

LIST OF DRAWINGS:

- 800 GENERAL ARRANGEMENT
- 801 BOREHOLE LOCATION AND SOIL STRATA
- 802 CONSTRUCTION STAGING
- 803 FOUNDATION LAYOUT AND DETAILS
- 804 REMOVALS
- 805 ABUTMENTS
- 806 WINGWALLS
- 807 RETAINED SOIL SYSTEM WALLS
- 808 JACKING DETAILS
- 809 BARRIER WALL WITHOUT RAILING
- 810 6000mm APPROACH SLAB
- 811 STANDARD DETAILS
- 812 ELECTRICAL EMBEDDED WORK

GENERAL NOTES:

1. DESIGN STANDARDS AND CODES:
 - SCHEDULE 15-1 AND SCHEDULE 15-2: PROJECT AGREEMENT
 - DESIGN CODE: CAN/CSA-S6-14
 - MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL MANUAL
 - ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS)
2. LIVE LOAD: CL-625-ONT.
3. CLASS OF CONCRETE

MASS CONCRETE	20 MPa
REMAINDER	30 MPa
4. CLEAR COVER TO REINFORCING STEEL

FOOTINGS	100±25
DECK	
TOP	70±20
BOTTOM	40±10
REMAINDER UNLESS OTHERWISE NOTED	70±20
5. REINFORCING STEEL
 REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
 BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
 STAINLESS REINFORCING STEEL SHALL BE TYPE 316 LN OR DUPLEX 2205 AND HAVE
 - A MINIMUM YIELD STRENGTH OF 500 MPa, UNLESS OTHERWISE SPECIFIED. UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS B.
 - BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWINGS SS12-1 UNLESS INDICATED OTHERWISE.
6. GLASS FIBRE REINFORCED POLYMER (GFRP)

GLASS FIBRE REINFORCED POLYMER (GFRP) REINFORCING BARS SHALL BE GRADE I, GRADE II OR GRADE III AS SPECIFIED IN THE CONTRACT DOCUMENTS.

THE NOMINAL DIAMETER, TENSILE MODULUS OF ELASTICITY AND GUARANTEED MINIMUM TENSILE STRENGTH SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.

BAR MARKS WITH THE PREFIX GI DENOTE GRADE I GFRP BARS, BAR MARKS WITH THE PREFIX GII DENOTE GRADE II GFRP BARS AND BAR MARKS WITH THE PREFIX GIII DENOTE GRADE III GFRP BARS.
7. ROADWAY CLASSIFICATION: RAMP 80
8. PROTECTION SYSTEM SHALL CONFORM TO PERFORMANCE LEVEL 2.
9. ALL DIMENSIONS ARE IN MILLIMETERS ALL ELEVATIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, DETAILS AND ELEVATIONS OF EXIST STRUCTURE THAT ARE RELEVANT TO THE WORK SHOWN ON THE DRAWINGS PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE CONTRACT ADMINISTRATOR AND THE PROPOSED ADJUSTMENT OF THE WORK REQUIRED TO MATCH THE EXIST STRUCTURE SHALL BE SUBMITTED FOR APPROVAL.
2. THE CONTRACTOR SHALL ESTABLISH THE BEARING SEAT ELEVATIONS BY DEDUCTING THE ACTUAL BEARING THICKNESSES FROM THE TOP OF BEARING ELEVATIONS. IF THE ACTUAL BEARING THICKNESSES ARE DIFFERENT FROM THOSE GIVEN WITH THE BEARING DESIGN DATA, THE CONTRACTOR SHALL ADJUST THE REINFORCING STEEL TO SUIT.

RETAINED SOIL SYSTEM:

RETAINED SOIL SYSTEM WALLS SHALL HAVE THE FOLLOWING ATTRIBUTES:

APPLICATION: WALL/SLOPE
 PERFORMANCE: HIGH
 APPEARANCE: HIGH

APPLICABLE STANDARD DRAWINGS:

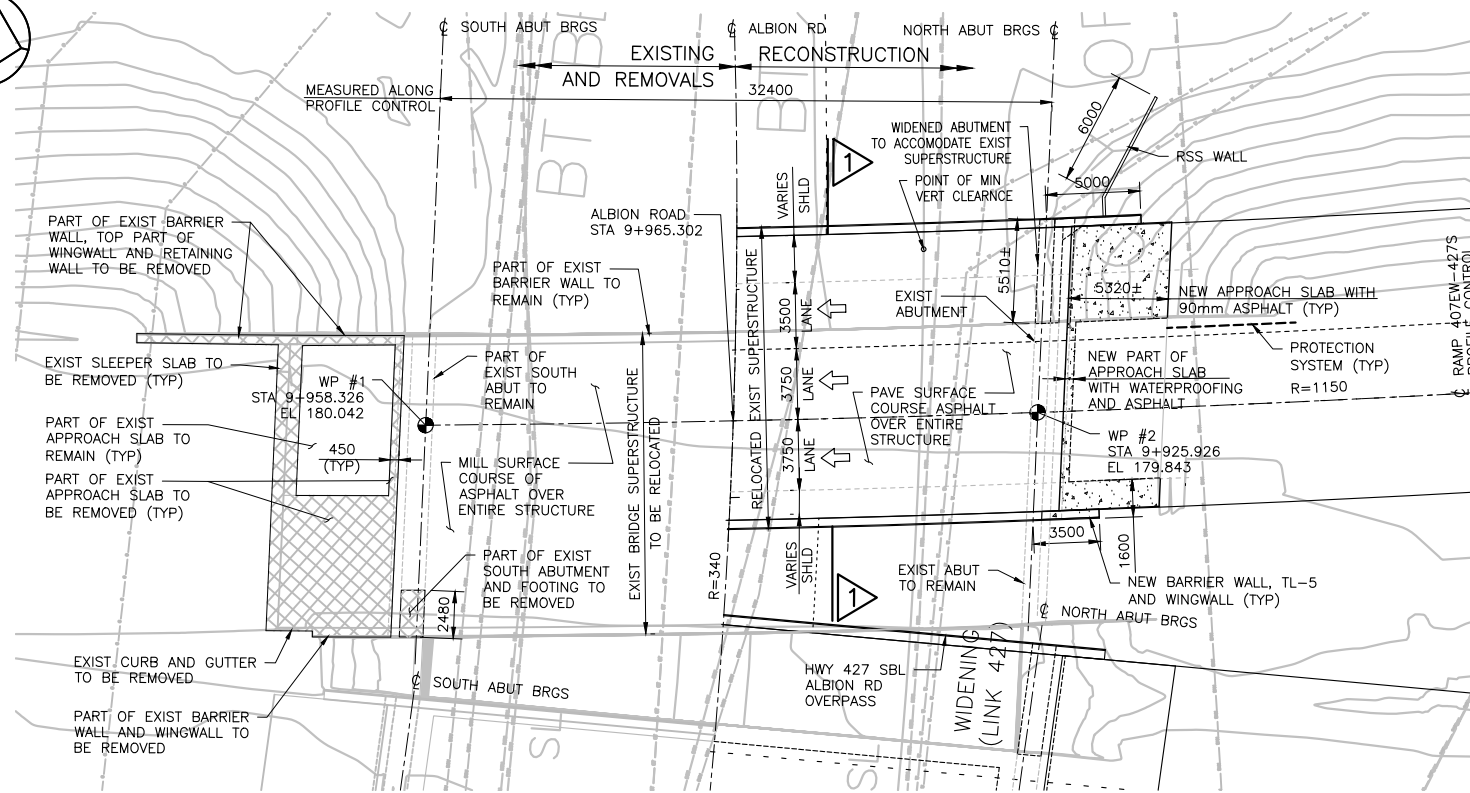
- OPSD 3101.150 WALLS - ABUTMENT, BACKFILL MINIMUM GRANULAR REQUIREMENTS
- OPSD 3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
- OPSD 3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS
- OPSD 3941.200 FIGURES IN CONCRETE - SITE NUMBER AND DATE LAYOUT

