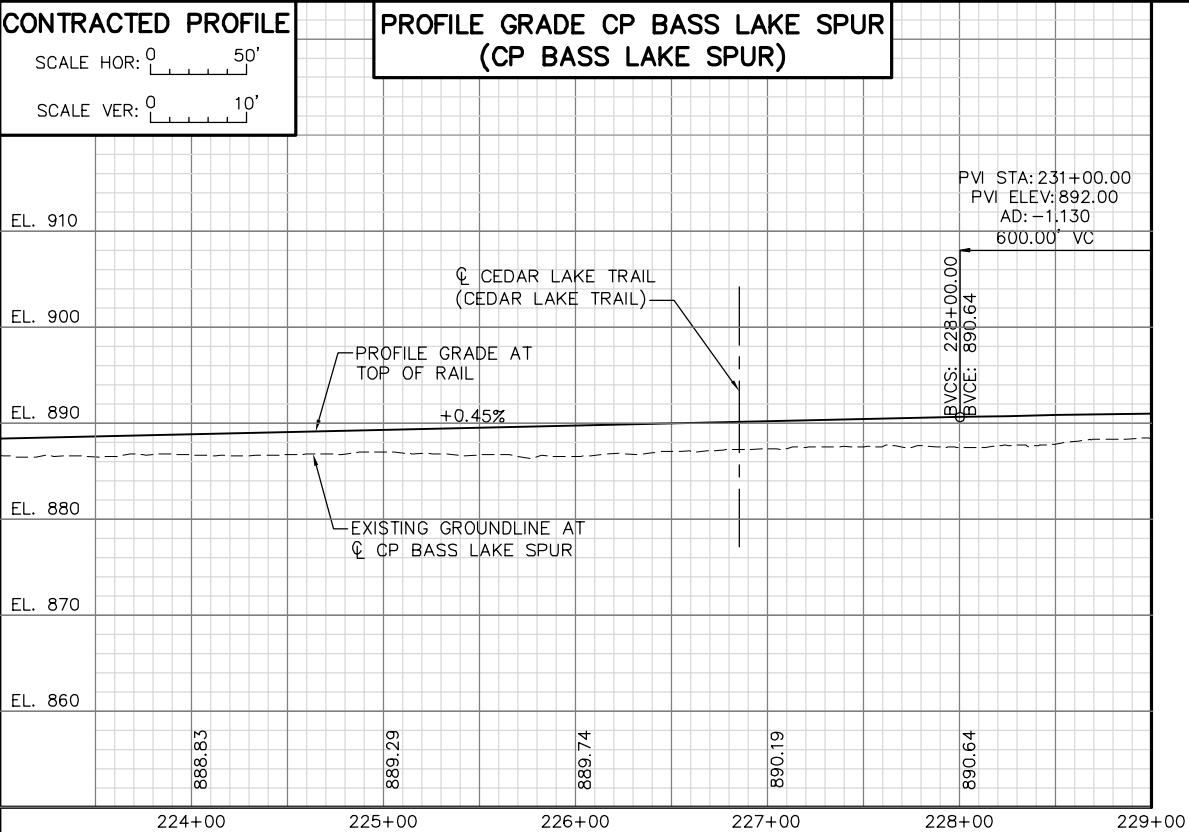
**EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
GENERAL PLAN AND ELEVATION (3 OF 3)**

STRUCTURES

SHEET NAME:
E2-STU-BRG-CLTR-TRL-GPE-004

SHEET
117
OF
274

Aug. 26 2014 01:52 pm V:\3300_pec-e\CAD\segment e2\plan sheets\structures\E2-STU-BRG-CLTR-TRL-SUR-001.dwg By: Katie.Ellis



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension

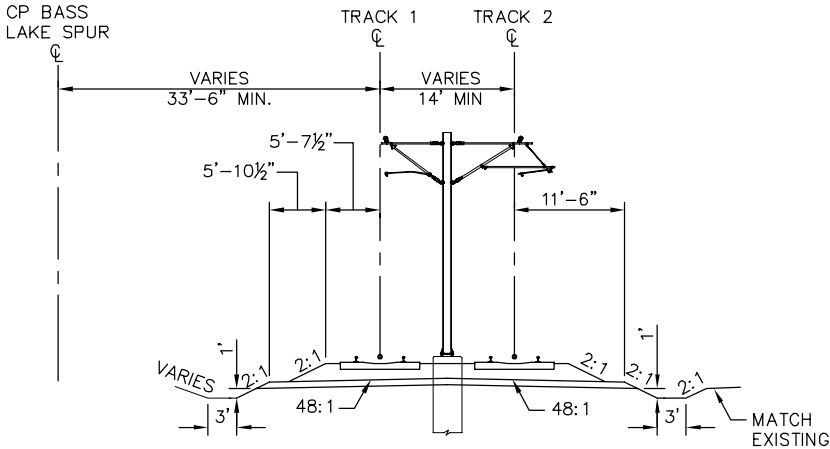


EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
BRIDGE SURVEY (2 OF 2)

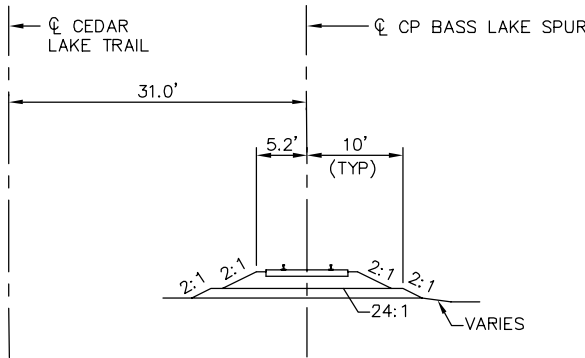
DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-CLTR-TRL-SUR-001B

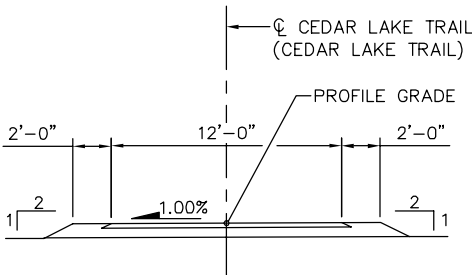
SHEET
119
OF
274



TYPICAL APPROACH SECTION-LRT



TYPICAL SECTION-CP BASS LAKE SPUR



TYPICAL SECTION-CEDAR LAKE TRAIL

LOCATION ENGINEER'S OBSERVATIONS
AT BRIDGE SITE

- SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.
- OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
- APPARENT HIGHWATER ELEVATION OBTAINED FROM:
- OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

HYDRAULIC ENGINEER'S RECOMMENDATION

DATE:

STREAM OR DITCH DESIGNATION

DRAINAGE AREA

MAX FLOOD ON RECORD

DESIGN FLOOD (YR. FREQ.): C.F.S.
HEADWATER ELEVATION: FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE F.P.S.
TOTAL STAGE INCREASE FT.
LOW MEMBER AT OR ABOVE ELEVATION FT.

WATERWAY AREA REQUIRED BELOW ELEV. = SQ. FT.
AT RIGHT ANGLES TO CHANNEL

BASIC FLOOD (100 YR. FREQ.) C.F.S.
HEADWATER ELEVATION: FT.
TOTAL STAGE INCREASE FT.
MEAN VELOCITY THROUGH STRUCTURE

FLOWLINE ELEVATION: FT. SKEW ANGLE:

ESTIMATED PRILIMINARY TOTAL SCOUR AT PIER EL.
(500 OR OT YR. FREQ.)

SCOUR CONFIRMATION RECOMMENDATION

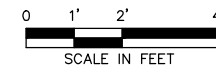
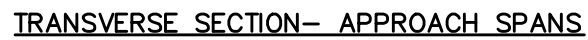
DATE:

TOTAL SCOUR AT PIER EL. (500 OR OT YR. FREQ.)
SCOUR CODE: OBTAIN FROM HYDRAULIC ENGINEER

BRIDGE SURVEY SHEETS MADE FROM 2014 MFRA SURVEYS

1ST BENCH MARK
ELEVATION: 887.43
NORTHING: 156091.81
EASTING: 512264.50
DESCRIPTION: MAG NAIL IN BIT. PATH

2ND BENCH MARK
ELEVATION: 887.63
NORTHING: 156137.69
EASTING: 512537.72
DESCRIPTION: ROD INSIDE 2" PIPE

[illegible][illegible]

Kimley»Horn

PRELIMINARY ENGINEERING



**EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
TRANSVERSE SECTION**

DISCIPLINE: **STRUCTURES**

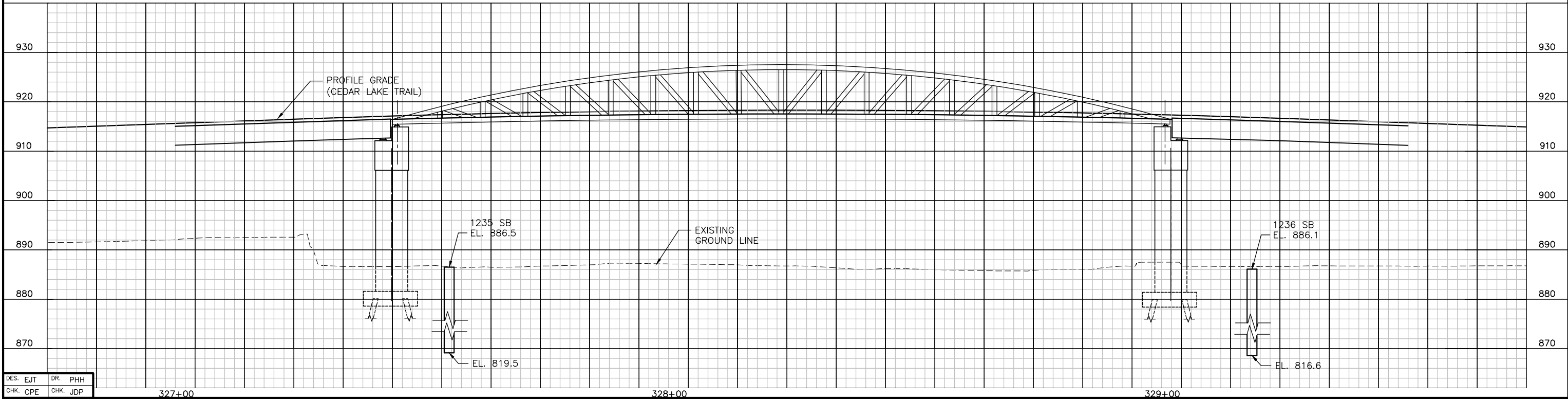
SHEET NAME:	E2-STU-BRG-CLTR-TRL-SUP
-------------	-------------------------

SHEET
120
OF
274

Aug. 26 2014 12:19 pm V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-CLTR-TRL-SUR-003.dwg By: ronald.dee

NOTES:

1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
2. FOR STATIONS AND COORDINATES OF POINTS ⑤ AND ⑥, SEE GENERAL PLAN, SHEET 114.



DES. EJT	DR. PHH		
CHK. CPE	CHK. JDP		
NO.	DATE	BY	CHECK DESIGN REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

EAST - VOLUME 2 (STRUCTURES)

CEDAR LAKE TRAIL

BRIDGE XXXXX (TRL)

BORINGS (2 OF 4)

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-CLTR-TRL-BOR-002

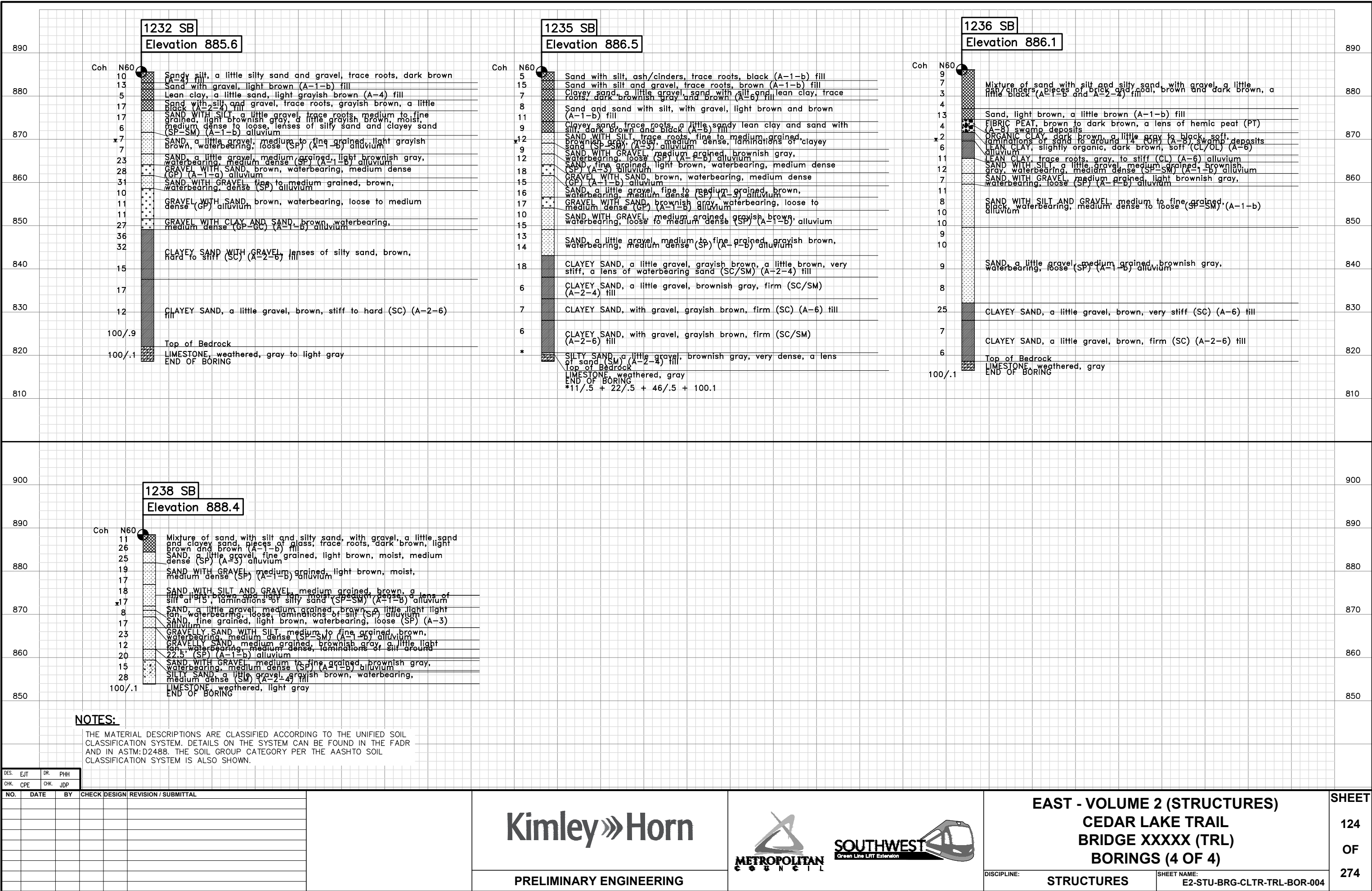
SHEET

122

OF

274

Aug. 26 2014 12:21 pm V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-CLTR-BOR .dwg By: ronald.dee



Aug. 26 2014 12:21 pm v:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\E2-STU-BRG-CLTR-TRL-AES.dwg By: ronald.dee

DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AESTHETIC DETAILS TO BE DETERMINED DURING ADVANCED DESIGN

- 1. ABUTMENT SURFACE
- 2. ABUTMENT/WALL CORNER DETAIL
- 3. EXPOSED EDGE OF DECK
- 4. EXPOSED BARRIER
- 5. TRUSS
- 6. BOTTOM OF BEAMS
- 7. PIER COLUMN GEOMETRY AND SURFACE
- 8. RAILING AND SCREENING



PRELIMINARY ENGINEERING



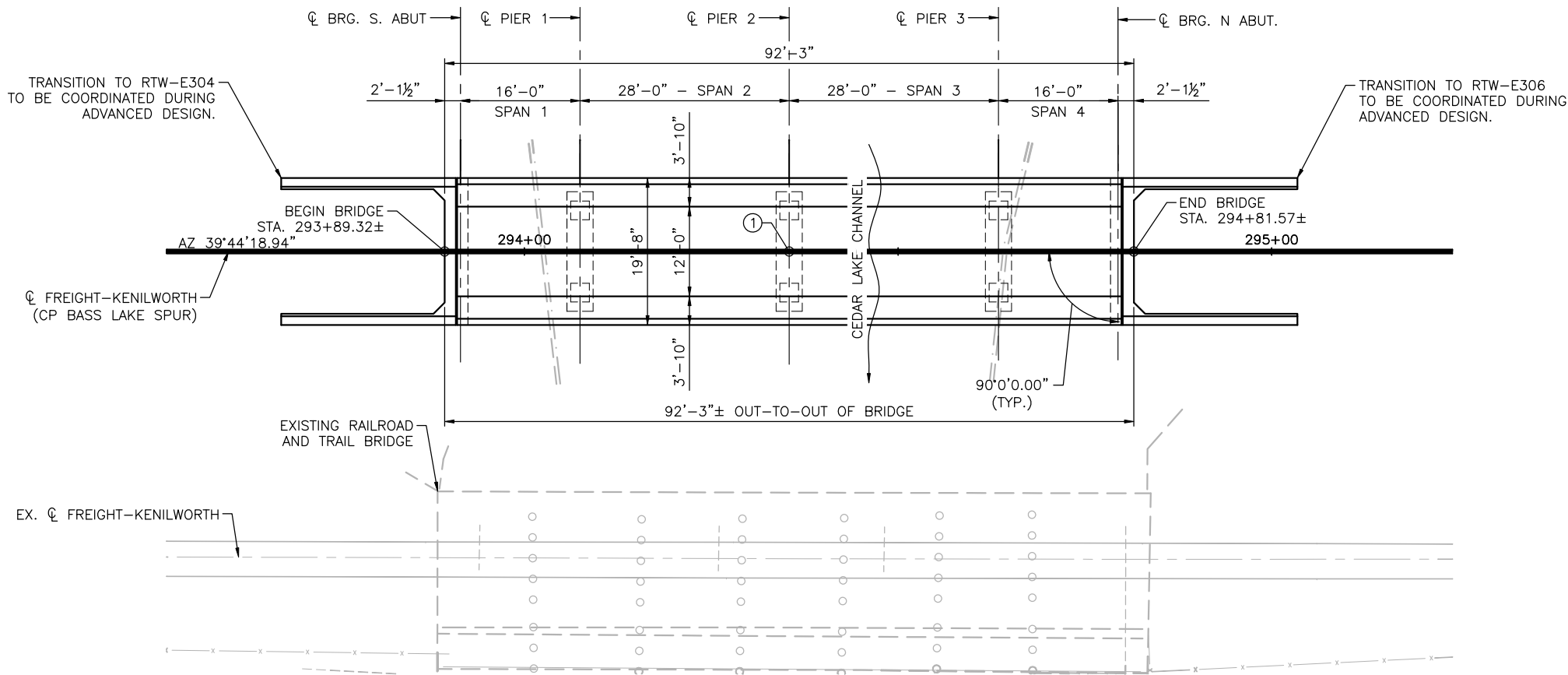
EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
AESTHETICS

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-BRG-CLTR-TRL-AES

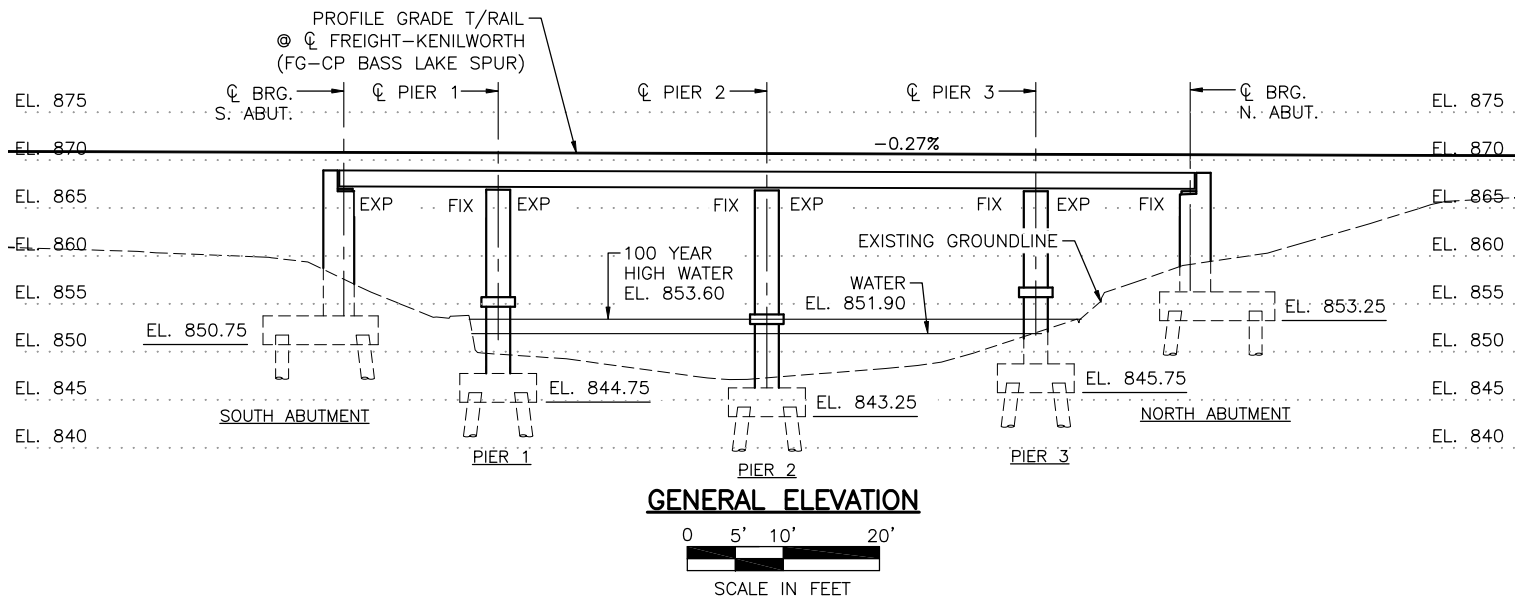
SHEET 125 OF 274

Aug. 25 2014 10:23 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-BRG-CLCH-FRT-GPE.dwg By: muellerj



NOTES:
THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF C/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

- ① CONTROL POINT 1
CL FREIGHT-KENILWORTH STA. 294+35.45
X = 517,215.954
Y = 159,991.868



DESIGN DATA

2013 A.R.E.M.A. MANUAL FOR RAILWAY ENGINEERING

COOPER E90 LIVE LOAD OR 100 KIP (4 AXLES)
ALTERNATE LOAD WITH DIESEL IMPACT.

MAXIMUM BALLAST DEPTH: 2'-0" (FOR DESIGN)

LOAD FACTOR DESIGN METHOD:

MATERIAL DESIGN PROPERTIES

REINFORCED CONCRETE:

$f'_c = 4000$ PSI $n = 8$

$f_y = 60000$ PSI REINFORCEMENT

PRESTRESSED CONCRETE:

$f'_c = 6000$ PSI $n = 6$

$f_{pu} = 270$ KSI LOW RELAXATION STRANDS

0.75 x f_{pu} FOR INITIAL PRESTRESS

DESIGN SPEED: OVER = 30 MPH (FRT)
UNDER = N. A.

APPROXIMATE DECK AREA 1815 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
126	GENERAL PLAN AND ELEVATION
127	BRIDGE SURVEY
128	TRANSVERSE SECTION
129	CONSTRUCTION SEQUENCING
130-131	BORINGS
132	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK:

4 SPANS - 22" x 7'-6" PRECAST
PRE-TENSIONED CONCRETE SLABS.

SUBSTRUCTURE:

PARAPET ABUTMENTS SUPPORTED ON C.I.P.
PILES.

PIER WALL SUPPORTED ON C.I.P. PILES

DEPTH OF STRUCTURE:

3'-10 1/2"± TOP OF RAIL TO LOW BRIDGE

AESTHETIC LEVEL: ____

PRELIMINARY PLAN BRIDGE NO. XXXXX

CP FREIGHT RAIL OVER CEDAR LAKE CHANNEL
BETWEEN LAKE OF THE ISLES AND CEDAR LAKE
IN MINNEAPOLIS

16'- 28'- 28'-16' PRESTRESSED CONCRETE SLAB
SPANS. 20'-4" RAILWAY
0'00'00.00" SKEW

BRIDGE ID NO. 509

GENERAL PLAN AND ELEVATION

SEC 32 T 29 N R 24 W

CITY OF MINNEAPOLIS

HENNEPIN COUNTY

APPROVED: _____
STATE BRIDGE ENGINEER DATE

DES. JRM DR. JRM
CHK. GM CHK. GM

JOB NO.: T9N635

STATE PROJ. NO.: 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE CHANNEL RAILROAD BRIDGE
BRIDGE XXXXX (FRT)
GENERAL PLAN & ELEVATION

DISCIPLINE:

STRUCTURES

SHEET NAME:

E3-STU-BRG-CLCH-FRT-GPE

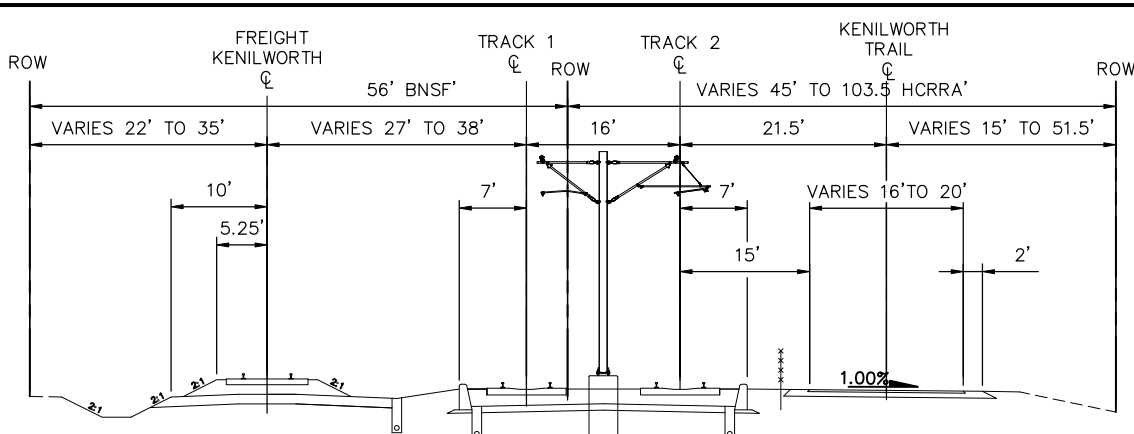
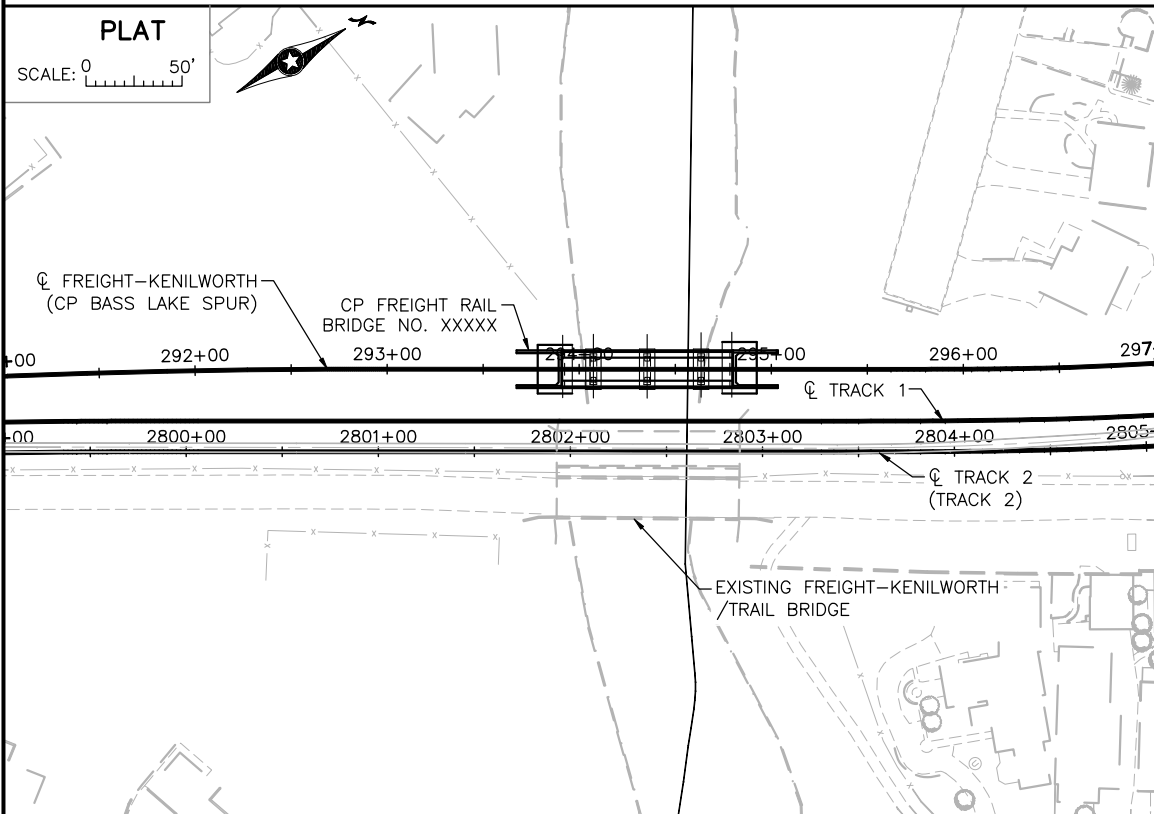
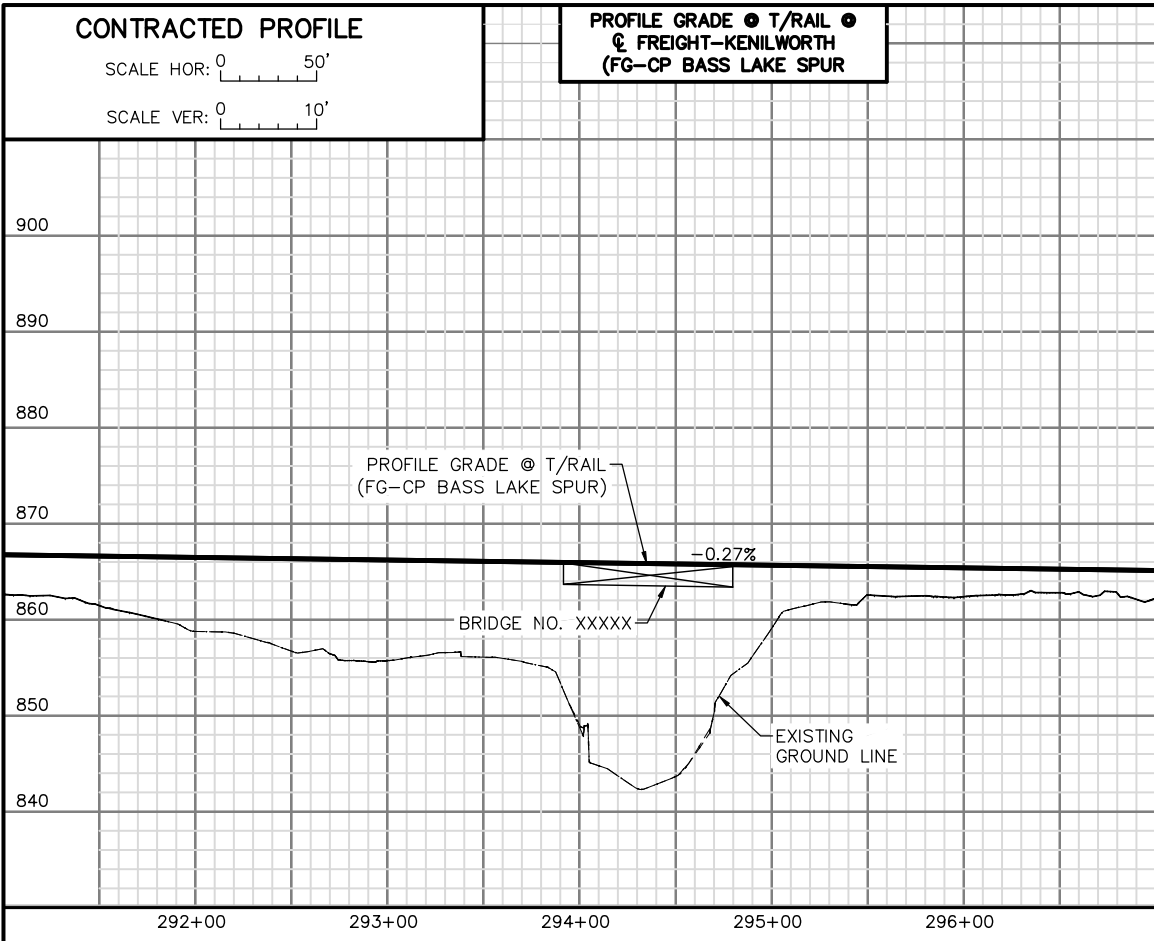
SHEET

126

OF

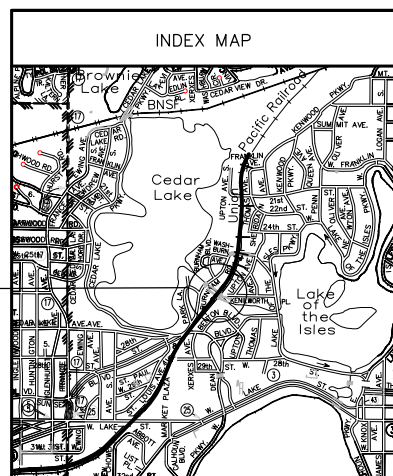
274

Aug. 25 2014 10:27 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-BRG-CLCH-FRT-SUR-001.dwg By: muellerj



TYPICAL APPROACH SECTION CEDAR LAKE CHANNEL-SOUTH

PROPOSED
BRIDGE NO. XXXXX



LOCATION ENGINEER'S OBSERVATIONS
AT BRIDGE SITE

1. SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.
2. OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
3. APPARENT HIGHWATER ELEVATION OBTAINED FROM:
4. OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

HYDRAULIC ENGINEER'S RECOMMENDATION

DATE: 5/28/2014

STREAM OR DITCH DESIGNATION CEDAR LAKE CHANNEL

DRAINAGE AREA 9.4 SQ. MI.

MAX FLOOD ON RECORD 855.43 FT (JULY 1997)

DESIGN FLOOD (100YR. FREQ.): 184 C.F.S.
HEADWATER ELEVATION: FT. 853.58
DESIGN MEAN VELOCITY THROUGH STRUCTURE 2.0 F.P.S.
TOTAL STAGE INCREASE 0.0 FT.
LOW MEMBER AT OR ABOVE ELEVATION 854.58 FT.

WATERWAY AREA REQUIRED BELOW ELEV. 853.58 = 299 SQ. FT.
AT RIGHT ANGLES TO CHANNEL

BASIC FLOOD (100 YR. FREQ.) 184 C.F.S.
HEADWATER ELEVATION: 853.43 FT.
TOTAL STAGE INCREASE 0.0 FT.
MEAN VELOCITY THROUGH STRUCTURE 2.0 FPS

FLOWLINE ELEVATION: 842.00 FT. SKEW ANGLE: 0 DEG

ESTIMATED PRLIMINARY TOTAL SCOUR AT PIER EL. TBD
(500 YR. FREQ.)

SCOUR CONFIRMATION RECOMMENDATION

DATE: 5/28/2014

TOTAL SCOUR AT PIER EL. TBD (500 YR. FREQ.)
SCOUR CODE: L - STABLE - EVAL

BRIDGE SURVEY SHEETS MADE FROM 2014 MFRA SURVEYS

- 1ST BENCH MARK (NAVD 88)
BENCHMARK ID PT. 183
ELEVATION = 869.09
N = 159916.74, E = 517227.56
DESCRIPTION = MAG NAIL IN BIT. PATH
- 2ND BENCH MARK (NAVD 88)
BENCHMARK ID PT. 184
ELEVATION = 867.99
N = 160069.02, E = 517359.05
DESCRIPTION = MAG NAIL IN BIT. PATH

BRIDGE SURVEY

CP FREIGHT RAIL BRIDGE IN KENILWORTH CORRIDOR
OVER CHANNEL BETWEEN LAKE OF THE ISLES AND
CEDAR LAKE IN MINNEAPOLIS.

SEC 32 T 29N R 34W

CITY OF MINNEAPOLIS HENNEPIN COUNTY

BRIDGE NO. XXXXX

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



Kimley»Horn

PRELIMINARY ENGINEERING

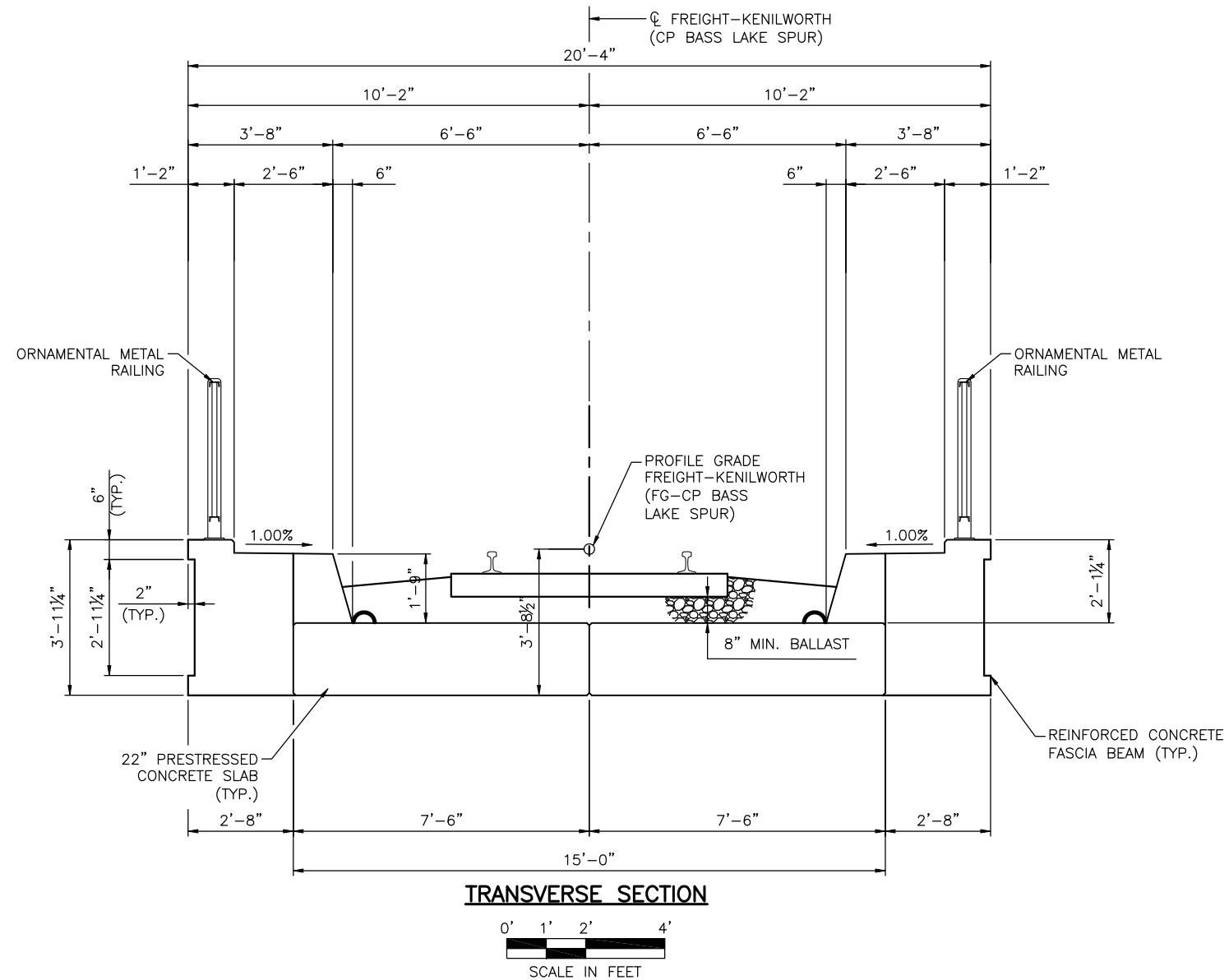
EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE CHANNEL RAILROAD BRIDGE
BRIDGE XXXXX (FRT)
BRIDGE SURVEY

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-BRG-CLCH-FRT-SUR-001

SHEET
127
OF
274

Aug. 25 2014 10:27 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-BRG-CLCH-FRT-SUP.dwg By: muellerj



DES.	JRM	DR.	JRM
CHK.	GM	CHK.	GM
NO.	DATE	BY	



TKDA

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE CHANNEL RAILROAD BRIDGE
BRIDGE XXXXX (FRT)
TRANSVERSE SECTION

DISCIPLINE: STRUCTURES

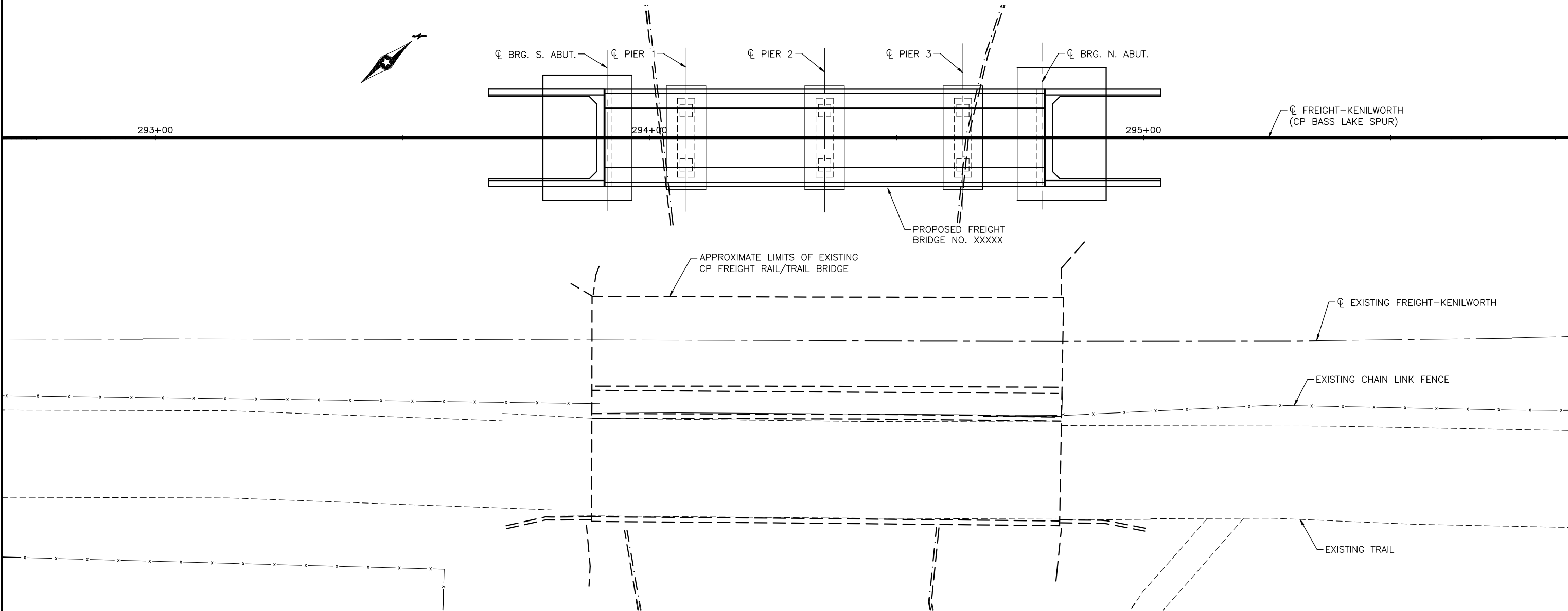
SHEET NAME: E3-STU-BRG-CLCH-FRT-SUP

SHEET
128
OF
274

Aug. 25 2014 10:28 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-BRG-CLCH-FRT-DTL.dwg By: muellerj

SUGGESTED CONSTRUCTION SEQUENCE FOR NEW FREIGHT RAIL BRIDGE:

1. CONSTRUCT PROPOSED RR BRIDGE NO. XXXXX FOOTINGS, ABUTMENTS, WINGWALLS, PIERS AND SUPERSTRUCTURE.
2. PLACE BALLAST, TIES, AND RAILS FOR CP BASS LAKE SPUR.
3. SHIFT EXISTING FREIGHT-KENILWORTH ALIGNMENT TO NEW FREIGHT-KENILWORTH ALIGNMENT.
4. FOR REMOVALS AND STAGING OF EXISTING CP FREIGHT RAIL/TRAIL BRIDGE REFER TO THE CEDAR LAKE CHANNEL LRT/TRAIL BRIDGE PLANS.



PROPOSED CONSTRUCTION SEQUENCE FOR BRIDGE XXXXX

DES. JRM CHK. GM		DR. JRM CHK. GM		
NO.	DATE	BY	CHECK/DESIGN	REVISION / SUBMITTAL

TKDA

PRELIMINARY ENGINEERING

SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE CHANNEL RAILROAD BRIDGE
BRIDGE XXXXX (FRT)
CONSTRUCTION SEQUENCING

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-BRG-CLCH-FRT-DTL

SHEET 129 OF 274



NOTES:

1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF C/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

✓ Q FREIGHT-KENILWORTH
(CP BASS LAKE SPUR)

[illegible]

00 1800+00 1801+00 1802+00 1803+00 1804+00 1805+00

1005 SB
STA. 2801+92.22
15' RT. OF C TRACK 2

1006 SB
STA. 2802+94.54
7' RT. OF C TRACK 2

Q TRACK
(TRACK 2)

— EXISTING FREIGHT RAIL/
KENILWORTH TRAIL BRIDGE

[illegible]

— PROFILE GRADE T/ RAIL
 @ FREIGHT—KENILWORTH
 (FG— CP BASS LAKE SPUR)

1005 SB-
EL. 874.60

1006 SB-
EL. 874.20

-0.27%

EX. GROUND
LINE

SOUTH ABUTMENT FOOTING
B/FOOTING EL. 850.75

PIER 1 FOOTING
B/FOOTING EL. 844.75

PIER 2 FOOTING
B/FOOTING EL. 843.25

— NORTH ABUTMENT FOOTING
— B/FOOTING EL. 853.25
— PIER 3 FOOTING
— B/FOOTING EL. 845.75

EL. 804

EL. 783.70 —

DES. JRM	DR. JRM	292+00	293+00	294+00	295+00	296+00	297+00
CHK. GM	CHK. GM						

[illegible]





--	--

The image contains two logos. On the left is the Metropolitan Council logo, featuring a stylized triangle with a diagonal line through it, and the text "METROPOLITAN COUNCIL" below it. On the right is the Southwest Green Line LRT Extension logo, featuring a stylized train and the text "SOUTHWEST Green Line LRT Extension" below it.

<p align="center">EAST - VOLUME 2 (STRUCTURES) CEDAR LAKE CHANNEL RAILROAD BRIDGE BRIDGE XXXXX (FRT) BORINGS (1 OF 2)</p>	
<p>DISCIPLINE:</p>	<p>STRUCTURES</p>
<p>SHEET NAME:</p>	<p>E3-STU-BRG-CLCH-FRT-BOR-001</p>

SHEET
130
OF
274

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

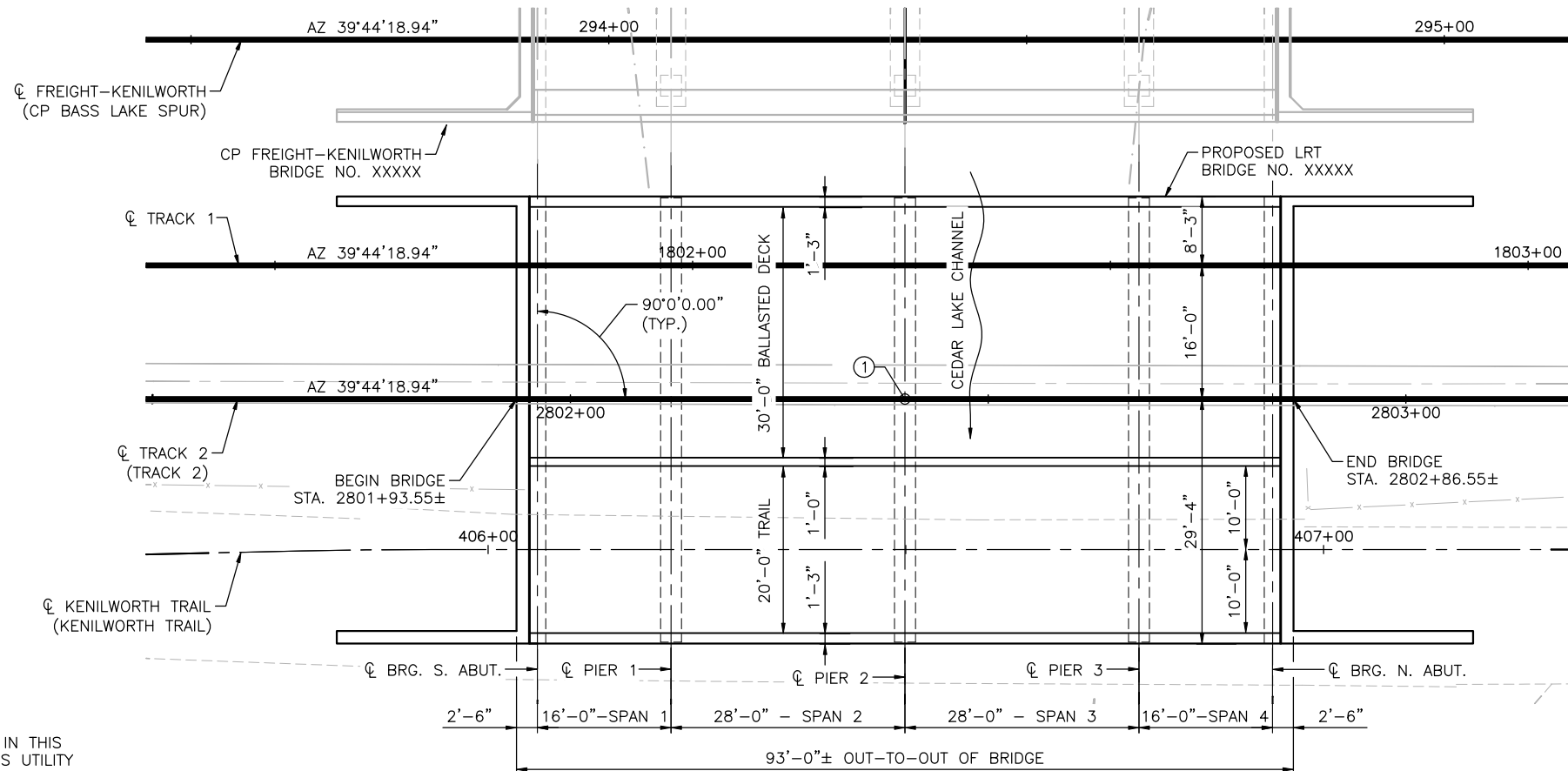
DES. JRM		DR. JRM												720																							
CHK. GM		CHK. GM																																			
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL	<div><div></div><div>PRELIMINARY ENGINEERING</div></div>										<div><div></div></div>										<div>EAST - VOLUME 2 (STRUCTURES) CEDAR LAKE CHANNEL RAILROAD BRIDGE BRIDGE XXXXX (FRT) BORINGS (2 OF 2)</div> <div>DISCIPLINE: STRUCTURES</div> <div>SHEET NAME: E3-STU-BRG-CLCH-FRT-BOR-002</div>										SHEET 131 OF 274	

Aug. 25 2014 10:29 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-BRG-CLCH-FRT-AES.dwg By: muellerj

AESTHETIC DETAILS TO BE DETERMINED DURING ADVANCED DESIGN:

- 1. ABUTMENT SURFACE
- 2. ABUTMENT/WALL CORNER DETAIL
- 3. EXPOSED EDGE OF DECK/WALKWAY
- 4. BOTTOM OF BEAMS
- 5. PIER COLUMN GEOMETRY AND SURFACE
- 6. PIER TYPE
- 7. ORNAMENTAL METAL RAILING

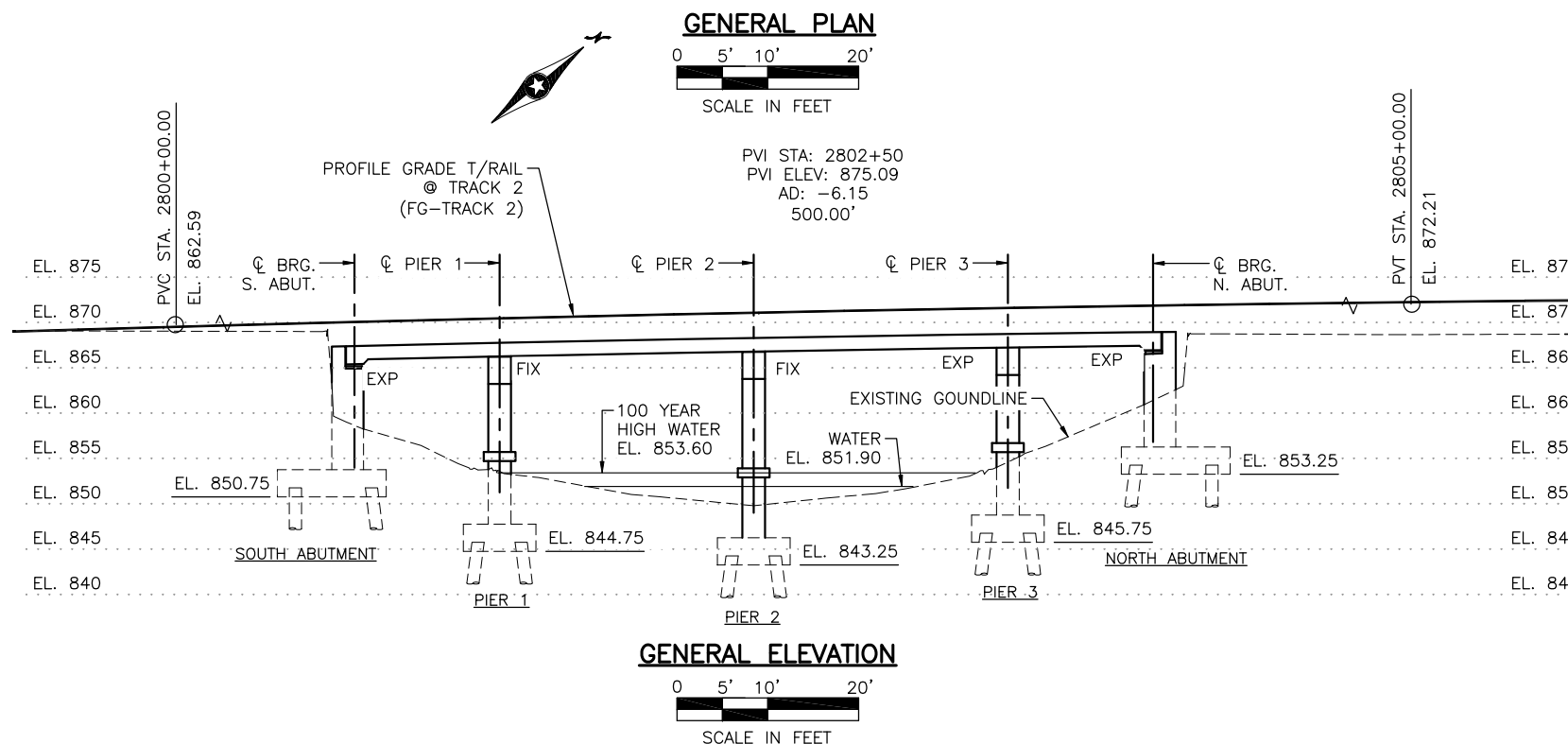
DES. JRM		DR. JRM													
CHK. GM		CHK. GM													
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL										



NOTES:

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

① CONTROL POINT 1
 CL TRACK 2 STA. 2802+40.05
 X = 517,249.020
 Y = 159,964.379



DESIGN DATA

2012 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
6TH EDITION AND CURRENT INTERIMS

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA
(REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD

LRV & MV LOADING DIAGRAM SHOWN ON SHEET 13

MATERIAL DESIGN PROPERTIES
REINFORCED CONCRETE:
 $f'c = 4000$ PSI $n = 8$
 $f_y = 60000$ PSI REINFORCEMENT

DESIGN SPEED: OVER = 30 MPH (LRT)
UNDER = N/A

APPROXIMATE DECK AREA 4960 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
133	GENERAL PLAN AND ELEVATION
134	BRIDGE SURVEY
135	TRANSVERSE SECTION
136	CONSTRUCTION SEQUENCING
137-138	BORINGS
139	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK: 4 SPANS - CONTINUOUS CONCRETE SLAB SPAN

SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON C.I.P. PILE.

PIER WALL SUPPORTED ON C.I.P. PILE

DEPTH OF STRUCTURE:
±3'-6" TOP OF RAIL TO LOW BRIDGE

AESTHETICS LEVEL: ____

PRELIMINARY PLAN
BRIDGE NO. XXXXX

SOUTHWEST LRT OVER CEDAR LAKE CHANNEL
BETWEEN LAKE OF THE ISLES AND CEDAR
LAKE IN MINNEAPOLIS

88'-0" CONTINUOUS CONCRETE SLAB
30'-0" RAILWAY W/ 20'-0" TRAIL
0'00'00.00" SKEW

BRIDGE ID NO. 209

GENERAL PLAN AND ELEVATION

SEC 32 T 29N R 24W
CITY OF MINNEAPOLIS HENNEPIN COUNTY

APPROVED: _____
STATE BRIDGE ENGINEER DATE

[illegible]

STATE PROJ. NO.: 9909-01

MNDOT REVIEW:



PRELIMINARY ENGINEERING

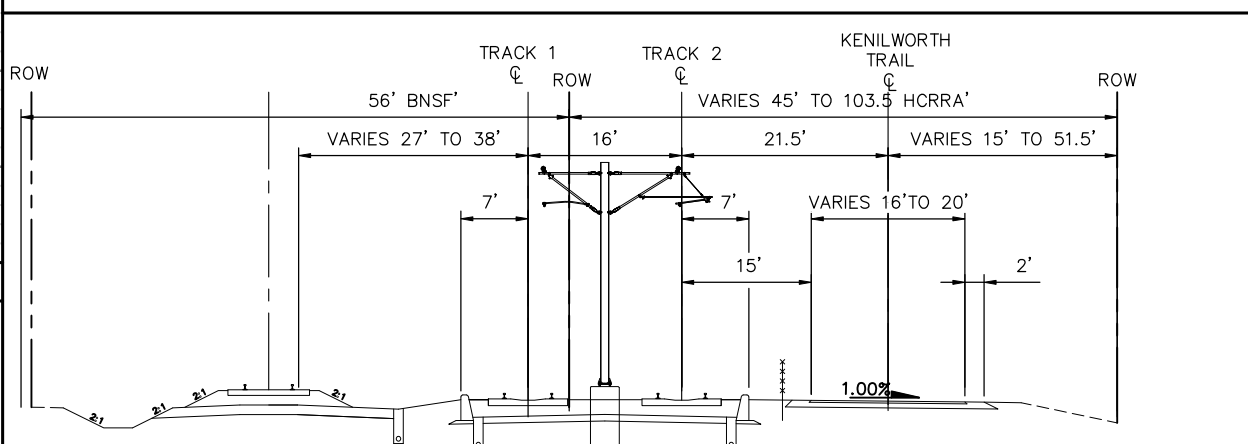
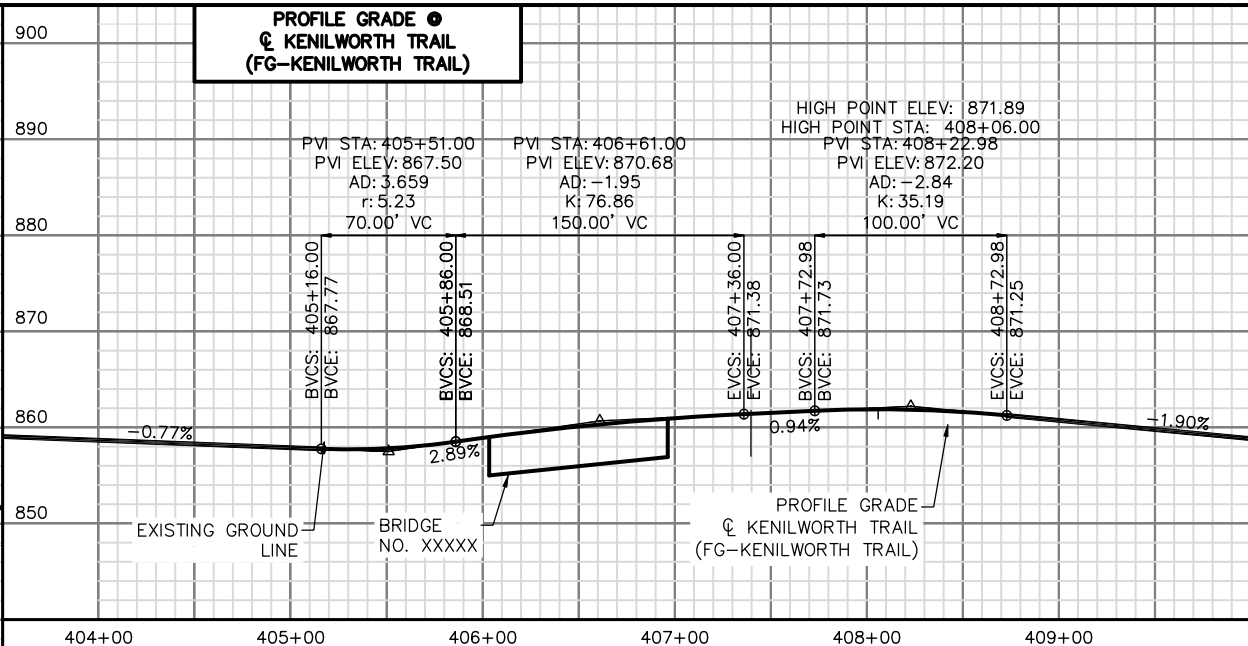
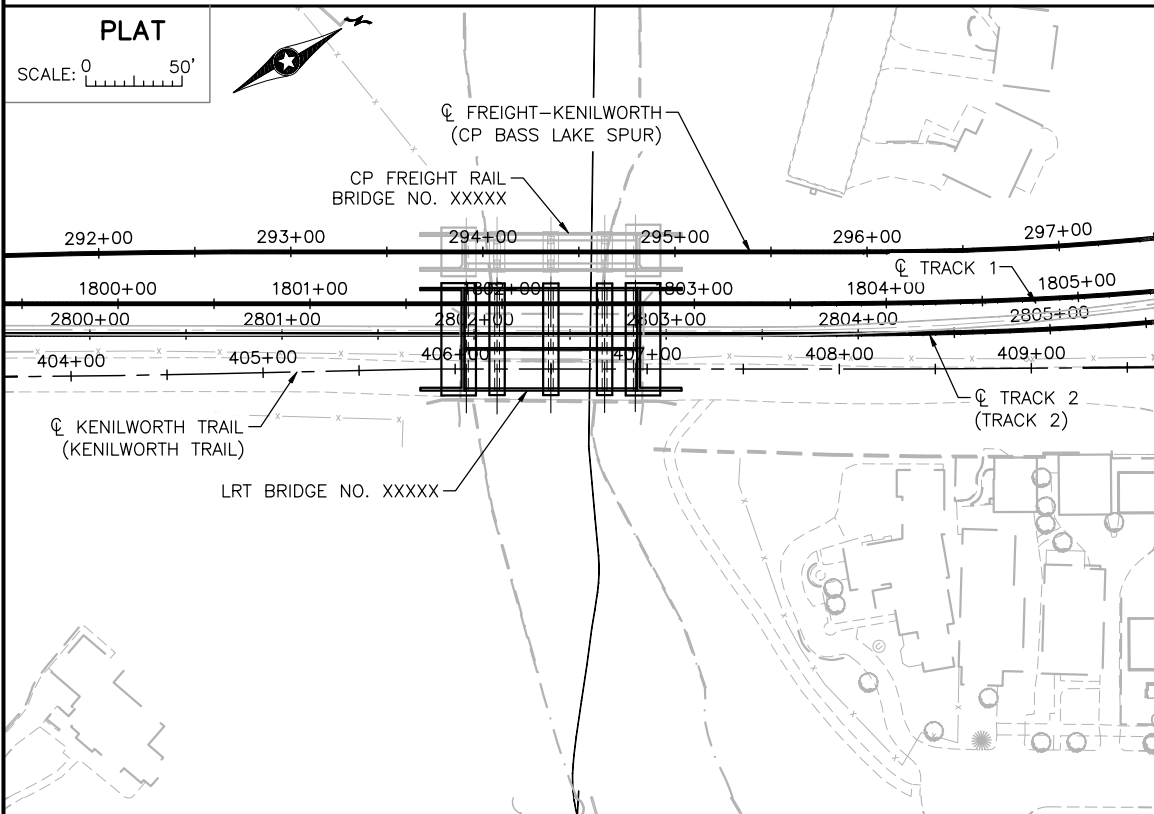
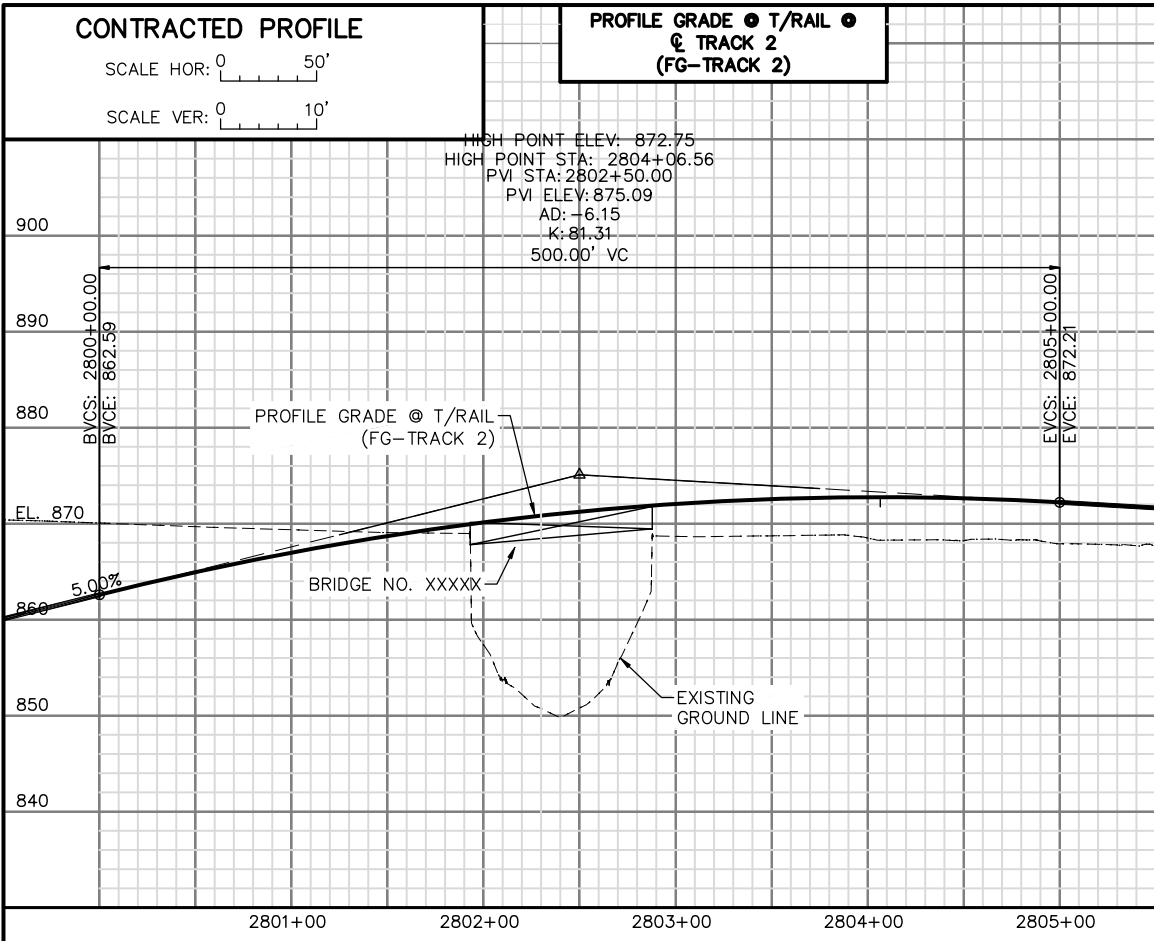


**EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE CHANNEL LRT/TRAIL
BRIDGE XXXXX (LRT)
GENERAL PLAN & ELEVATION**

DISCIPLINE:	STRUCTURES	SHEET NAME:	E3-STU-BRG-CLCH-LRT-GPE
-------------	-------------------	-------------	--------------------------------

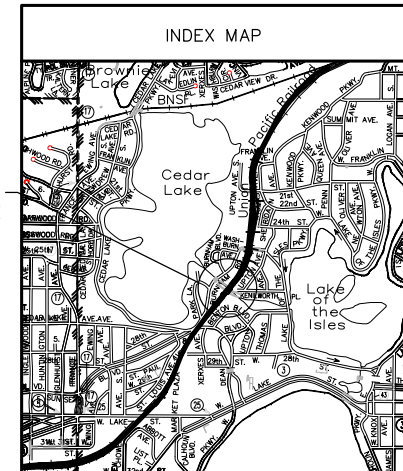
SHEET
133
OF
274

Aug. 25 2014 10:37 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-BRG-CLCH-LRT-SUR-001.dwg By: muellerj



TYPICAL APPROACH SECTION CEDAR LAKE CHANNEL-SOUTH

PROPOSED
BRIDGE NO. XXXXX



**LOCATION ENGINEER'S OBSERVATIONS
AT BRIDGE SITE**

1. SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.
2. OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
3. APPARENT HIGHWATER ELEVATION OBTAINED FROM:
4. OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

HYDRAULIC ENGINEER'S RECOMMENDATION

DATE: 5/28/2014

STREAM OR DITCH DESIGNATION CEDAR LAKE CHANNEL

DRAINAGE AREA 9.4 SQ. MI.

MAX FLOOD ON RECORD 855.43 FT (JULY 1997)

DESIGN FLOOD (100YR. FREQ.): 184 C.F.S.
HEADWATER ELEVATION: FT. 853.58
DESIGN MEAN VELOCITY THROUGH STRUCTURE 2.0 F.P.S.
TOTAL STAGE INCREASE 0.0 FT.
LOW MEMBER AT OR ABOVE ELEVATION 854.58 FT.

WATERWAY AREA REQUIRED BELOW ELEV. 853.58 = 299 SQ. FT. AT RIGHT ANGLES TO CHANNEL

BASIC FLOOD (100 YR. FREQ.) 184 C.F.S.
HEADWATER ELEVATION: 853.43 FT.
TOTAL STAGE INCREASE 0.0 FT.
MEAN VELOCITY THROUGH STRUCTURE 2.0 FPS

FLOWLINE ELEVATION: 842.00 FT. SKEW ANGLE: 0 DEG

ESTIMATED PRILIMINARY TOTAL SCOUR AT PIER EL. TBD (500 YR. FREQ.)

SCOUR CONFIRMATION RECOMMENDATION

DATE: 5/28/2014

TOTAL SCOUR AT PIER EL. TBD (500 YR. FREQ.)

SCOUR CODE: L - STABLE - EVAL

BRIDGE SURVEY SHEETS MADE FROM 2014 MFRA SURVEYS

1ST BENCH MARK (NAVD 88)
BENCHMARK ID PT. 183
ELEVATION = 869.09
N = 159916.74, E = 517227.56
DESCRIPTION = MAG NAIL IN BIT. PATH

2ND BENCH MARK (NAVD 88)
BENCHMARK ID PT. 184
ELEVATION = 867.99
N = 160069.02, E = 517359.05
DESCRIPTION = MAG NAIL IN BIT. PATH

BRIDGE SURVEY

SOUTHWEST LRT OVER CEDAR LAKE CHANNEL
BETWEEN LAKE OF THE ISLES AND CEDAR LAKE IN MINNEAPOLIS

SEC 32 T 29N R 24W

CITY OF MINNEAPOLIS HENNEPIN COUNTY

BRIDGE NO. XXXXX

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



Kimley»Horn

TKDA

PRELIMINARY ENGINEERING

METROPOLITAN COUNCIL

SOUTHWEST
Green Line LRT Extension

**EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE CHANNEL LRT/TRAIL
BRIDGE XXXXX (LRT)
BRIDGE SURVEY**

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E3-STU-BRG-CLCH-LRT-SUR-001**

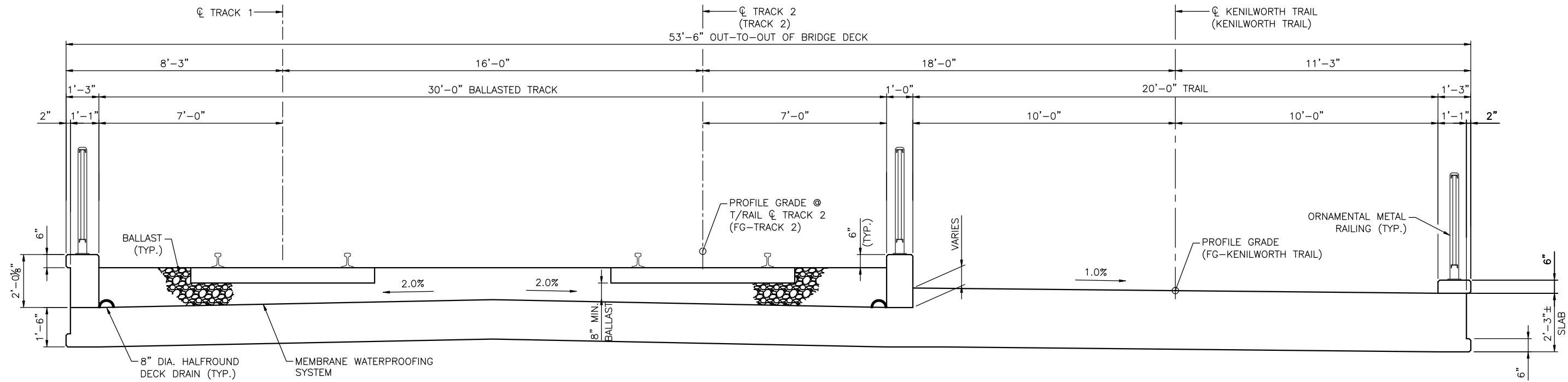
SHEET

134

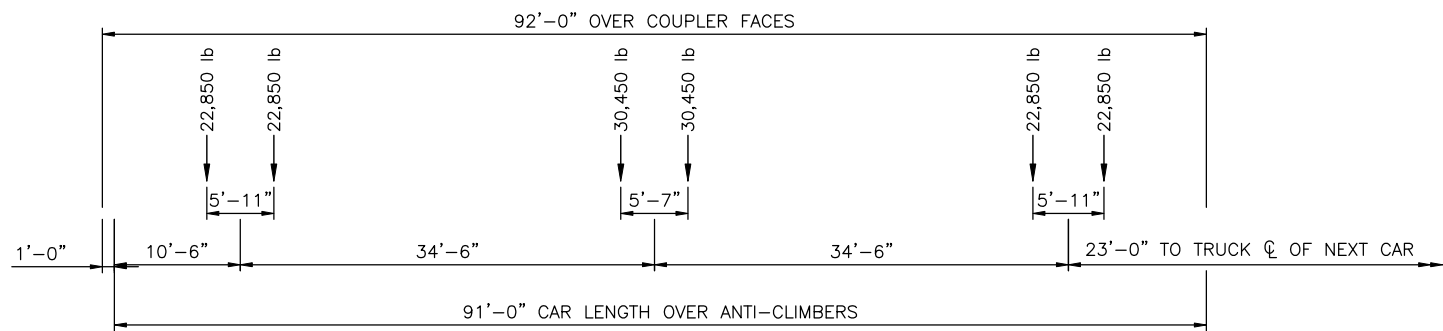
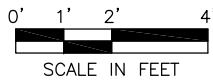
OF

274

Aug. 26 2014 10:03 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-BRG-CLCH-LRT-SUP.dwg By: muellerj



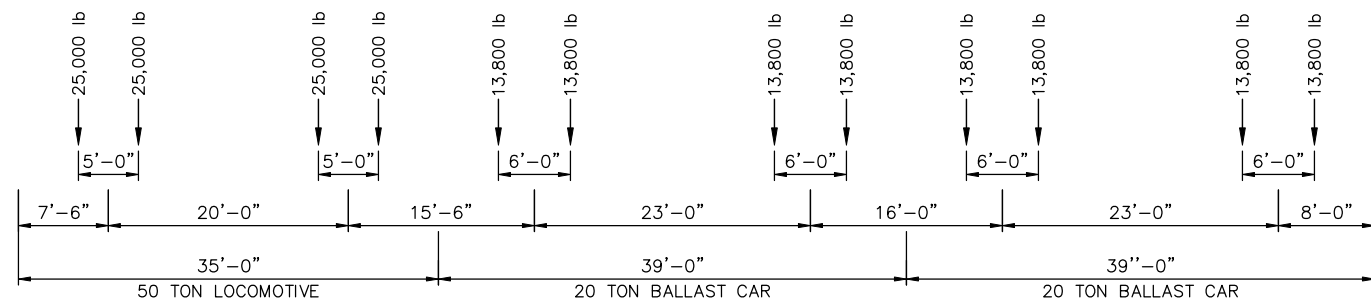
TRANSVERSE SECTION



LIGHT RAIL VEHICLE LOADING DIAGRAM

NOTES:

- 1. THE LRT TRAIN SHALL CONSIST OF EITHER ONE, TWO OR THREE CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
- 2. AXLE LOAD IN POUNDS.
- 3. LOADING DIAGRAM REPRESENTS MAXIMUM LOAD AT EACH TRUCK.



MAINTENANCE TRAIN LOADING DIAGRAM

NOTES:

- 1. THE MAINTENANCE TRAIN SHALL CONSIST OF ONE LOCOMOTIVE AND ONE, TWO, THREE OR FOUR BALLAST CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
- 2. AXLE LOAD IN POUNDS.
- 3. WEIGHT OF EMPTY BALLAST CAR IS 15,000 POUNDS.

DES. JRM	DR. JRM
CHK. GM	CHK. GM

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

PRELIMINARY ENGINEERING

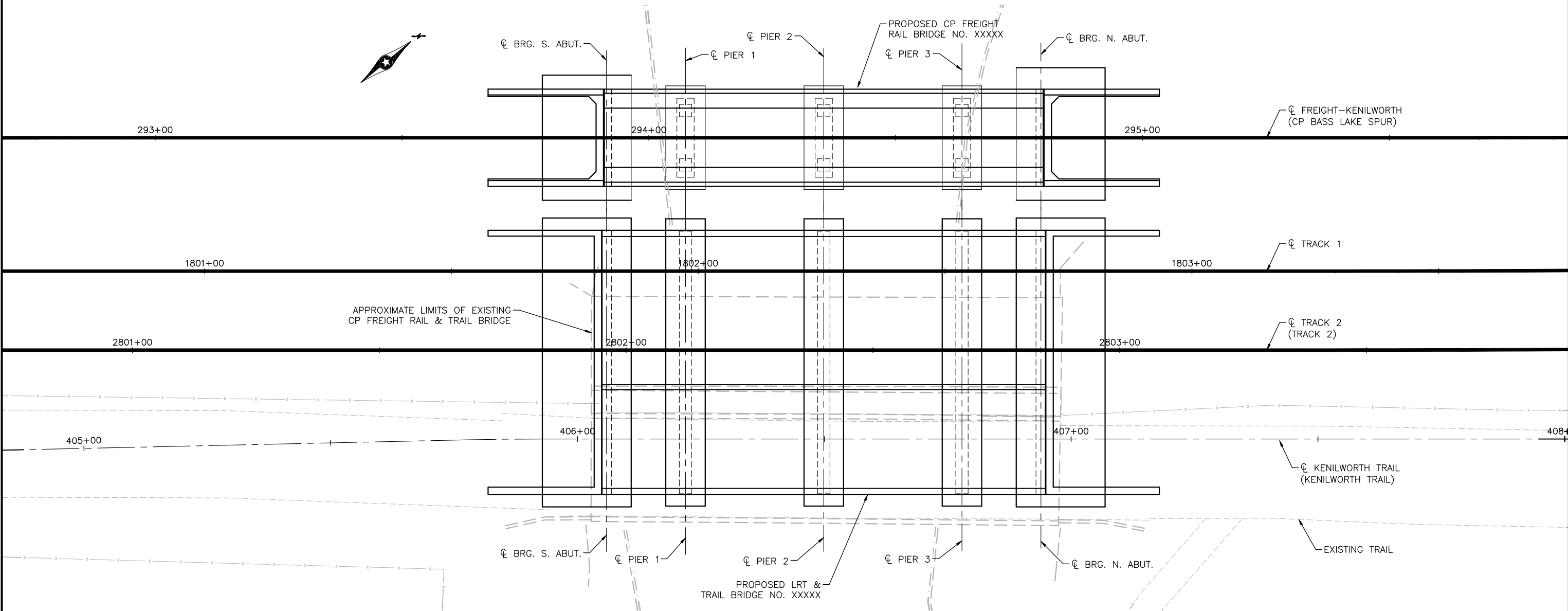
EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE CHANNEL LRT/TRAIL
BRIDGE XXXXX (LRT)
TRANSVERSE SECTION

DISCIPLINE: **STRUCTURES**
SHEET NAME: **E3-STU-BRG-CLCH-LRT-SUP**

Aug. 25 2014 10:38 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-BRG-CLCH-LRT-DTL.dwg By: muellerj

SUGGESTED CONSTRUCTION SEQUENCE FOR NEW LRT/TRAIL BRIDGE:



- 1. REMOVE EXISTING CP FREIGHT/TRAIL BRIDGE TO BOTTOM OF FOOTINGS.
- 2. CONSTRUCT FOOTINGS, ABUTMENTS, WINGWALLS, PIERS AND SUPERSTRUCTURE.
- 3. INSTALL BALLAST, TIES AND RAILS FOR LRT TRACKS.



PROPOSED CONSTRUCTION SEQUENCE FOR BRIDGE XXXXX

DES. JRM	DR. JRM
CHK. GM	CHK. GM

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



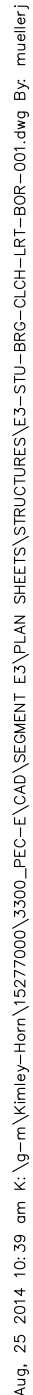
PRELIMINARY ENGINEERING



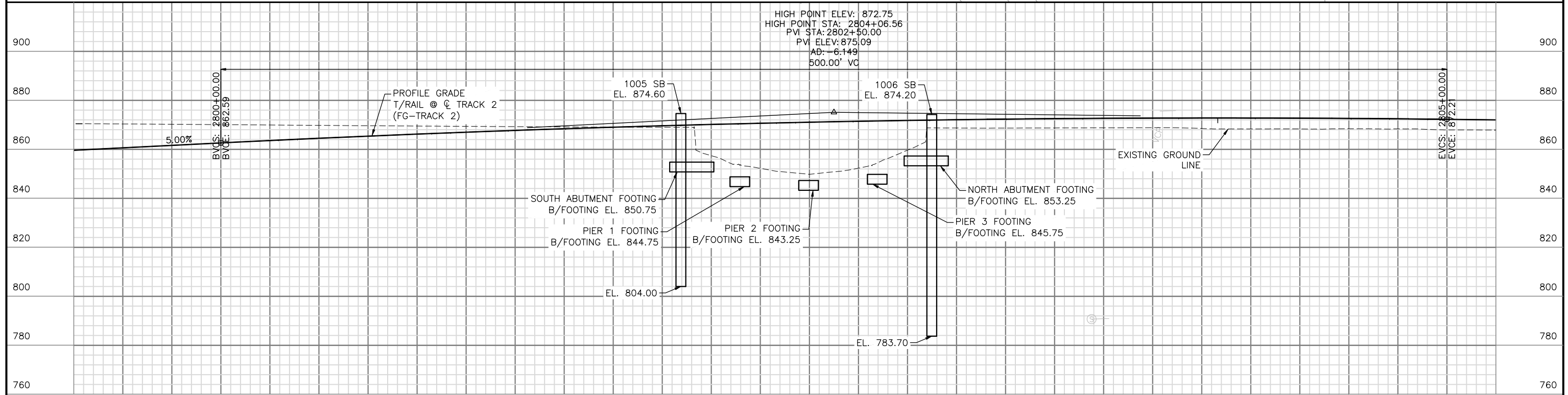
EAST - VOLUME 2 (STRUCTURES)
CEDAR LAKE CHANNEL LRT/TRAIL
BRIDGE XXXXX (LRT)
CONSTRUCTION SEQUENCING





DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-BRG-CLCH-LRT-DTL







1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF C/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."



DES. JRM			2800+00			2801+00			2802+00			2803+00			2804+00			2805+00		
CHK. GM																				
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL	<div>  PRELIMINARY ENGINEERING</div>			<div> </div>			EAST - VOLUME 2 (STRUCTURES) CEDAR LAKE CHANNEL LRT/TRAIL BRIDGE XXXXX (LRT) BORINGS (1 OF 2)			SHEET 137 OF 274					
						DISCIPLINE: STRUCTURES			SHEET NAME: E3-STU-BRG-CLCH-LRT-BOR-001											

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

DES. JRM		DR. JRM												720					
CHK. GM		CHK. GM																	
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL	<div><div></div><div>PRELIMINARY ENGINEERING</div></div> <div></div>										<div>EAST - VOLUME 2 (STRUCTURES)</div> <div>CEDAR LAKE CHANNEL LRT/TRAIL</div> <div>BRIDGE XXXXX (LRT)</div> <div>BORINGS (2 OF 2)</div> <div>DISCIPLINE: STRUCTURES</div> <div>SHEET NAME: E3-STU-BRG-CLCH-LRT-BOR-002</div>		SHEET 138 OF 274	

Aug. 25 2014 10:40 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-BRG-CLCH-LRT-AES.dwg By: muellerj

AESTHETIC DETAILS TO BE DETERMINED DURING ADVANCED DESIGN:

- 1. ABUTMENT SURFACE
- 2. ABUTMENT/WALL CORNER DETAIL
- 3. EXPOSED EDGE OF DECK
- 4. EXPOSED BARRIER
- 5. BOTTOM OF SLAB
- 6. PIER COLUMN GEOMETRY AND SURFACE
- 7. PIER TYPE
- 8. ORNAMENTAL METAL RAILING

DES. JRM		DR. JRM																							
CHK. GM		CHK. GM																							
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL	<div><div><div>Kimley»Horn</div><div><div><div></div><div></div><div></div></div><div>TKDA</div></div></div></div> <div>PRELIMINARY ENGINEERING</div>										<div><div><div><div></div><div></div></div><div><div>METROPOLITAN</div><div>C O U N C I L</div></div></div><div><div>SOUTHWEST</div><div>Green Line LRT Extension</div></div><div><div></div><div></div></div></div>				<div>EAST - VOLUME 2 (STRUCTURES)</div> <div>CEDAR LAKE CHANNEL LRT/TRAIL</div> <div>BRIDGE XXXXX (LRT)</div> <div>AESTHETICS</div>				<div>SHEET</div> <div>139</div> <div>OF</div> <div>274</div>	
						DISCIPLINE: STRUCTURES				SHEET NAME: E3-STU-BRG-CLCH-LRT-AES															

⑤ \mathbb{Q} NORTH CEDAR LAKE TRAIL (TRAIL I) STA. 559+73.51
 \mathbb{Q} TRAIL G (TRAIL G) STA. 559+47.50
 $X=518807.023$
 $Y=164140.185$

⑥ \mathbb{Q} NORTH CEDAR LAKE TRAIL (TRAIL I) STA. 559+95.23
 \mathbb{Q} TRAIL F (TRAIL F) STA. 652+91.98
 $X=518822.238$
 $Y=164124.692$

⑦ \mathbb{Q} NORTH CEDAR LAKE TRAIL (TRAIL I) STA. 562+40.67
 \mathbb{Q} TRAIL F (TRAIL F) STA. 654+86.03
 $X=519008.358$
 $Y=164170.055$

- 8 P.C. STA. 555+74.99
X=518476.676
Y=164307.999
- 9 P.T. STA. 558+04.78
X=518688.796
Y=164260.571
- 10 P.C. STA. 560+14.62
X=518835.829
Y=164110.853
- 11 P.R.C STA. 562+24.04
X=519003.524
Y=164154.139
- 12 P.R.C STA. 565+85.83
X=519248.744
Y=164398.096

13 BORINGS PERFORMED FOR PRELIMINARY
ENGINEERING WERE LIMITED TO THE
NORTH SIDE OF THE EXISTING FREIGHT
TRACKS (MINNEAPOLIS PARK AND
RECREATION BOARD PROPERTY).
ADDITIONAL BORINGS TO BE OBTAINED ON
HCCRA PROPERTY FOR FURTHER TESTING
AND DEVELOPMENT OF FOUNDATION
RECOMMENDATIONS IN ADVANCED DESIGN.



GENERAL PLAN

0 25' 50' 100'

SCALE IN FEET

[illegible]

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST

Green Line LRT Extension



**EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
GENERAL PLAN**

DISCIPLINE: **STRUCTURES**

SHEET NAME:
E4-STU-BRG-NCDL-TRL-GPE-001

SHEET
140
OF
274

2012 AND CURRENT INTERIM AASHTO LRFD
BRIDGE DESIGN SPECIFICATIONS

2009 AASHTO LRFD GUIDE SPECIFICATIONS FOR THE
DESIGN OF PEDESTRIAN BRIDGES

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA
(REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD

90 PSF PEDESTRIAN LIVE LOAD
H 10 MAINTENANCE VEHICLE LIVE LOAD

MATERIAL DESIGN PROPERTIES:

REINFORCED CONCRETE:

$f'c = 4000 \text{ PSI}$ $n = 8$
 $fy = 60000 \text{ PSI}$ REINFORCEMENT

STRUCTURAL STEEL:

$fy = 50000 \text{ PSI}$

DESIGN SPEED: OVER = 20 MPH

APPROXIMATE DECK AREA: 28750 SQ. FT.

NO.	DESCRIPTION
140	GENERAL PLAN
141-144	GENERAL PLAN AND ELEVATION
145-147	BRIDGE SURVEY
148	TRANSVERSE SECTION
149-155	BORINGS
156	AESTHETICS

MAIN SPAN:
SINGLE SPAN — PREFABRICATED STEEL TRUSS —
SIMPLE SPAN

APPROACH SPANS:
THREE OR FOUR SPAN — CAST-IN-PLACE CONCRETE
DECK GIRDER — CONTINUOUS SPANS

ALL BARS EPOXY COATED

SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON SPREAD
FOOTINGS (13)

SINGLE COLUMN PIER FOUNDATION RECOMMENDATIONS
TO BE FINALIZED IN ADVANCED DESIGN

DEPTH OF MAIN SPAN STRUCTURE:
2'-11"± PROFILE GRADE TO LOW BRIDGE

DEPTH OF APPROACH STRUCTURE:
4'-9"± PROFILE GRADE TO LOW BRIDGE

AESTHETICS: LEVEL —

NORTH CEDAR LAKE TRAIL OVER CANADIAN PACIFIC
RAILWAY & SOUTHWEST LRT 0.2 MI. SOUTH OF JCT. OF
CSAH 2 & I-394 IN MINNEAPOLIS

PREFABRICATED STEEL TRUSS MAIN SPAN WITH C.I.P.
CONCRETE DECK GIRDER APPROACH SPANS
24'-0" TRAIL
00'-00'-00.00" SKEW

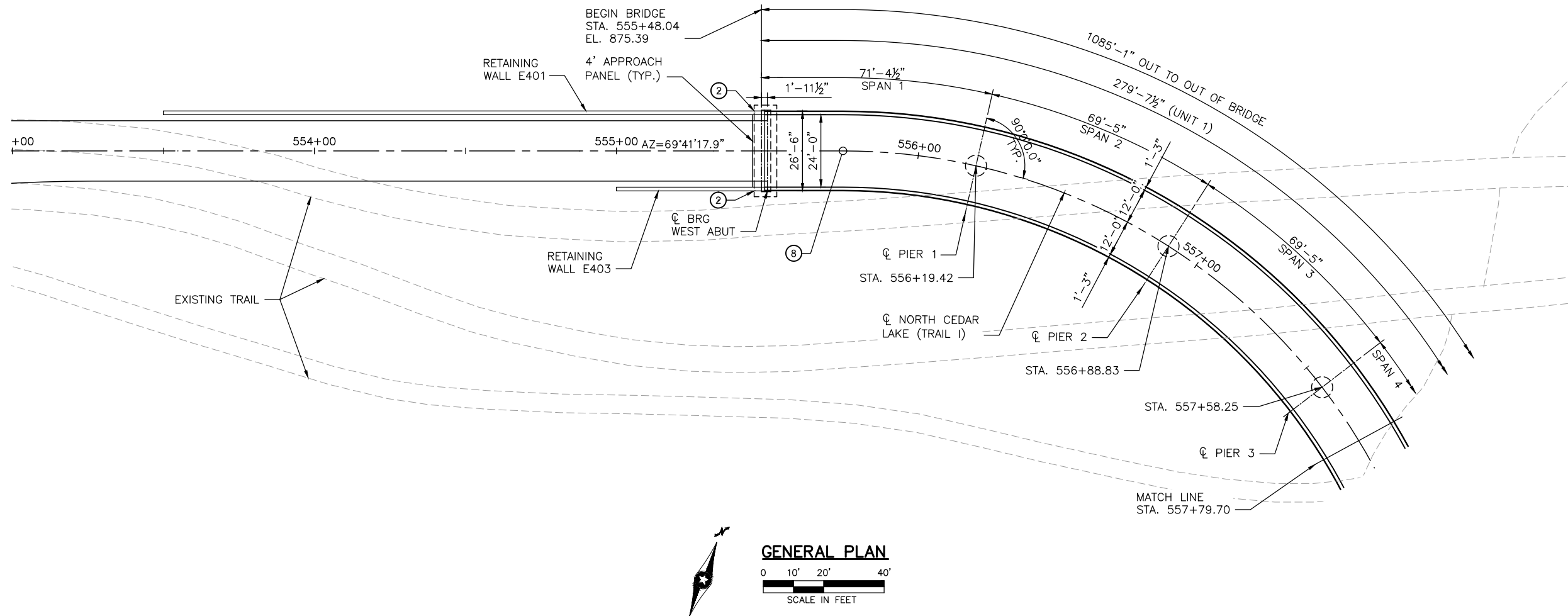
BRIDGE I.D. NO. 302 (MAIN SPAN)
206 (APPROACH SPANS)

GENERAL PLAN

SEC 28 T 29N R 24W
CITY OF MINNEAPOLIS HENNEPIN COUNTY

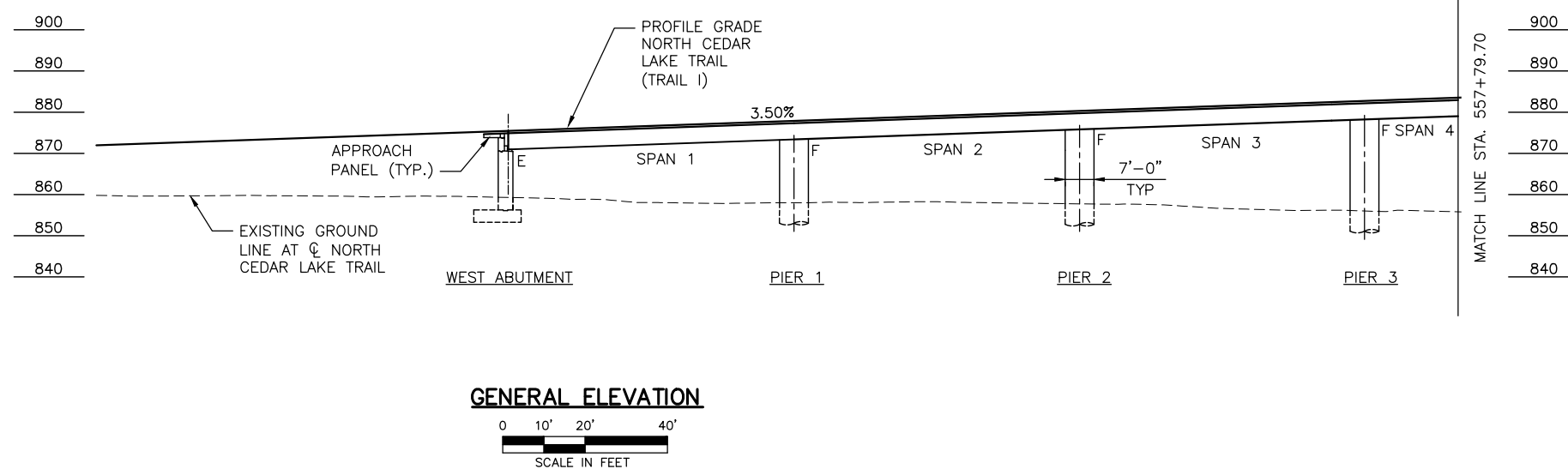
APPROVED: _____
STATE BRIDGE ENGINEER DATE

Aug. 26 2014 01:09 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-NCDL-TRL-GPE-002.dwg By: Katie.Ellis



NOTES:

- SUBSTRUCTURES SET TO FOLLOWING AZIMUTHS
W ABUTMENT AZ=159°41'17.9"
PIER 1 AZ=172°24'56.2"
PIER 2 AZ=12°18'7.7"
PIER 3 AZ=32°11'19.7"
- END OF BRIDGE SUBSTRUCTURE AND BEGINNING OF RETAINING WALL TO BE DETERMINED IN ADVANCED DESIGN.
- SEE BORING SURVEY SHEET FOR IN PLACE UTILITIES.
- FOR STATION AND COORDINATES OF POINT ⑧, SEE SHEET 140.



DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



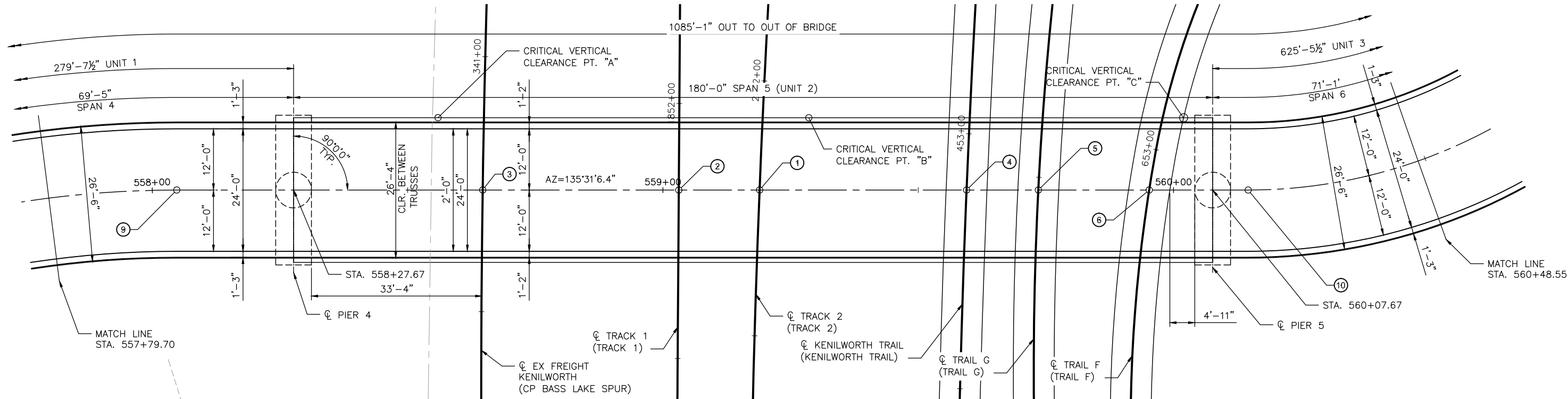
EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
GENERAL PLAN AND ELEVATION (1 OF 4)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E4-STU-BRG-NCDL-TRL-GPE-002**

SHEET
141
OF
274

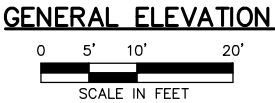
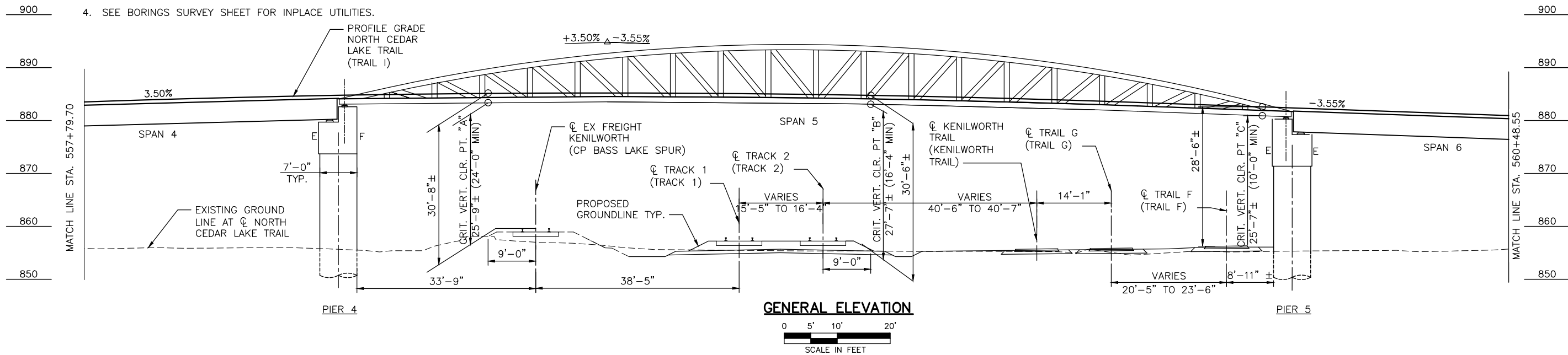
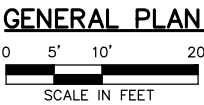
Aug. 26 2014 01:10 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-NCDL-TRL-GPE-003.dwg By: Katie.Ellis



NOTES:

1. FOR STATION AND COORDINATES OF POINTS ① THRU ⑥ AND ⑨ THRU ⑩, SEE SHEET 140
2. PIERS 4 AND 5 SET PARALLEL AT AZIMUTH 45°31'6.4"
3. METAL RAILING TO MEET REQUIREMENTS FOR PROTECTIVE SCREENING PER LRFD DESIGN MANUAL 13,2,5.
4. SEE BORINGS SURVEY SHEET FOR INPLACE UTILITIES.

PVI STA:558+78.43
PVI ELEV:886.96
200.00' VC



DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



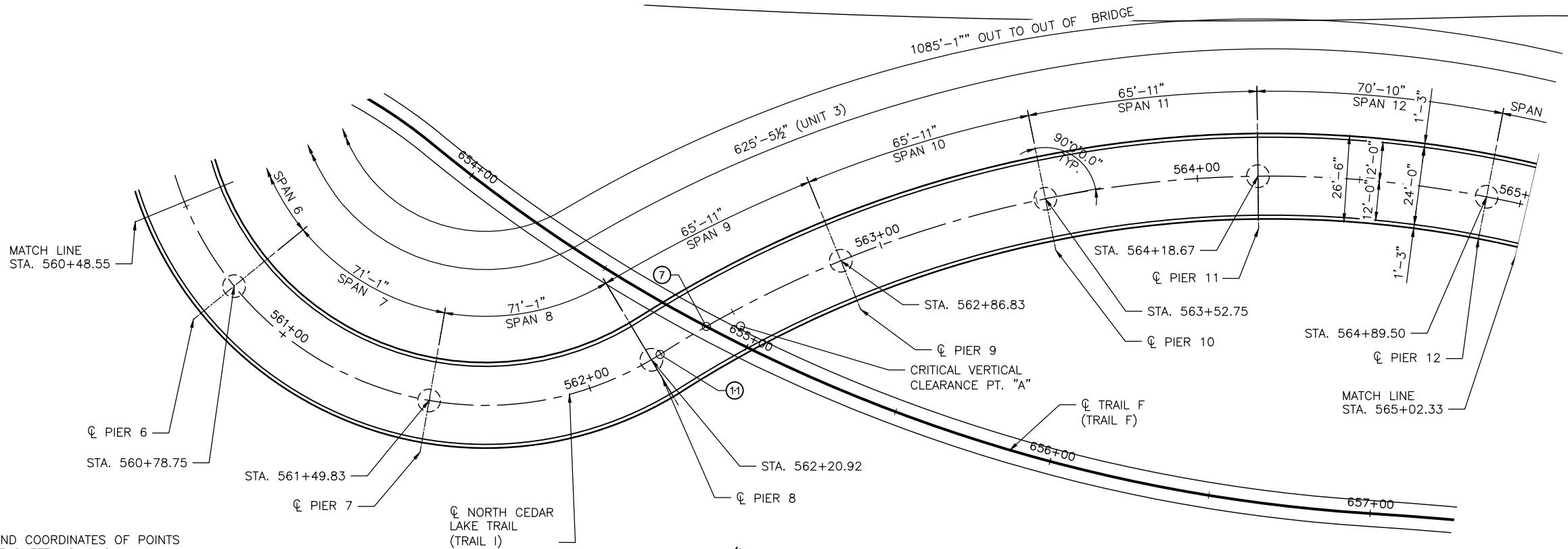
EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
GENERAL PLAN AND ELEVATION (2 OF 4)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E4-STU-BRG-NCDL-TRL-GPE-003**

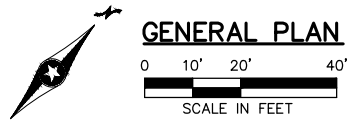
SHEET
142
OF
274

Aug. 26 2014 01:12 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-NCDL-TRL-GPE-004.dwg By: Katie.Ellis

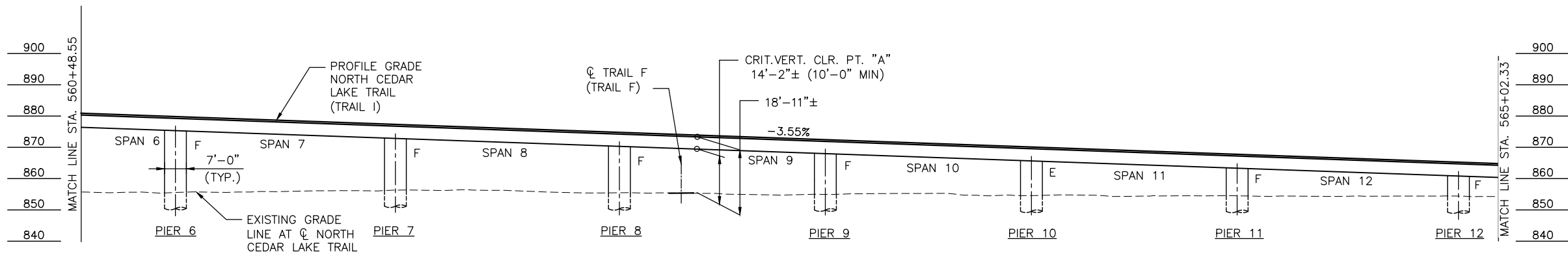


NOTES:

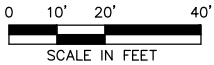
- FOR STATION AND COORDINATES OF POINTS ⑦ AND ⑪, SEE SHEET NO. 140.
- SUBSTRUCTURES SET TO FOLLOWING AZIMUTHS:
PIER 6 AZ=8°46'35.1"
PIER 7 AZ=148°2'55.8"
PIER 8 AZ=107°19'16.5"
PIER 9 AZ=115°48'53.6"
PIER 10 AZ=126°36'20.2"
PIER 11 AZ=137°23'47.0"
PIER 12 AZ=148°59'30.9"
- SEE BORINGS SURVEY SHEET FOR IN PLACE UTILITIES.



GENERAL PLAN



GENERAL ELEVATION



DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
GENERAL PLAN AND ELEVATION (3 OF 4)

DISCIPLINE: **STRUCTURES**

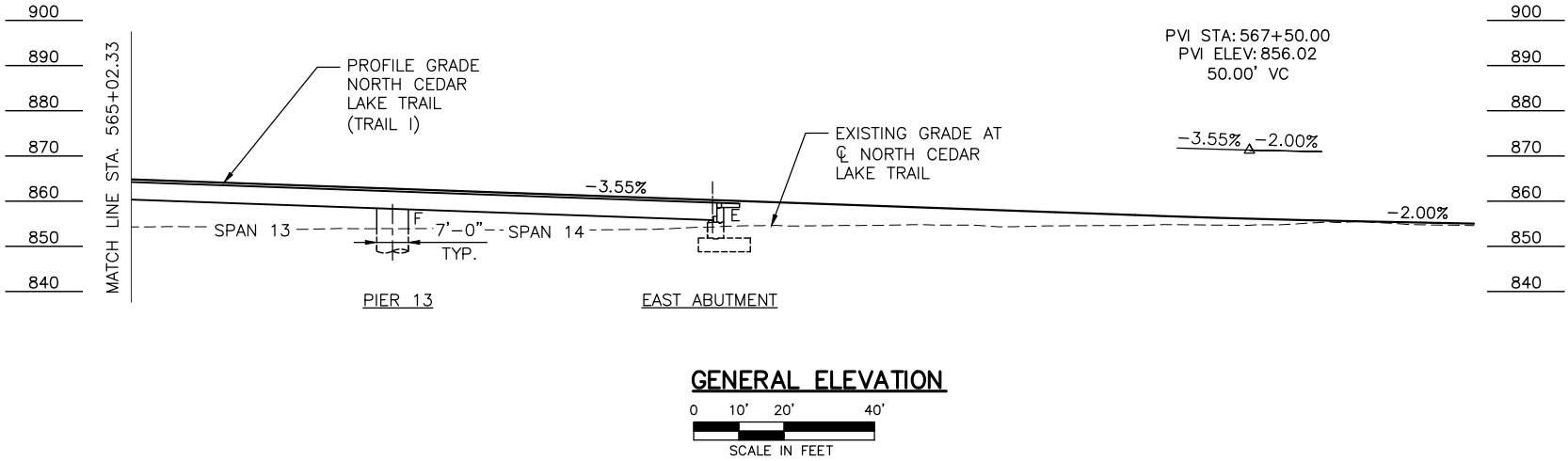
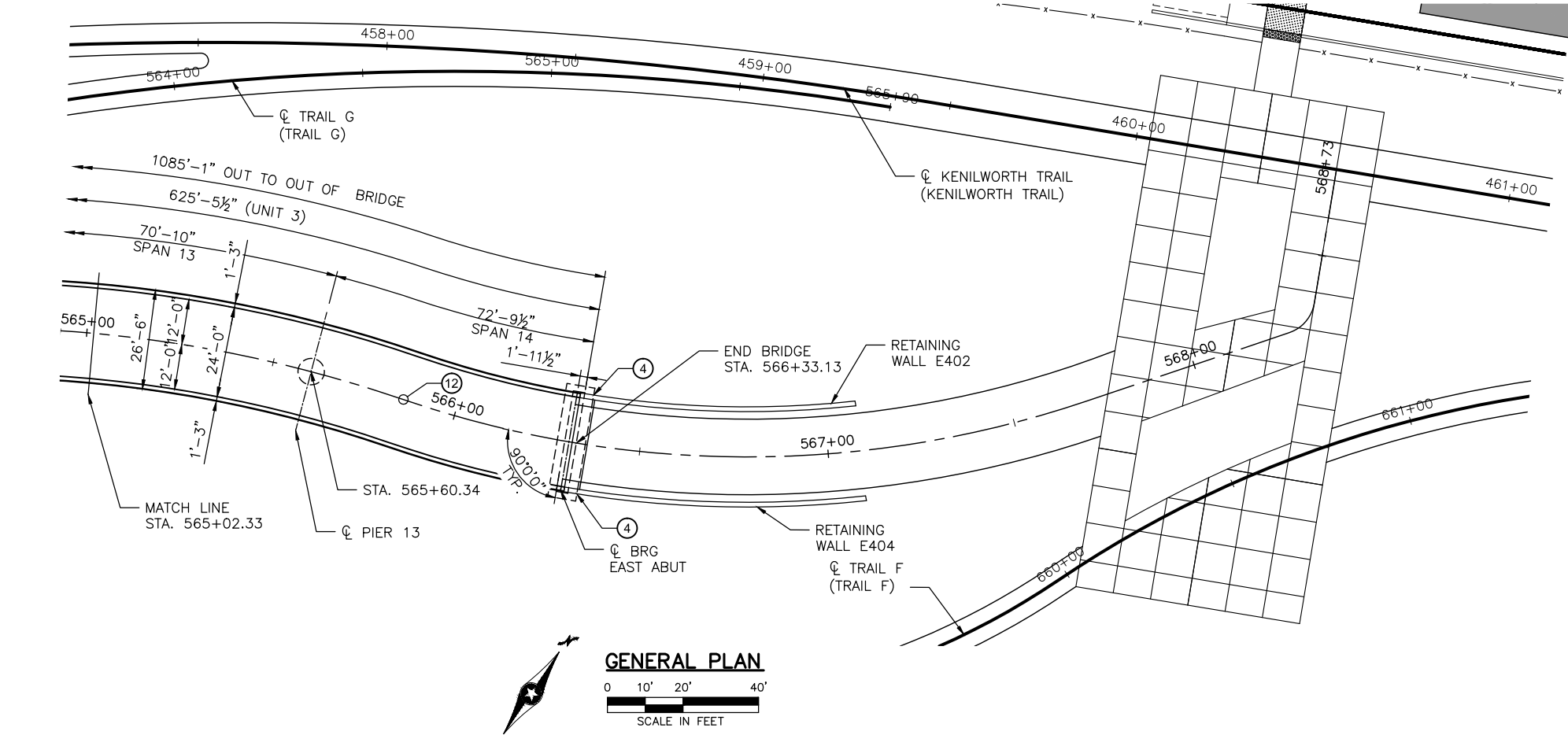
SHEET NAME: **E4-STU-BRG-NCDL-TRL-GPE-004**

SHEET
143
OF
274

Aug. 26 2014 01:14 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-NCDL-TRL-GPE-005.dwg By: KatieEllis

NOTES:

- FOR STATION AND COORDINATES OF POINT 12 SEE SHEET 140.
- SUBSTRUCTURES SET TO FOLLOWING AZIMUTHS:
PIER 13 AZ=160°33'8.9"
E. ABUT AZ=155°29'35.9"
- SEE BORINGS SURVEY SHEET FOR IN PLACE UTILITIES.
- END OF BRIDGE SUBSTRUCTURE AND BEGINNING OF RETAINING WALL TO BE DETERMINED IN ADVANCED DESIGN



DES. EJT	DR. PHH
CHK. CPE	CHK. JPD

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

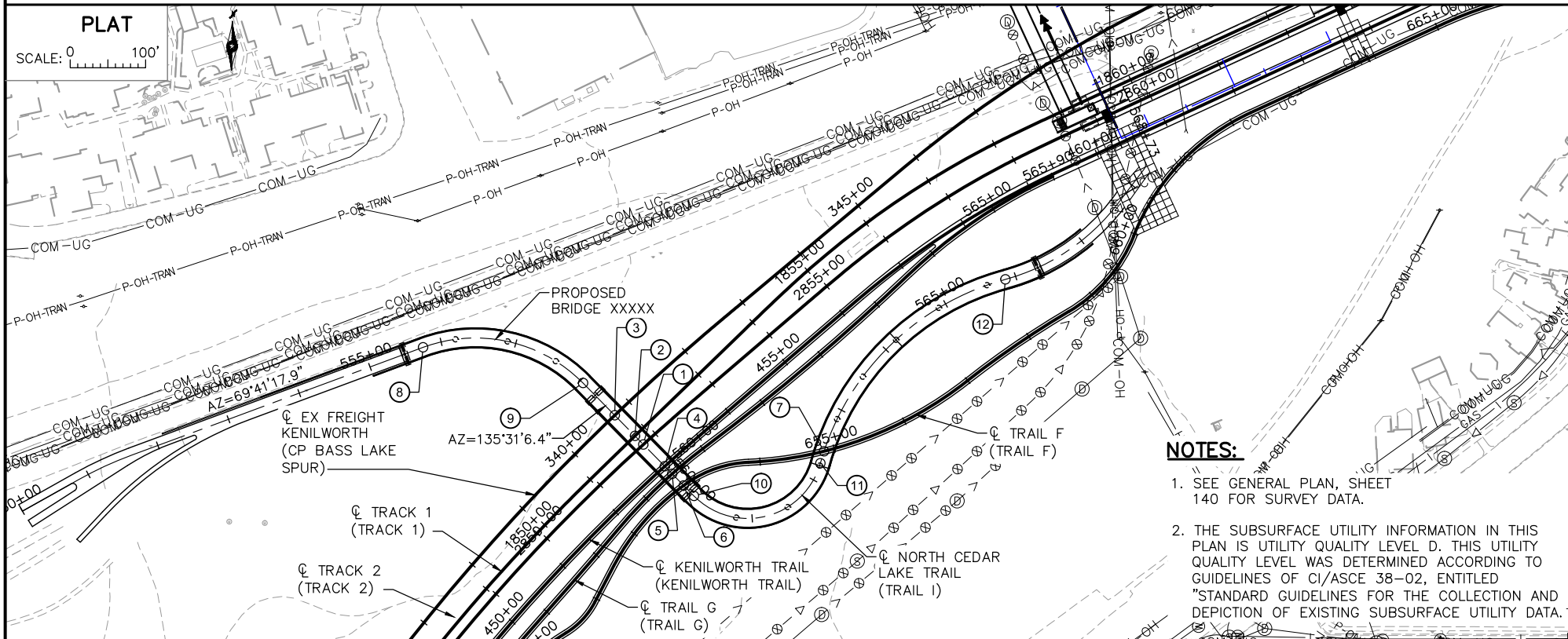
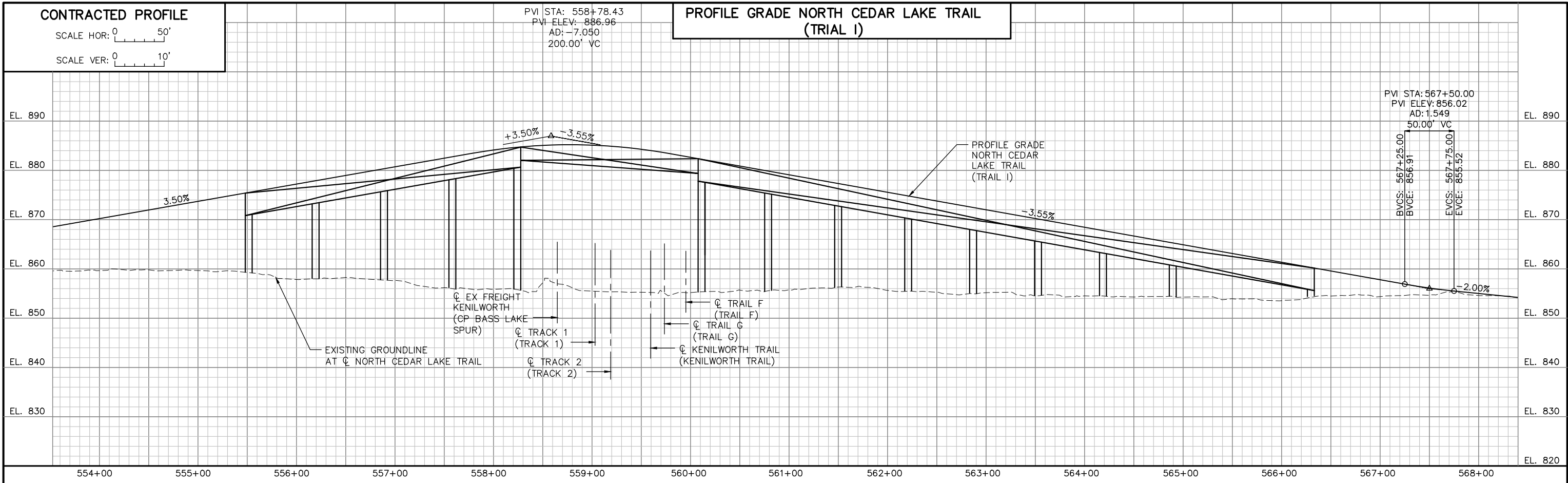


EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
GENERAL PLAN AND ELEVATION (4 OF 4)

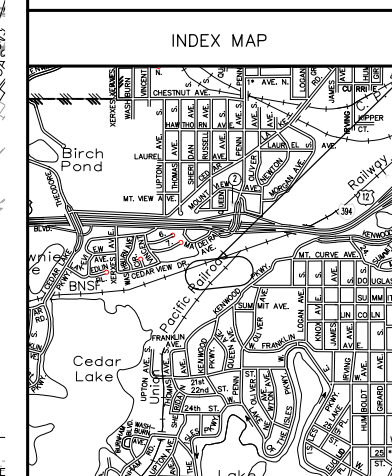
DISCIPLINE: STRUCTURES

SHEET NAME: E4-STU-BRG-NCDL-TRL-GPE-005

SHEET
144
OF
274



- NOTES:**
1. SEE GENERAL PLAN, SHEET 140 FOR SURVEY DATA.
 2. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF C/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."



PROPOSED
BRIDGE XXXXX

BRIDGE SURVEY

PROPOSED BRIDGE LOCATED 0.2 MILES
SOUTH OF JCT. CSAH 2 AND I-394
IN MINNEAPOLIS

NORTH CEDAR LAKE TRAIL OVER CANADIAN PACIFIC
RAILWAY AND SOUTHWEST LRT

SEC 28 T 29N R 24W

CITY OF MINNEAPOLIS HENNEPIN COUNTY

BRIDGE XXXXX

[illegible]

Kimley»Horn

PRELIMINARY ENGINEERING



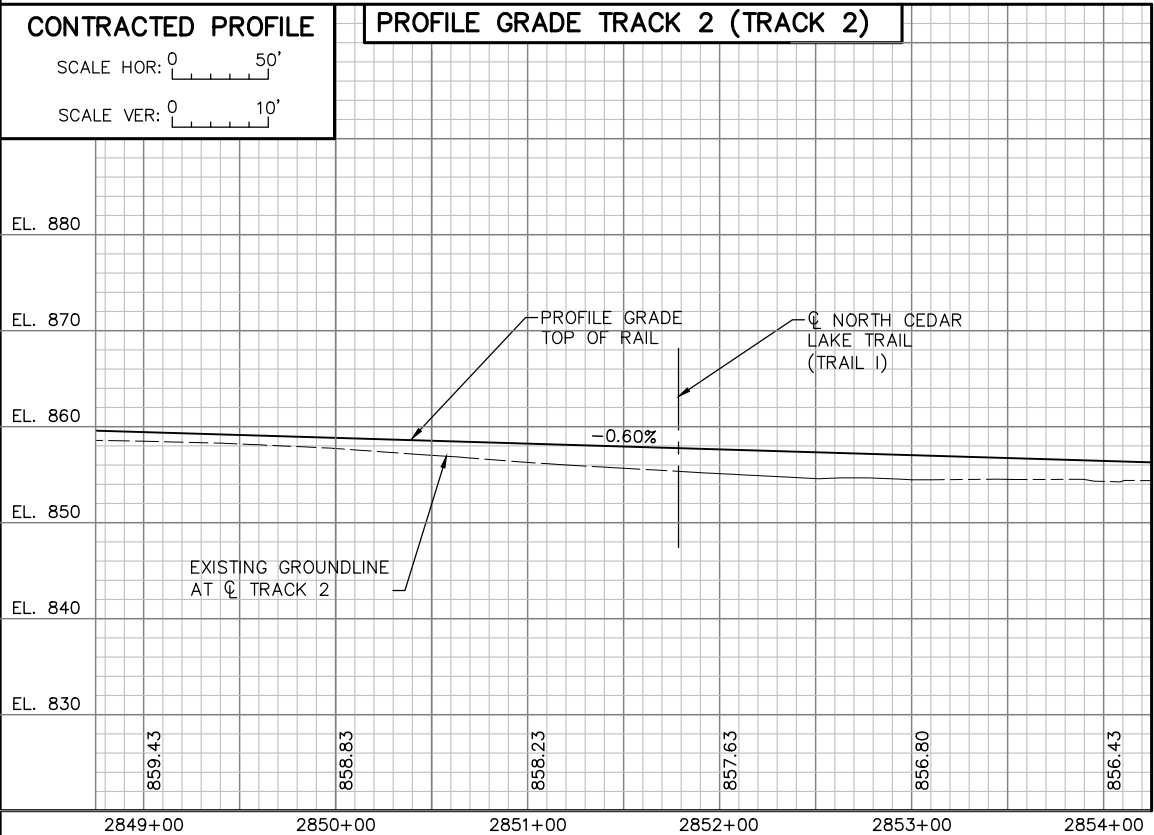
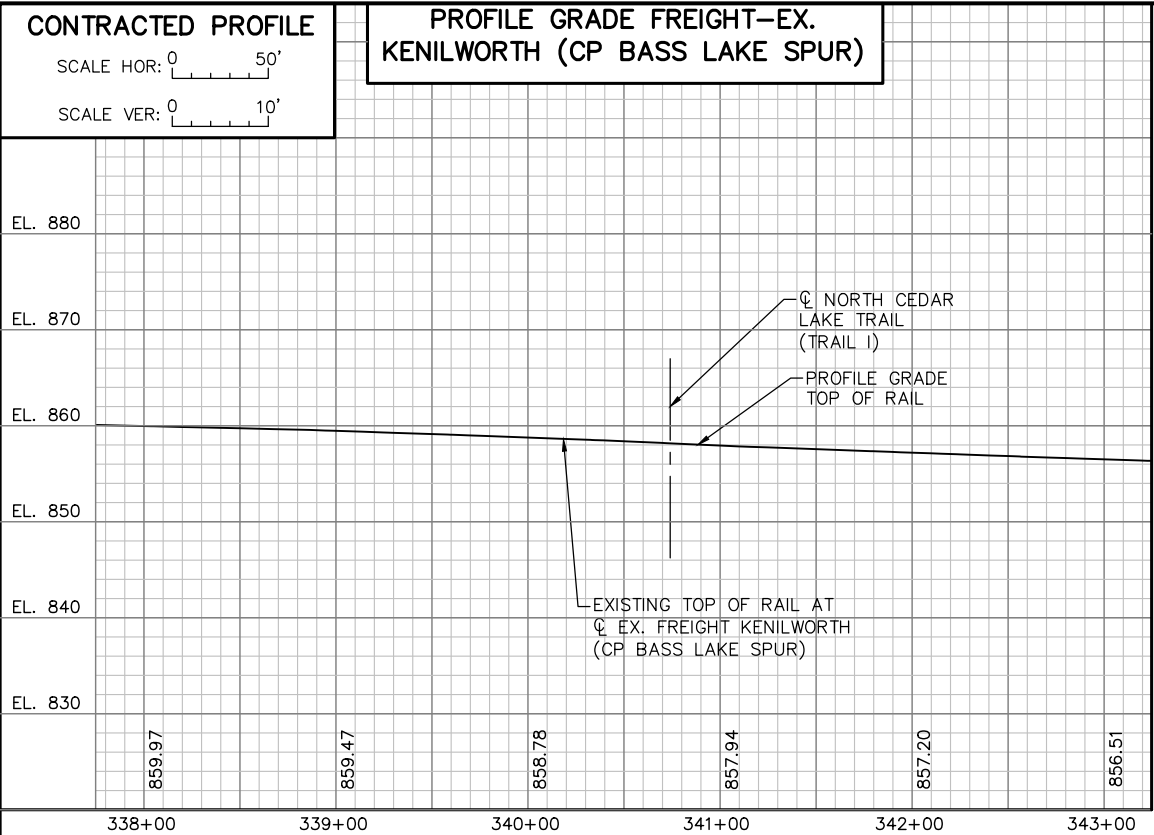
EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
BRIDGE SURVEY (1 OF 3)

DISCIPLINE: **STRUCTURES**

SHEET NAME:	E4-STU-BRG-NCDL-TRL-SUR-001
-------------	-----------------------------

SHEET
145
OF
274

Aug. 26 2014 01:19 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-NCDL-TRL-SUR-001.dwg By: Katie Ellis



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

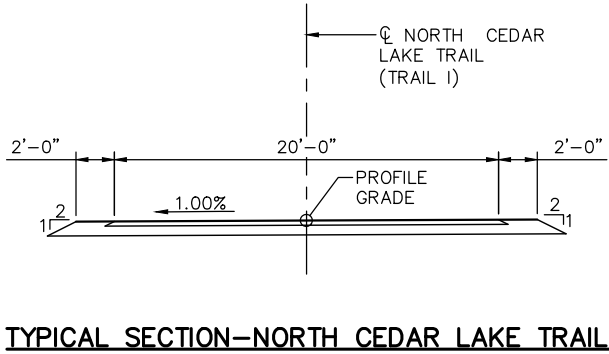
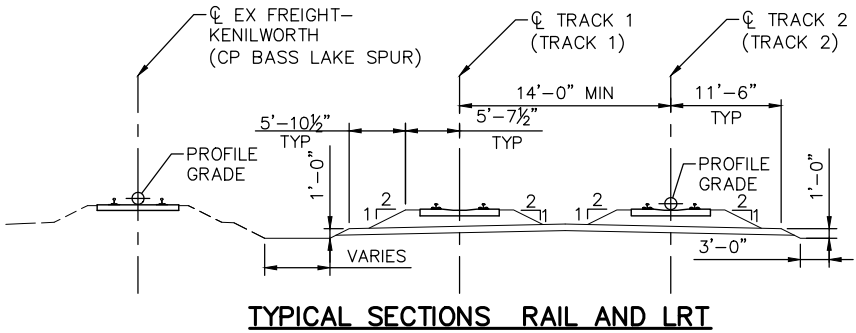


Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
BRIDGE SURVEY (2 OF 3)

DISCIPLINE: STRUCTURES
SHEET NAME: E4-STU-BRG-NCDL-TRL-SUR-002

SHEET
146
OF
274



LOCATION ENGINEER'S OBSERVATIONS
AT BRIDGE SITE

1. SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.

2. OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.

3. APPARENT HIGH WATER ELEVATION OBTAINED FROM:

4. OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

HYDRAULIC ENGINEER'S RECOMMENDATION

DATE:

STREAM OR DITCH DESIGNATION

DRAINAGE AREA

MAX FLOOD ON RECORD

DESIGN FLOOD (YR. FREQ.): C.F.S.

HEADWATER ELEVATION: FT.

DESIGN MEAN VELOCITY THROUGH STRUCTURE F.P.S.

TOTAL STAGE INCREASE FT.

LOW MEMBER AT OR ABOVE ELEVATION FT.

WATERWAY AREA REQUIRED BELOW ELEV. = SQ. FT.

AT RIGHT ANGLES TO CHANNEL

BASIC FLOOD (100 YR. FREQ.) C.F.S.

HEADWATER ELEVATION: FT.

TOTAL STAGE INCREASE FT.

MEAN VELOCITY THROUGH STRUCTURE

FLOWLINE ELEVATION: FT. SKEW ANGLE:

ESTIMATED PRILIMINARY TOTAL SCOUR AT PIER EL. (500 OR OT YR. FREQ.)

SCOUR CONFIRMATION RECOMMENDATION

DATE:

TOTAL SCOUR AT PIER EL. (500 OR OT YR. FREQ.)

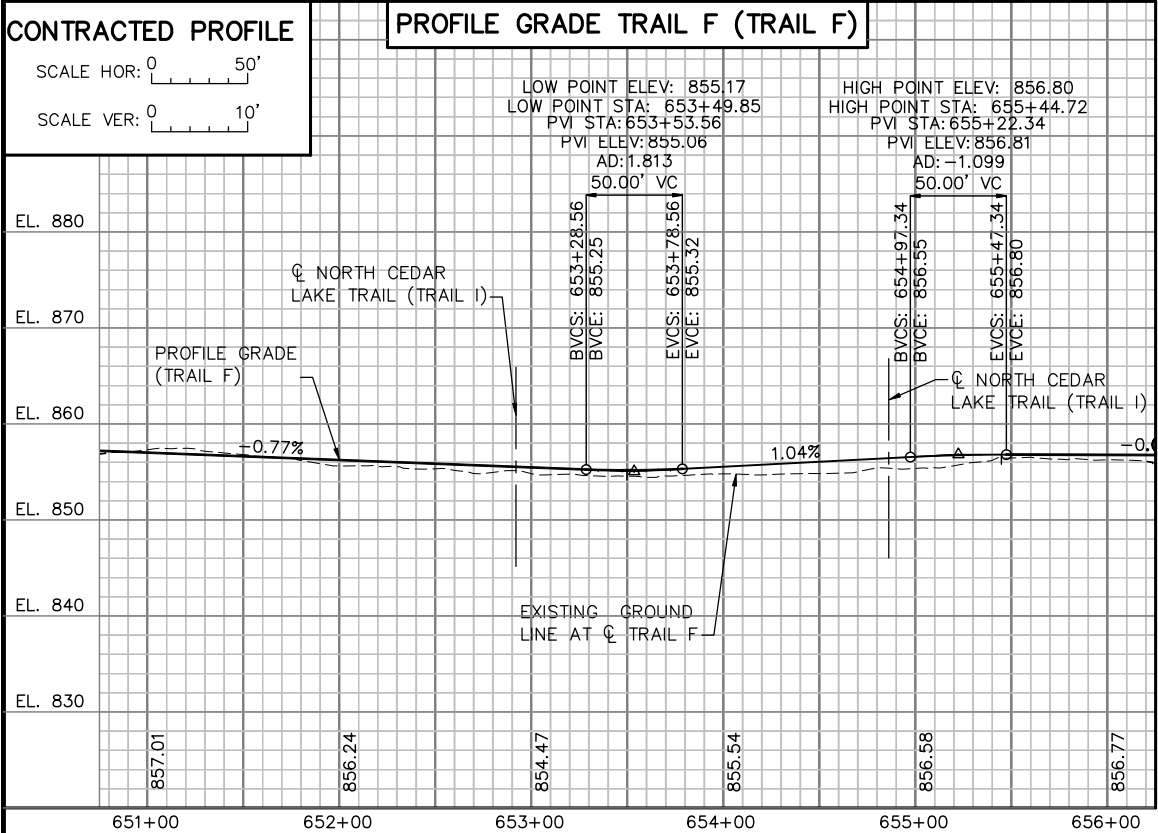
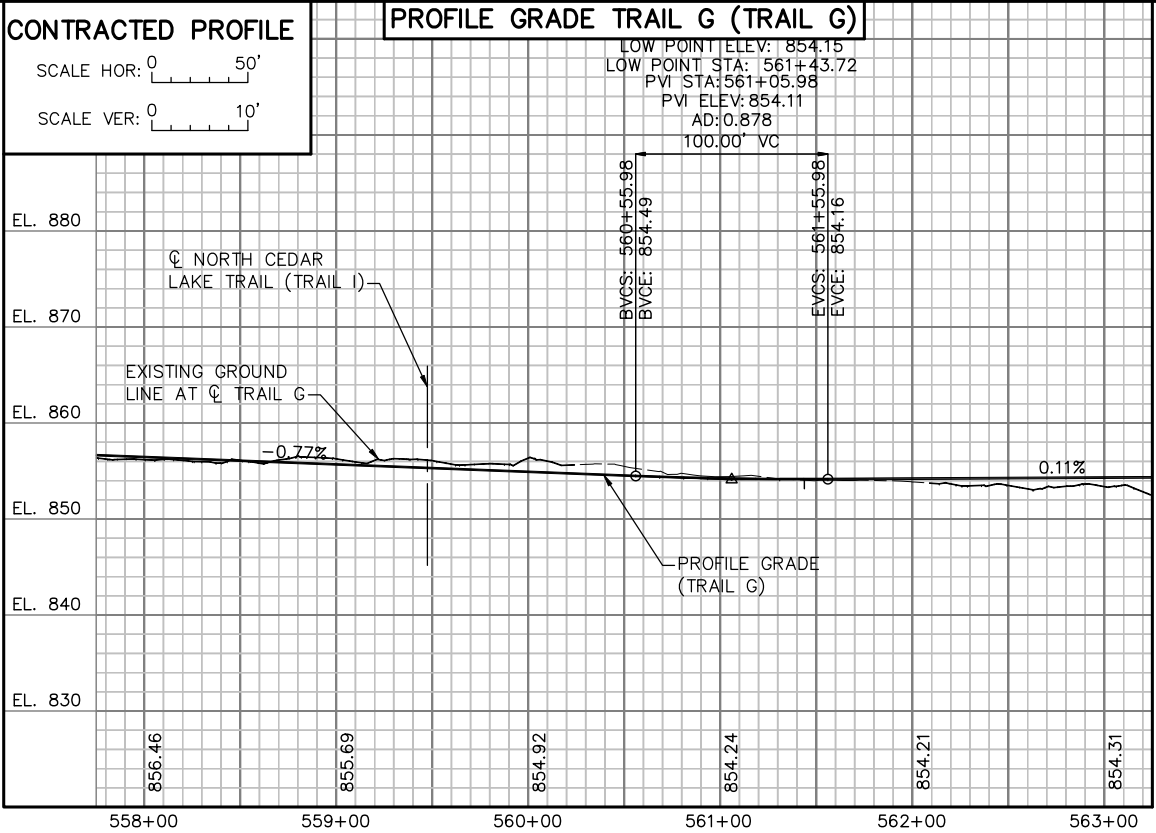
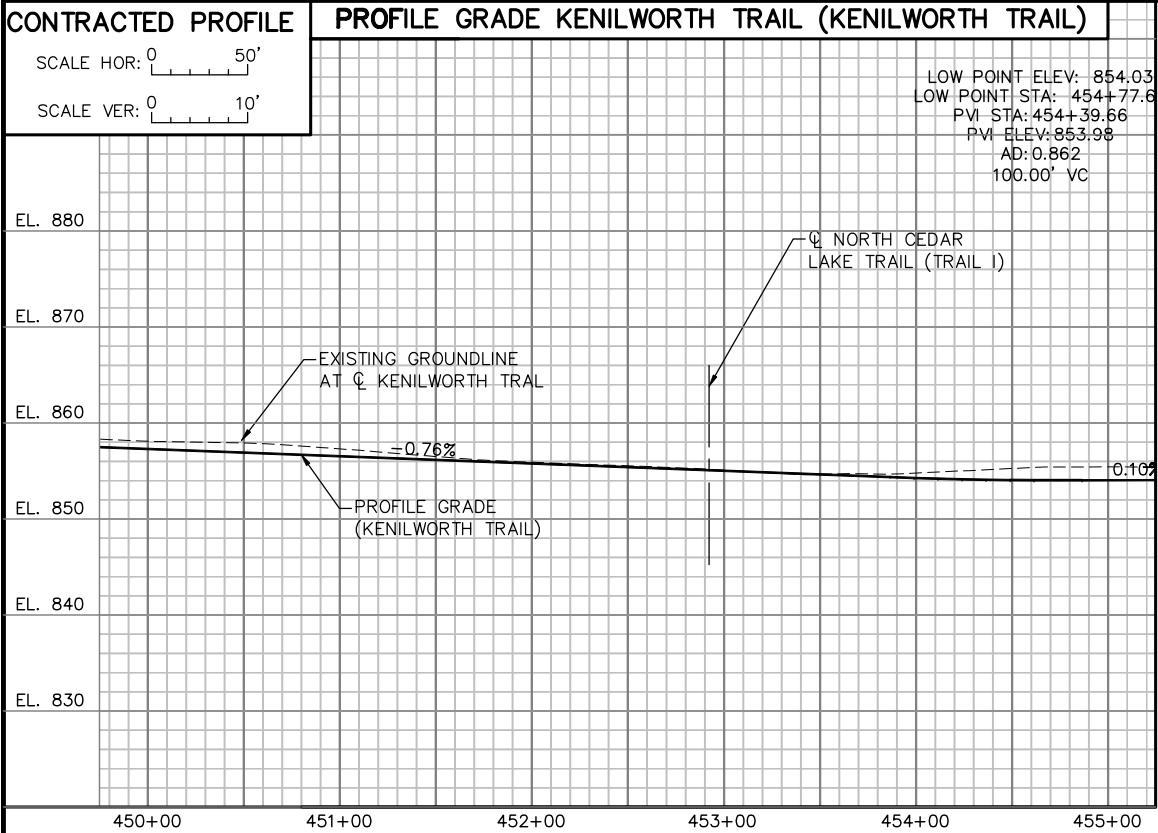
SCOUR CODE: OBTAIN FROM HYDRAULIC ENGINEER

BRIDGE SURVEY SHEETS MADE FROM 2014 MFRA SURVEYS

1ST BENCH MARK
ELEVATION: 856.58
NORTHING: 164153.67
EASTING: 518695.30
DESCRIPTION: 1/2" PIPE WITH CAP

2ND BENCH MARK
ELEVATION: 853.64
NORTHING: 164593.72
EASTING: 519411.98
DESCRIPTION: MAG NAIL IN BIT. PATH

Aug. 26 2014 02:02 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-NCDL-TRL-SUR-001.dwg By: hope.wedge



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

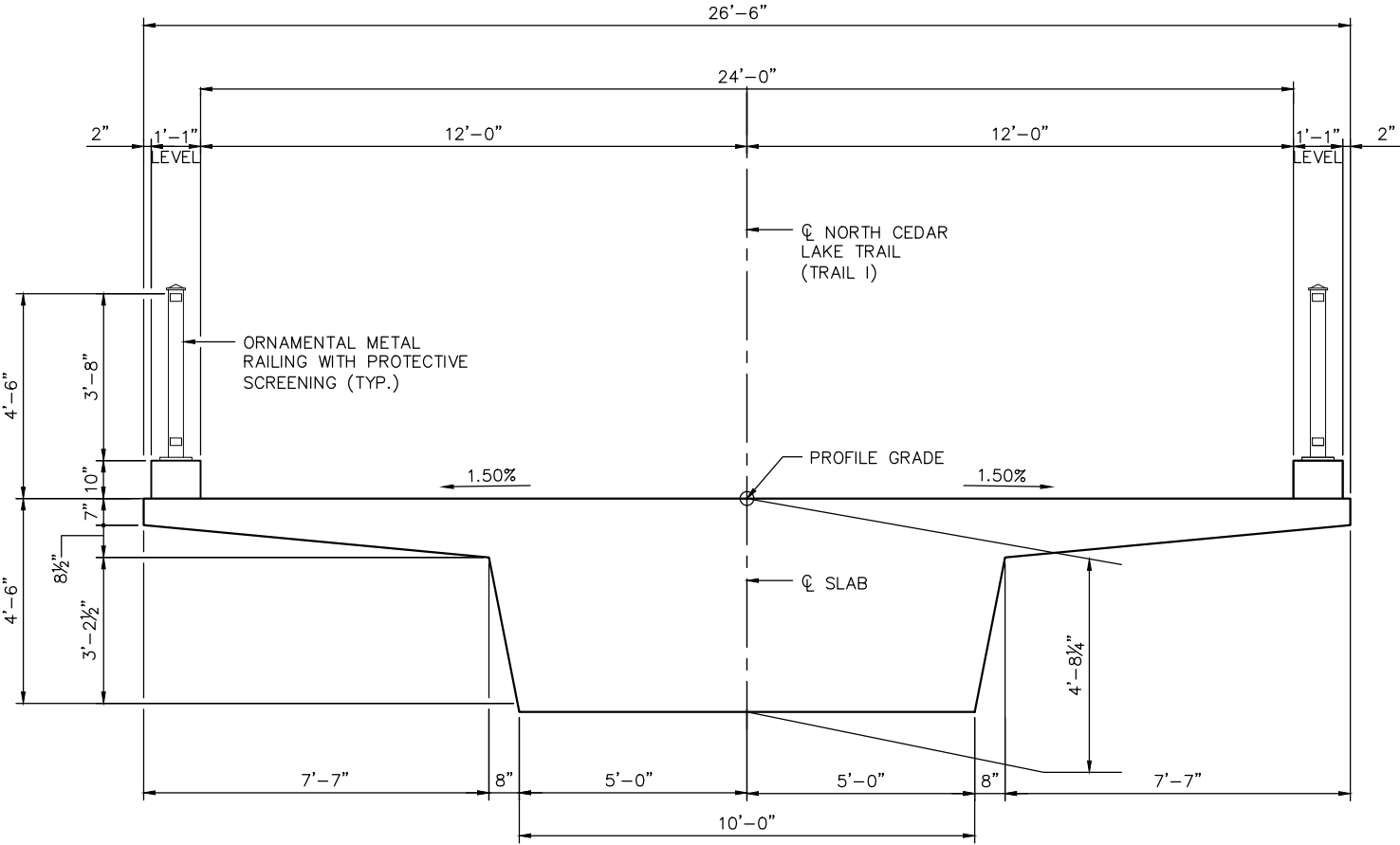
EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
BRIDGE SURVEY (3 OF 3)

DISCIPLINE: STRUCTURES
SHEET NAME: E4-STU-BRG-NCDL-TRL-SUR-003

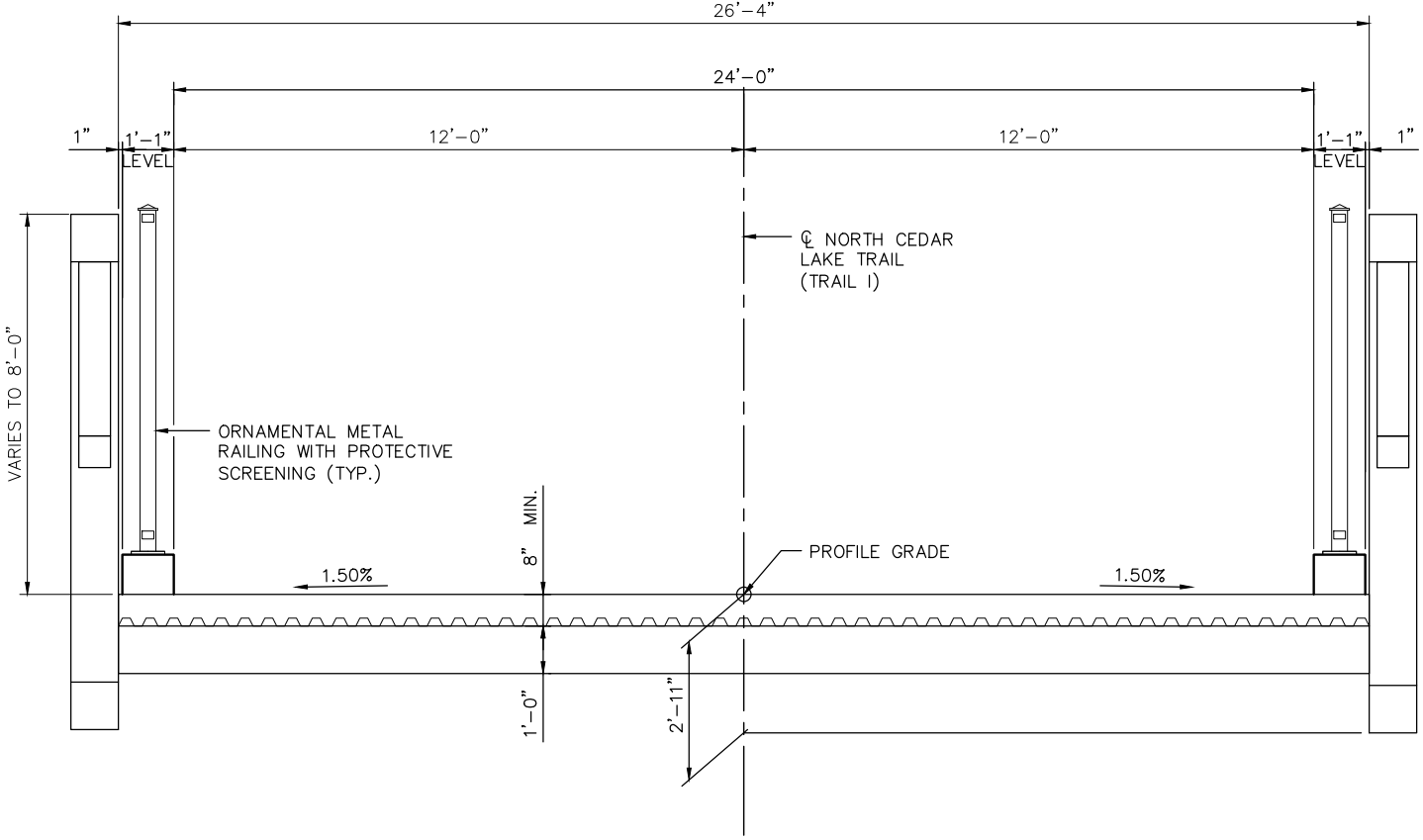
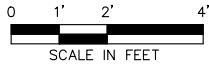
SHEET

147
OF
274

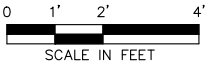
Aug. 26 2014 01:20 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-NCDL-TRL-SUP.dwg By: Katie.Ellis



TRANSVERSE SECTION - APPROACH SPANS



TRANSVERSE SECTION - MAIN SPAN



DES. EJP	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



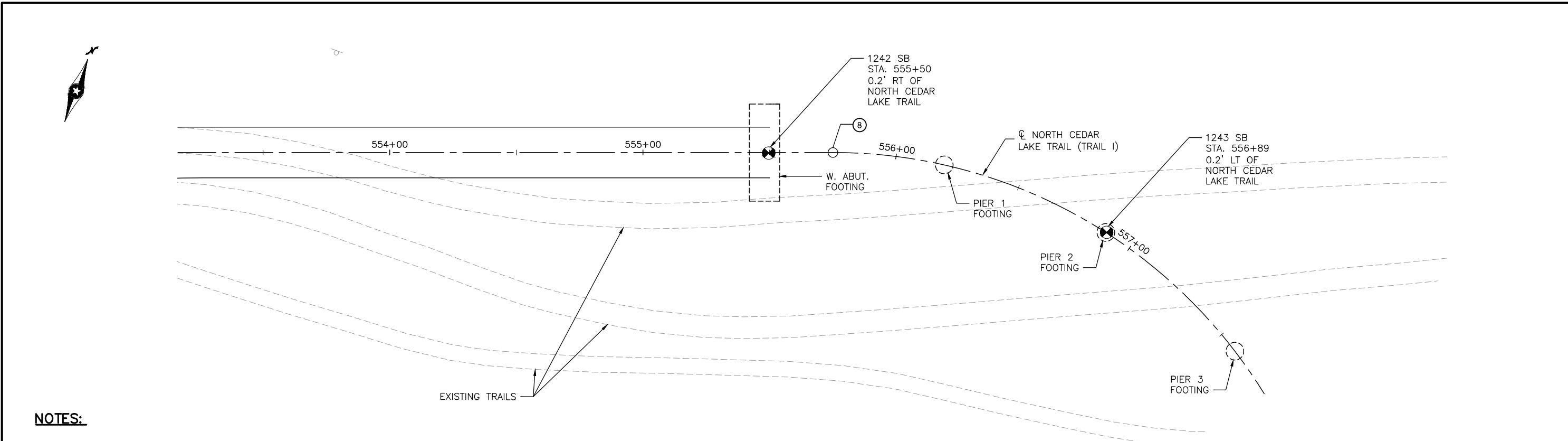
EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
TRANSVERSE SECTION

DISCIPLINE: STRUCTURES

SHEET NAME: E4-STU-BRG-NCDL-TRL-SUP

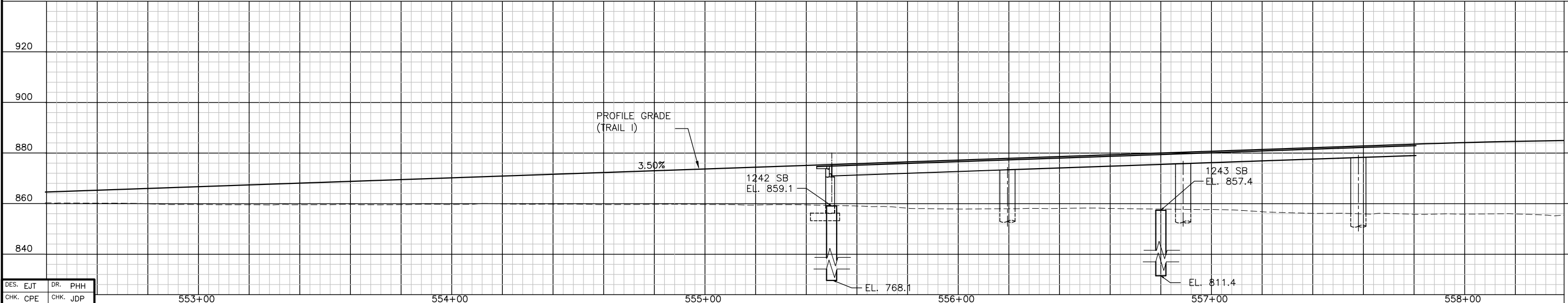
SHEET
148
OF
274

Aug. 26 2014 01:21 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-NCDL-TRL-SUR-002.dwg By: KateEllis



NOTES:

- 1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
- 2. BORINGS ON HCCRA PROPERTY FOR THE EAST HALF OF THE BRIDGE WILL BE OBTAINED AFTER MUNICIPAL CONSENT AND DURING ADVANCED DESIGN.
- 3. FOR P.C., P.T., AND P.R.C. COORDINATES SEE GENERAL PLAN, SHEET 140.




NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



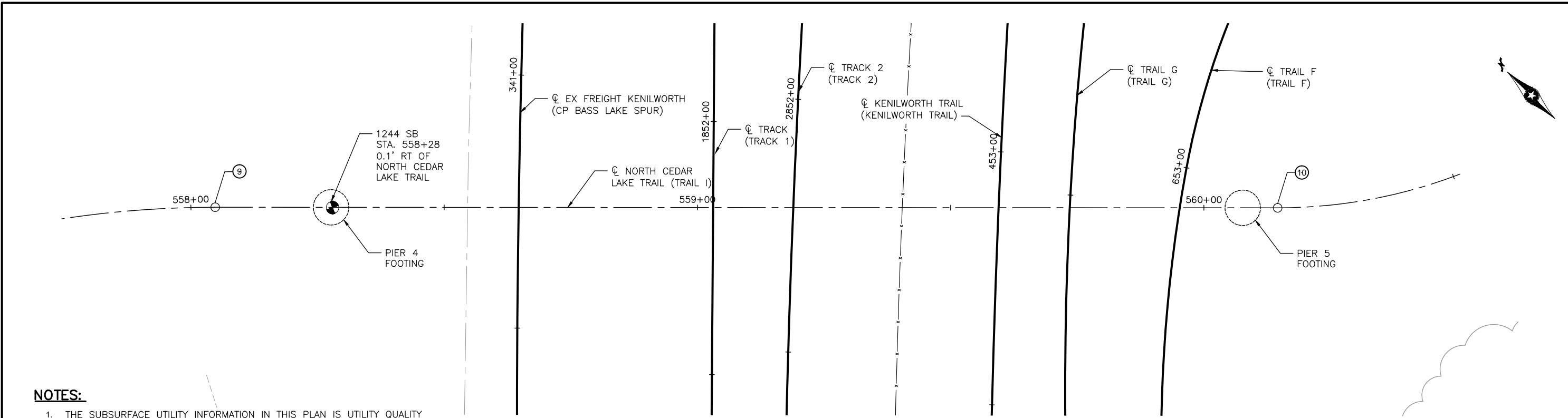
EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
BORINGS (1 OF 7)

DISCIPLINE: STRUCTURES

SHEET NAME:
E4-STU-BRG-NCDL-TRL-BOR-001

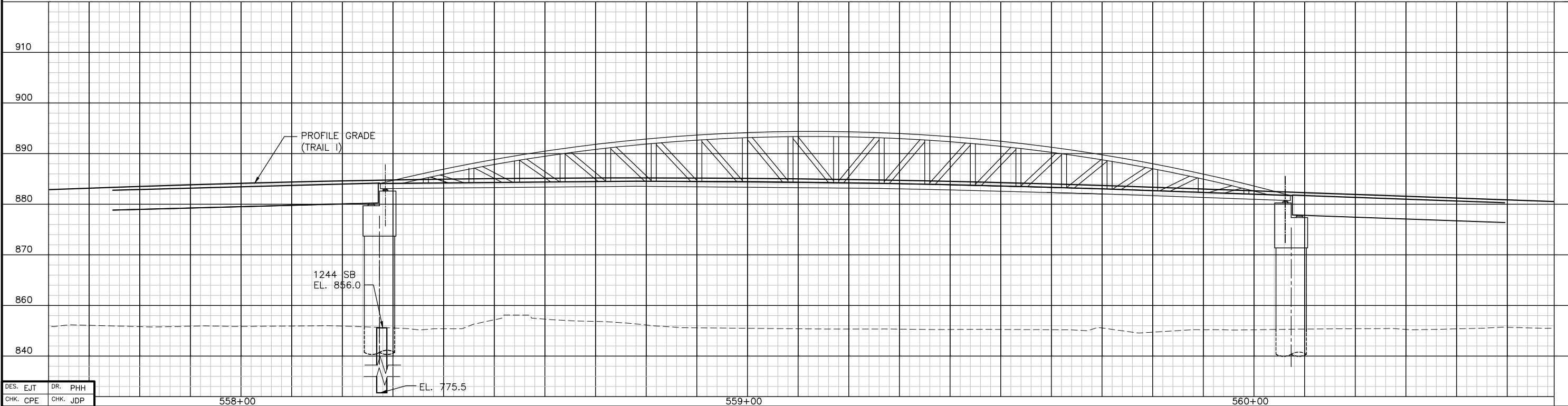
SHEET
149
OF
274

Aug. 26 2014 01:22 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-NCDL-TRL-SUR-003.dwg By: Katie Ellis



NOTES:

1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
2. BORINGS ON HCCRA PROPERTY FOR THE EAST HALF OF THE BRIDGE TO BE OBTAINED AFTER MUNICIPAL CONSENT AND DURING ADVANCED DESIGN.
3. FOR P.C., P.T., AND P.R.C. COORDINATES SEE GENERAL PLAN, SHEET 140.



DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING

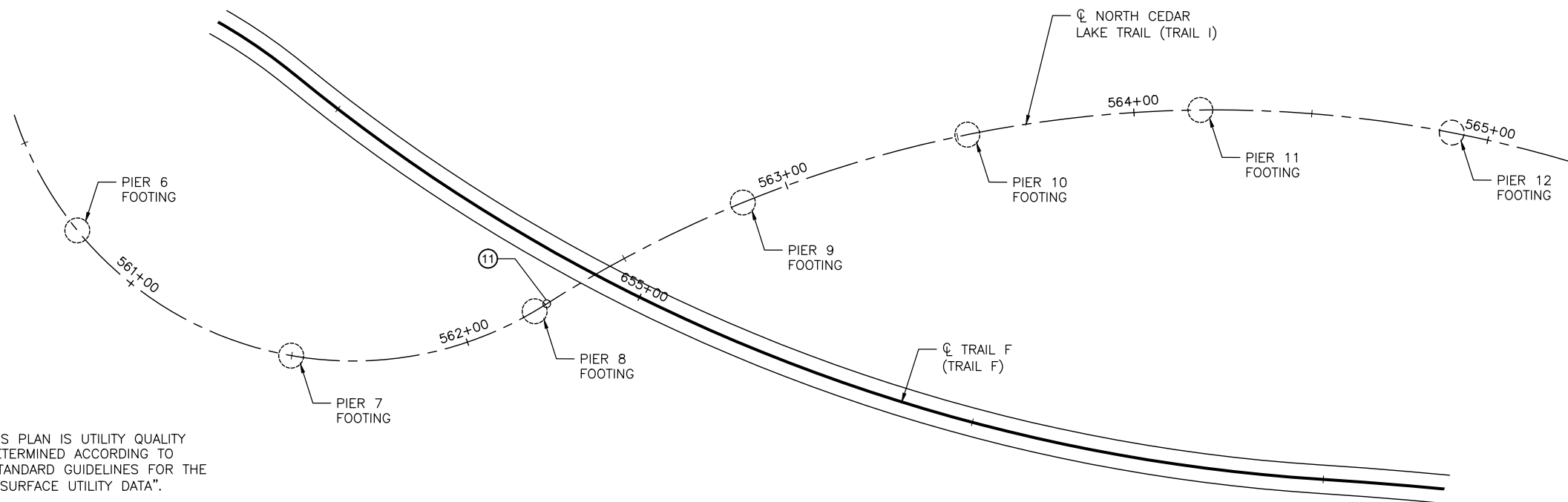


EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
BORINGS (2 OF 7)

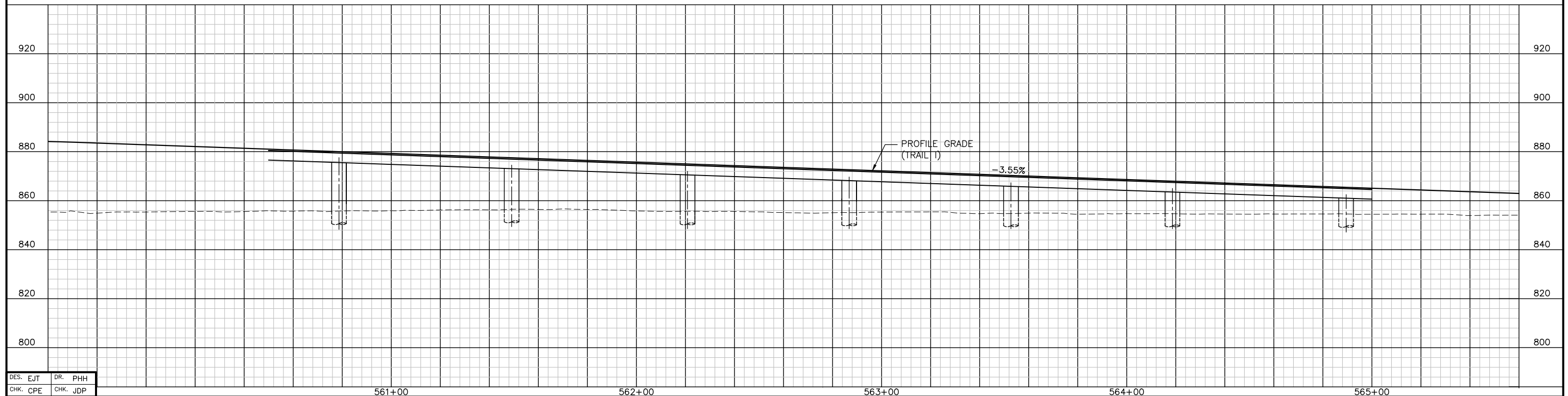
DISCIPLINE: STRUCTURES

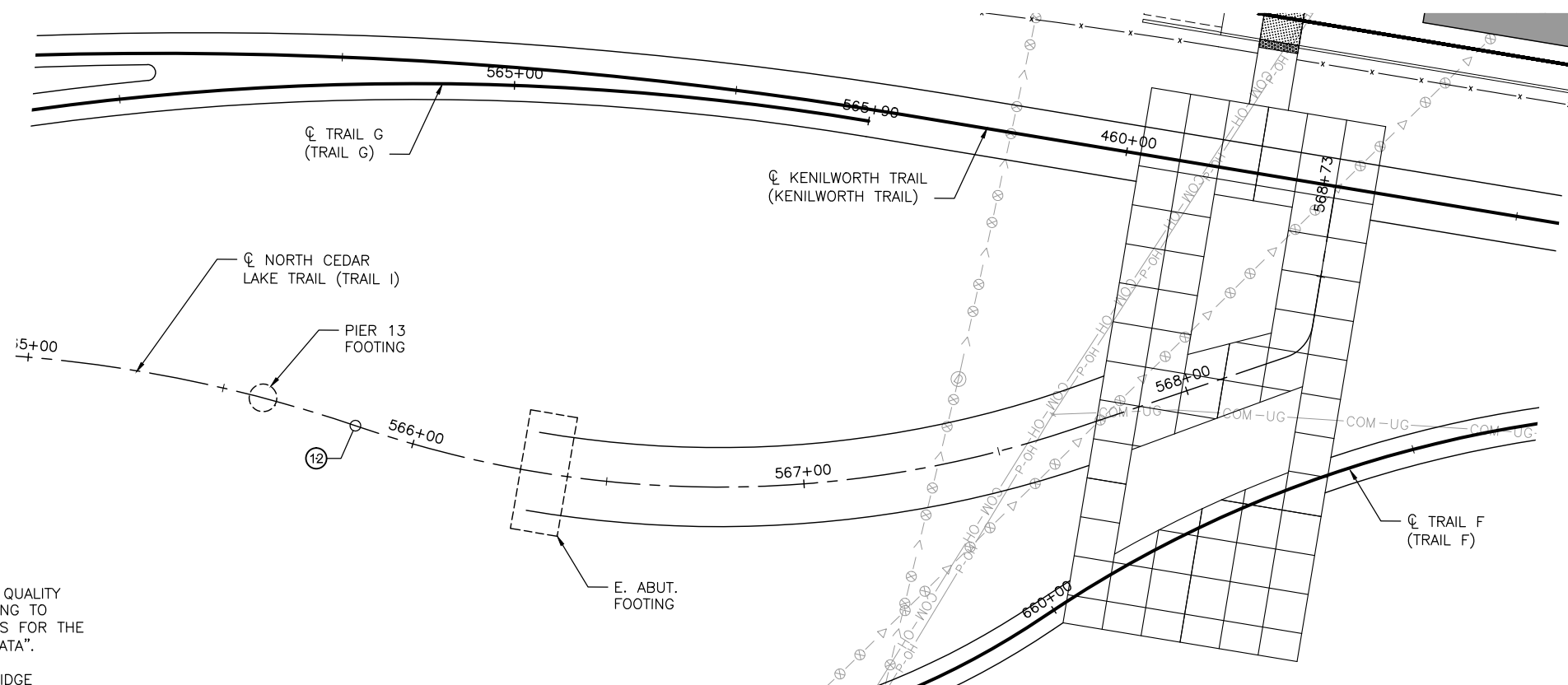
SHEET NAME: E4-STU-BRG-NCDL-TRL-BOR-002

SHEET
150
OF
274

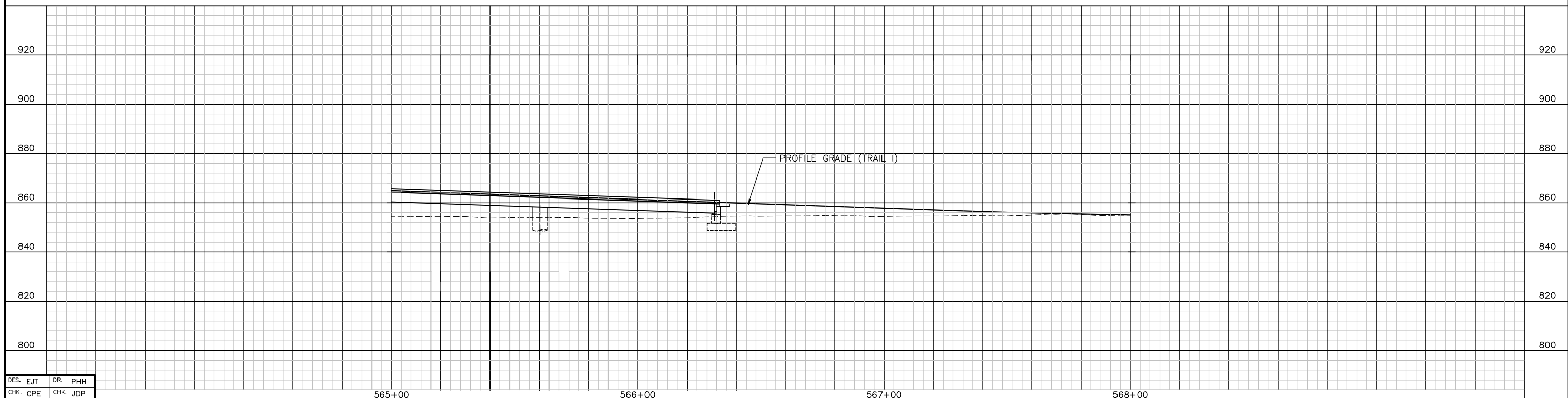


1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
2. BORINGS ON HCCRA PROPERTY FOR THE EAST HALF OF THE BRIDGE WILL BE OBTAINED AFTER MUNICIPAL CONSENT AND DURING ADVANCED DESIGN.
3. FOR P.C., P.T., AND P.R.C. COORDINATES SEE GENERAL PLAN, SHEET 140.

[illegible]



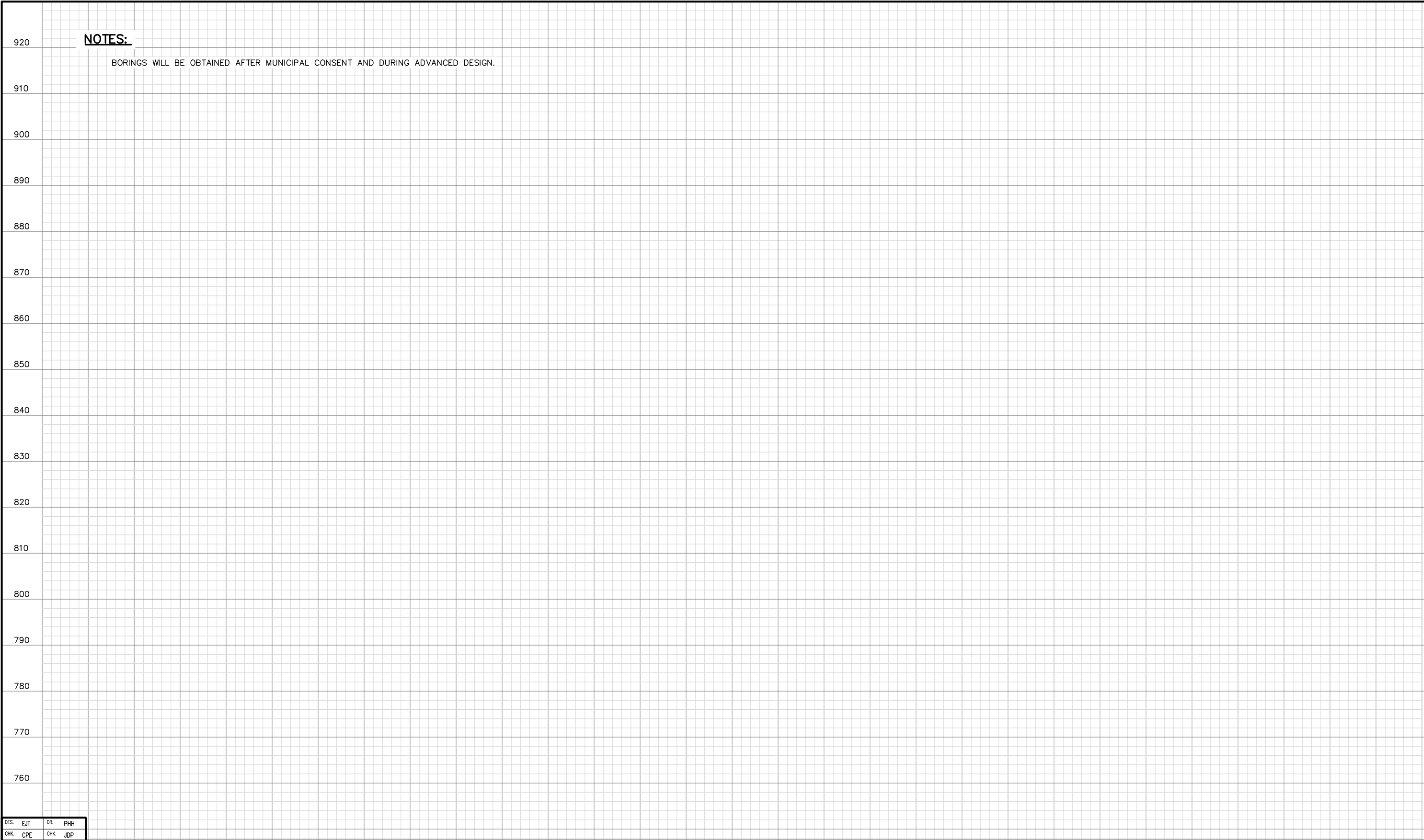
1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
2. BORINGS ON HCCRA PROPERTY FOR THE EAST HALF OF THE BRIDGE TO BE OBTAINED AFTER MUNICIPAL CONSENT AND DURING ADVANCED DESIGN.
3. FOR COORDINATES OF P.C., P.T., AND P.R.C., SEE GENERAL PLAN, SHEET 140.

[illegible]

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

SHEET
153
OF
274

Aug. 26 2014 01:25 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-NDCL-TRL-BOR-006.dwg By: Katie Ellis



DES. EJT DR. PHH					
CHK. CPE CHK. JDP					
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



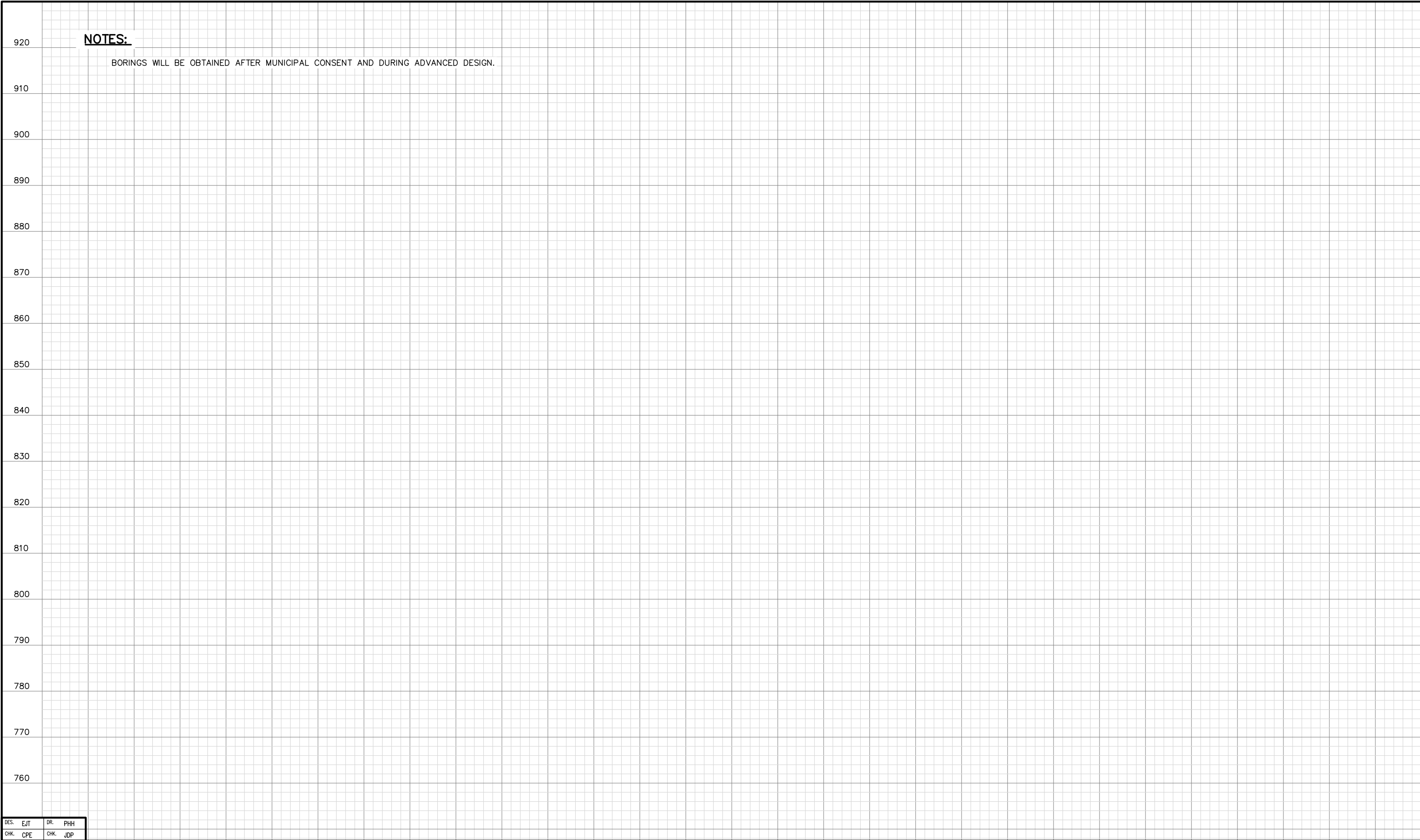
EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
BORINGS (6 OF 7)

DISCIPLINE: **STRUCTURES**

SHEET NAME:
E4-STU-BRG-NDCL-TRL-BOR-006

SHEET
154
OF
274

Aug. 26 2014 01:25 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-NDCL-TRL-BOR-007.dwg By: Katie Ellis



<div>DES. EJT DR. PHH</div> <div>CHK. CPE CHK. JDP</div>						<div>Kimley»Horn</div> <div>PRELIMINARY ENGINEERING</div>	<div><div><div>METROPOLITAN COUNCIL</div></div><div><div>SOUTHWEST Green Line LRT Extension</div></div></div>	<div>EAST - VOLUME 2 (STRUCTURES) NORTH CEDAR LAKE TRAIL BRIDGE XXXXX (TRL) BORINGS (7 OF 7)</div> <div>DISCIPLINE: STRUCTURES</div>	<div>SHEET NAME: E4-STU-BRG-NDCL-TRL-BOR-007</div>	<div>SHEET 155 OF 274</div>
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL					

Aug. 26 2014 01:25 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-NCDL-TRL-AES.dwg By: Katie.Ellis

DES. EJT	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)
NORTH CEDAR LAKE TRAIL
BRIDGE XXXXX (TRL)
AESTHETICS

DISCIPLINE: STRUCTURES

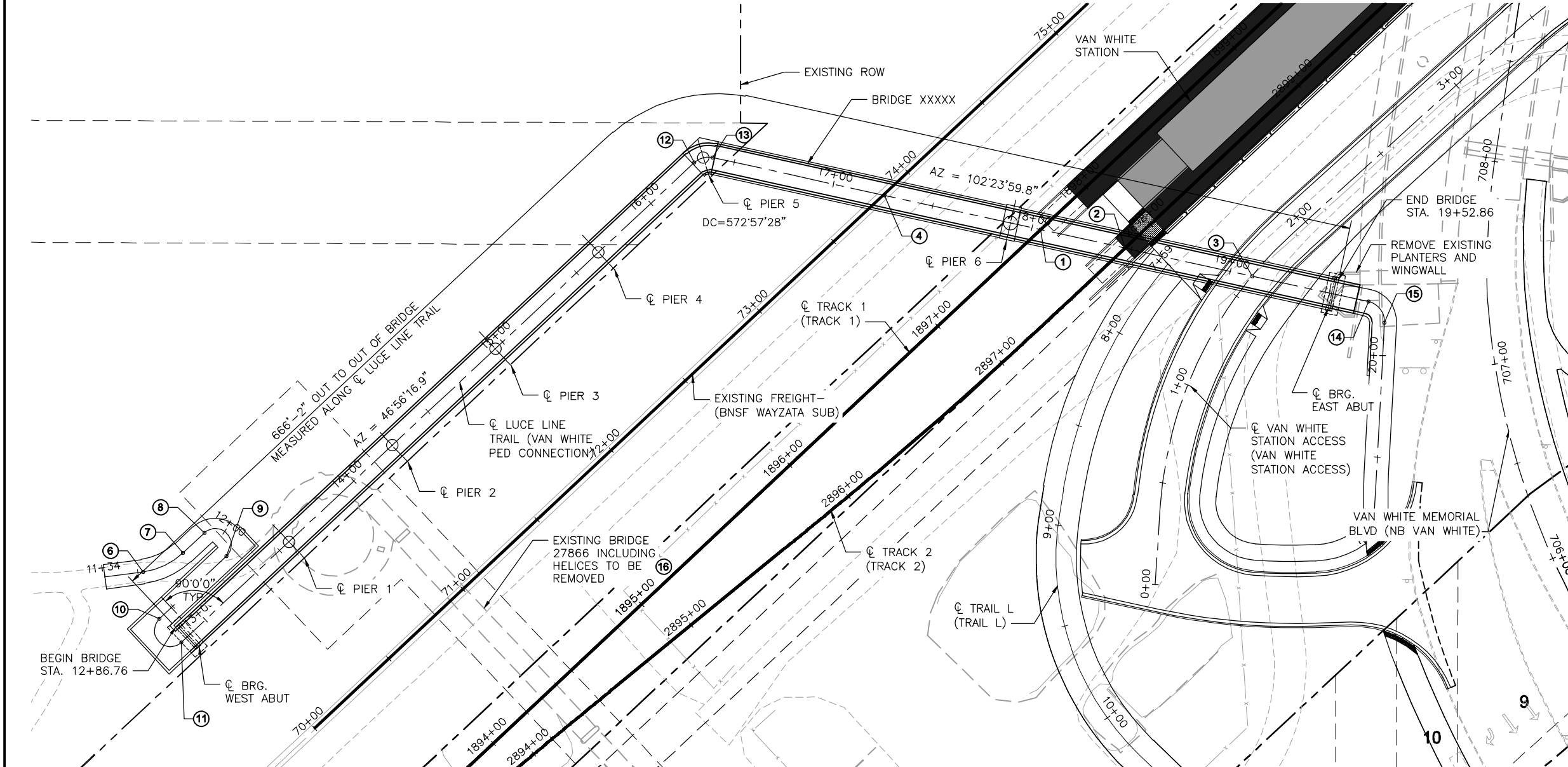
SHEET NAME: E4-STU-BRG-NCDL-TRL-AES

SHEET
156
OF
274

AESTHETIC DETAILS TO BE DETERMINED DURING ADVANCED DESIGN

- 1. ABUTMENT SURFACE
- 2. ABUTMENT/WALL CORNER DETAIL
- 3. EXPOSED EDGE OF DECK
- 4. EXPOSED BARRIER
- 5. TRUSS CONFIGURATION
- 6. BOTTOM OF BEAMS
- 7. PIER COLUMN GEOMETRY AND SURFACE
- 8. RAILING AND SCREENING

Aug. 28 2014 10:21 am V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-VNWHIT-TRL-GPE-001.dwg By: Katie.Ellis



- ① CL LUCE LINE TRAIL BRIDGE (VAN WHITE PED CONNECTION) STA. 18+04.41
CL TRACK 1 (TRACK 1) STA. 1897+69.35
X=522521.564
Y=166687.309
- ② CONTROL POINT
CL LUCE LINE TRAIL BRIDGE (VAN WHITE PED CONNECTION) STA. 18+46.86
CL TRACK 2 (TRACK 2) STA. 2897+82.87
X=522563.065
Y=166678.197
- ③ CL LUCE LINE TRAIL BRIDGE (VAN WHITE PED CONNECTION) STA. 19+10.97
CL VAN WHITE STATION ACCESS (VAN WHITE STATION ACCESS) STA. 1+62.46
X=522625.679
Y=166664.437
- ④ CL LUCE LINE TRAIL BRIDGE (VAN WHITE PED CONNECTION) STA. 17+25.61
CL EXISTING FREIGHT (BNSF-WAYZATA SUB) STA. 73+83.51
X=522444.63
Y=166704.20

- ⑥ P.C. STA. 11+52.52
X=522079.694
Y=166518.997
- ⑦ P.T. STA. 11+74.73
X=522099.440
Y=166528.369
- ⑧ P.C. STA. 11+89.11
X=522109.947
Y=166538.188

- ⑨ P.T. STA. 12+13.98
X=522120.755
Y=166526.622
- ⑩ P.C. STA. 12+58.98
X=522087.875
Y=166495.895
- ⑪ P.T. STA. 12+83.85
X=522098.684
Y=166484.329
- ⑫ P.C. STA. 16+29.43
X=522351.172
Y=166720.289
- ⑬ P.T. STA. 16+39.11
X=522360.144
Y=166722.750

- ⑭ P.C. STA. 19+69.63
X=522682.983
Y=166651.868
- ⑮ P.T. STA. 19+83.72
X=522690.823
Y=166641.559
- ⑯ THREE SPAN STEEL BEAM BRIDGE
WITH CONCRETE HELICES AT EACH
END TO BE REMOVED.

GENERAL PLAN

0 15 30 60
SCALE IN FEET

DESIGN DATA

2012 AND CURRENT INTERIM AASHTO LRFD
BRIDGE DESIGN SPECIFICATIONS

2009 AASHTO LRFD GUIDE SPECIFICATIONS FOR THE
DESIGN OF PEDESTRIAN BRIDGES

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA
(REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD

90 PSF PEDESTRIAN LIVE LOAD
H 10 MAINTENANCE VEHICLE LIVE LOAD

MATERIAL DESIGN PROPERTIES:
REINFORCED CONCRETE:
f_c = 4000 PSI n = 8
f_y = 60000 PSI REINFORCEMENT

STRUCTURAL STEEL:
f_y = 50000 PSI

DESIGN SPEED: OVER = 10 MPH

APPROXIMATE DECK AREA: 9660 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
157	GENERAL PLAN
158-159	GENERAL PLAN AND ELEVATION
160-162	BRIDGE SURVEY
163	TRANSVERSE SECTION
164-166	BORINGS
167	AESTHETICS

PROPOSED TYPE OF STRUCTURE

MAIN SPAN:
TWO SPAN - PREFABRICATED STEEL TRUSS -
SIMPLE SPAN

APPROACH SPANS:
FIVE SPAN - CAST-IN-PLACE CONCRETE
DECK GIRDER - CONTINUOUS SPANS

ALL BARS EPOXY COATED

SUBSTRUCTURE:
PARAPET ABUTMENTS SUPPORTED ON 12" CIP
CONCRETE PILES

SINGLE COLUMN PIERS SUPPORTED ON 72" OR 78"
DIA. CONCRETE DRILLED SHAFTS

FOUNDATION RECOMMENDATIONS TO BE FINALIZED IN
ADVANCED DESIGN

DEPTH OF MAIN SPAN STRUCTURE:
2'-3"± PROFILE GRADE TO LOW BRIDGE

DEPTH OF APPROACH STRUCTURE:
4'-9"± PROFILE GRADE TO LOW BRIDGE

AESTHETICS: LEVEL -

PRELIMINARY PLAN BRIDGE NO. XXXXX

LUCE LINE TRAIL BRIDGE OVER BNSF RAILWAY &
SOUTHWEST LRT 0.5 MI. SOUTHWEST OF JCT. OF I-94
& TH-394 IN MINNEAPOLIS

PREFABRICATED STEEL TRUSS MAIN SPANS WITH C.I.P.
CONCRETE DECK GIRDER APPROACH SPANS
12'-0" TRAIL
00'-00'-00.00" SKEW

BRIDGE I.D. NO. 302 (MAIN SPAN)
206 (APPROACH SPANS)

GENERAL PLAN

SEC 28 T 29N R 24W
CITY OF MINNEAPOLIS HENNEPIN COUNTY

APPROVED: _____ STATE BRIDGE ENGINEER _____ DATE _____

DES. KAE DR. PHH
CHK. CPE CHK. JDP
JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
LUCE LINE TRAIL
BRIDGE XXXXX (TRL)
GENERAL PLAN

DISCIPLINE: **STRUCTURES**

SHEET NAME:
E4-STU-BRG-VNWHIT-TRL-GPE-001

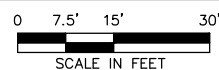
SHEET

157

OF

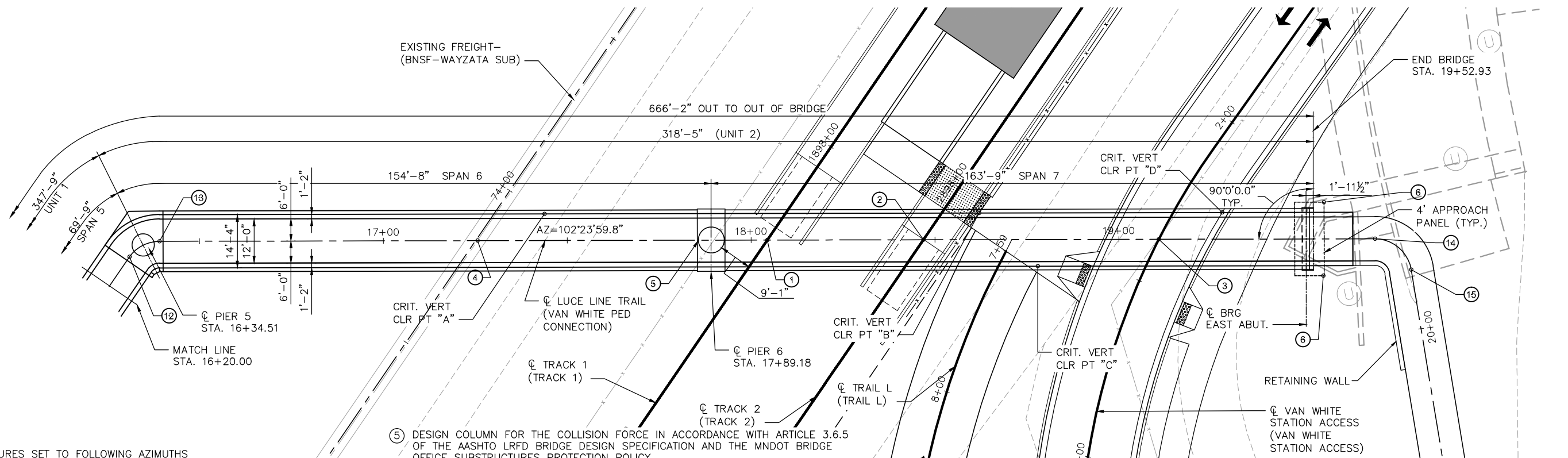
274

A horizontal scale bar with tick marks at 0, 7.5', 15', and 30'. The bar is divided into alternating black and white segments. Below the bar is the text "SCALE IN FEET".



DISCIPLINE:	STRUCTURES	SHEET NAME:	E4-STU-BRG-VNWHT-TRL-GPE-002
-------------	-------------------	-------------	-------------------------------------

Aug. 26 2014 09:32 am V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-VNWH-TRL-GPE-003.dwg By: ronald.dee

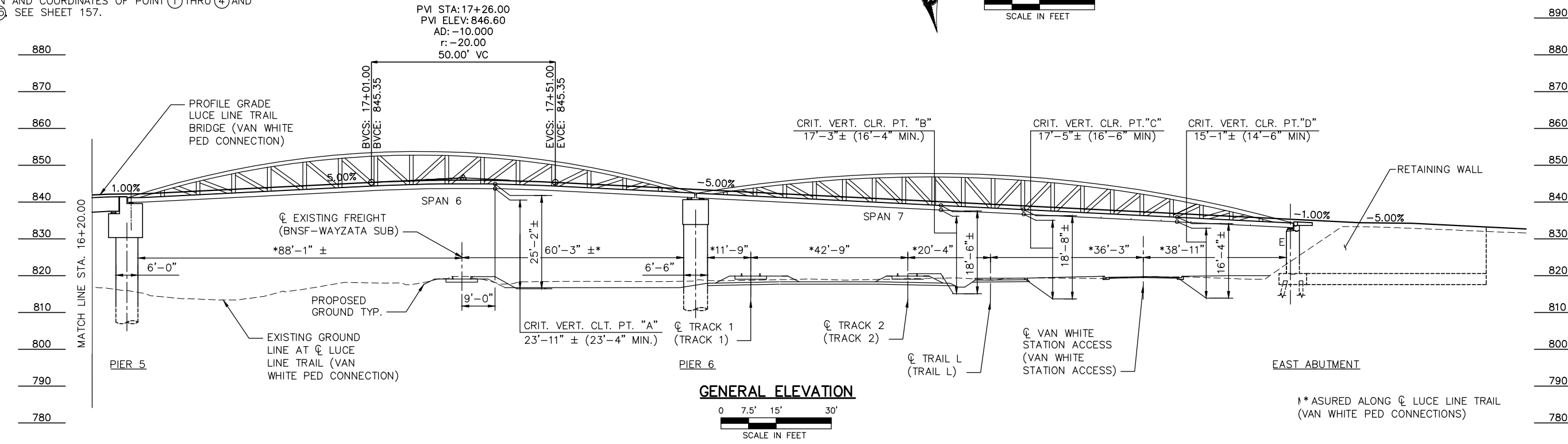


- NOTES:**
- 1. SUBSTRUCTURES SET TO FOLLOWING AZIMUTHS
E ABUTMENT AZ=102°23'59.8"
 - 2. SEE BORING SHEET FOR INPLACE UTILITIES
 - 3. FOR STATION AND COORDINATES OF POINT ① THRU ④ AND ⑫ THRU ⑮, SEE SHEET 157.

⑤ DESIGN COLUMN FOR THE COLLISION FORCE IN ACCORDANCE WITH ARTICLE 3.6.5 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATION AND THE MNDOT BRIDGE OFFICE SUBSTRUCTURES PROTECTION POLICY.