LIST OF ABBREVIATIONS:

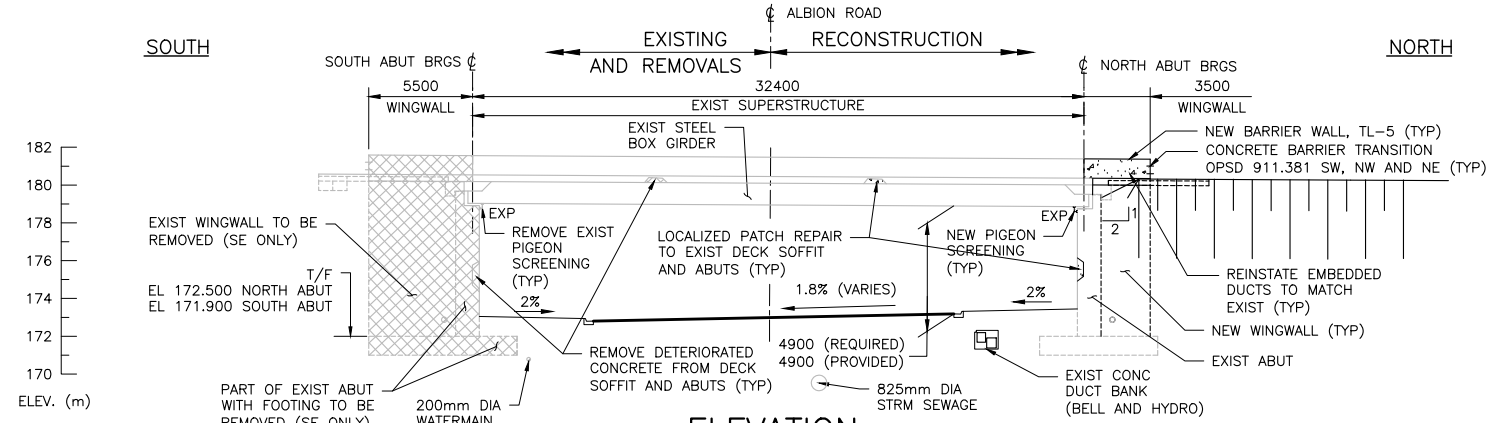
- PVI POINT OF VERTICAL INTERSECTION
- T/F TOP OF FOOTING
- WP WORKING POINT

LEGEND:

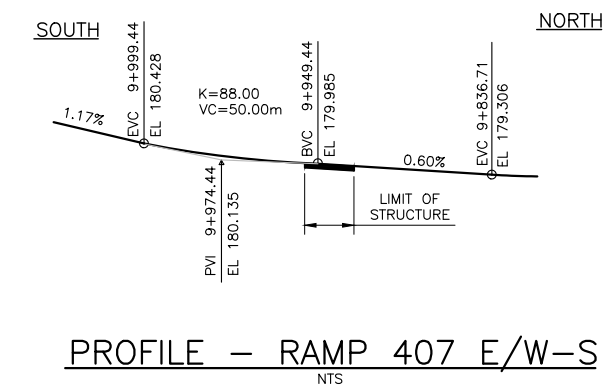
- REMOVALS
- NEW CONCRETE
- NEW ASPHALT



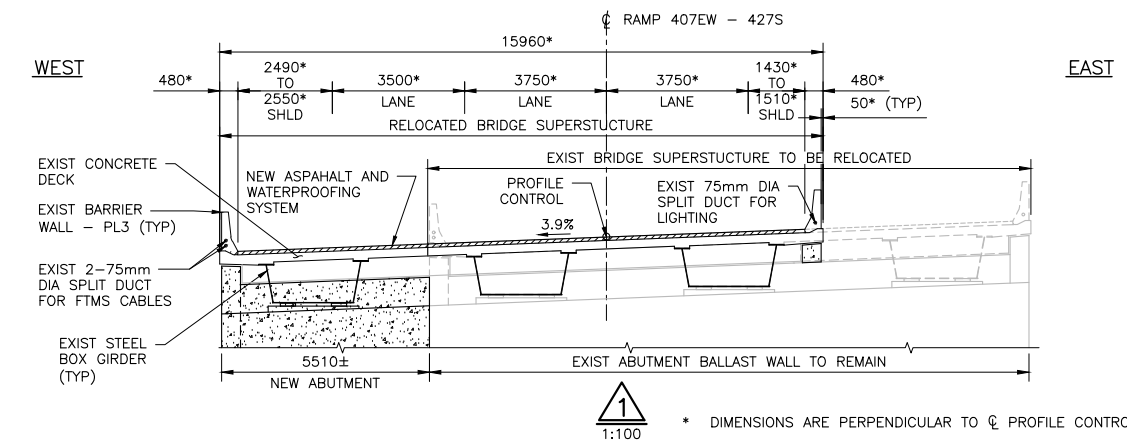
PLAN
1:200



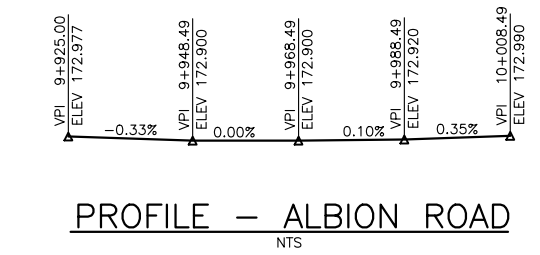
ELEVATION
1:200



PROFILE - RAMP 407 E/W-S
NTS



ELEVATION
1:100



PROFILE - ALBION ROAD
NTS

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 MODIFIED: 3/20/2018 10:17:57 AM BY: PANG
 DATE PLOTTED: 3/20/2018 10:19:13 AM BY: PANG, FEI

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

SCALE : AS NOTED

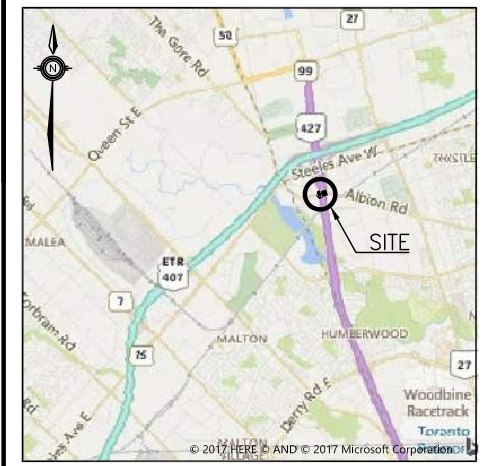
DESIGNED	NMA MAHMOUDI
DRAWN	FEI PANG
CHECKED	SUBOOHI OBAID
APPROVED LEAD ENG.	TATIYANA GJALA
APPROVED PROJ. MANAGER	



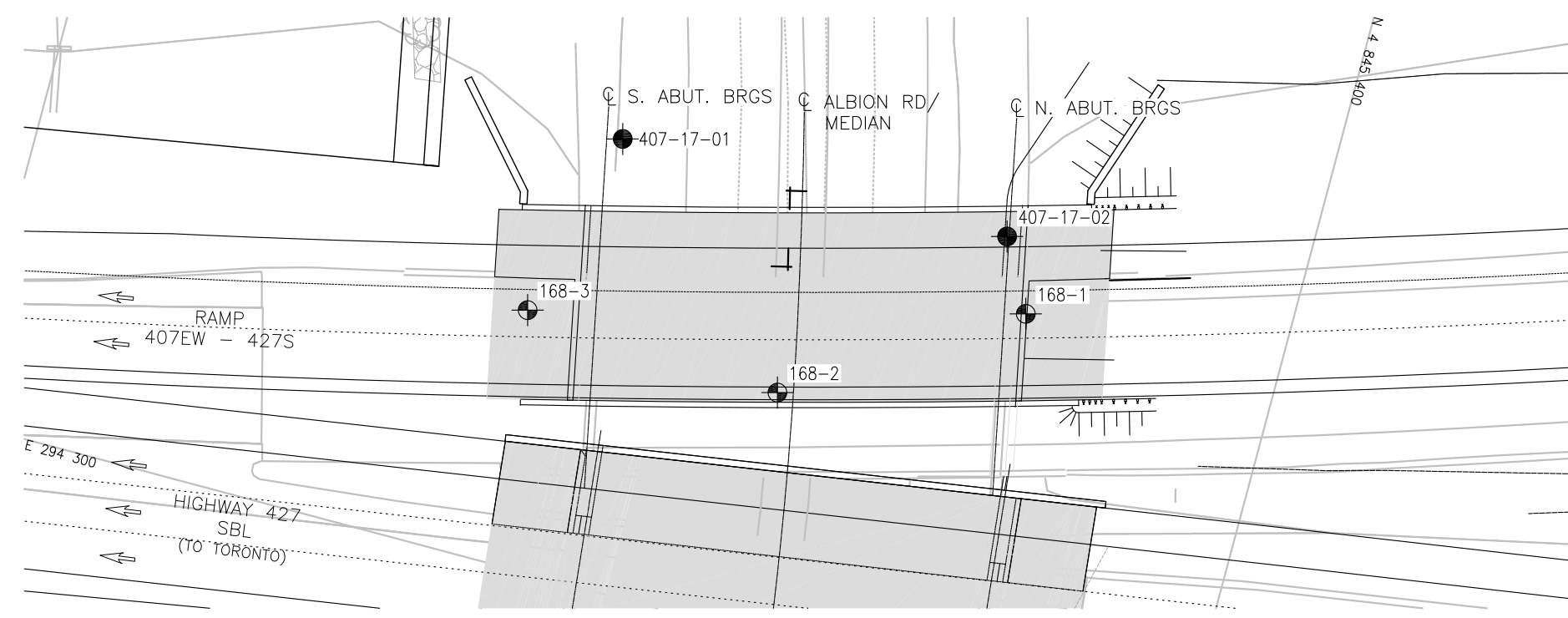
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PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9	STR	B06	DWG	800	B



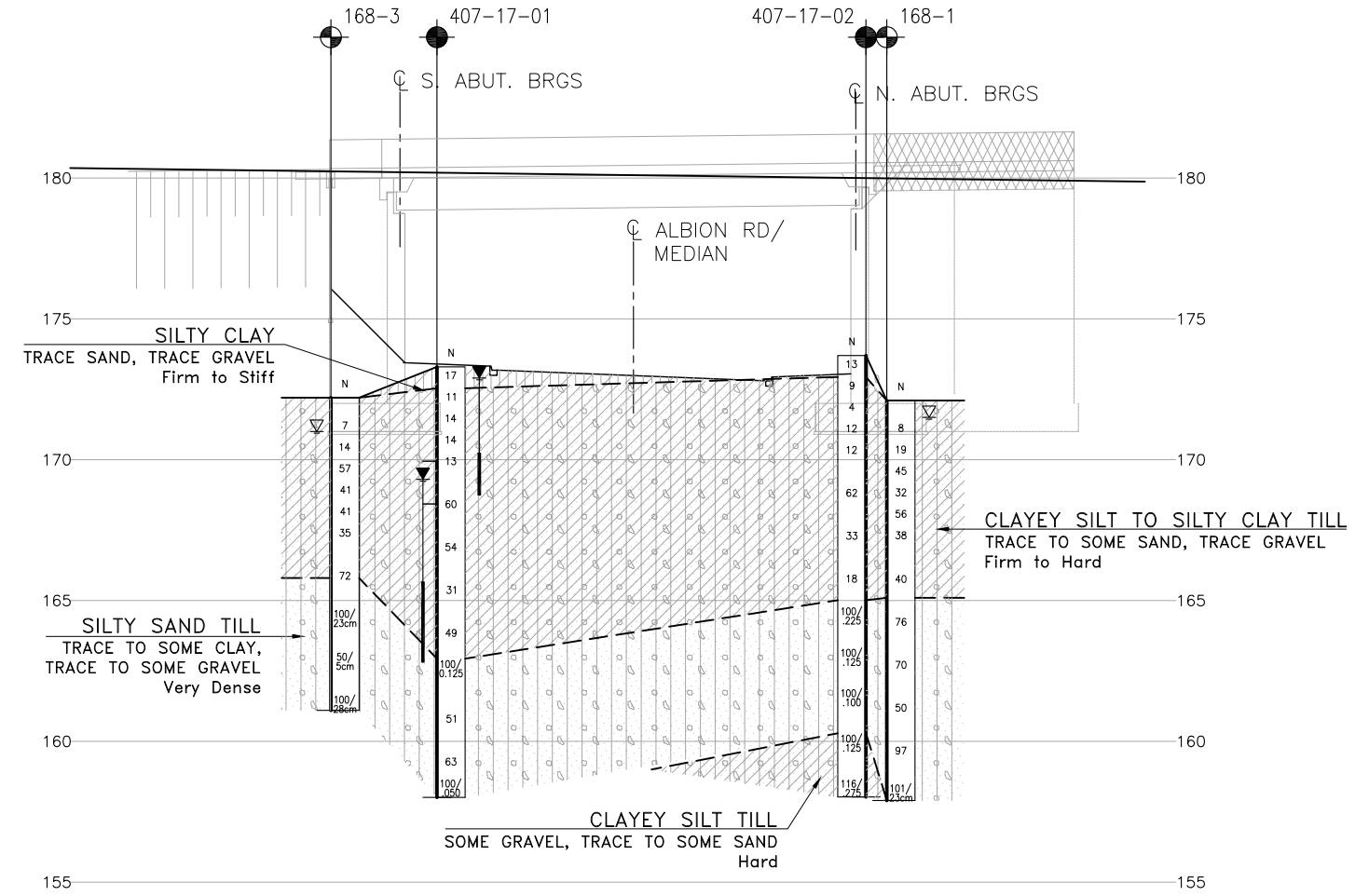
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



KEYPLAN



PLAN



PROFILE ALONG \varnothing RAMP 407EW-427S

LEGEND

	Borehole (By Thurber)
	Borehole (By Others)
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
168-1	172.1	4 845 379.4	294 269.9
168-2	172.1	4 845 362.0	294 281.0
168-3	172.2	4 845 341.2	294 279.8
407-17-01	173.3	4 845 345.0	294 264.8
407-17-02	173.7	4 845 376.4	294 264.4

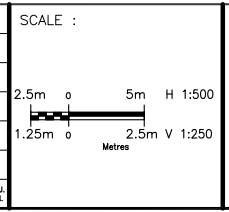
-NOTES-

- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No.