⑥ END OF BRIDGE SUBSTRUCTURE AND BEGINNING OF RETAINING WALL TO BE DETERMINED IN ADVANCED DESIGN

PVI STA: 17+26.00
PVI ELEV: 846.60
AD: -10.000
r: -20.00
50.00' VC



DES. KAE	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

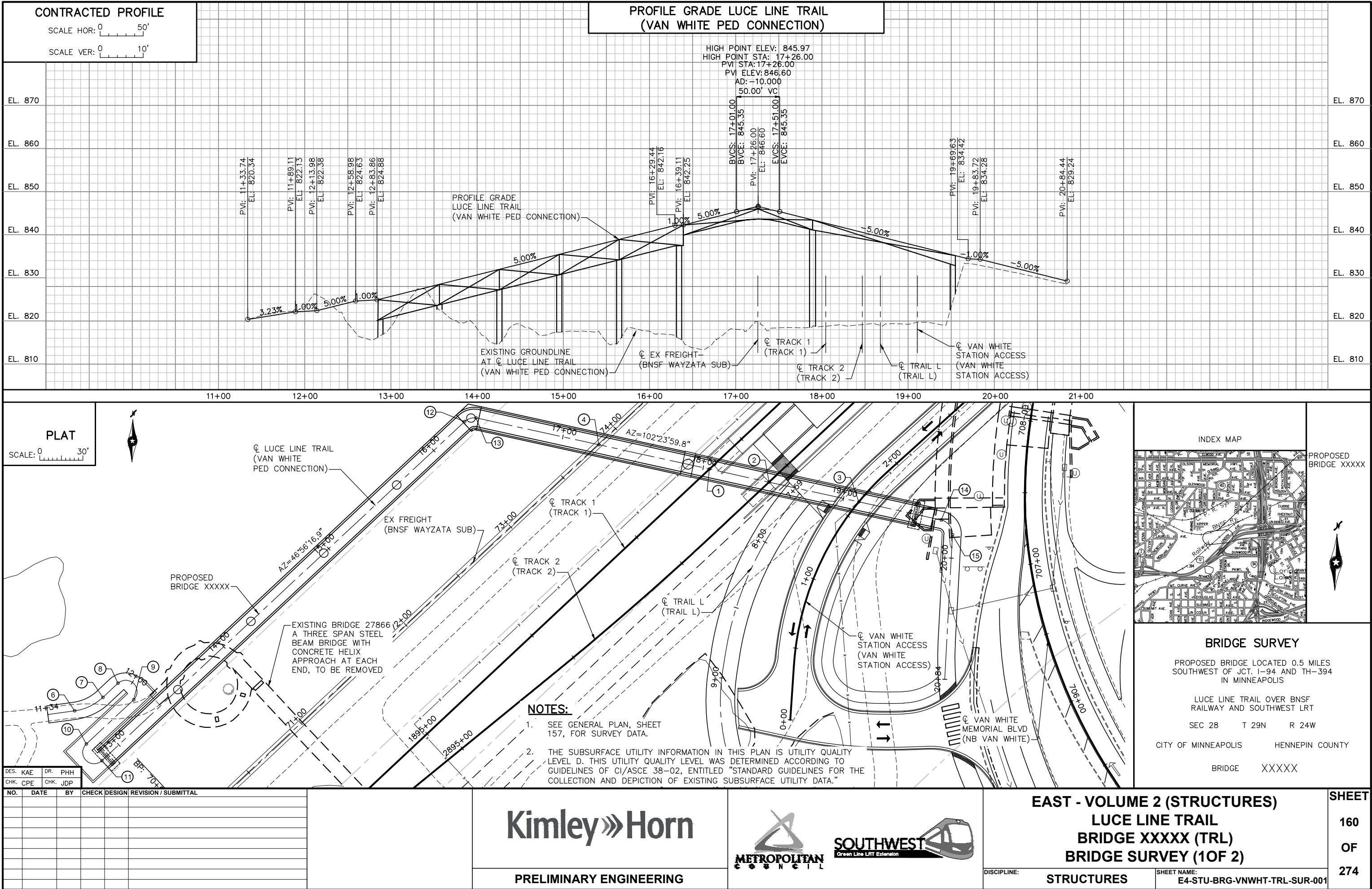


EAST - VOLUME 2 (STRUCTURES)
LUCE LINE TRAIL
BRIDGE XXXXX (TRL)
GENERAL PLAN AND ELEVATION (2 OF 2)

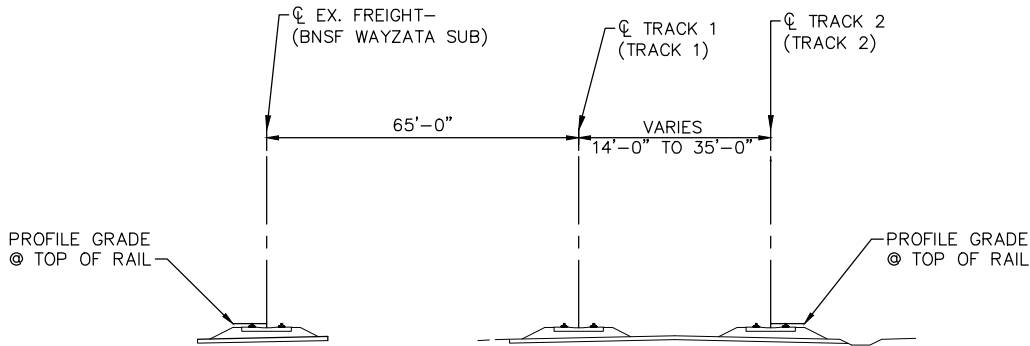
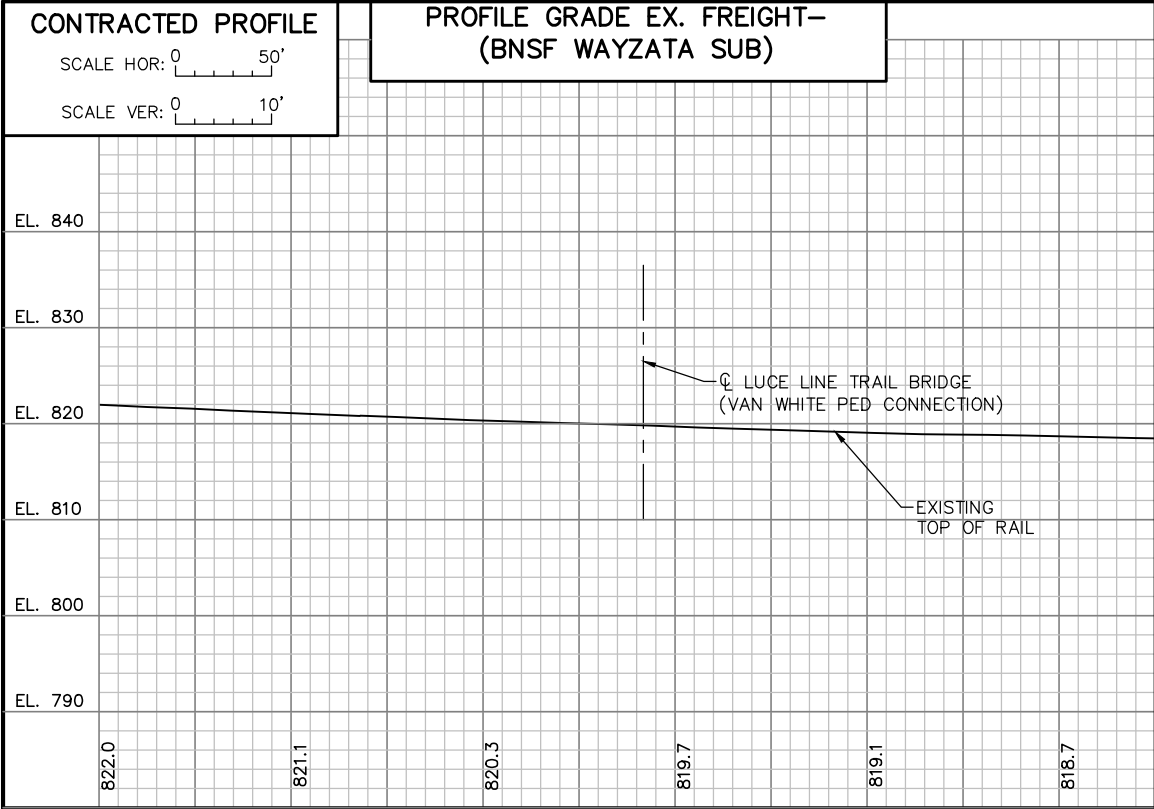
DISCIPLINE: **STRUCTURES**
SHEET NAME: **E4-STU-BRG-VNWH-TRL-GPE-003**

SHEET
159
OF
274

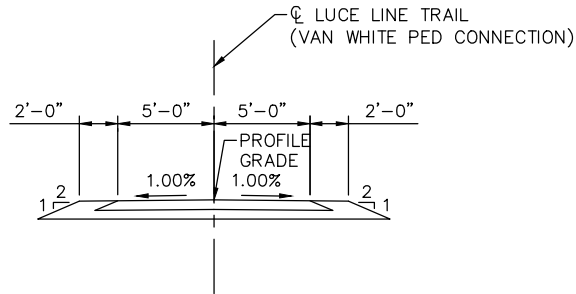
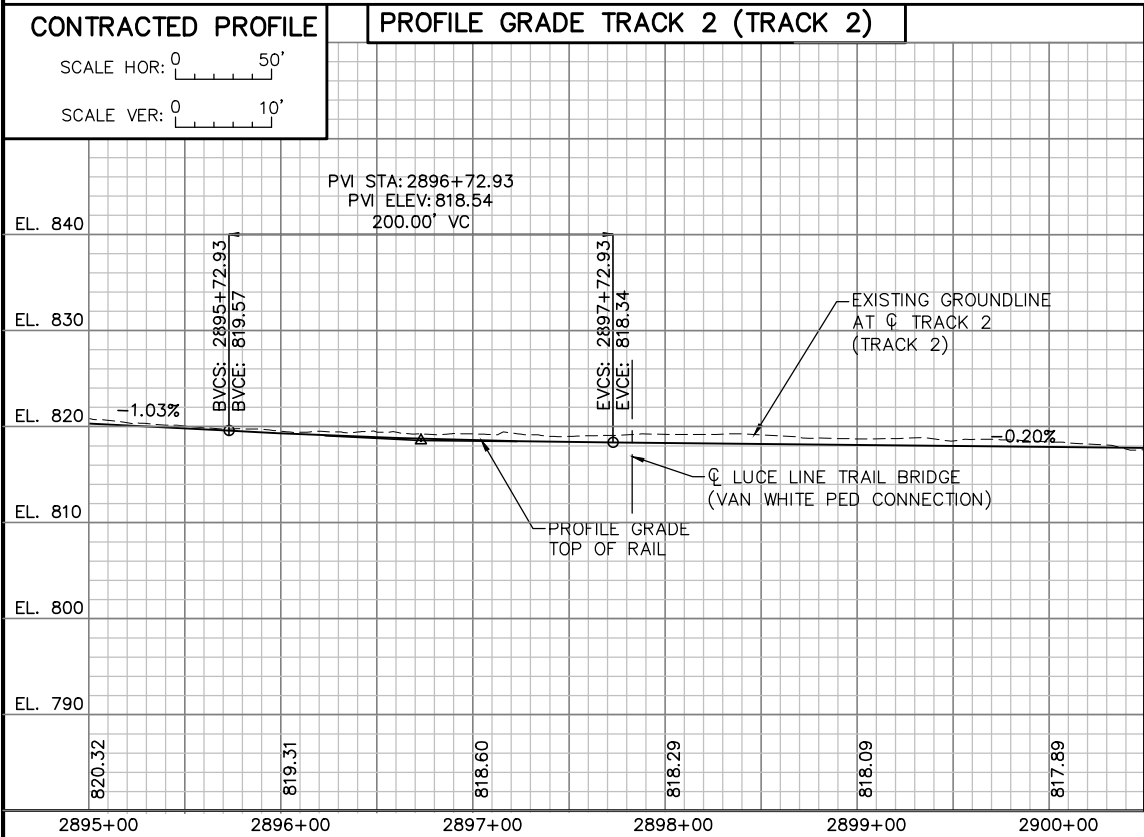
Aug. 26 2014 09:25 am V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-VNWH-TRL-SUR-001.dwg By: ronald.dee



Aug. 26 2014 09:34 am V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-VNWH-TRL-SUR-002.dwg By: ronald.dee



TYPICAL SECTIONS EX. FREIGHT AND
TRACK 1 AND TRACK 2



TYPICAL SECTIONS LUCE LINE TRAIL

LOCATION ENGINEER'S OBSERVATIONS
AT BRIDGE SITE

1. SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS
SLIDING BANKS, RECREATIONAL BOATING.

2. OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM
(PARTICULARY STRUCTURES WHICH CARRY HIGH WATER
WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE,
LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL
AREA ETC.

3. APPARENT HIGHWATER ELEVATION
OBTAINED FROM:

4. OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF
SURVEY.

HYDRAULIC ENGINEER'S RECOMMENDATION

DATE:

STREAM OR DITCH DESIGNATION

DRAINAGE AREA

MAX FLOOD ON RECORD

DESIGN FLOOD (YR. FREQ.): C.F.S.
HEADWATER ELEVATION: FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE F.P.S.
TOTAL STAGE INCREASE FT.
LOW MEMBER AT OR ABOVE ELEVATION FT.

WATERWAY AREA REQUIRED BELOW ELEV. = SQ. FT.
AT RIGHT ANGLES TO CHANNEL

BASIC FLOOD (100 YR. FREQ.) C.F.S.
HEADWATER ELEVATION: FT.
TOTAL STAGE INCREASE FT.
MEAN VELOCITY THROUGH STRUCTURE

FLOWLINE ELEVATION: FT. SKEW ANGLE:

ESTIMATED PRILIMINARY TOTAL SCOUR AT PIER EL.
(500 OR OT YR. FREQ.)

SCOUR CONFIRMATION RECOMMENDATION

DATE:

TOTAL SCOUR AT PIER EL. (500 OR OT YR. FREQ.)

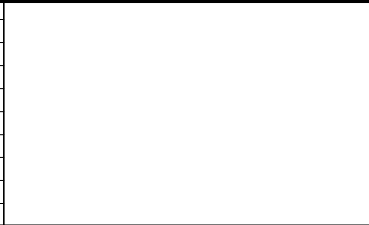
SCOUR CODE: OBTAIN FROM HYDRAULIC ENGINEER

BRIDGE SURVEY = SHEETS MADE FROM 2014 MFRA SURVEYS

1ST BENCH MARK
ELEVATION: 838.49
NORTHING: 166512.10
EASTING: 522182.52
DESCRIPTION: DRILL HOLE IN CONCRETE

2ND BENCH MARK
ELEVATION: 841.33
NORTHING: 166200.34
EASTING: 522480.63
DESCRIPTION: DRILL HOLE IN CONCRETE

DES.	KAE	DR.	PHH		
CHK.	CPE	CHK.	JDP		
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



Kimley»Horn

PRELIMINARY ENGINEERING

METROPOLITAN
COUNCIL

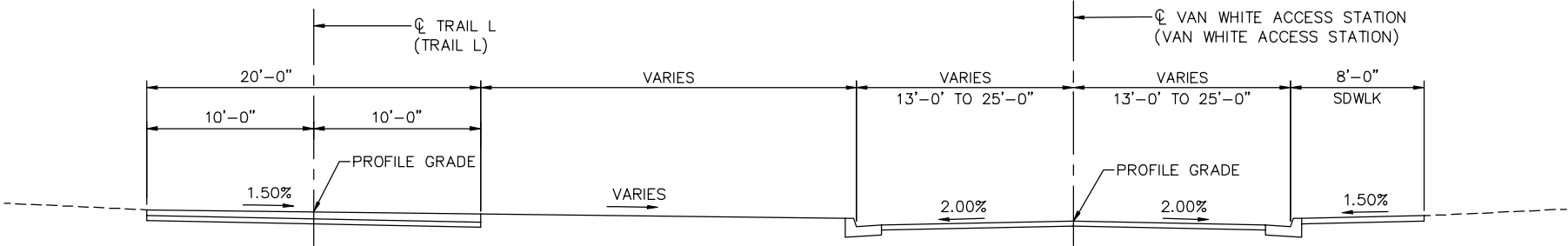
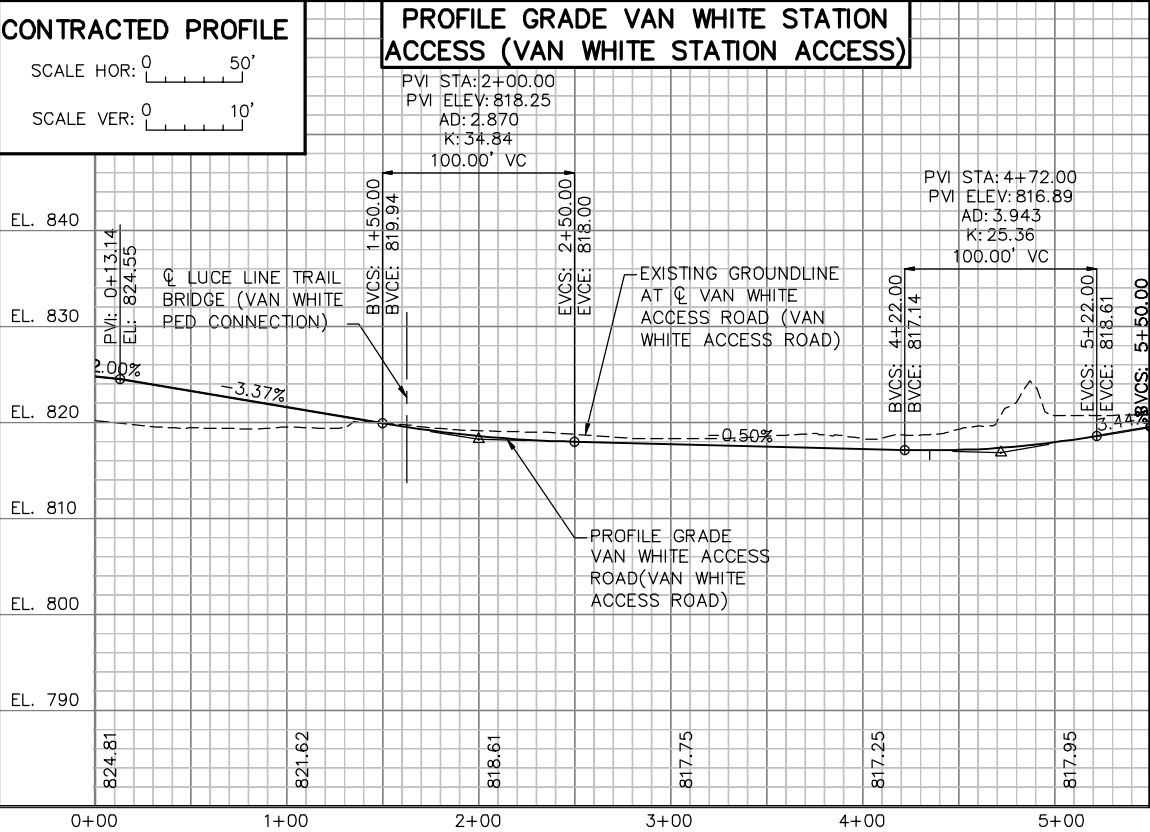
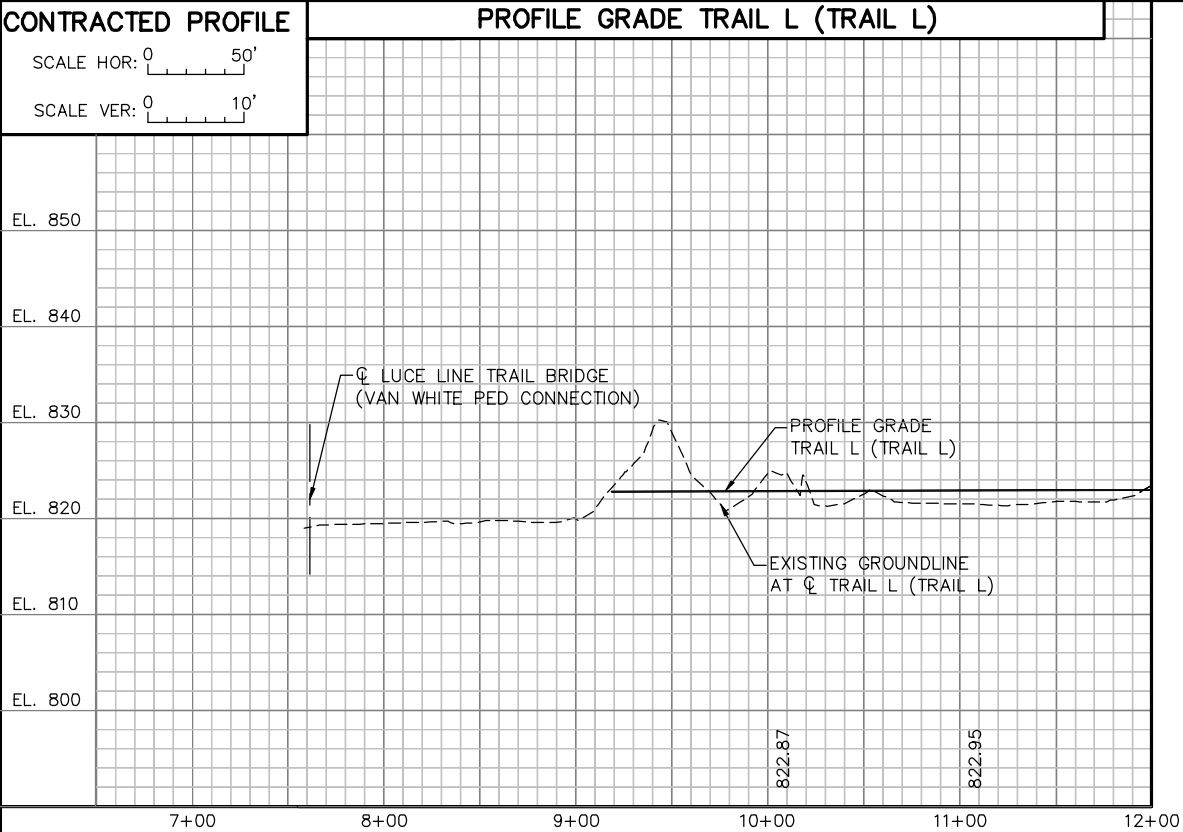
SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
LUCE LINE TRAIL
BRIDGE XXXXX (TRL)
BRIDGE SURVEY (2 OF 3)

DISCIPLINE: STRUCTURES
SHEET NAME: E4-STU-BRG-VNWH-TRL-SUR-002

SHEET 161 OF 274

Aug. 26 2014 09:19 am V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-VNHW-TRL-SUR-003.dwg By: curtis.neft



TYPICAL SECTIONS TRAIL L AND
VAN WHITE ACCESS STATION

DES. KAE	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



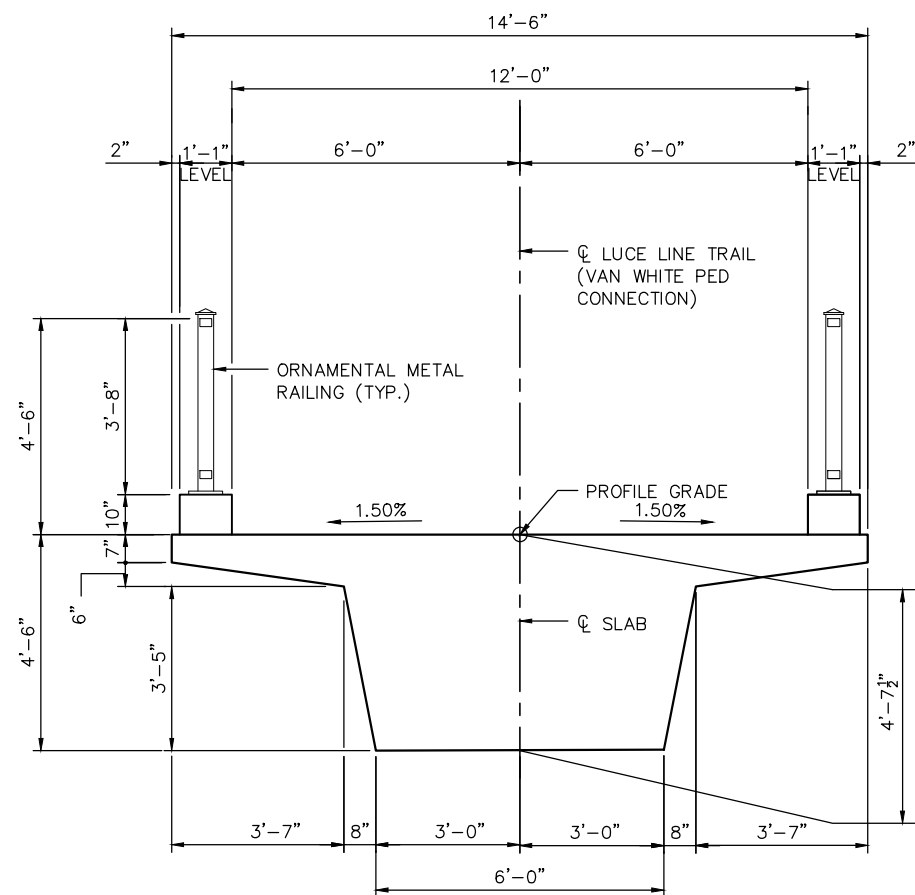
EAST - VOLUME 2 (STRUCTURES)
LUCE LINE TRAIL
BRIDGE XXXXX (TRL)
BRIDGE SURVEY (3 OF 3)

DISCIPLINE: STRUCTURES

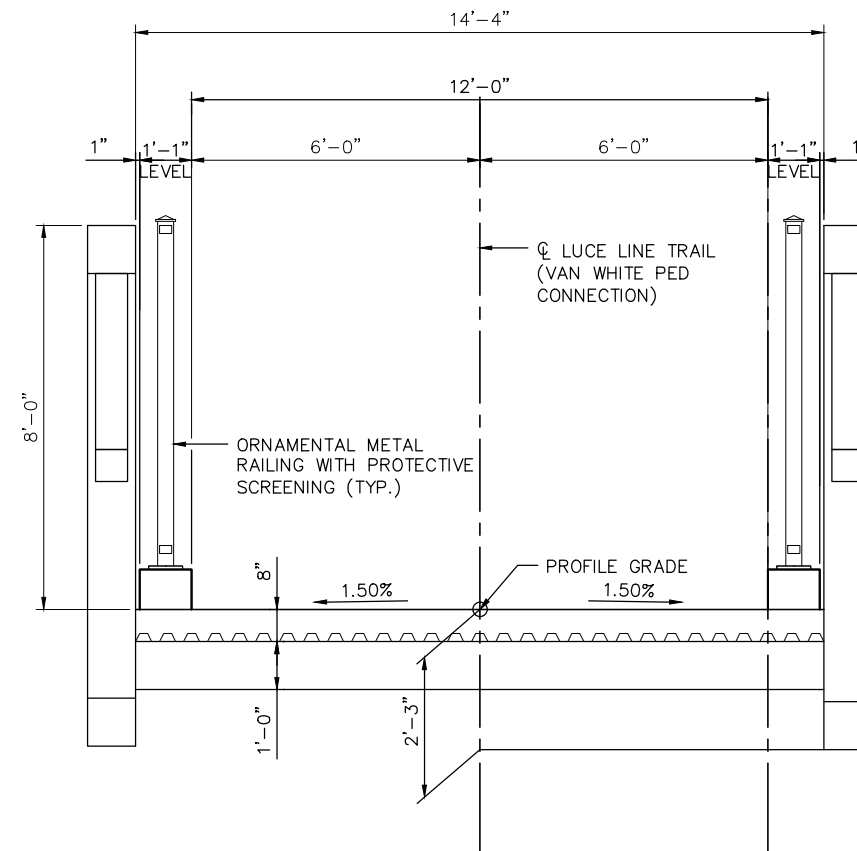
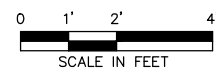
SHEET NAME: E4-STU-BRG-VNHW-TRL-SUR-003

SHEET
162
OF
274

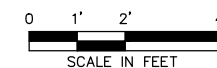
Aug. 26 2014 09:38 am V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-VNWH-TRL-SUP.dwg By: ronald.dee



TRANSVERSE SECTION - APPROACH SPANS



TRANSVERSE SECTION - MAIN SPAN



DES. KAE	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

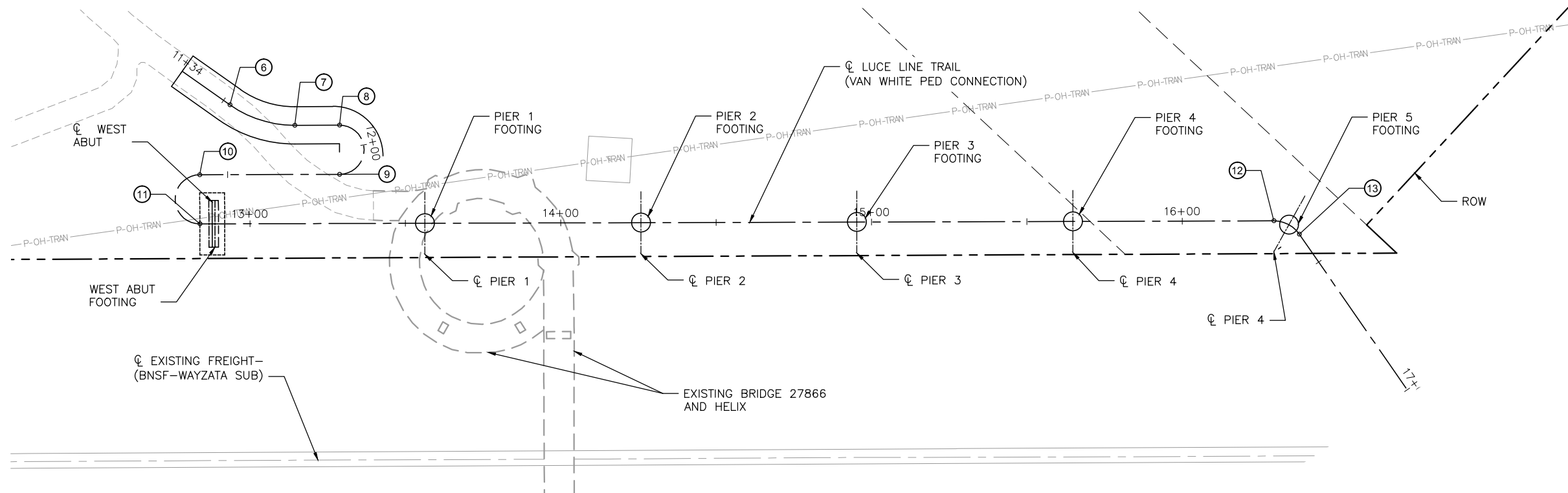


EAST - VOLUME 2 (STRUCTURES)
LUCE LINE TRAIL
BRIDGE XXXXX (TRL)
TRANSVERSE SECTION

DISCIPLINE: STRUCTURES

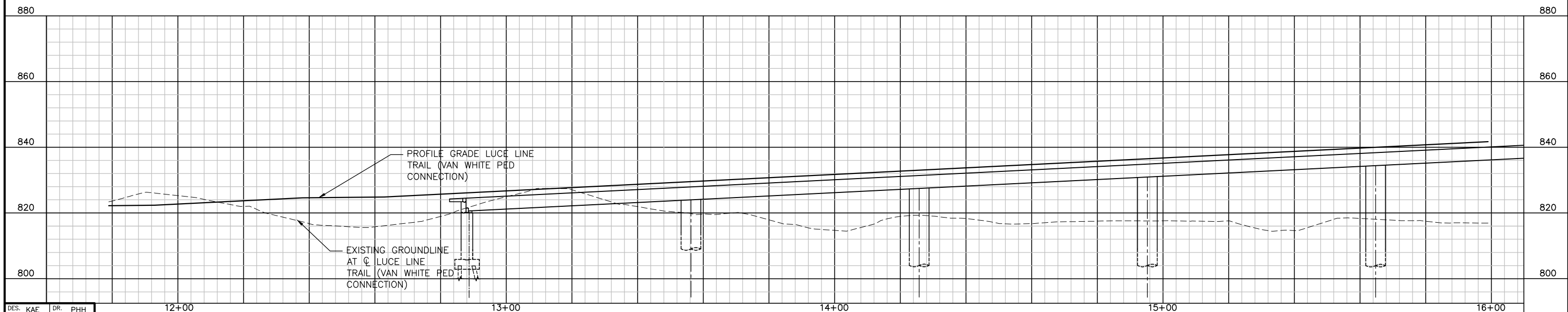
SHEET NAME: E4-STU-BRG-VNWH-TRL-SUP



SHEET
163
OF
274



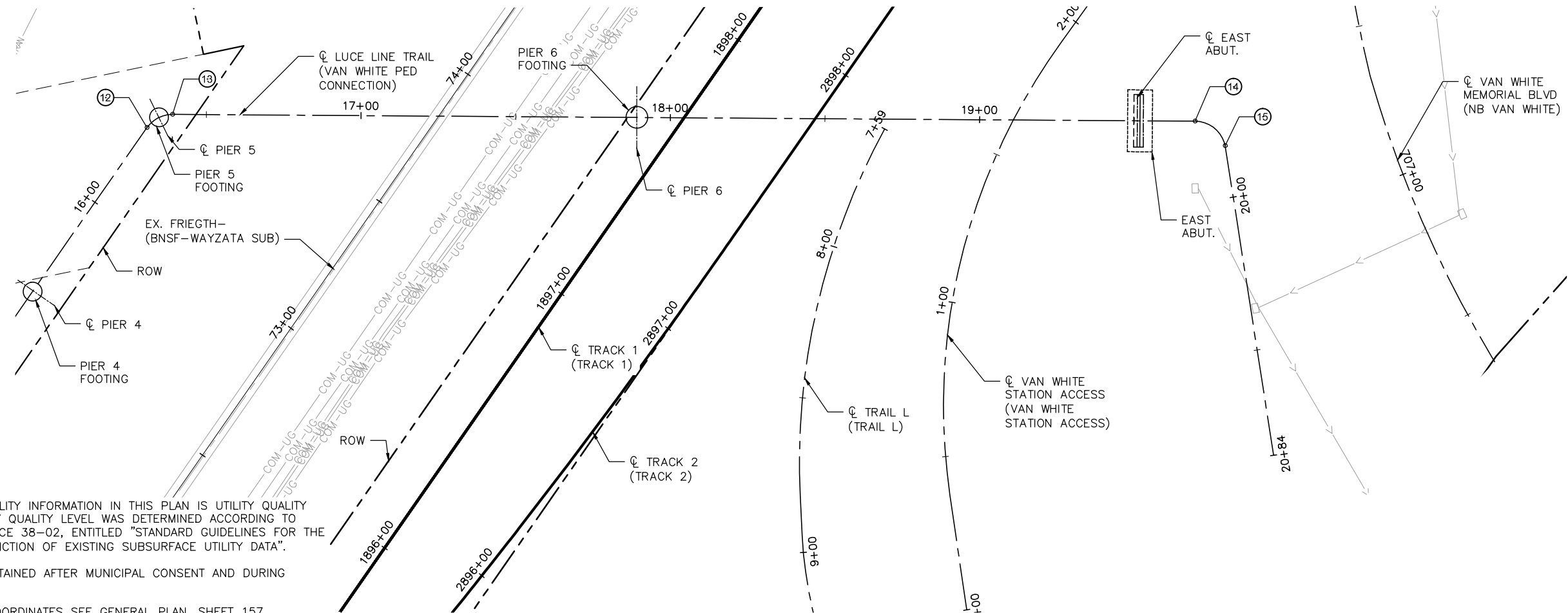
NOTES:

1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
2. BORINGS WILL BE OBTAINED AFTER MUNICIPAL CONSENT AND DURING ADVANCED DESIGN.
3. FOR P.C. AND P.T., COORDINATES SEE GENERAL PLAN, SHEET 157.



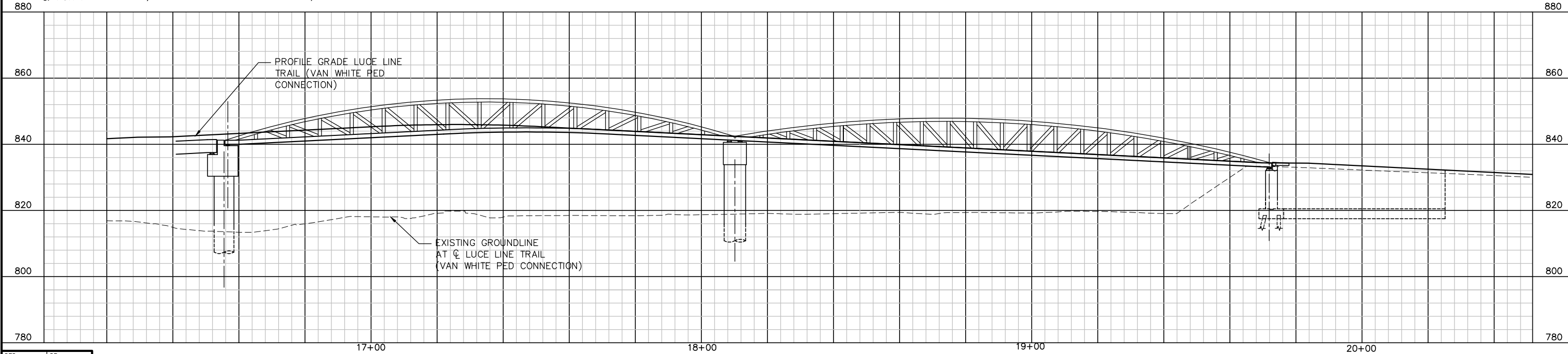
DES. KAE	DR. PHH	12+00			13+00			14+00			15+00			16+00															
CHK. CPE	CHK. JDP																												
NO.	DATE	BY	CHECK/DESIGN	REVISION / SUBMITTAL	<div>Kimley»Horn</div> <div>PRELIMINARY ENGINEERING</div>					<div><div></div><div></div></div>					<div>EAST - VOLUME 2 (STRUCTURES)</div> <div>LUCE LINE TRAIL</div> <div>BRIDGE XXXXX (TRL)</div> <div>BORINGS (1 OF 3)</div> <div>DISCIPLINE: STRUCTURES</div> <div>SHEET NAME: E4-STU-BRG-VNWH-T-RL-BOR-001</div>					SHEET 164 OF 274									

Aug. 26 2014 09:42 am V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-VNWH-TRL-BOR-002.dwg By: ronald.dee



NOTES:

- 1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF C/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
- 2. BORINGS WILL BE OBTAINED AFTER MUNICIPAL CONSENT AND DURING ADVANCED DESIGN.
- 3. FOR P.C. AND P.T.,COORDINATES SEE GENERAL PLAN, SHEET 157.



DES. KAE	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

PRELIMINARY ENGINEERING

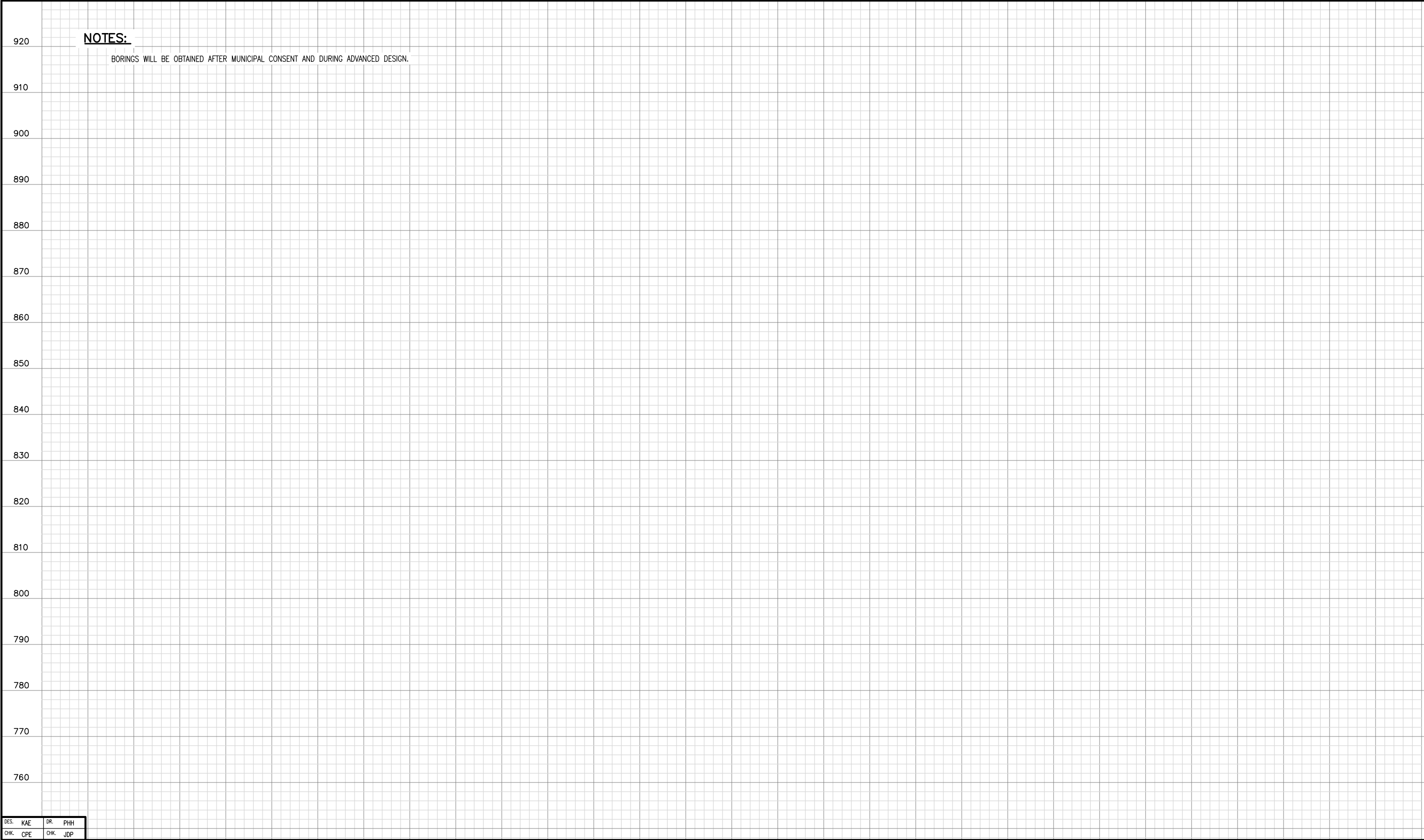
EAST - VOLUME 2 (STRUCTURES)
LUCE LINE TRAIL
BRIDGE XXXXX (TRL)
BORINGS (2 OF 3)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E4-STU-BRG-VNWH-TRL-BOR-002**


SHEET
165
OF
274

Aug. 26 2014 09:42 am V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-VANWHT-TRL-BOR-003.dwg By: ronald.dee



DES. KAE DR. PHH					
CHK. CPE CHK. JDP					
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL


PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)
LUCE LINE TRAIL
BRIDGE XXXXX (TRL)
BORINGS (3 OF 3)

DISCIPLINE: STRUCTURES

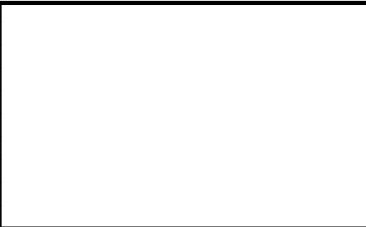
SHEET NAME: E4-STU-BRG-VANWHT-TRL-BOR-003

SHEET 166 OF 274

Aug. 26 2014 09:42 am V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-VNWH-T-TRL-AES.dwg By: ronald.dee

DES. KAE	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)
LUCE LINE TRAIL
BRIDGE XXXXX (TRL)
AESTHETICS

DISCIPLINE: STRUCTURES

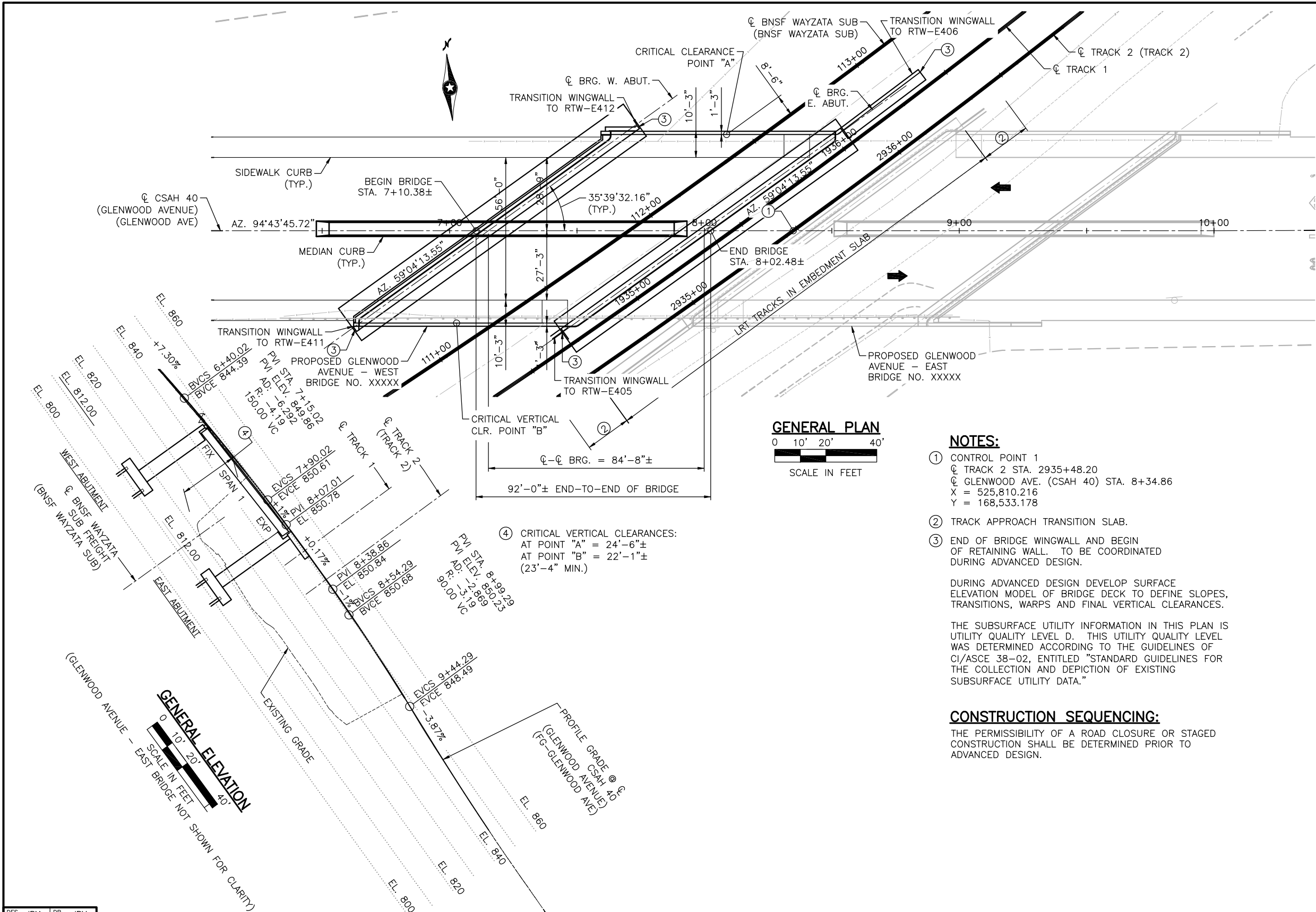
SHEET NAME: E4-STU-BRG-VNWH-T-TRL-AES

SHEET
167
OF
274

AESTHETIC DETAILS TO BE DETERMINED DURING ADVANCED DESIGN

- 1. ABUTMENT SURFACE
- 2. ABUTMENT/WALL CORNER DETAIL
- 3. EXPOSED EDGE OF DECK
- 4. EXPOSED BARRIER
- 5. TRUSS CONFIGURATION
- 6. BOTTOM OF BEAMS
- 7. PIER COLUMN GEOMETRY AND SURFACE
- 8. RAILING AND SCREENING

Aug. 25 2014 10:43 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-GLAW-VEH-GPE.dwg By: muellerj



GENERAL PLAN
0 10' 20' 40'
SCALE IN FEET

NOTES:

- ① CONTROL POINT 1
CL TRACK 2 STA. 2935+48.20
CL GLENWOOD AVE. (CSAH 40) STA. 8+34.86
X = 525,810.216
Y = 168,533.178
- ② TRACK APPROACH TRANSITION SLAB.
- ③ END OF BRIDGE WINGWALL AND BEGIN OF RETAINING WALL. TO BE COORDINATED DURING ADVANCED DESIGN.

DURING ADVANCED DESIGN DEVELOP SURFACE ELEVATION MODEL OF BRIDGE DECK TO DEFINE SLOPES, TRANSITIONS, WARPS AND FINAL VERTICAL CLEARANCES.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

CONSTRUCTION SEQUENCING:

THE PERMISSIBILITY OF A ROAD CLOSURE OR STAGED CONSTRUCTION SHALL BE DETERMINED PRIOR TO ADVANCED DESIGN.

DESIGN DATA

2012 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 6TH EDITION AND CURRENT INTERIMS

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA (REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD HL-93 LIVE LOAD.
DEAD LOAD INCLUDES 20 PSF ALLOWANCE FOR FUTURE WEARING COURSE MODIFICATIONS.

MATERIAL DESIGN PROPERTIES

REINFORCED CONCRETE:

$f'_c = 4000$ PSI $n = 8$

$f_y = 60000$ PSI REINFORCEMENT

PRESTRESSED CONCRETE:

$f'_c = 9000$ PSI $n = 1$

$f_{pu} = 270$ KSI LOW RELAXATION STRANDS

0.75 x f_{pu} FOR INITIAL PRESTRESS

DESIGN SPEED: OVER = 30 MPH (LRT)
UNDER = PER BNSF RAILWAY

APPROXIMATE DECK AREA 7046 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
168	GENERAL PLAN AND ELEVATION
169	BRIDGE SURVEY
170	TRANSVERSE SECTION
171-173	BORINGS
174	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK:
SINGLE-SPAN REINFORCED CONCRETE SLAB ON 36M PRESTRESSED CONCRETE BEAMS.

SUBSTRUCTURE:
DEEP PARAPET ABUTMENTS SUPPORTED ON HP 12x53 PILING.

DEPTH OF STRUCTURE:
 $\pm 4'-8"$ P.G. LINE TO LOW SUPERSTRUCTURE

AESTHETICS:
LEVEL _

**PRELIMINARY PLAN
BRIDGE NO. XXXXX**

CSAH 40 (GLENWOOD AVE) OVER BNSF WAYZATA SUB RR TRACK. LOCATED 0.2 MILES EAST OF JCT. OF CSAH 40 (GLENWOOD AVE) AND INTERSTATE 94

86' PRESTRESSED CONCRETE BEAM SPAN.
25' ROADWAYS, 9' SIDEWALKS AND A 6' RAISED CONCRETE MEDIAN; CONCRETE PARAPETS.
54'20"27.84" SKEW; PARAPET ABUTMENTS
BRIDGE ID NO. 501

GENERAL PLAN AND ELEVATION

SEC 22 T 29N R 24W
CITY OF MINNEAPOLIS HENNEPIN COUNTY

APPROVED: _____
STATE BRIDGE ENGINEER DATE

DES. JRM DR. JRM
CHK. MJC CHK. MJC
JOB NO.: T9N635

STATE PROJ. NO.: 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



**EAST - VOLUME 2 (STRUCTURES)
CSAH 40 (GLENWOOD AVENUE) - WEST
BRIDGE XXXXX (VEH)
GENERAL PLAN AND ELEVATION**

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E4-STU-BRG-GLAW-VEH-GPE**

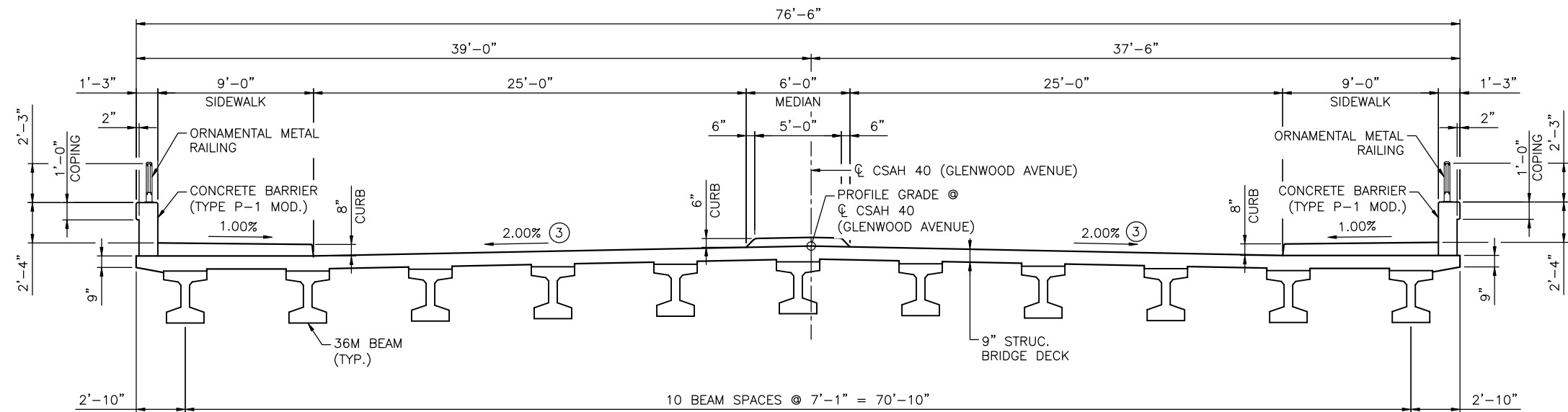
SHEET

168

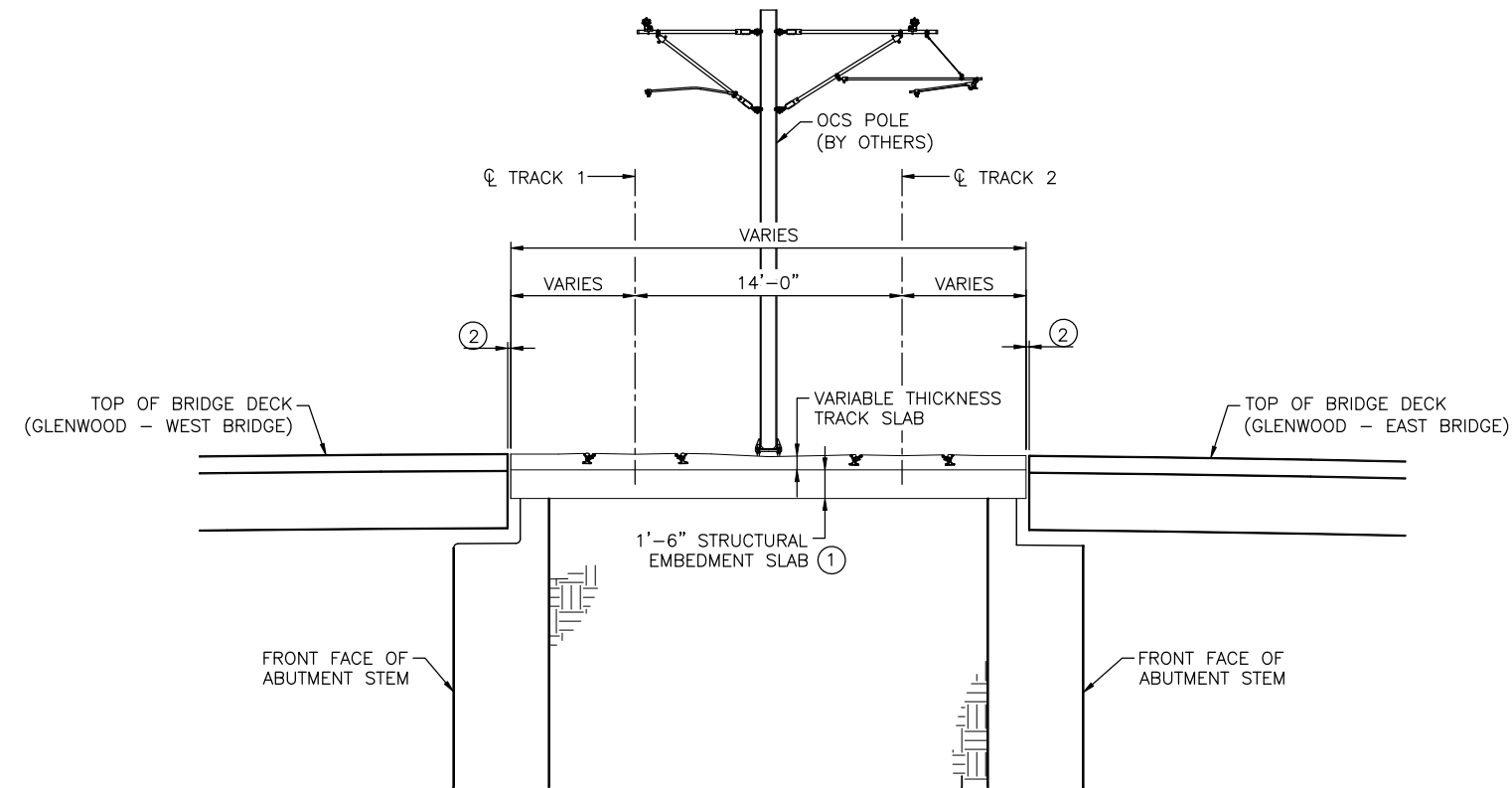
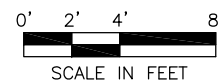
OF

274

Aug. 25 2014 10:47 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-GLAW-VEH-SUP.dwg By: muellerj



TRANSVERSE SECTION



TYPICAL SECTION BETWEEN GLENWOOD WEST BRIDGE & GLENWOOD EAST BRIDGE

NOTES:

- STRUCTURAL SLAB TO BE SUPPORTED ON ABUTMENT BACKWALLS. END REGIONS OF STRUCTURAL SLAB AND TRACK SLAB ARE ALSO USED TO EMBED THE WATERPROOF EXPANSION JOINT DEVICES.
- TYPE 5 WATERPROOF EXPANSION JOINT DEVICE WITH SNOWPLOW FINGERS.
- THE TYPICAL CROSS SLOPE IS 2.00%, BUT THE CROSS SLOPES ADJACENT TO THE LRT TRACK CORRIDOR NEED TO BE TRANSITIONED TO MATCH THE GEOMETRY OF THE LRT TRACK CORRIDOR.

DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



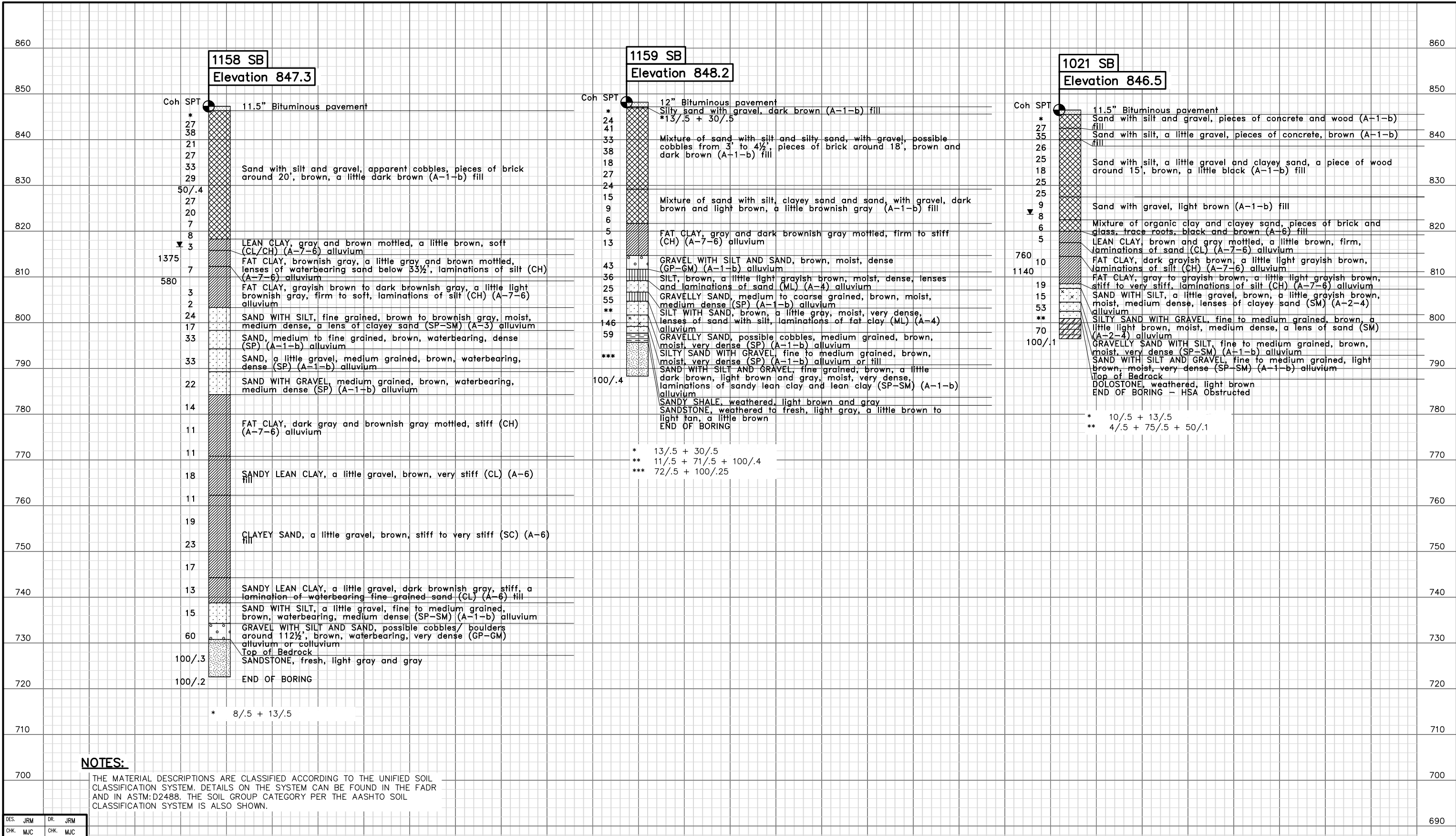
EAST - VOLUME 2 (STRUCTURES)
CSAH 40 (GLENWOOD AVENUE) - WEST
BRIDGE XXXXX (VEH)
TRANSVERSE SECTION

DISCIPLINE: STRUCTURES

SHEET NAME: E4-STU-BRG-GLAW-VEH-SUP


SHEET
170
OF
274

Aug. 25 2014 10:48 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-GLAW-VEH-BOR-002.dwg By: muellerj





DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK/DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING







EAST - VOLUME 2 (STRUCTURES)
CSAH 40 (GLENWOOD AVENUE) - WEST
BRIDGE XXXXX (VEH)
BORINGS (2 OF 3)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E4-STU-BRG-GLAW-VEH-BOR-002**

SHEET
172
OF
274

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

DES. JRM		DR. JRM												690					
CHK. MJC		CHK. MJC																	
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL	<div><div></div><div>PRELIMINARY ENGINEERING</div></div> <div></div>										<div>EAST - VOLUME 2 (STRUCTURES) CSAH 40 (GLENWOOD AVENUE) - WEST BRIDGE XXXXX (VEH) BORINGS (3 OF 3)</div> <div>DISCIPLINE: STRUCTURES</div> <div>SHEET NAME: E4-STU-BRG-GLAW-VEH-BOR-003</div>		SHEET 173 OF 274	

1. ABUTMENT SURFACE
2. ABUTMENT/WALL CORNER DETAIL
3. EXPOSED EDGE OF DECK
4. EXPOSED BARRIER
5. EXPOSED FASCIA BEAM
6. BOTTOM OF BEAMS
7. RAILING AND SCREENING

[illegible][illegible]

PRELIMINARY ENGINEERING



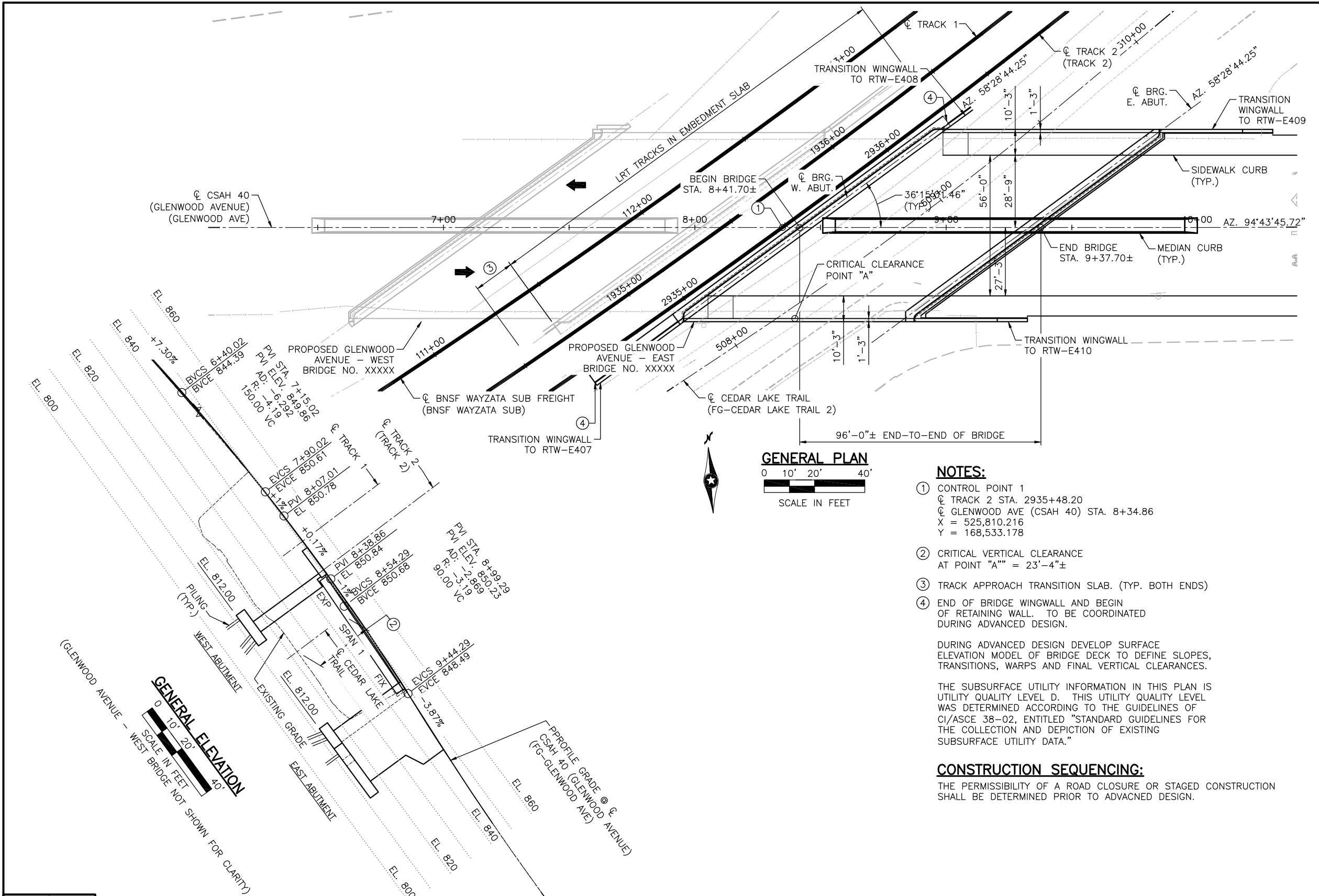
**EAST - VOLUME 2 (STRUCTURES)
CSAH 40 (GLENWOOD AVENUE) - WEST
BRIDGE XXXXX (VEH)
AESTHETICS**

DISCIPLINE: **STRUCTURES**

SHEET NAME:	E4-STU-BRG-GLAW-VEH-AES
-------------	-------------------------

SHEET
174
OF
274

Aug. 25 2014 11:01 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-GLAE-VEH-GPE.dwg By: muellerj



GENERAL PLAN
0 10' 20' 40'
SCALE IN FEET

GENERAL ELEVATION
0 10' 20' 40'
SCALE IN FEET
SCALE NOT SHOWN FOR CLARITY

NOTES:

- CONTROL POINT 1
CL TRACK 2 STA. 2935+48.20
CL GLENWOOD AVE (CSAH 40) STA. 8+34.86
X = 525,810.216
Y = 168,533.178
- CRITICAL VERTICAL CLEARANCE
AT POINT "A" = 23'-4"±
- TRACK APPROACH TRANSITION SLAB. (TYP. BOTH ENDS)
- END OF BRIDGE WINGWALL AND BEGIN
OF RETAINING WALL. TO BE COORDINATED
DURING ADVANCED DESIGN.

DURING ADVANCED DESIGN DEVELOP SURFACE
ELEVATION MODEL OF BRIDGE DECK TO DEFINE SLOPES,
TRANSITIONS, WARPS AND FINAL VERTICAL CLEARANCES.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS
UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL
WAS DETERMINED ACCORDING TO THE GUIDELINES OF
CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR
THE COLLECTION AND DEPICTION OF EXISTING
SUBSURFACE UTILITY DATA."

CONSTRUCTION SEQUENCING:

THE PERMISSIBILITY OF A ROAD CLOSURE OR STAGED CONSTRUCTION
SHALL BE DETERMINED PRIOR TO ADVANCED DESIGN.

DESIGN DATA

2012 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
6TH EDITION AND CURRENT INTERIMS

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA
(REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD
HL-93 LIVE LOAD.
DEAD LOAD INCLUDES 20 PSF ALLOWANCE FOR
FUTURE WEARING COURSE MODIFICATIONS.

MATERIAL DESIGN PROPERTIES

REINFORCED CONCRETE:

$f'_c = 4000$ PSI $n = 8$

$f_y = 60000$ PSI REINFORCEMENT

PRESTRESSED CONCRETE:

$f'_c = 9000$ PSI $n = 1$

$f_{pu} = 270$ KSI LOW RELAXATION STRANDS

0.75 x f_{pu} FOR INITIAL PRESTRESS

DESIGN SPEED: OVER = 30 MPH
UNDER = N.A.

APPROXIMATE DECK AREA 7344 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
175	GENERAL PLAN AND ELEVATION
176	BRIDGE SURVEY
177	TRANSVERSE SECTION
178-180	BORINGS
181	AESTHETICS

PROPOSED TYPE OF STRUCTURE

DECK:
SINGLE-SPAN REINFORCED CONCRETE SLAB
ON 36M PRESTRESSED CONCRETE BEAMS.
SUBSTRUCTURE:
DEEP PARAPET ABUTMENTS SUPPORTED ON
HP 12x53 PILING.

DEPTH OF STRUCTURE:
±4'-8" P.G. LINE TO LOW SUPERSTRUCTURE

AESTHETICS:
LEVEL -

**PRELIMINARY PLAN
BRIDGE NO. XXXXX**

CSAH 40 (GLENWOOD AVE) OVER HCRRR CORRIDOR.
LOCATED 0.2 MILES EAST OF JCT. OF CSAH 40
(GLENWOOD AVE) AND INTERSTATE 94.

89' PRESTRESSED CONCRETE BEAM SPAN.
25' ROADWAYS, 9' SIDEWALKS AND A 6' RAISED
CONCRETE MEDIAN; CONCRETE PARAPETS.
53'17"58.89" SKEW; PARAPET ABUTMENTS

BRIDGE ID NO. 501

GENERAL PLAN AND ELEVATION

SEC 22 T 29N R 24W
CITY OF MINNEAPOLIS HENNEPIN COUNTY

APPROVED: _____
STATE BRIDGE ENGINEER DATE

DES. JRM DR. JRM
CHK. MJC CHK. MJC
JOB NO.: T9N635

STATE PROJ. NO.: 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension

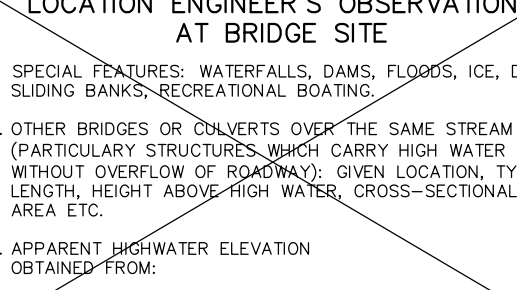
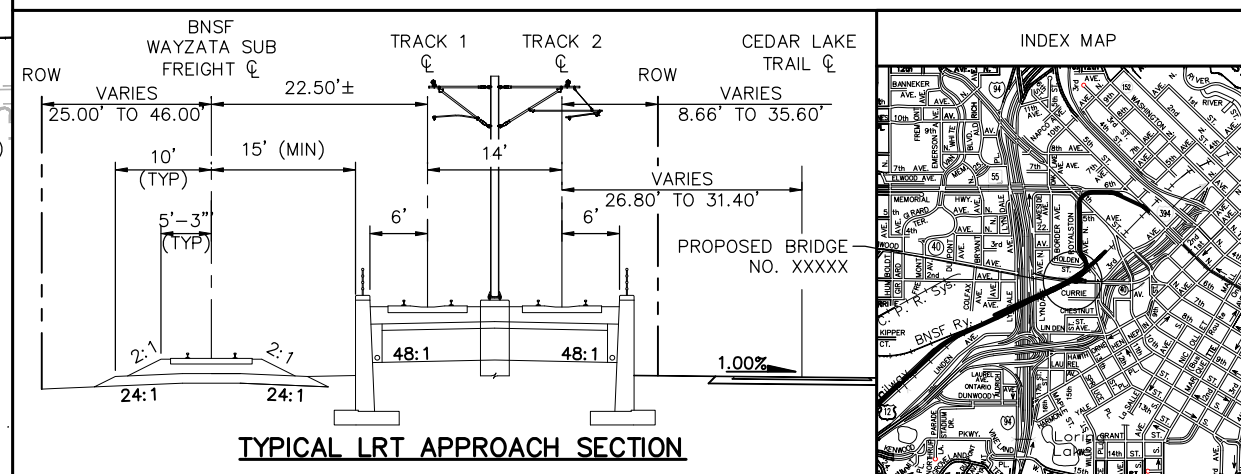
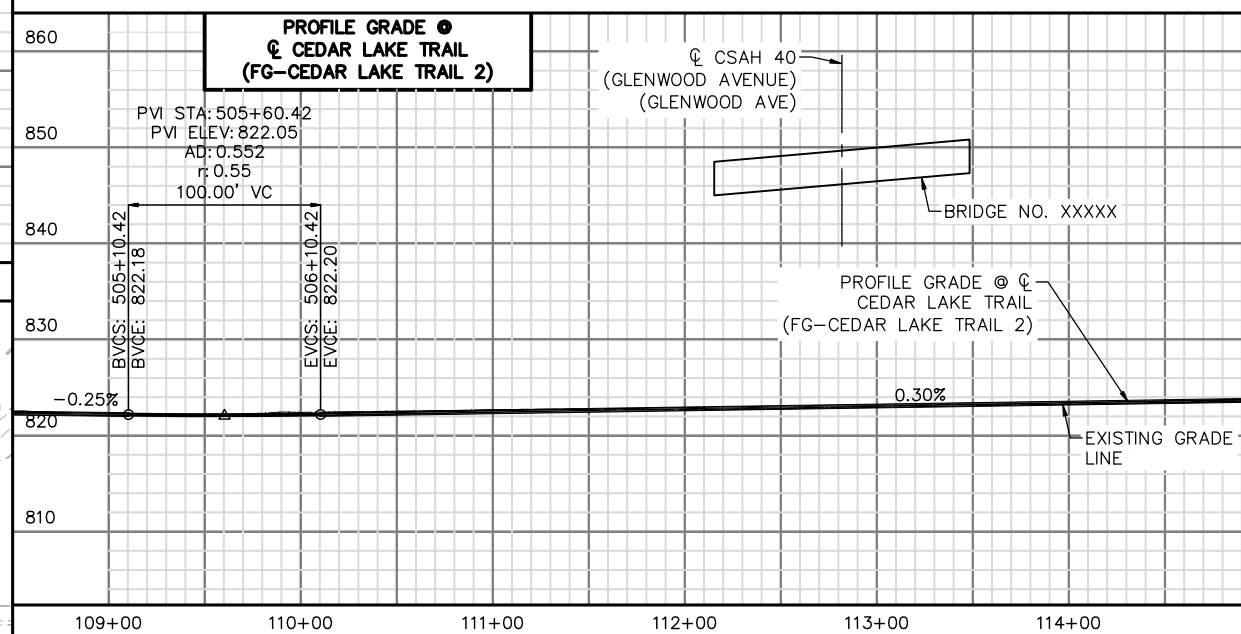
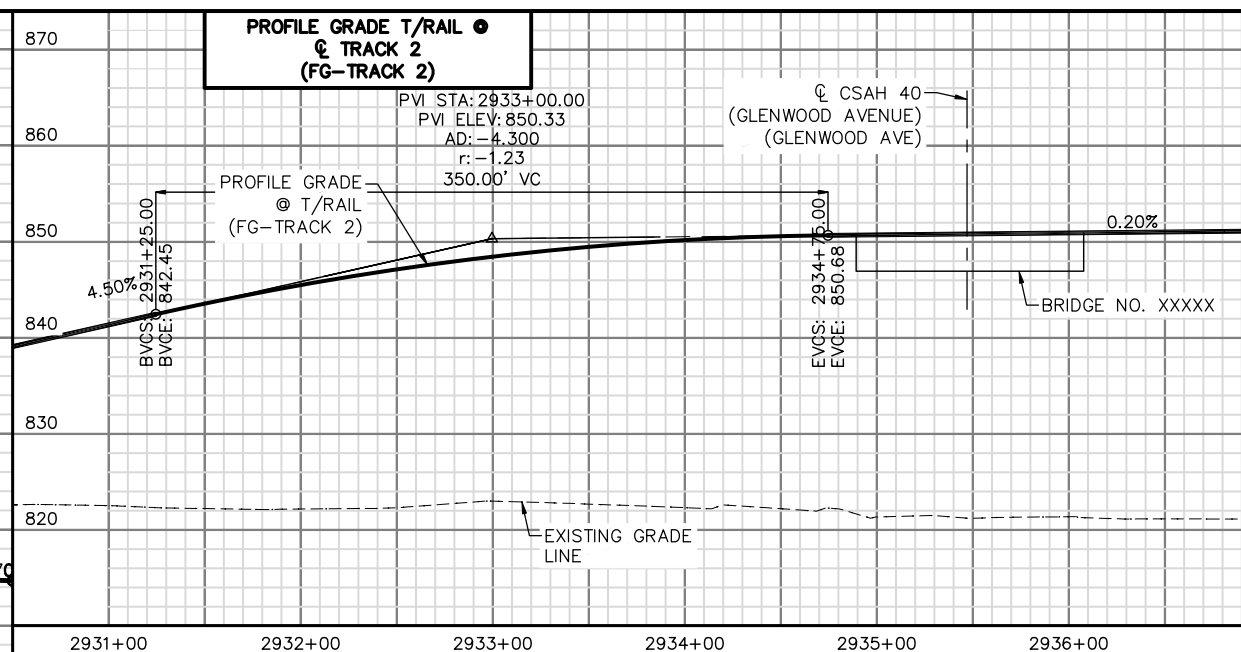
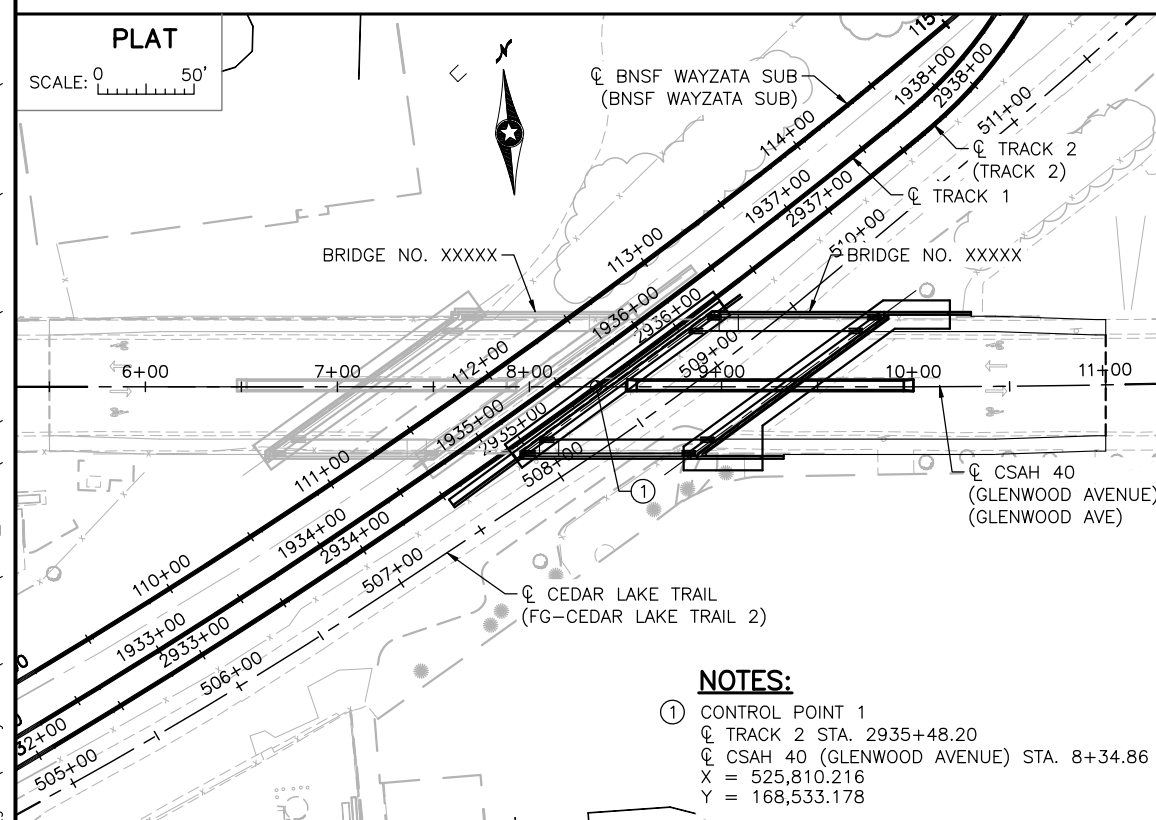
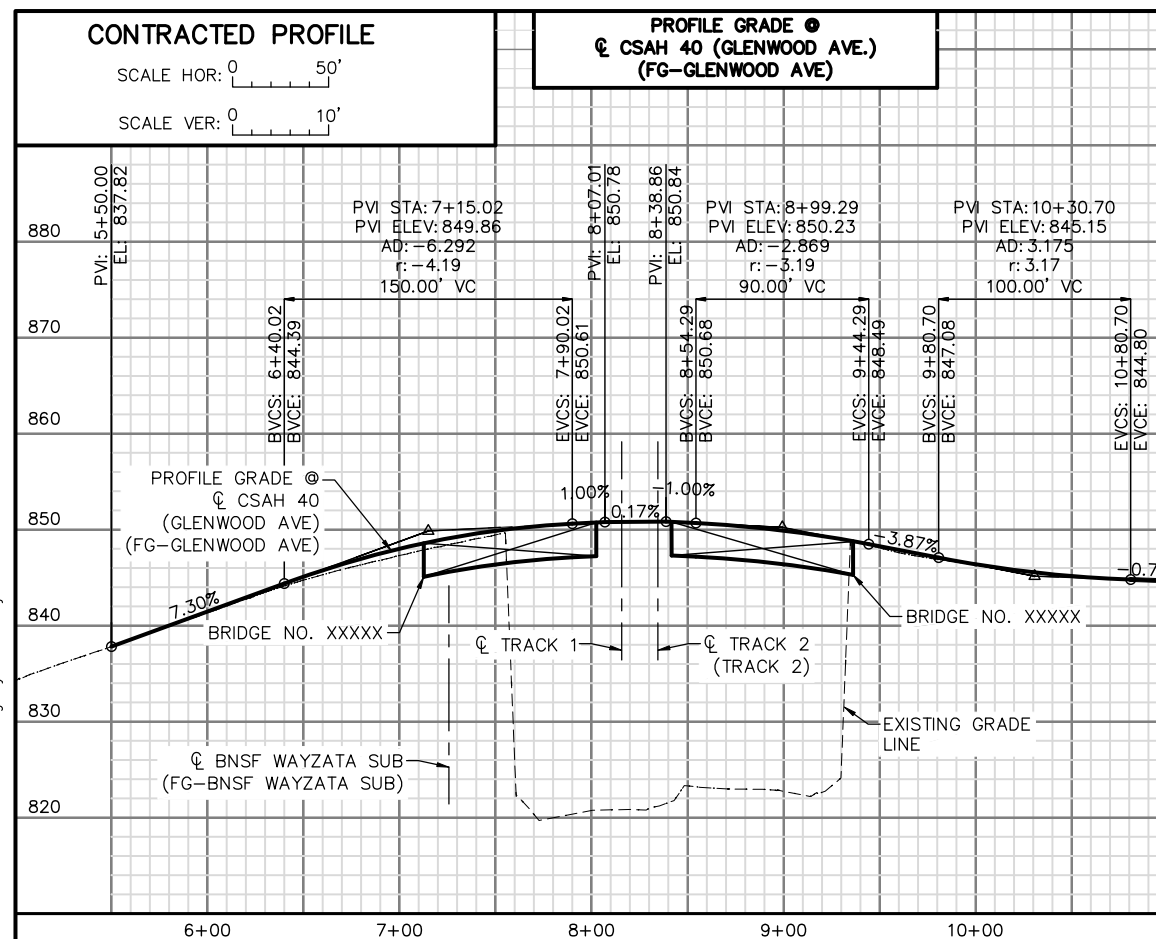


**EAST - VOLUME 2 (STRUCTURES)
CSAH 40 (GLENWOOD AVENUE) - EAST
BRIDGE XXXXX (VEH)
GENERAL PLAN AND ELEVATION**

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E4-STU-BRG-GLAE-VEH-GPE**

SHEET
175
OF
274



**LOCATION ENGINEER'S OBSERVATIONS
AT BRIDGE SITE**

1. SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.
2. OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
3. APPARENT HIGHWATER ELEVATION OBTAINED FROM:
4. OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.


HYDRAULIC ENGINEER'S RECOMMENDATION	
DATE:	
STREAM OR DITCH DESIGNATION	
DRAINAGE AREA	
MAX FLOOD ON RECORD	
DESIGN FLOOD (YR. FREQ.):	C.F.S.
HEADWATER ELEVATION:	FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE	F.P.S.
TOTAL STAGE INCREASE	FT.
LOW MEMBER AT OR ABOVE ELEVATION	FT.
WATERWAY AREA REQUIRED BELOW ELEV.	= SQ. FT.
AT RIGHT ANGLES TO CHANNEL	
BASIC FLOOD (100 YR. FREQ.)	C.F.S.
HEADWATER ELEVATION:	FT.
TOTAL STAGE INCREASE	FT.
MEAN VELOCITY THROUGH STRUCTURE	
FLOWLINE ELEVATION:	FT. SKEW ANGLE:
ESTIMATED PRELIMINARY TOTAL SCOUR AT PIER EL.	
(500 OR OT YR. FREQ.)	

SCOUR CONFIRMATION RECOMMENDATION	
DATE: _____	
TOTAL SCOUR AT PIER EL. _____ (500 OR QT. YR. FREQ.)	
SCOUR CODE: OBTAIN FROM HYDRAULIC ENGINEER	

BRIDGE SURVEY SHEETS MADE FROM 2014 MFRA SURVEYS


1ST BENCH MARK (NAVD 88)
BENCHMARK ID PT. 163
ELEVATION = 822.94
N = 168527.62, E = 525863.31
DESCRIPTION = MAG NAIL IN BIT. PATH

2ND BENCH MARK (NAVD 88)
BENCHMARK ID PT. 162
ELEVATION = 822.47
N = 168430.42, E = 525688.95
DESCRIPTION = MAG NAIL IN BIT. PATH

	BRIDGE SURVEY		
	CSAH 40 (GLENWOOD AVENUE) OVER HCRRRA CORRIDOR. LOCATED 0.2 MILES EAST OF JCT.		
	CSAH 40 (GLENWOOD AVENUE) AND INTERSTATE 94		
	SEC 22	T 29N	R 24W
	CITY OF MINNEAPOLIS	HENNEPIN COUNTY	
	BRIDGE NO. XXXXX		

[illegible]

Kimley»Horn



TKDA

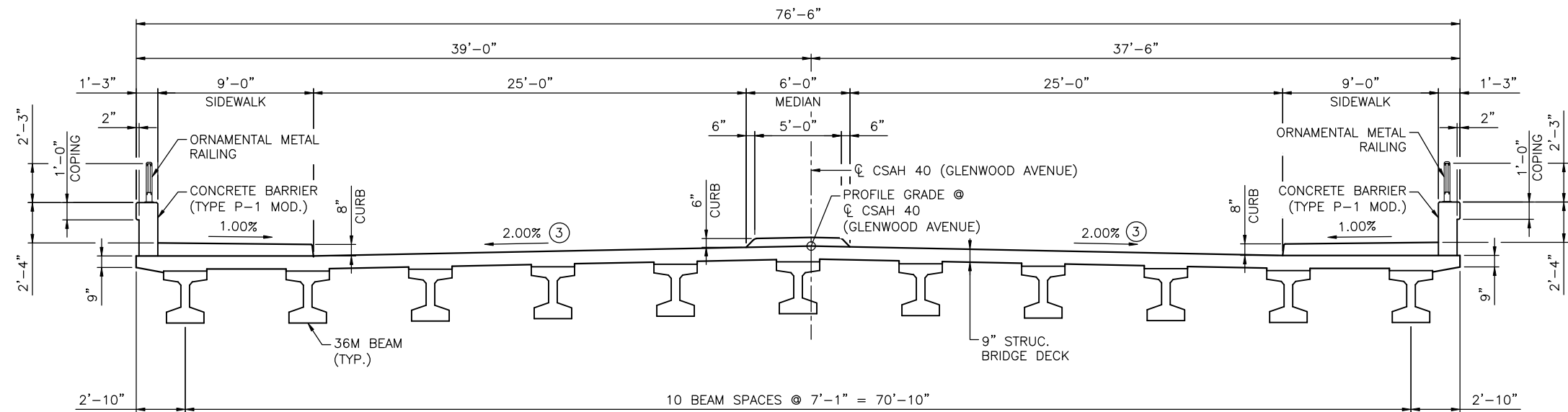
PRELIMINARY ENGINEERING



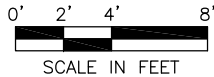
METROPOLITAN
C O U N C I L

EAST - VOLUME 2 (STRUCTURES)		SHEET
CSAH 40 (GLENWOOD AVENUE) - EAST		176
BRIDGE XXXXX (VEH)		OF
BRIDGE SURVEY		274
DISCIPLINE:	STRUCTURES	
SHEET NAME:	E4-STU-BRG-GLAE-VEH-SUR-001	

Aug. 25 2014 11:06 am k:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-GLAE-VEH-SUP.dwg By: muellerj

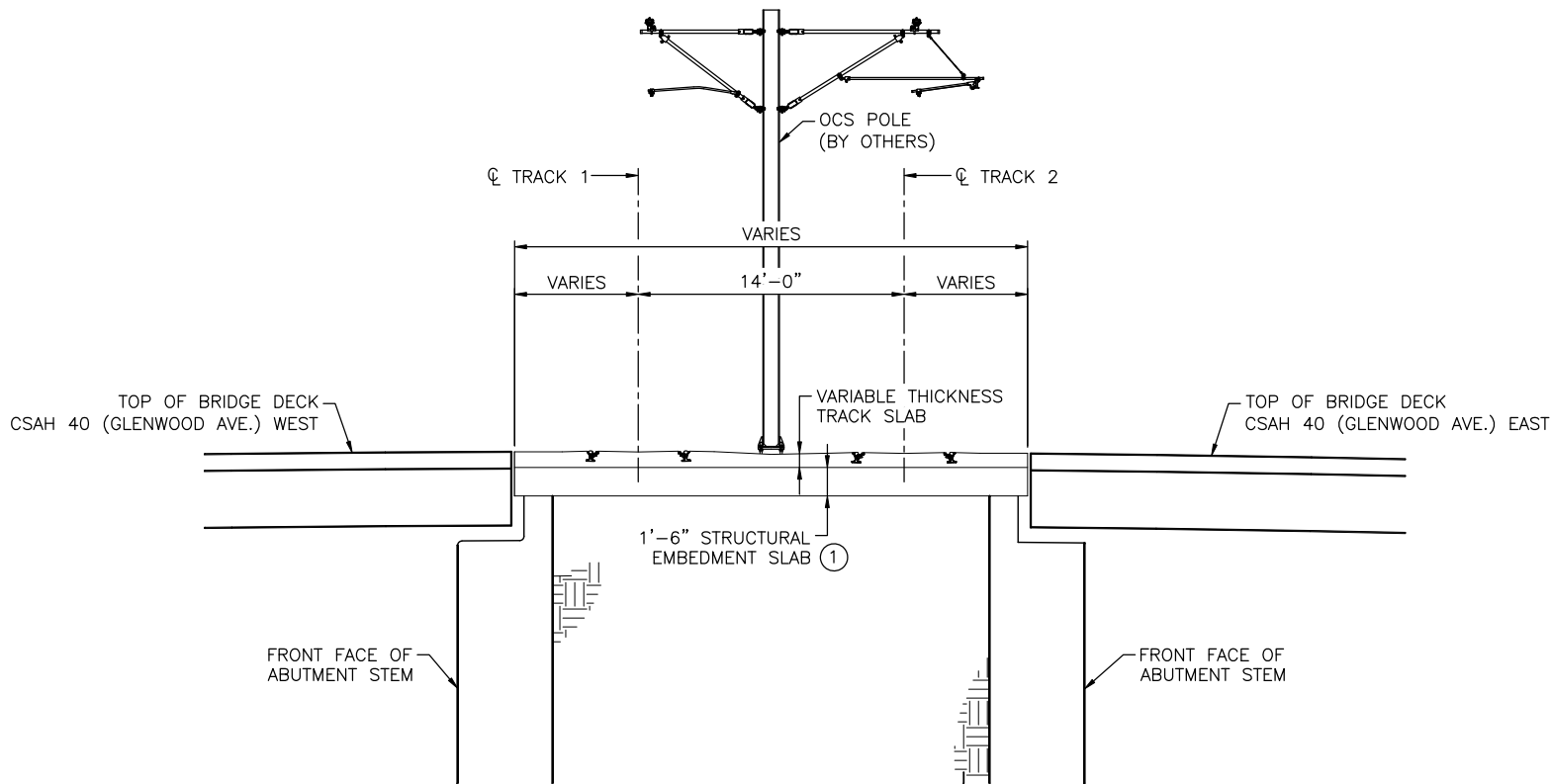


TRANSVERSE SECTION



NOTES:

- ① STRUCTURAL SLAB TO BE SUPPORTED ON ABUTMENT BACKWALLS. END REGIONS OF STRUCTURAL SLAB AND TRACK SLAB ARE ALSO USED TO EMBED THE WATERPROOF EXPANSION JOINT DEVICES.
- ② TYPE 5 WATERPROOF EXPANSION JOINT DEVICE WITH SNOWPLOW FINGERS.
- ③ THE TYPICAL CROSS SLOPE IS 2.00%, BUT THE CROSS SLOPES ADJACENT TO THE LRT TRACK CORRIDOR NEED TO BE TRANSITIONED TO MATCH THE GEOMETRY OF THE LRT TRACK CORRIDOR.