FILENAME: H:\Drafting\19000\19484\TED19484-PLR-HWY 427 Ramp 407EW-427S.dwg
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NO.	DATE	REVISIONS	BY	CHK	LEAD. ENG.	PROJ. MGR.
B	18/03/16	90% SUBMISSION TO CA	AN	KS	JL	JL
A	18/01/12	90% SUBMISSION TO CA	AN	KS	JL	JL



DESIGNED	A. PIASIK	AP	18/03/16
DRAWN	A. NOOR	AN	18/03/16
CHECKED	K. SHI	KS	18/03/16
APPROVED LEAD ENGINEER	J. LEE	JL	18/03/16
APPROVED PROJ. MANAGER	J. LEE	JL	18/03/16
NAME (PRINT)	INIT.	DATE	



TITLE							
HWY 427 EXPANSION HWY 427 RAMP 407EW-427S OVER ALBION ROAD REHABILITATION R - 1 BOREHOLE LOCATIONS AND SOIL STRATA							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9	STR	B06	DWG	801	B

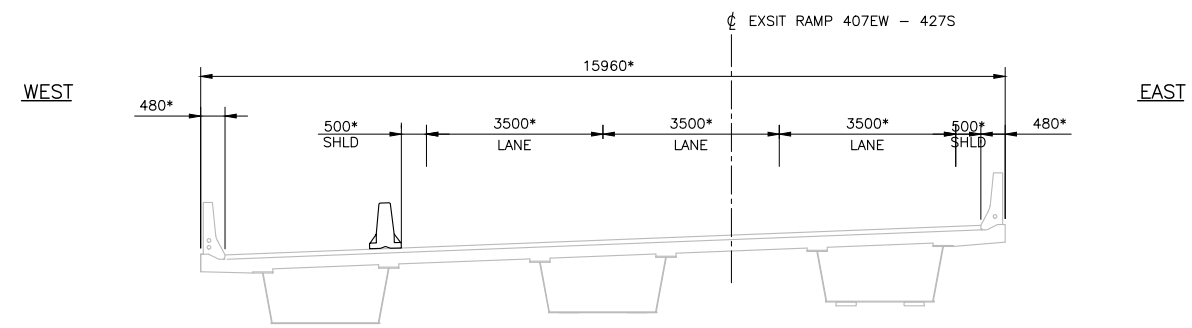
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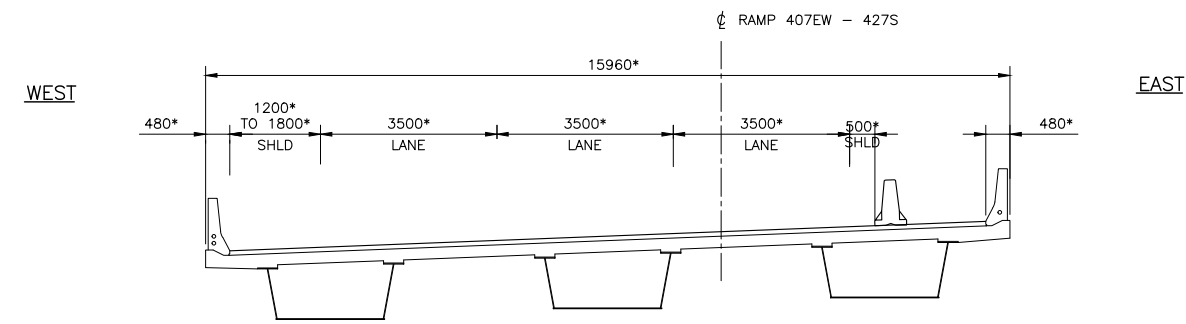
- THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT AND HIGHWAY STAGING DRAWINGS.

SCOPE OF RECONSTRUCTION WORK:

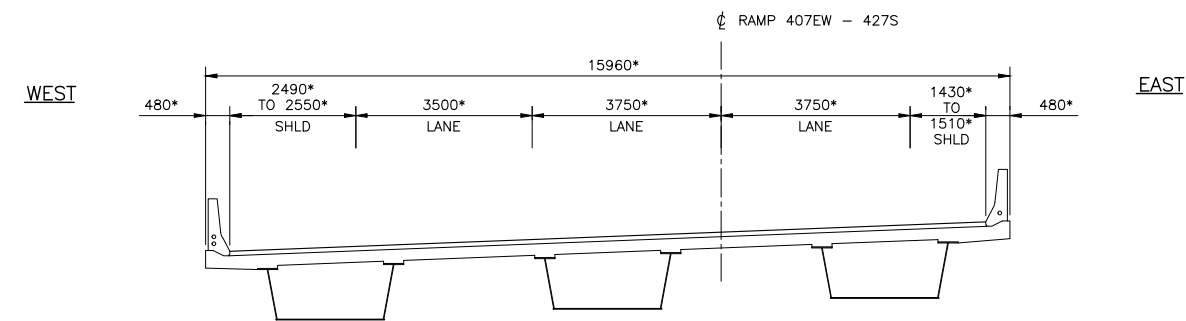
- PATCH REPAIR EXISTING DECK SOFFIT AND ABUTMENTS.
- WIDEN ABUTMENTS TO THE WEST AND CONSTRUCT NEW WEST WINGWALLS.
- CUT AND REMOVE PORTION OF APPROACH SLAB ADJACENT TO DECK END AND SHIFT BRIDGE SUPERSTRUCTURE TO NEW LOCATION.
- INSTALL APPROACH SLAB DOWELS TO CONNECT APPROACH SLAB TO EXISTING SEMI-INTEGRAL DIAPHRAGM.
- CONSTRUCT NEW PARTS OF APPROACH SLABS.
- CONSTRUCT NEW PARTS OF BARRIER WALLS.
- PAVE LOWER COURSE ASPHALT OVER APPROACH SLABS.
- MILL UPPER COURSE ASPHALT OVER ENTIRE DECK AND REPAVE DECK AND APPROACH SLABS.



EXISTING STAGE 1A/1B
1:100



RELOCATED STAGE 1C
1:100



FINAL
1:100

* DIMENSIONS ARE MEASURED PERPENDICULAR TO ϕ PROFILE CONTROL

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

SCALE :