TYPICAL SECTION BETWEEN GLENWOOD WEST BRIDGE & GLENWOOD EAST BRIDGE

DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



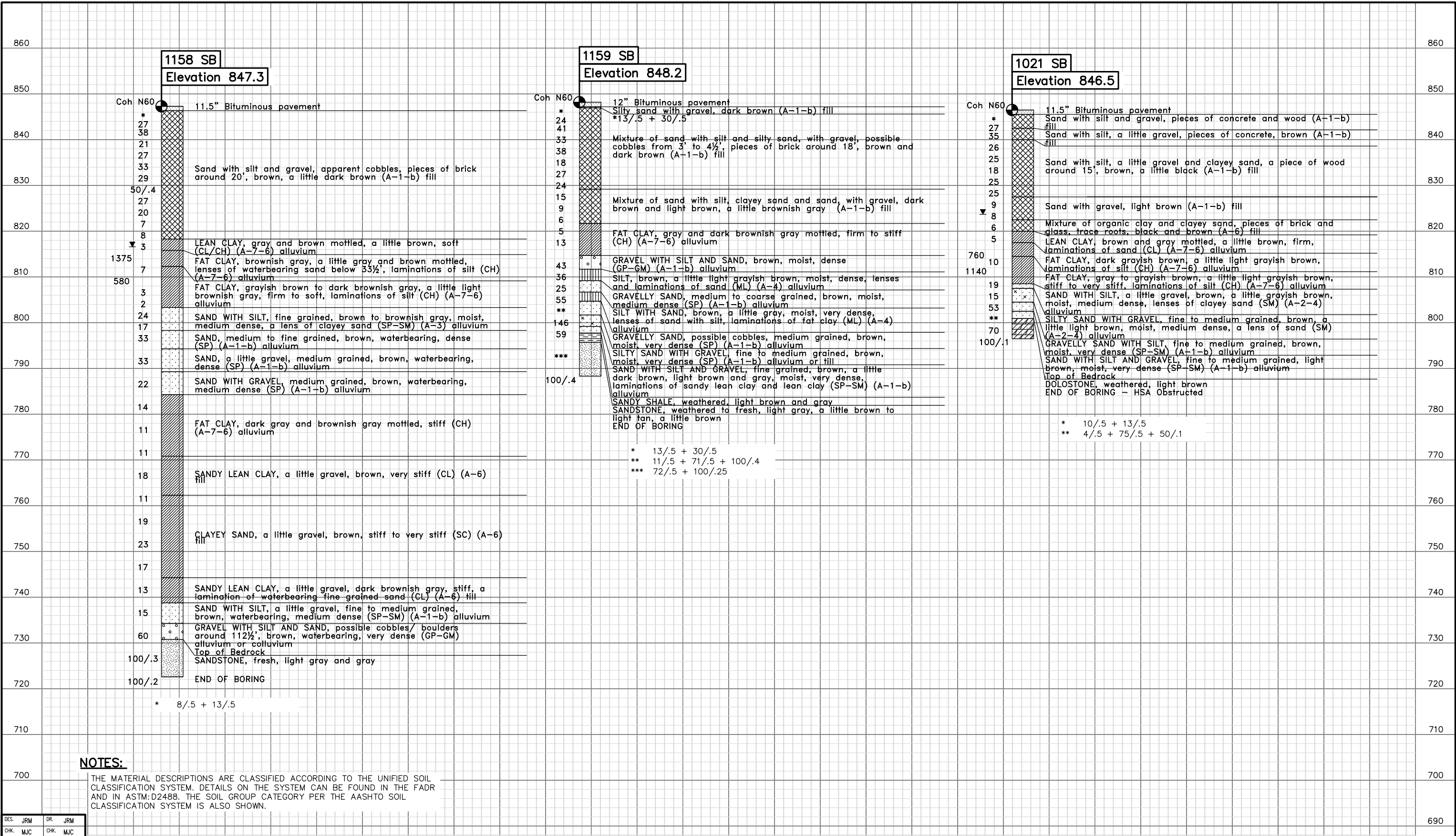
EAST - VOLUME 2 (STRUCTURES)
CSAH 40 (GLENWOOD AVENUE) - EAST
BRIDGE XXXXX (VEH)
TRANSVERSE SECTION

DISCIPLINE: STRUCTURES

SHEET NAME: E4-STU-BRG-GLAE-VEH-SUP

SHEET
177
OF
274

Aug. 25 2014 11:06 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-GLAE-VEH-BOR-002.dwg By: muellerj



NOTES:

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

DES. JRM CHK. MJC	DR. JRM CHK. MJC				
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

PRELIMINARY ENGINEERING

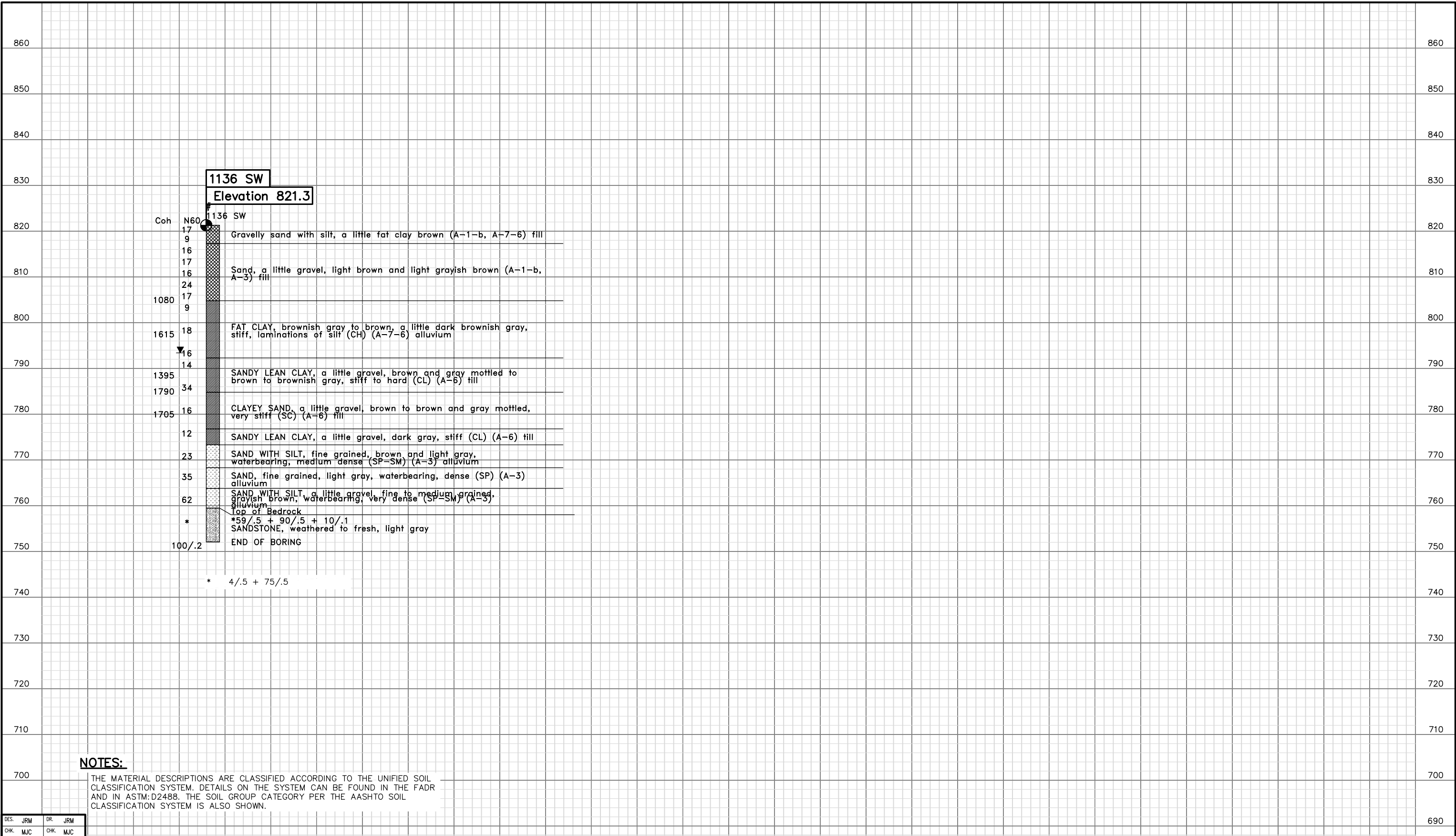
EAST - VOLUME 2 (STRUCTURES)
CSAH 40 (GLENWOOD AVENUE) - EAST
BRIDGE XXXXX (VEH)
BORINGS (2 OF 3)

DISCIPLINE: STRUCTURES

SHEET NAME: E4-STU-BRG-GLAE-VEH-BOR-002

SHEET 179 OF 274

Aug. 25 2014 11:06 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-GLAE-VEH-BOR-003.dwg By: muellerj





NOTES:

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

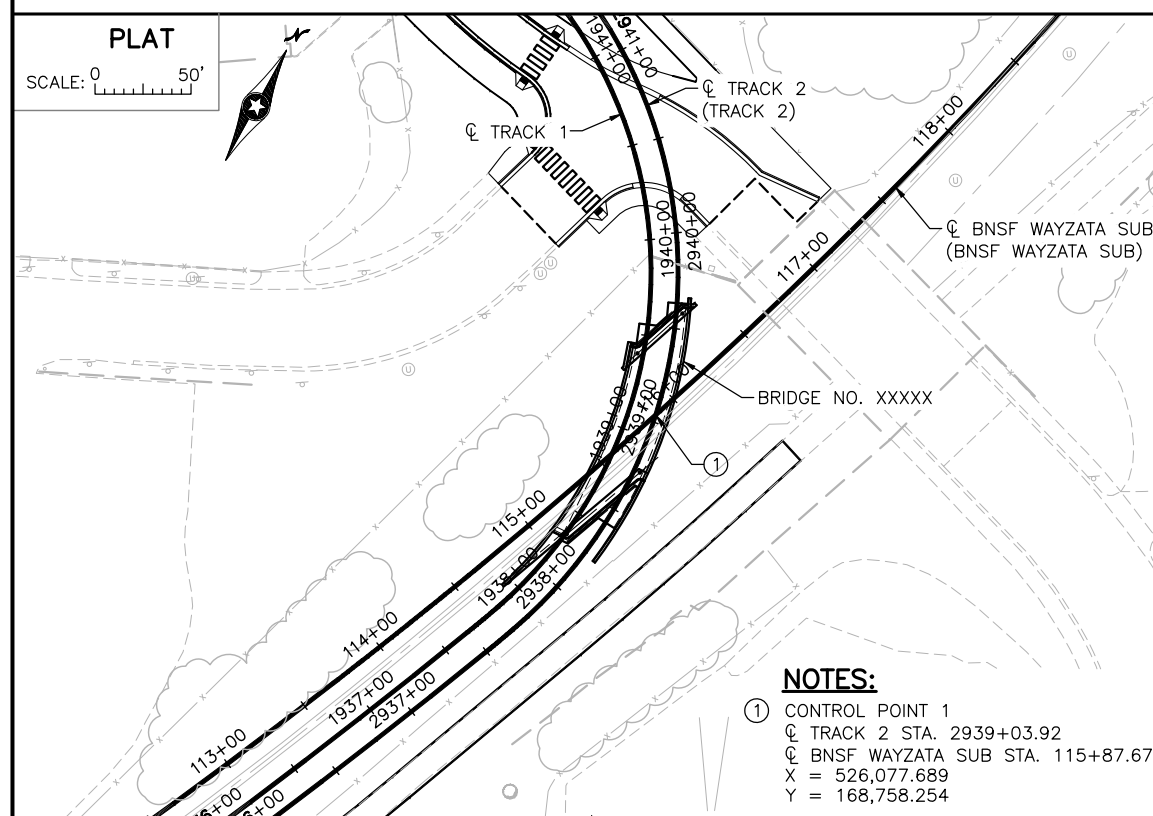
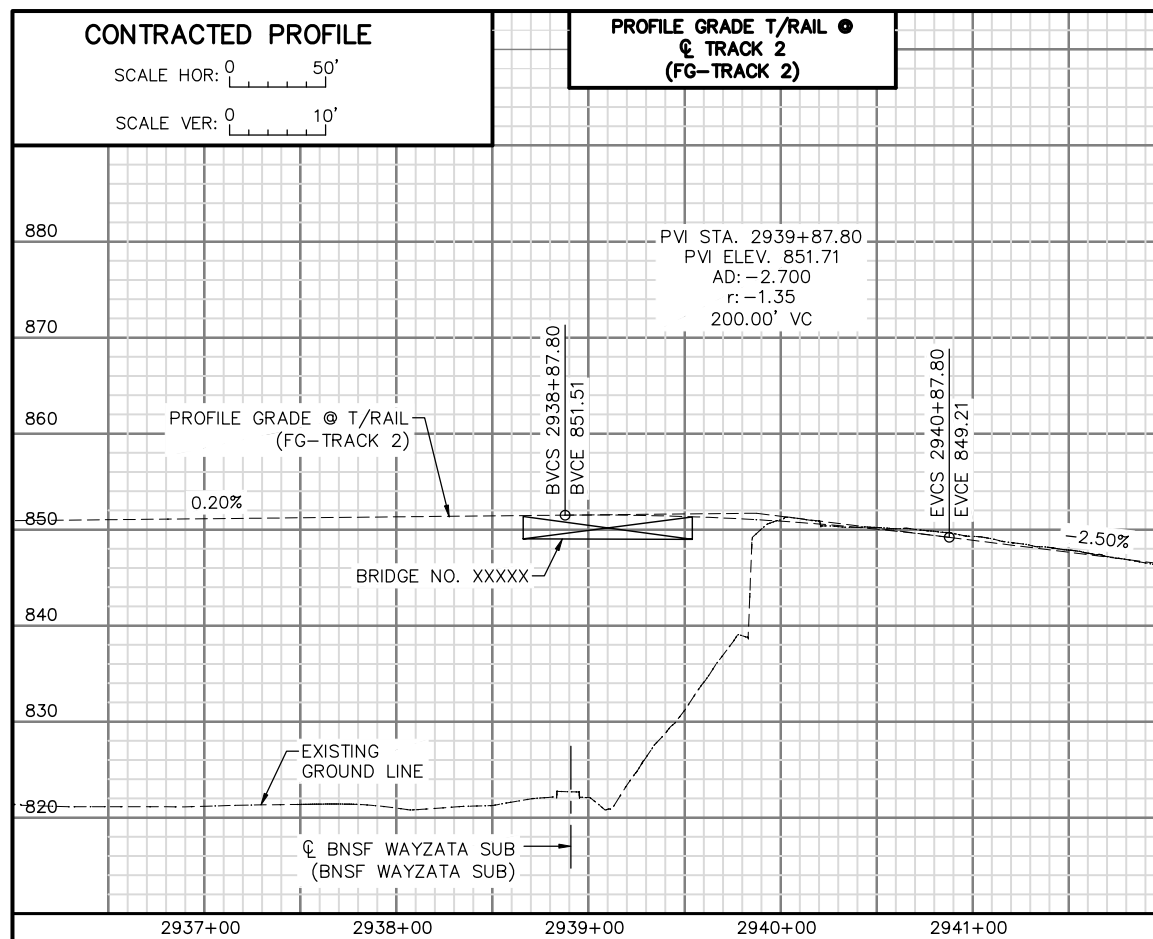
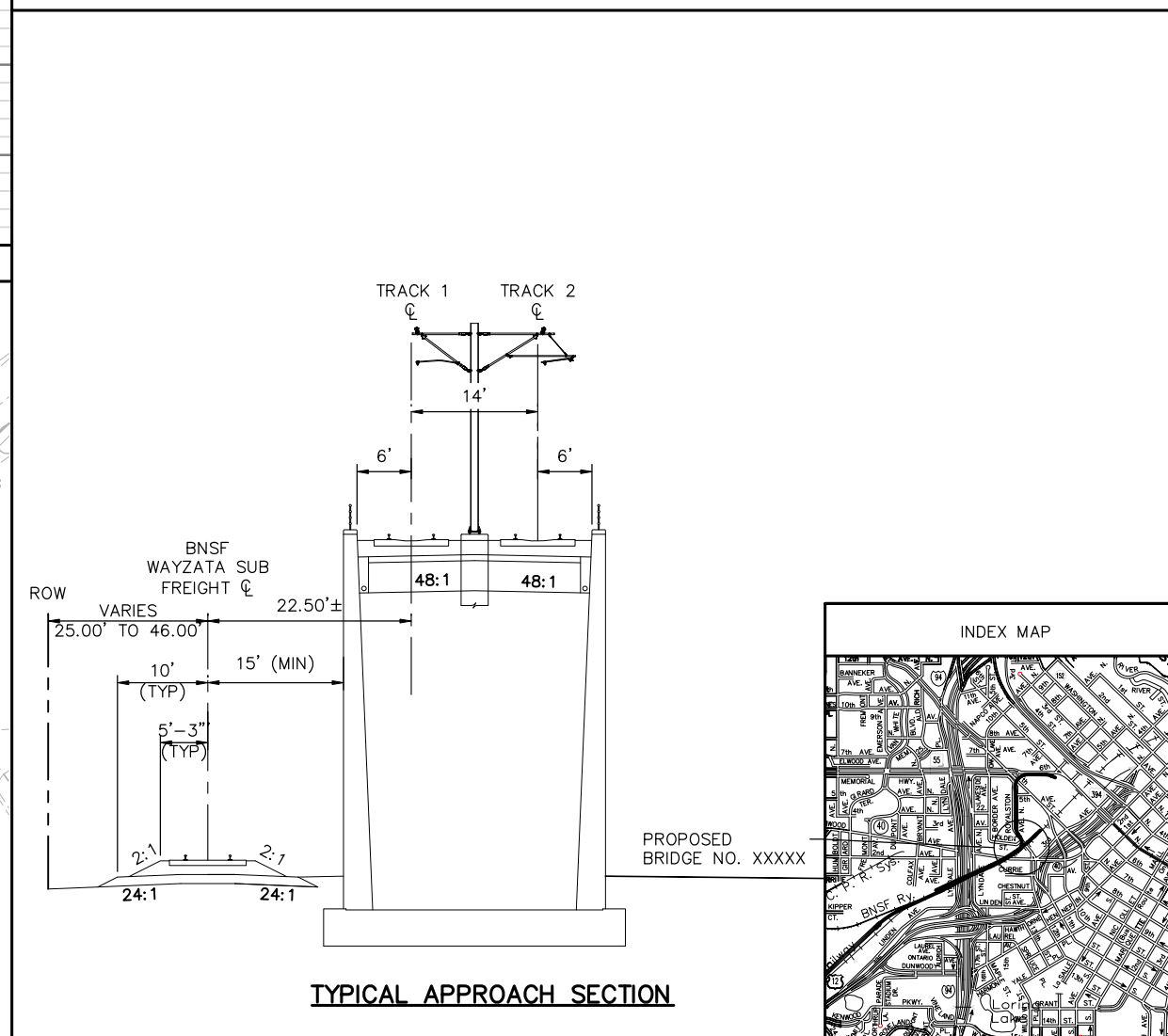
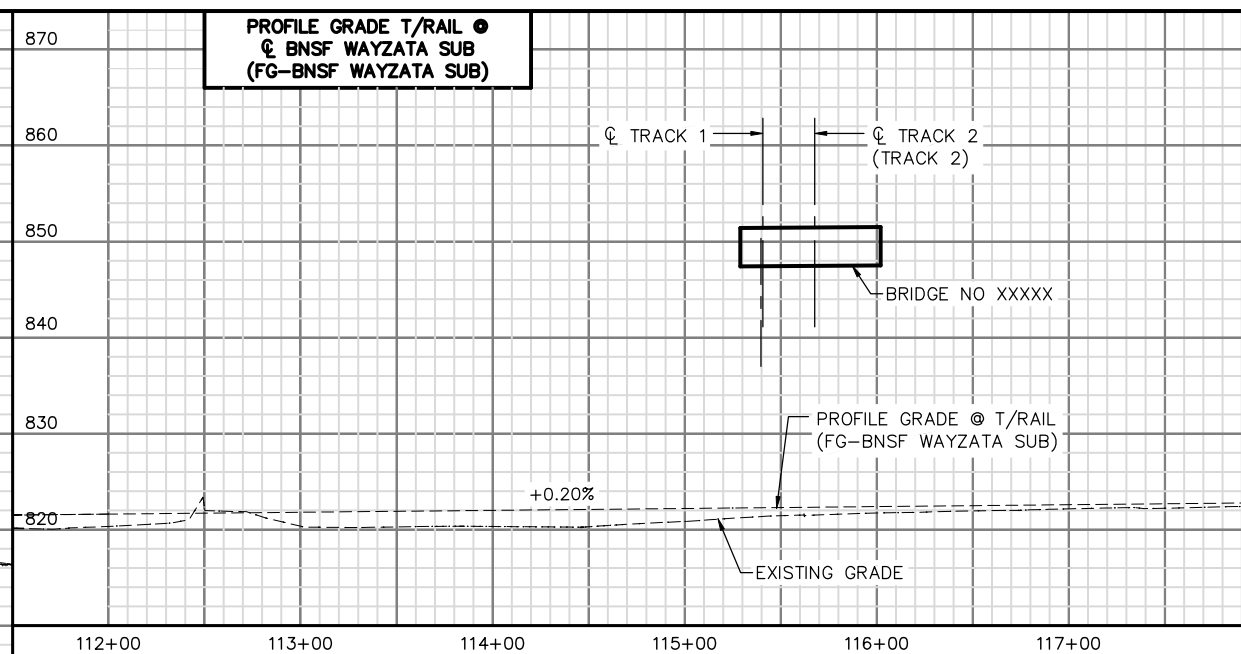
Kimley»Horn TKDA	 METROPOLITAN COUNCIL	 SOUTHWEST Green Line LRT Extension	EAST - VOLUME 2 (STRUCTURES) CSAH 40 (GLENWOOD AVENUE) - EAST BRIDGE XXXXX (VEH) BORINGS (3 OF 3)	SHEET 180 OF 274
PRELIMINARY ENGINEERING			DISCIPLINE: STRUCTURES	SHEET NAME: E4-STU-BRG-GLAE-VEH-BOR-003

Aug. 25 2014 11:06 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-GLAE-VEH-AES.dwg By: muellerj

AESTHETIC DETAILS TO BE DETERMINED DURING ADVANCED DESIGN:

- 1. ABUTMENT SURFACE
- 2. ABUTMENT/WALL CORNER DETAIL
- 3. EXPOSED EDGE OF DECK
- 4. EXPOSED BARRIER
- 5. EXPOSED FASCIA BEAM
- 6. BOTTOM OF BEAMS
- 7. RAILING AND SCREENING

DES. JRM		DR. JRM													
CHK. MJC		CHK. MJC													
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL										

[illegible]

**LOCATION ENGINEER'S OBSERVATIONS
AT BRIDGE SITE**

1. SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS SLIDING BANKS, RECREATIONAL BOATING.
2. OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
3. APPARENT HIGHWATER ELEVATION OBTAINED FROM:
4. OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.


HYDRAULIC ENGINEER'S RECOMMENDATION	
DATE:	
STREAM OR DITCH DESIGNATION	
DRAINAGE AREA	
MAX FLOOD ON RECORD	
DESIGN FLOOD (YR. FREQ.):	C.F.S.
HEADWATER ELEVATION:	FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE	F.P.S.
TOTAL STAGE INCREASE	FT.
LOW MEMBER AT OR ABOVE ELEVATION	FT.
WATERWAY AREA REQUIRED BELOW ELEV.	= SQ. FT.
AT RIGHT ANGLES TO CHANNEL	
BASIC FLOOD (100 YR. FREQ.)	C.F.S.
HEADWATER ELEVATION:	FT.
TOTAL STAGE INCREASE	FT.
MEAN VELOCITY THROUGH STRUCTURE	
FLOWLINE ELEVATION:	FT.
SKEW ANGLE:	
ESTIMATED PRILIMINARY TOTAL SCOUR AT PIER EL.	
(500 OR OT YR. FREQ.)	

SCOUR CONFIRMATION RECOMMENDATION	
DATE: _____	
TOTAL SCOUR AT PIER EL. _____ (500 OR QT YR. FREQ.)	
SCOUR CODE: OBTAIN FROM HYDRAULIC ENGINEER	


BRIDGE SURVEY SHEETS MADE FROM 2014 MFRA SURVEYS

1ST BENCH MARK (NAVD 88)
BENCHMARK ID PT. 78
ELEVATION = 851.67
N = 168845.25, E = 526108.98
DESCRIPTION = 1/2" PIPE W/ CAP

2ND BENCH MARK (NAVD 88)
BENCHMARK ID PT. 77
ELEVATION = 849.53
N = 168719.56, E = 526300.32
DESCRIPTION = 1/2" PIPE W/ CAP

	BRIDGE SURVEY	
	SOUTHWEST LRT OVER BNSF WAYZATA SUB RR TRACKS. LOCATED 0.25 MILES NORTH-EAST OF JCT. CSAH 40 (GLENWOOD AVENUE) AND INTERSTATE 94	
	SEC 22	T 29N R 24W
	CITY OF MINNEAPOLIS	HENNEPIN COUNTY
	BRIDGE NO.	XXXXXX

Kimley»»Horn


TKDA

PRELIMINARY ENGINEERING



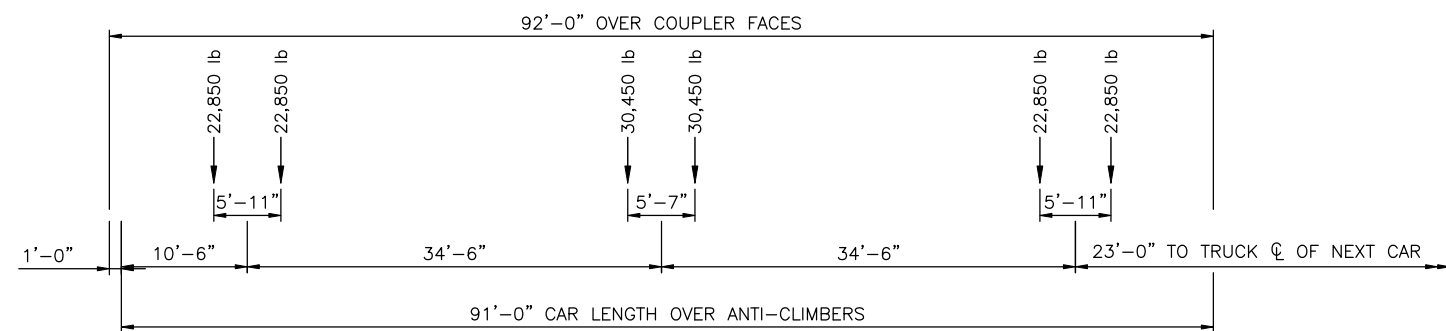
METROPOLITAN
C O U N C I L



SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES) LRT OVER BNSF TRACK BRIDGE XXXXX (LRT) BRIDGE SURVEY		SHEET 183 OF 274
DISCIPLINE: STRUCTURES	SHEET NAME: E4-STU-BRG-TRK2-LRT-SUR-001	

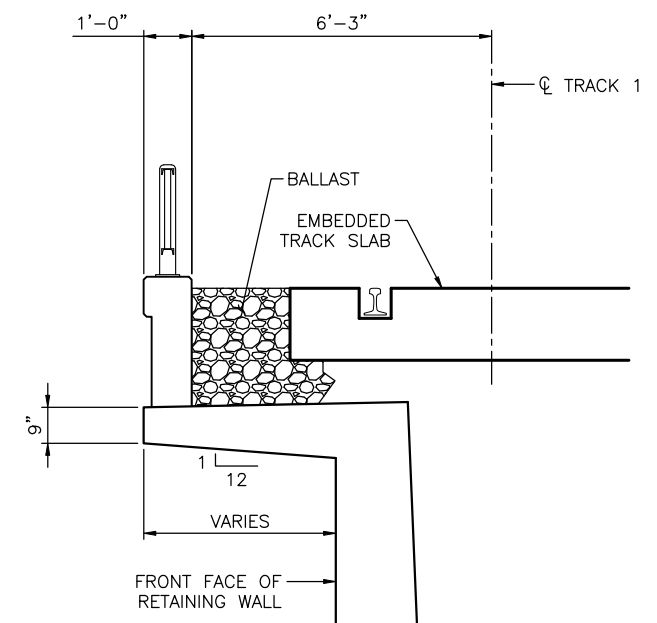
① VARIES IN THE REGION NEAR THE
SOUTHWEST CORNER OF THE BRIDGE.



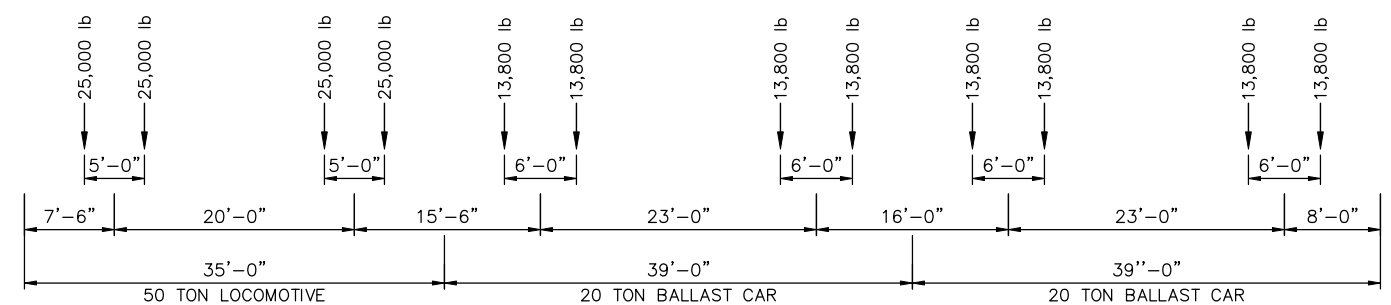
NOTES:

-
- Diagram illustrating the cross-section of a concrete barrier (Type P-1 MOD.) showing dimensions and components:
- Dimensions:**
 - Top width: 1'-0" (left section) and 6'-3" (main section).
 - Vertical dimensions on the left: 9" (top section), 2'-3" (main section, labeled "VARIES"), and 4" (bottom section).
 - Vertical dimension on the right: 3'-0" (labeled "CONC. SLAB" and "PT").
 - Bottom width: VARIES.
 - Components and Features:**
 - EMBEDDED TRACK SLAB:** The main horizontal structure.
 - BALLAST:** The material filling the space between the concrete barrier and the track slab.
 - CL TRACK 1:** The track centerline.
 - 2.00%:** The slope of the track bed.
 - 1/12:** The slope of the barrier face.

SUPERSTRUCTURE DETAIL AT SOUTHWEST CORNER



WALL DETAIL AT SOUTHWEST CORNER



NOTES:

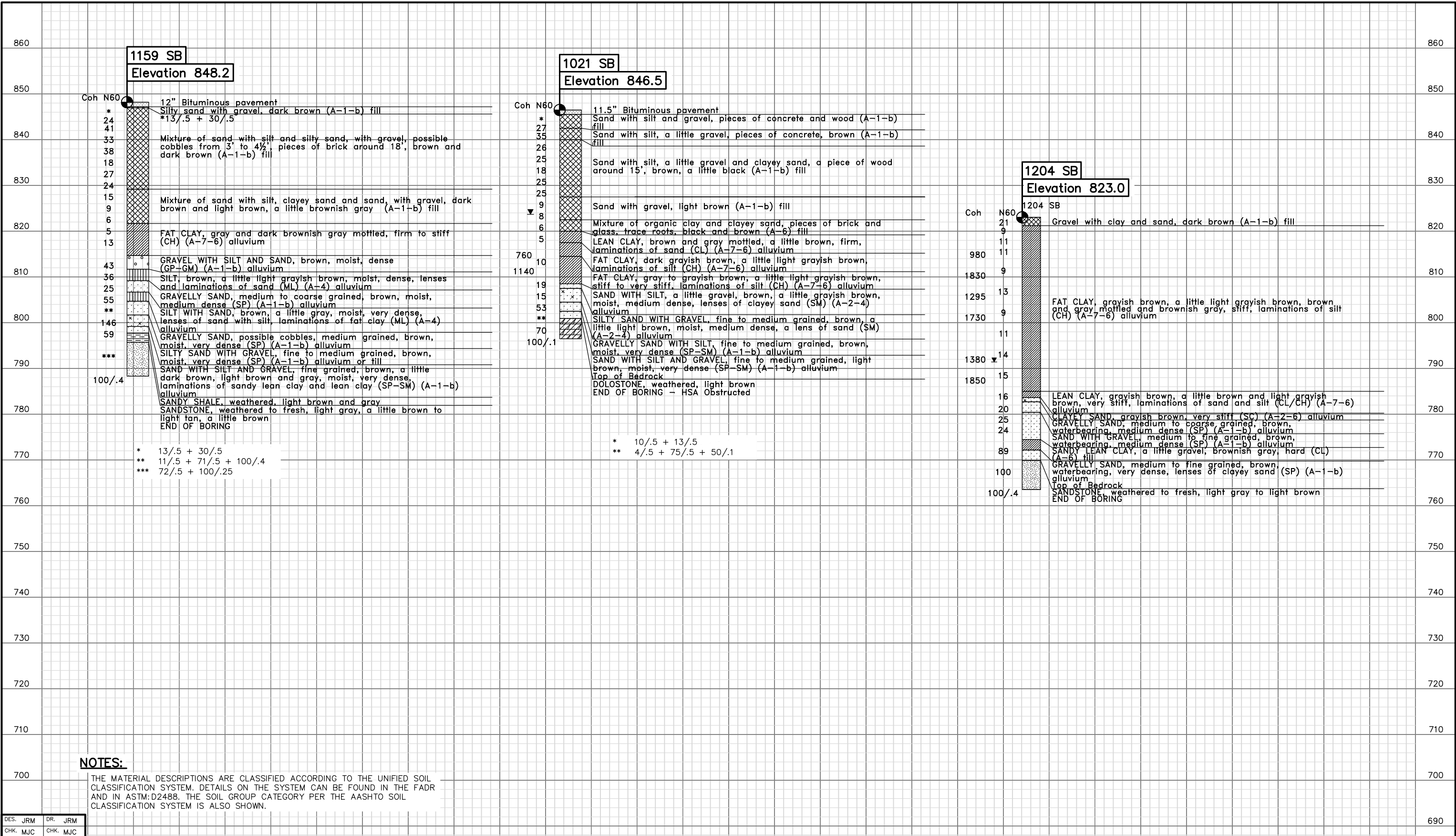
1. THE MAINTENANCE TRAIN SHALL CONSIST OF ONE LOCOMOTIVE AND ONE, TWO, THREE OR FOUR BALLAST CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
2. AXLE LOAD IN POUNDS.
3. WEIGHT OF EMPTY BALLAST CAR IS 15,000 POUNDS.

[illegible]

SHEET NAME:	E4-STU-BRG-TRK2-LRT-SUP
-------------	-------------------------

SHEET
184
OF
274

Aug. 25 2014 11:13 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-TRK2-LRT-BOR-002.dwg By: muellerj



NOTES:

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

TKDA

PRELIMINARY ENGINEERING

METROPOLITAN
C O U N C I L

SOUTHWEST
Green Line LRT Extension

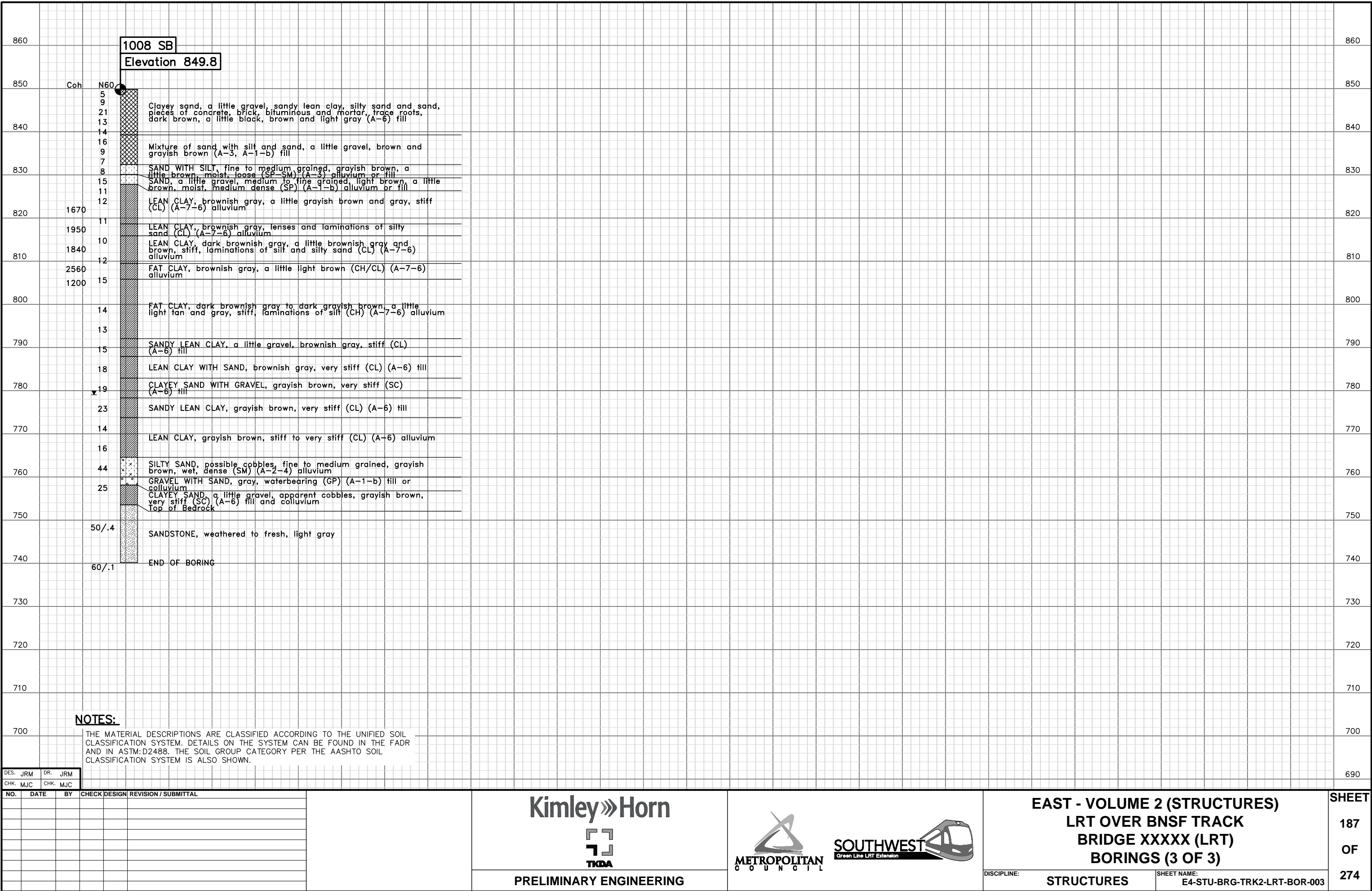
EAST - VOLUME 2 (STRUCTURES)
LRT OVER BNSF TRACK
BRIDGE XXXXX (LRT)
BORINGS (2 OF 3)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E4-STU-BRG-TRK2-LRT-BOR-002**

SHEET
186
OF
274

Aug. 25 2014 11:13 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-TRK2-LRT-BOR-003.dwg By: muellerj

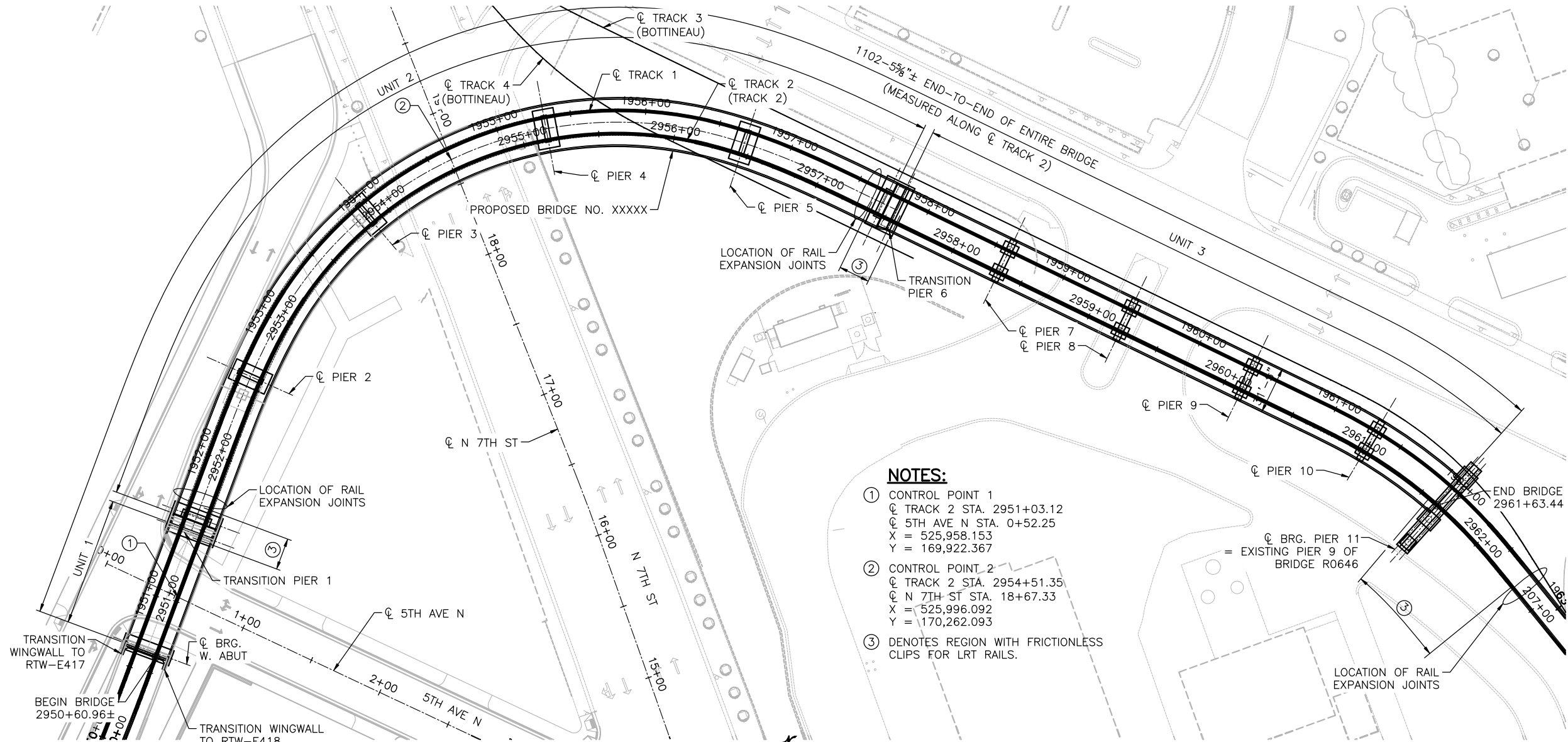


AESTHETIC DETAILS TO BE DETERMINED DURING ADVANCED DESIGN:

1. ABUTMENT SURFACE
2. ABUTMENT/WALL CORNER DETAIL
3. EXPOSED EDGE OF DECK
4. EXPOSED BARRIER
5. EXPOSED FASCIA BEAM
6. BOTTOM OF BEAMS
7. PIER COLUMN GEOMETRY AND SURFACE
8. RAILING AND SCREENING

[illegible]

Aug. 25 2014 11:39 am k:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-5A7S-LRT-GPE-001.dwg By: mueller]



NOTES:

- ① CONTROL POINT 1
CL TRACK 2 STA. 2951+03.12
CL 5TH AVE N STA. 0+52.25
X = 525,958.153
Y = 169,922.367
- ② CONTROL POINT 2
CL TRACK 2 STA. 2954+51.35
CL N 7TH ST STA. 18+67.33
X = 525,996.092
Y = 170,262.093
- ③ DENOTES REGION WITH FRICTIONLESS CLIPS FOR LRT RAILS.

GENERAL PLAN

0 20' 40' 80'

SCALE IN FEET

RAIL VS. STRUCTURE MOVEMENTS:

ALL THREE UNITS USE DIRECT-FIXATION RAILS EXCEPT FOR THE REGIONS WHERE THE RAILS TRAVERSE BRIDGE EXPANSION JOINTS.

THERE, FRICTIONLESS CLIPS WILL BE REQUIRED TO ALLOW THE BRIDGE DECKS TO EXPAND AND CONTRACT DUE TO TEMPERATURE, SHRINKAGE AND CREEP. THESE REGIONS HAVE BEEN IDENTIFIED ON THIS PLAN SHEET.

THE SUGGESTED LOCATIONS OF THE RAIL EXPANSION JOINTS ARE SHOWN ON THIS PLAN SHEET.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

PROPOSED TYPE OF STRUCTURE

UNIT 1:

DECK:

SINGLE-SPAN WITH 5 LINES OF 36M PRESTRESSED CONCRETE BEAMS. DIRECT-FIXATION RAILS

SUBSTRUCTURE:

DEEP PARAPET ABUTMENTS SUPPORTED ON C.I.P. PILING.

DEPTH OF STRUCTURE:

±5'-8" TOP OF RAIL TO LOW BRIDGE

AESTHETICS:

LEVEL _

PROPOSED TYPE OF STRUCTURE

UNIT 2:

DECK:

CURVED 5-SPAN POST-TENSIONED CONCRETE SINGLE-CELL BOX GIRDER. DIRECT-FIXATION RAILS.

PIERS:

RADIALLY ALIGNED PIER SHAFTS SUPPORTED ON C.I.P. PILING.

DEPTH OF STRUCTURE:

±8'-0" TOP OF RAIL TO LOW BRIDGE

AESTHETICS:

LEVEL _

PROPOSED TYPE OF STRUCTURE

UNIT 3:

DECK:

5 SPANS WITH 4 LINES OF MN45 PRESTRESSED CONCRETE BEAMS. DIRECT FIXATION RAILS.

SUBSTRUCTURE:

PIER FRAMES SUPPORTED ON HP 12x53 PILING.

DEPTH OF STRUCTURE:

±6'-6" TOP OF RAIL TO LOW BRIDGE

AESTHETICS:

LEVEL _

DESIGN DATA

2012 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 6TH EDITION AND CURRENT INTERIMS

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA (REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD

LRV & MV LOADING DIAGRAM SHOWN ON SHEET 195

MATERIAL DESIGN PROPERTIES

REINFORCED CONCRETE:

f'c = 4000 PSI n = 8

fy = 60000 PSI REINFORCEMENT

PRE-TENSIONED CONCRETE:

f'c = 9000 PSI n = 1

POST-TENSIONED CONCRETE:

f'c = 6000 PSI n = 6

PRESTRESSING STEEL:

fpu = 270 KSI LOW RELAXATION STRANDS

0.75 x fpu FOR INITIAL PRESTRESS

DESIGN SPEED: OVER = 30 MPH (LRT)

UNDER = 30 MPH (VEH)

APPROXIMATE DECK AREA 34640 SQ. FT.

LIST OF SHEETS

NO.	DESCRIPTION
189	GENERAL PLAN
190-193	GENERAL PLAN AND ELEVATION
194	BRIDGE SURVEY
195-197	TRANSVERSE SECTION UNITS 1-3
198-205	BORINGS
206	AESTHETICS

PRELIMINARY PLAN
BRIDGE NO. XXXXX

SOUTHWEST LRT TRACKS OVER 5TH AVENUE NORTH AND 7TH STREET. LOCATED 0.3 MILES EAST OF JCT. T.H. 55 (OLSON MEMORIAL HIGHWAY) AND INTERSTATE 94.

DOUBLE-TRACK LRT BRIDGE UTILIZING THREE DIFFERENT STRUCTURE TYPES AND VARYING SPAN LENGTHS.

BRIDGE ID NOS. 501, 607 & 501

GENERAL PLAN

SEC 22 T 29N R 24W
CITY OF MINNEAPOLIS HENNEPIN COUNTY

APPROVED: _____
STATE BRIDGE ENGINEER DATE

DES. JRM DR. JRM
CHK. MJC CHK. MJC

JOB NO.: T9N635

STATE PROJ. NO.: 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
5TH AVENUE TO 7TH STREET
BRIDGE XXXXX (LRT)
GENERAL PLAN

DISCIPLINE: STRUCTURES

SHEET NAME: E4-STU-BRG-5A7S-LRT-GPE-001

SHEET
189
OF
274

The elevation view shows the bridge structure from station 0+00 to 0+52.25. It includes three spans: Span 1 (36M PCB STRUCTURE), Span 2 (POST-TENSIONED BOX GIRDER STRUCTURE), and Span 3. The bridge is supported by a South Abutment, Transition Pier 1, Pier 2, and Pier 3. The existing ground line is shown as a dashed line. Key features include vertical clearance points, profile grade lines, and various structural details like expansion joints (EXP) and fixed ends (FIX). Elevation markers range from EL. 800 to EL. 880.

DEVELOPED ELEVATION

Scale: 0 7.5' 15' 30'

SCALE IN FEET

DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NOTES:
 ① CONTROL POINT 1
 CL TRACK 2 STA. 2951+03.12
 CL 5TH AVE N STA. 0+52.25
 X = 525,958.153
 Y = 169,922.367

 ② DIMENSIONS MEASURED ALONG CL TRACK 2.

 ③ CRITICAL CLEARANCE DATA BASED ON PRELIMINARY INFORMATION FOR 5TH AVENUE NORTH.

 ④ REFER TO NOTES ON SHEET 196 DESCRIBING THE GEOMETRIC RELATIONSHIP OF CL BOX GIRDER AND THE LRT TRACK ALIGNMENTS.

 ⑤ PROVIDE GUIDE LUGS ON SUBSTRUCTURES IDENTIFIED THUS. GUIDE LUGS TO BE DESIGNED TO PRODUCE THE FORCE COUPLE NECESSARY TO DIRECT THE DECK MOVEMENT PARALLEL TO THE TRACKS AT THE MODULAR JOINT.

 ⑥ THE TRANSITION PIER PROVIDES A VISUAL SEPARATION AND TRANSITION FOR THE DIFFERENT STRUCTURE DEPTHS OF ADJACENT SPANS. IT ALSO PROVIDES ADEQUATE SPACE FOR POST-TENSIONING OPERATIONS. THE STRUCTURE STYLE OF THE TRANSITION PIER WILL BE FURTHER EVALUATED DURING ADVANCED DESIGN.

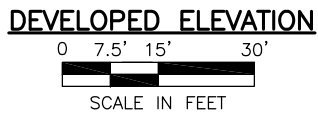
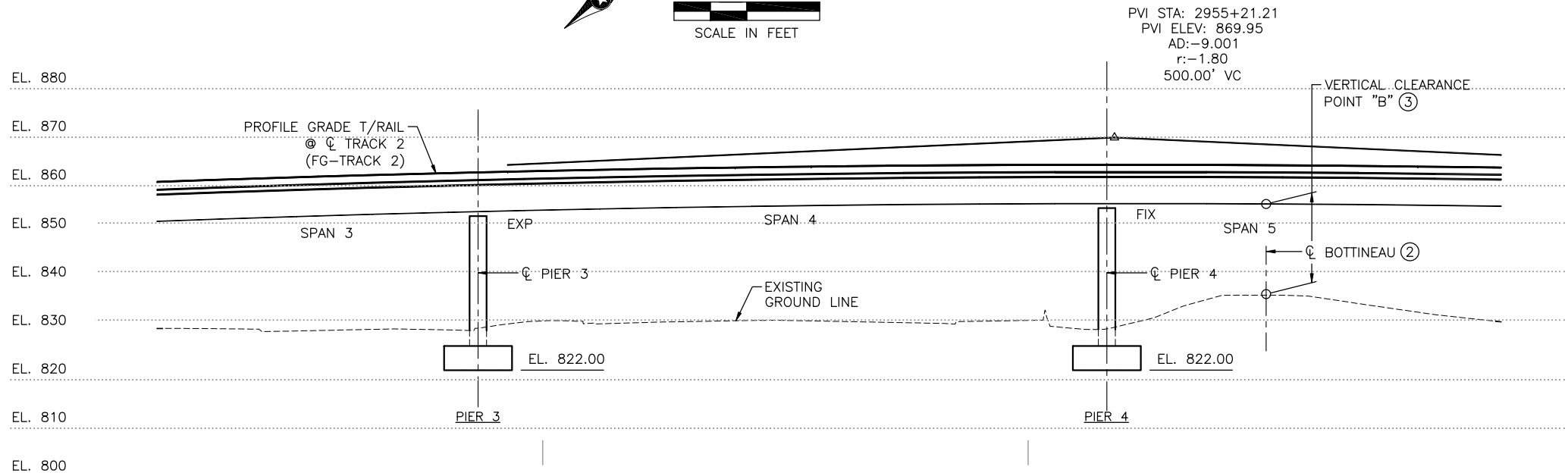
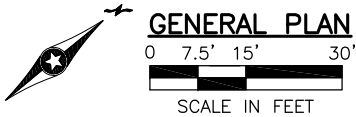
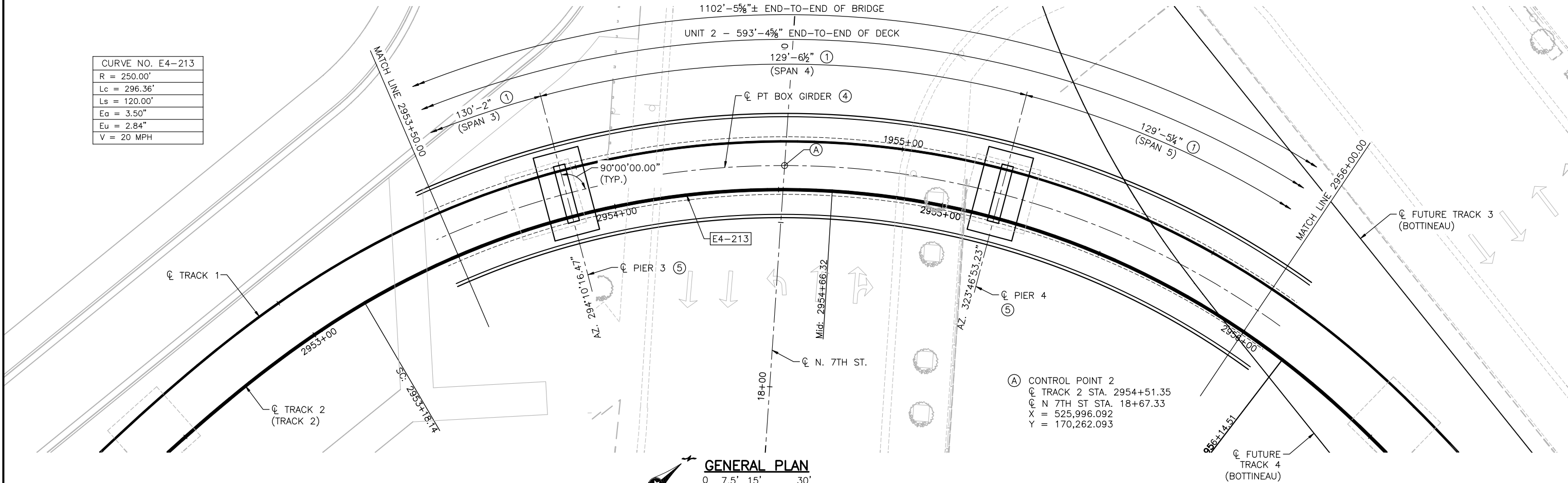
--

The logos for the Metropolitan Council and the Southwest Green Line LRT Extension are displayed. The Metropolitan Council logo features a stylized triangle with a diagonal line through it, above the text "METROPOLITAN COUNCIL". The Southwest logo features a stylized train icon above the text "SOUTHWEST" and "Green Line LRT Extension".

<p>EAST - VOLUME 2 (STRUCTURES)</p> <p>5TH AVENUE AND 7TH STREET</p> <p>BRIDGE XXXXX (LRT)</p> <p>GENERAL PLAN AND ELEVATION (1 OF 4)</p>		<p>SHEET</p> <p>190</p> <p>OF</p> <p>274</p>
<p>DISCIPLINE:</p> <p>STRUCTURES</p>	<p>SHEET NAME:</p> <p>E4-STU-BRG-5A7S-LRT-GPE-002</p>	

Aug. 25 2014 11:42 am k:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-5A7S-LRT-GPE-003.dwg By: muellerj

CURVE NO. E4-213
R = 250.00'
Lc = 296.36'
Ls = 120.00'
Ea = 3.50"
Eu = 2.84"
V = 20 MPH



NOTES:

- (1) DIMENSIONS MEASURED ALONG CL TRACK 2.
- (2) BOTTINEAU ALIGNMENT SHOWN IS BASED ON PRELIMINARY INFORMATION AND IS TO BE FINALIZED PRIOR TO FINAL DESIGN.
- (3) PROFILE GRADE INFORMATION UNAVAILABLE FOR BOTTINEAU ALIGNMENT. VERTICAL CLEARANCE DIMENSION TO BE DETERMINED UPON FINAL DESIGN AND AVAILABLE PROFILE INFORMATION.
- (4) REFER TO NOTES ON SHEET 196 DESCRIBING THE GEOMETRIC RELATIONSHIP OF CL BOX GIRDER AND THE LRT TRACK ALIGNMENTS.
- (5) PROVIDE GUIDE LUGS ON SUBSTRUCTURES IDENTIFIED THUS. GUIDE LUGS TO BE DESIGNED TO PRODUCE THE FORCE COUPLE NECESSARY TO DIRECT THE DECK MOVEMENT PARALLEL TO THE TRACKS AT THE MODULAR JOINT.

DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



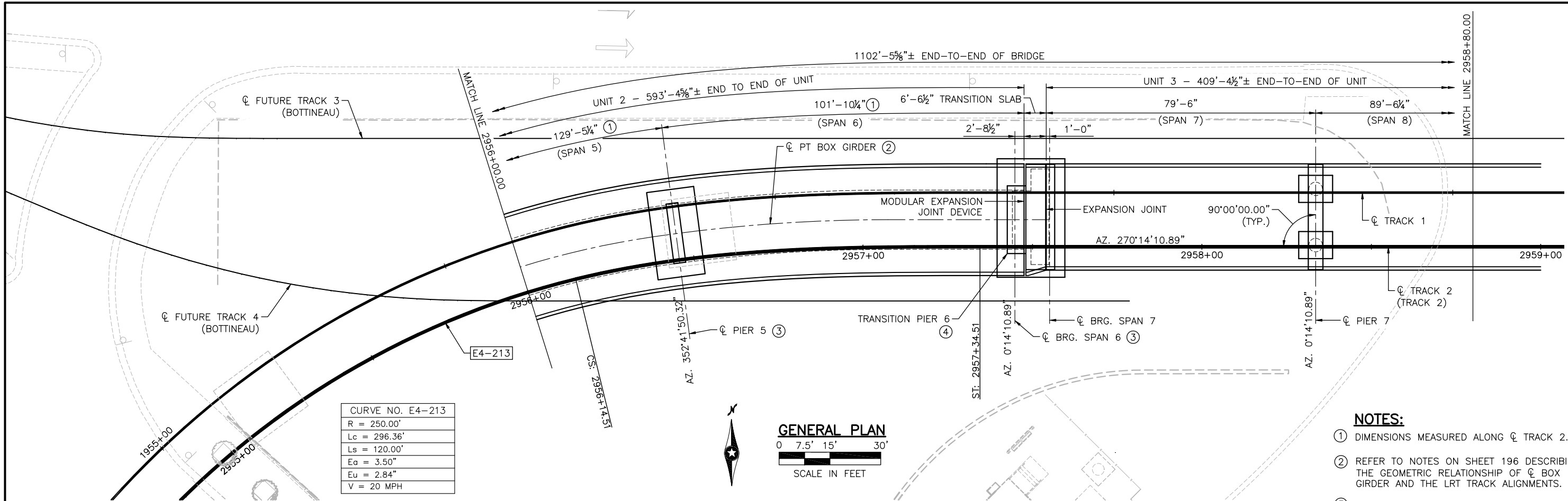
EAST - VOLUME 2 (STRUCTURES)
5TH AVENUE AND 7TH STREET
BRIDGE XXXXX (LRT)
GENERAL PLAN AND ELEVATION (2 OF 4)

DISCIPLINE: STRUCTURES

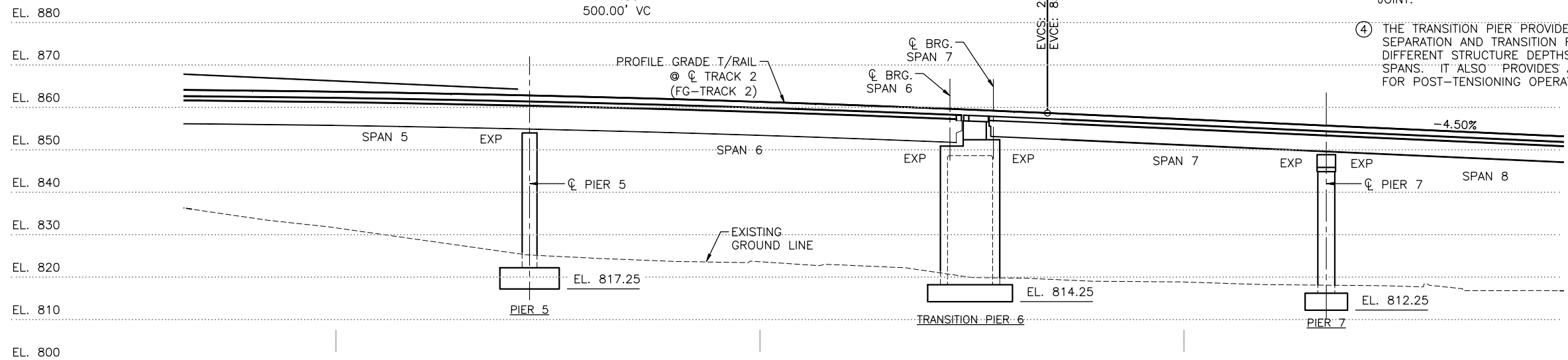
SHEET NAME: E4-STU-BRG-5A7S-LRT-GPE-003

SHEET
191
OF
274

Aug. 25 2014 11:44 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-5A7S-LRT-GPE-004.dwg By: muellerj



PVI STA: 2955+21.21
PVI ELEV: 869.95
AD: -9.001
r: -1.80
500.00' VC




NOTES:

- ① DIMENSIONS MEASURED ALONG ϕ TRACK 2.
- ② REFER TO NOTES ON SHEET 196 DESCRIBING THE GEOMETRIC RELATIONSHIP OF ϕ BOX GIRDER AND THE LRT TRACK ALIGNMENTS.
- ③ PROVIDE GUIDE LUGS ON SUBSTRUCTURES IDENTIFIED THUS. GUIDE LUGS TO BE DESIGNED TO PRODUCE THE FORCE COUPLE NECESSARY TO DIRECT THE DECK MOVEMENT PARALLEL TO THE TRACKS AT THE MODULAR JOINT.
- ④ THE TRANSITION PIER PROVIDES A VISUAL SEPARATION AND TRANSITION FOR THE DIFFERENT STRUCTURE DEPTHS OF ADJACENT SPANS. IT ALSO PROVIDES ADEQUATE SPACE FOR POST-TENSIONING OPERATIONS.

DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn


TKDA

PRELIMINARY ENGINEERING


METROPOLITAN
C O U N C I L

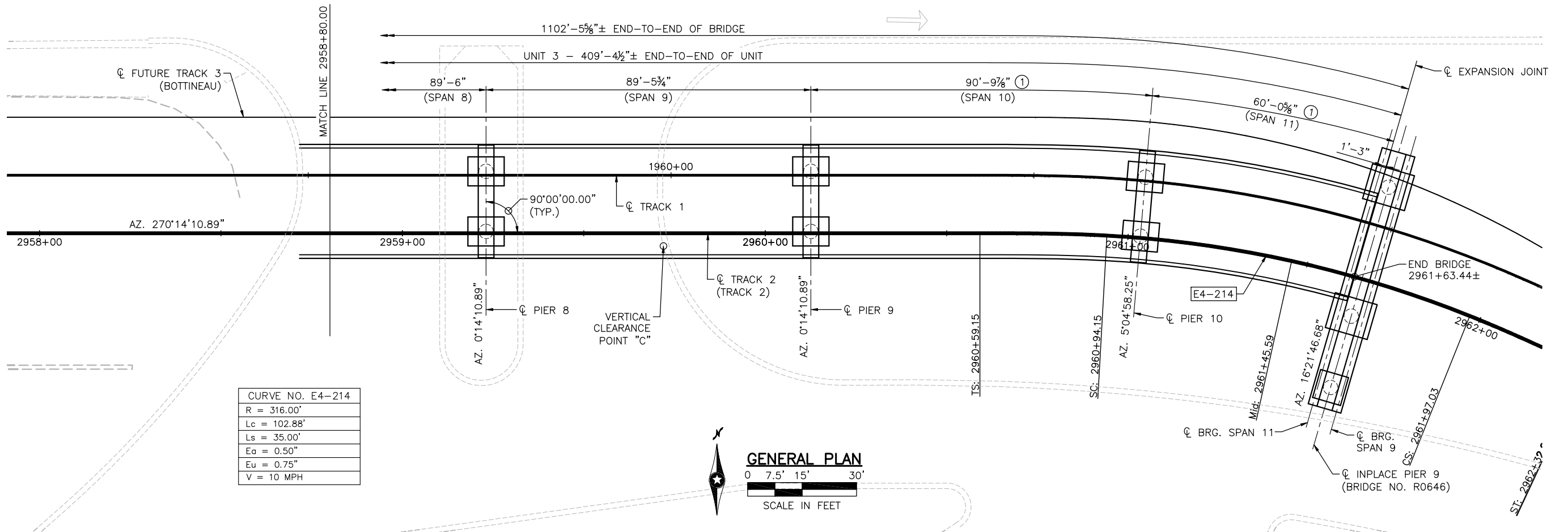

SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
5TH AVENUE AND 7TH STREET
BRIDGE XXXXX (LRT)
GENERAL PLAN AND ELEVATION (3 OF 4)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E4-STU-BRG-5A7S-LRT-GPE-004**

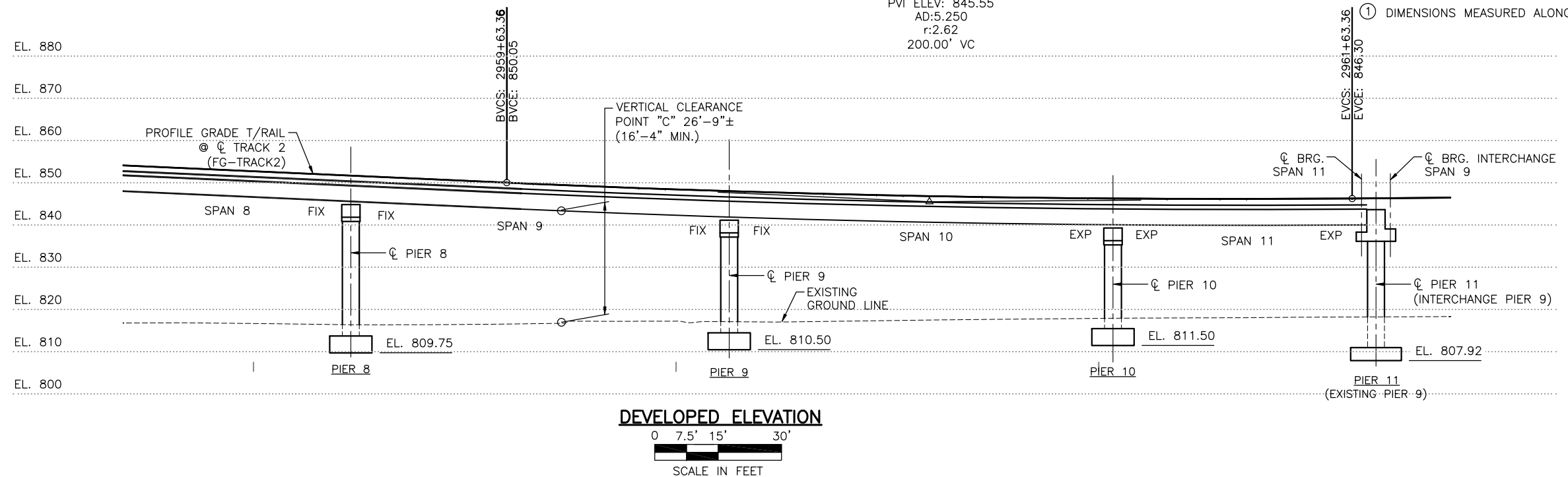
Aug. 25 2014 11:45 am k:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-5A7S-LRT-GPE-005.dwg By: muellerj



PVI STA: 2960+63.36
PVI ELEV: 845.55
AD: 5.250
r: 2.62
200.00' VC



NOTES:

- ① DIMENSIONS MEASURED ALONG CL TRACK 2.



DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK/DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension

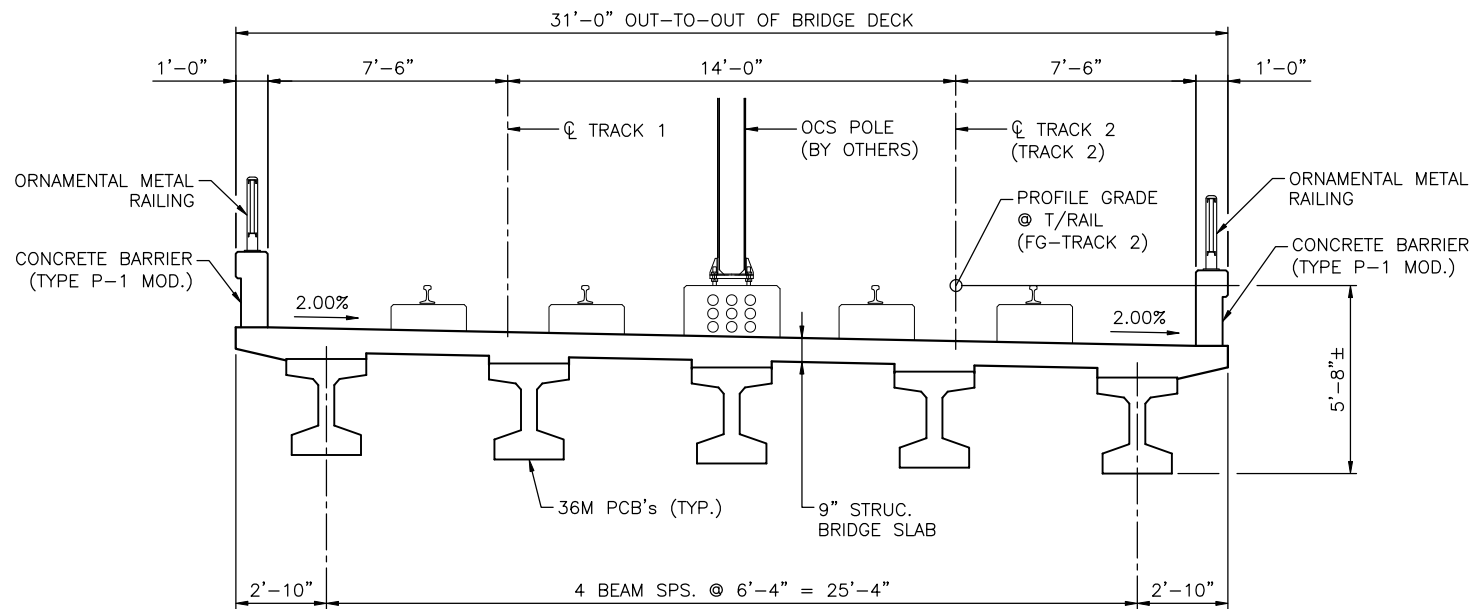
EAST - VOLUME 2 (STRUCTURES)
5TH AVENUE AND 7TH STREET
BRIDGE XXXX (LRT)
GENERAL PLAN AND ELEVATION (4 OF 4)

DISCIPLINE: STRUCTURES

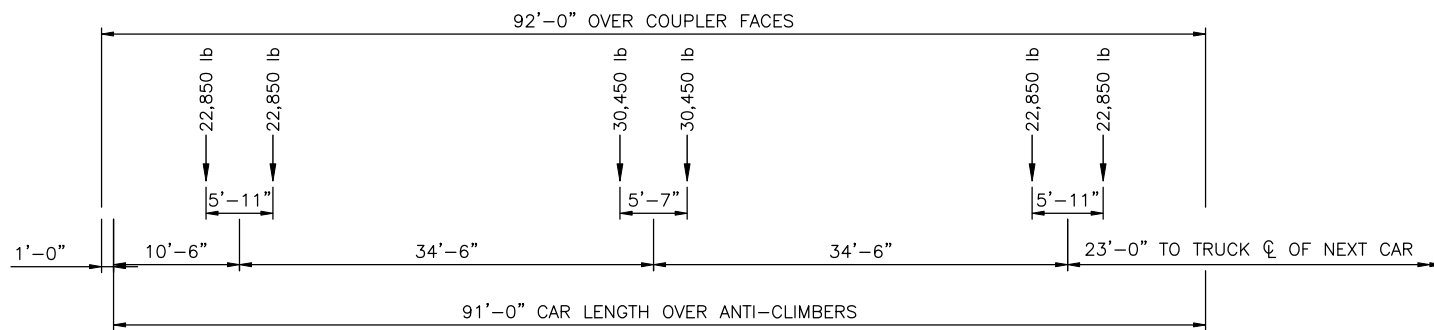
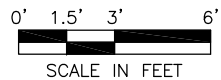
SHEET NAME: E4-STU-BRG-5A7S-LRT-GPE-005

SHEET
193
OF
274

Aug. 26 2014 10:10 am k:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-5A7S-LRT-SUP-001.dwg By: muellerj



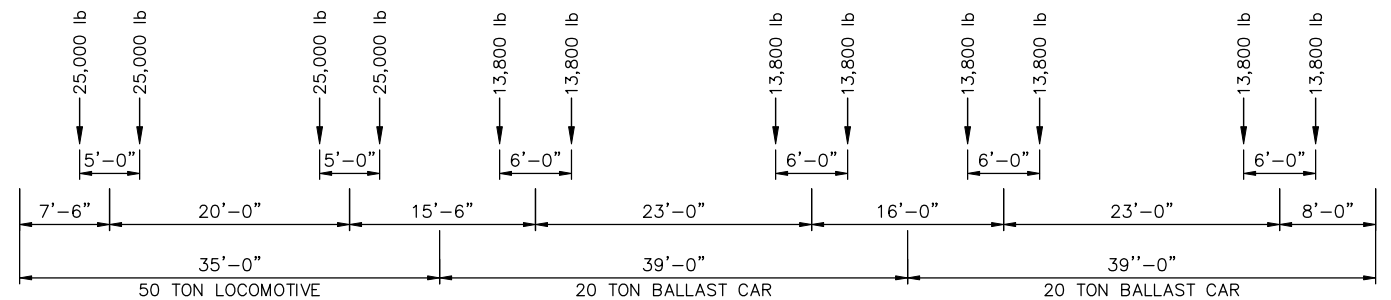
TRANSVERSE SECTION - UNIT 1



LIGHT RAIL VEHICLE LOADING DIAGRAM

NOTES:

1. THE LRT TRAIN SHALL CONSIST OF EITHER ONE, TWO OR THREE CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
2. AXLE LOAD IN POUNDS.
3. LOADING DIAGRAM REPRESENTS MAXIMUM LOAD AT EACH TRUCK.



MAINTENANCE TRAIN LOADING DIAGRAM

NOTES:

1. THE MAINTENANCE TRAIN SHALL CONSIST OF ONE LOCOMOTIVE AND ONE, TWO, THREE OR FOUR BALLAST CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
2. AXLE LOAD IN POUNDS.
3. WEIGHT OF EMPTY BALLAST CAR IS 15,000 POUNDS.

DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn



PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



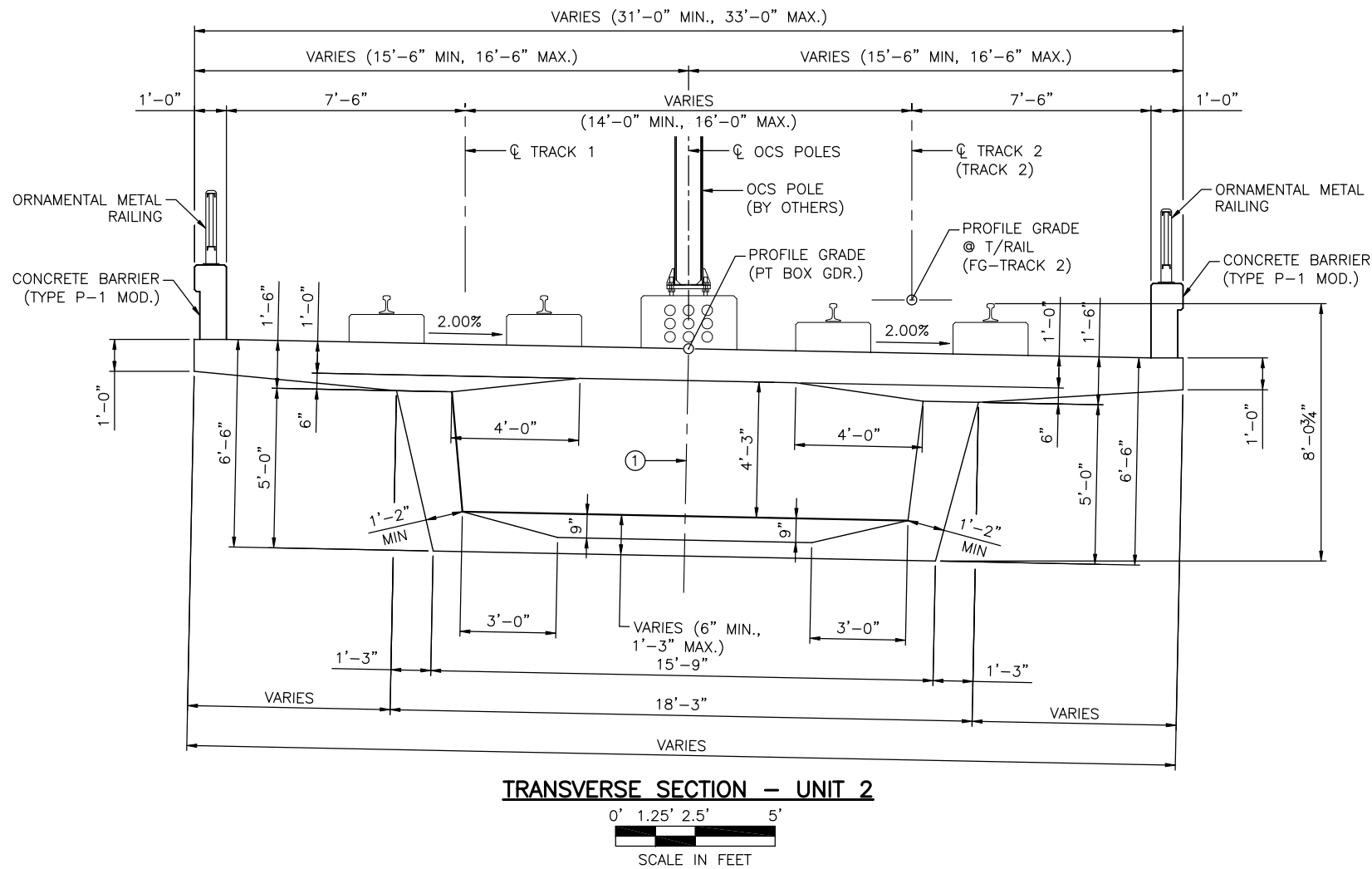
EAST - VOLUME 2 (STRUCTURES)
5TH AVENUE AND 7TH STREET
BRIDGE XXXXX (LRT)
TRANSVERSE SECTION - UNIT 1

DISCIPLINE: STRUCTURES

SHEET NAME: E4-STU-BRG-5A7S-LRT-SUP-001

SHEET
195
OF
274

Aug. 25 2014 11:50 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-5A7S-LRT-SUP-002.dwg By: muelerj



NOTES:

- ① THE SYMMETRY AXIS OF THE BOX GIRDER SPINE IS ROTATED 2.00% (1'08'44.75") FROM THE VERTICAL. THE SOFFIT SLAB AND THE INCLINED WEBS ARE SYMMETRICAL ABOUT THIS AXIS. THE INTERSECTION POINTS OF THE SYMMETRY AXIS WITH TOP OF TOP SLAB ARE IDENTICAL TO CL BOX GIRDER. THE PROFILE GRADE OF THE BOX GIRDER IS DEFINED ALONG CL BOX GIRDER.
- CL BOX GIRDER IN THE CURVED PORTION OF THE TRACK ALIGNMENTS CONSISTS OF CIRCULAR COMPOUND CURVES THAT BEST-FIT THE IRREGULAR AND VARIABLE DISTANCES BETWEEN THE TWO LRT ALIGNMENTS.
- OCS POLE LOCATIONS DO NOT NECESSARILY COINCIDE WITH CL BOX GIRDER.
- SINCE THE DISTANCE BETWEEN CL TRACK 1 & CL TRACK 2 VARIES FROM 14'-0" TO 16'-0", THE CANTILEVER OVERHANG DIMENSIONS VARY ACCORDINGLY. THE GEOMETRY OF THE CANTILEVER EDGE IS DEFINED BY A CONSTANT OFFSET FROM THE ADJACENT TRACK ALIGNMENT.

DES. JRM	DR. JRM	
CHK. MJC	CHK. MJC	
NO.	DATE	BY

Kimley»Horn


TKDA

PRELIMINARY ENGINEERING


METROPOLITAN COUNCIL


SOUTHWEST
Green Line LRT Extension

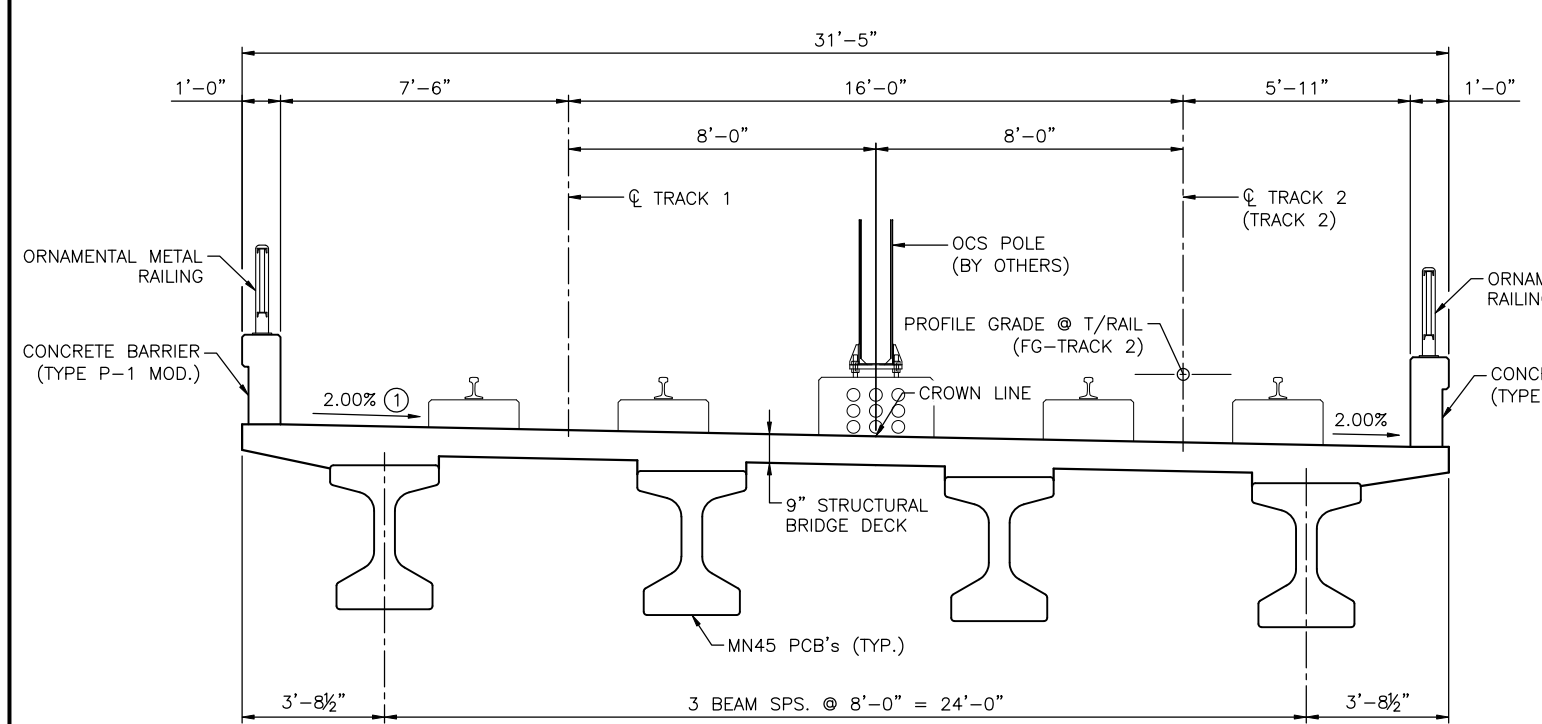
EAST - VOLUME 2 (STRUCTURES)
5TH AVENUE AND 7TH STREET
BRIDGE XXXXX (LRT)
TRANSVERSE SECTION - UNIT 2

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E4-STU-BRG-5A7S-LRT-SUP-002**

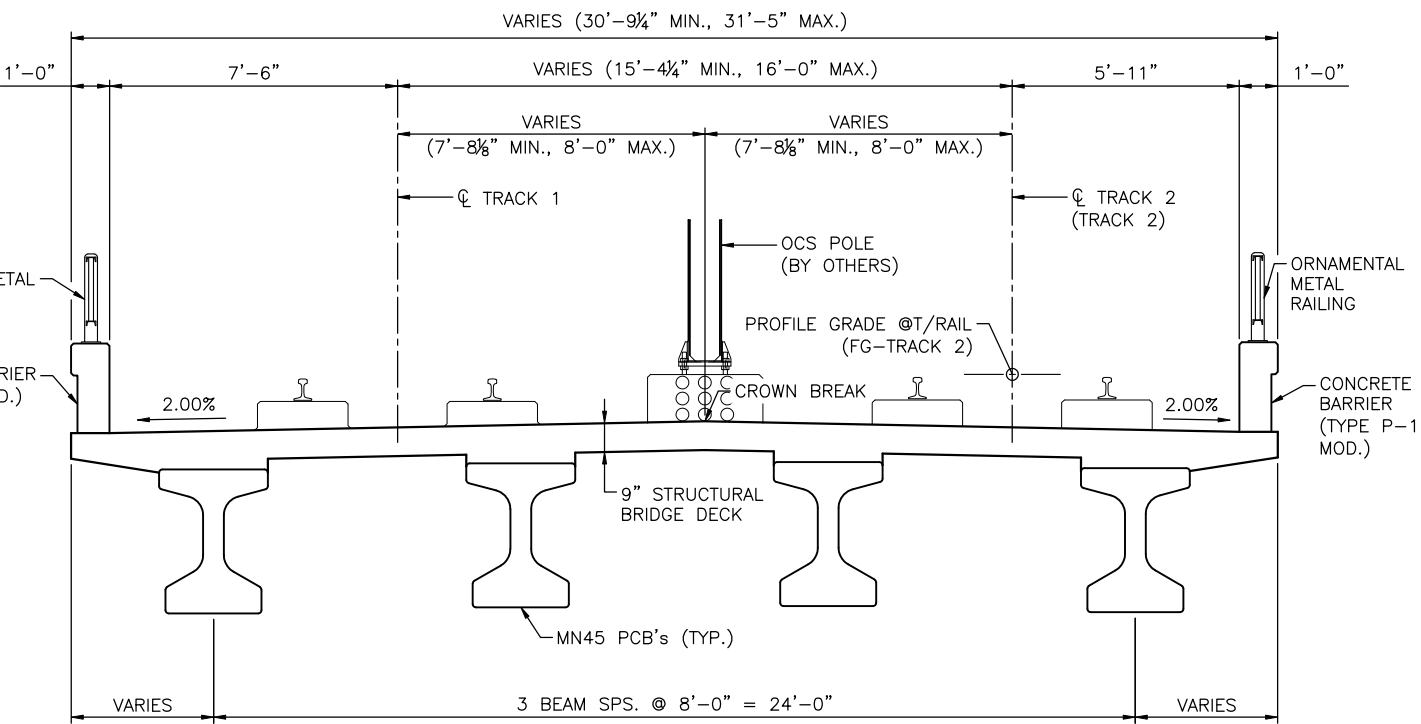
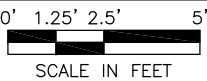
SHEET
196
OF
274

Aug. 25 2014 11:51 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-5A7S-LRT-SUP-003.dwg By: muellerj



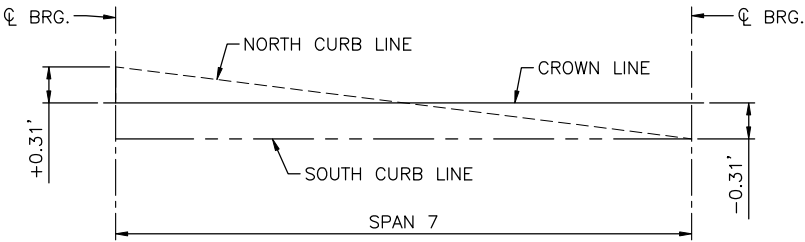
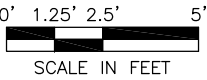
NORTH END

TRANSVERSE SECTION - UNIT 3 (SPAN 7)



SOUTH END



TRANSVERSE SECTION - UNIT 3



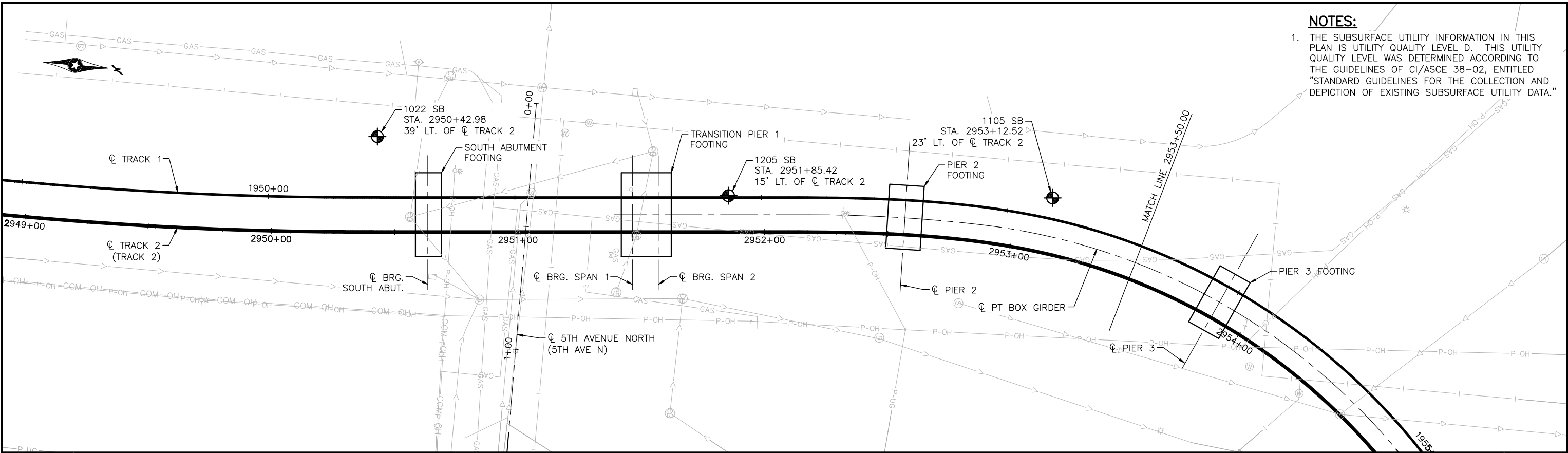
SCHEMATIC LAYOUT OF CURB TRANSITIONS

NOTES:

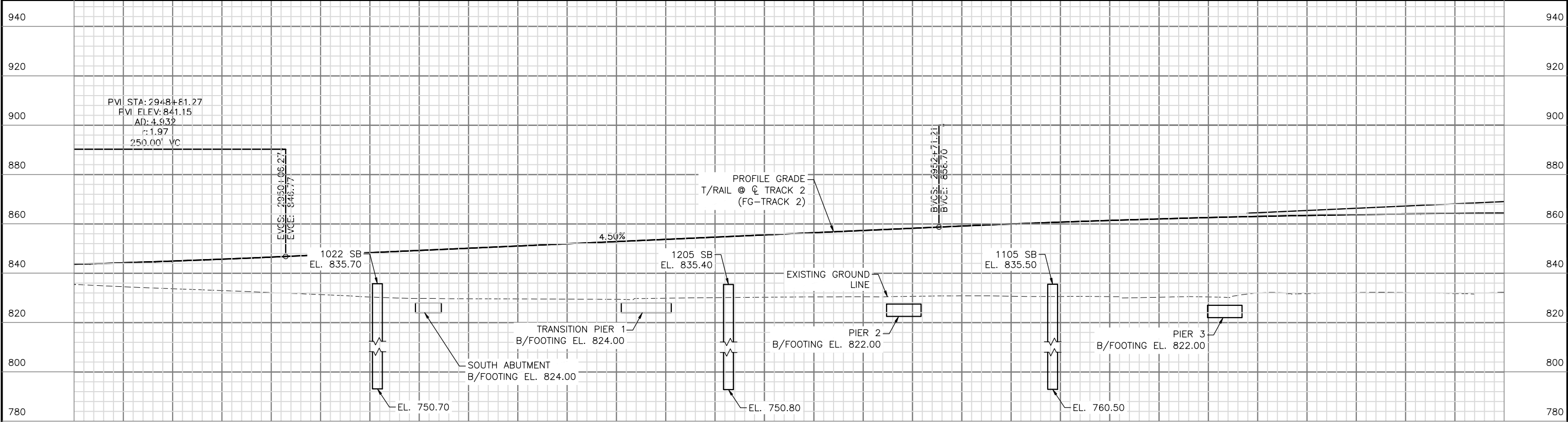
- ① TRANSITION CROSS SLOPE NORTH OF CROWN LINE IN SPAN 7 FROM +2.00% TO -2.00%. SEE SCHEMATIC LAYOUT OF CROWN DETAIL.

DES. JRM	DR. JRM														
CHK. MJC	CHK. MJC														
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL	<div> TKDA</div>			<div> SOUTHWEST <small>Green Line LRT Extension</small></div>			<div>EAST - VOLUME 2 (STRUCTURES) 5TH AVENUE AND 7TH STREET BRIDGE XXXXX (LRT) TRANSVERSE SECTION - UNIT 3</div>			<div>SHEET 197 OF 274</div>
PRELIMINARY ENGINEERING									DISCIPLINE: STRUCTURES			SHEET NAME: E4-STU-BRG-5A7S-LRT-SUP-003			

Aug. 25 2014 11:51 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-5A7S-LRT-BOR-001.dwg By: muellerj



NOTES:
1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF C1/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."



DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley-Horn

TKDA

PRELIMINARY ENGINEERING

METROPOLITAN

C O U N C I L

SOUTHWEST

Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)

5TH AVENUE AND 7TH STREET

BRIDGE XXXXX (LRT)

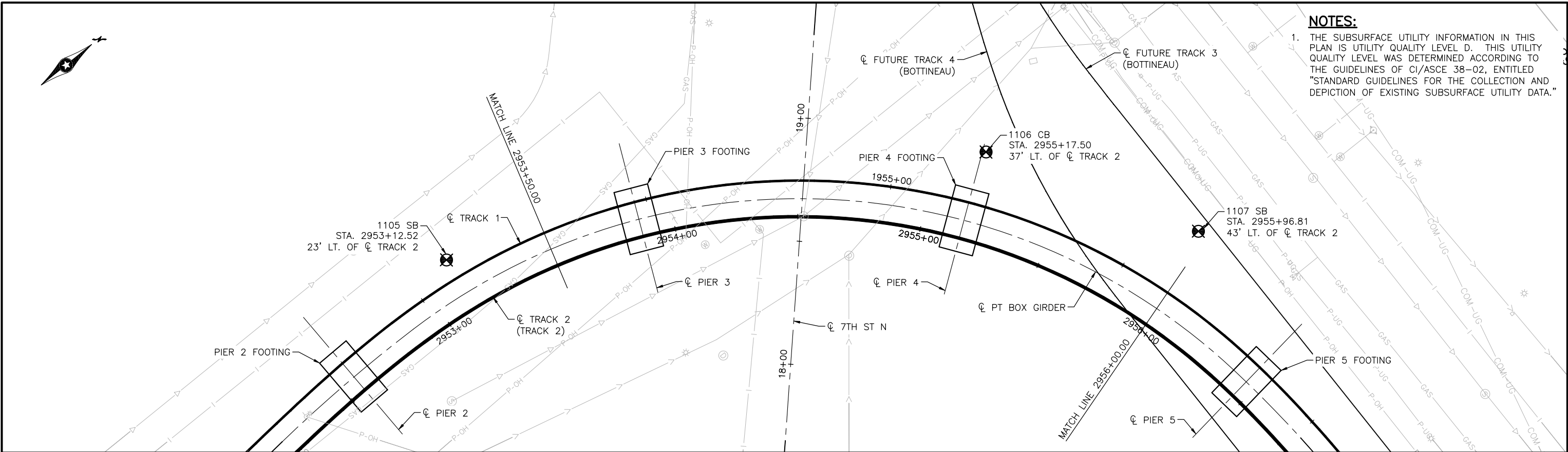
BORINGS (1 OF 8)

DISCIPLINE: **STRUCTURES**

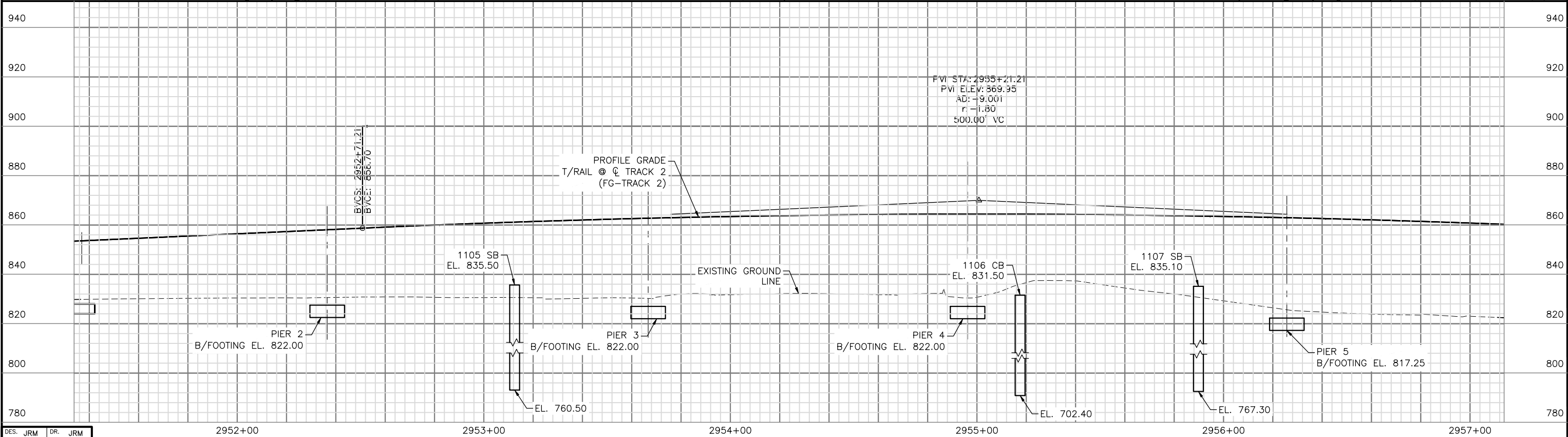
SHEET NAME: **E4-STU-BRG-5A7S-LRT-BOR-001**

SHEET
198
OF
274

Aug. 25 2014 11:52 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-5A7S-LRT-BOR-002.dwg By: muellerj



NOTES:
1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF C1/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."



DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK/DESIGN	REVISION / SUBMITTAL

Kimley-Horn
TKDA
PRELIMINARY ENGINEERING

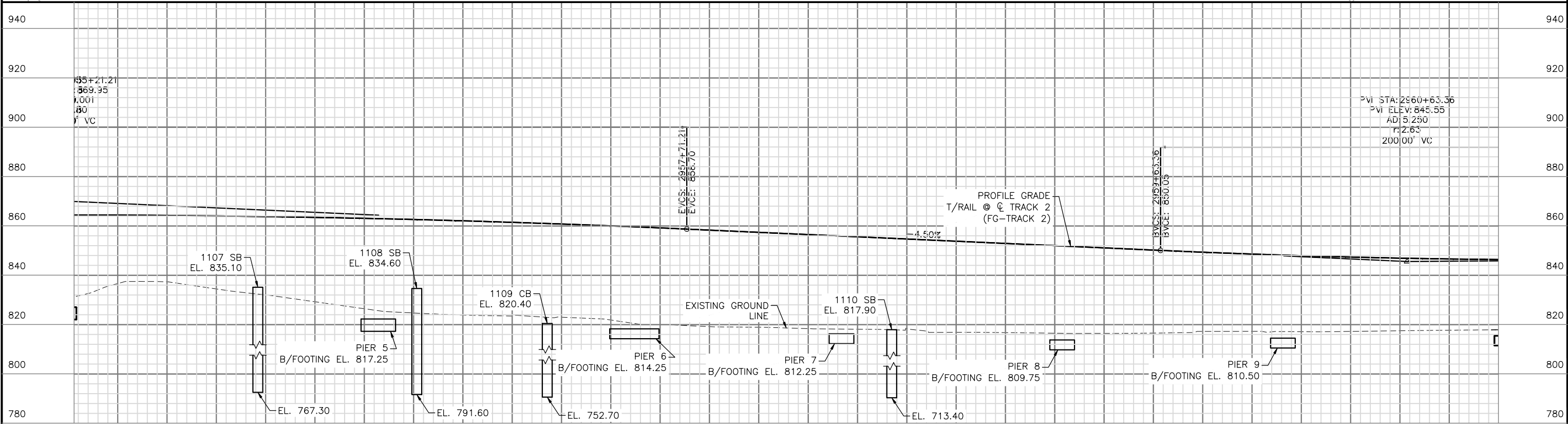
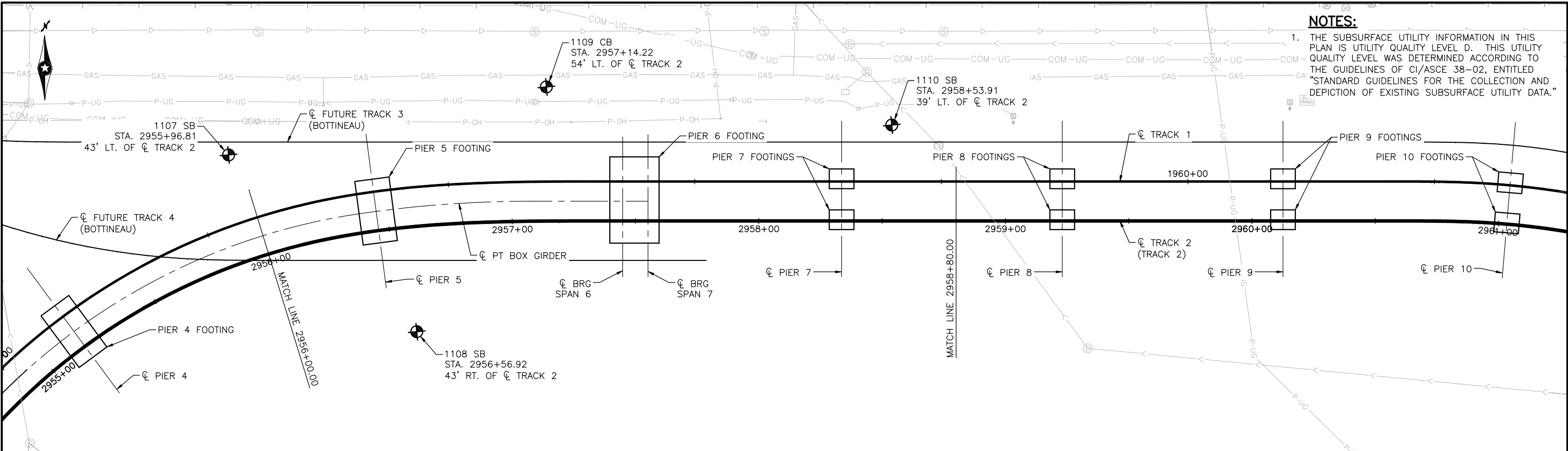
METROPOLITAN COUNCIL

SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
5TH AVENUE AND 7TH STREET
BRIDGE XXXXX (LRT)
BORINGS (2 OF 8)
DISCIPLINE: **STRUCTURES**
SHEET NAME: **E4-STU-BRG-5A7S-LRT-BOR-002**

SHEET
199
OF
274

Aug. 25 2014 11:53 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-5A7S-LRT-BOR-003.dwg By: muellerj



DES.	JRM	DR.	JRM
CHK.	MJC	CHK.	MJC
NO.	DATE	BY	CHECK/DESIGN/REVISION / SUBMITTAL

Kimley-Horn

TKDA

PRELIMINARY ENGINEERING

METROPOLITAN

C O U N C I L

SOUTHWEST

Green Line LRT Extension

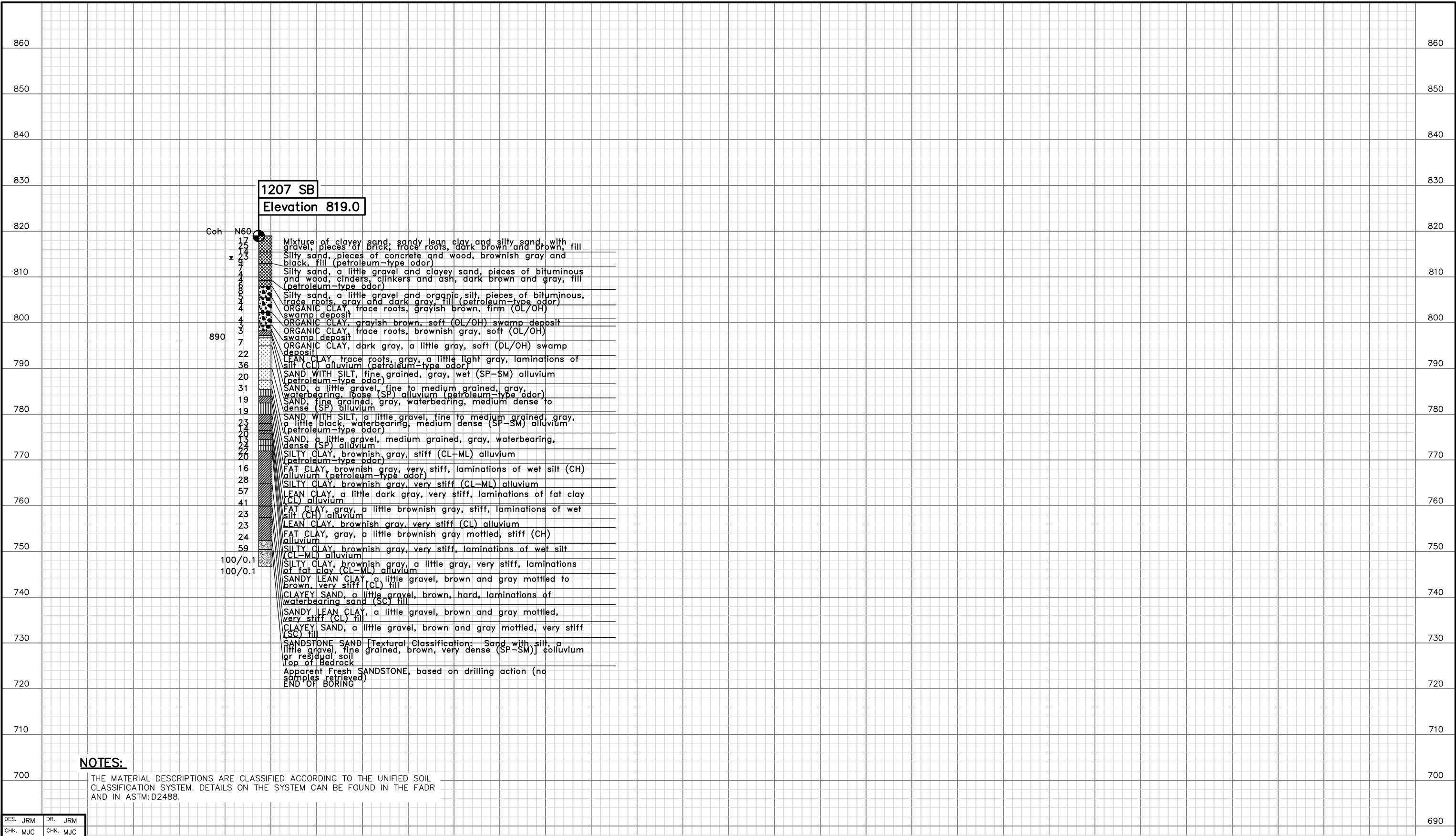
EAST - VOLUME 2 (STRUCTURES)
5TH AVENUE AND 7TH STREET
BRIDGE XXXXX (LRT)
BORINGS (3 OF 8)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E4-STU-BRG-5A7S-LRT-BOR-003**

SHEET
200
OF
274

Aug. 25 2014 11:54 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4-STU-BRG-5A7S-LRT-BOR-007.dwg By: muelierj





NOTES:

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488.

DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



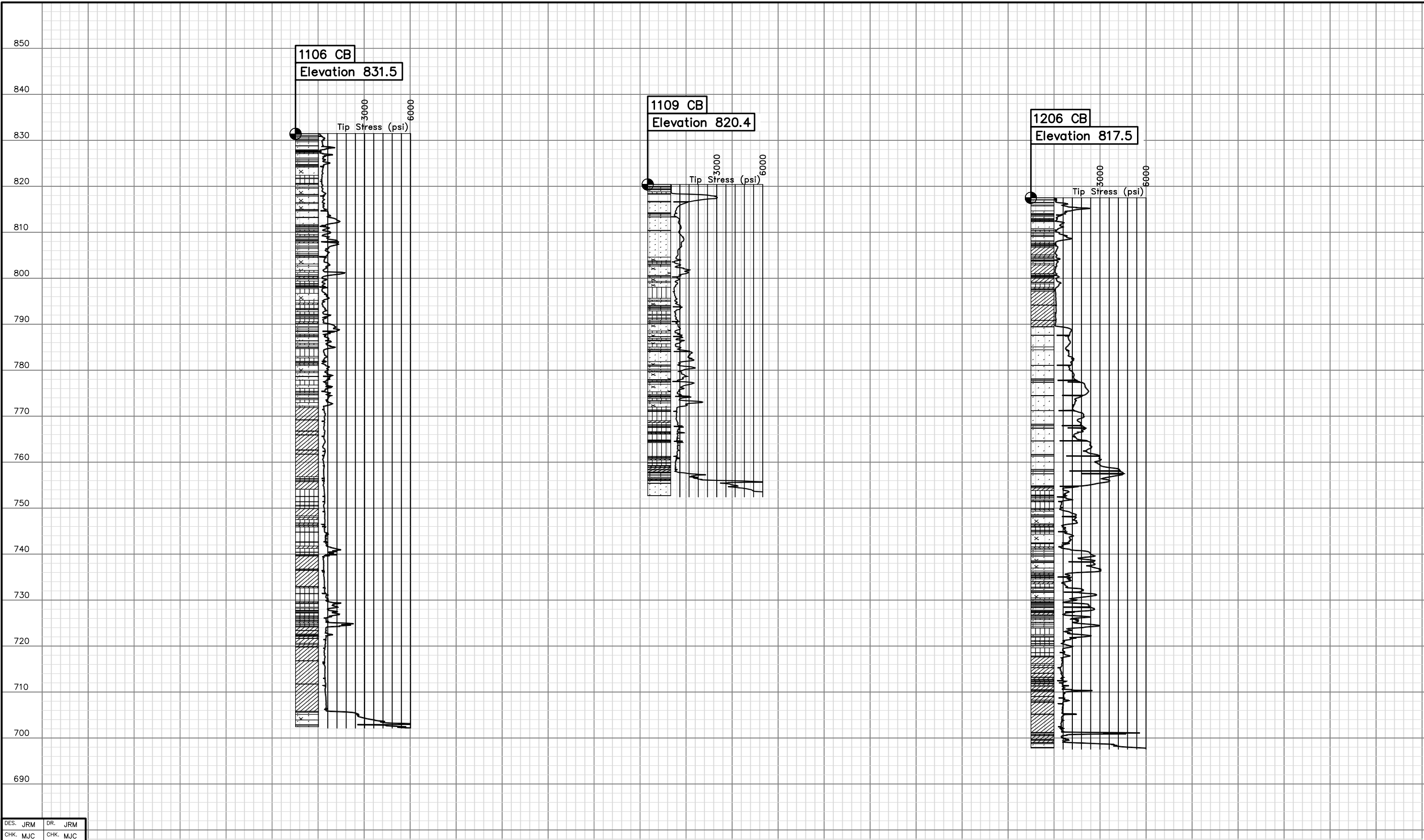
EAST - VOLUME 2 (STRUCTURES)
5TH AVENUE AND 7TH STREET
BRIDGE XXXXX (LRT)
BORINGS (7 OF 8)

DISCIPLINE: STRUCTURES

SHEET NAME: E4-STU-BRG-5A7S-LRT-BOR-007



SHEET 204 OF 274

Aug. 25 2014 11:54 am K:\g-m\Kimley-Horn\15277000\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\E4--STU-BRG-5A7S-LRT--BOR--008.dwg By: muellerj



DES. JRM	DR. JRM
CHK. MJC	CHK. MJC

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)
5TH AVENUE AND 7TH STREET
BRIDGE XXXXX (LRT)
BORINGS (8 OF 8)

DISCIPLINE: STRUCTURES

SHEET NAME: E4-STU-BRG-5A7S-LRT-BOR-008

1. ABUTMENT SURFACE
2. ABUTMENT/WALL CORNER DETAIL
3. EXPOSED EDGE OF DECK
4. EXPOSED BARRIER
5. EXPOSED FASCIA BEAM
6. BOTTOM OF BEAMS
7. PIER COLUMN GEOMETRY AND SURFACE
8. RAILING AND SCREENING

[illegible][illegible]

PRELIMINARY ENGINEERING



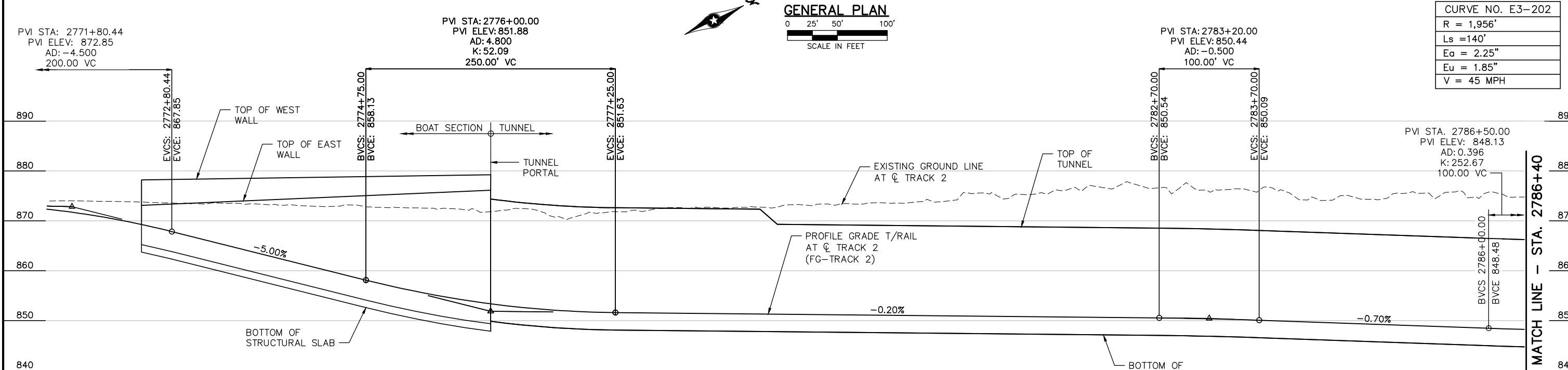
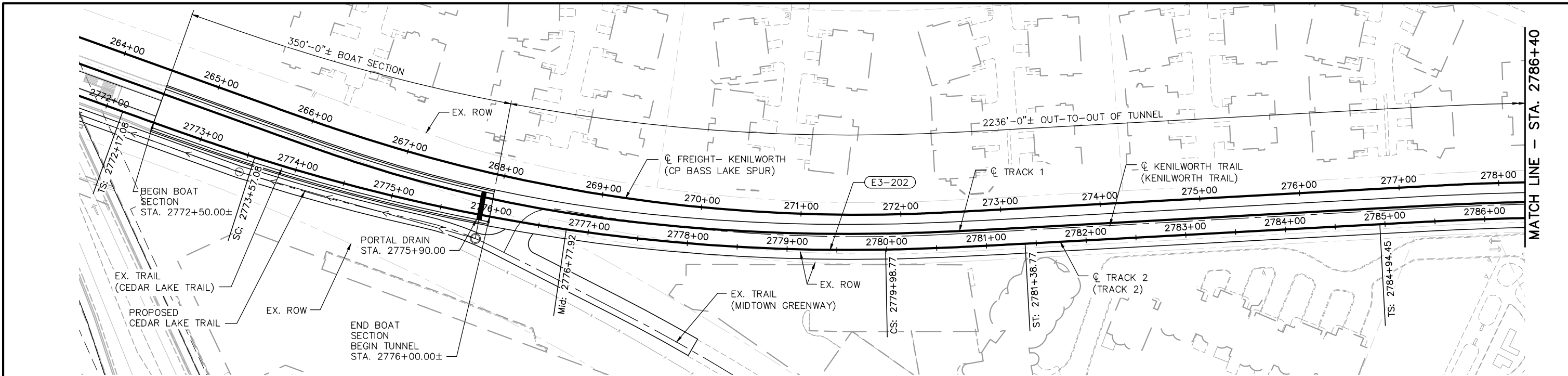
**EAST - VOLUME 2 (STRUCTURES)
5TH AVENUE AND 7TH STREET
BRIDGE XXXXX (LRT)
AESTHETICS**

DISCIPLINE: **STRUCTURES**

SHEET NAME:
E4-STU-BRG-5A7S-LRT-AES

SHEET
206
OF
274


Aug. 26 2014 10:41 am V:\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN-TUNS-LRT-GPE-002.dwg By: ronald.dee




DES. CPE	DR. PHH				
CHK. JDP	CHK. CPE				
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

**METROPOLITAN COUNCIL**

**SOUTHWEST**
Green Line LRT Extension

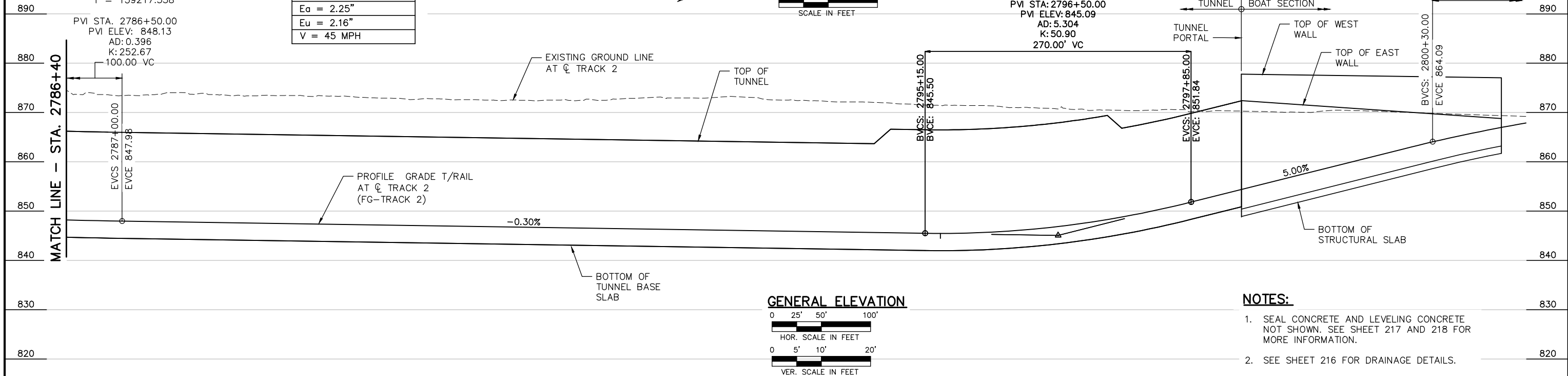
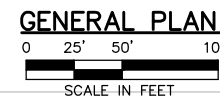
EAST - VOLUME 2 (STRUCTURES)
KENILWORTH CORRIDOR TUNNEL
BRIDGE XXXXX (LRT)
GENERAL PLAN AND ELEVATION (1 OF 2)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E3-STU-TUN-LRT-GPE-002**

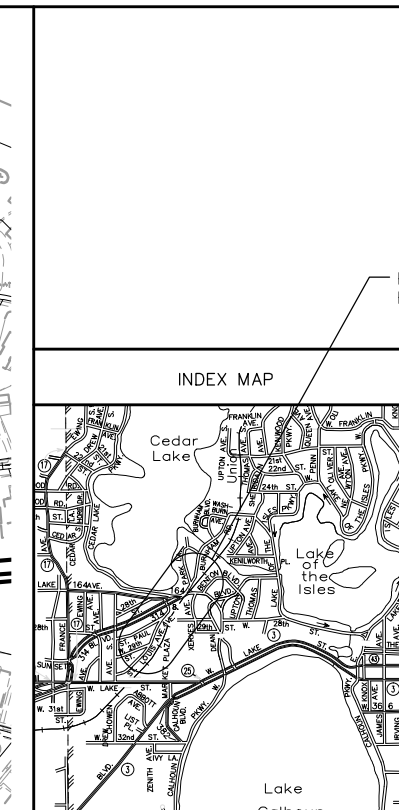
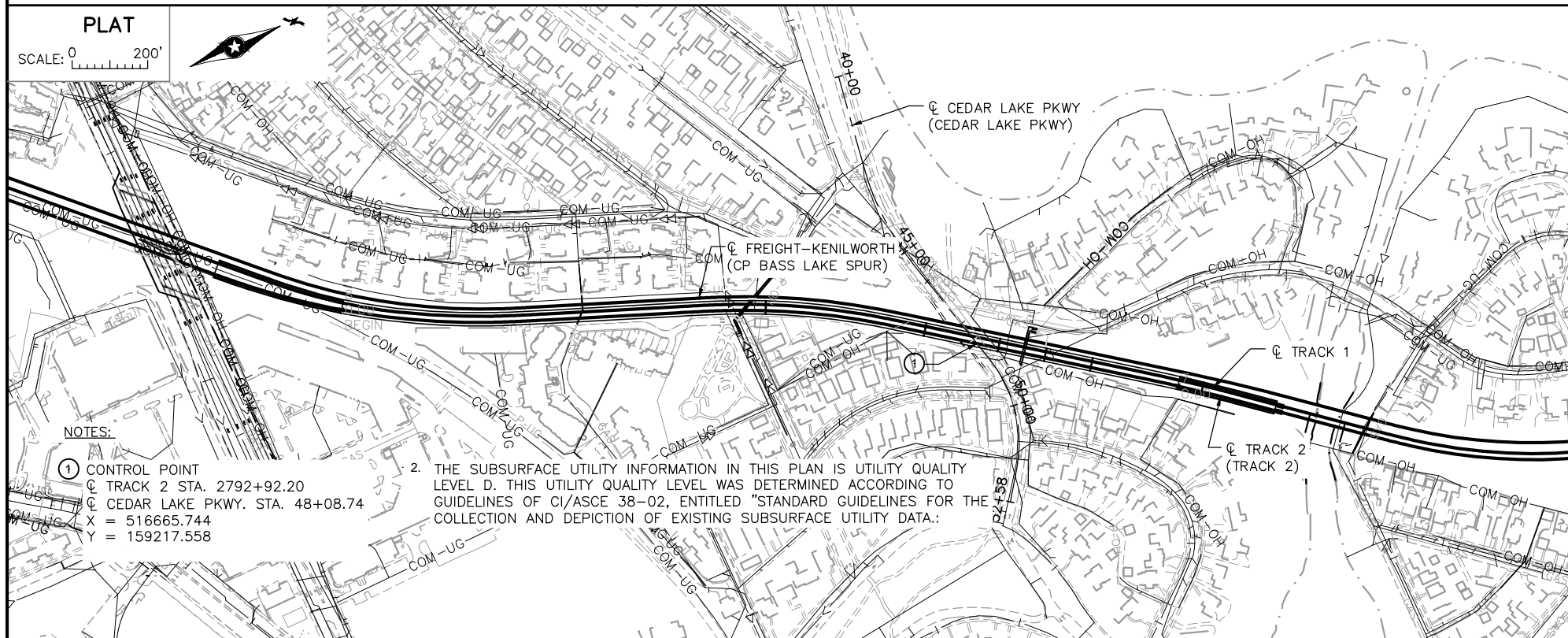
SHEET
208
OF
274

CURVE NO. E3-203
R = 1,820'
Ls = 160'
Ea = 2.25"
Eu = 2.16"
V = 45 MPH



1. SEAL CONCRETE AND LEVELING CONCRETE NOT SHOWN. SEE SHEET 217 AND 218 FOR MORE INFORMATION.
2. SEE SHEET 216 FOR DRAINAGE DETAILS.
3. SEE BORING SHEETS FOR INPLACE UTILITIES.

DES. CPE		DR. PHH																	
CHK. JDP		CHK. CPE																	
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL					 				EAST - VOLUME 2 (STRUCTURES) KENILWORTH CORRIDOR TUNNEL BRIDGE XXXXX (LRT) GENERAL PLAN AND ELEVATION (2 OF 2)				SHEET 209 OF 274	
						PRELIMINARY ENGINEERING								DISCIPLINE: STRUCTURES		SHEET NAME: E3-STU-TUN-LRT-GPE-003			



PROPOSED
BRIDGE XXXXX

BRIDGE SURVEY
(1 OF 2)

SOUTHWEST LRT TRACKS WITHIN KENILWORTH
CORRIDOR IN CITY OF MINNEAPOLIS.

14'-6" X 17'-19" DOUBLE-CELL TUNNEL
00' 00' 00.00" SKEW

SEC 32 T 29N R 24W

CITY OF MINNEAPOLIS HENNEPIN COUNTY

BRIDGE XXXXX

[illegible]

Kimley»Horn

PRELIMINARY ENGINEERING



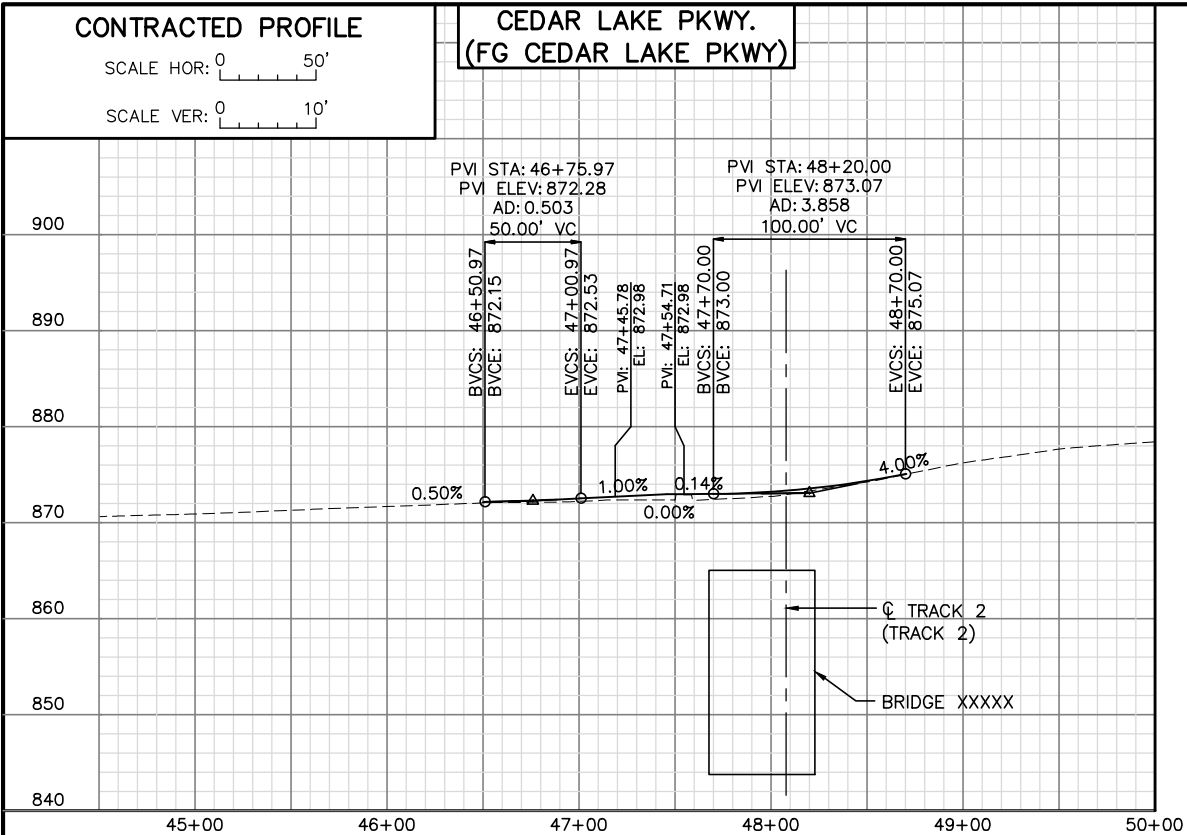
**EAST - VOLUME 2 (STRUCTURES)
KENILWORTH CORRIDOR TUNNEL
BRIDGE XXXXX (LRT)
BRIDGE SURVEY (1 OF 2)**

DISCIPLINE: **STRUCTURES**

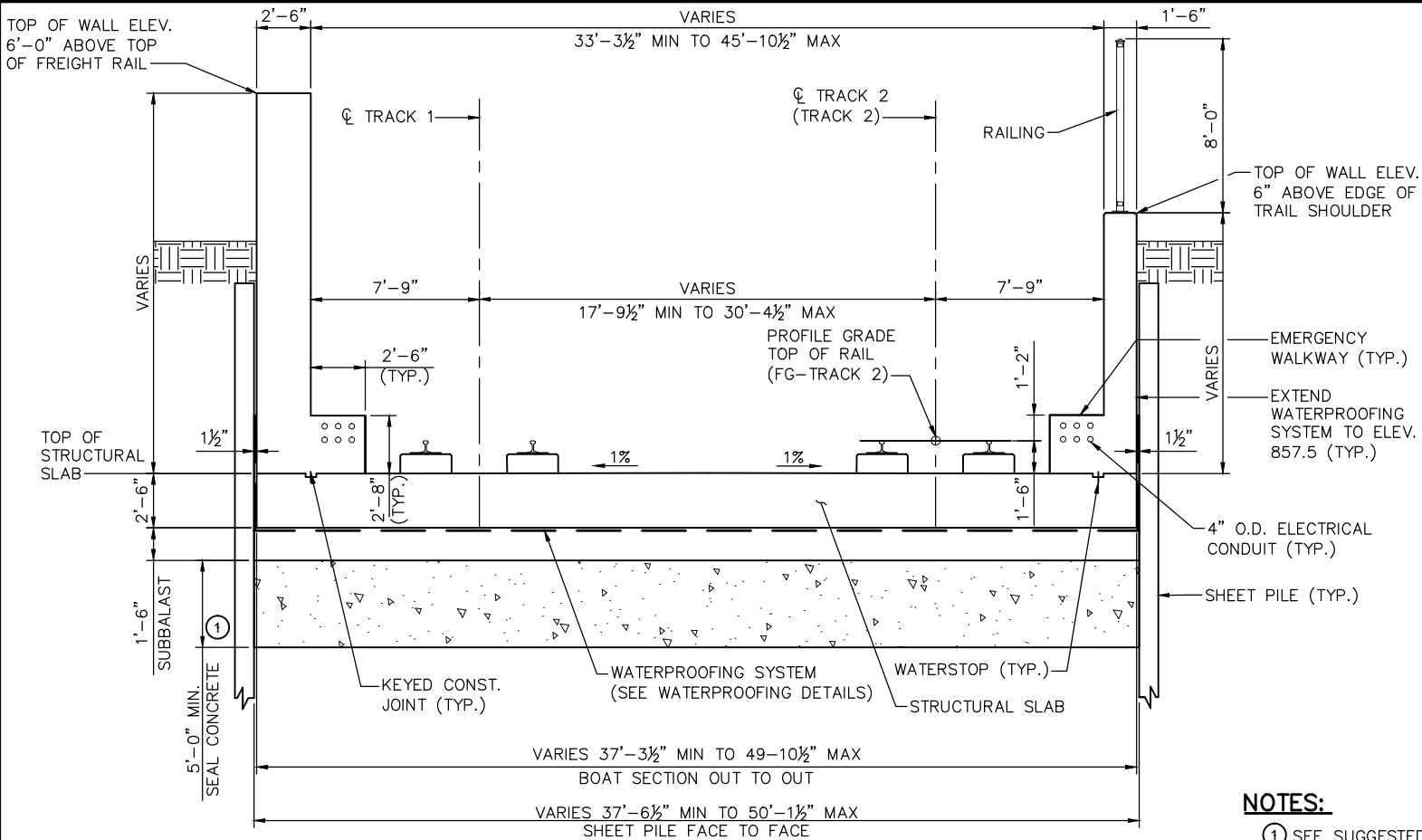
SHEET NAME:	E3-STU-TUN-LRT-SUR-001
-------------	------------------------

SHEET
210
OF
274

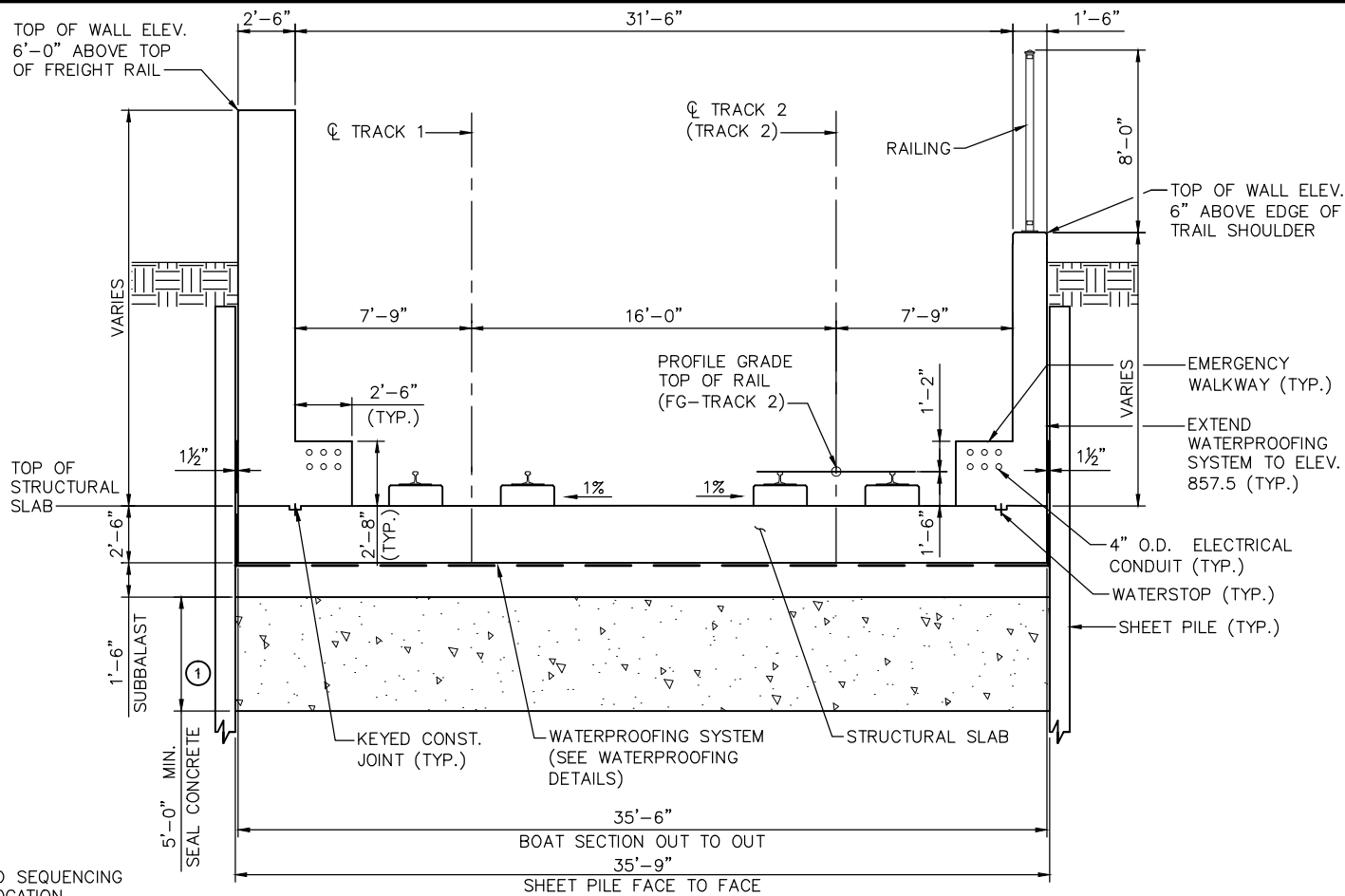
Aug. 26 2014 10:44 am V:\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN-LRT-SUR-001.dwg By: ronald.dee



Aug. 26 2014 10:44 am V:\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN-TUNS-LRT-DTL-002.dwg By: ronald.dee

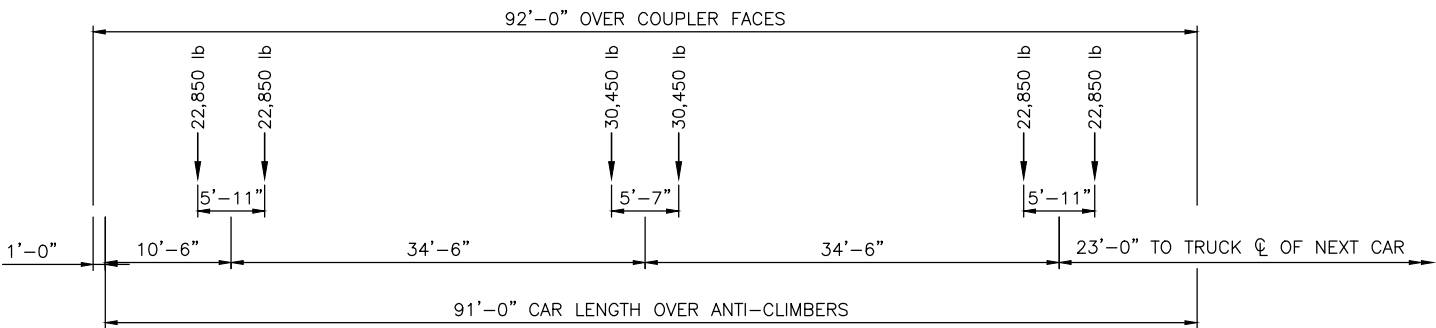


TYPICAL BOAT SECTION
STA. 2772+50 TO 2776+00



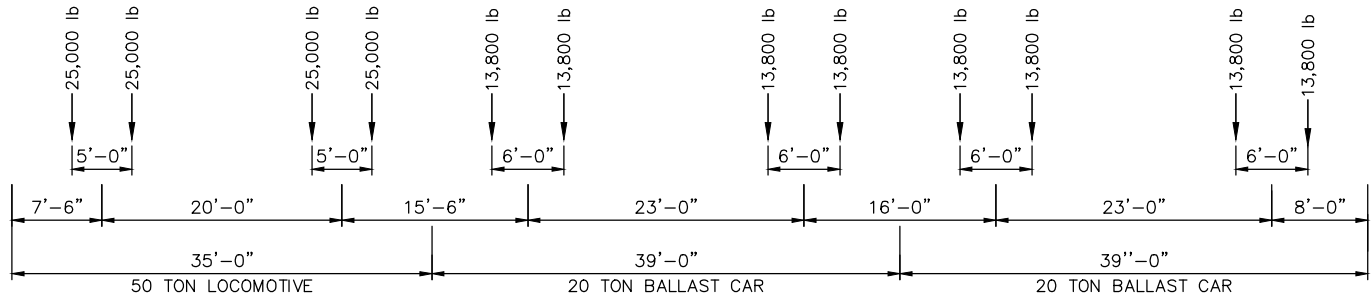
TYPICAL BOAT SECTION
STA. 2798+36 TO STA. 2801+00

NOTES:
① SEE SUGGESTED SEQUENCING SHEETS FOR LOCATION



LIGHT RAIL VEHICLE LOADING DIAGRAM

NOTES:
1. THE LRT TRAIN SHALL CONSIST OF EITHER ONE, TWO OR THREE CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
2. AXLE LOAD IN POUNDS.
3. LOADING DIAGRAM REPRESENTS MAXIMUM LOAD AT EACH TRUCK.



MAINTENANCE TRAIN LOADING DIAGRAM

NOTES:
1. THE MAINTENANCE TRAIN SHALL CONSIST OF ONE LOCOMOTIVE AND ONE, TWO, THREE OR FOUR BALLAST CARS, WHICHEVER PRODUCES THE MAXIMUM LOAD FOR THE ELEMENT UNDER CONSIDERATION.
2. AXLE LOAD IN POUNDS.
3. WEIGHT OF EMPTY BALLAST CAR IS 15,000 POUNDS.

DES. CPE	DR. PHH
CHK. JDP	CHK. CPE

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



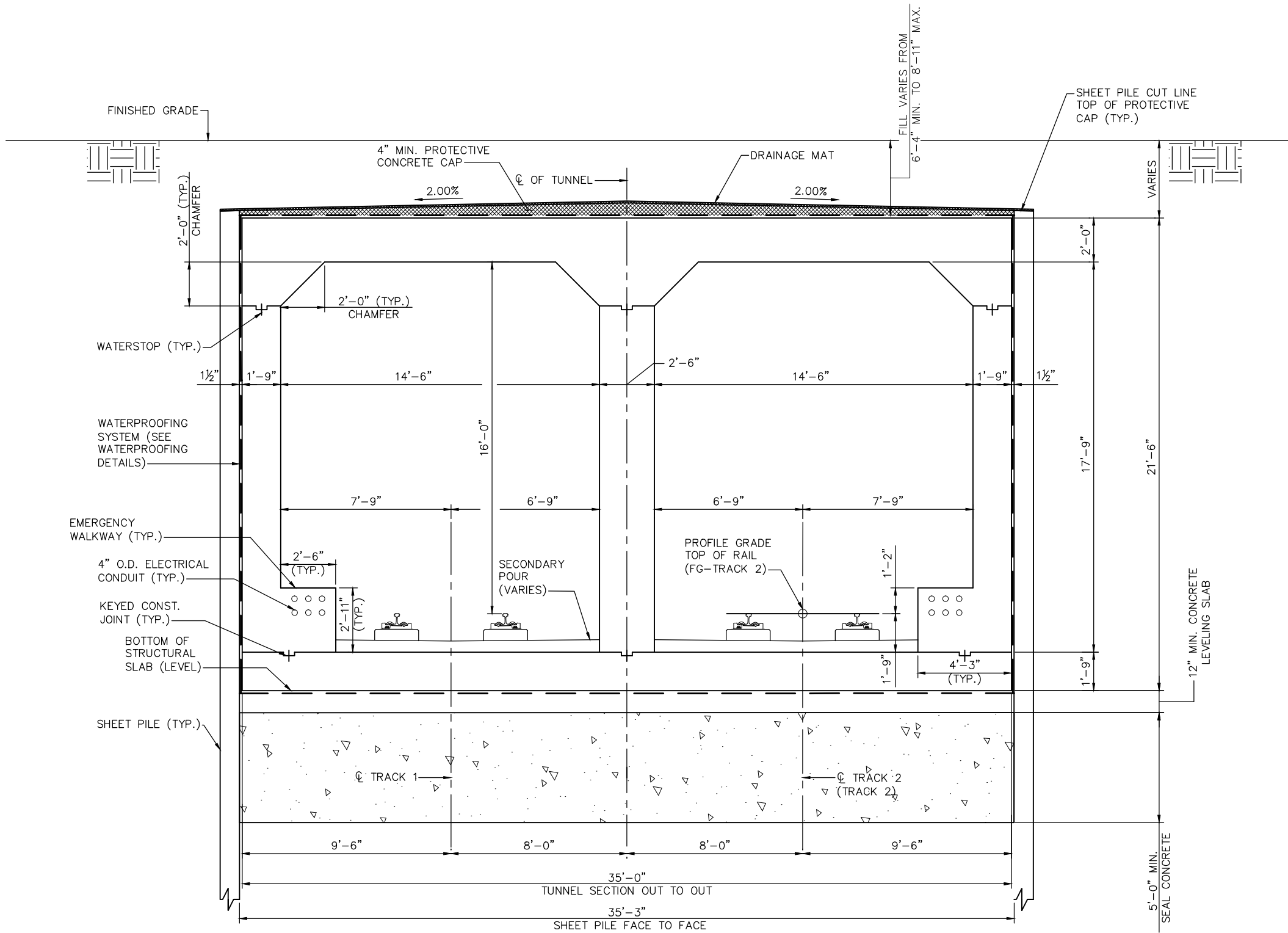
SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
KENILWORTH CORRIDOR TUNNEL
BRIDGE XXXXX (LRT)
TYPICAL SECTIONS (1 OF 3)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E3-STU-TUN-LRT-DTL-001**

Aug. 26 2014 10:44 am V:\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN-LRT-DTL-002.dwg By: ronald.dee



TYPICAL TRANSVERSE SECTION
STA. 2778+87 TO STA. 2794+65
STA. 2797+15 TO STA. 2798+36

DES.	CPE	DR.	PHH
CHK.	JDP	CHK.	CPE
NO.	DATE	BY	

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



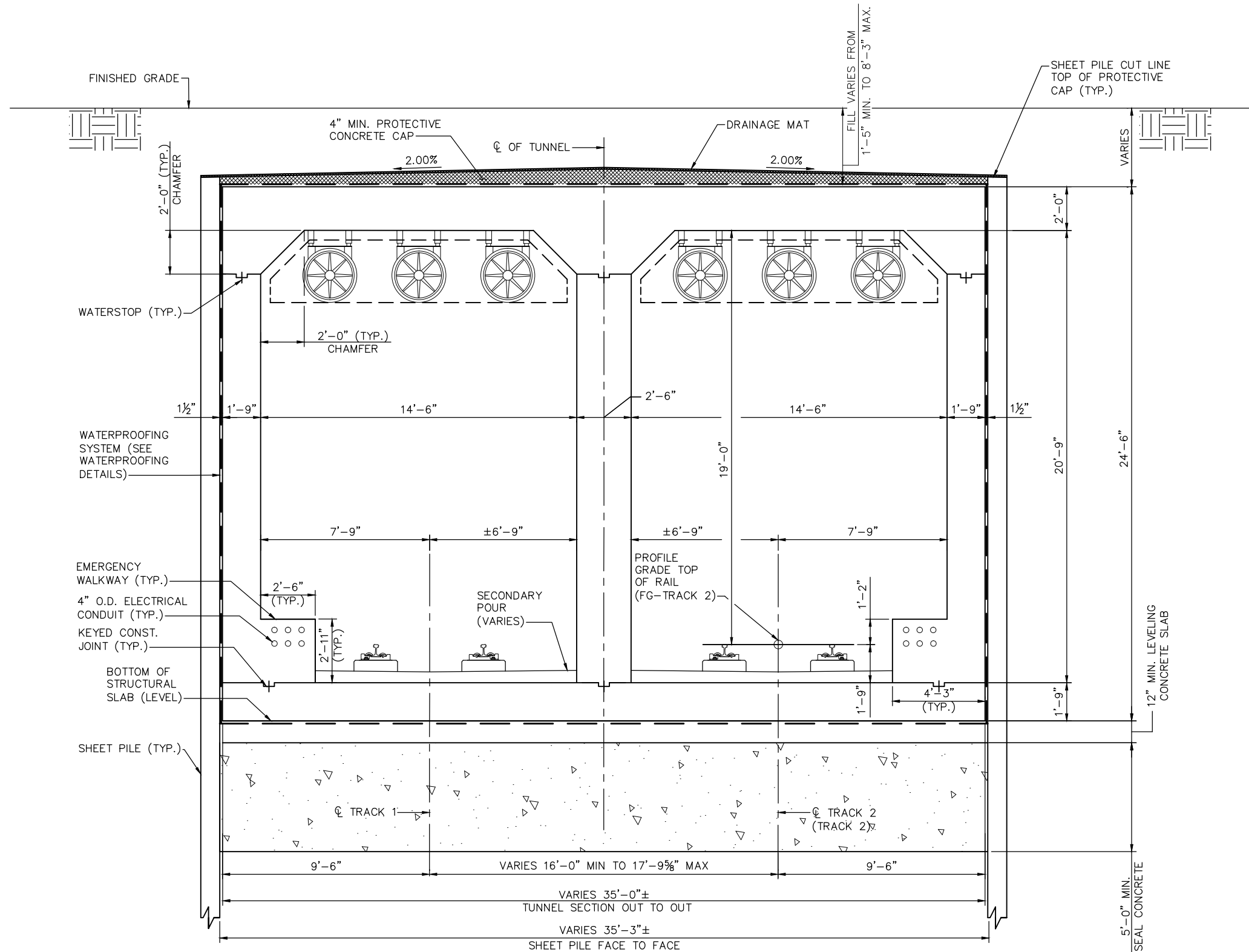
EAST - VOLUME 2 (STRUCTURES)
KENILWORTH CORRIDOR TUNNEL
BRIDGE XXXXX (LRT)
TYPICAL SECTIONS (2 OF 3)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E3-STU-TUN-LRT-DTL-002**

SHEET
213
OF
274

Aug. 26 2014 10:44 am V:\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN-LRT-DTL-002.dwg By: ronald.dee



TRANSVERSE SECTION AT TUNNEL FANS
STA. 2776+00 TO STA. 2778+87
STA. 2794+65 TO STA. 2797+15

DES.	CPE	DR.	PHH
CHK.	JDP	CHK.	CPE
NO.	DATE	BY	

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension

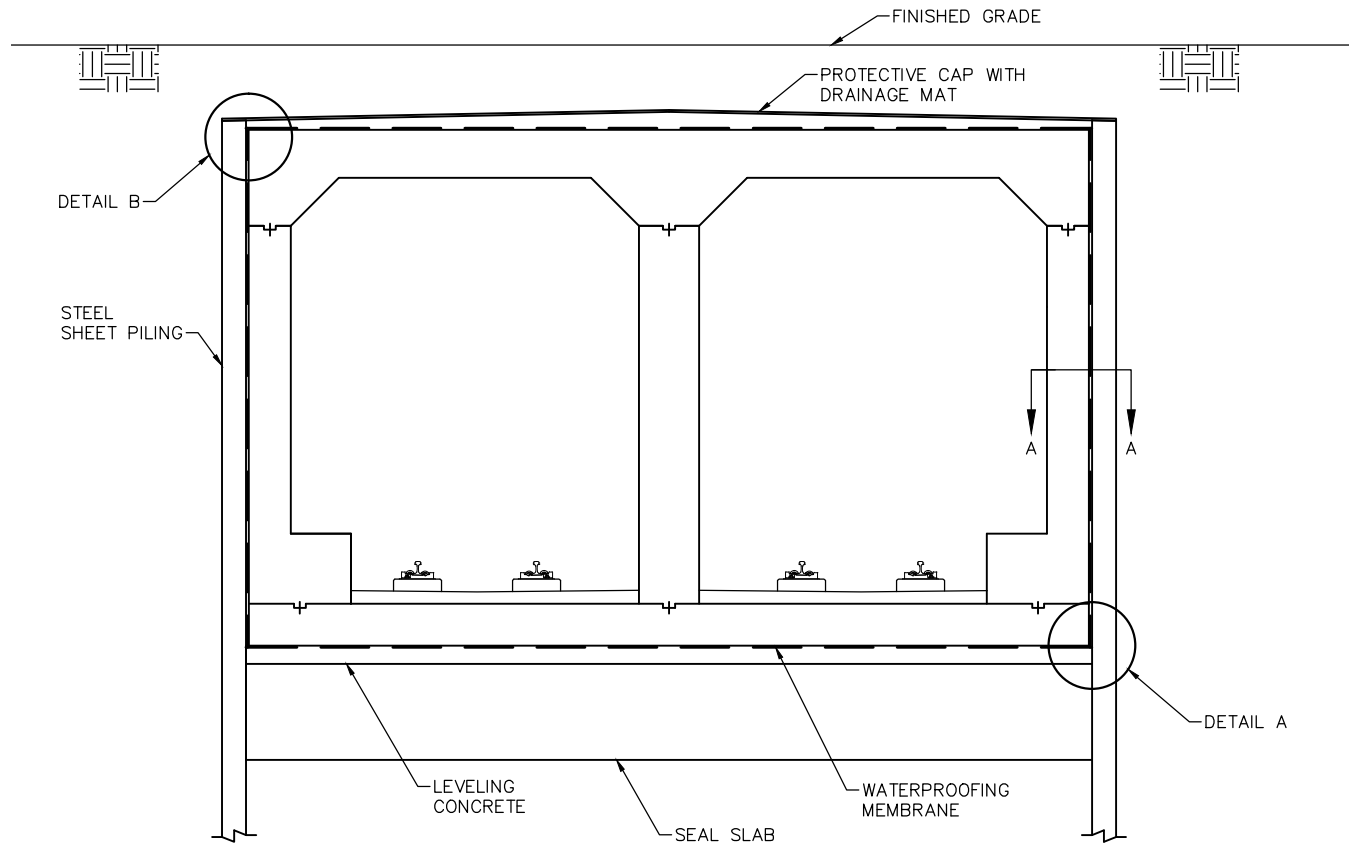


EAST - VOLUME 2 (STRUCTURES)
KENILWORTH CORRIDOR TUNNEL
BRIDGE XXXXX (LRT)
TYPICAL SECTIONS (3 OF 3)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-LRT-DTL-003

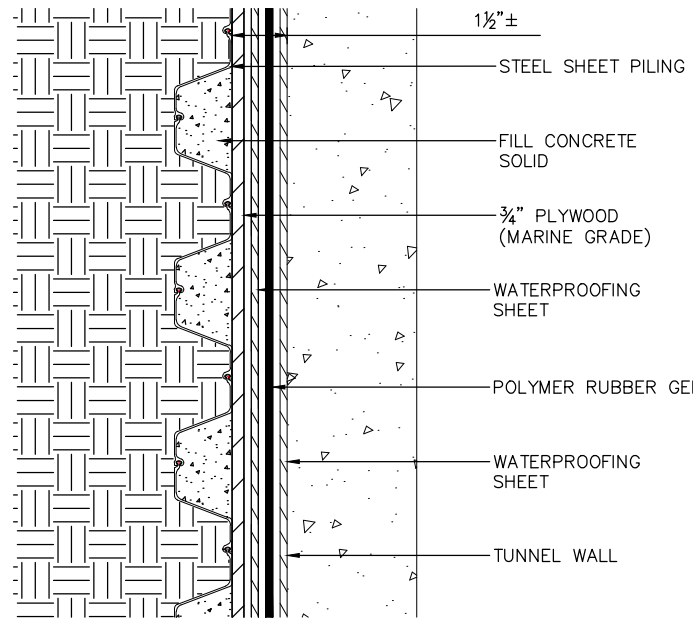
SHEET
214
OF
274



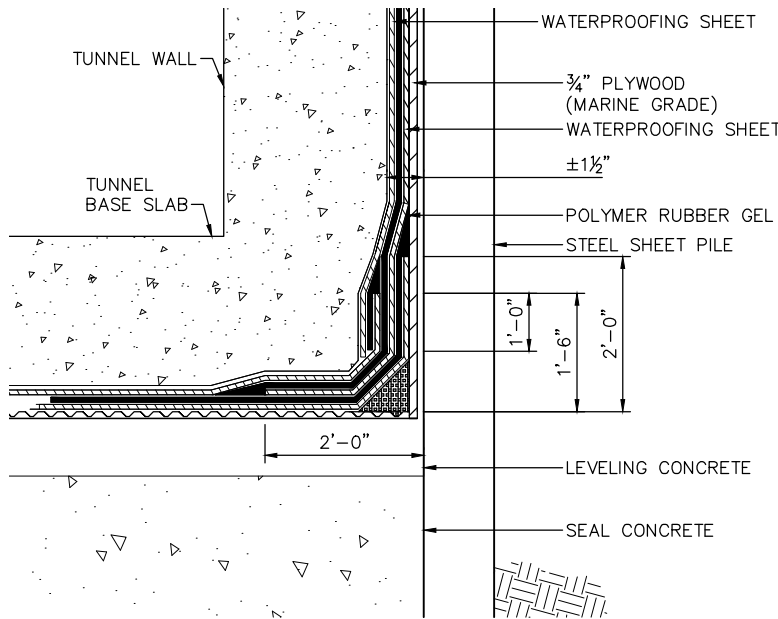
TYPICAL TUNNEL SECTION

WATERPROOFING NOTES:

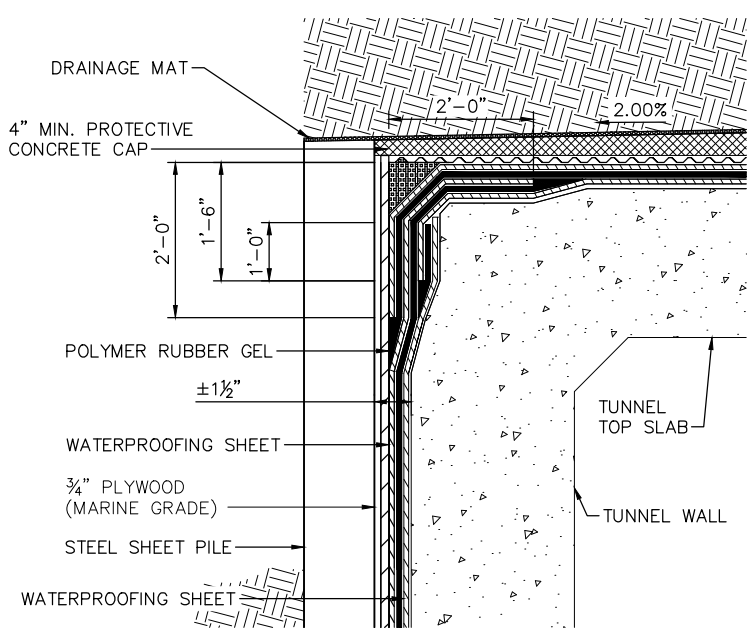
1. WATERPROOFING SYSTEM SHALL BE INSTALLED CONTINUOUS AROUND BOTTOM, SIDES AND TOP OF TUNNEL.
2. ENTIRE WATERPROOFING SHALL BE SUPPLIED BY ONE MANUFACTURER.
3. WATERPROOFING SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.



SECTION A-A



DETAIL A



DETAIL B

DES. CPE	DR. PHH
CHK. JDP	CHK. CPE

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



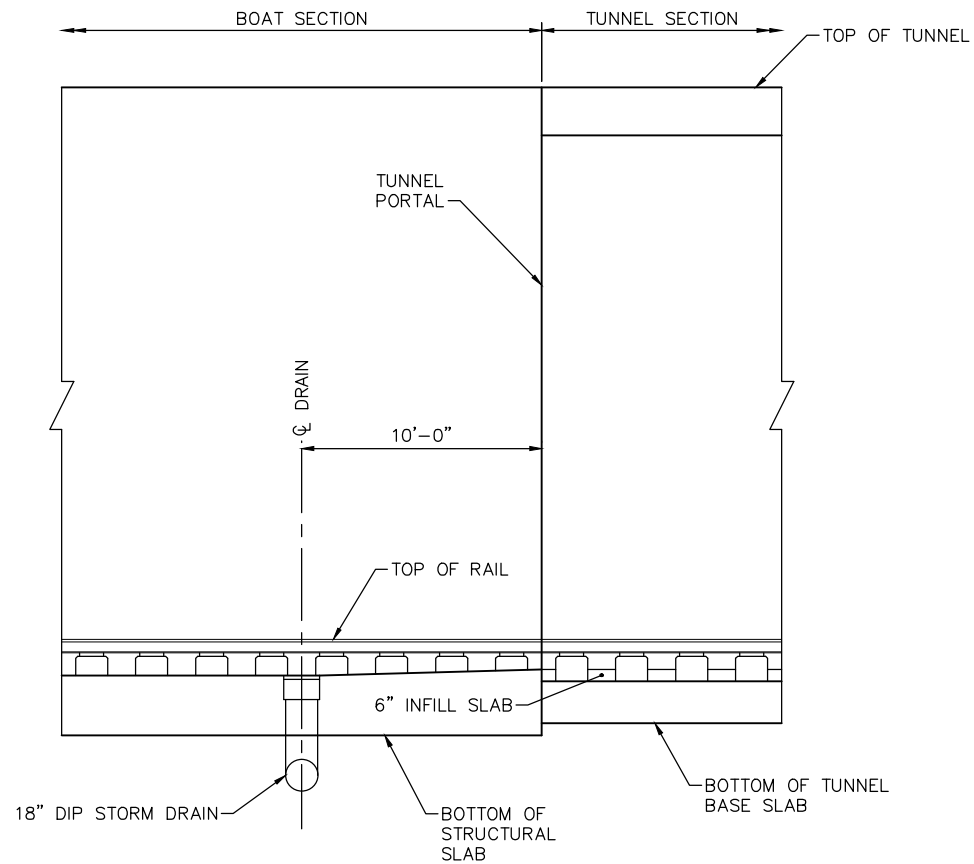
EAST - VOLUME 2 (STRUCTURES)
KENILWORTH CORRIDOR TUNNEL
BRIDGE XXXXX (LRT)
WATERPROOFING DETAILS

DISCIPLINE: STRUCTURES

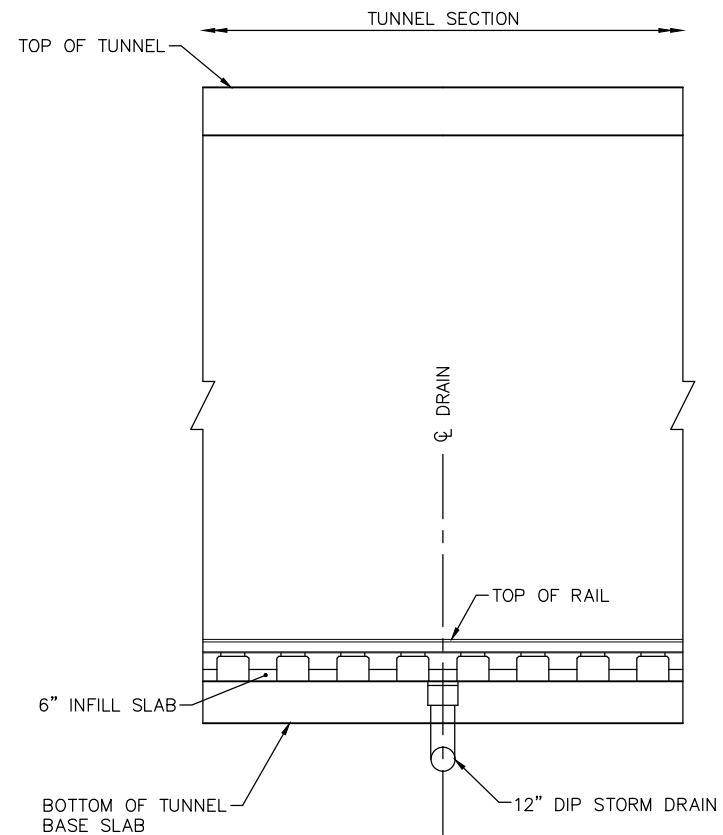
SHEET NAME: E3-STU-TUN-LRT-DTL-004

SHEET
215
OF
274

Aug. 26 2014 10:44 am V:\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN-TUNS-LRT-DTL-002.dwg By: ronald.dee



PORTAL DRAIN DETAIL
STA. 2775+90 AND 2798+46



TUNNEL DRAIN DETAIL
STA. 2794+70

DES.	CPE	DR.	PHH
CHK.	JDP	CHK.	CPE
NO.	DATE	BY	CHECK DESIGN REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



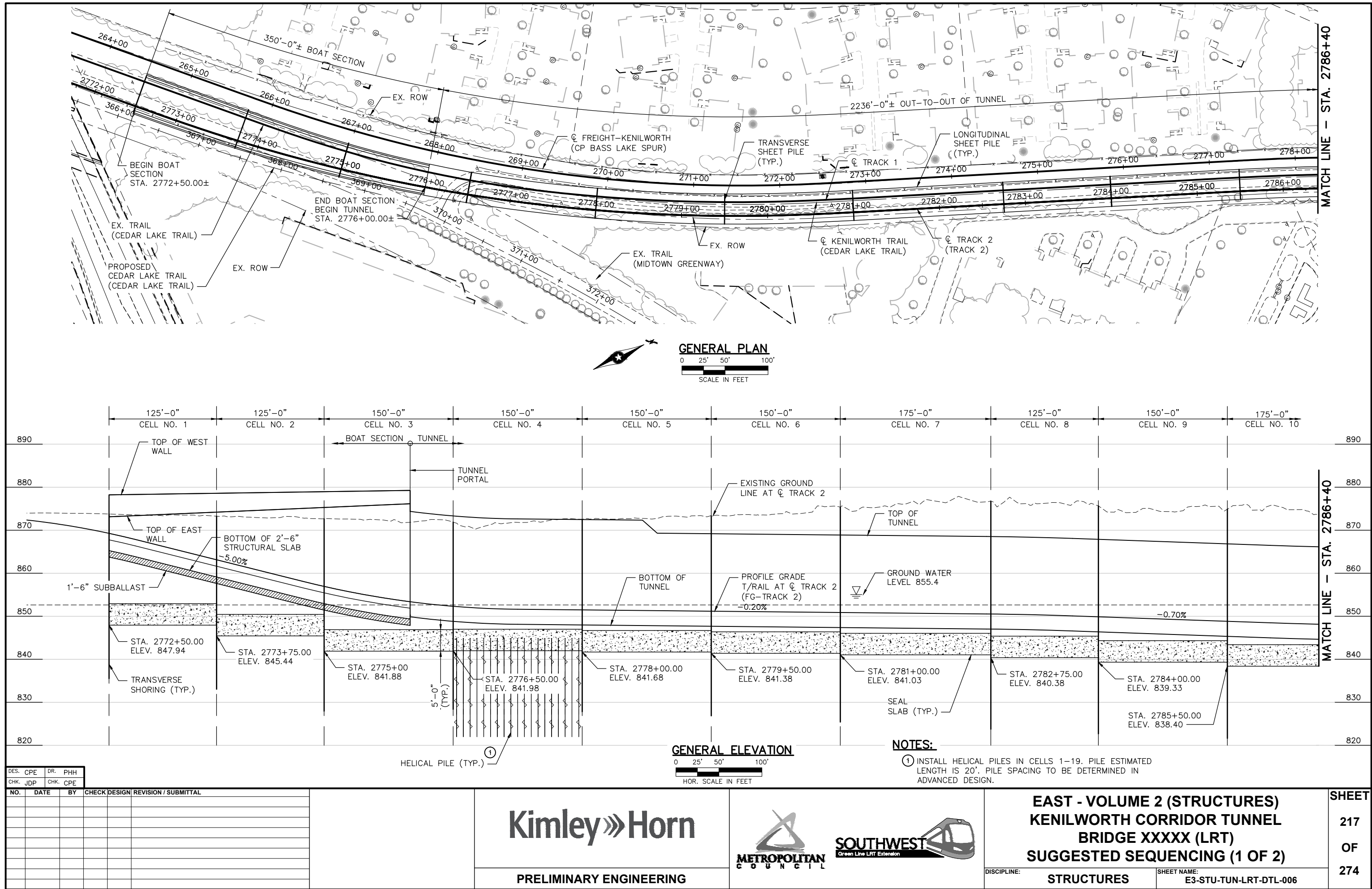
EAST - VOLUME 2 (STRUCTURES)
KENILWORTH CORRIDOR TUNNEL
BRIDGE XXXXX (LRT)
DRAINAGE DETAILS

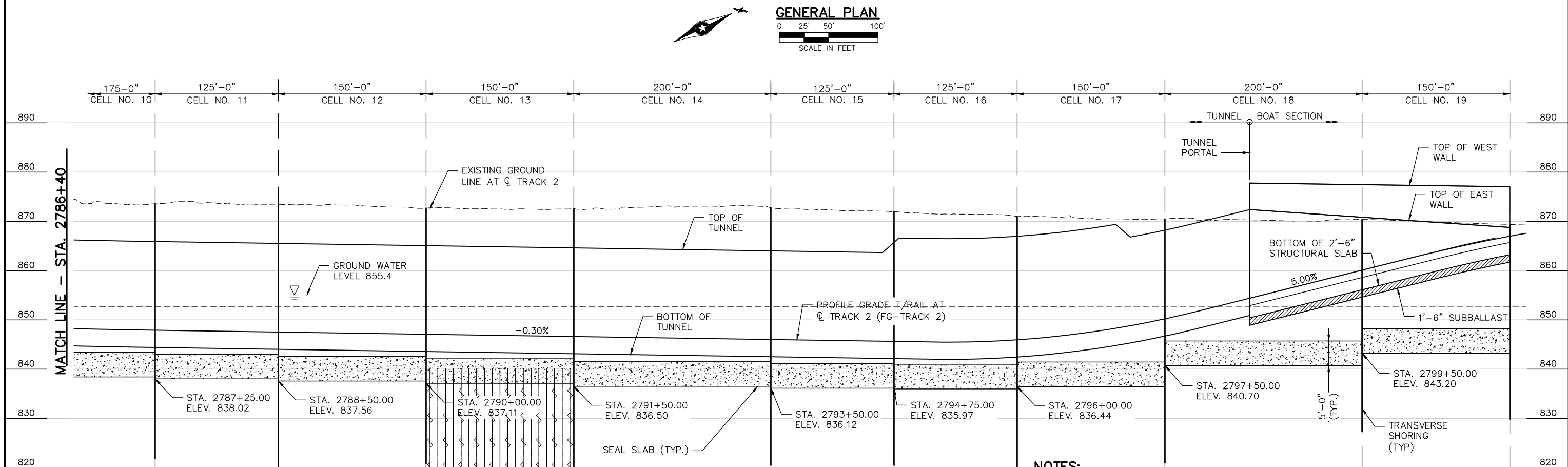
DISCIPLINE: **STRUCTURES**

SHEET NAME: **E3-STU-TUN-LRT-DTL-005**



SHEET
216
OF
274

Aug. 28 2014 11:28 am V:\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN-TUNS-LRT-DTL.dwg By: Katie.Ellis

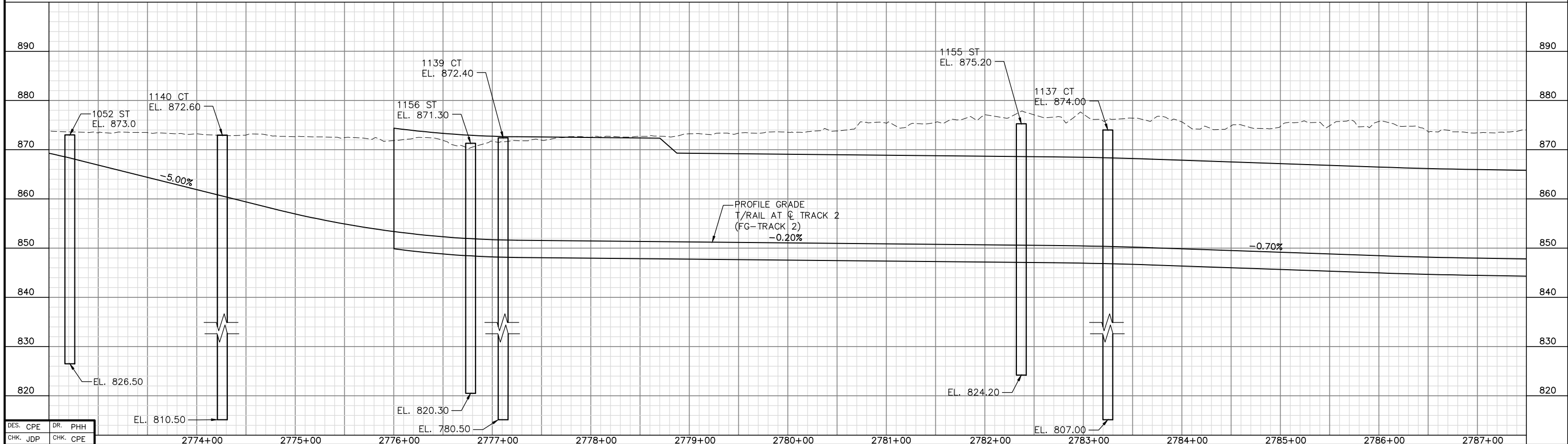
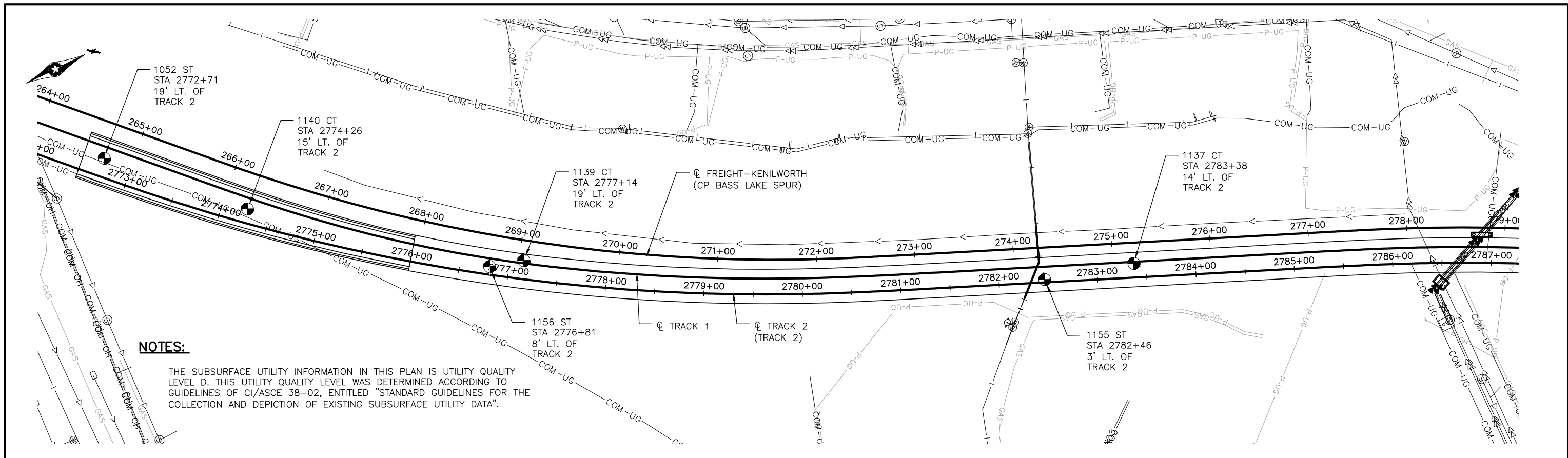




① INSTALL HELICAL PILES IN CELLS 1-19. PILE ESTIMATED LENGTH IS 20'. PILE SPACING TO BE DETERMINED IN FINAL DESIGN.

DES. CPE		DR. PHH												0 25 50 100 HOR. SCALE IN FEET		MINIMUM PILE LENGTH IS 20'. PILE SPACING TO BE DETERMINED IN FINAL DESIGN.					
CHK. JDP		CHK. CPE												1 HELICAL PILE (TYP.)							
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL	<div>Kimley»Horn</div> <div>PRELIMINARY ENGINEERING</div>										<div><div></div><div></div></div>		EAST - VOLUME 2 (STRUCTURES) KENILWORTH CORRIDOR TUNNEL BRIDGE XXXXX (LRT) SUGGESTED SEQUENCING (2 OF 2)		SHEET 218 OF 274	
DISCIPLINE: STRUCTURES		SHEET NAME: E3-STU-TUN-LRT-DTL-007																			
																PRELIMINARY ENGINEERING					

Aug. 26 2014 10:48 am V:\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN-LRT-SUR-002.dwg By: ronald.dee



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



EAST - VOLUME 2 (STRUCTURES)
KENILWORTH CORRIDOR TUNNEL
BRIDGE XXXXX (LRT)
BORINGS (1 OF 6)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-LRT-SUR-003

SHEET
219
OF
274



Kimley»Horn

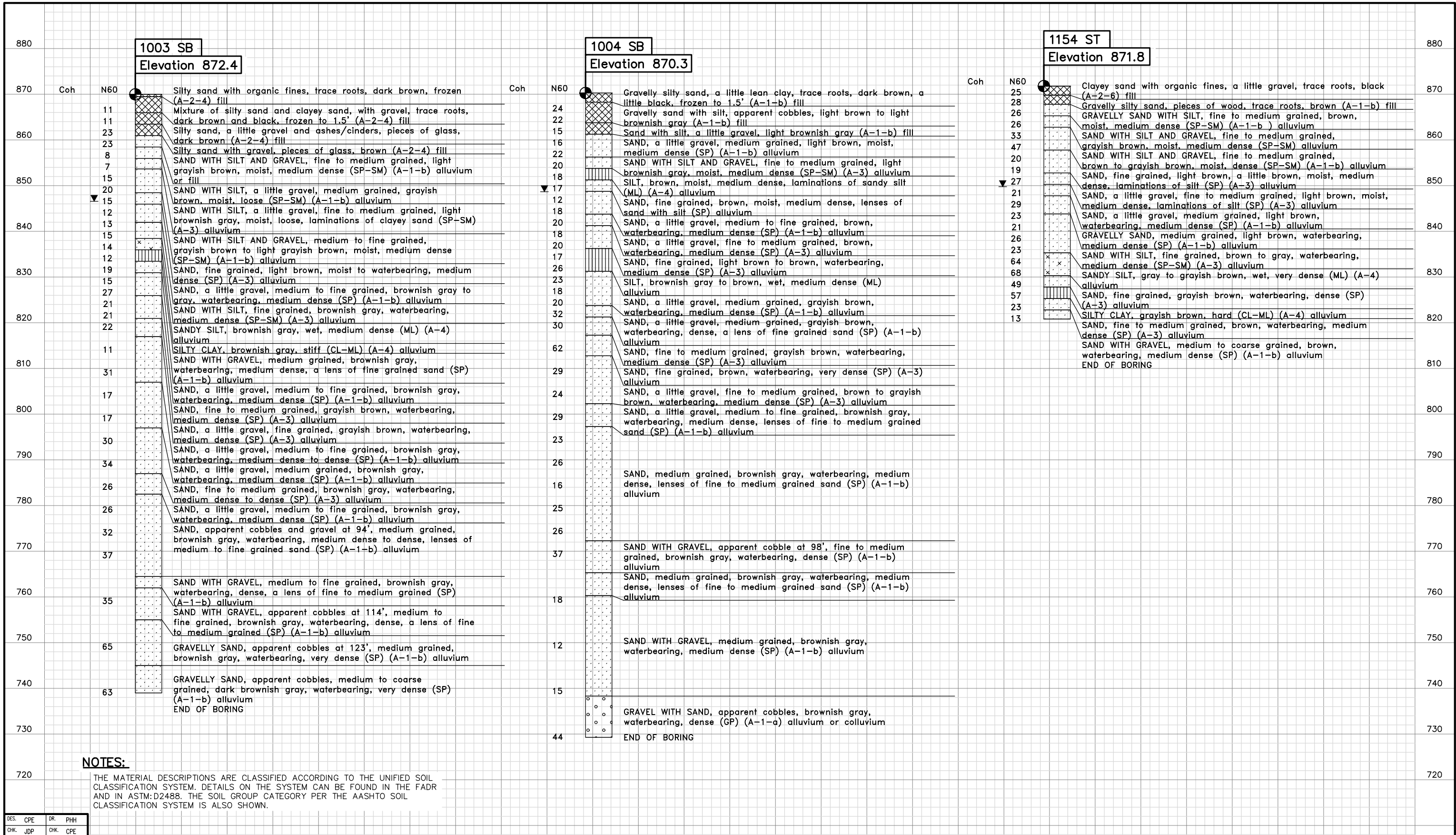


**EAST - VOLUME 2 (STRUCTURES)
KENILWORTH CORRIDOR TUNNEL
BRIDGE XXXXX (LRT)
BORINGS (3 OF 6)**

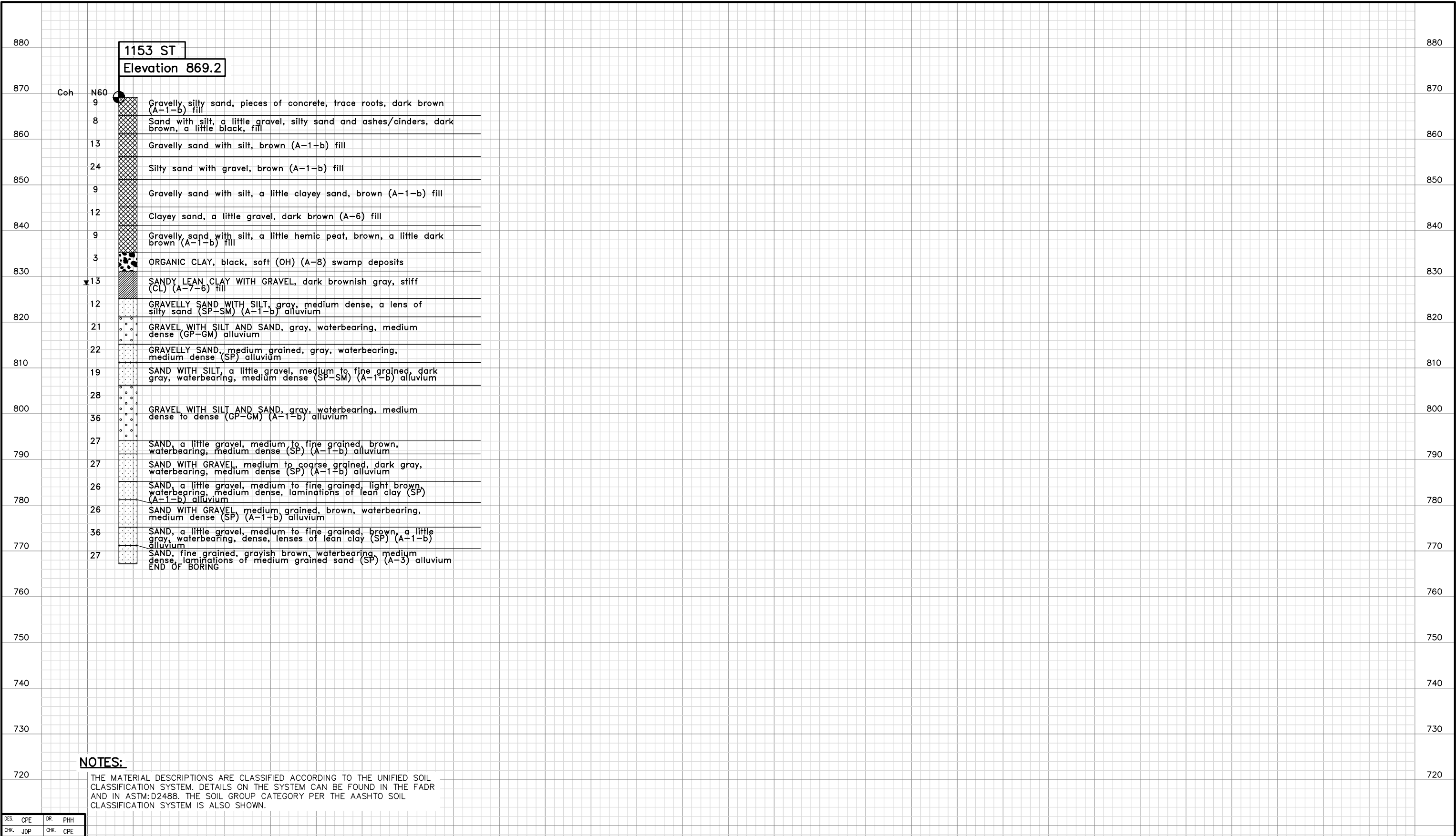
DISCIPLINE:	STRUCTURES	SHEET NAME:	E3-STU-TUN-LRT-BOR-001
-------------	-------------------	-------------	-------------------------------

SHEET
221
OF
274

Aug. 26 2014 10:48 am V:\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN-LRT-BOR.dwg By: ronald.dee



Aug. 26 2014 10:49 am V:\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN-TUNS-LRT-BOR .dwg By: ronald.dee



NOTES:

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

DES.	CPE	DR.	PHH		
CHK.	JDP	CHK.	CPE		
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)

KENILWORTH CORRIDOR TUNNEL

BRIDGE XXXXX (LRT)

BORINGS (5 OF 6)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-LRT-BOR-003

SHEET

223

OF

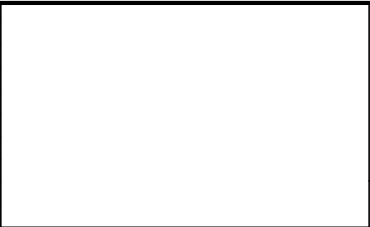
274

[illegible]

Aug. 26 2014 10:49 am V: \\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN-TUNS-LRT-AES.dwg By: ronadl.dee

DES. CPE	DR. PHH
CHK. JDP	CHK. CPE

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)
KENILWORTH CORRIDOR TUNNEL
BRIDGE XXXXXX (LRT)
AESTHETICS

DISCIPLINE: STRUCTURES

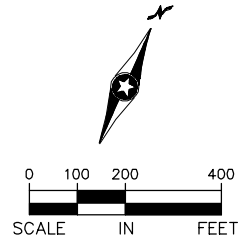
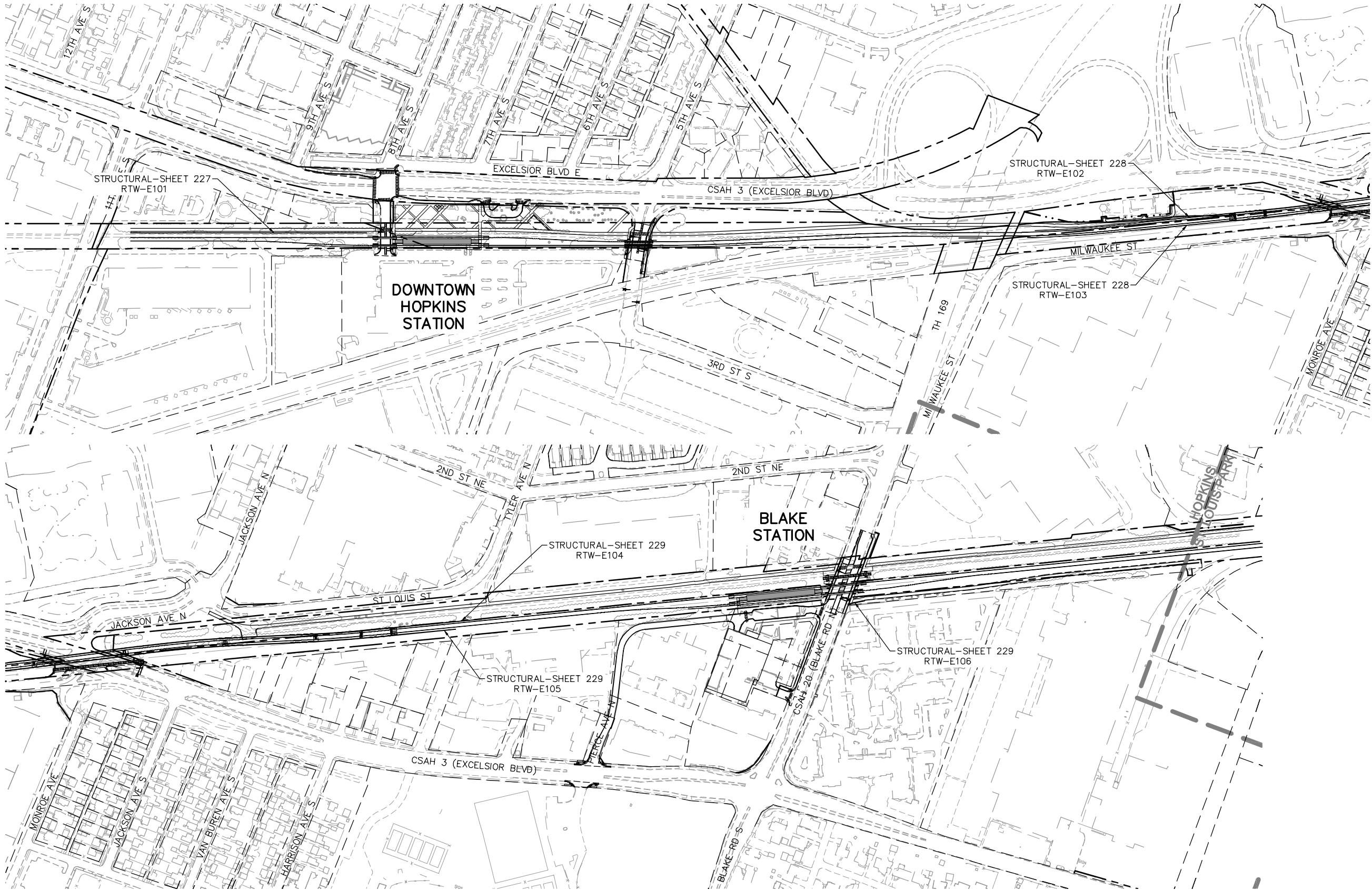
SHEET NAME: E3-STU-TUN-LRT-AES

SHEET
225
OF
274

AESTHETIC DETAILS TO BE DETERMINED DURING ADVANCED DESIGN

- 1. BOAT SECTION SURFACES
- 2. WALL CORNER DETAILS
- 3. RAILING AND SCREENING

Aug. 26 2014 12:03 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E1-STU-RTW-IDX.dwg By: Katie.Ellis



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)

SEGMENT 1

RETAINING WALLS

LAYOUT INDEX

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E1-STU-RTW-IDX - 001**

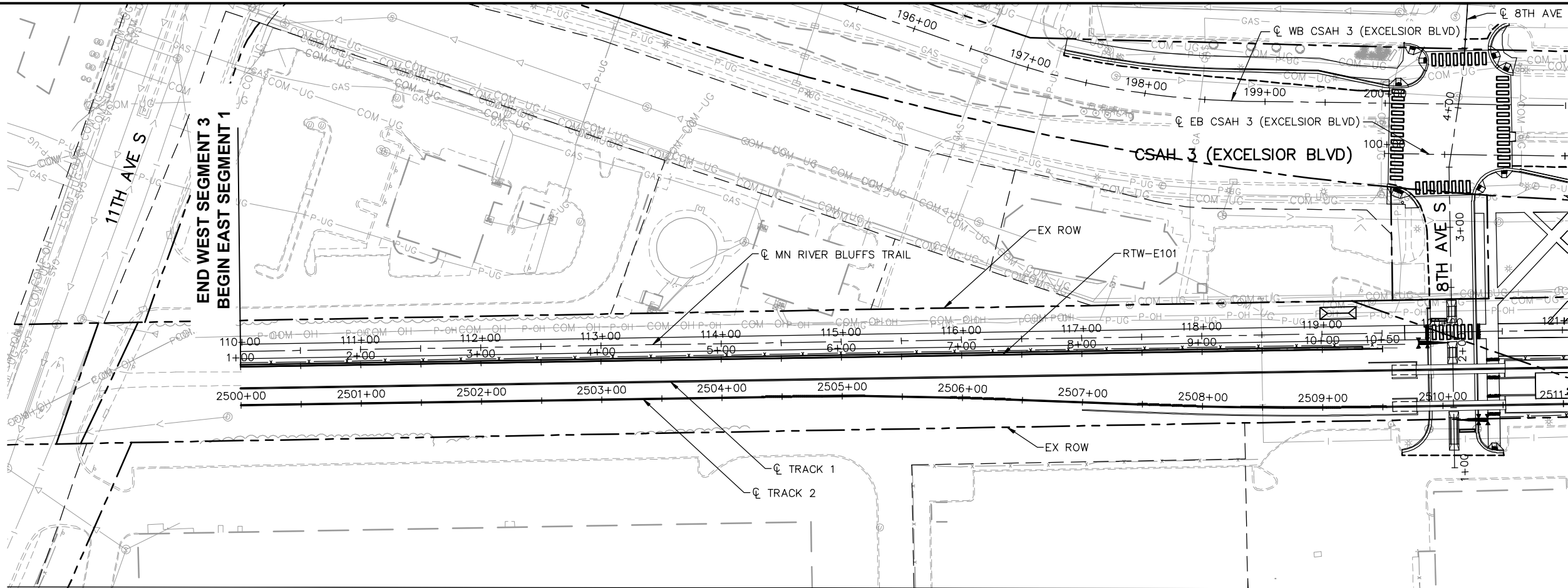
SHEET

226

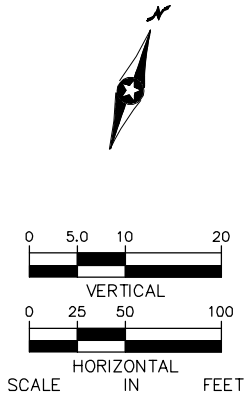
OF

274

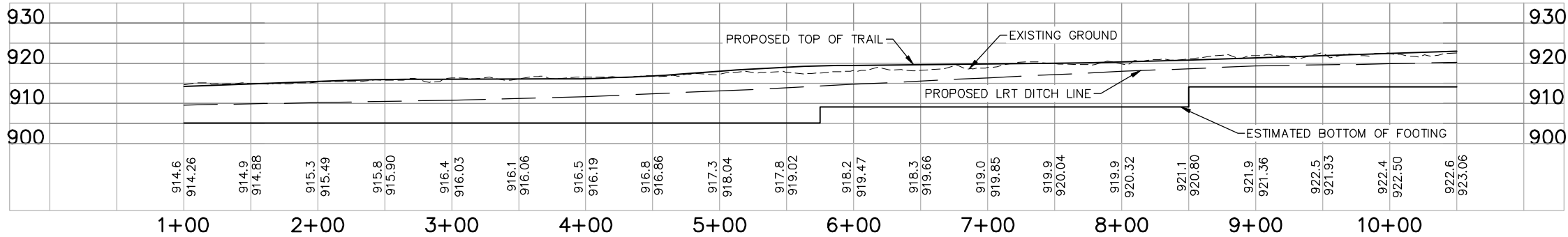
Aug. 26 2014 12:05 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E1-STU-RTW-PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E101 IS ANTICIPATED TO
BE A CAST-IN-PLACE
RETAINING WALL ON SPREAD
FOOTINGS OR BLOCK WALL.



RTW-E101



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



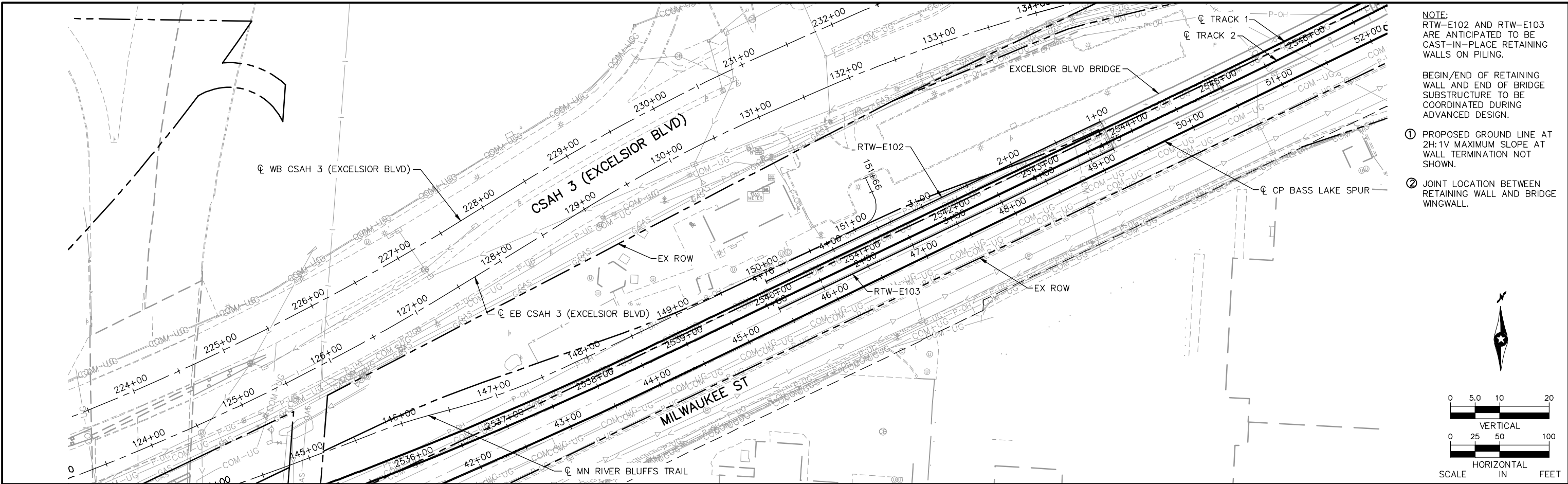
EAST - VOLUME 2 (STRUCTURES)
RTW-E101
PLAN AND PROFILE

DISCIPLINE: STRUCTURES

SHEET NAME:
E1-STU-RTW-PPFL - 001

SHEET
227
OF
274

Aug. 26 2014 12:06 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E1-STU-RTW-PPFL.dwg By: Katie.Ellis

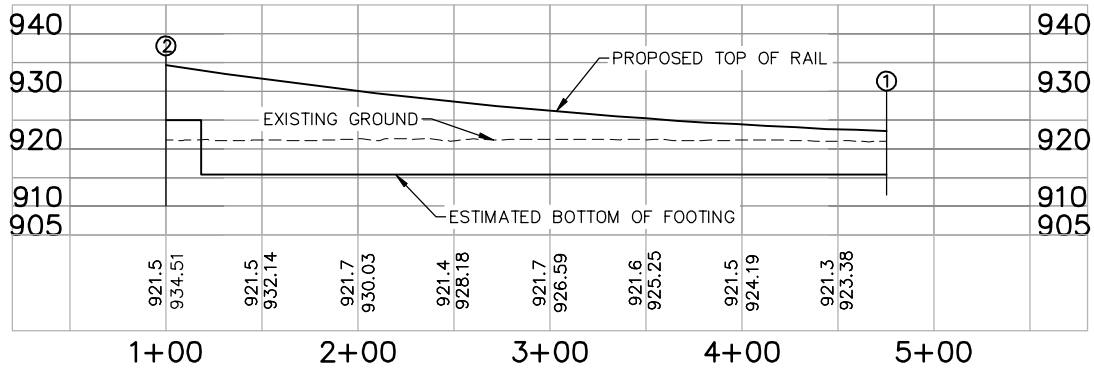


NOTE:
RTW-E102 AND RTW-E103
ARE ANTICIPATED TO BE
CAST-IN-PLACE RETAINING
WALLS ON PILING.

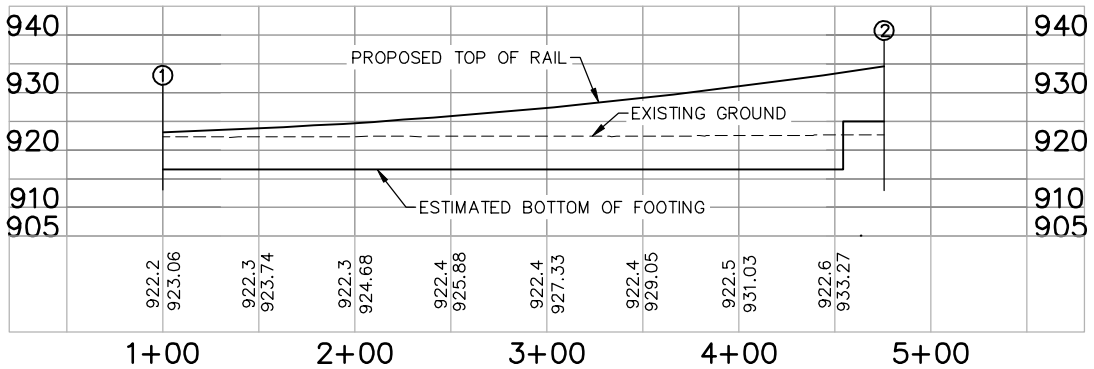
BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

- ① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
- ② JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL.

RTW-E102



RTW-E103



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



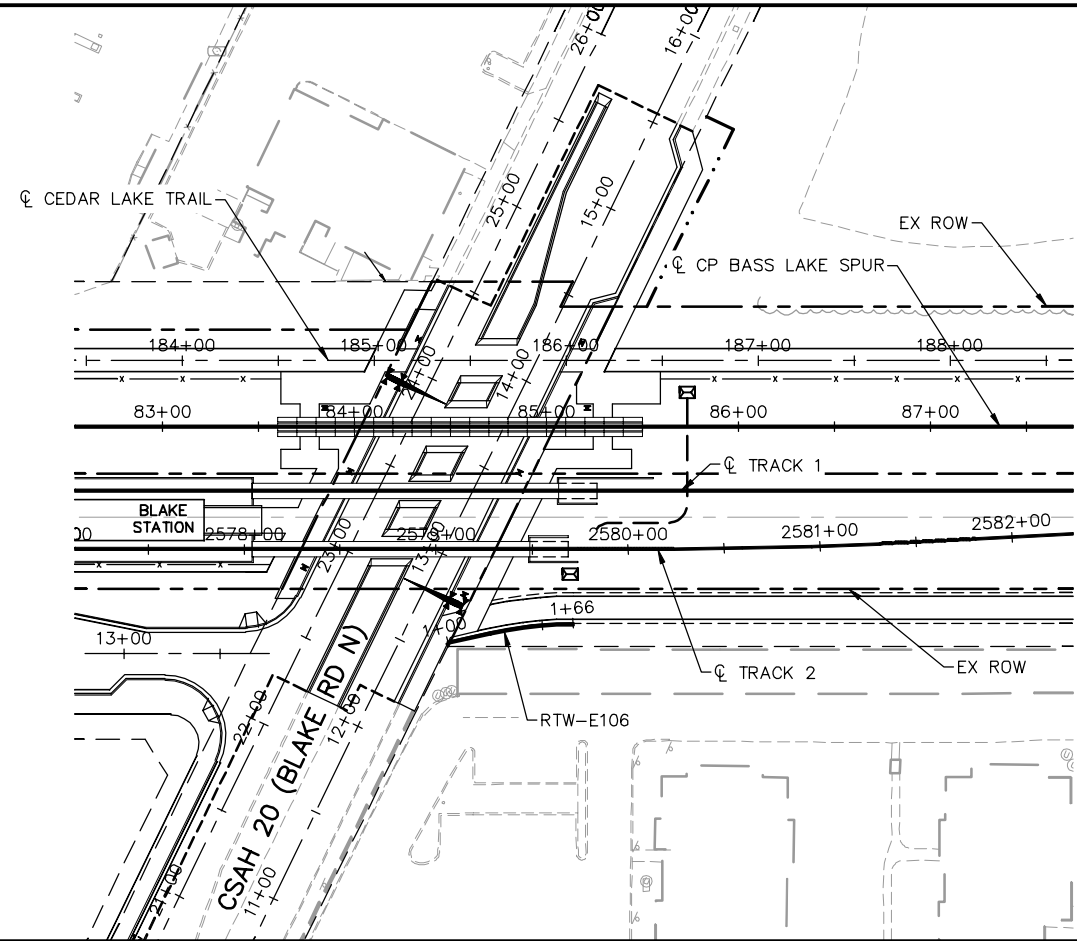
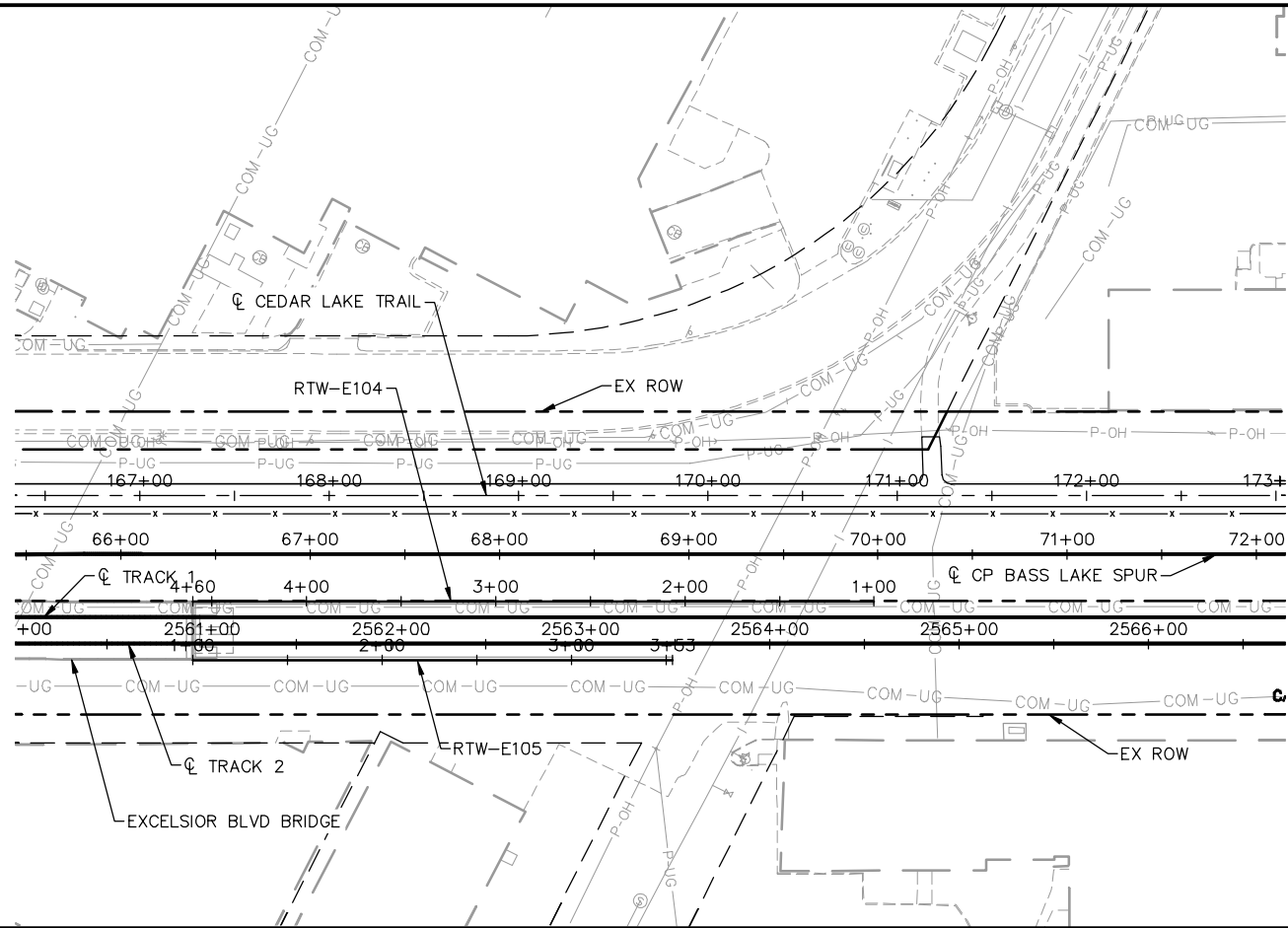
EAST - VOLUME 2 (STRUCTURES)
RTW-E102 & RTW-E103
PLAN AND PROFILES

DISCIPLINE: **STRUCTURES**

SHEET NAME:
E1-STU-RTW-PPFL - 002

SHEET
228
OF
274

Aug. 26 2014 12:08 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E1-STU-RTW-PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E104 AND RTW-E105
ARE ANTICIPATED TO BE
CAST-IN-PLACE RETAINING
WALLS ON PILING.