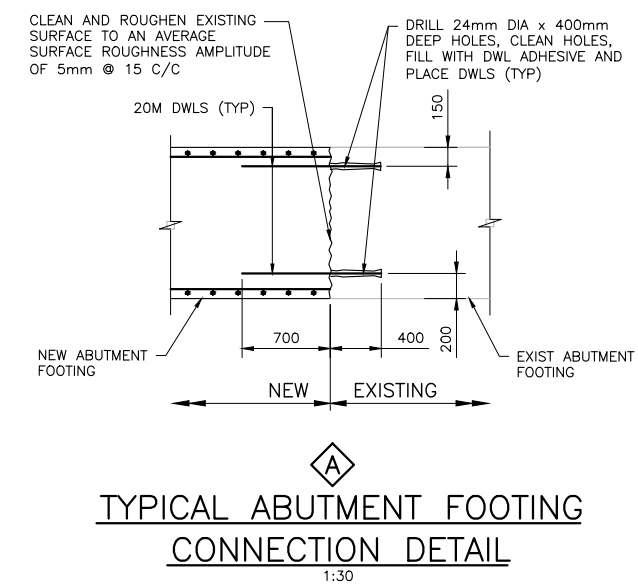
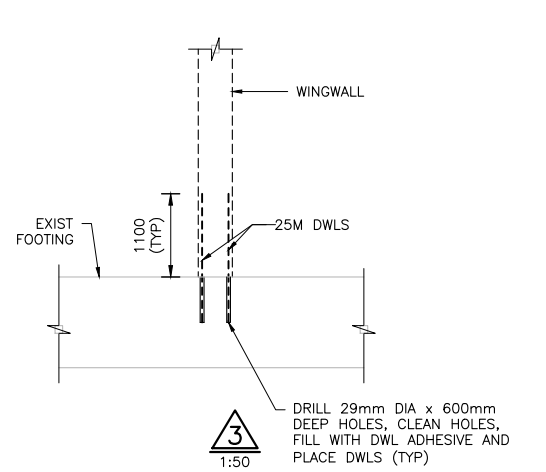
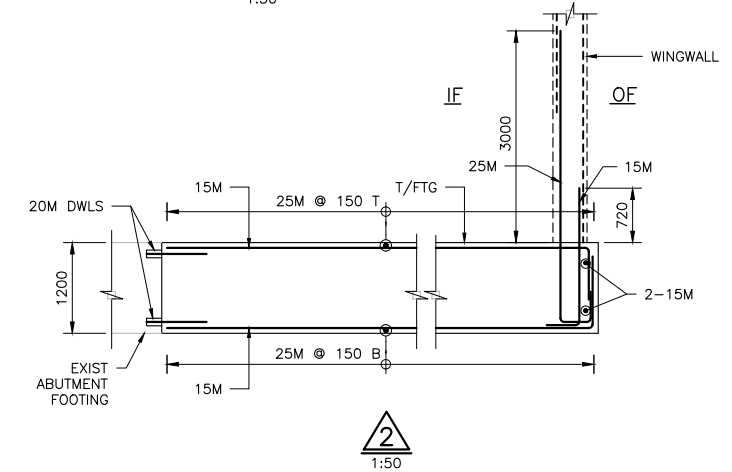
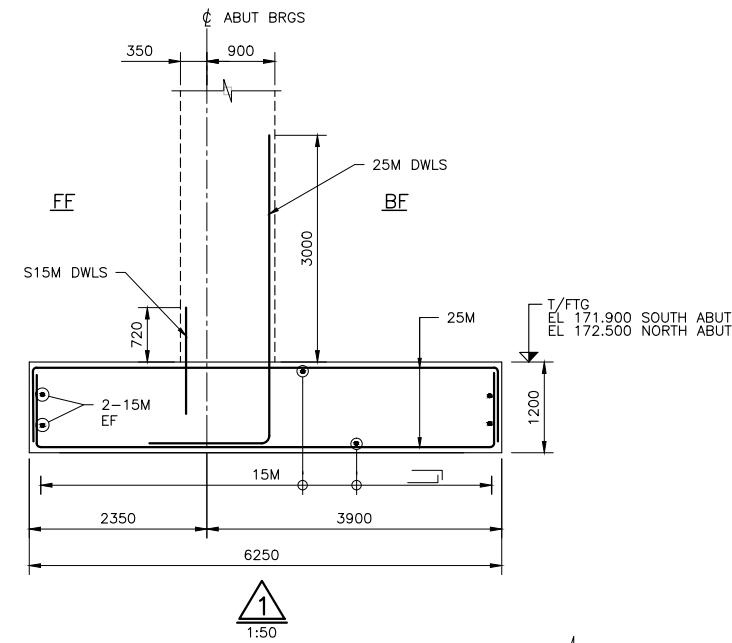
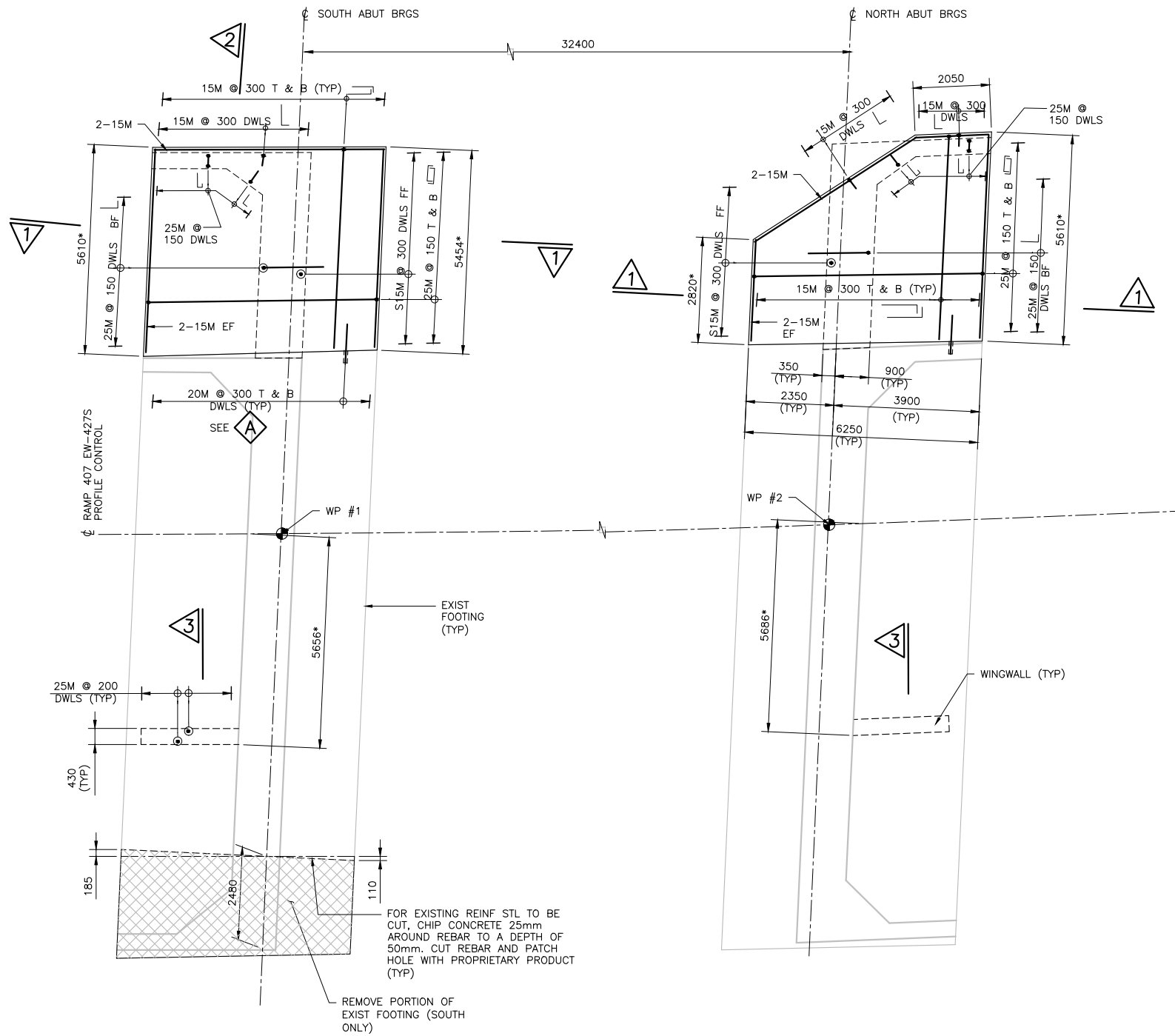
AS NOTED

DESIGNED : NMA MAHMOUDI
 DRAWN : FEI PANG
 CHECKED : SUBOOHI OBAID
 APPROVED LEAD ENG. : TATIANA OJALA
 APPROVED PROJ. MANAGER :
 NAME (PRINT) : _____
 INIT. : _____
 DATE : _____



PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9	STR	B06	DWG	802	B

TITLE
**HWY 427 EXPANSION
 HWY 427 RAMP 407EW-427S
 REHABILITATION R2
 SITE 37-115
 CONSTRUCTION STAGING**



- NOTES:**
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 800, 802 AND 805.
 - SUBGRADE PREPARATION FOR ABUTMENT FOOTING WIDENING SHALL BE AS PER GEO-TECHNICAL RECOMMENDATIONS.
 - 100mm THICK PROTECTIVE COVER OF MASS CONCRETE SHOULD BE PLACED TO PROTECT THE SUBGRADE. PROVIDE ADDITIONAL 200mm THICK MASS CONCRETE (300mm TOTAL) AT NORTH ABUTMENT FOOTING ONLY.