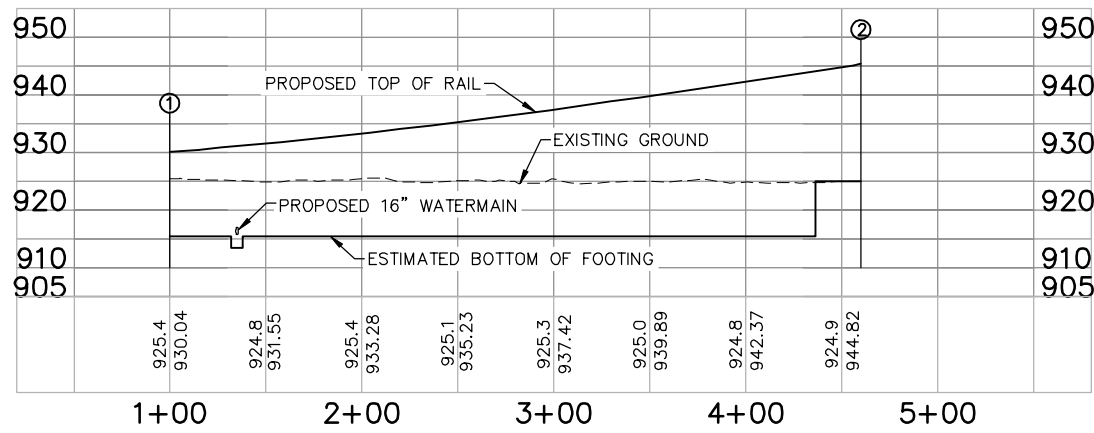
RTW-E106 IS ANTICIPATED
TO BE A CAST-IN-PLACE
RETAINING WALL OR BLOCK
WALL.

BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

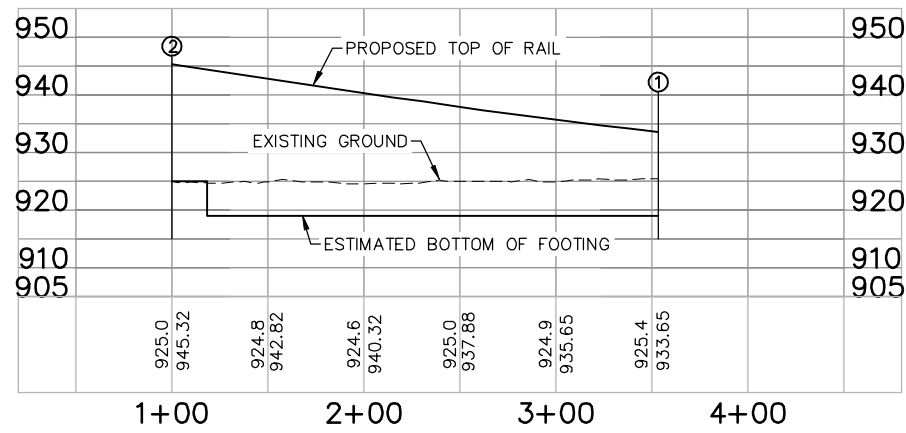
① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.

② JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL.

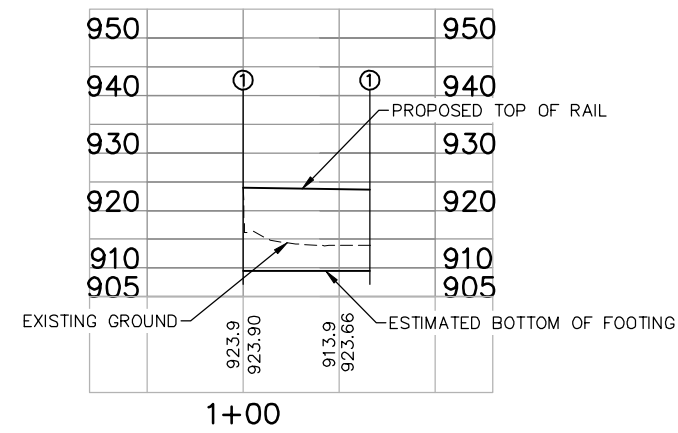
RTW-E104



RTW-E105



RTW-E106



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING

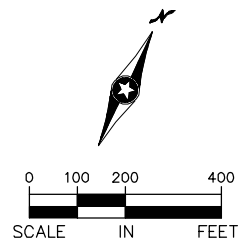
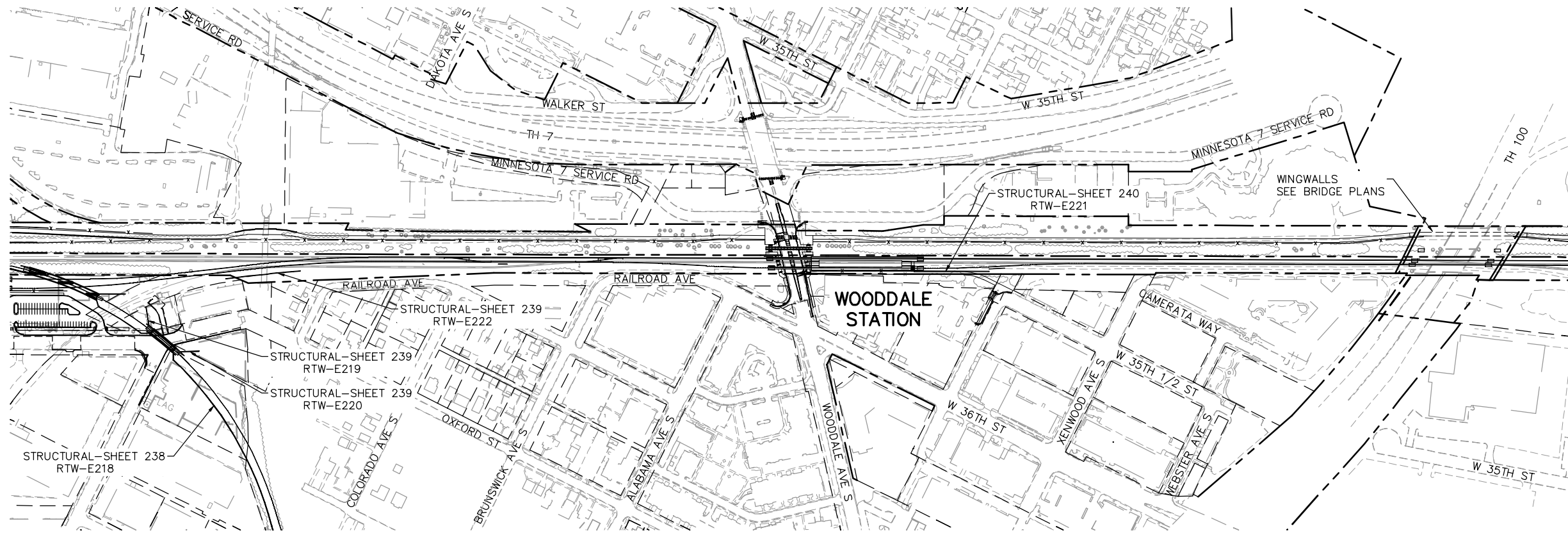
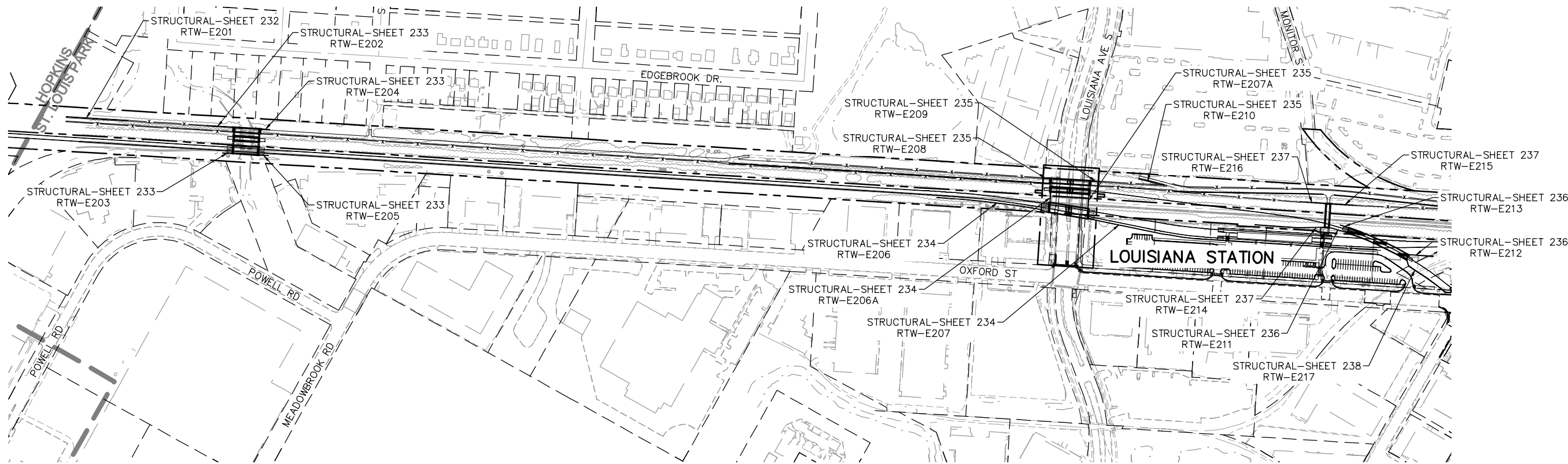
EAST - VOLUME 2 (STRUCTURES)
RTW-E104 TO RTW-E106
PLAN AND PROFILES

DISCIPLINE: STRUCTURES
SHEET NAME: E1-STU-RTW-PPFL - 003

SHEET

229
OF
274

Aug. 26 2014 12:14 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2-STU-RTW-IDX.dwg By: Katie.Ellis



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)

SEGMENT 2

RETAINING WALLS

LAYOUT INDEX (1 OF 2)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-RTW-IDX - 001**

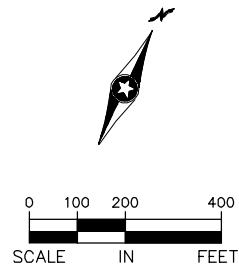
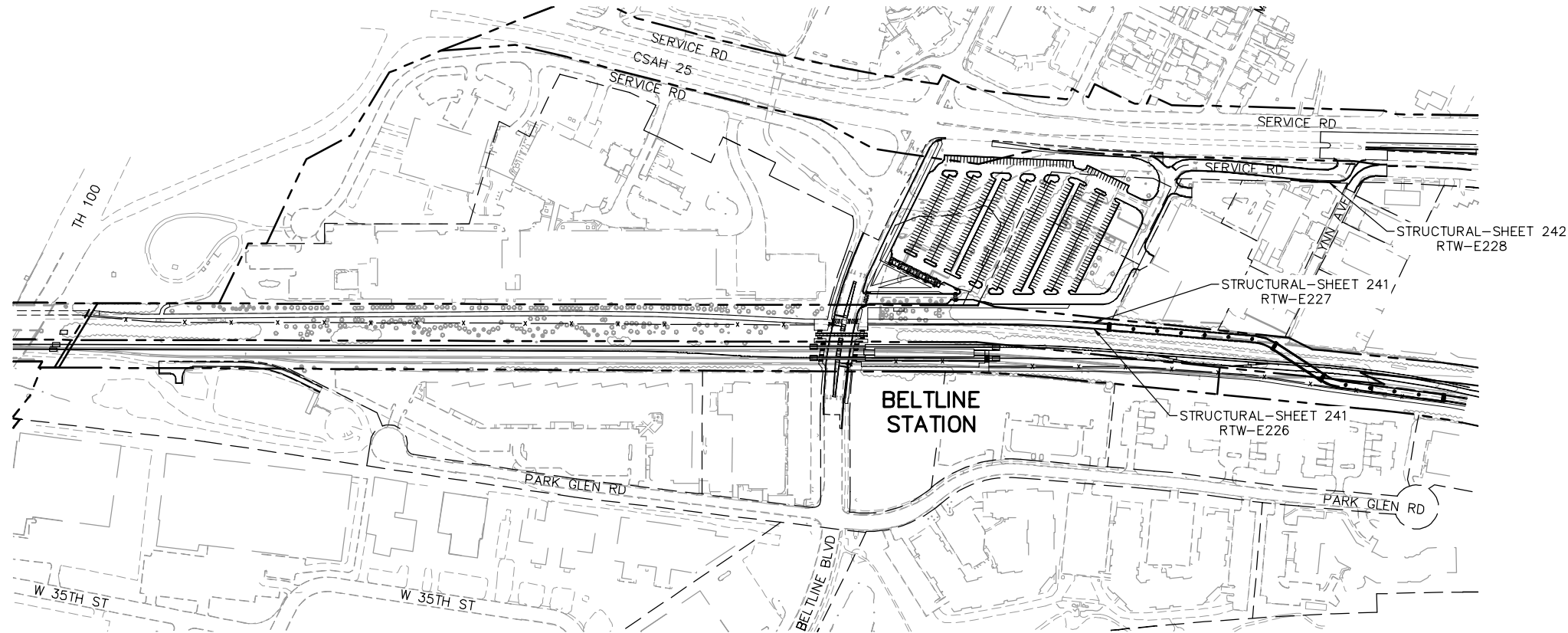
SHEET

230

OF

274

Aug. 26 2014 12:14 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2-STU-RTW-IDX.dwg By: Katie.Ellis



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



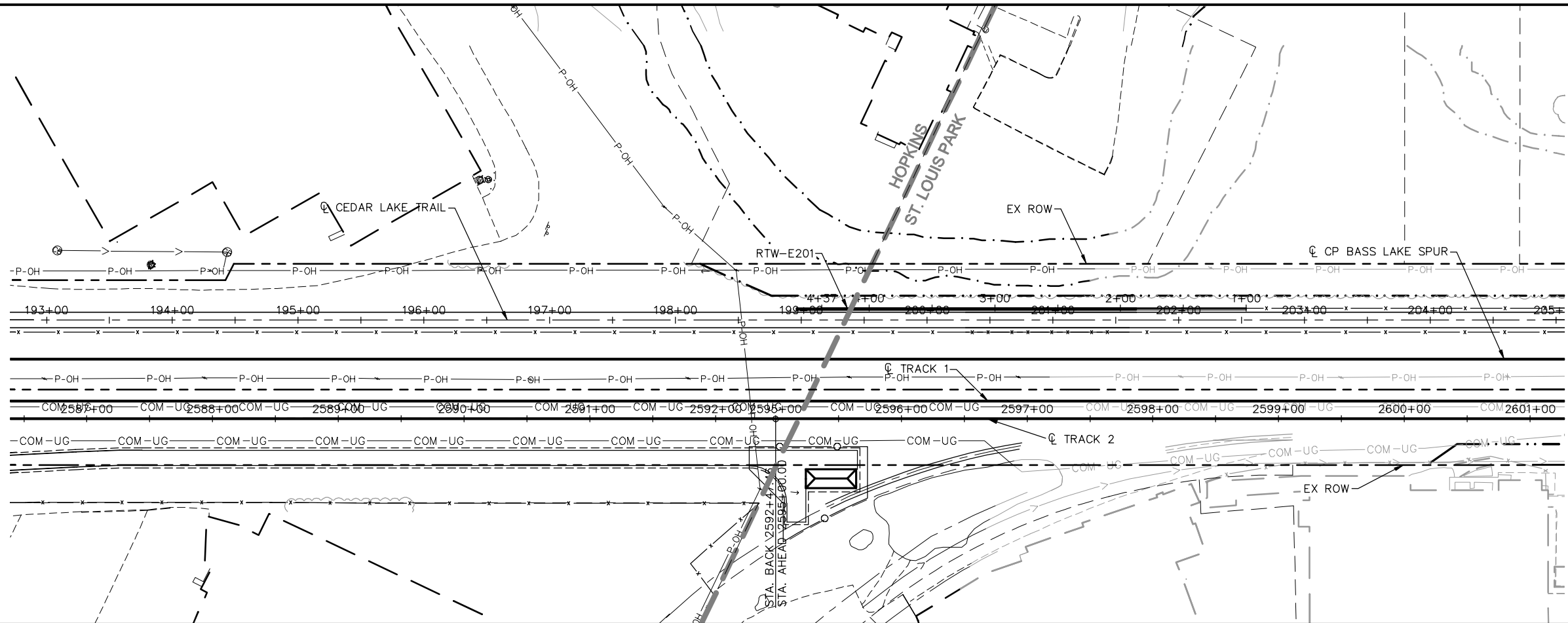
**EAST - VOLUME 2 (STRUCTURES)
SEGMENT 2
RETAINING WALLS
LAYOUT INDEX (2 OF 2)**

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-RTW-IDX - 002**

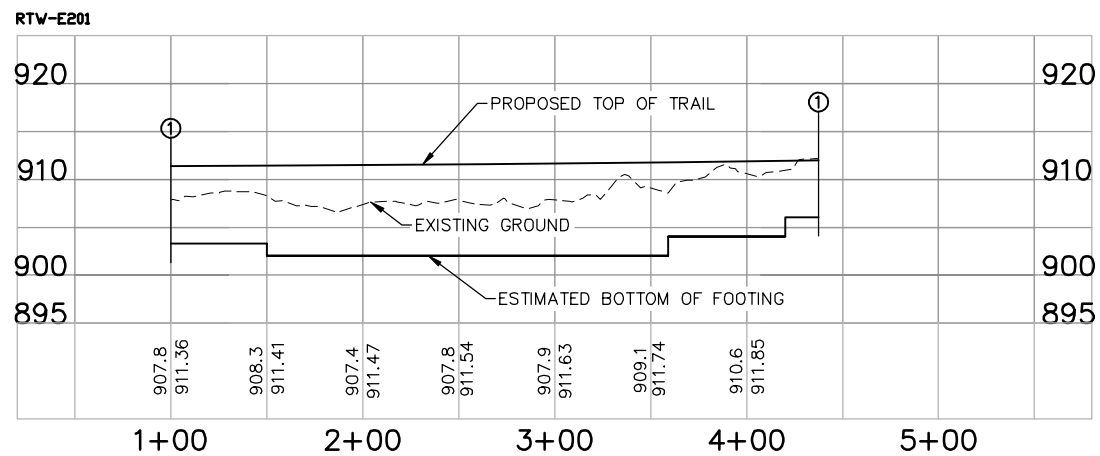
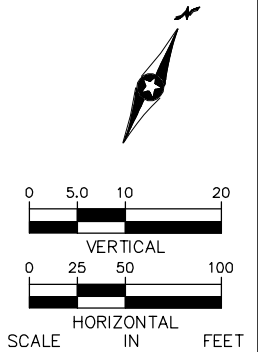
SHEET
231
OF
274

Aug. 26 2014 12:16 pm v:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2-STU-RTW-PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E201 IS ANTICIPATED
TO BE A CAST-IN-PLACE
RETAINING WALL ON SPREAD
FOOTINGS.

① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



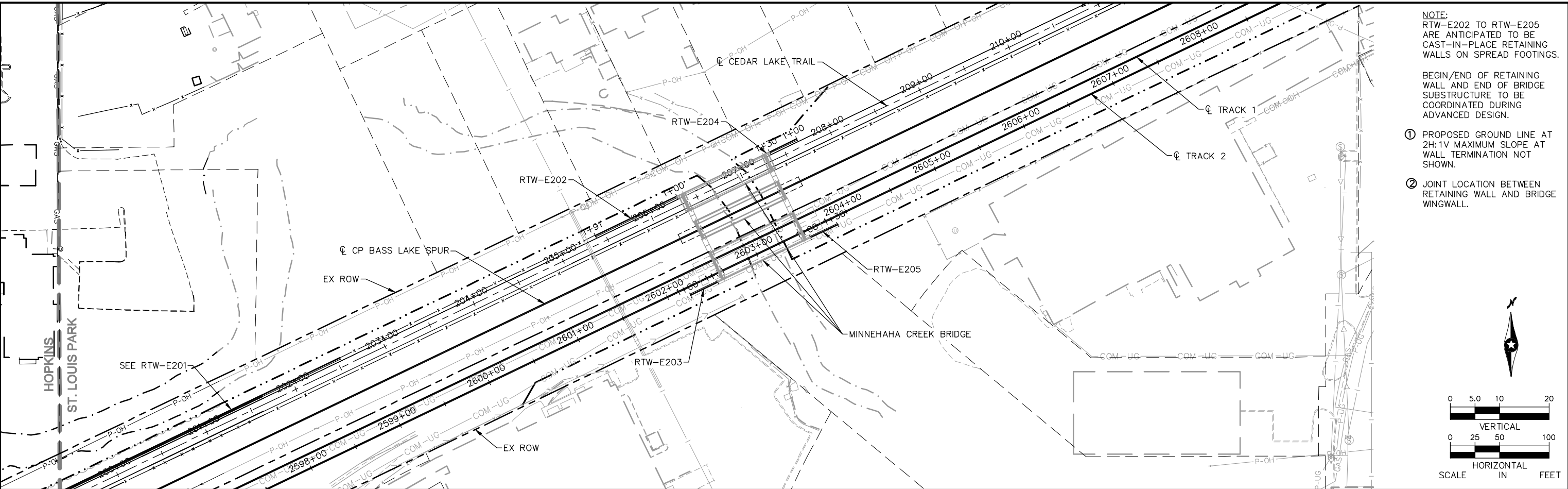
EAST - VOLUME 2 (STRUCTURES)
RTW-E201
PLAN AND PROFILE

DISCIPLINE: STRUCTURES

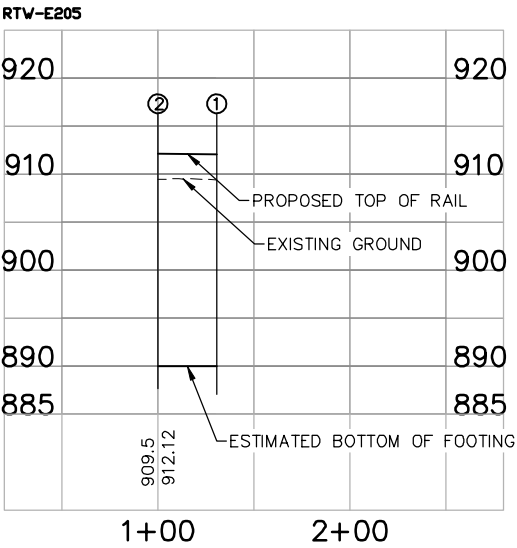
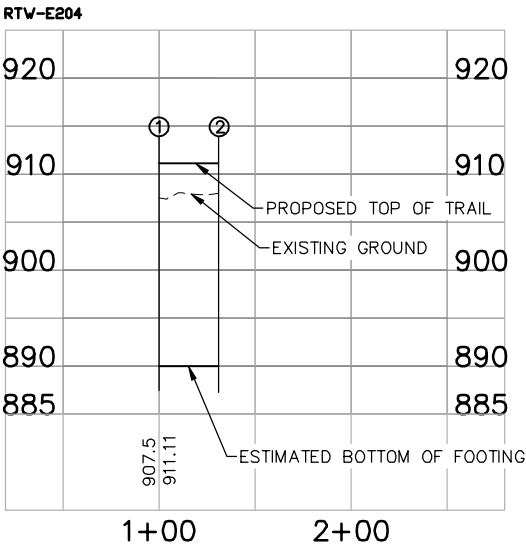
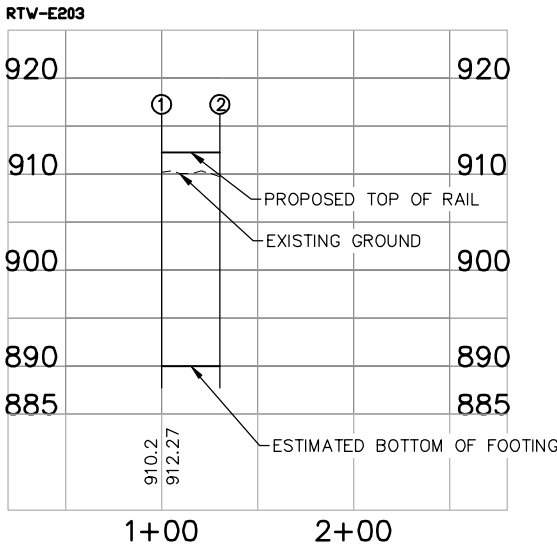
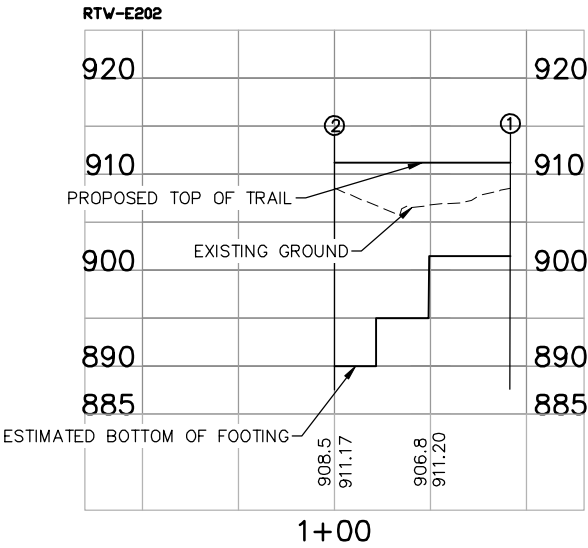
SHEET NAME:
E2-STU-RTW-PPFL - 001

SHEET
232
OF
274

Aug. 26 2014 12:18 pm v:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2-STU-RTW-PPFL.dwg By: Katie.Ellis



- NOTE:
RTW-E202 TO RTW-E205
ARE ANTICIPATED TO BE
CAST-IN-PLACE RETAINING
WALLS ON SPREAD FOOTINGS.
- BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.
- ① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
 - ② JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



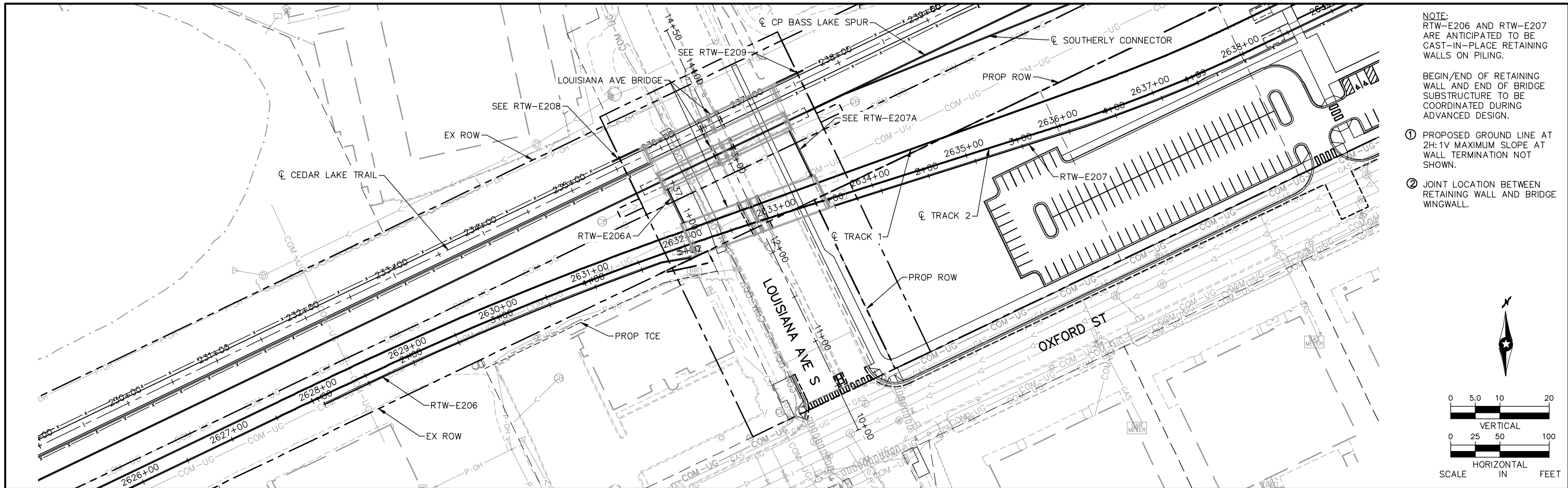
EAST - VOLUME 2 (STRUCTURES)
RTW-E202 TO RTW-E205
PLAN AND PROFILES

DISCIPLINE: **STRUCTURES**

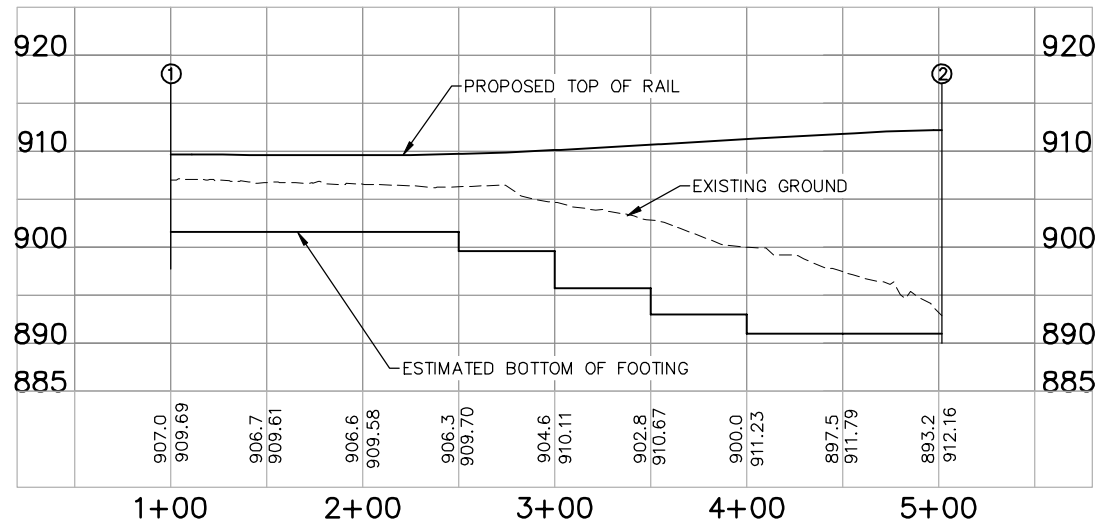
SHEET NAME:
E2-STU-RTW-PPFL - 002

SHEET
233
OF
274

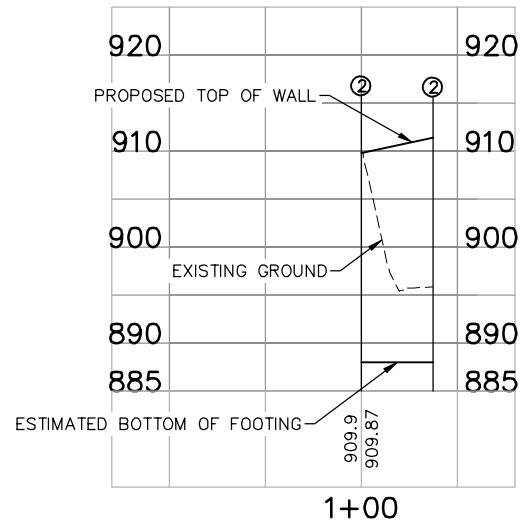
Aug. 26 2014 12:18 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2-STU-RTW-PPFL.dwg By: Katie.Ellis



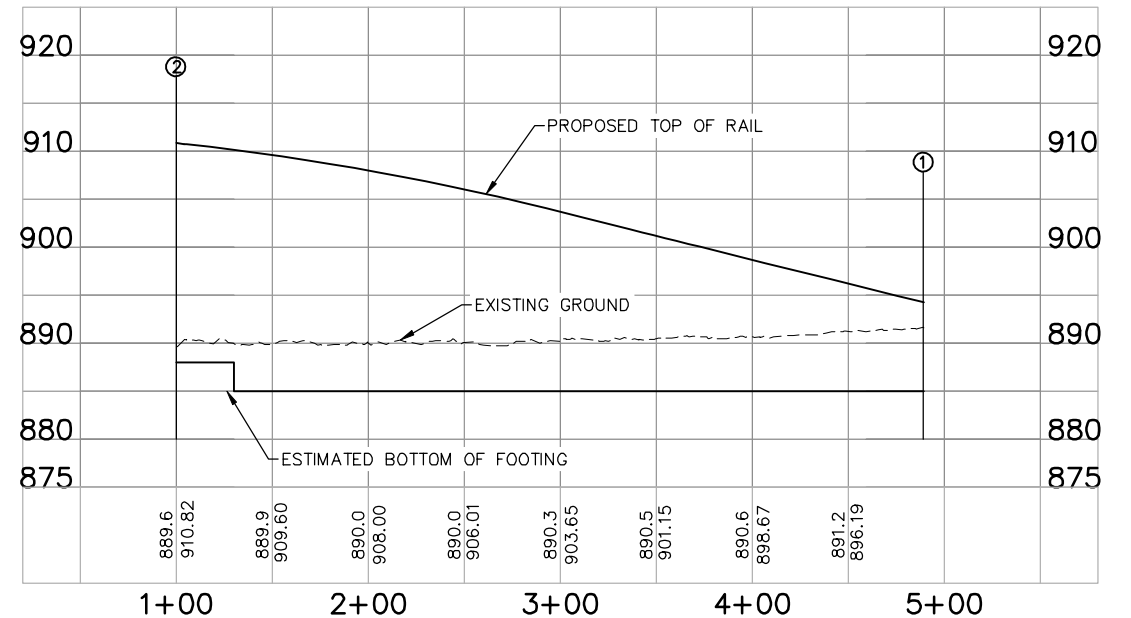
RTW-E206



RTW-E206A



RTW-E207



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



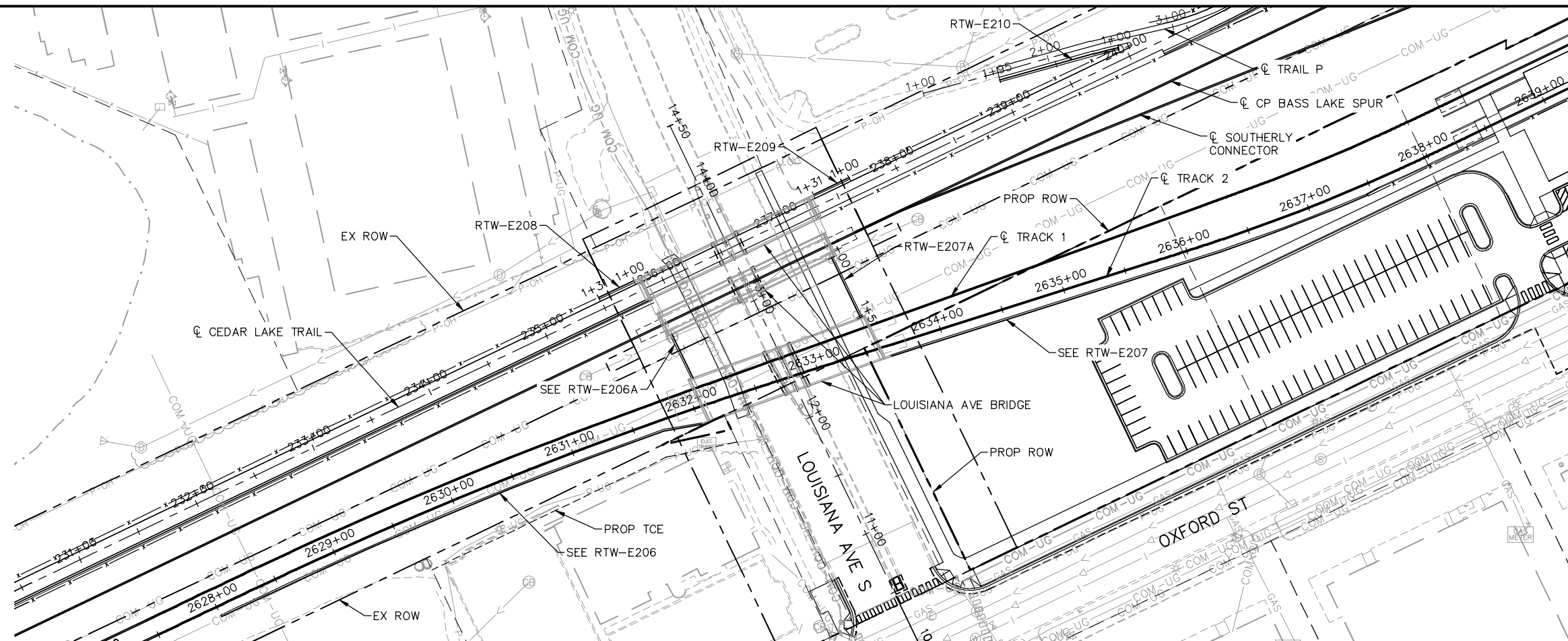
EAST - VOLUME 2 (STRUCTURES)
RTW-E206, RTW-E206A & RTW-E207
PLAN AND PROFILES

DISCIPLINE: STRUCTURES

SHEET NAME: E2-STU-RTW-PPFL - 003

SHEET
234
OF
274

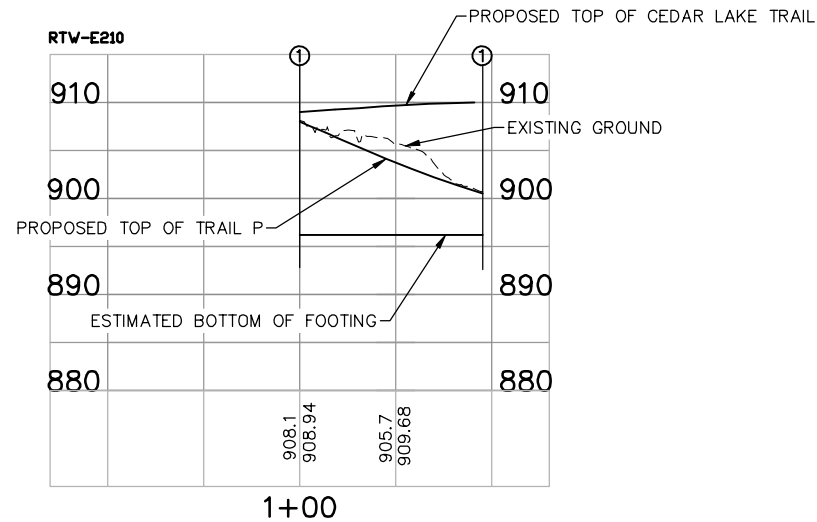
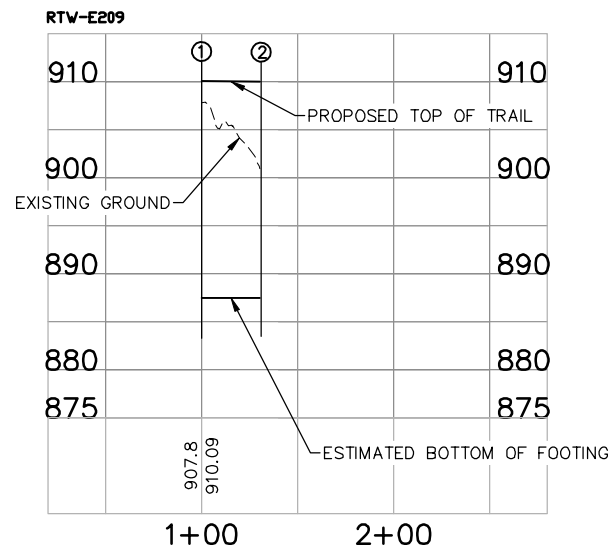
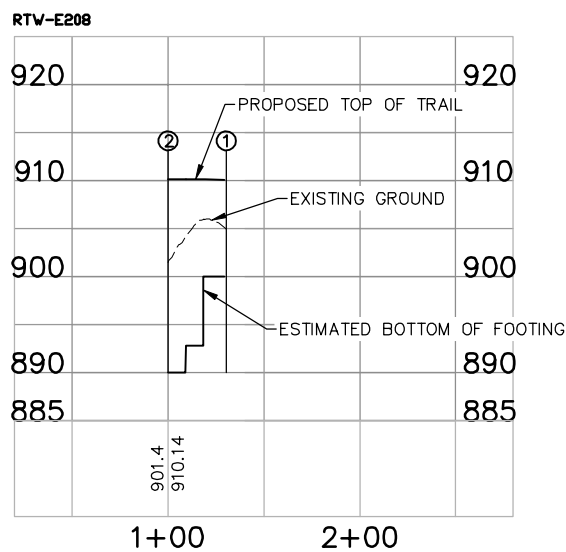
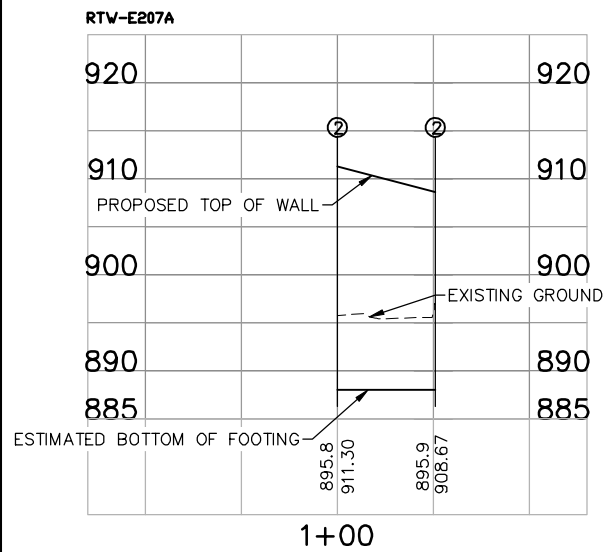
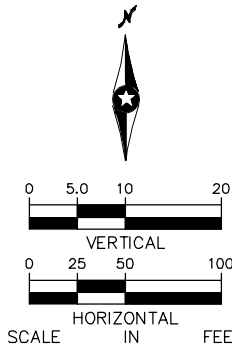
Aug. 26 2014 12:19 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2--STU--RTW--PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E207A AND RTW-E208
TO RTW-E210 ARE
ANTICIPATED TO BE
CAST-IN-PLACE RETAINING
WALLS ON PILING.

BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

- ① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
- ② JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



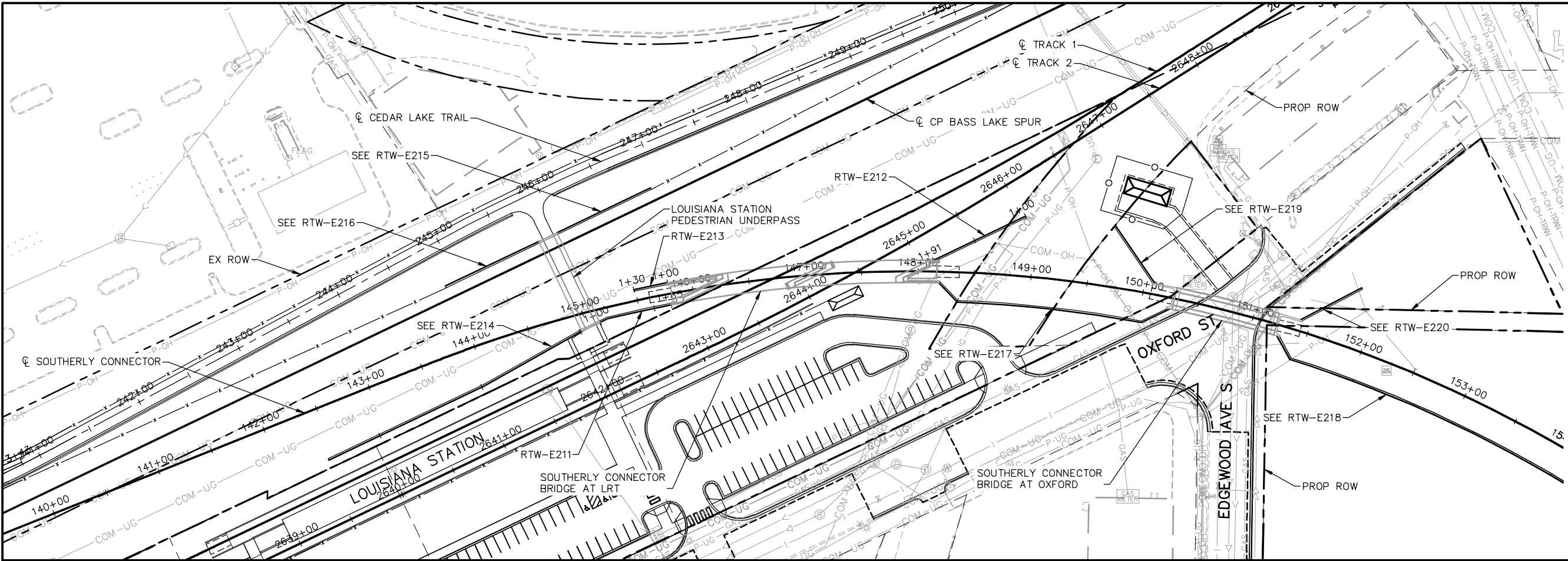
**EAST - VOLUME 2 (STRUCTURES)
RTW-E207A, RTW-E208 TO RTW-E210
PLAN AND PROFILES**

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-RTW-PPFL - 004**

SHEET
235
OF
274

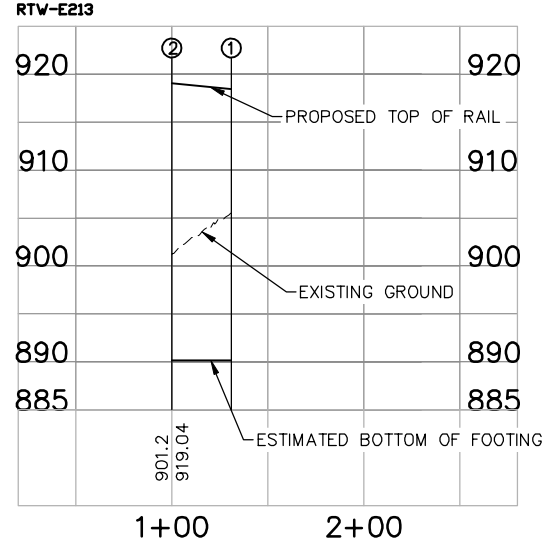
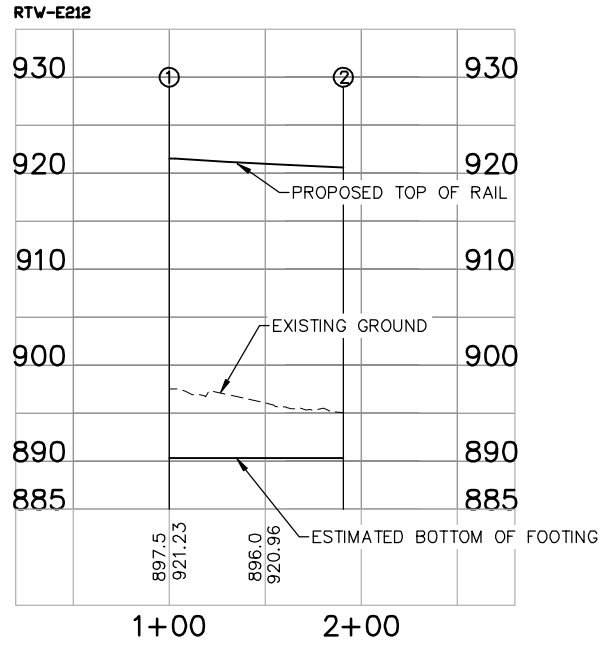
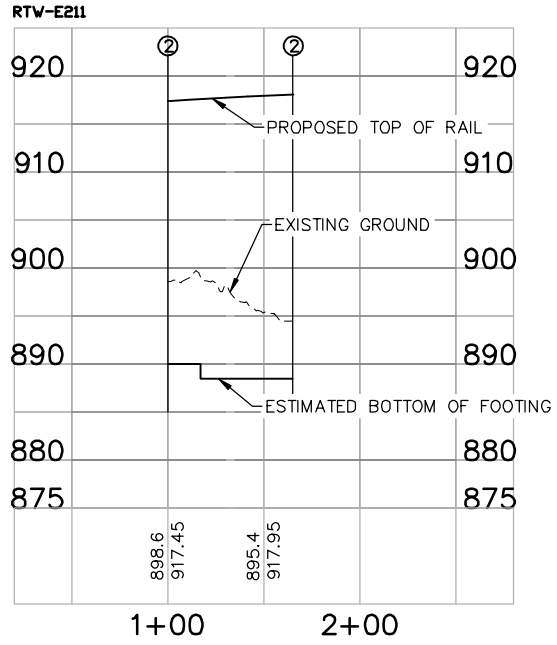
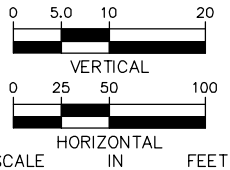
Aug. 26 2014 12:20 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2-STU-RTW-PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E211 TO RTW-E213 ARE
ANTICIPATED TO BE
CAST-IN-PLACE RETAINING
WALLS ON PILING.

BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

- ① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
- ② JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL OR PEDESTRIAN
UNDERPASS STRUCTURE.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

METROPOLITAN
COUNCIL

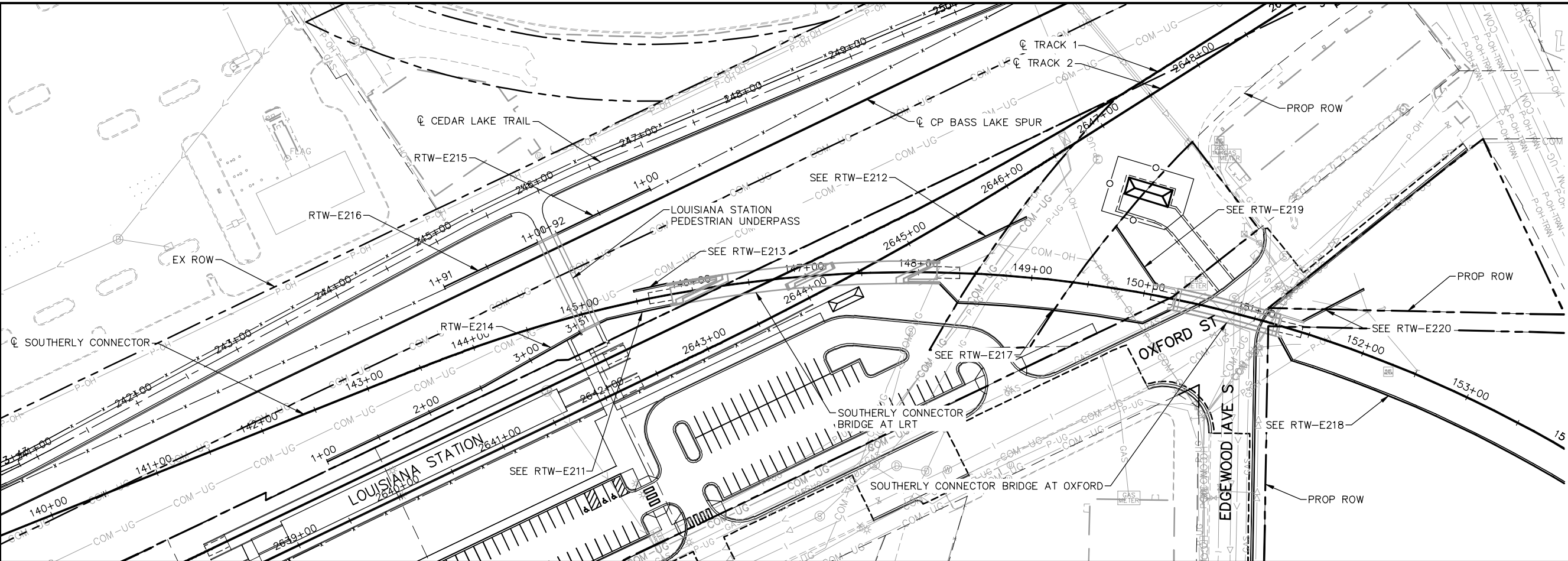
SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
RTW-E211 TO RTW-E213
PLAN AND PROFILES

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-RTW-PPFL - 005**

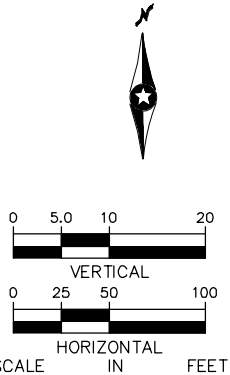
Aug. 26 2014 12:20 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2-STU-RTW-PPFL.dwg By: Katie.Ellis



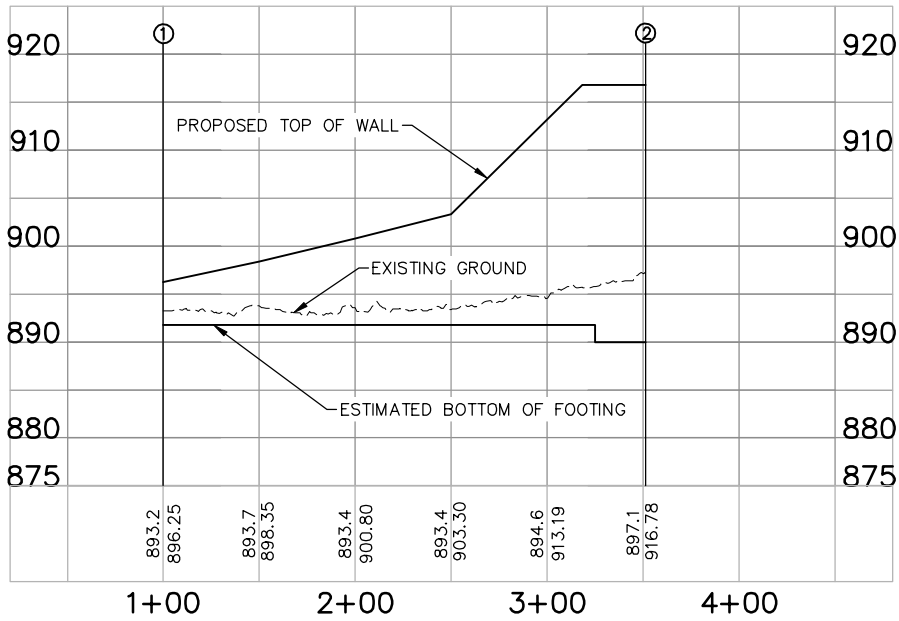
NOTE:
RTW-E214 TO RTW-E216 ARE
ANTICIPATED TO BE
CAST-IN-PLACE RETAINING
WALLS ON PILING.

BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

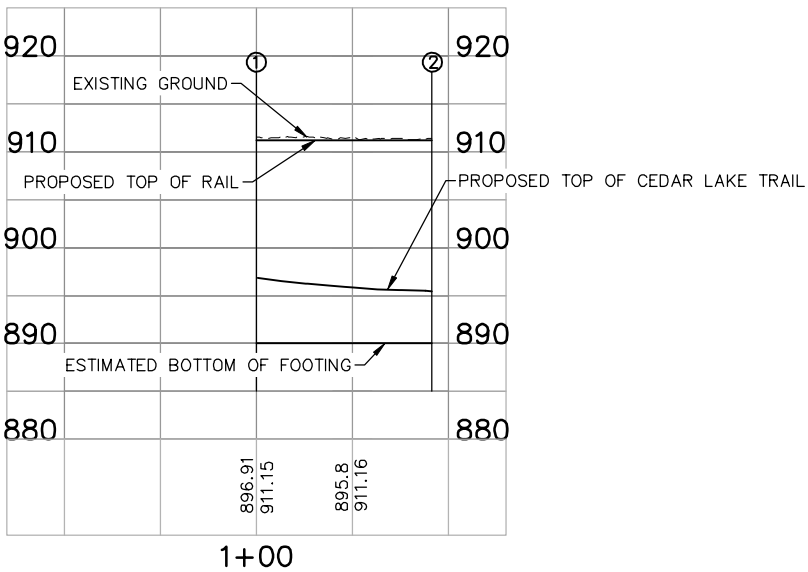
- ① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
- ② JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL OR PEDESTRIAN
UNDERPASS STRUCTURE.



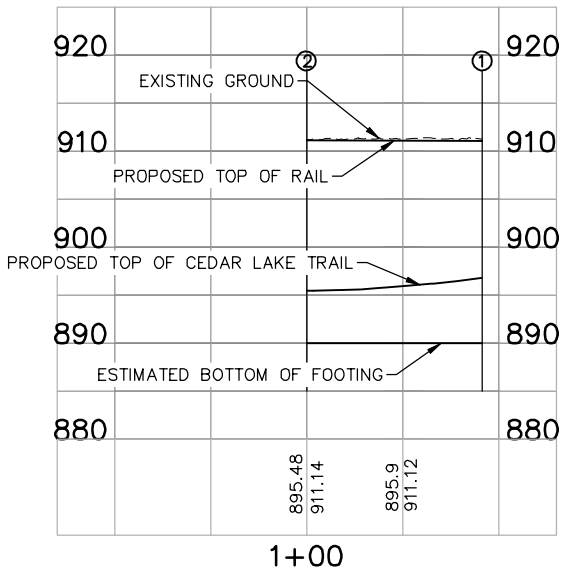
RTW-E214



RTW-E215



RTW-E216



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

METROPOLITAN
COUNCIL

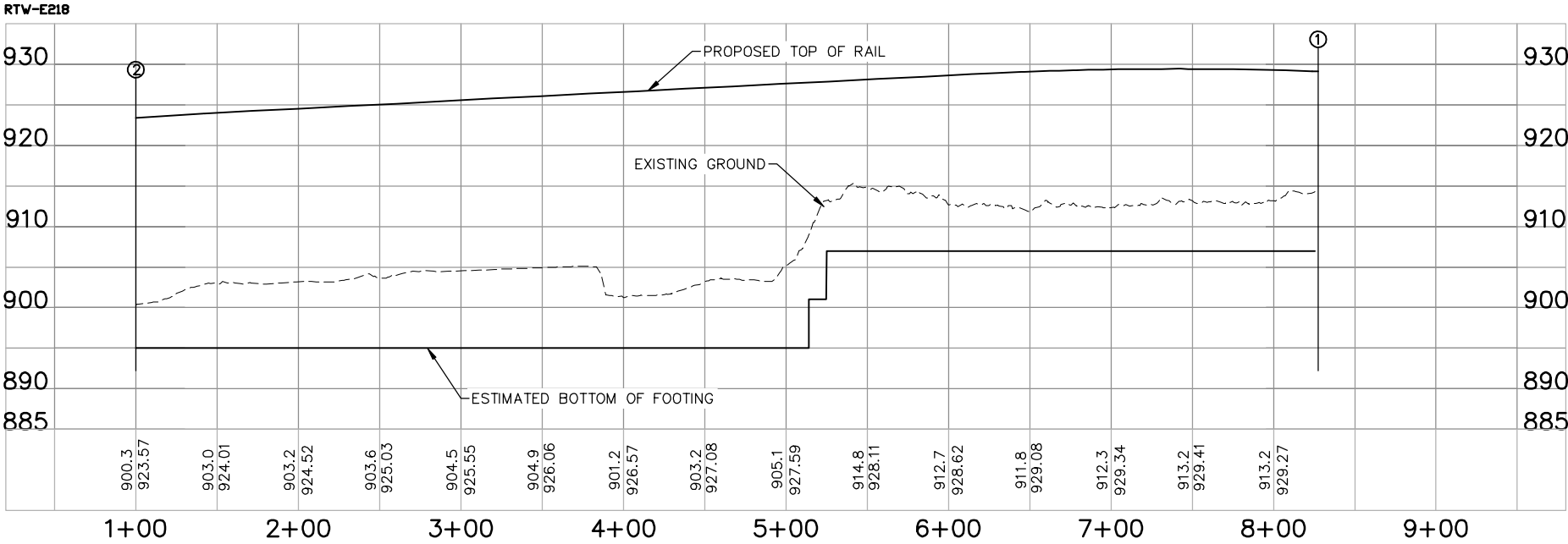
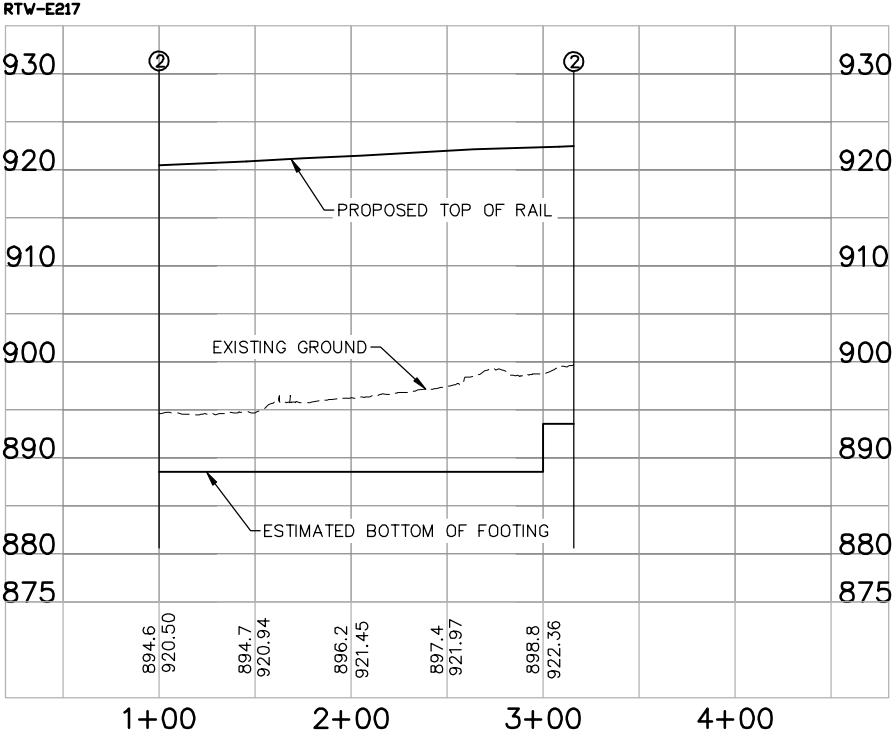
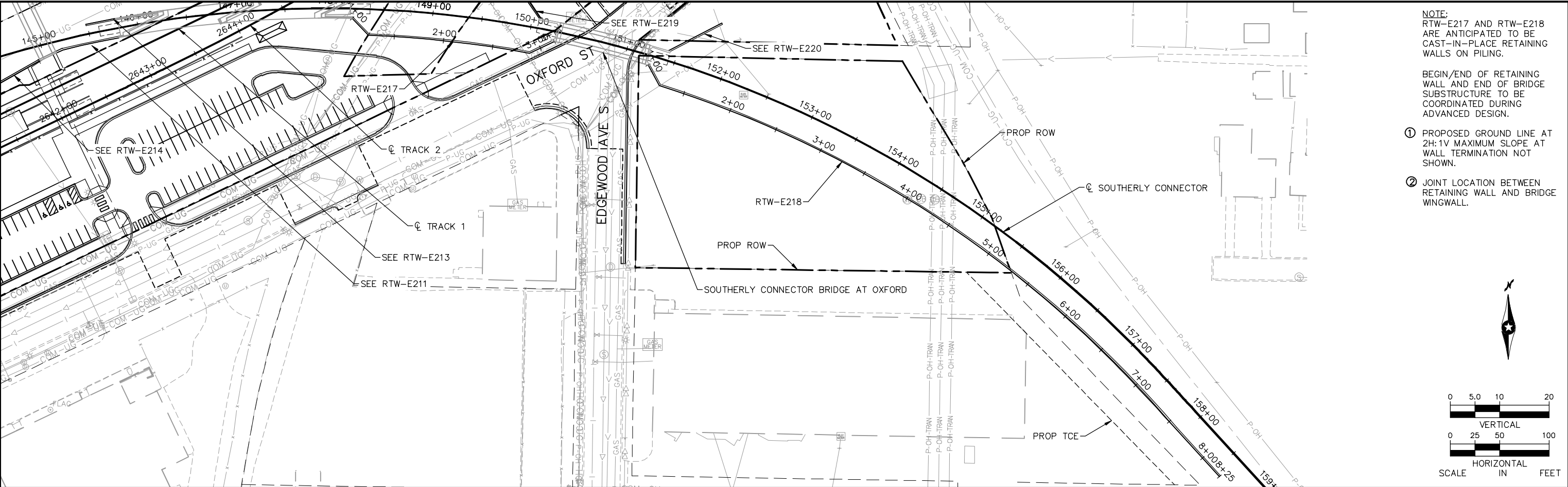
SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
RTW-E214 TO RTW-E216
PLAN AND PROFILES

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-RTW-PPFL - 006**

Aug. 26 2014 12:21 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2--STU--RTW--PPFL.dwg By: Katie.Ellis



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



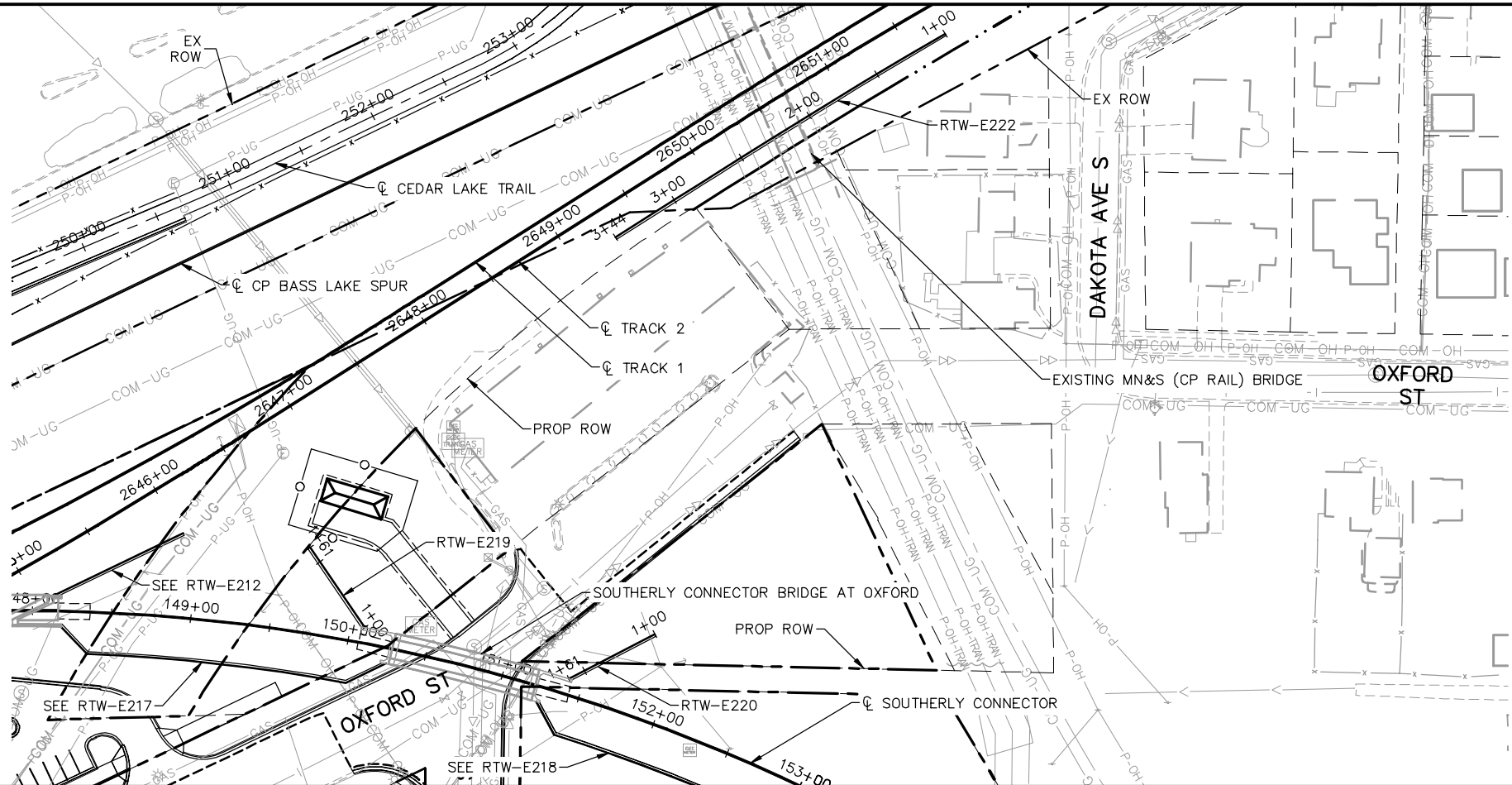
**EAST - VOLUME 2 (STRUCTURES)
RTW-E217 & RTW-E218
PLAN AND PROFILES**

DISCIPLINE: **STRUCTURES**

SHEET NAME:
E2-STU-RTW-PPFL - 007

**SHEET
238
OF
274**

Aug. 26 2014 12:21 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2--STU--RTW--PPFL.dwg By: Katie.Ellis

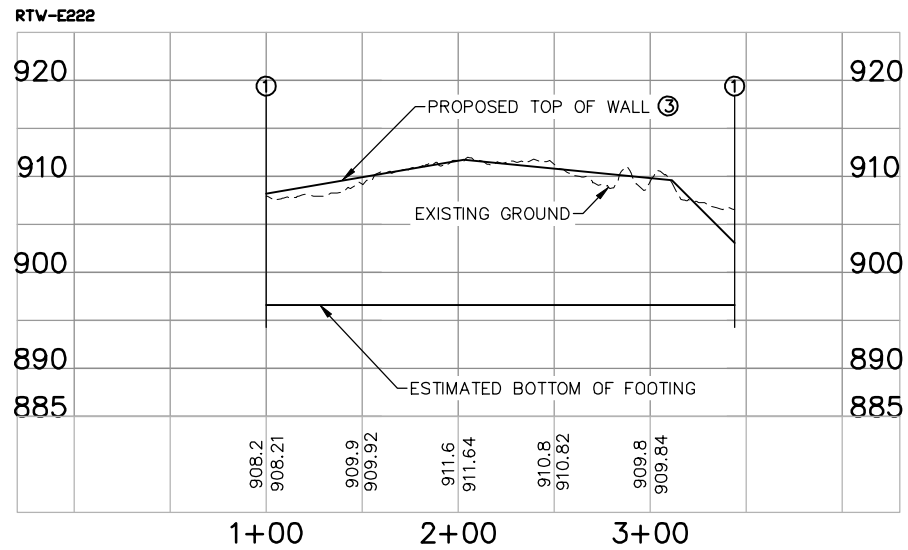
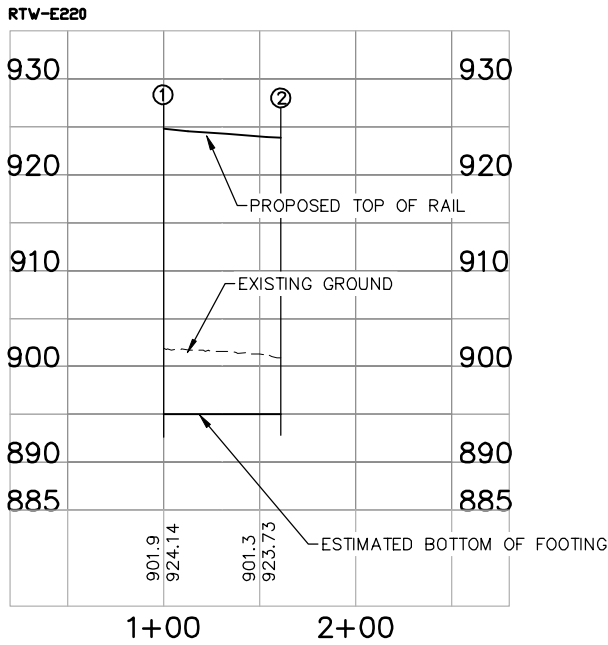
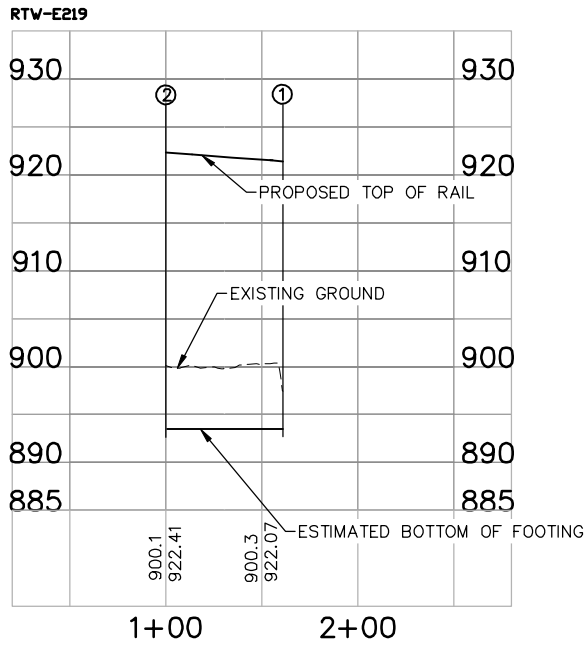
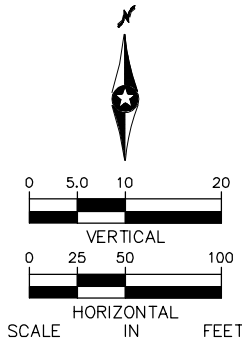


NOTE:
RTW-E219 AND RTW-E220
ARE ANTICIPATED TO BE
CAST-IN-PLACE RETAINING
WALLS ON PILING.

RTW-E222 WALL TYPE TO BE
DETERMINED IN ADVANCED
DESIGN.

BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

- 1 PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
- 2 JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL.
- 3 PORTIONS OF RTW-E222 TO
BE CONSTRUCTED UNDER
EXISTING MN&S RAILROAD
BRIDGE.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



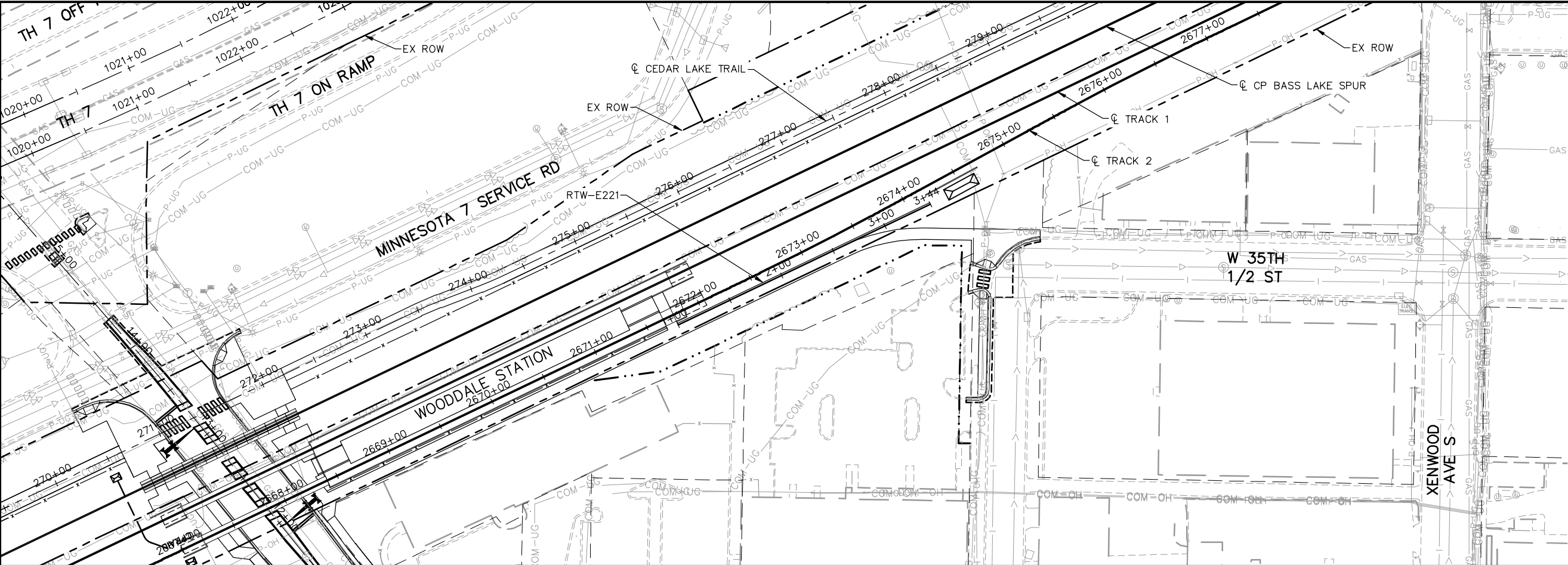
**EAST - VOLUME 2 (STRUCTURES)
RTW-E219, RTW-E220 & RTW-E222
PLAN AND PROFILES**

DISCIPLINE: **STRUCTURES**

SHEET NAME:
E2-STU-RTW-PPFL - 008

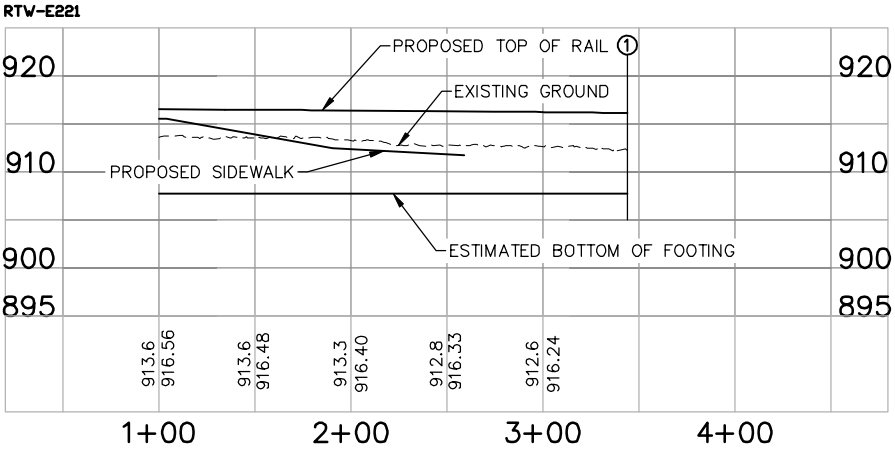
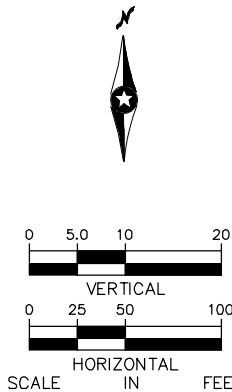
SHEET
239
OF
274

Aug. 26 2014 12:22 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2-STU-RTW-PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E221 IS ANTICIPATED
TO BE A CAST-IN-PLACE
RETAINING WALL ON SPREAD
FOOTINGS.

① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING

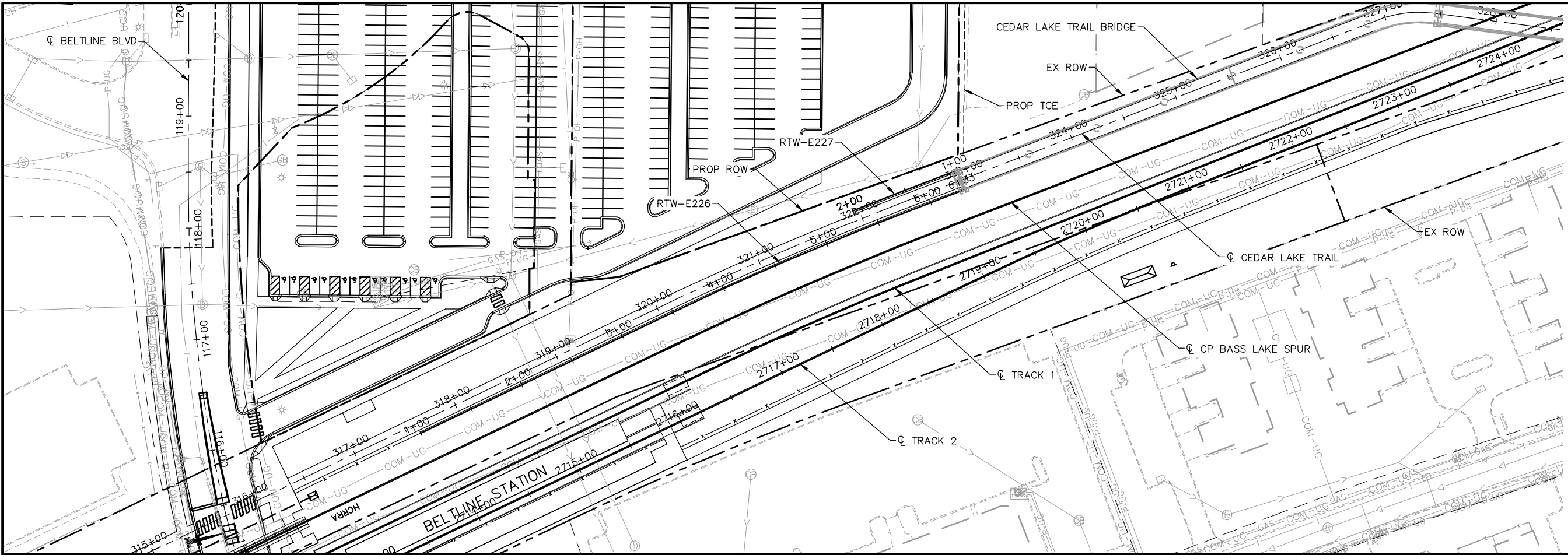


EAST - VOLUME 2 (STRUCTURES)
RTW-E221
PLAN AND PROFILE

DISCIPLINE: STRUCTURES

SHEET NAME:
E2-STU-RTW-PPFL - 009

SHEET
240
OF
274

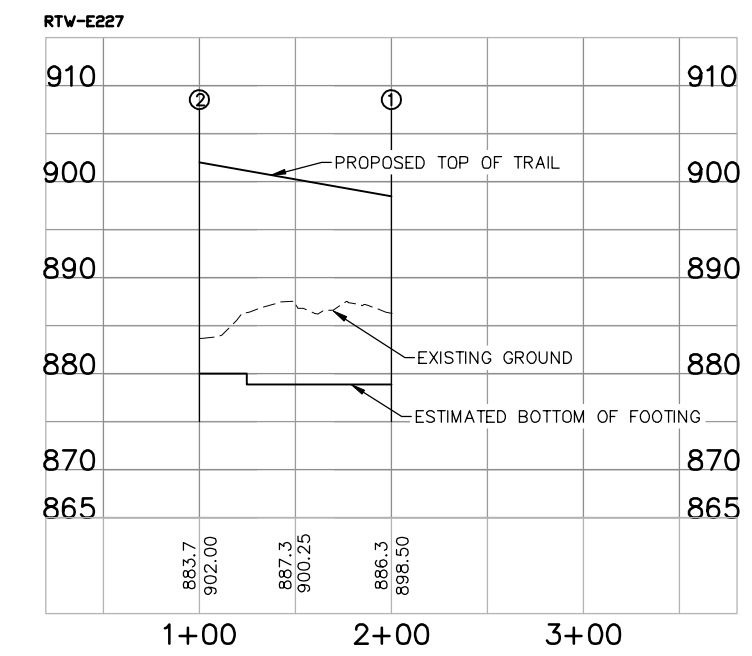
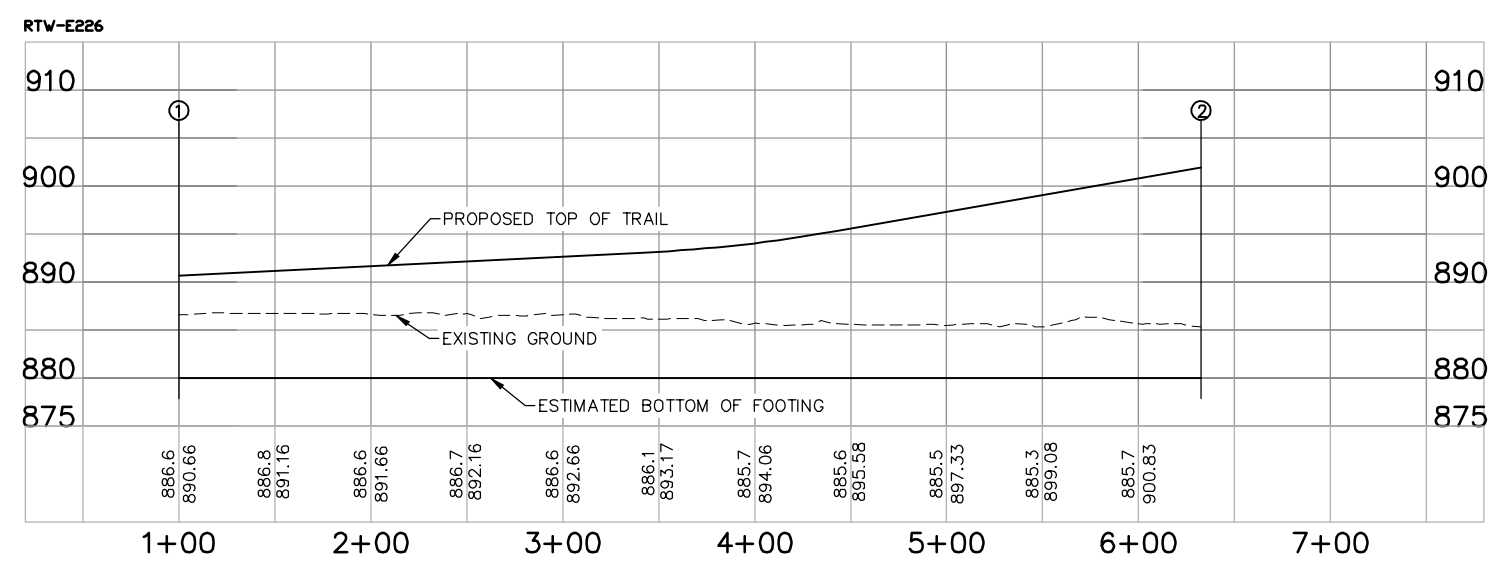
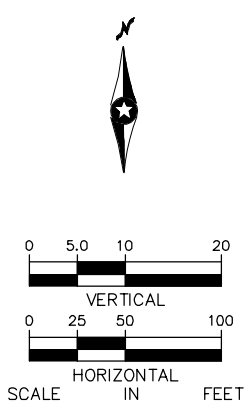


NOTE:
RTW-E226 AND RTW-E227
ARE ANTICIPATED TO BE A
CAST-IN-PLACE RETAINING
WALLS ON PILING.

BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.

② JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL OR TUNNEL BOAT
SECTION



Aug. 26 2014 12:22 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2-STU-RTW-PPFL.dwg By: Katie.Ellis

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

METROPOLITAN COUNCIL

SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
RTW-E226 & RTW-E227
PLAN AND PROFILES

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E2-STU-RTW-PPFL - 010**

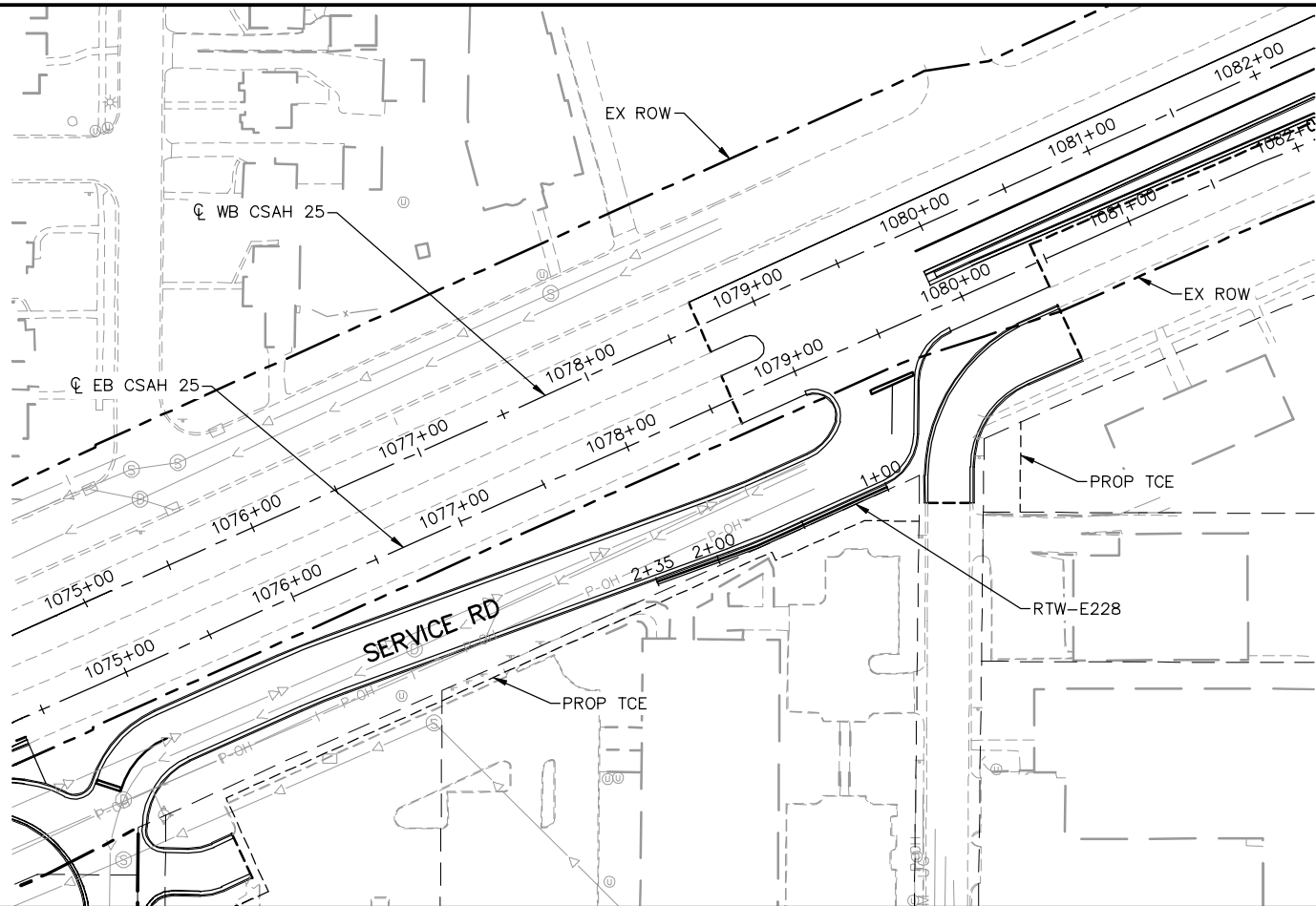
SHEET

241

OF

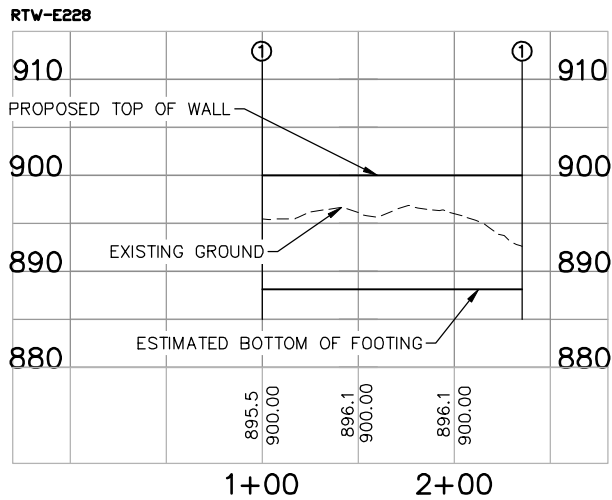
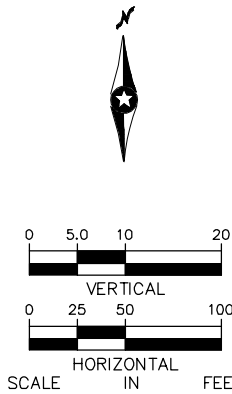
274

Aug. 26 2014 12:23 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E2-STU-RTW-PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E228 IS ANTICIPATED
TO BE A CAST-IN-PLACE
RETAINING WALL ON SPREAD
FOOTINGS OR BLOCK WALL.

① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



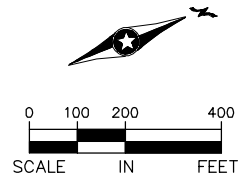
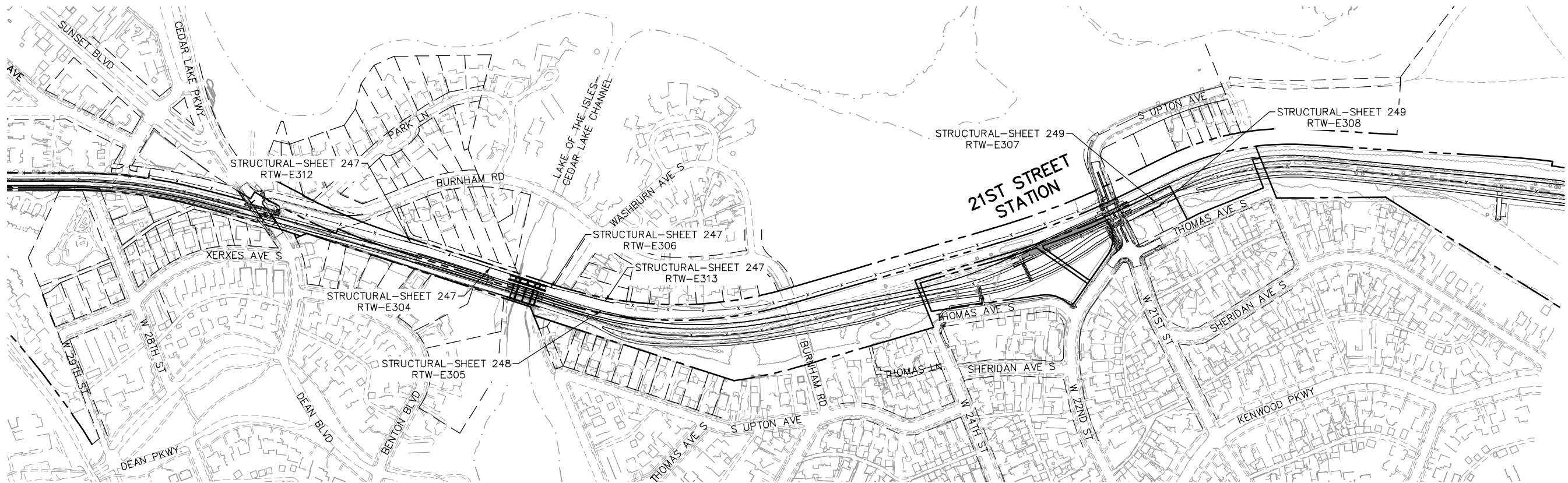
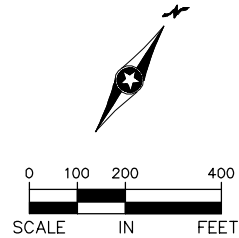
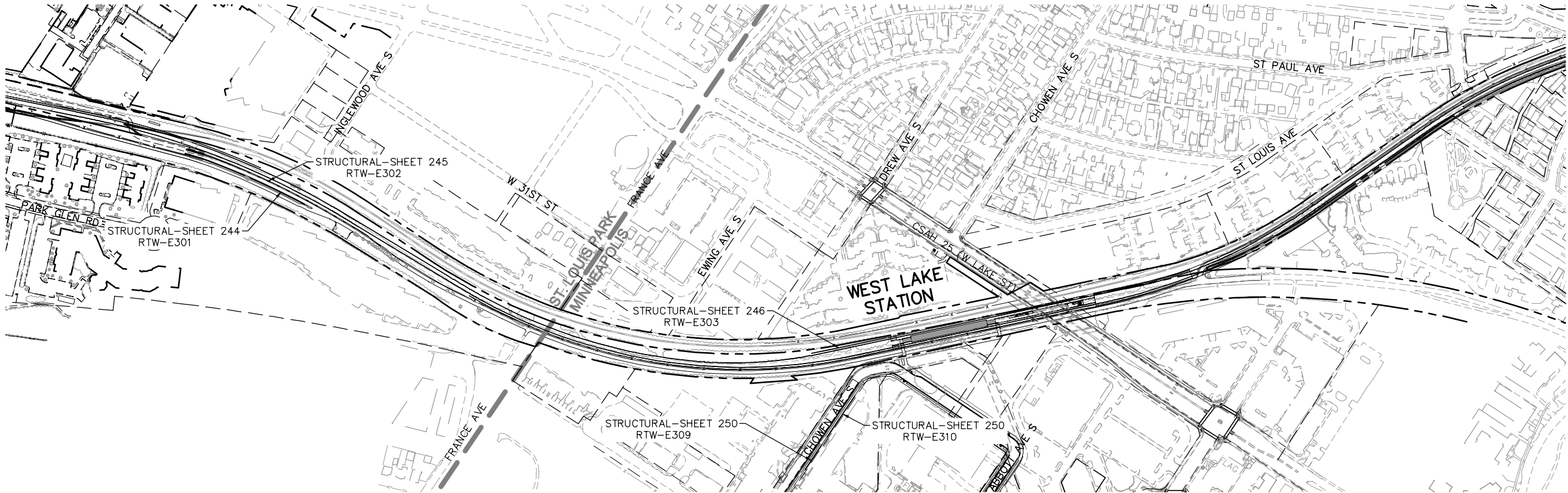
EAST - VOLUME 2 (STRUCTURES)
RTW-E228
PLAN AND PROFILE

DISCIPLINE: STRUCTURES

SHEET NAME:
E2-STU-RTW-PPFL - 011

SHEET
242
OF
274

Aug. 26 2014 12:24 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E3-STU-RTW-IDX.dwg By: Katie.Ellis



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)

SEGMENT 3

RETAINING WALLS

LAYOUT INDEX

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E3-STU-RTW-IDX - 001**

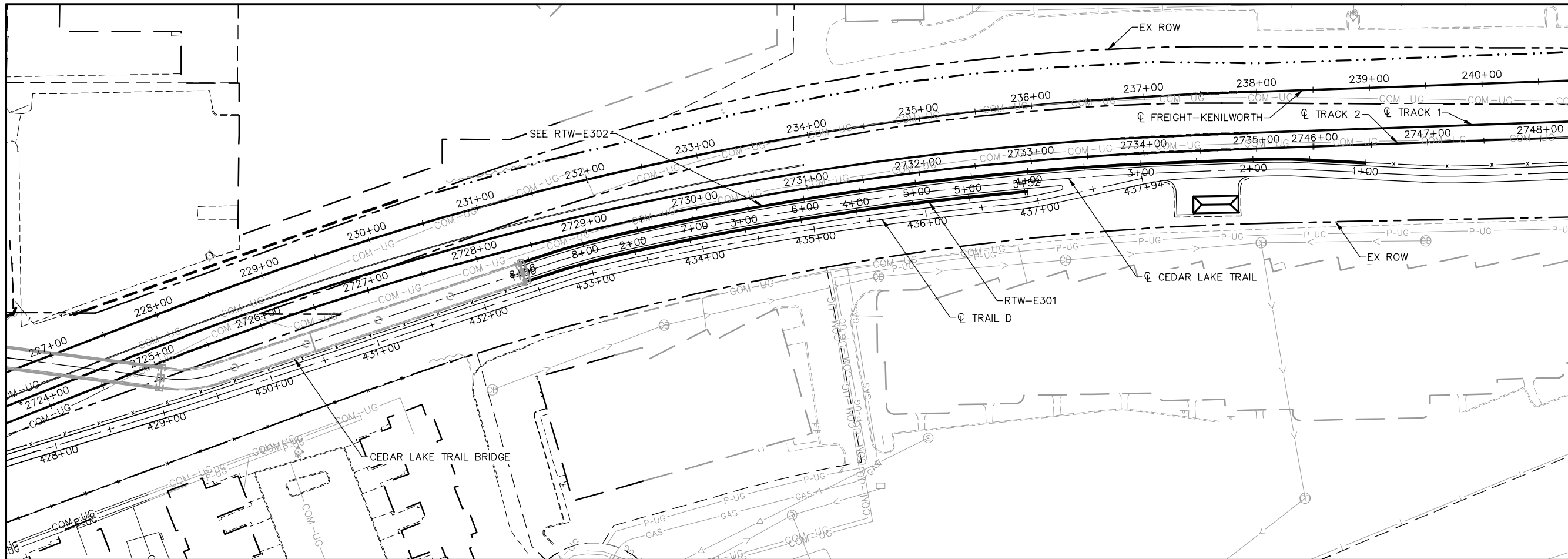
SHEET

243

OF

274

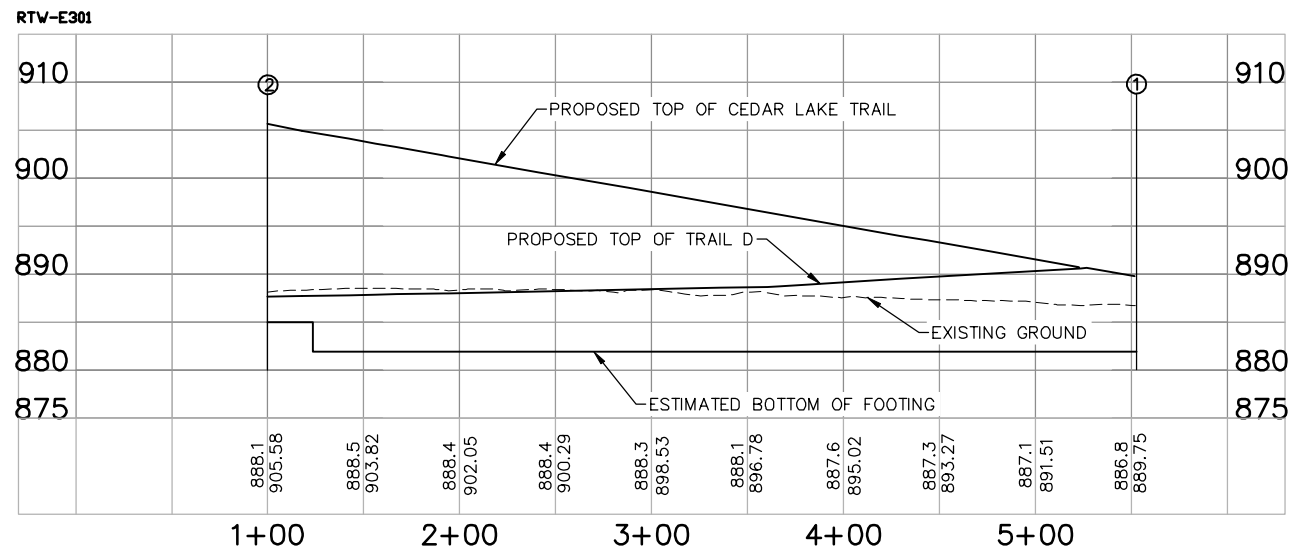
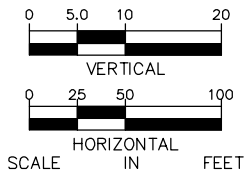
Aug. 26 2014 12:27 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E3-STU-RTW-PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E301 IS ANTICIPATED
TO BE A CAST-IN-PLACE
RETAINING WALL ON PILING.

BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

- ① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
- ② JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



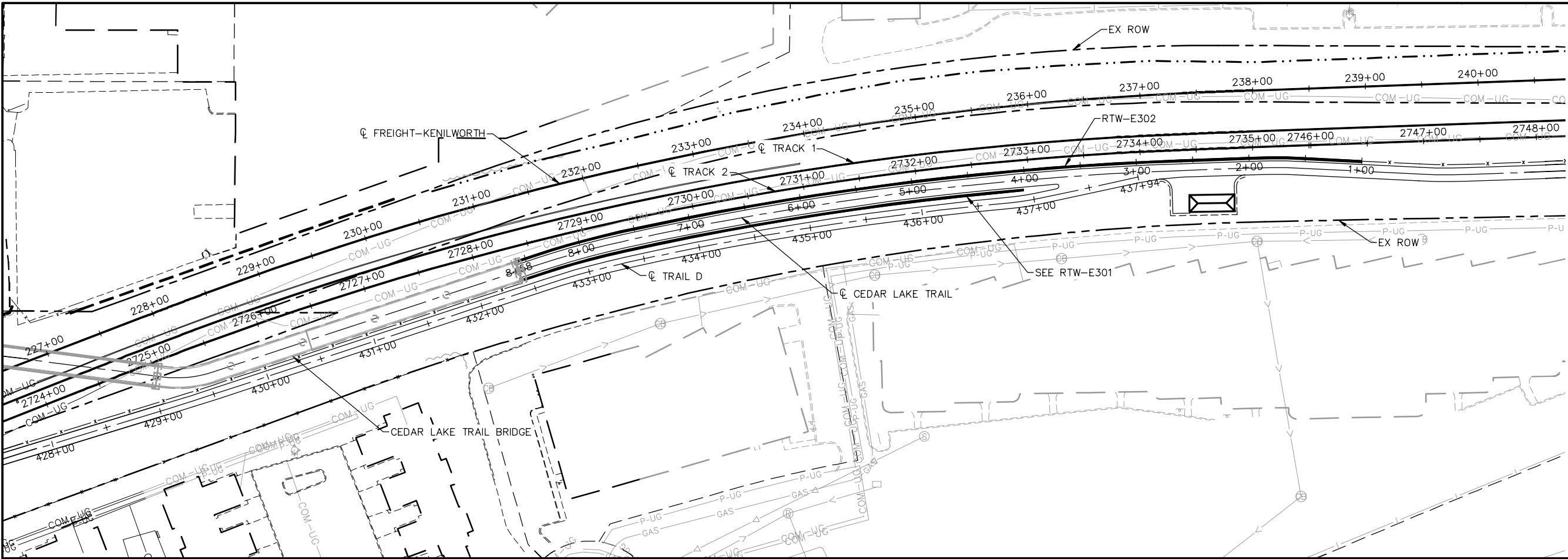
EAST - VOLUME 2 (STRUCTURES)
RTW-E301
PLAN AND PROFILE

DISCIPLINE: STRUCTURES

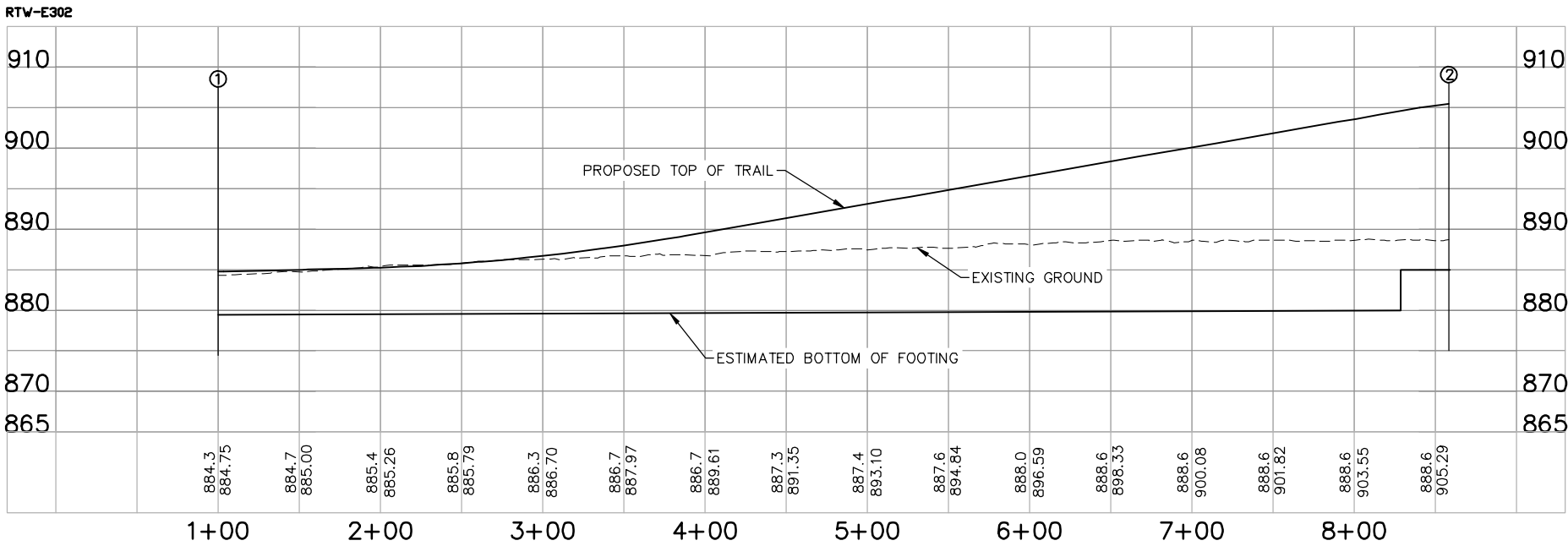
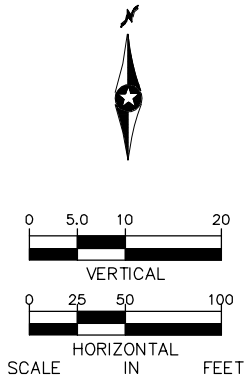
SHEET NAME:
E3-STU-RTW-PPFL - 001

SHEET
244
OF
274

Aug. 26 2014 12:28 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E3-STU-RTW-PPFL.dwg By: Katie.Ellis



- NOTE:
RTW-E302 IS ANTICIPATED
TO BE A CAST-IN-PLACE
RETAINING WALL ON PILING.
- BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.
- ① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
- ② JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



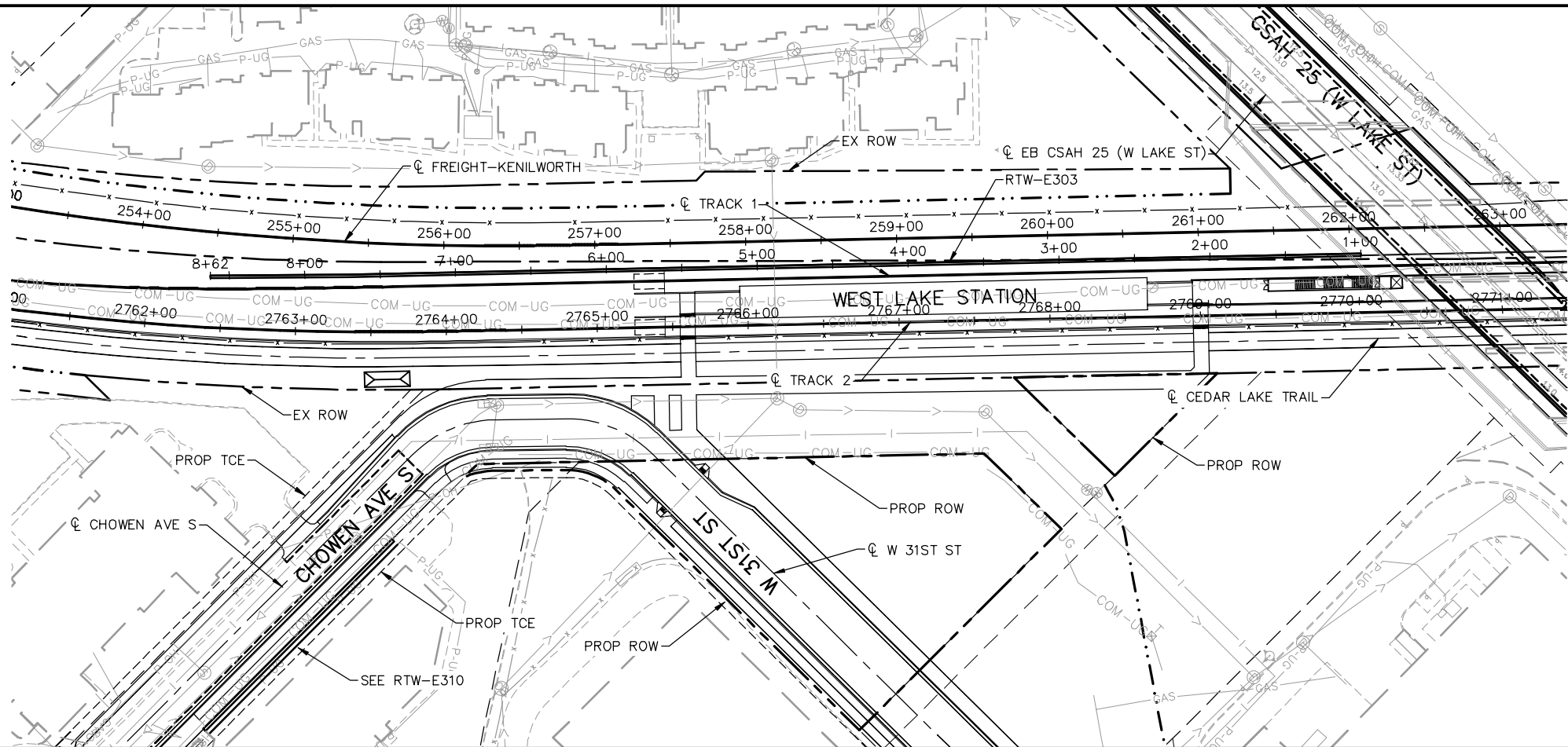
EAST - VOLUME 2 (STRUCTURES)
RTW-E302
PLAN AND PROFILE

DISCIPLINE: STRUCTURES

SHEET NAME:
E3-STU-RTW-PPFL - 002

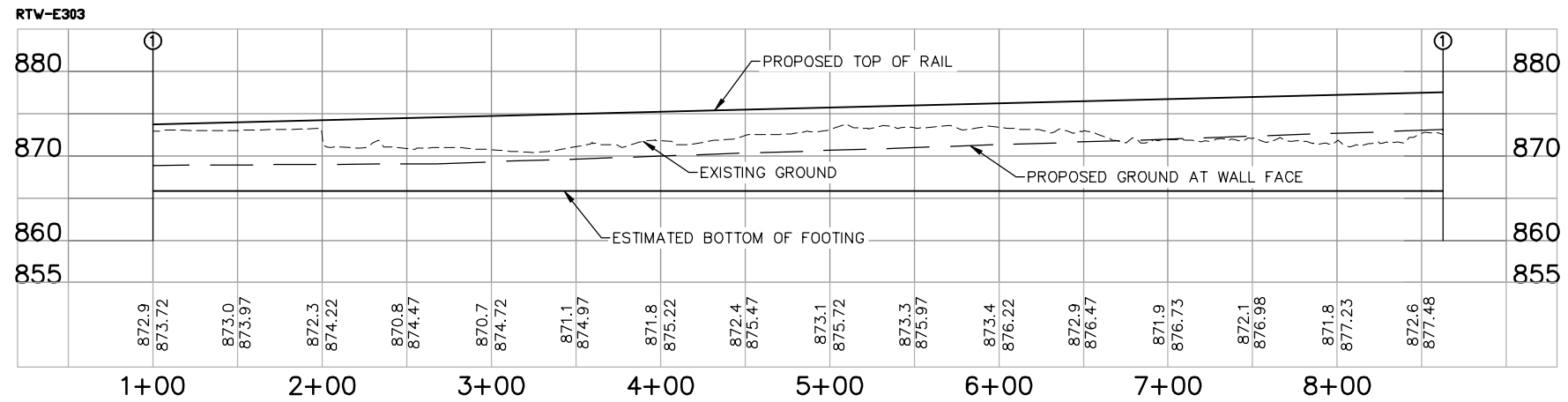
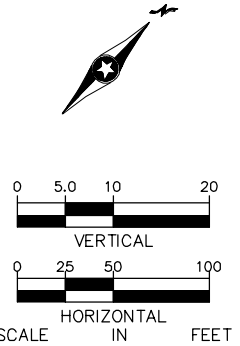
SHEET
245
OF
274

Aug. 26 2014 12:28 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E3-STU-RTW-PPFL.dwg By: Katie.Elliis



NOTE:
RTW-E303 IS ANTICIPATED
TO BE A CAST-IN-PLACE
RETAINING WALL ON PILING.

① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



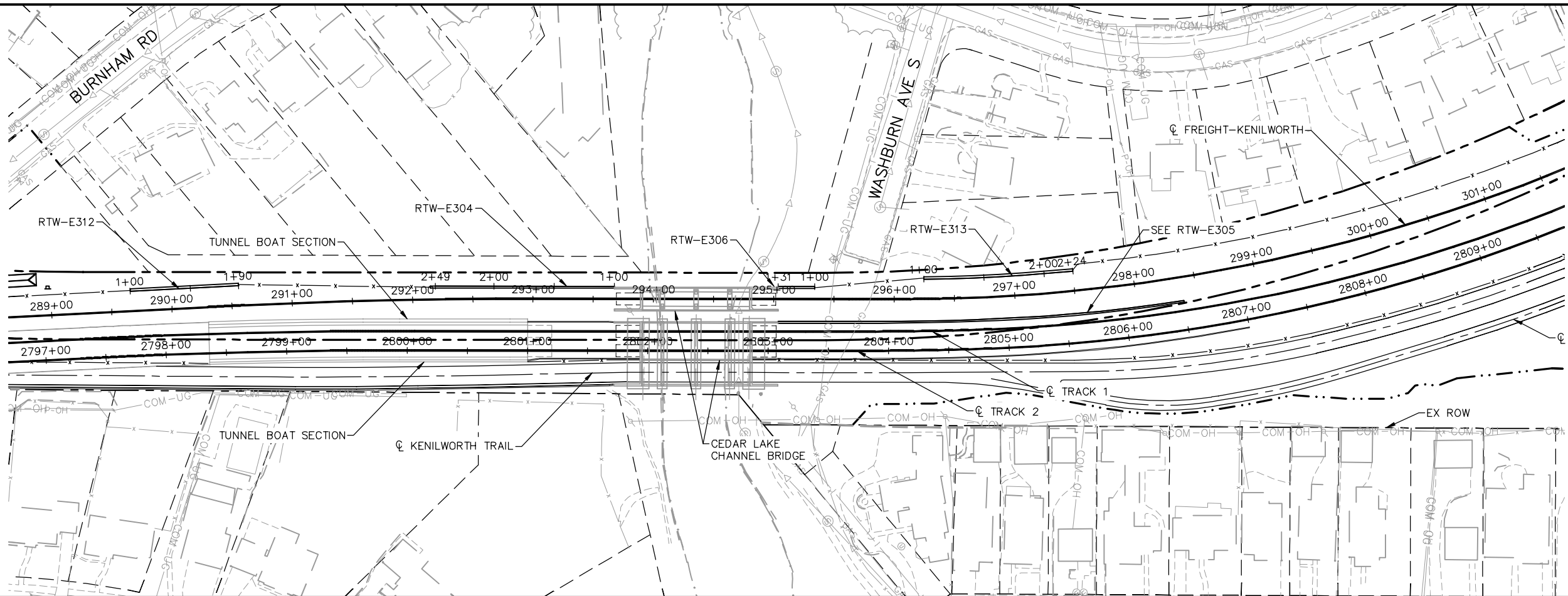
EAST - VOLUME 2 (STRUCTURES)
RTW-E303
PLAN AND PROFILE

DISCIPLINE: STRUCTURES

SHEET NAME:
E3-STU-RTW-PPFL - 003

SHEET
246
OF
274

Aug. 26 2014 12:29 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E3-STU-RTW-PPFL.dwg By: Katie.Ellis

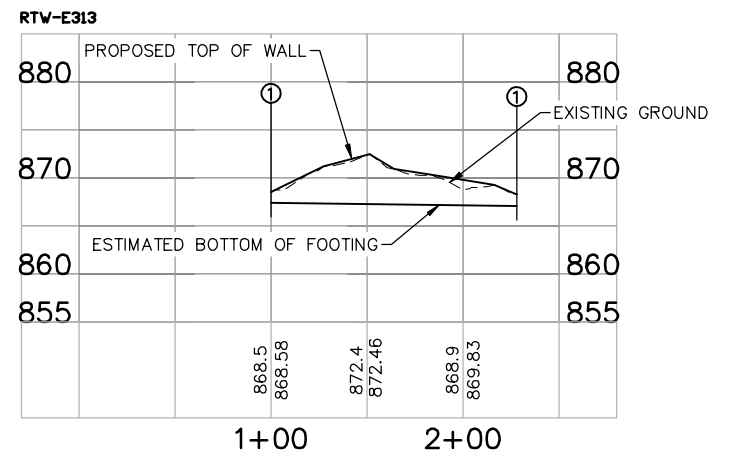
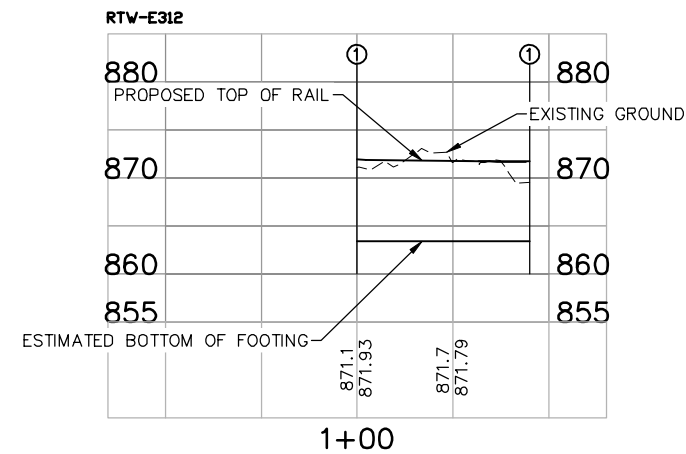
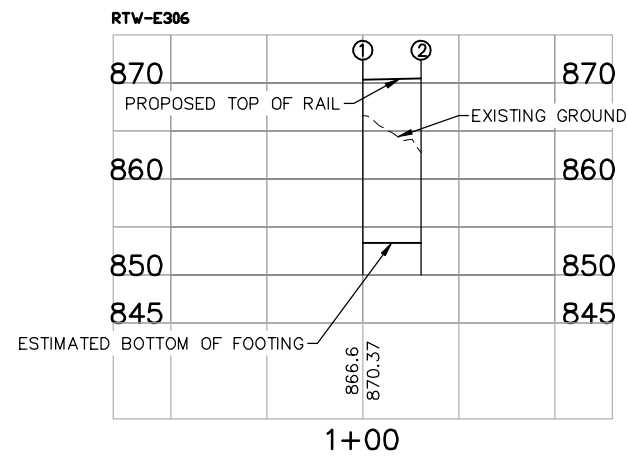
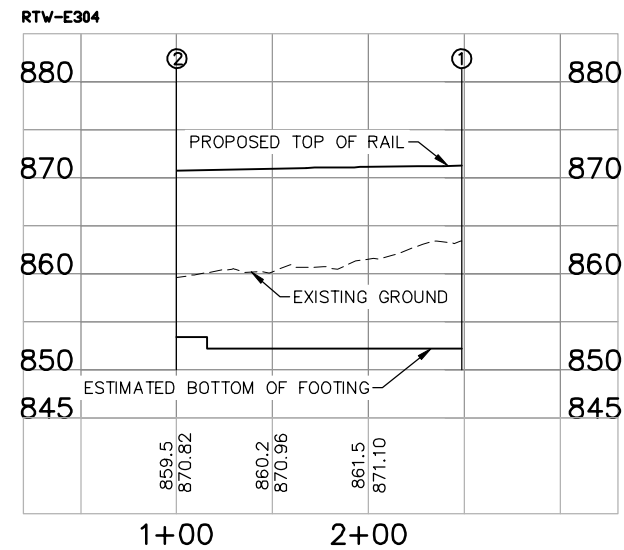
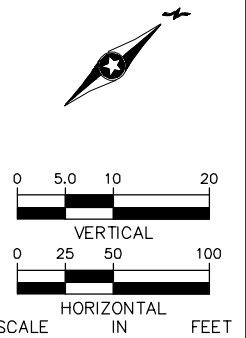


NOTE:
RTW-E304, RTW-E306, AND
RTW-E312 ARE ANTICIPATED
TO BE A CAST-IN-PLACE
RETAINING WALLS ON PILING.

RTW-E313 IS ANTICIPATED
TO BE SHEET PILE RETAINING
WALL.

BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

- 1 PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
- 2 JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



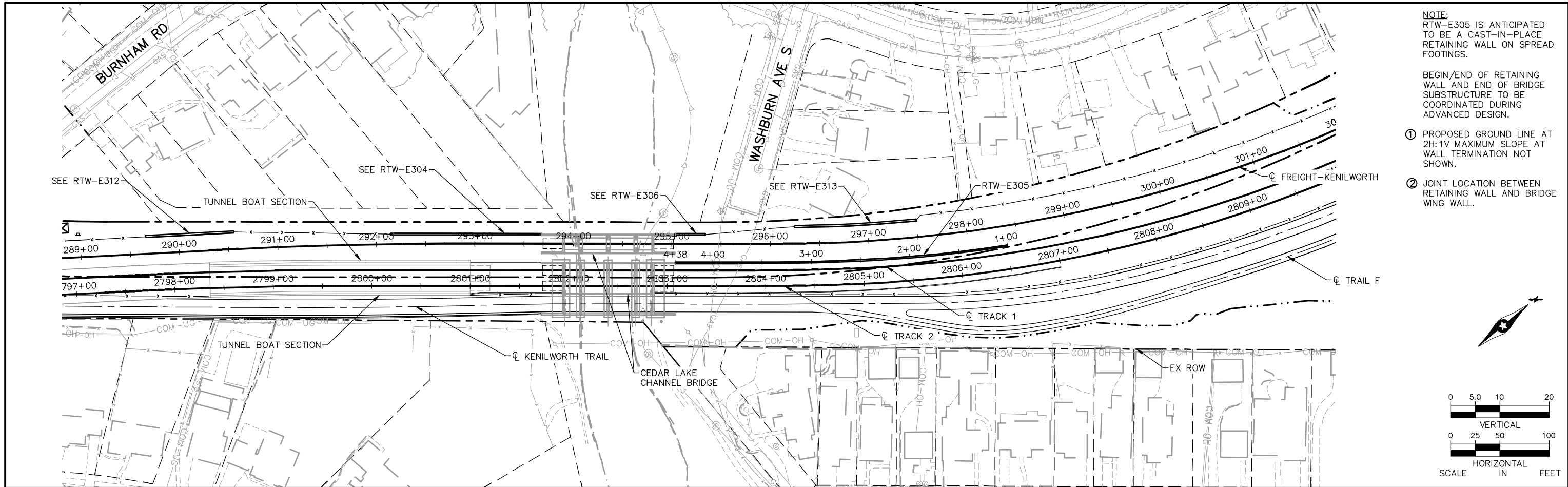
EAST - VOLUME 2 (STRUCTURES)
RTW-E304, RTW-E306, RTW-E312 TO RTW-E313
PLAN AND PROFILES

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E3-STU-RTW-PPFL - 004**

SHEET
247
OF
274

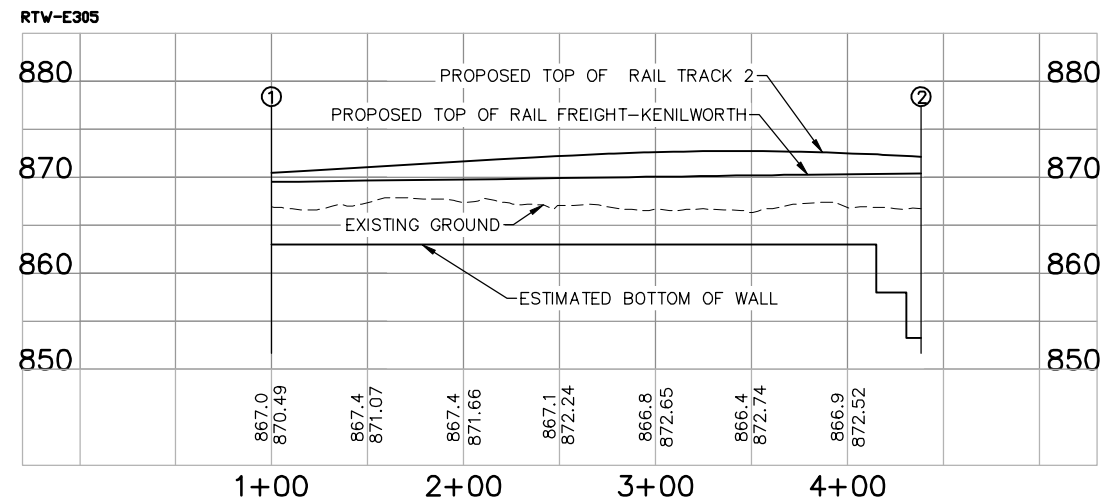
Aug. 26 2014 12:29 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E3-STU-RTW-PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E305 IS ANTICIPATED
TO BE A CAST-IN-PLACE
RETAINING WALL ON SPREAD
FOOTINGS.

BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

- ① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
- ② JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WING WALL.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



Kimley»Horn

PRELIMINARY ENGINEERING

METROPOLITAN
COUNCIL

SOUTHWEST
Green Line LRT Extension

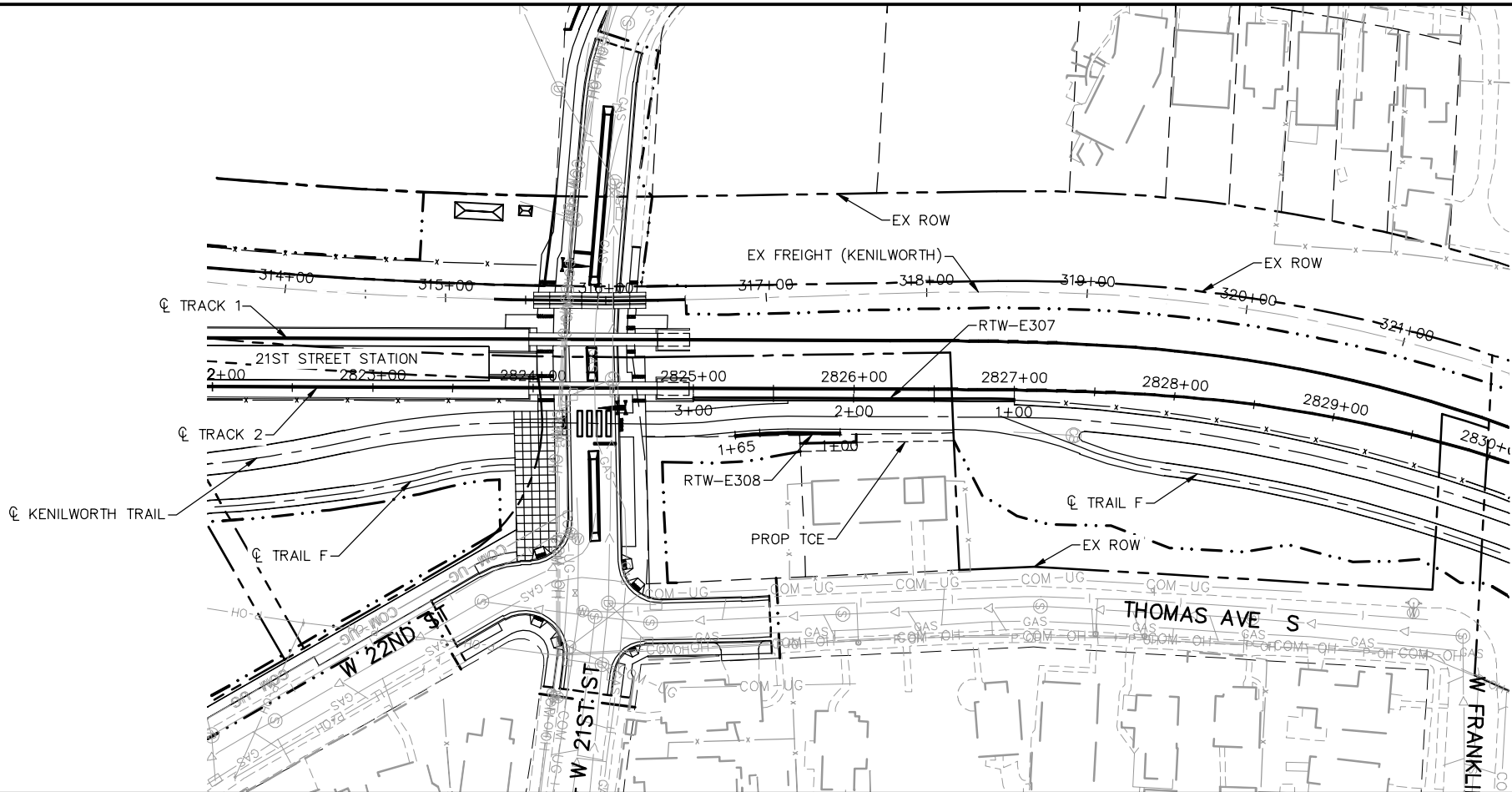
EAST - VOLUME 2 (STRUCTURES)
RTW-E305
PLAN AND PROFILE

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E3-STU-RTW-PPFL - 005**

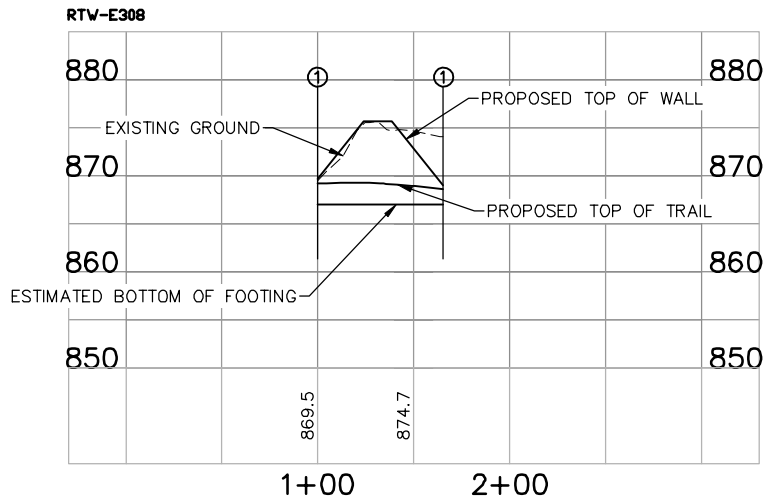
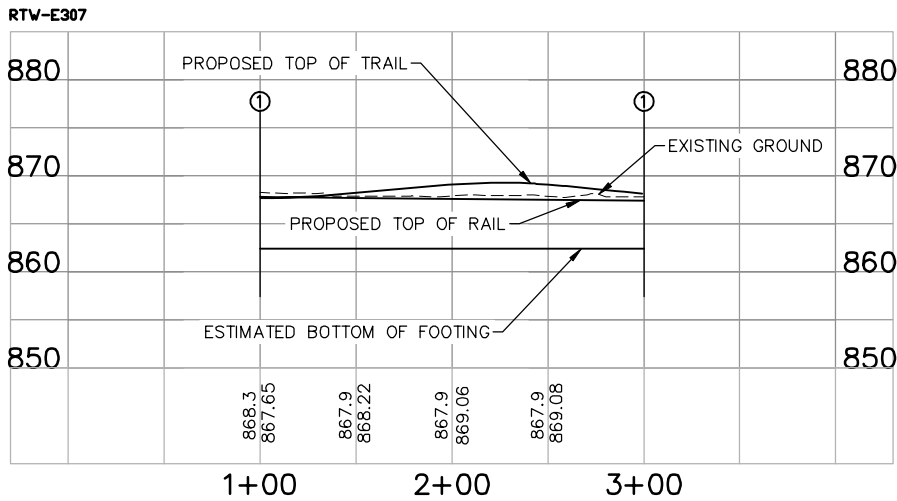
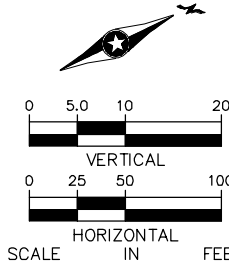
SHEET
248
OF
274

Aug. 26 2014 12:30 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E3-STU-RTW-PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E307 AND RTW-E308
ARE ANTICIPATED TO BE
CAST-IN-PLACE RETAINING
WALLS ON SPREAD FOOTINGS
OR BLOCK WALLS.

① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



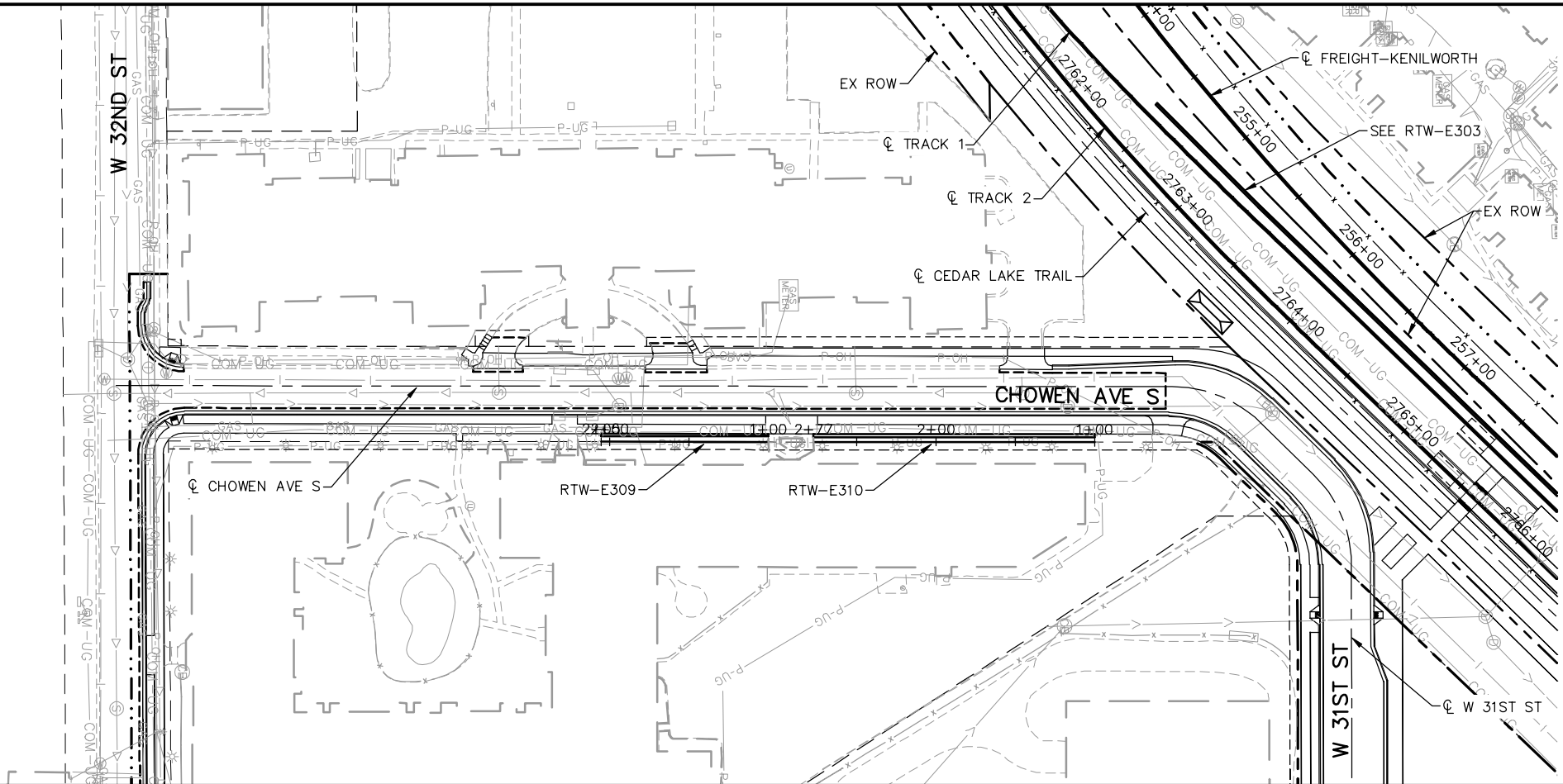
EAST - VOLUME 2 (STRUCTURES)
RTW-E307 & RTW-E308
PLAN AND PROFILE

DISCIPLINE: STRUCTURES

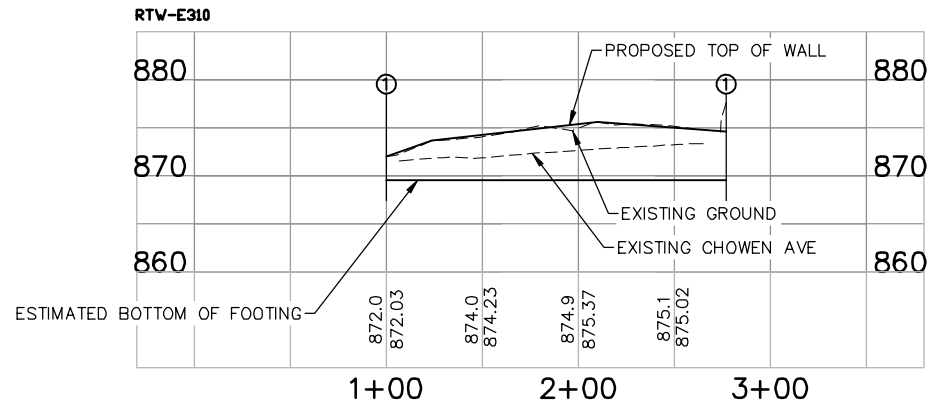
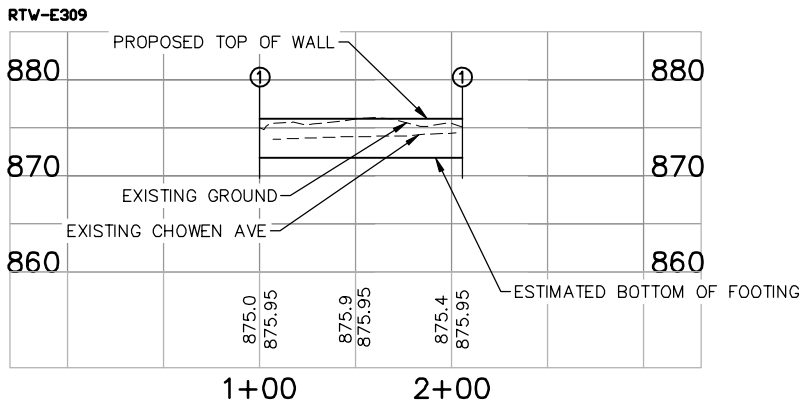
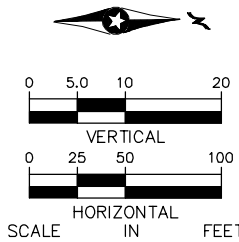
SHEET NAME:
E3-STU-RTW-PPFL - 006

SHEET
249
OF
274

Aug. 26 2014 12:30 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E3-STU-RTW-PPFL.dwg By: Katie.Ellis



- NOTE:
RTW-E309 AND RTW-310
ARE ANTICIPATED TO BE
CAST-IN-PLACE RETAINING
WALLS ON SPREAD FOOTINGS
OR BLOCK WALLS.
- ① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



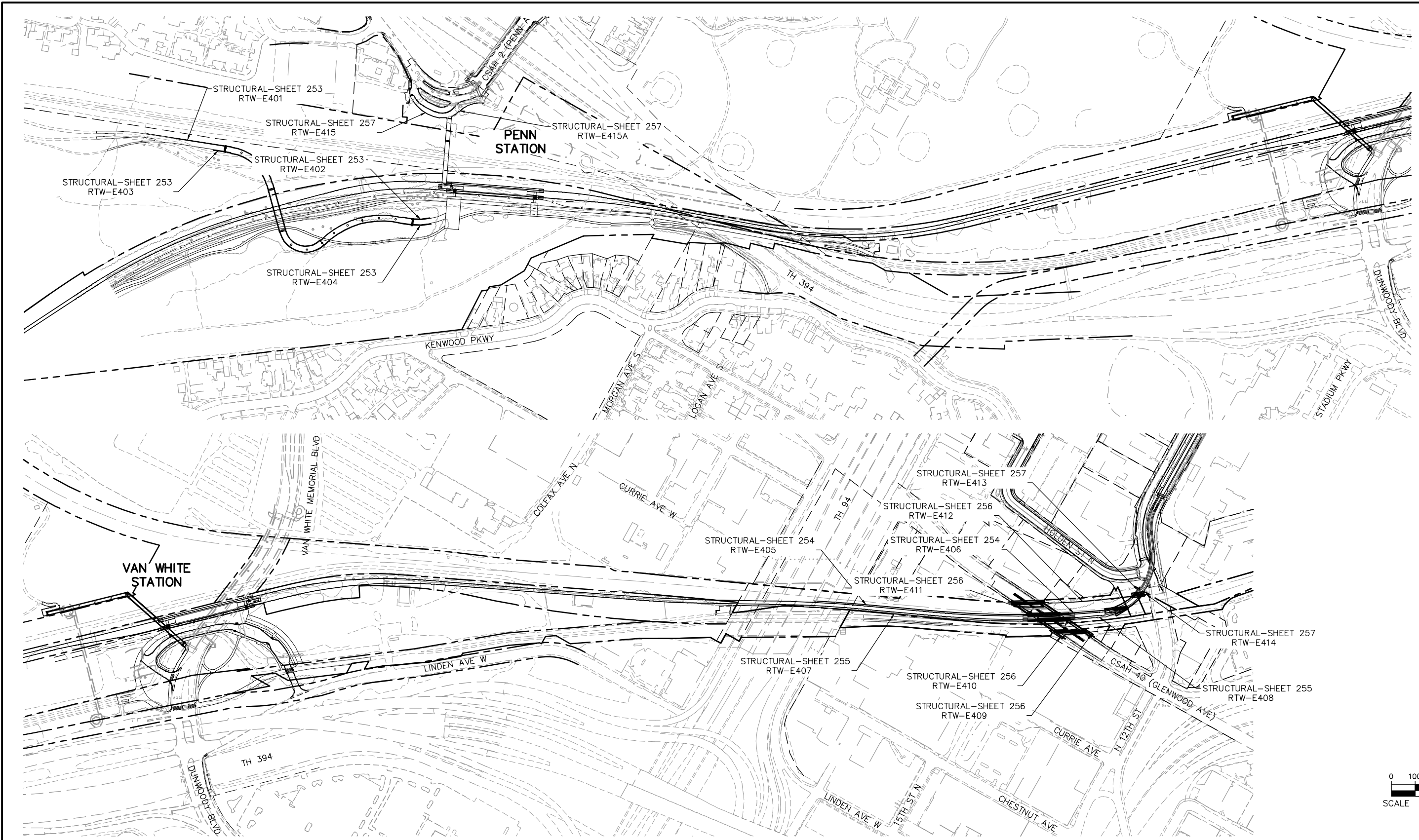
EAST - VOLUME 2 (STRUCTURES)
RTW-E309 & RTW-E310
PLAN AND PROFILE

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-RTW-PPFL - 007

SHEET
250
OF
274

Aug. 26 2014 12:34 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E4-STU-RTW-IDX.dwg By: Katie.Ellis



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





Kimley»Horn

PRELIMINARY ENGINEERING



METROPOLITAN
COUNCIL



SOUTHWEST
Green Line LRT Extension

EAST - VOLUME 2 (STRUCTURES)
SEGMENT 4
RETAINING WALLS
LAYOUT INDEX (1 OF 2)

DISCIPLINE: **STRUCTURES**

SHEET NAME: **E4-STU-RTW-IDX - 001**

SHEET
251
OF
274

Aug. 26 2014 12:35 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E4-STU-RTW-IDX.dwg By: Katie.Ellis



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





PRELIMINARY ENGINEERING



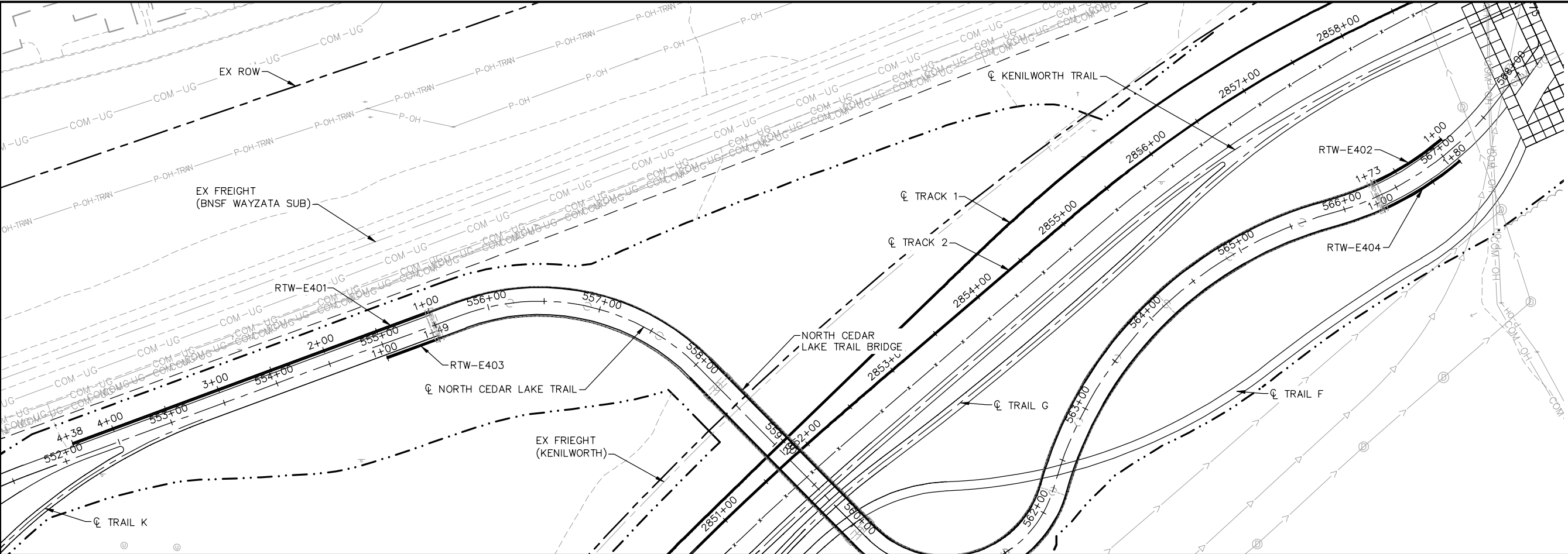
EAST - VOLUME 2 (STRUCTURES)
SEGMENT 4
RETAINING WALLS
LAYOUT INDEX (2 OF 2)

DISCIPLINE: STRUCTURES

SHEET NAME:
E4-STU-RTW-IDX - 002

SHEET
252
OF
274

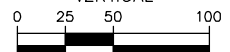
Aug. 26 2014 12:37 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E4-STU-RTW-PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E401 TO RTW-E404
ARE ANTICIPATED TO BE A
CAST-IN-PLACE RETAINING
WALLS ON PILING.

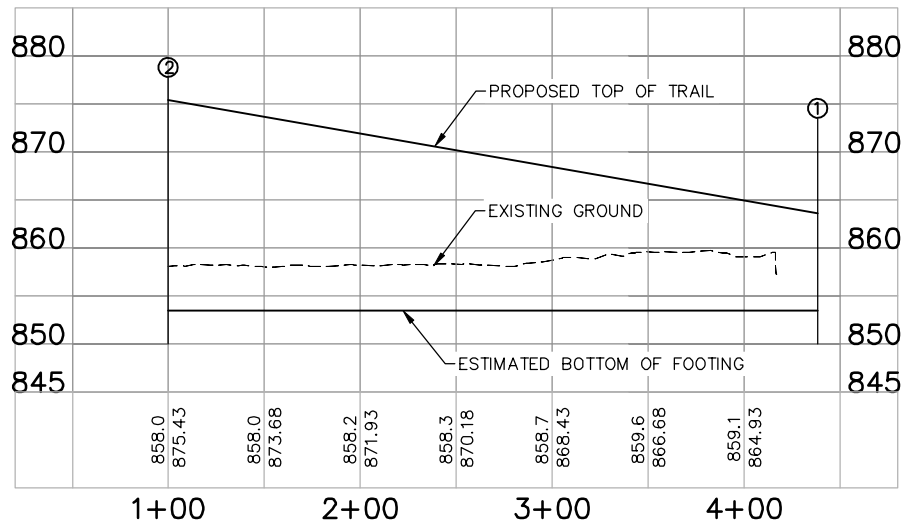
BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

- ① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
- ② JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL.

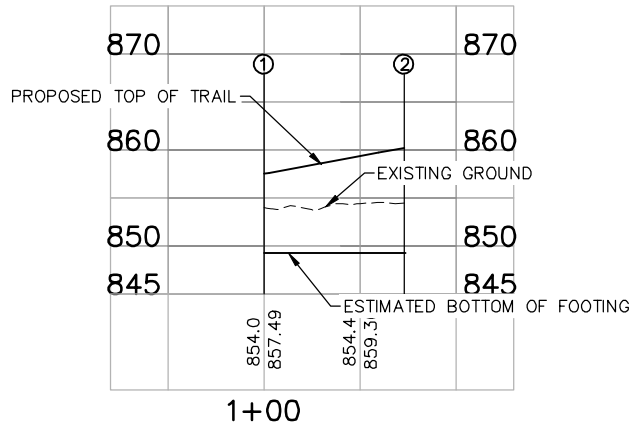


SCALE
IN FEET

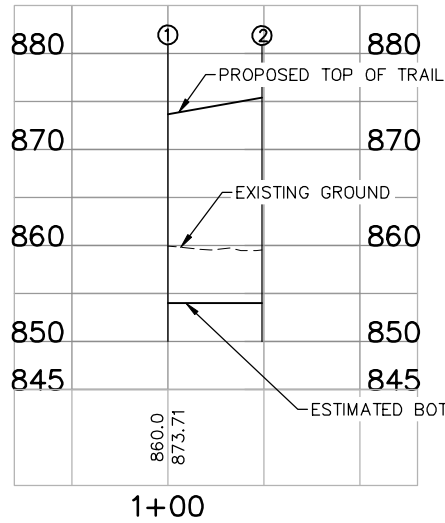
RTW-E401



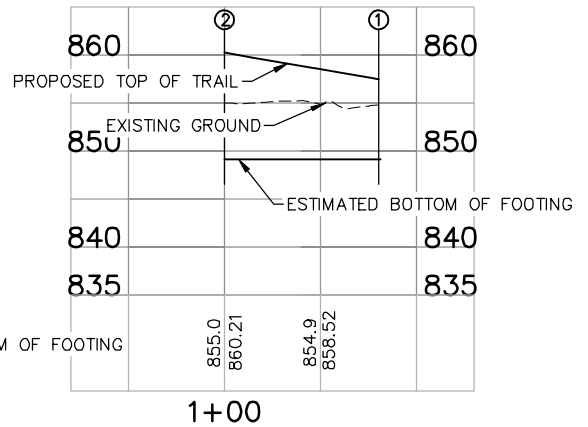
RTW-E402



RTW-E403



RTW-E404



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



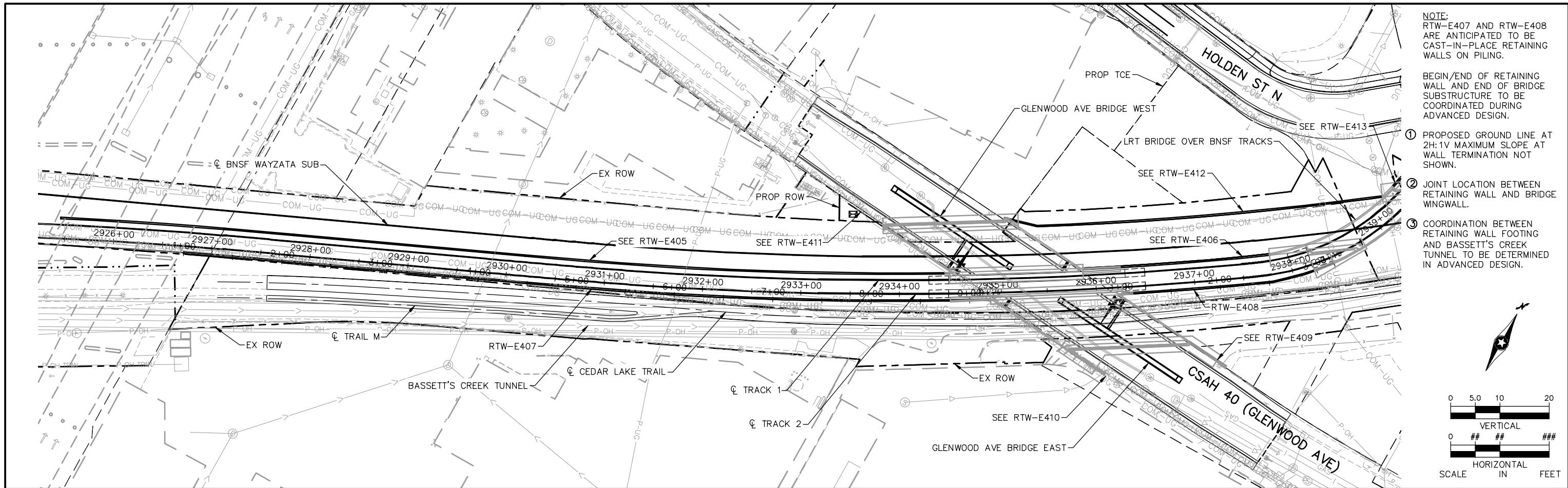
EAST - VOLUME 2 (STRUCTURES)
RTW-E401 TO RTW-E404
PLAN AND PROFILES

DISCIPLINE: STRUCTURES

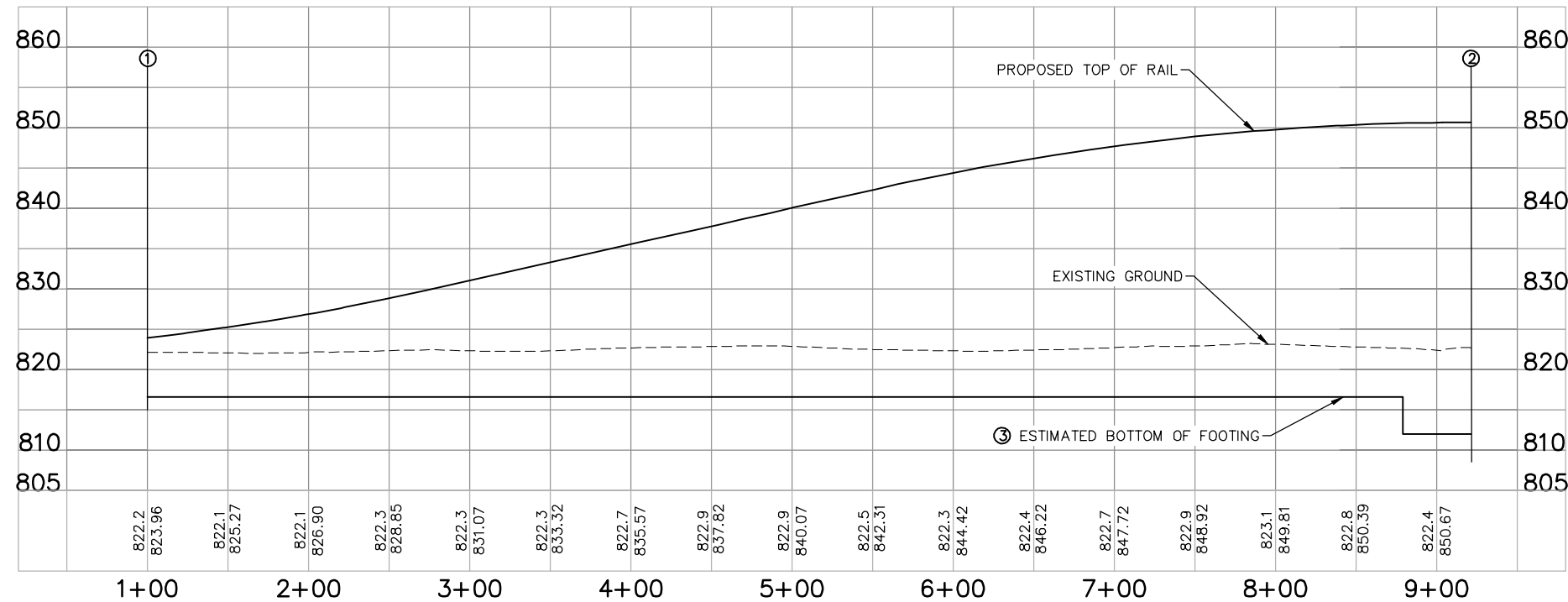
SHEET NAME: E4-STU-RTW-PPFL - 001

SHEET
253
OF
274

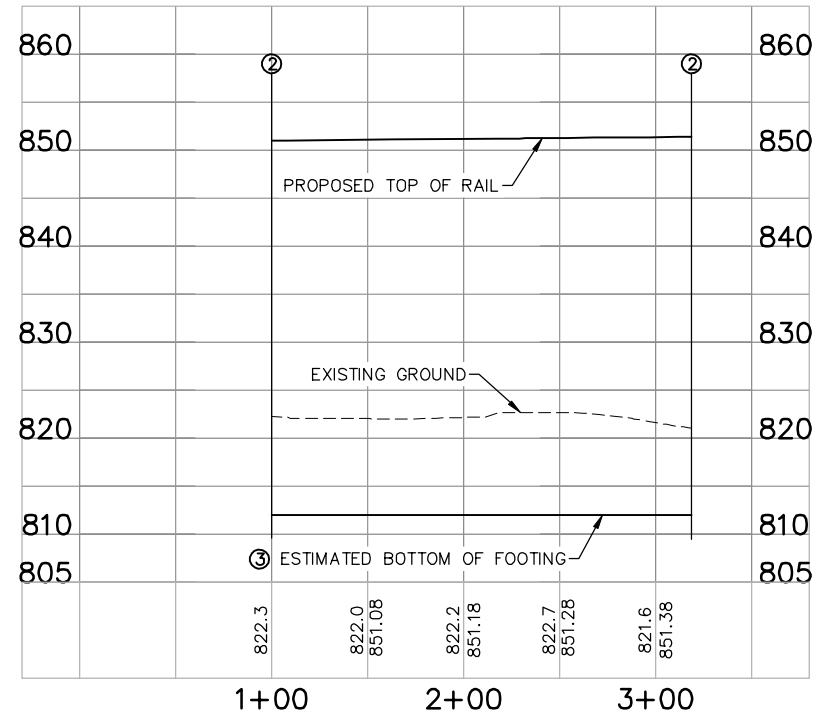
Aug. 26 2014 12:38 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E4-STU-RTW-PPFL.dwg By: Katie.Ellis



RTW-E407



RTW-E408



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL



PRELIMINARY ENGINEERING

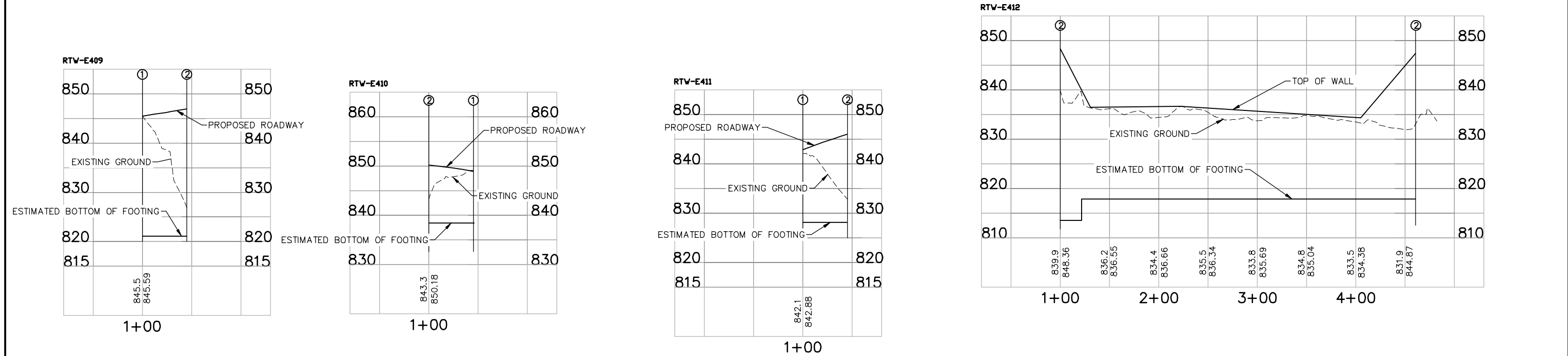
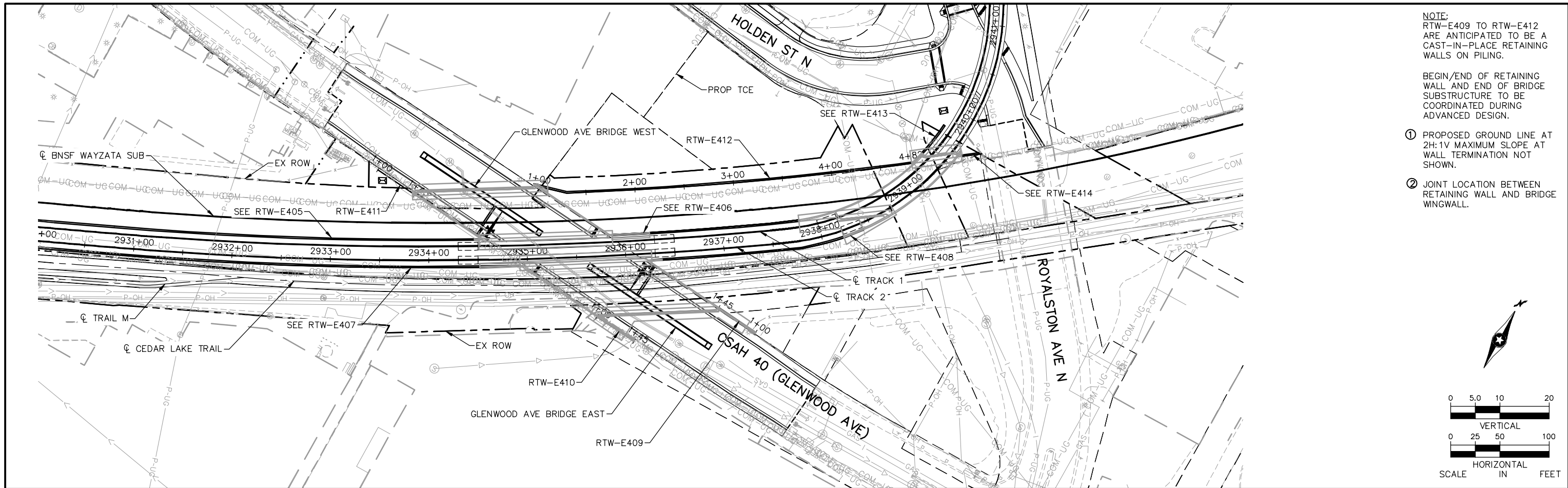
EAST - VOLUME 2 (STRUCTURES)
RTW-E407 & RTW-E408
PLAN AND PROFILES

DISCIPLINE: STRUCTURES



SHEET NAME:
E4-STU-RTW-PPFL - 003

SHEET
255
OF
274

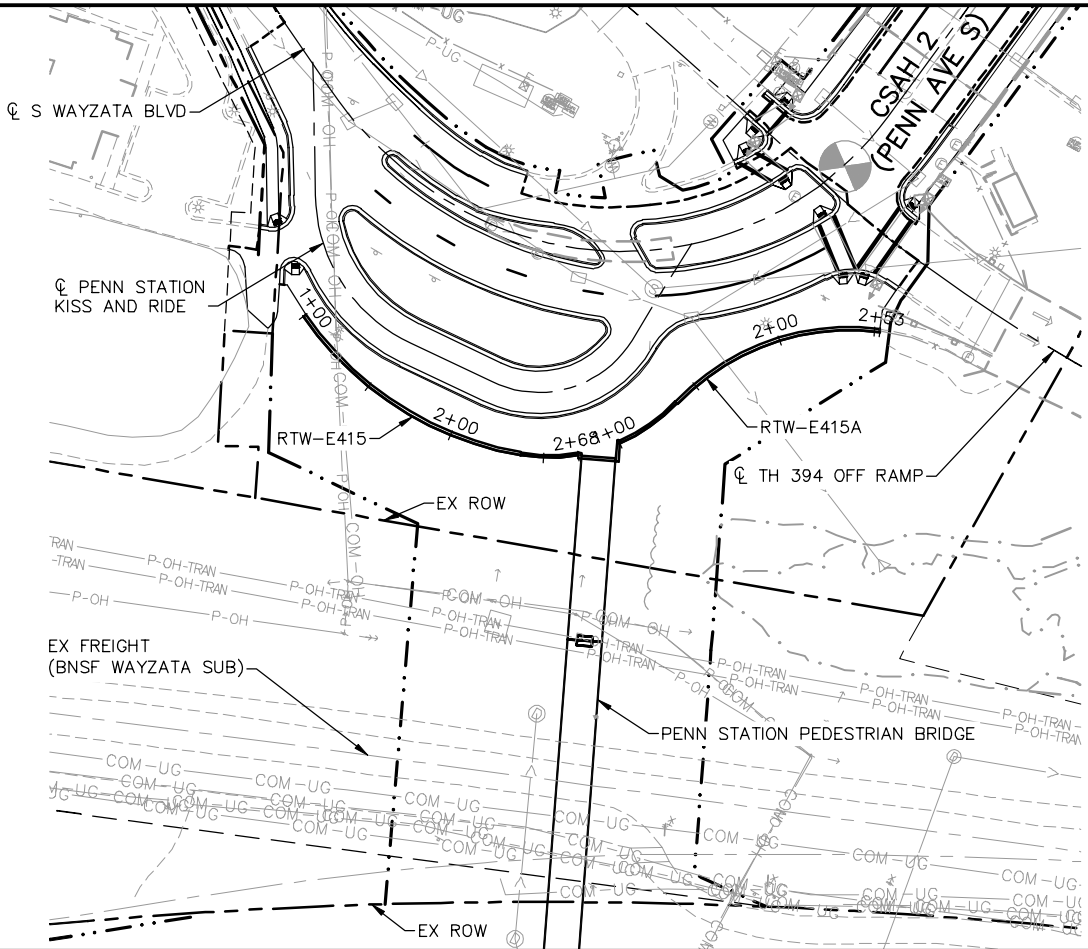
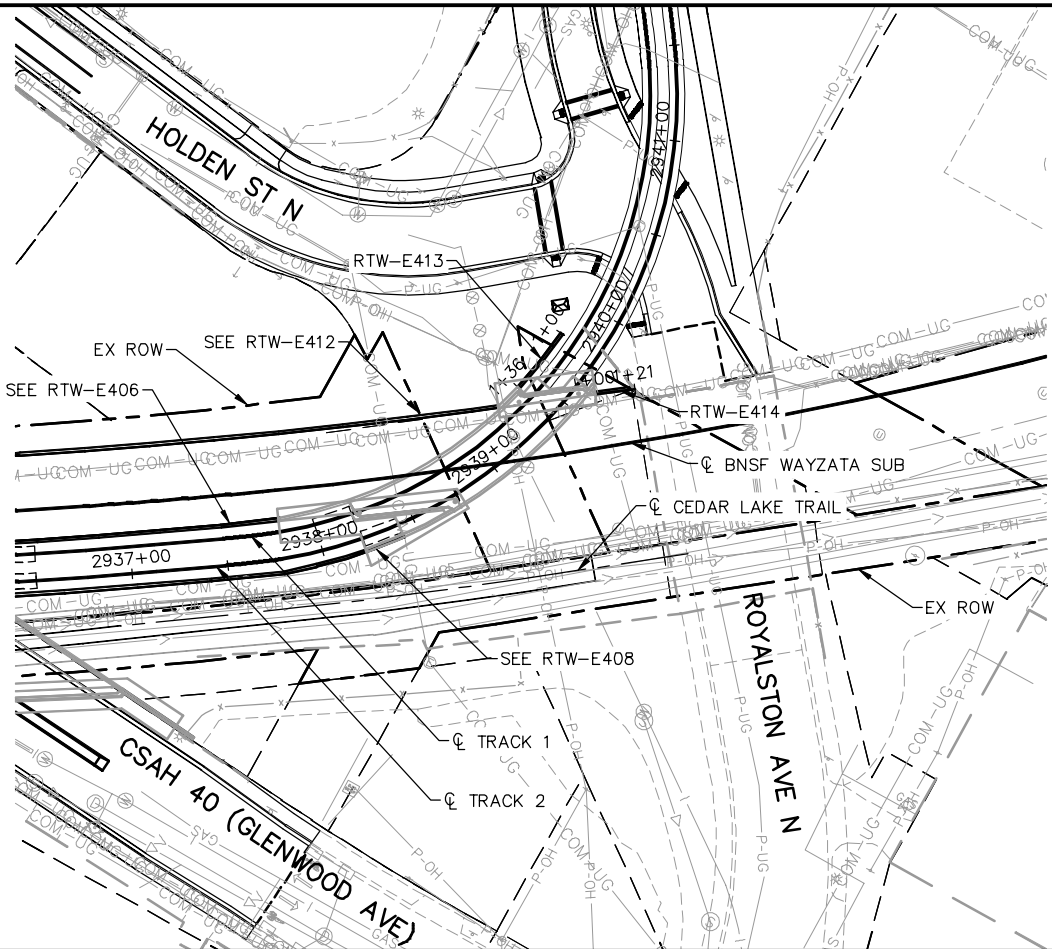
Aug. 26 2014 12:38 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E4-STU-RTW-PPFL.dwg By: Katie.Ellis



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

<div><div>Kimley»Horn</div><div>PRELIMINARY ENGINEERING</div></div>	<div><div><div>METROPOLITAN COUNCIL</div></div><div><div>SOUTHWEST Green Line LRT Extension</div></div></div>	EAST - VOLUME 2 (STRUCTURES) RTW-E409 TO RTW-E412 PLAN AND PROFILES		SHEET 256 OF 274
		DISCIPLINE: STRUCTURES	SHEET NAME: E4-STU-RTW-PPFL - 004	

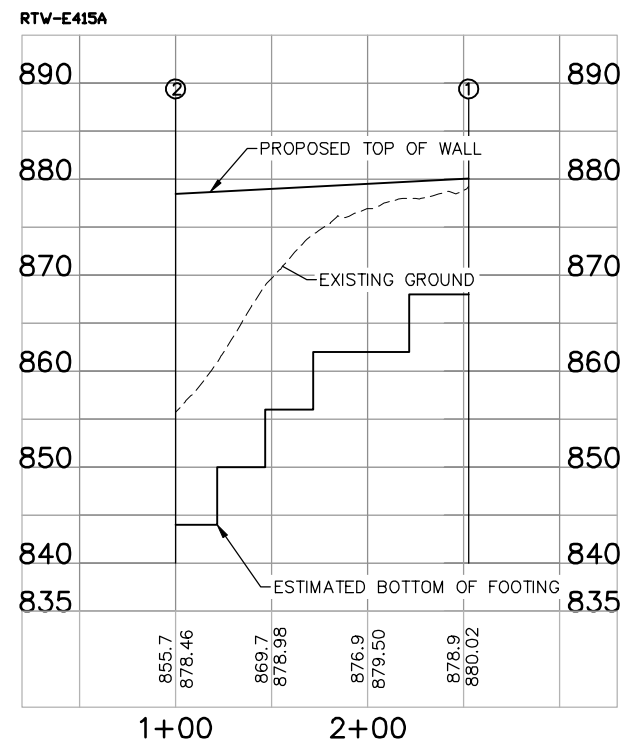
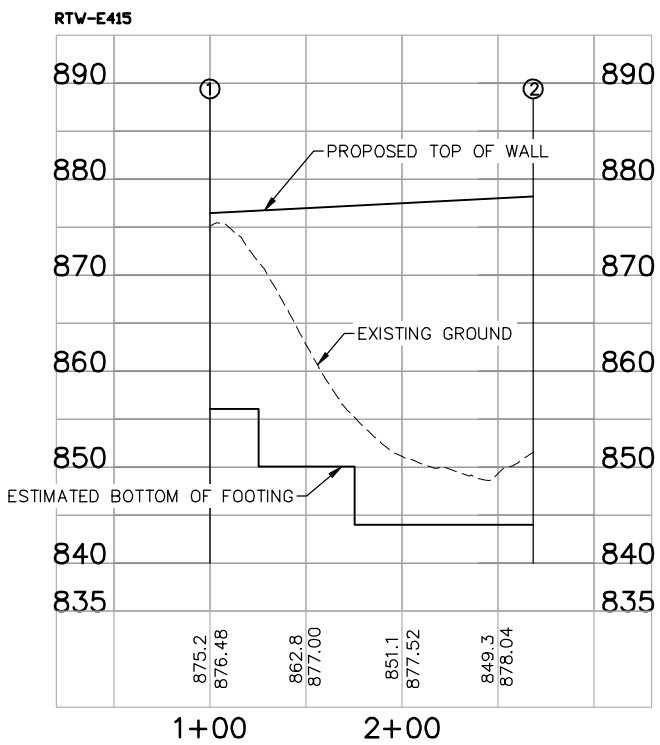
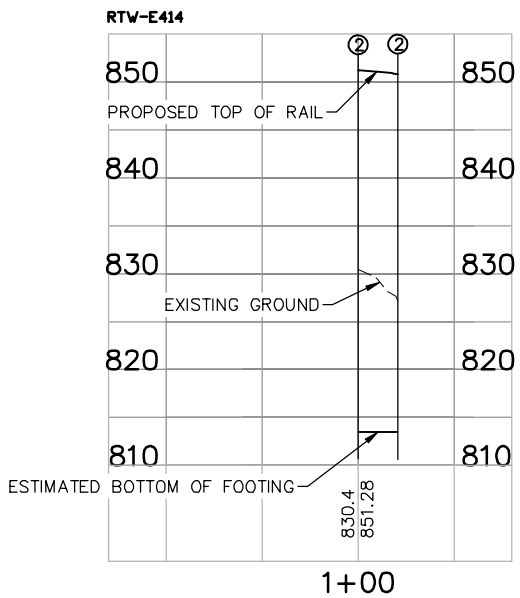
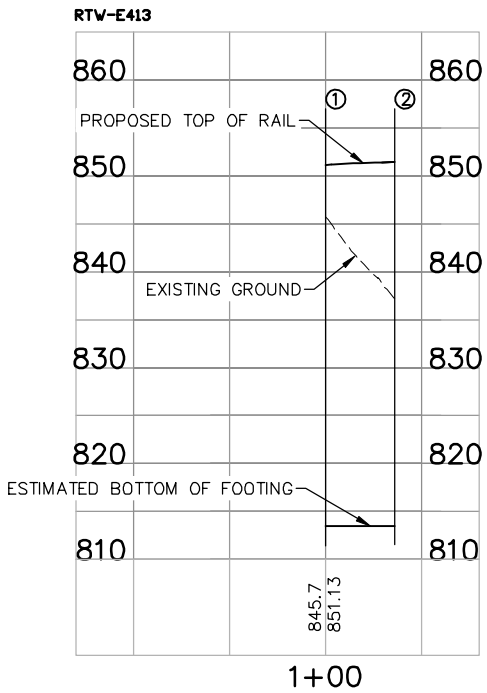
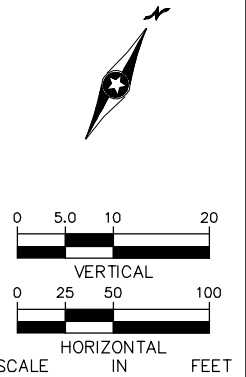
Aug. 26 2014 12:39 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E4-STU-RTW-PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E413 TO RTW-E415
AND RTW-E415A ARE
ANTICIPATED TO BE A
CAST-IN-PLACE RETAINING
WALLS ON PILING.

BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

- 1 PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
- 2 JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



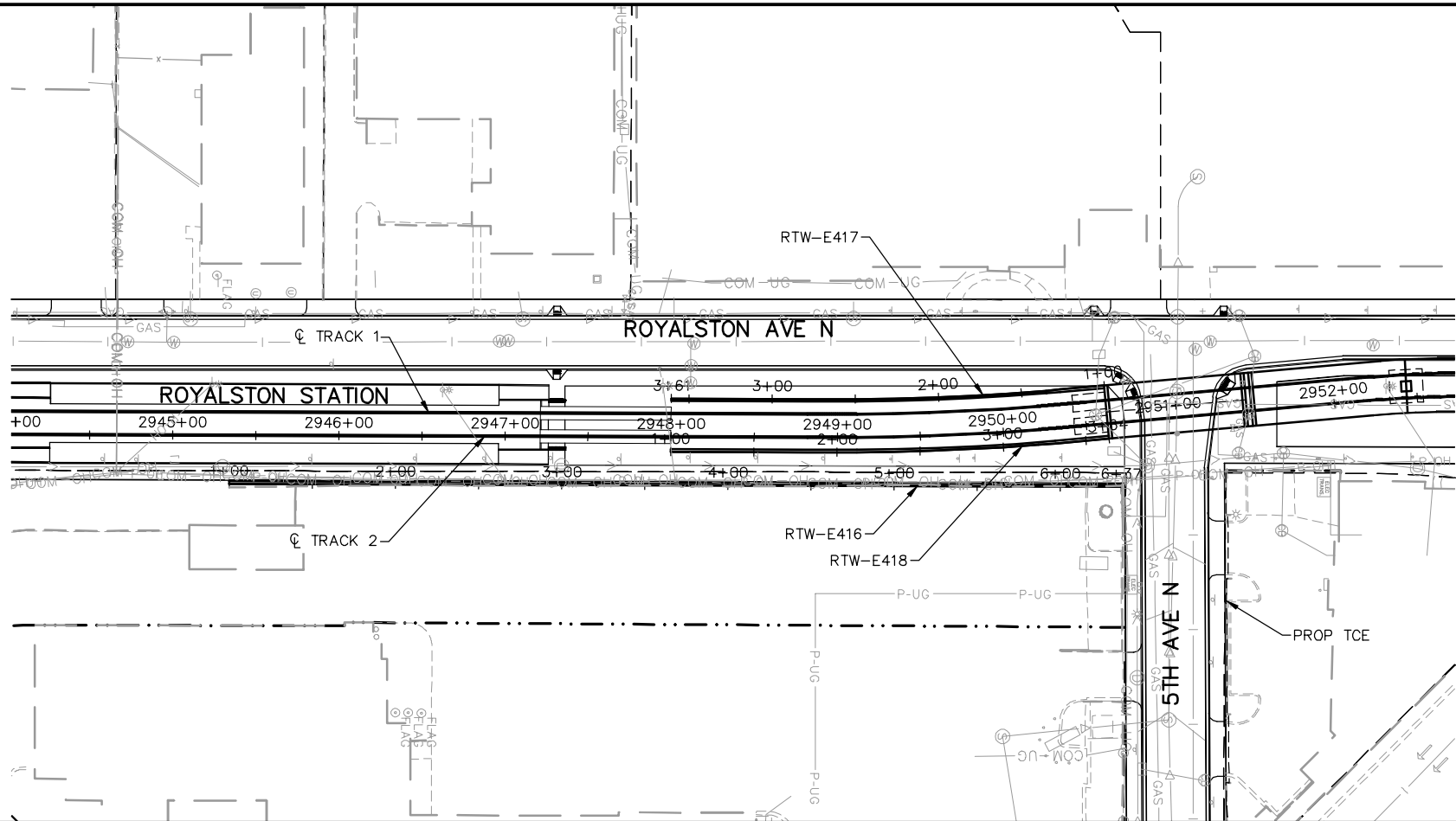
EAST - VOLUME 2 (STRUCTURES)
RTW-E413 TO RTW-E415, & RTW-E415A
PLAN AND PROFILES

DISCIPLINE: STRUCTURES

SHEET NAME:
E4-STU-RTW-PPFL - 005

SHEET
257
OF
274

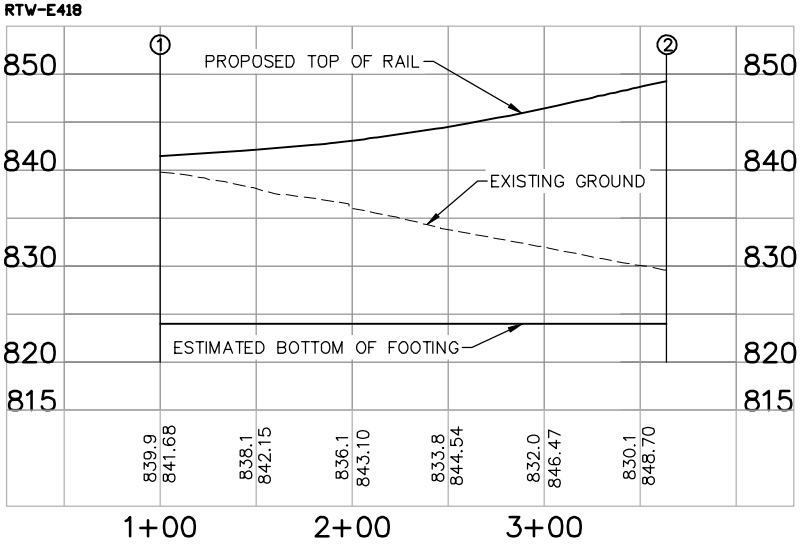
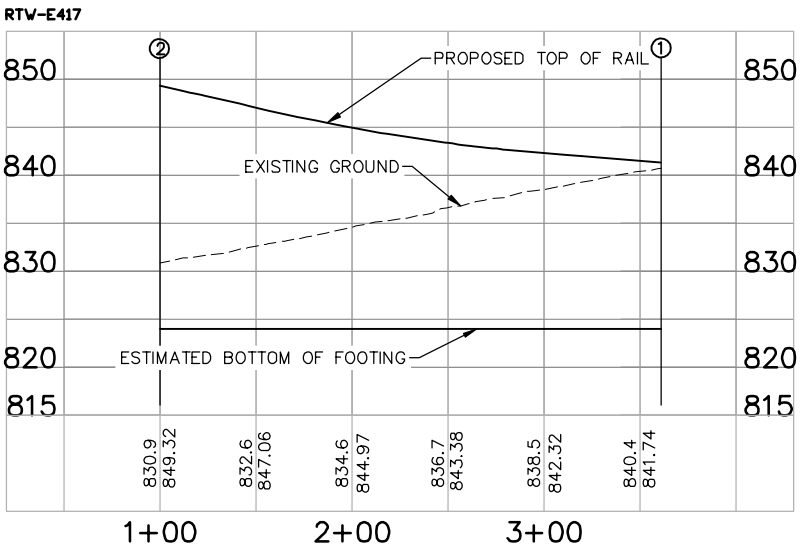
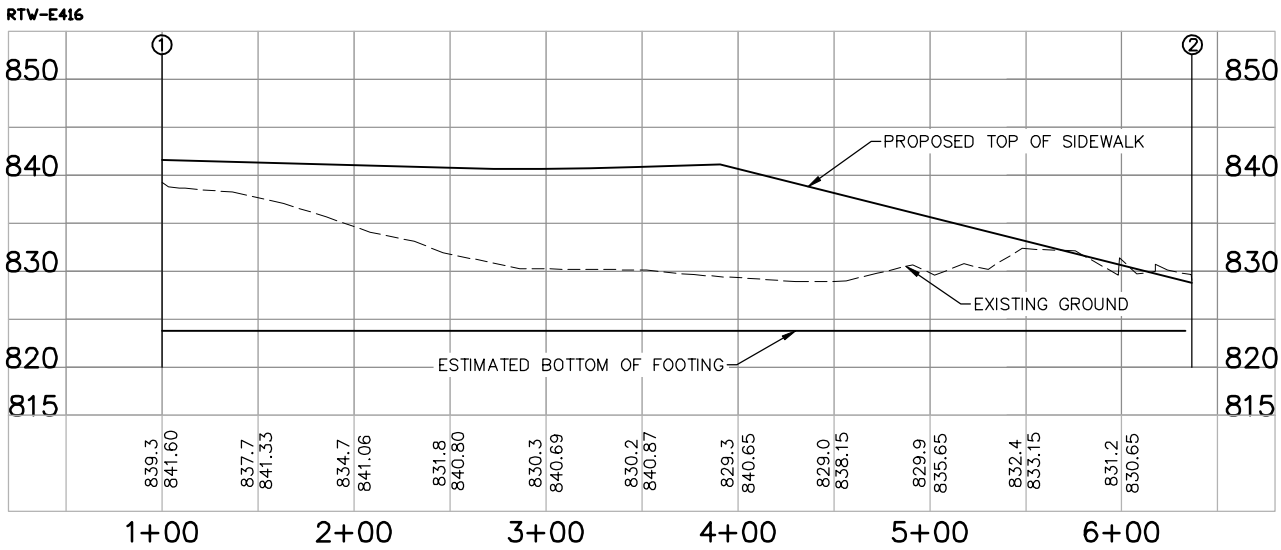
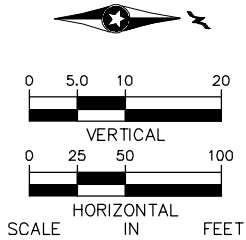
Aug. 26 2014 12:40 pm V:\3300_PEC-E\CAD\OVERALL\PLAN SHEETS\STRUCTURES\E4-STU-RTW-PPFL.dwg By: Katie.Ellis



NOTE:
RTW-E416 TO RTW-E418 ARE
ANTICIPATED TO BE
CAST-IN-PLACE RETAINING
WALLS ON PILING.

BEGIN/END OF RETAINING
WALL AND END OF BRIDGE
SUBSTRUCTURE TO BE
COORDINATED DURING
ADVANCED DESIGN.

- ① PROPOSED GROUND LINE AT
2H:1V MAXIMUM SLOPE AT
WALL TERMINATION NOT
SHOWN.
- ② JOINT LOCATION BETWEEN
RETAINING WALL AND BRIDGE
WINGWALL.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL





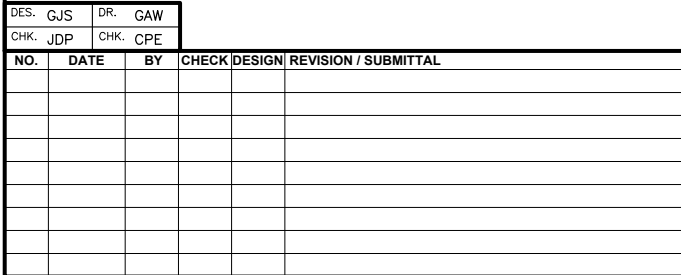
PRELIMINARY ENGINEERING



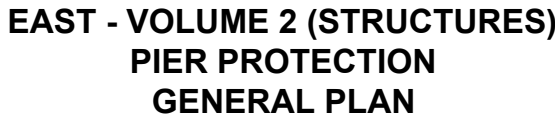
EAST - VOLUME 2 (STRUCTURES)
RTW-E416 TO RTW-E418
PLAN AND PROFILES

DISCIPLINE: STRUCTURES

SHEET NAME:
E4-STU-RTW-PPFL - 006



METROPOLITAN
COUNCIL



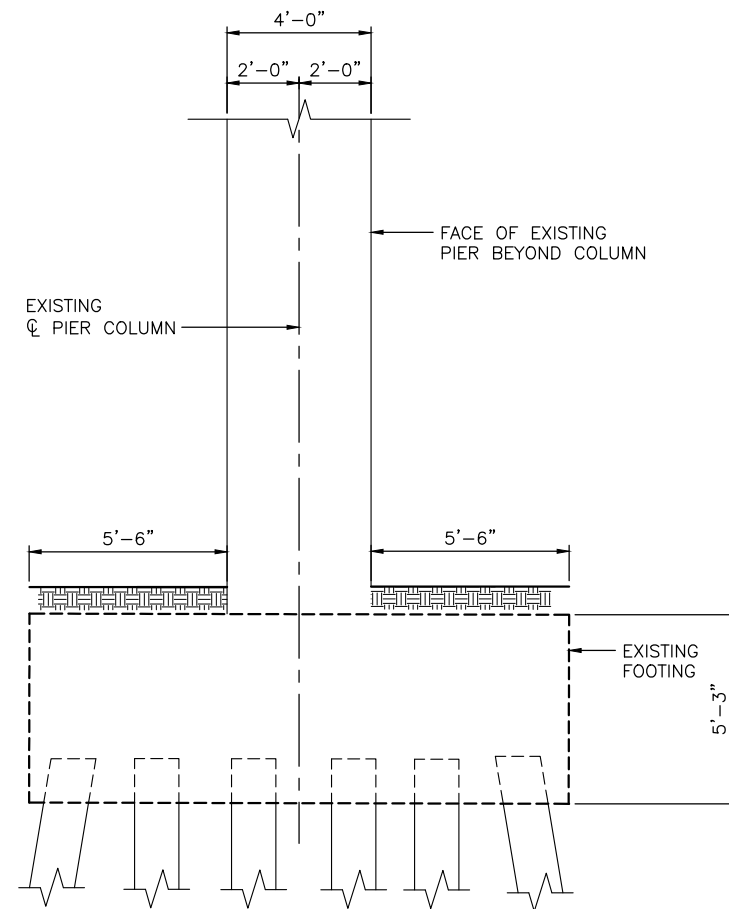
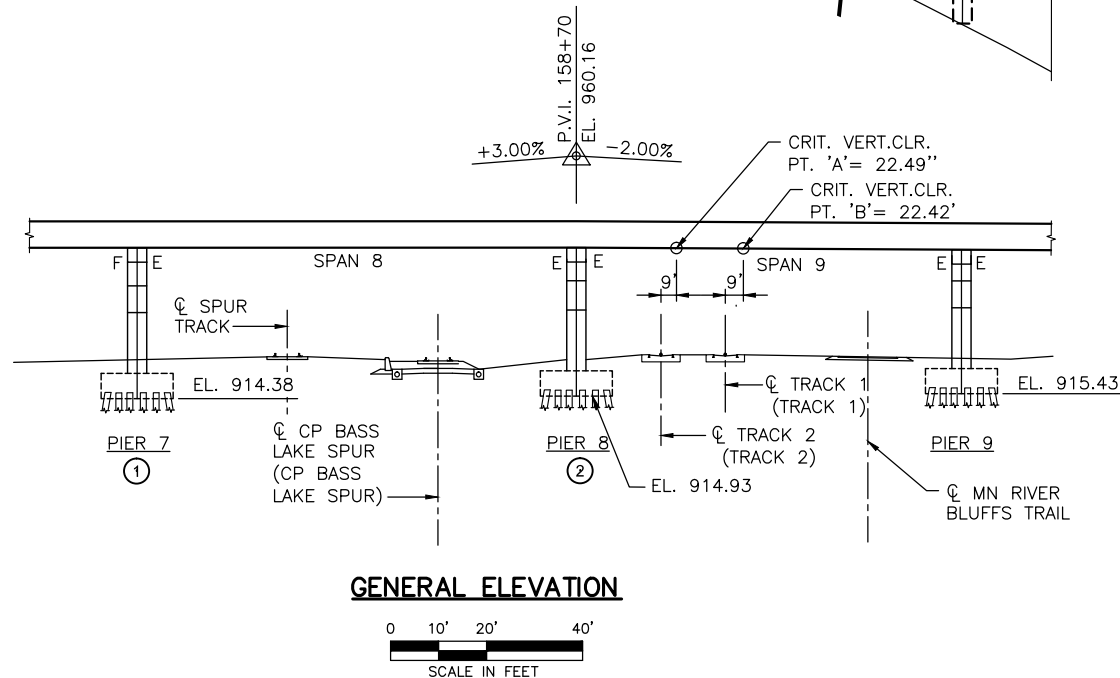
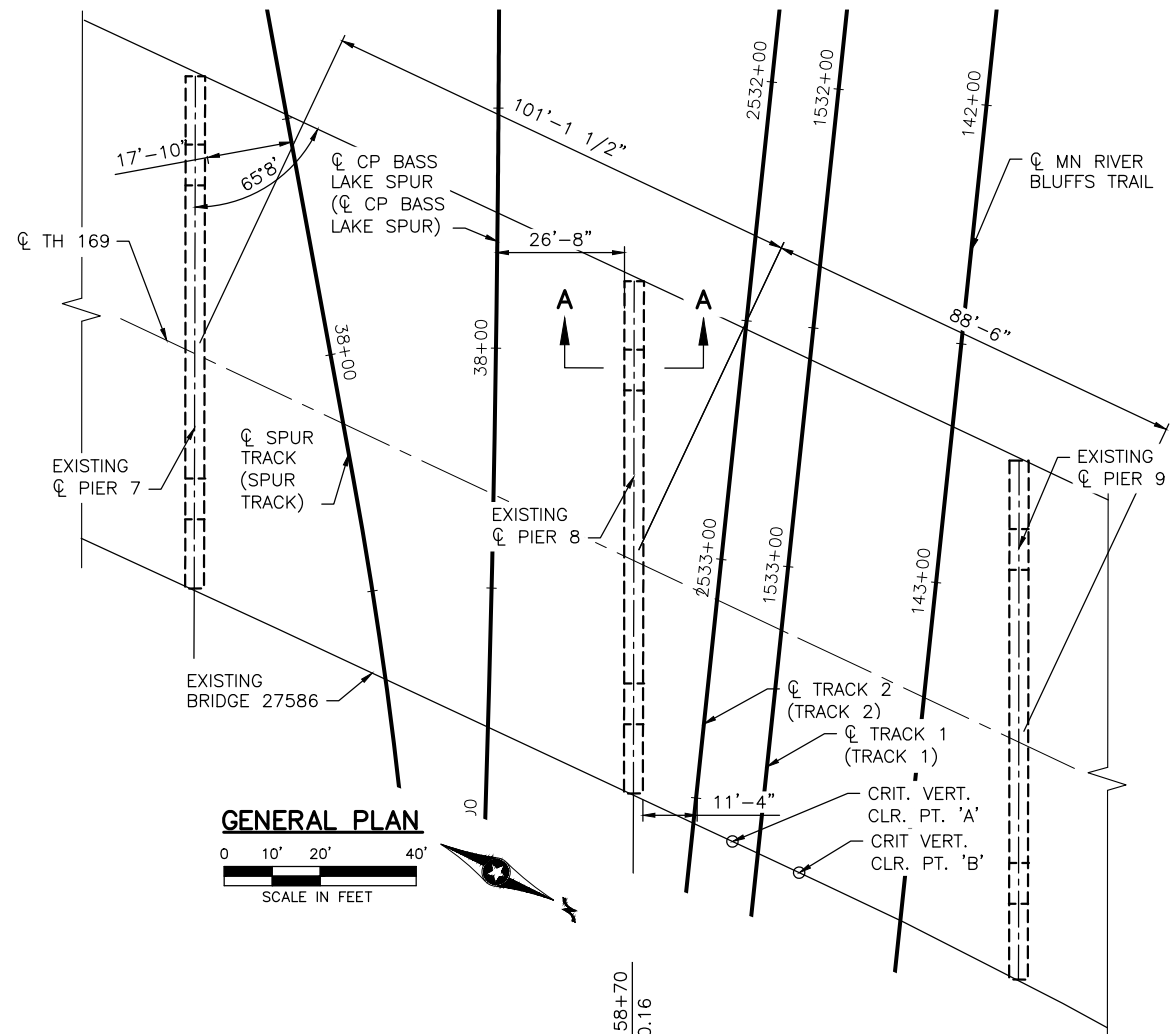
SHEET NAME: E0-STU-PPR-IDX

PIER PROTECTION CRITERIA NOTES:

1. NO MODIFICATIONS TO EXISTING PIER PROTECTION IF ANY OF THE FOLLOWING ARE MET:
 - a. PIER IS OF HEAVY CONSTRUCTION.
 - b. CENTERLINE OF NEW ALIGNMENT IS THE SAME OR IMPROVED OVER THE EXISTING CONDITIONS.
2. EXISTING PIERS THAT MEET HEAVY CONSTRUCTION GUIDELINES SHOULD BE ANALYZED FOR A MINIMUM RAILWAY COLLISION LOAD OF 600 KIPS APPLIED DIRECTLY AT AN ANGLE UP TO 15 DEGREES TANGENT TO THE RAILWAY IN ADVANCED DESIGN. APPLY THE COLLISION LOAD AT 5 FEET ABOVE TOP OF RAIL ELEVATION.
3. WHEN ABOVE CONDITIONS ARE NOT MET, THE FOLLOWING ARE USED FOR NEW PIER PROTECTION:
 - a. WHEN CENTERLINE OF NEW ALIGNMENT IS 12'-0" TO 25'-0", PROVIDE NEW PIER PROTECTION THAT IS 6'-0" ABOVE RAIL AND EXTENDS TO TOP OF FOOTING OR 4'-0" BELOW GRADE BETWEEN FOOTINGS.
 - b. WHEN CENTERLINE OF NEW ALIGNMENT IS LESS THAN 12'-0" FROM PIER, PROVIDE NEW PIER PROTECTION THAT IS 12'-0" ABOVE RAIL AND EXTENDS TO TOP OF FOOTING OR 4'-0" BELOW GRADE BETWEEN FOOTINGS.
 - c. THE LENGTH OF NEW PIER PROTECTION SHALL MEET THE FOLLOWING:
 - i. MULTI-COLUMN PIERS:
 1. MINIMUM OF 1'-0" EXTENSION ON APPROACHING SIDE OF PIER OR EXTEND TO EDGE OF FOOTING (WHICHEVER IS GREATER).
 - ii. SINGLE-COLUMN PIERS:
 1. 6'-0" EXTENSION ON APPROACHING SIDE OF PIER.
 - iii. MULTI-PIER BRIDGES:
 1. EXTEND PIER PROTECTION TO BE CONTINUOUS BETWEEN PIER SECTIONS.
 - d. THE THICKNESS OF NEW PIER PROTECTION SHALL MEET THE FOLLOWING:
 - i. THICKNESS SHALL BE MINIMUM 2'-6" THICK.
 - ii. EXTEND PIER PROTECTION 6" PAST EXISTING FACE OF PIER ON TRACK SIDE OF PIER.
 - iii. FOR ROUND COLUMN PIERS, EXTEND PIER PROTECTION 6" ON BOTH FACES OF EXISTING PIER.