SOIL BEARING CAPACITY FOR ABUTMENT FOOTINGS:

CAPACITY AT SLS: 300 KPa
CAPACITY AT ULS: 450 KPa

LIST OF ABBREVIATIONS:

DWLS DOWELS
WP WORKING POINT

LEGEND:

REMOVALS

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B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

SCALE :
AS NOTED

DESIGNED	NMA MAHMOUDI
DRAWN	FEI PANG
CHECKED	SUBOOHI OBAID
APPROVED LEAD ENG.	TATIYANA OJALA
APPROVED PROJ. MANAGER	

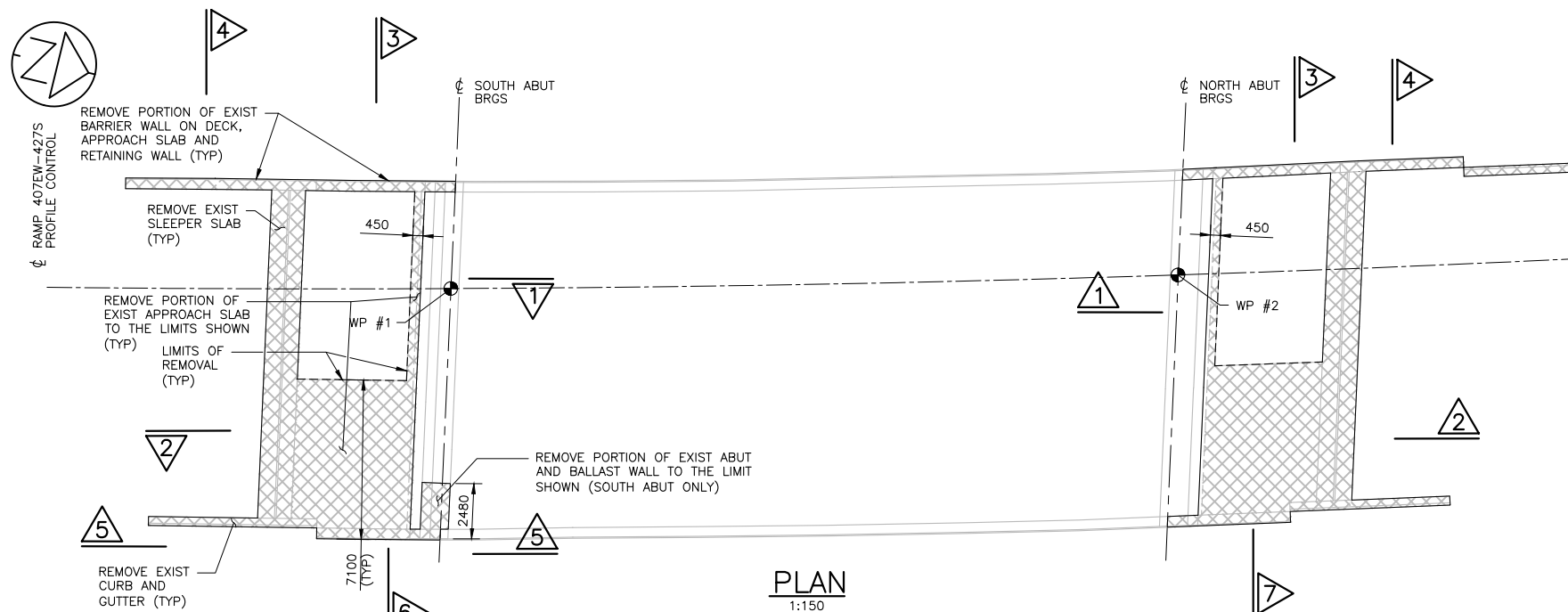
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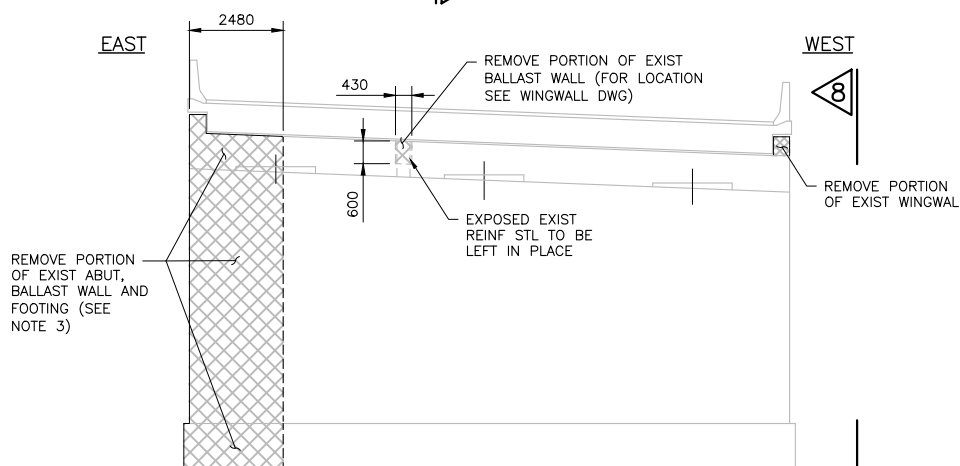
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H427-D	N	9	STR	B06	DWG	803	B