SHEET
259
OF
274

Aug. 26 2014 12:54 pm V:\3300_PEC-E\CAD\SEGMENT E1\PLAN SHEETS\STRUCTURES\EX1-STU-PPR-T169-VEH-DTL.dwg By: Katie.Ellis



NOTES:

- NO CHANGE IN FREIGHT RAIL ALIGNMENT OR PROFILE. THEREFORE, NO MODIFICATIONS TO EXISTING PIER PROTECTION.
- PIER IS CONSIDERED HEAVY CONSTRUCTION.
-CROSS-SECTIONAL AREA \geq 30 SF
-MINIMUM DIMENSION \geq 2.5 FT.
- EXISTING PIERS THAT MEET HEAVY CONSTRUCTION GUIDELINES SHOULD BE ANALYZED FOR A MINIMUM RAILWAY COLLISION LOAD OF 600 KIPS APPLIED AT AN ANGLE UP TO 15 DEGREES TANGENT TO THE RAILWAY IN ADVANCED DESIGN. APPLY THE COLLISION LOAD AT 5 FEET ABOVE THE TOP OF RAIL ELEVATION.

**PRELIMINARY PLAN
BRIDGE 27586**

T.H. 169 OVER THIRD STREET SOUTH, SPUR
TRACKS, CP RR, SOUTHWEST LRT, C.S.A.H. NO.
3, AND MN RIVER BLUFFS TRAIL.

**BRIDGE I.D. NO. 501
GENERAL PLAN AND ELEVATION**

SEC 24/25 T 117N R 22W
CITY OF HOPKINS HENNEPIN COUNTY

DES. GJS	DR. GAW
CHK. JDP	CHK. CPE

JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



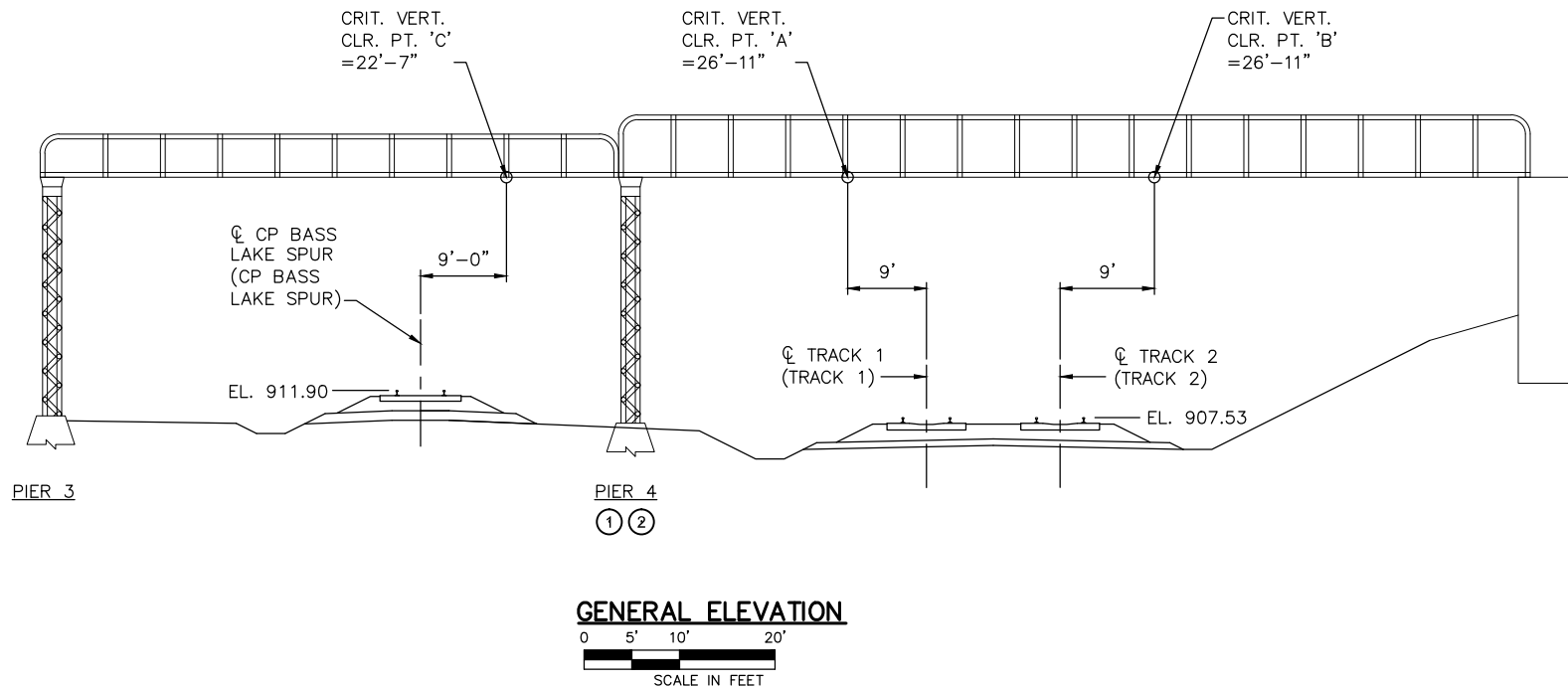
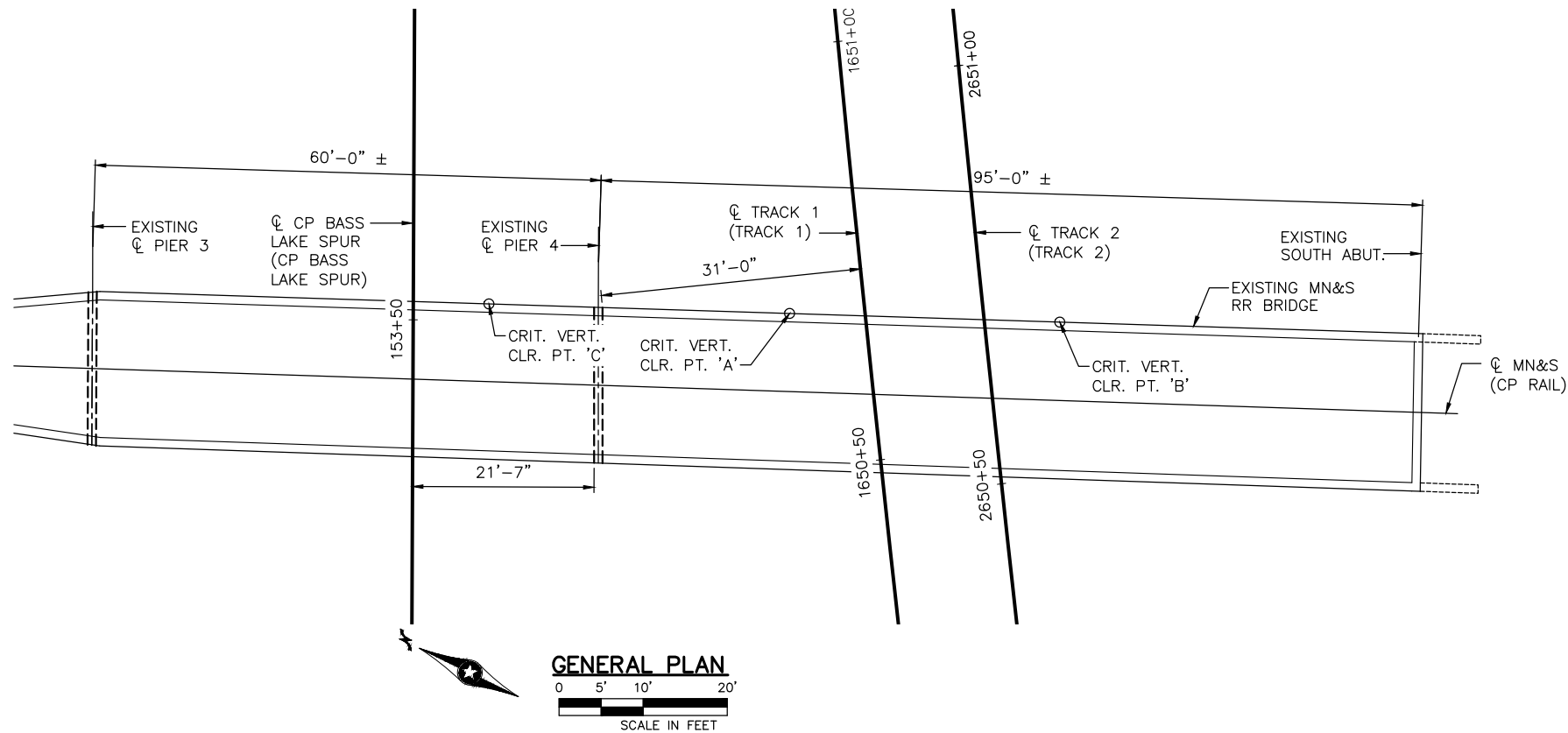
**EAST - VOLUME 2 (STRUCTURES)
TH 169 (BRIDGE 27586)
PIER PROTECTION
GENERAL PLAN AND ELEVATION**

DISCIPLINE: **STRUCTURES**

SHEET NAME: **EX1-STU-PPR-T169-VEH-DTL**

**SHEET
260
OF
274**

Aug. 26 2014 12:54 pm V:\3300_PEC-E\CAD\SEGMENT E2\PLAN SHEETS\STRUCTURES\EX2-STU-PPR-MNSR-FRT-DTL.dwg By: Katie Ellis



NOTES:

- REALIGNED CP BASS LAKE SPUR INCREASES THE MINIMUM HORIZONTAL CLEARANCE FROM EXISTING CONDITIONS AT PIER 4. NO MODIFICATIONS TO PIER PROTECTION REQUIRED.
- PROPOSED LRT ALIGNMENT IS GREATER THAN 25'-0". PIER PROTECTION NOT REQUIRED.

**PRELIMINARY PLAN
MN&S RR (CP RAIL)**

CP RAIL OVER CP RR, SOUTHWEST LRT, AND CEDAR LAKE TRAIL

BRIDGE I.D. NO. 305
GENERAL PLAN AND ELEVATION

SEC 17 T 117N R 21W
CITY OF ST. LOUIS PARK HENNEPIN COUNTY

APPROVED: _____ STATE BRIDGE ENGINEER DATE _____

DES. GJS DR. GAW
CHK. JDP CHK. CPE

JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

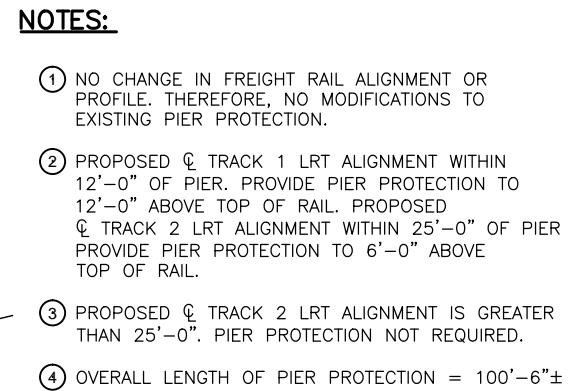
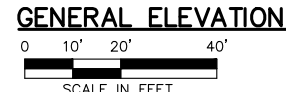
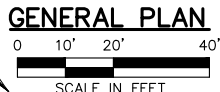


**EAST - VOLUME 2 (STRUCTURES)
MN&S RR (CP RAIL)
PIER PROTECTION
GENERAL PLAN AND ELEVATION**

DISCIPLINE: **STRUCTURES**

SHEET NAME: **EX2-STU-PPR-MNSR-FRT-DTL**

**SHEET
261
OF
274**



<p>PRELIMINARY PLAN BRIDGE 27037</p>	
<p>CSAH 5 (WEST LAKE STREET) OVER CP RR, SOUTHWEST LRT, AND CEDAR LAKE TRAIL-ABT. 1.2 MI. E. OF JCT. T.H. 100 AND T.H. 7.</p>	
<p>BRIDGE I.D. NO. 501</p>	
<p><u>GENERAL PLAN AND ELEVATION</u></p>	
<p>SEC 32/5</p>	<p>T 29N/28N</p>
<p>CITY OF MINNEAPOLIS</p>	<p>R 24W HENNEPIN COUNTY</p>
<p>APPROVED: _____ DATE _____</p>	

[illegible]

STATE PROJECT NO. 9909-01 MNDOT REVIEW:

Kimley»Horn

PRELIMINARY ENGINEERING

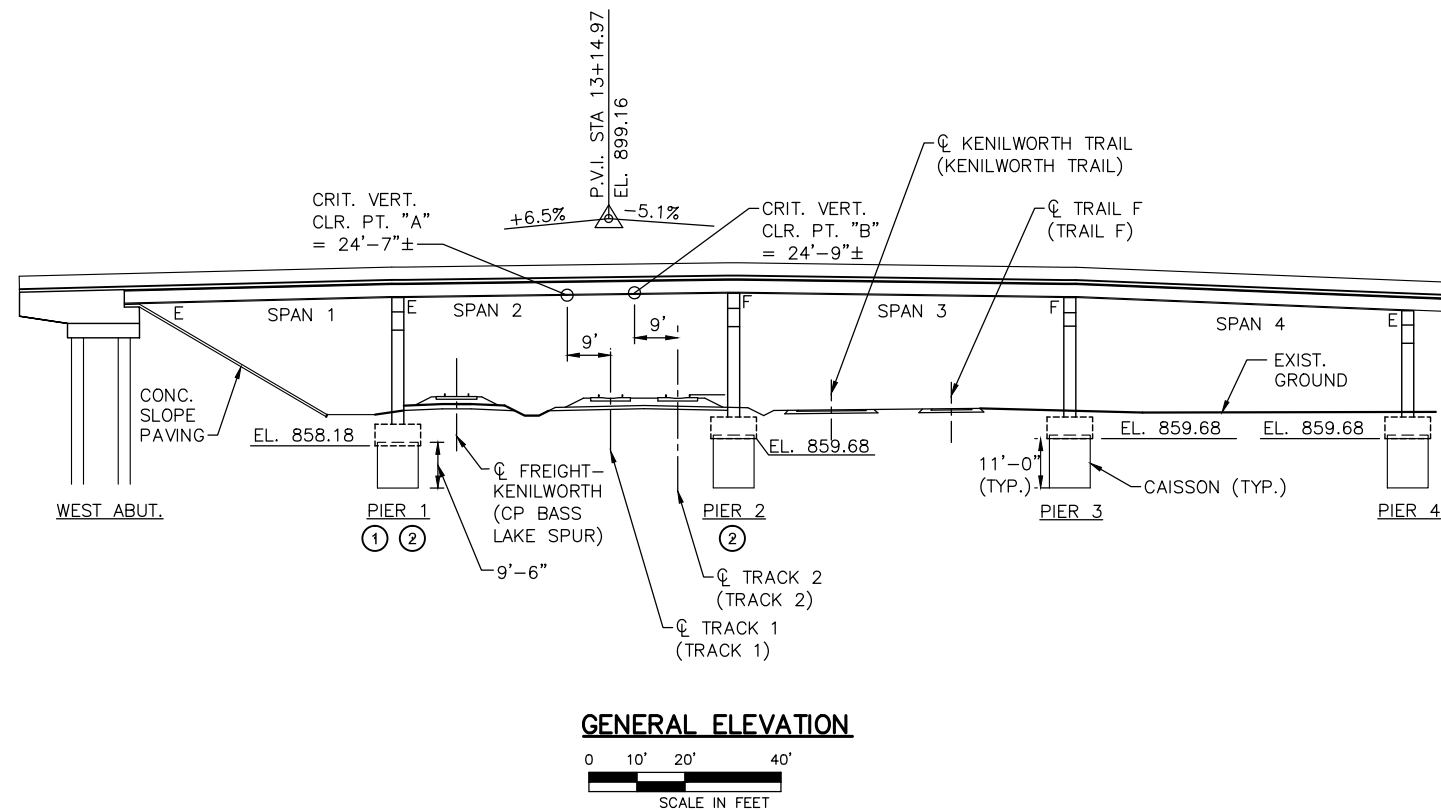
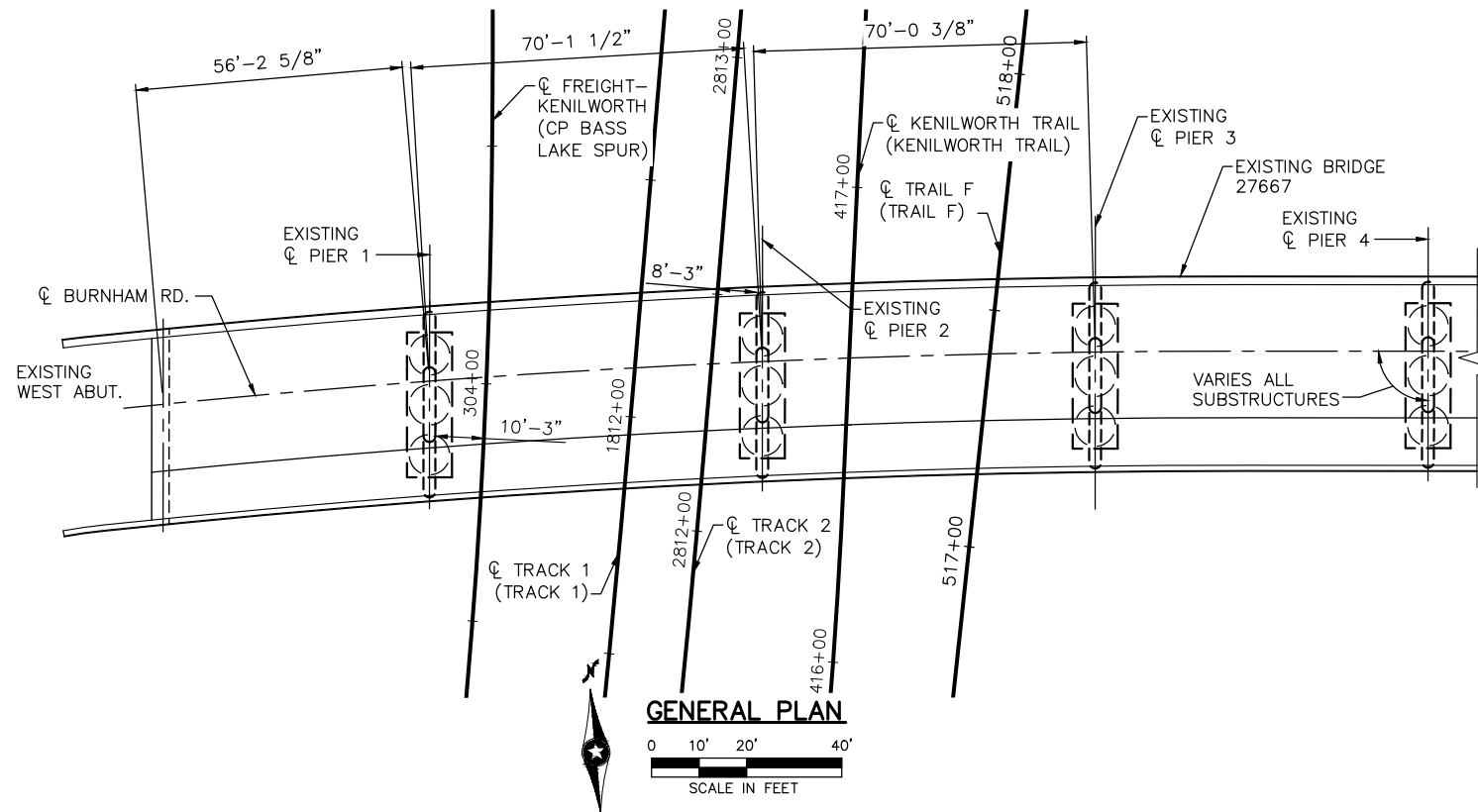


EAST - VOLUME 2 (STRUCTURES)
CSAH 5 (WEST LAKE STREET) (BRIDGE 27037)
PIER PROTECTION
GENERAL PLAN AND ELEVATION

DISCIPLINE:	STRUCTURES	SHEET NAME:	EX3-STU-PPR-WLKS-VEH-DTL
-------------	-------------------	-------------	---------------------------------

SHEET
262
OF
274

Aug. 26 2014 12:55 pm V:\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\EX3-STU-PPR-BRHR-VEH-DTL.dwg By: Katie Ellis



NOTES:

- ① NO CHANGE IN FREIGHT RAIL ALIGNMENT OR PROFILE. THEREFORE, NO MODIFICATIONS TO EXISTING PIER PROTECTION.
- ② PIER IS CONSIDERED HEAVY CONSTRUCTION.
-CROSS-SECTIONAL AREA \geq 30 SF
-MINIMUM DIMENSION \geq 2.5 FT.
3. EXISTING PIERS THAT MEET HEAVY CONSTRUCTION GUIDELINES SHOULD BE ANALYZED FOR A MINIMUM RAILWAY COLLISION LOAD OF 600 KIPS APPLIED AT AN ANGLE UP TO 15 DEGREES TANGENT TO THE RAILWAY IN ADVANCED DESIGN. APPLY THE COLLISION LOAD AT 5 FEET ABOVE THE TOP OF RAIL ELEVATION.

**PRELIMINARY PLAN
BRIDGE 27667**

BURNHAM ROAD OVER CP RR, SOUTHWEST LRT,
KENILWORTH TRAIL, AND TRAIL F.

BRIDGE I.D. NO. 501
GENERAL PLAN AND ELEVATION

SEC 32 T 29N R 24W
CITY OF MINNEAPOLIS HENNEPIN COUNTY

APPROVED: _____ DATE _____
STATE BRIDGE ENGINEER

DES.	GJD	DR.	GAW
CHK.	JDP	CHK.	CPE

JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



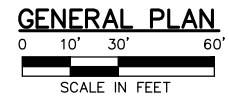
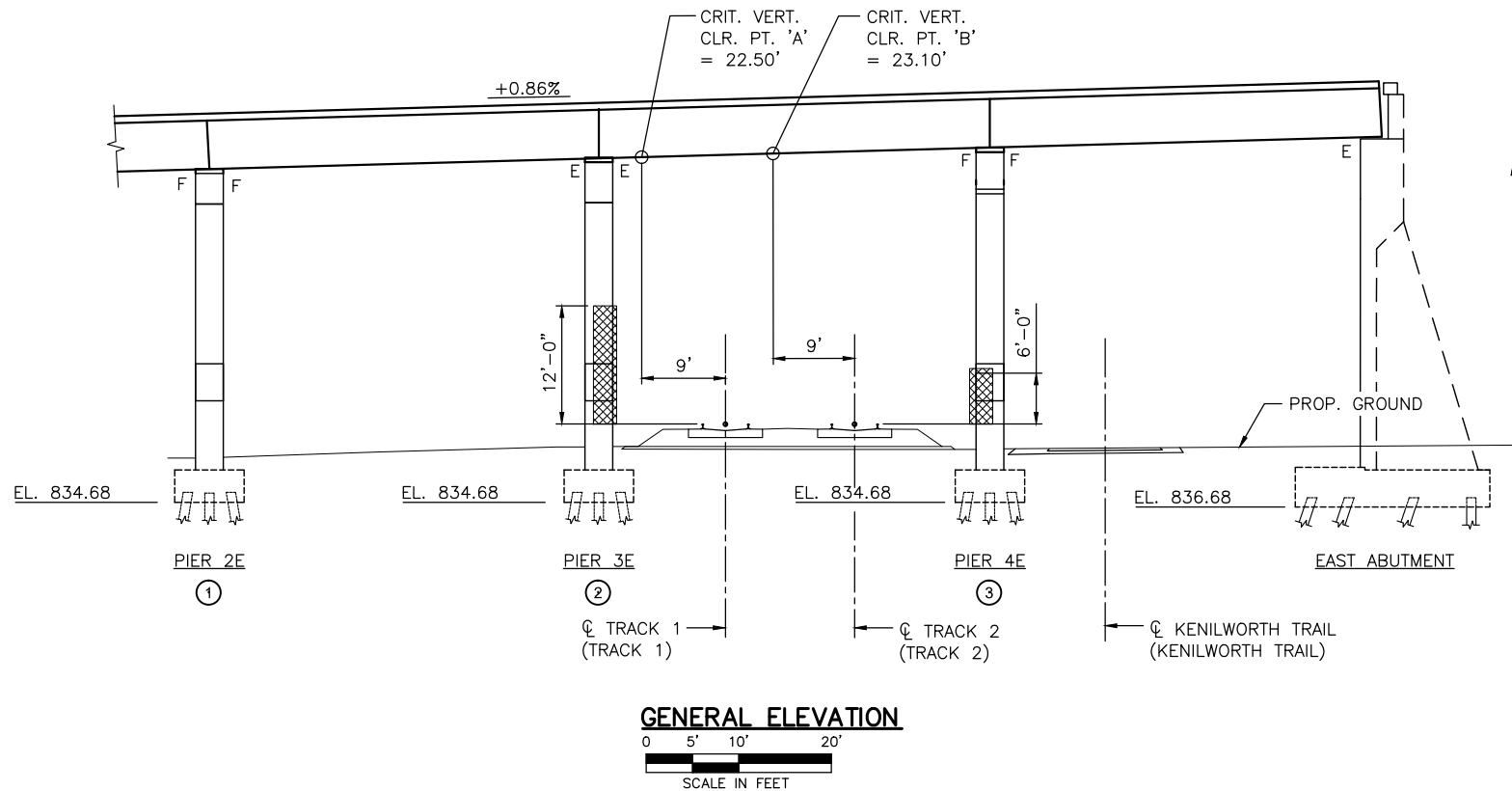
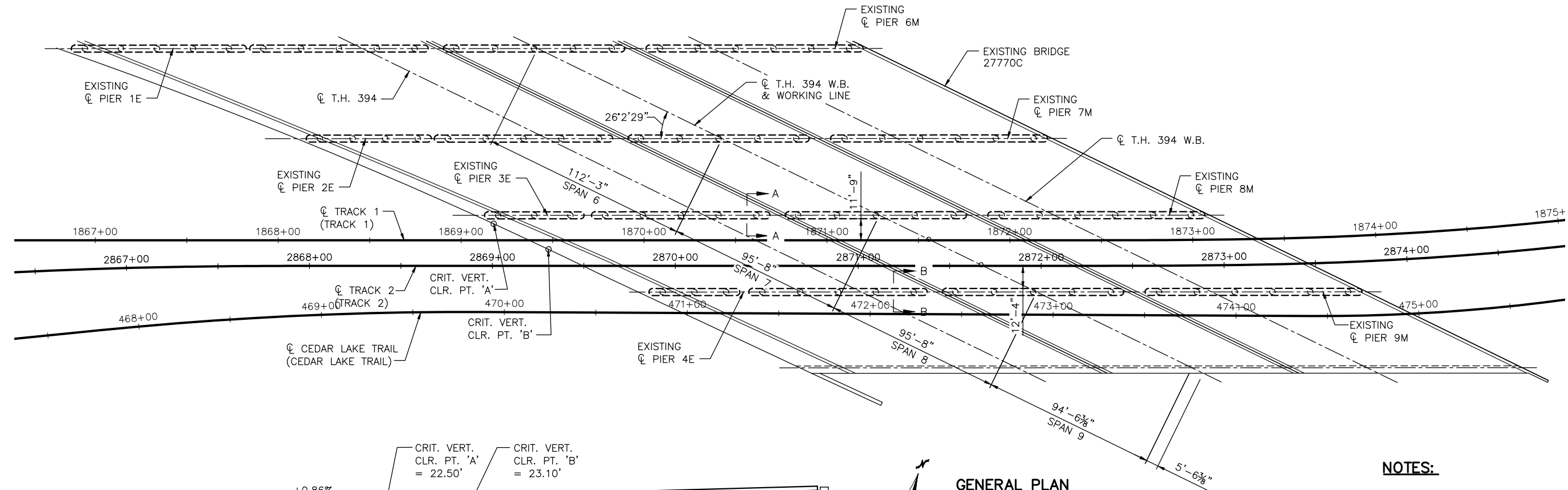
DISCIPLINE: **STRUCTURES**

**EAST - VOLUME 2 (STRUCTURES)
BURNHAM ROAD (BRIDGE 27667)
PIER PROTECTION
GENERAL PLAN AND ELEVATION**

SHEET NAME: **EX3-STU-PPR-BRHR-VEH-DTL**

SHEET
263
OF
274

Aug. 26 2014 12:56 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\EX4-STU-PPR-T394-VEH-DTL.dwg By: Katie.Ellis



- NOTES:**
- ① NO CHANGE IN FREIGHT RAIL ALIGNMENT OR PROFILE. THEREFORE, NO MODIFICATIONS TO EXISTING PIER PROTECTION.
 - ② PROPOSED LRT ALIGNMENT WITHIN 12'-0" OF PIER. PROVIDE PIER PROTECTION TO 12'-0" ABOVE RAIL.
 - ③ PROPOSED LRT ALIGNMENT WITHIN 25'-0" OF PIER. PROVIDE PIER PROTECTION TO 6'-0" ABOVE RAIL.
 - ④ FOR SECTIONS A-A & B-B SEE DETAILS SHEET 265

**PRELIMINARY PLANS
BRIDGE 27770C**

T.H. 394 AND RAMPS OVER BNSF RR, SOUTHWEST LRT, AND CEDAR LAKE TRAIL. 1.7 MILES EAST OF JCT. T.H. 100 AND T.H. 394.

BRIDGE I.D. NO. 501

GENERAL PLAN AND ELEVATION

SEC 28 T 29N R 24W
CITY OF MINNEAPOLIS HENNEPIN COUNTY

APPROVED: _____ DATE _____
STATE BRIDGE ENGINEER

DES.	GJS	DR.	GAW
CHK.	JDP	CHK.	CPE
NO.	DATE	BY	CHECK/DESIGN/REVISION / SUBMITTAL

JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



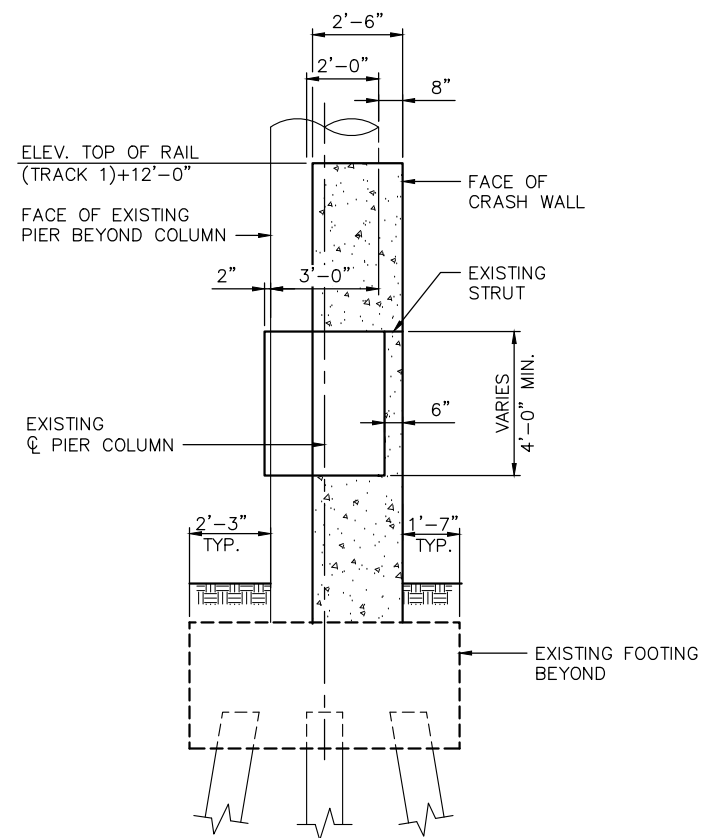
**EAST - VOLUME 2 (STRUCTURES)
TH 394 (BRIDGE 27770C)
PIER PROTECTION
GENERAL PLAN AND ELEVATION**

DISCIPLINE: **STRUCTURES**

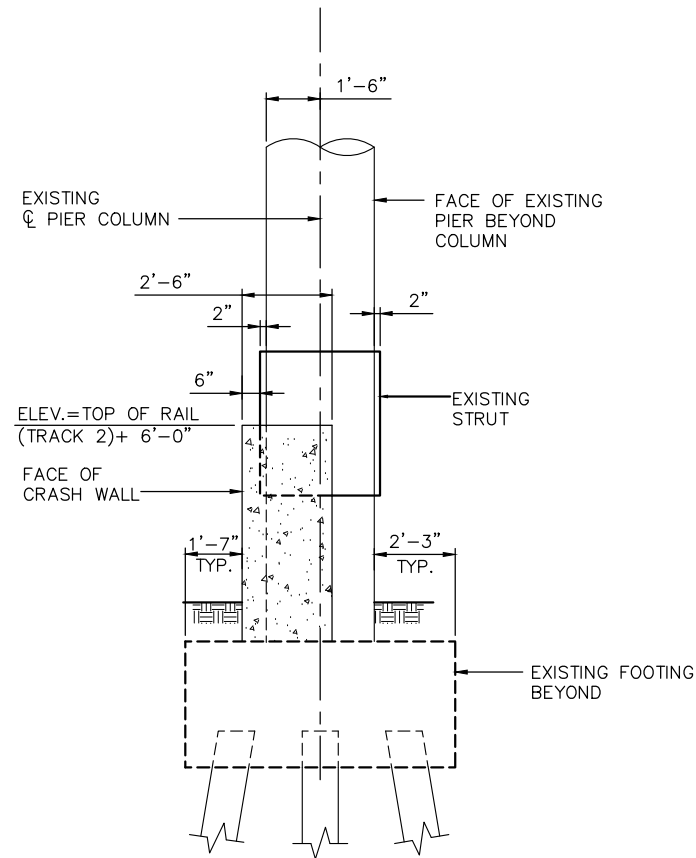
SHEET NAME: **EX4-STU-PPR-T394-VEH-DTL**

**SHEET
264
OF
274**

Aug. 26 2014 12:56 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\EX4-STU-PPR-T394-VEH-DTL.dwg By: Katie.Ellis



SECTION A-A



SECTION B-B

DES.	GJS	DR.	GAW
CHK.	JDP	CHK.	CPE
NO.	DATE	BY	CHECK/DESIGN/REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

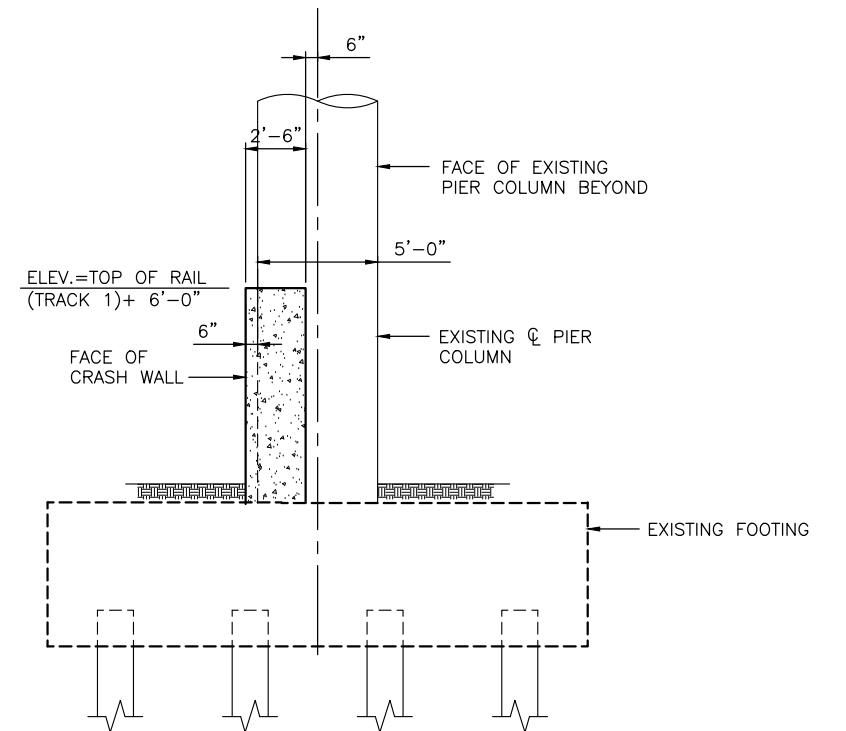


EAST - VOLUME 2 (STRUCTURES)
TH 394 (BRIDGE 27770C)
PIER PROTECTION
DETAILS

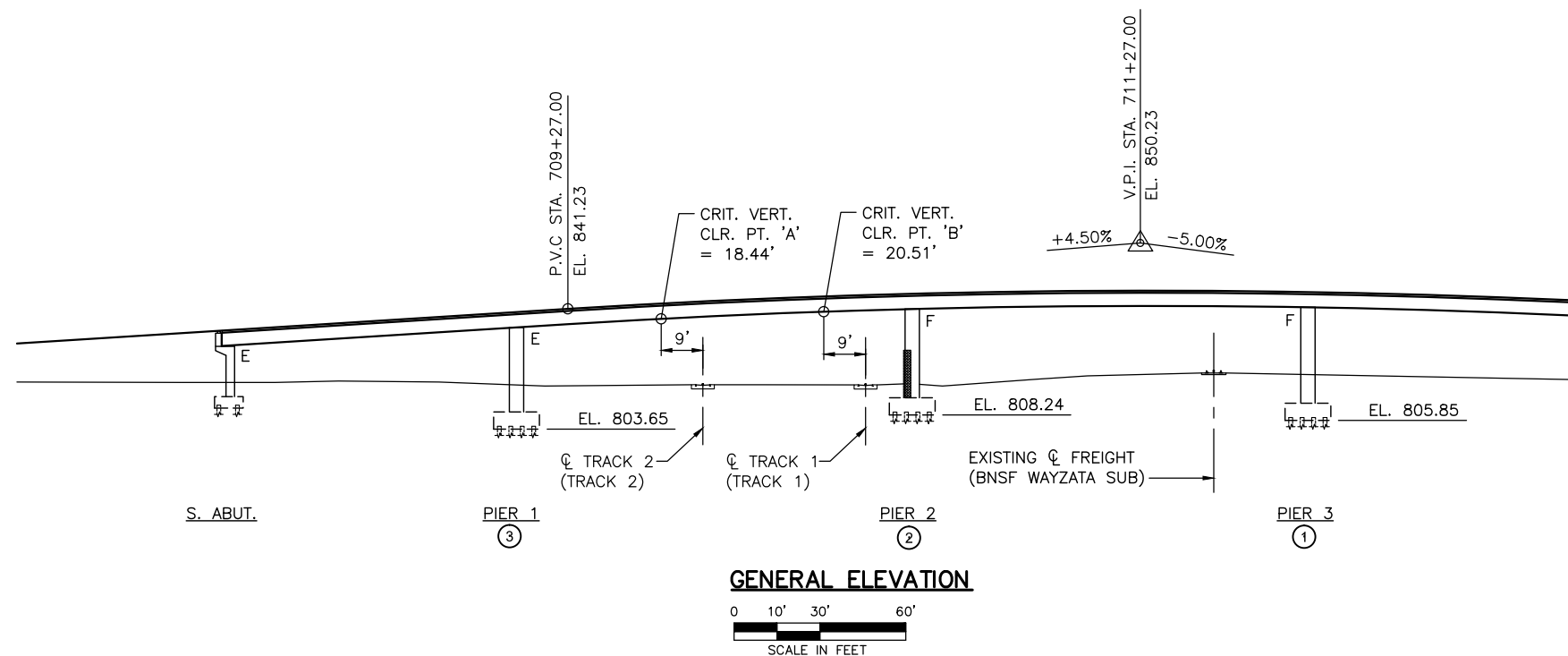
DISCIPLINE: STRUCTURES

SHEET NAME: EX4-STU-PPR-T394-VEH-DTL




SHEET
265
OF
274



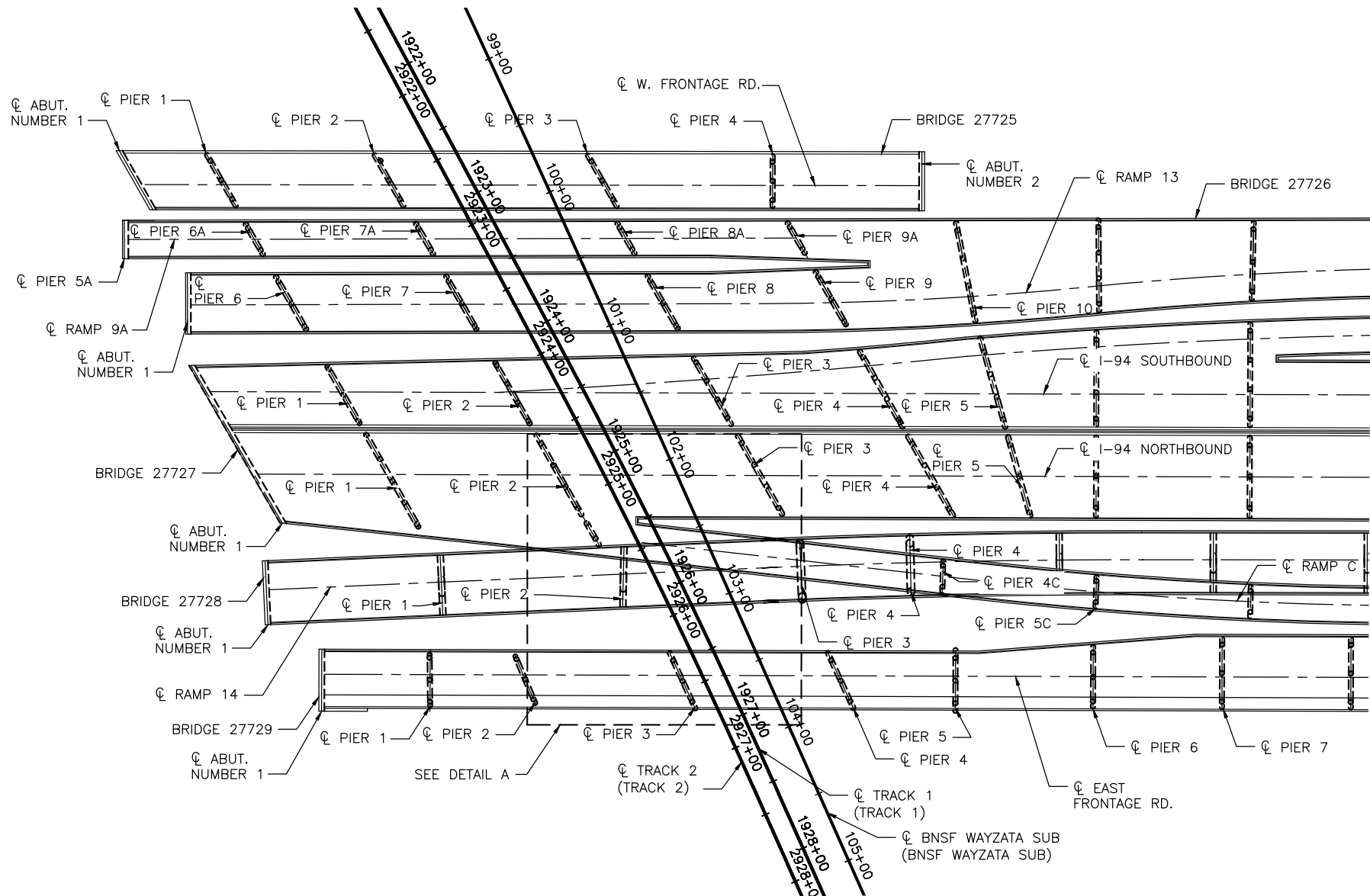
- ① NO CHANGE IN FREIGHT RAIL ALIGNMENT OR PROFILE. EXISTING PIER PROTECTION IS ADEQUATE.
- ② PROPOSED LRT ALIGNMENT WITHIN 25'-0" OF PIER. PROVIDE PIER PROTECTION TO 6'-0" ABOVE RAIL.
- ③ PROPOSED LRT ALIGNMENT IS GREATER THAN 25'-0". PIER PROTECTION NOT REQUIRED.



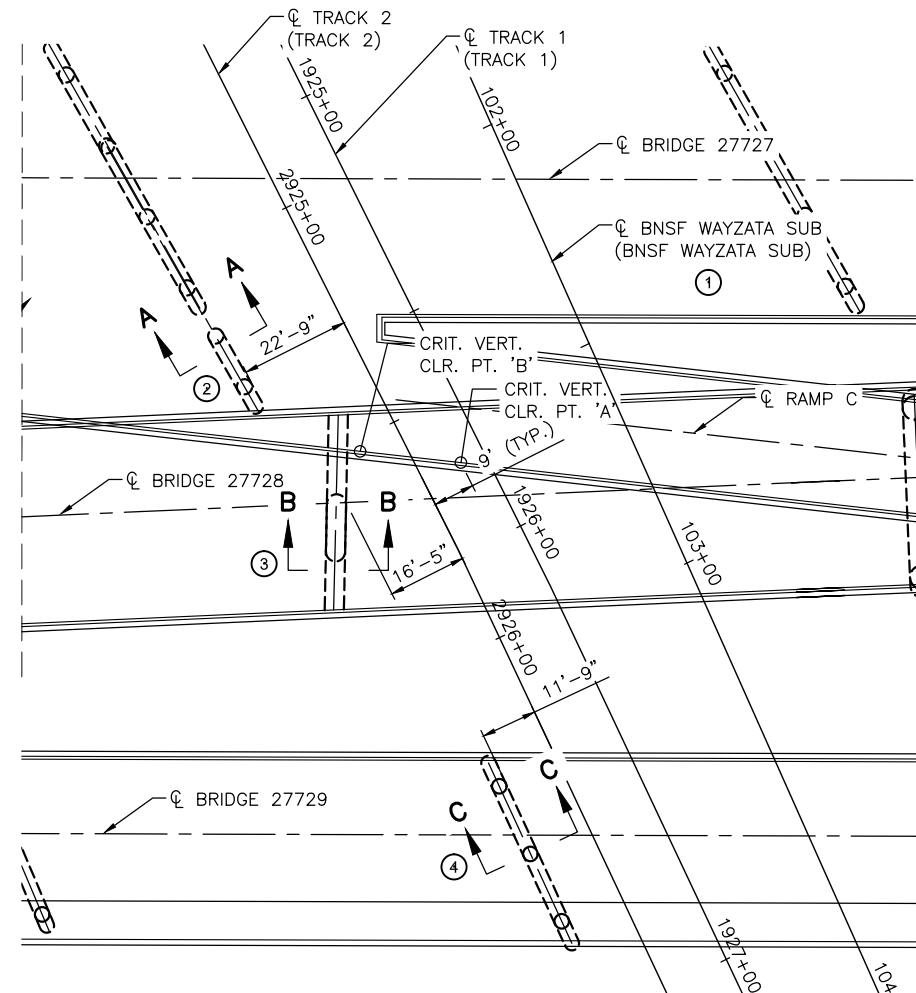
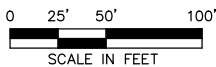
GENERAL ELEVATION

DES. GJS		DR. GAW		JOB NO. T9N635		STATE PROJECT NO. 9909-01		MNDOT REVIEW:		APPROVED: _____		STATE BRIDGE ENGINEER		DATE	
CHK. JDP		CHK. CPE													
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL			 		EAST - VOLUME 2 (STRUCTURES) VAN WHITE MEM. BLVD (BRIDGE 27B01) PIER PROTECTION GENERAL PLAN AND ELEVATION		SHEET 266 OF 274			
						PRELIMINARY ENGINEERING				DISCIPLINE: STRUCTURES		SHEET NAME: EX4-STU-PPR-VWMB-VEH-DTL			

Aug. 26 2014 12:58 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\EX4-STU-PPR-ALL94-VEH-DTL.dwg By: Katie.Ellis



GENERAL PLAN



DETAIL A



NOTES:

- ① NO CHANGE IN FREIGHT RAIL ALIGNMENT OR PROFILE. THEREFORE, NO MODIFICATIONS TO EXISTING PIER PROTECTION.
- ② PROPOSED ϕ TRACK 2 LRT ALIGNMENT WITHIN 25'-0" OF PIER. PROVIDE PIER PROTECTION TO 6'-0" ABOVE TOP OF RAIL.
- ③ PIER IS CONSIDERED HEAVY CONSTRUCTION
-CROSS-SECTIONAL AREA \geq 30 SF
-MINIMUM DIMENSION \geq 2.5 FT
- ④ PROPOSED ϕ TRACK 2 LRT ALIGNMENT WITHIN 12'-0" OF PIER. PROVIDE PIER PROTECTION TO 12'-0" ABOVE TOP OF RAIL.
5. EXISTING PIERS THAT MEET HEAVY CONSTRUCTION GUIDELINES SHOULD BE ANALYZED FOR A MINIMUM RAILWAY COLLISION LOAD OF 600 KIPS APPLIED AT AN ANGLE UP TO 15 DEGREES TANGENT TO THE RAILWAY IN ADVANCED DESIGN. APPLY THE COLLISION LOAD AT 5 FEET ABOVE THE TOP OF RAIL ELEVATION.
6. FOR SECTIONS A-A, B-B, AND C-C, SEE DETAIL SHEET 268

PRELIMINARY PLANS
BRIDGES 27725-27729

WEST FRONTAGE ROAD, RAMP 9A, RAMP 13, I-94,
RAMP 14, RAMP C, AND EAST FRONTAGE ROAD OVER
BNSF RR AND SOUTHWEST LRT. 0.4 MILES SOUTH OF
JCT. T.H. 55 & I-94.

BRIDGE I.D. NO. 401
GENERAL PLAN

SEC 22 T 29N R 24W
CITY OF MINNEAPOLIS HENNEPIN COUNTY

APPROVED: _____ STATE BRIDGE ENGINEER DATE _____

DES. GJS	DR. GAW
CHK. JDP	CHK. CPE

JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



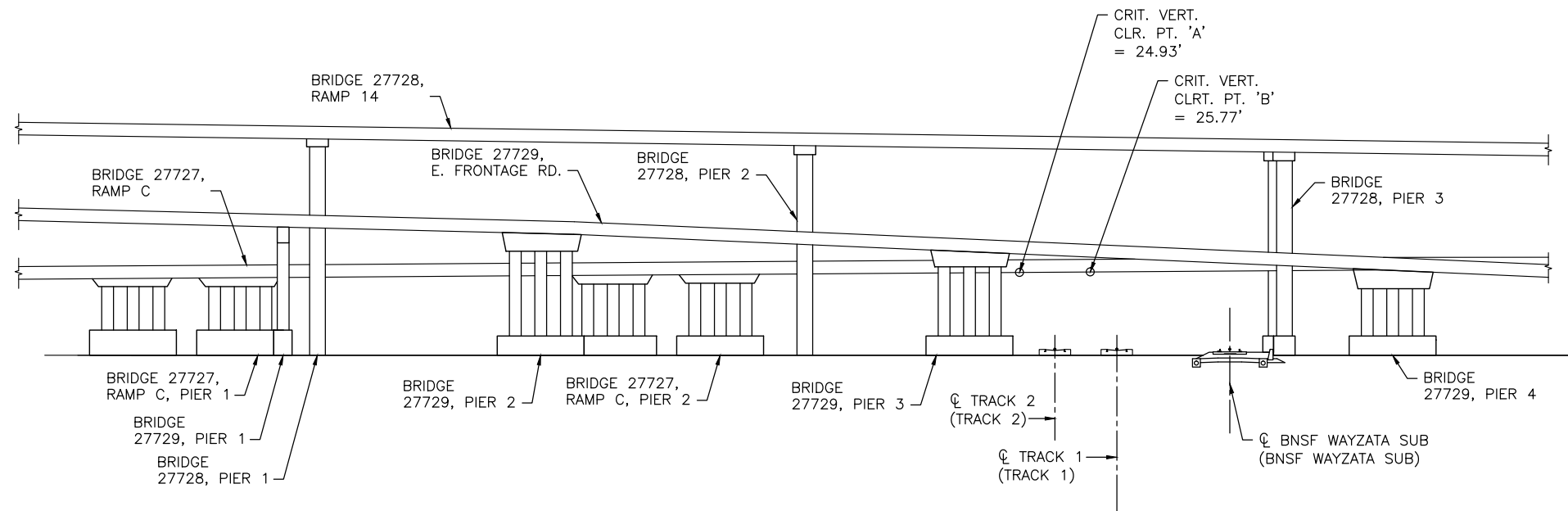
EAST - VOLUME 2 (STRUCTURES)
I-94 (BRIDGES 27725-27729)
PIER PROTECTION
GENERAL PLAN

DISCIPLINE: STRUCTURES

SHEET NAME: EX4-STU-PPR-ALL94-VEH-DTL

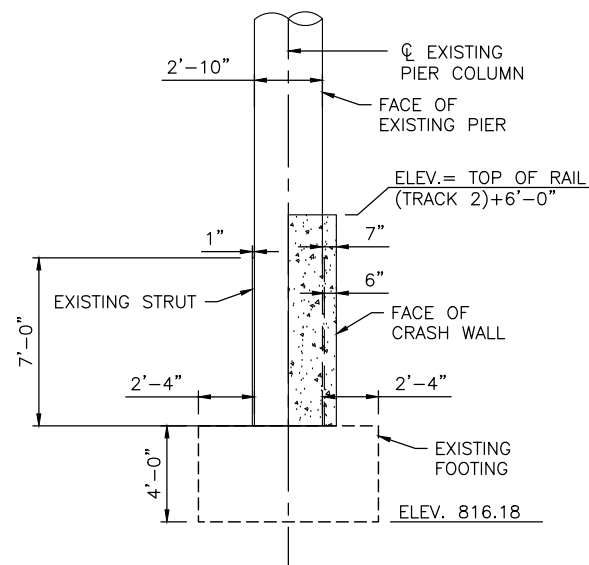
SHEET
267
OF
274

Aug. 26 2014 12:58 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\EX4-STU-PPR-ALL94-ELEV-VEH-DTL.dwg By: KatieEllis

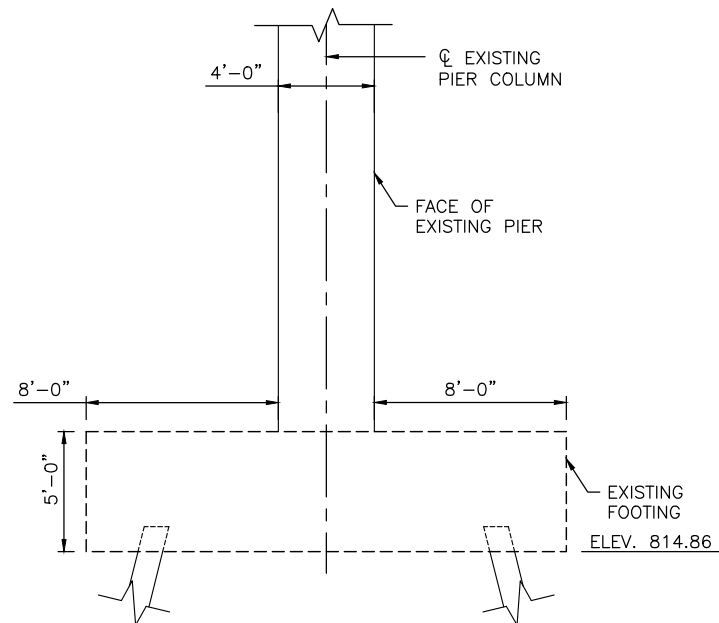


GENERAL ELEVATION

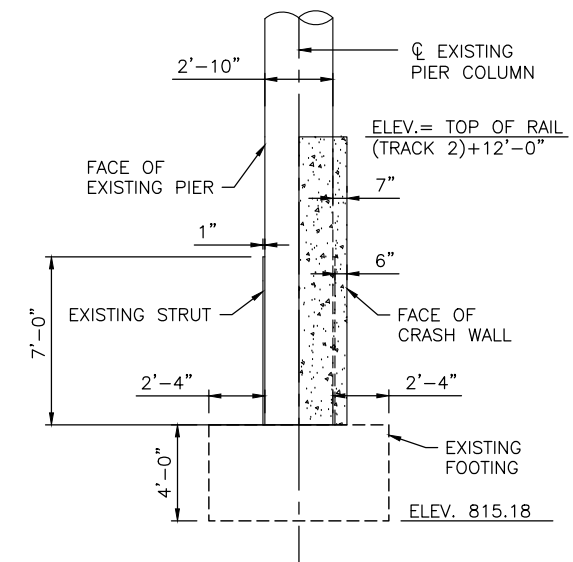
0 10 20 40
SCALE IN FEET






SECTION A-A



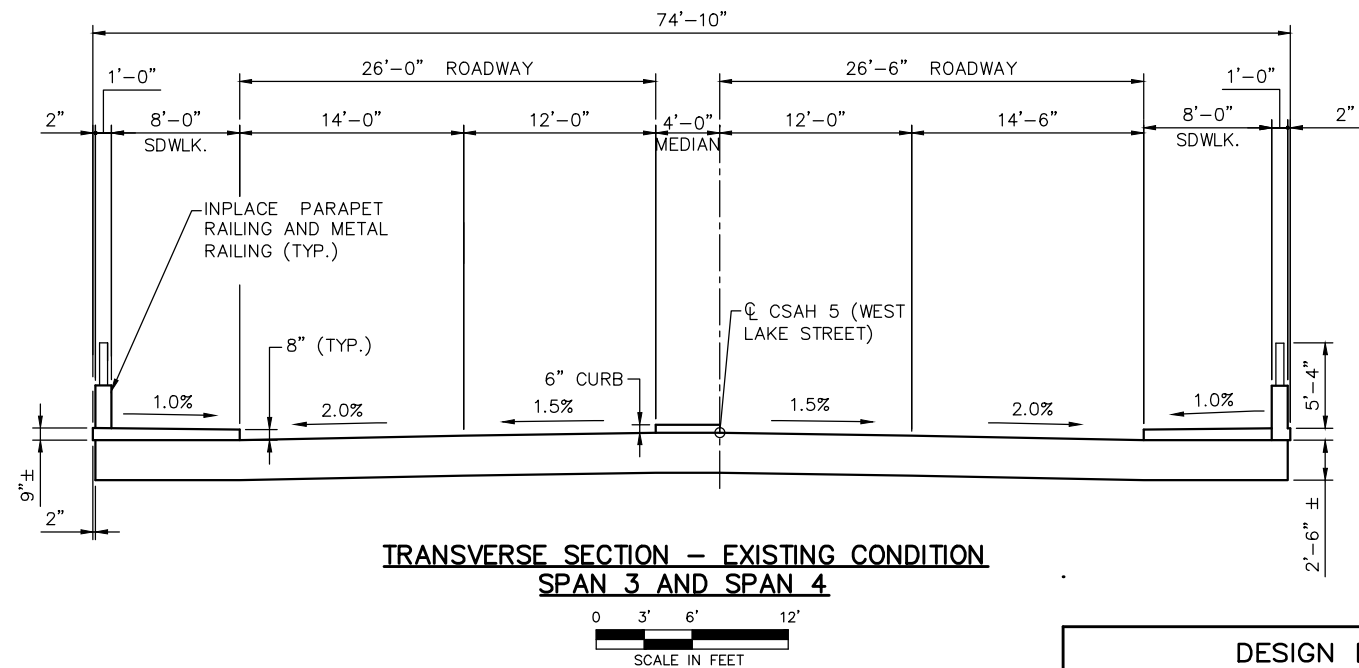
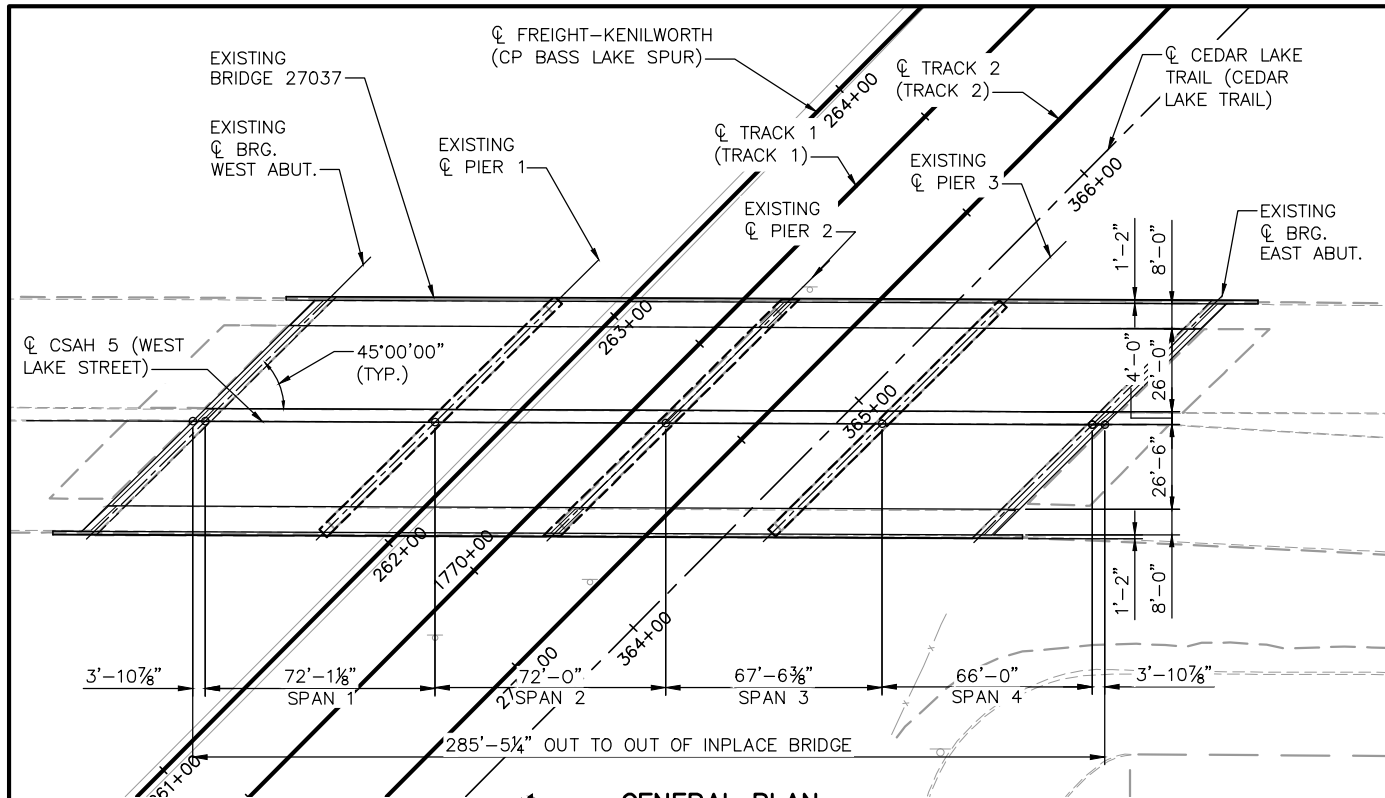
SECTION B-B



SECTION C-C

DES. GJS		DR. GAW		JOB NO. T9N635		STATE PROJECT NO. 9909-01		MNDOT REVIEW:		<div></div>		EAST - VOLUME 2 (STRUCTURES) I-94 (BRIDGES 27725-27729) PIER PROTECTION GENERAL ELEVATION AND DETAILS		SHEET 268 OF 274	
CHK. JDP		CHK. CPE													
NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL			PRELIMINARY ENGINEERING		DISCIPLINE: STRUCTURES		SHEET NAME: EX4-STU-PPR-ALL94-ELEV-VEH-DTL			

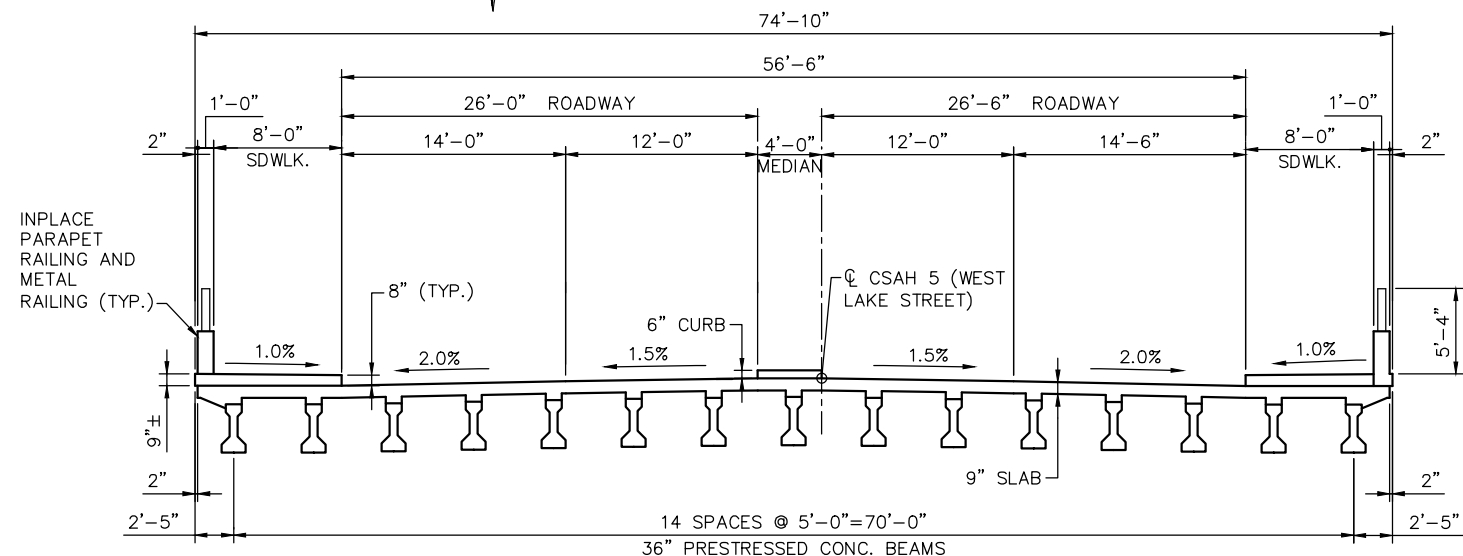
Aug. 26 2014 01:18 pm V:\3300_PEC-E\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\EX3-STU-BRG-WLKS-GPE-001.dwg By: ronald.dee



NOTES:

ALL DIMENSIONS ARE APPROXIMATE.
FIELD VERIFY.

DIMENSIONS FOR BRIDGE MODIFICATIONS
ARE BASED UPON THE 1990 CONSTRUCTIONS
PLANS FOR BRIDGE 27037.



DESIGN DATA

2012 AND CURRENT INTERIMS AASHTO LRFD BRIDGE
DESIGN SPECIFICATIONS

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA
(REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD

MATERIAL DESIGN PROPERTIES:
REINFORCED CONCRETE:
f'c = 4000 PSI n = 8
fy = 60000 PSI REINFORCEMENT

PRESTRESSED CONCRETE:
f'c = 6000 PSI n = 8
fpu = 270 KSI LOW RELAXATION STRANDS
0.75 x fpu FOR INITIAL PRESTRESS

DESIGN SPEED: OVER = 35 MPH
UNDER = N.A.

DECK AREA 21360 SQ. FT.

HL93 LRFR INVENTORY RATING RF 1.1
HL93 LRFR OPERATING RATING RF 1.5

LIST OF SHEETS

NO.	
269	EXISTING GENERAL PLAN & SECTIONS
270	REMOVAL DETAILS
271	PROPOSED GENERAL PLAN & SECTIONS

PRELIMINARY PLAN BRIDGE NO. 27037

CSAH 5 (WEST LAKE STREET) OVER CP RR, SOUTHWEST
LRT, AND CEDAR LAKE TRAIL. LOCATED 1.2 MILES EAST
OF JCT. OF CSAH 5 (WEST LAKE STREET) AND TH 100

BRIDGE I.D. NO. 501/209 GENERAL PLAN

SEC 32/5 T 29N/28N R 24W
CITY OF MINNEAPOLIS HENNEPIN COUNTY

APPROVED: _____ STATE BRIDGE ENGINEER DATE _____

DES. KAE DR. PHH
CHK. CPE CHK. JDP
JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



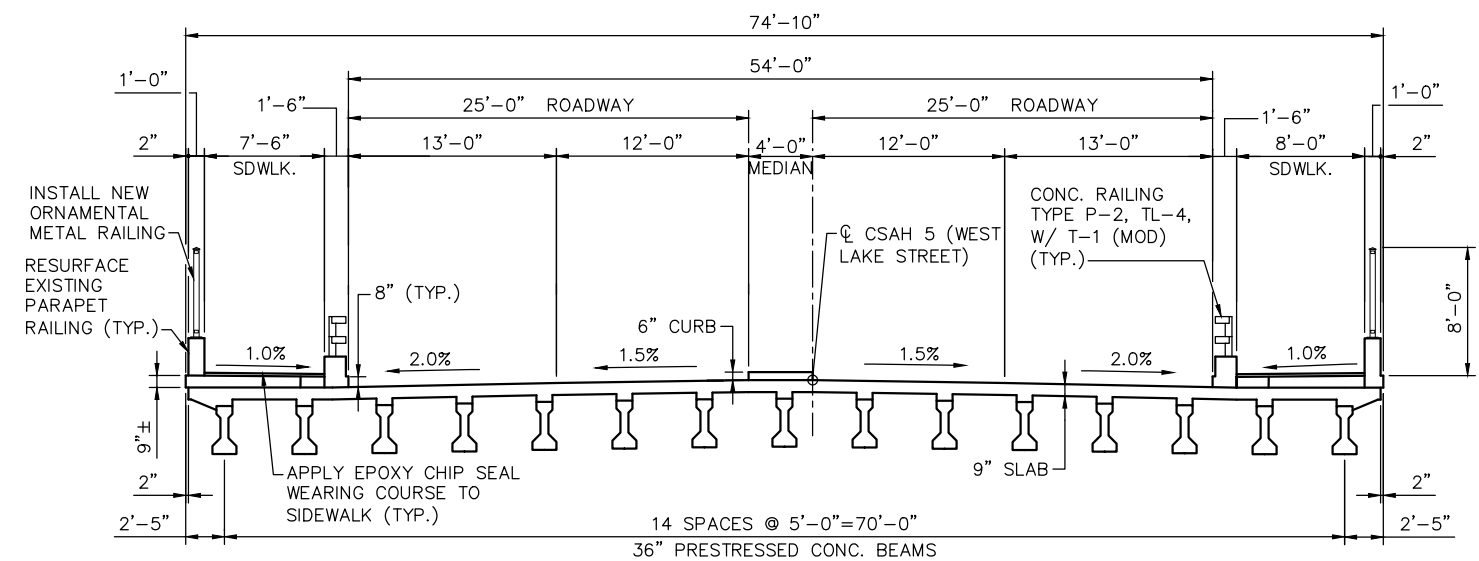
EAST - VOLUME 2 (STRUCTURES)
CSAH 5 (WEST LAKE STREET) (BRIDGE 27037)
BRIDGE MODIFICATIONS
EXISTING GENERAL PLAN & SECTIONS

DISCIPLINE: STRUCTURES

SHEET NAME: EX3-STU-BRG-WLKS-GPE-001

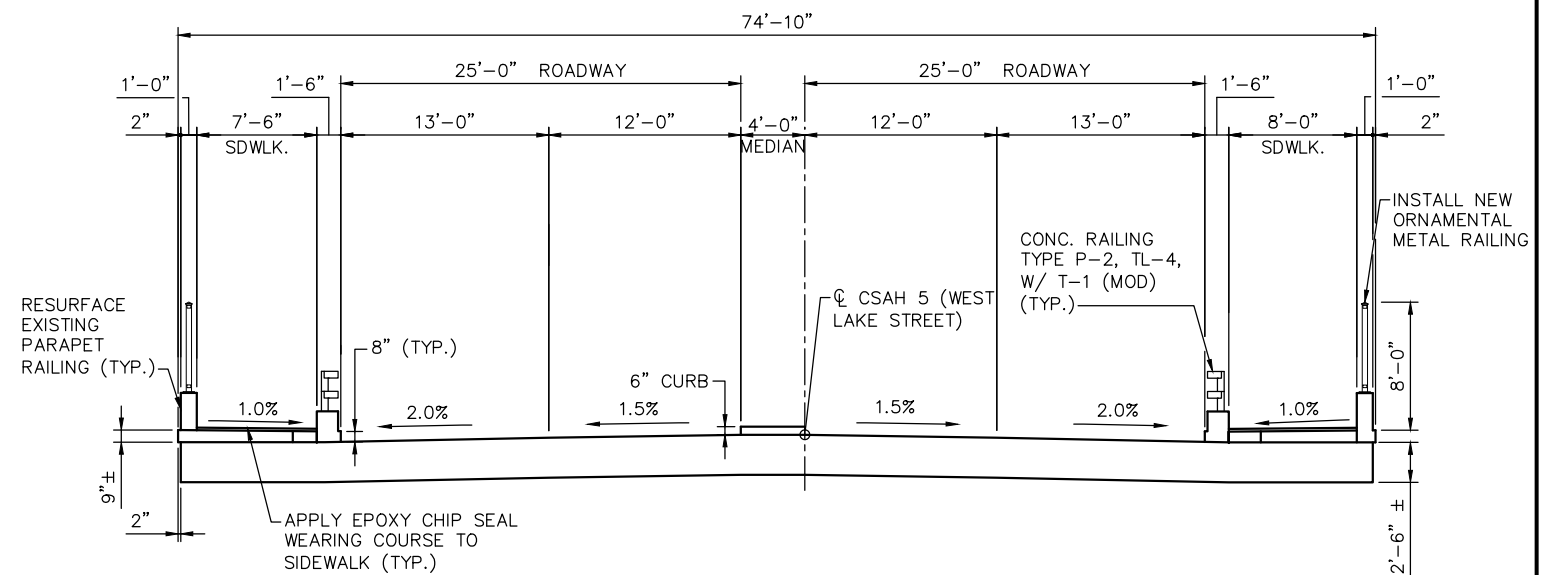
SHEET
269
OF
274





0 3' 6' 12'

SCALE IN FEET

[illegible][illegible]

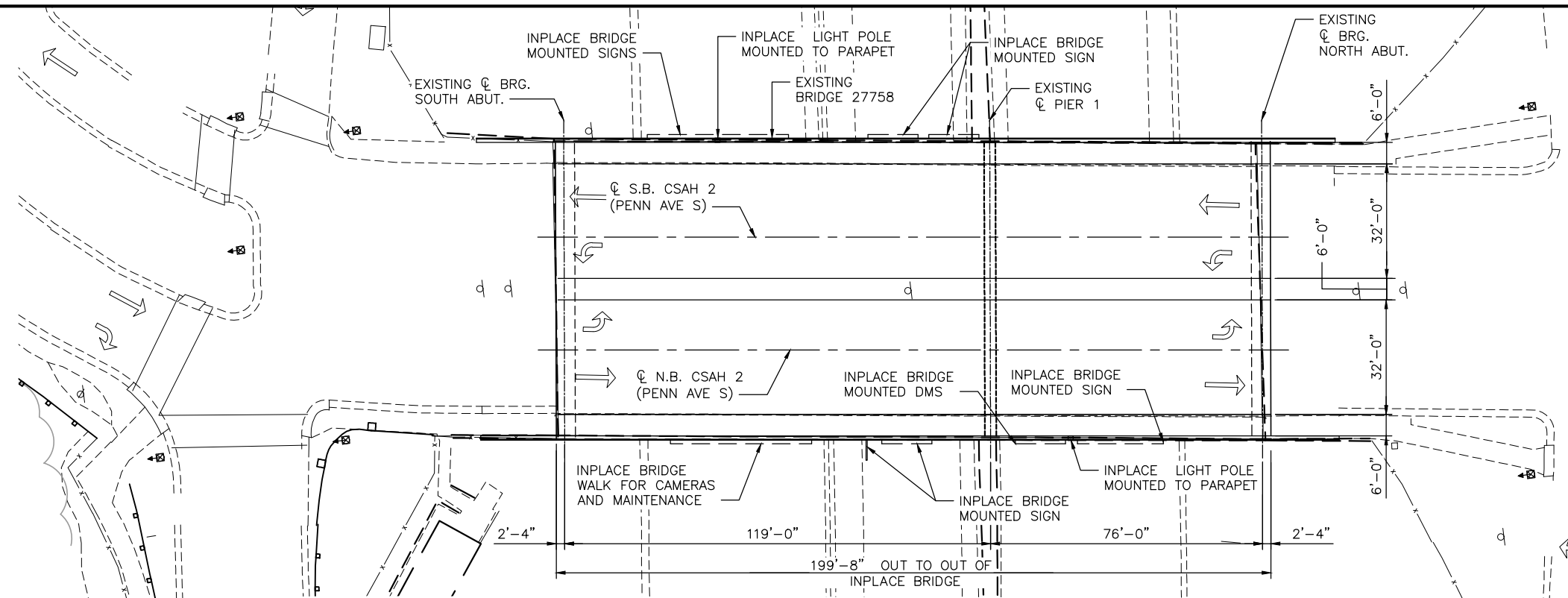
METROPOLITAN
COLLEGE

DISCIPLINE: **STRUCTURES**

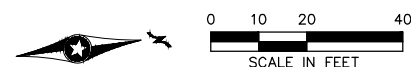
SHEET NAME:	EX3-STU-BRG-WLKS-MODS-003
-------------	---------------------------

SHEET
271
OF
274

Aug. 26 2014 01:28 pm v:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\EX4-STU-BRG-PEN-GPE-001.dwg By: ronaldi.dee



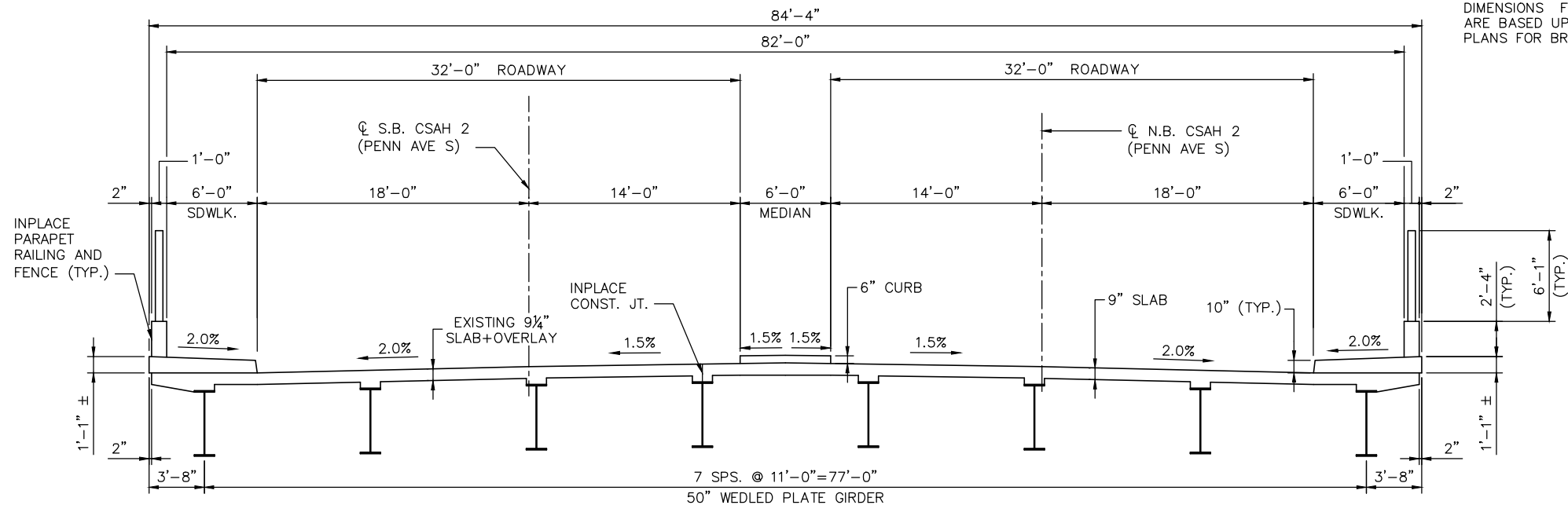
GENERAL PLAN - EXISTING CONDITION



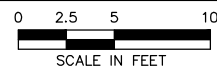
NOTES:

ALL DIMENSIONS ARE APPROXIMATE.
FIELD VERIFY.

DIMENSIONS FOR BRIDGE MODIFICATIONS
ARE BASED UPON THE 1986 CONSTRUCTIONS
PLANS FOR BRIDGE 27758.



TRANSVERSE SECTION - EXISTING CONDITION



DESIGN DATA

2012 AND CURRENT INTERIM AASHTO LRFD BRIDGE
DESIGN SPECIFICATIONS

SOUTHWEST LIGHT RAIL TRANSIT DESIGN CRITERIA
(REVISION 2.0)

LOAD AND RESISTANCE FACTOR DESIGN METHOD

MATERIAL DESIGN PROPERTIES:

REINFORCED CONCRETE:

$f'_c = 4000$ PSI $n = 8$

$f_y = 60000$ PSI REINFORCEMENT

STRUCTURAL STEEL

$f_y = 50,000$ PSI

DESIGN SPEED: OVER = 30 MPH
UNDER = 60 MPH

DECK AREA 16837 SQ. FT.

HL93 LRFR INVENTORY RATING RF 0.9

HL93 LRFR OPERATING RATING RF 1.1

LIST OF SHEETS

NO.	
272	EXISTING GENERAL PLAN & SECTION
273	REMOVAL DETAILS
274	PROPOSED GENERAL PLAN & SECTION

PRELIMINARY PLAN
BRIDGE NO. 27758

CSAH 2 (PENN AVE S) OVER T.H. 394 LOCATED 1.6
MILES EAST OF JCT. OF TH 100 AND TH 394

BRIDGE I.D. NO. 301
GENERAL PLAN

SEC 29 T 118N R 24W
CITY OF MINNEAPOLIS HENNEPIN COUNTY

APPROVED: _____ DATE _____
STATE BRIDGE ENGINEER

DES. KAE DR. PHH
CHK. CPE CHK. JDP
JOB NO. T9N635

STATE PROJECT NO. 9909-01

MNDOT REVIEW:

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



SOUTHWEST
Green Line LRT Extension



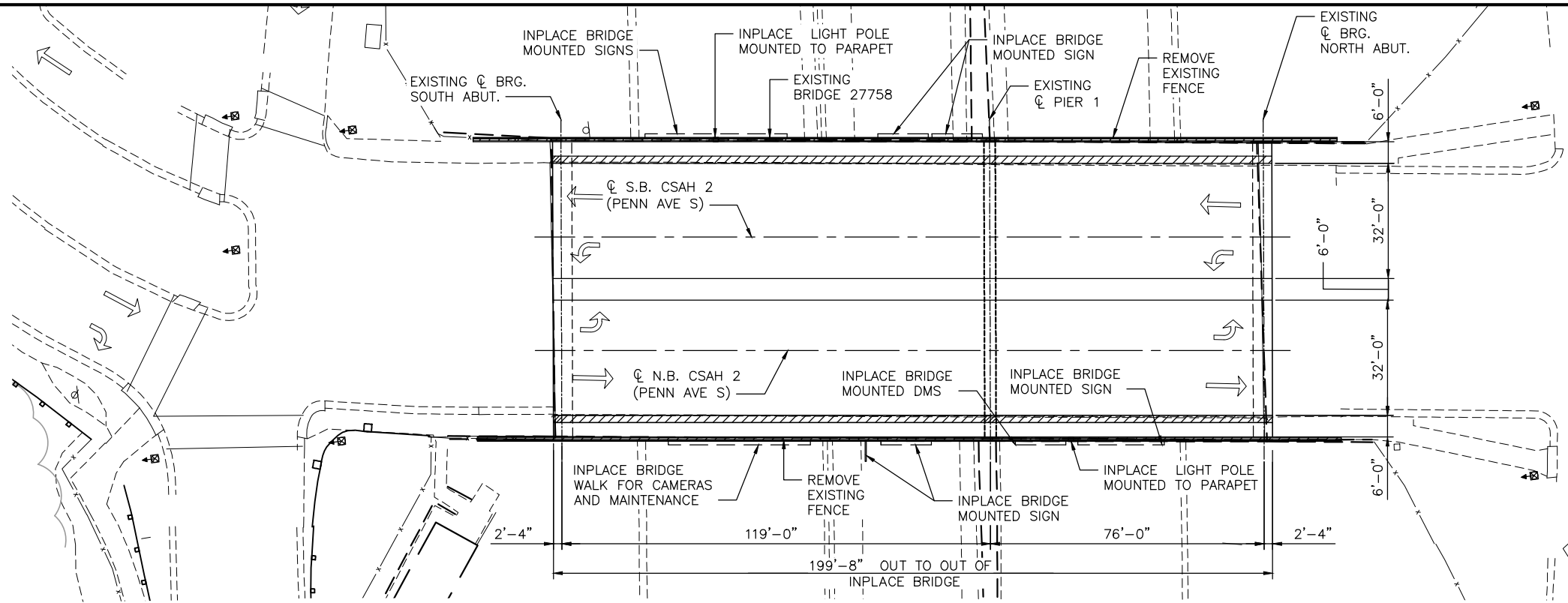
EAST-VOLUME 2 (STRUCTURES)
CSAH 2 (PENN AVE S) (BRIDGE 27758)
BRIDGE MODIFICATIONS
EXISTING GENERAL PLAN & SECTIONS

DISCIPLINE: STRUCTURES

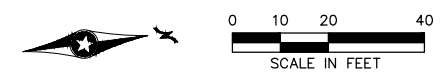
SHEET NAME: EX4-STU-BRG-PEN-GPE-001

SHEET
272
OF
274

Aug. 26 2014 01:29 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\EX4-STU-BRG-PEN-REMOVE-002.dwg By: ronald.dee

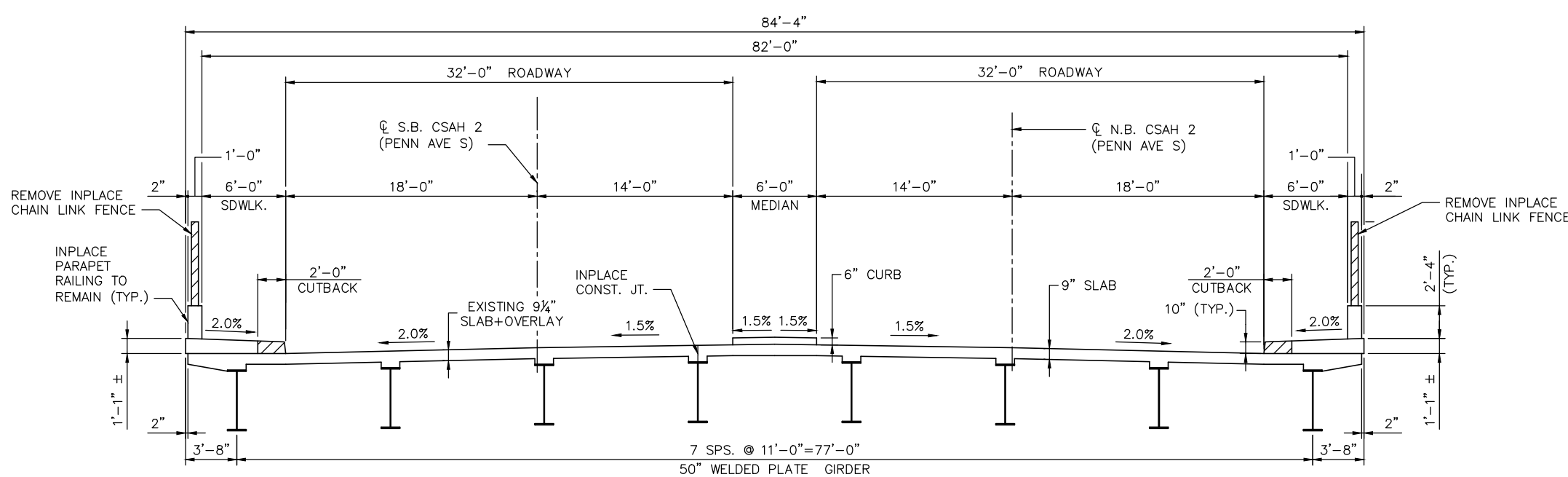


GENERAL PLAN - REMOVALS

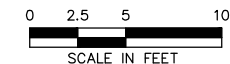


NOTES:

DENOTES REMOVAL OF FENCE AND RAISED SIDEWALK.



TRANSVERSE SECTION - REMOVALS



DES. KAE	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING

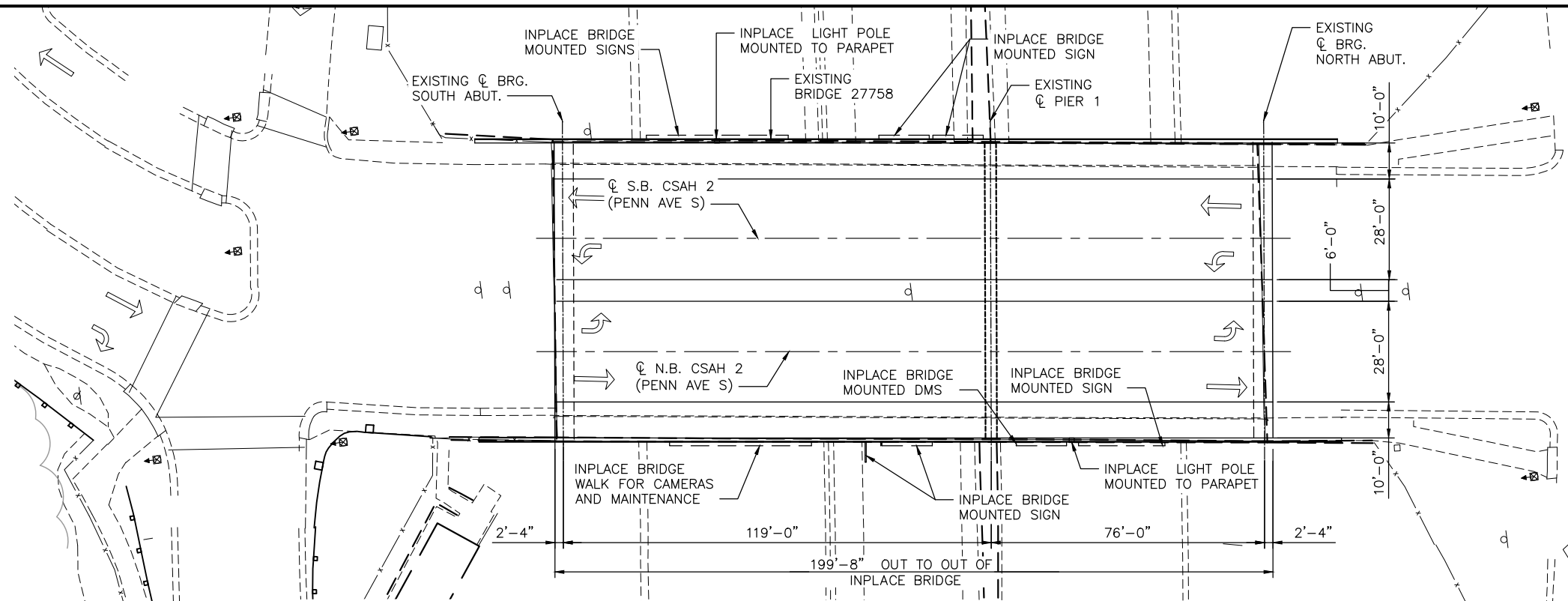


EAST VOLUME 2 (STRUCTURES)
CSAH 2 (PENN AVE S) (BRIDGE 27758)
BRIDGE MODIFICATIONS
REMOVAL DETAILS

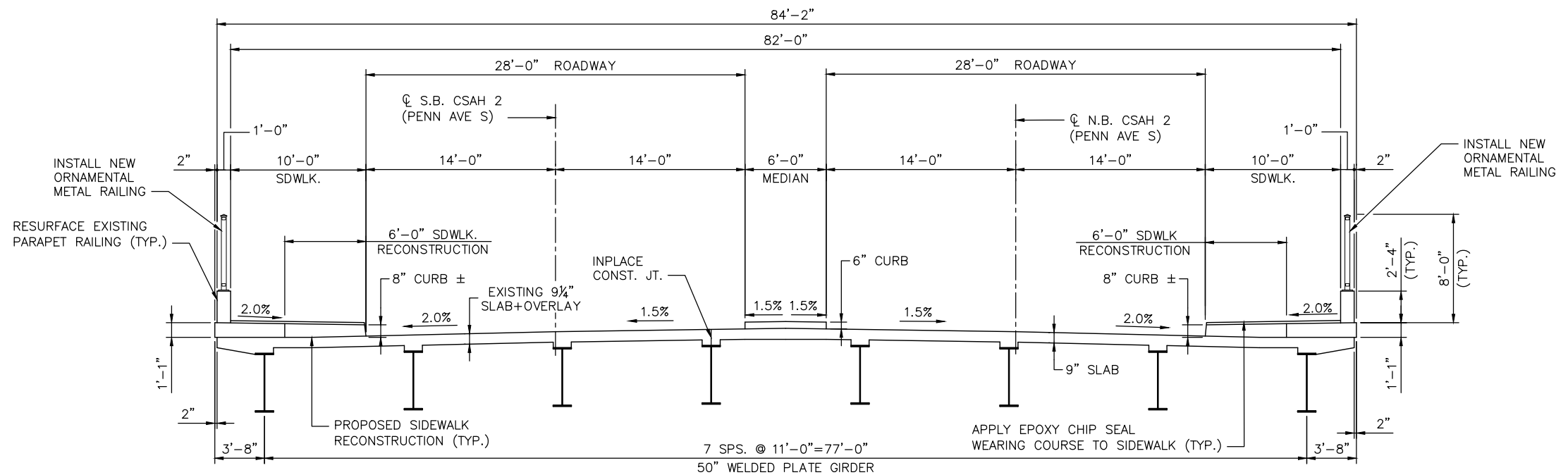
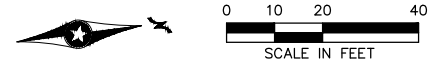
DISCIPLINE: STRUCTURES
SHEET NAME: EX4-STU-BRG-PEN-REMOVE-002

SHEET
273
OF
274

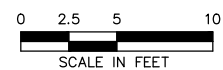
Aug. 26 2014 03:22 pm V:\3300_PEC-E\CAD\SEGMENT E4\PLAN SHEETS\STRUCTURES\EX4-STU-BRG-PEN-MOD-003.dwg By: phil.horton



GENERAL PLAN - PROPOSED



TRANSVERSE SECTION - PROPOSED



DES. KAE	DR. PHH
CHK. CPE	CHK. JDP

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

Kimley»Horn

PRELIMINARY ENGINEERING



EAST - VOLUME 2 (STRUCTURES)
CSAH 2 (PENN AVE S) (BRIDGE 27758)
BRIDGE MODIFICATIONS
PROPOSED GENERAL PLAN & SECTION

DISCIPLINE: STRUCTURES

SHEET NAME: EX4-STU-BRG-PEN-MOD-003

SHEET
274
OF
274