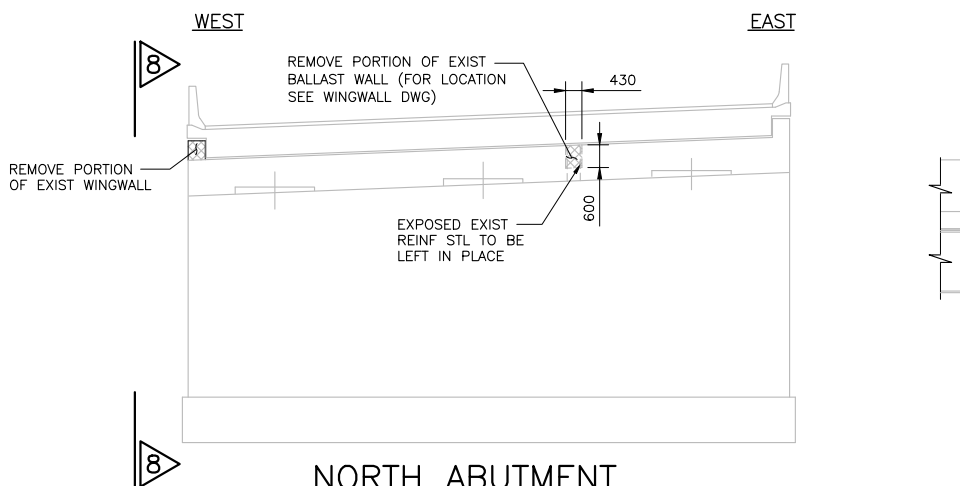
RAMP 407EW-427S
PROFILE CONTROL



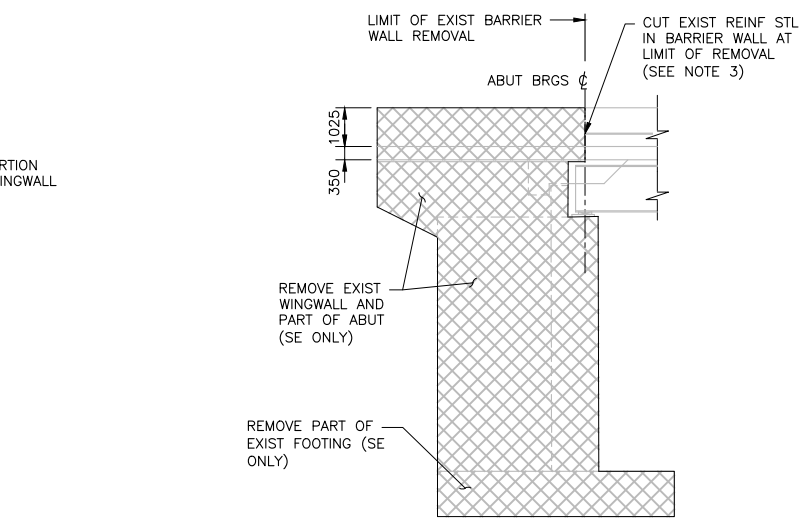
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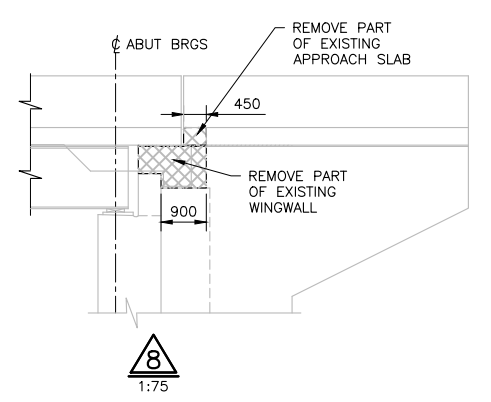
SOUTH ABUTMENT
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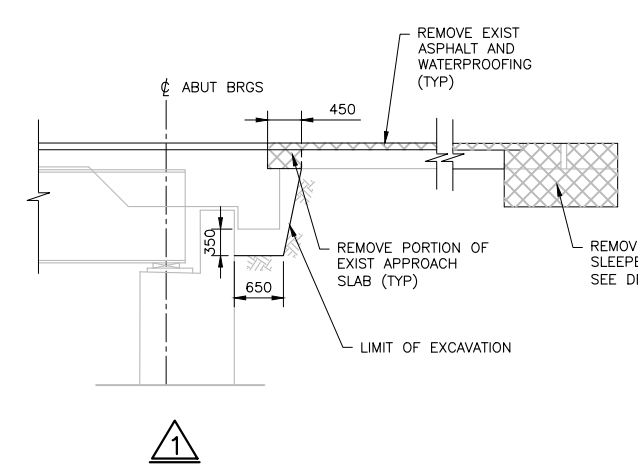
NORTH ABUTMENT
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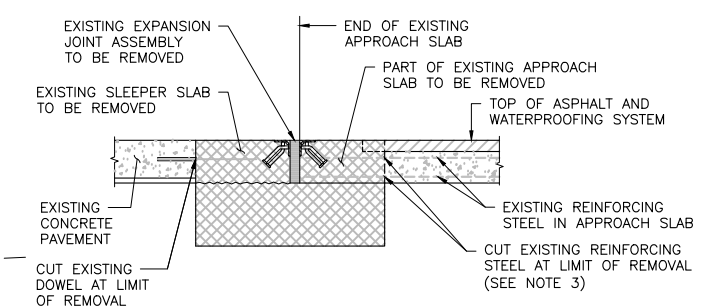
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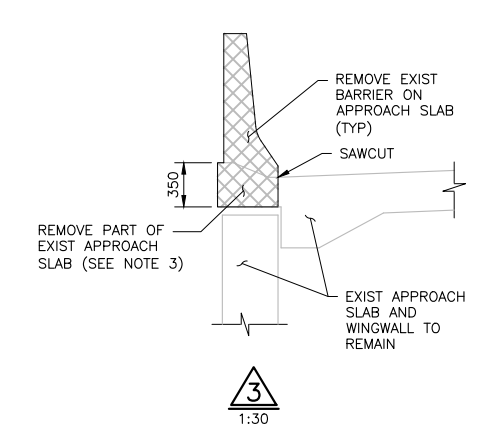
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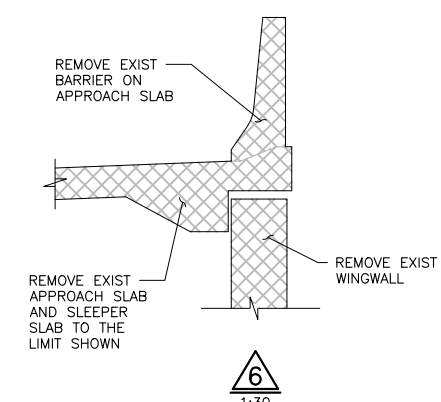
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SLEEPER SLAB REMOVALS
1:30



3
1:30

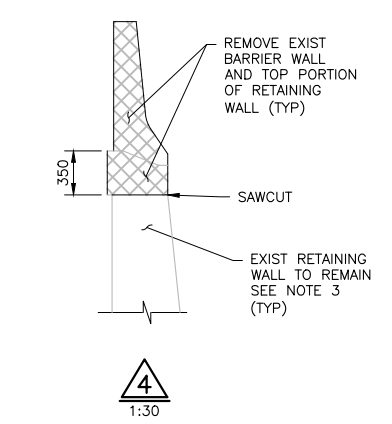


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1:30

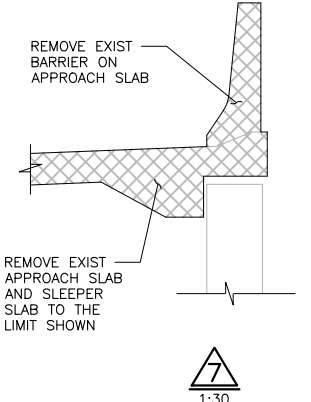
- NOTES:**
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 800 AND 802.
 - EXISTING REINFORCING STEEL TO REMAIN SHALL BE ABRASIVE BLAST CLEANED.
 - FOR REINFORCING STEEL THAT IS CUT AND WILL NOT BE EMBEDDED IN CONCRETE THE FOLLOWING APPLIES:
 - CHIP CONCRETE 25mm AROUND REBAR TO A DEPTH OF 50mm.
 - CUT REBAR AND PATCH HOLE WITH PROPRIETARY PRODUCT.
 - SAWCUTS IN CONCRETE, WHERE DESIGNATED, SHALL BE 25mm DEEP OR TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS.

LEGEND:

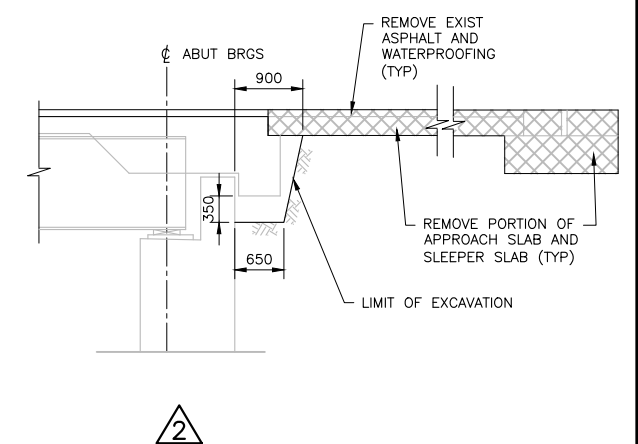
REMOVALS



4
1:30



7
1:30



2
1:50

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DATE PLOTTED: 3/20/2018 10:19:22 AM BY:

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

SCALE :

AS NOTED

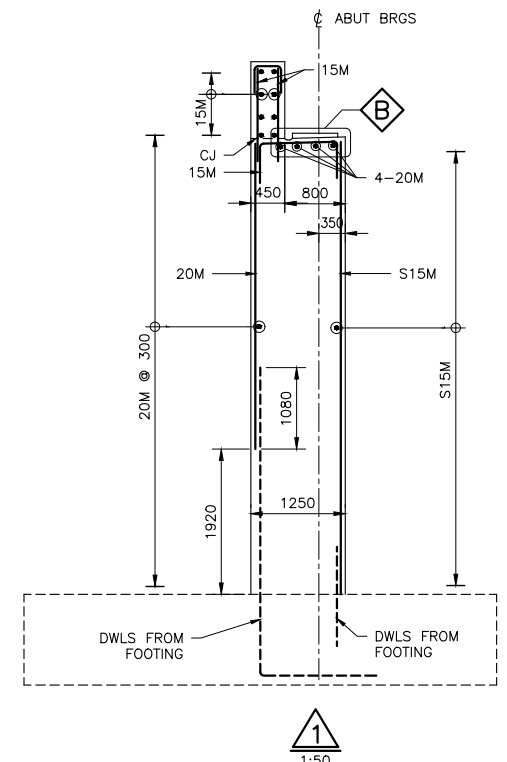
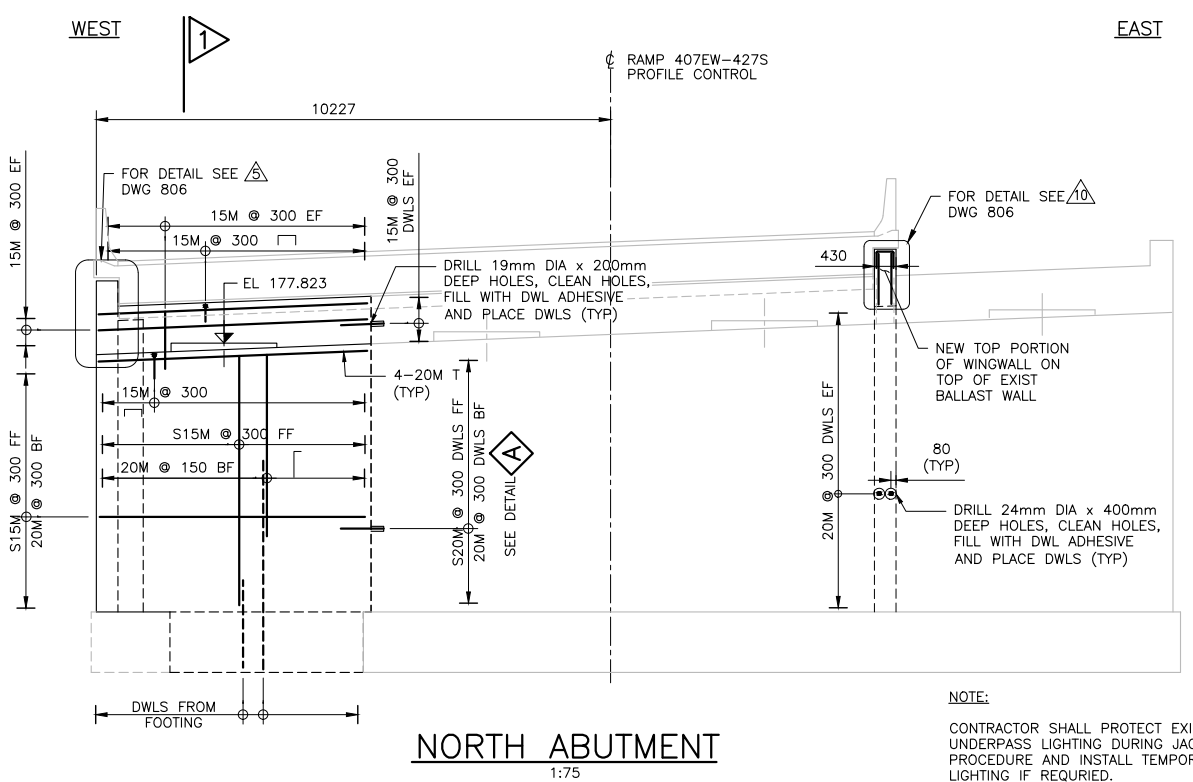
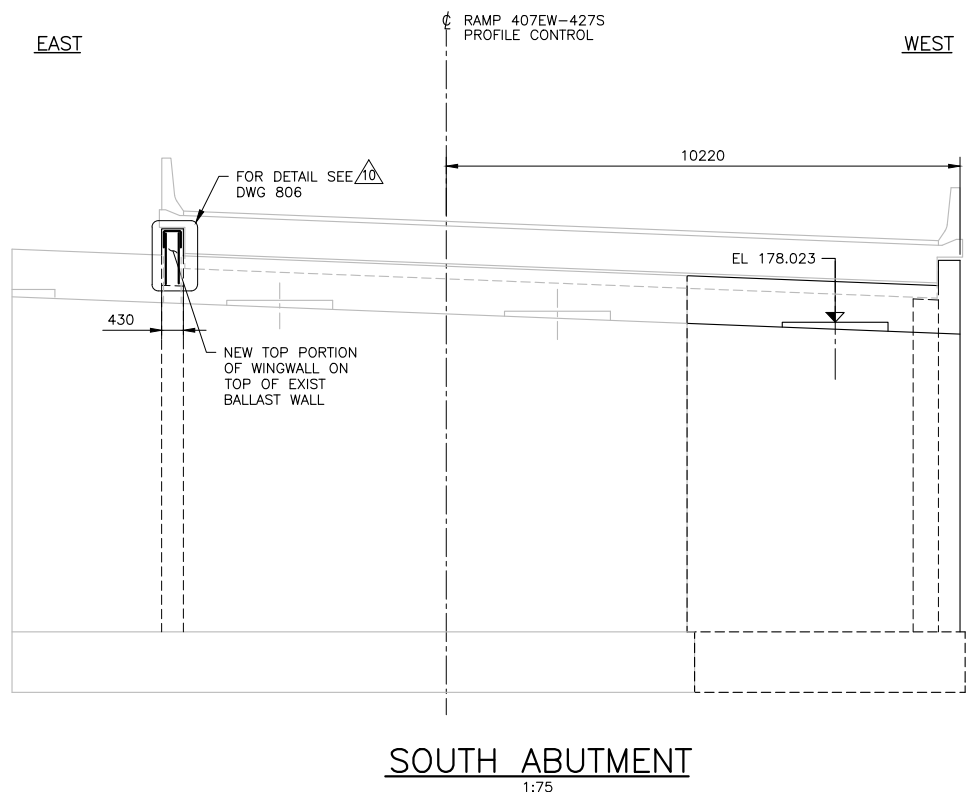
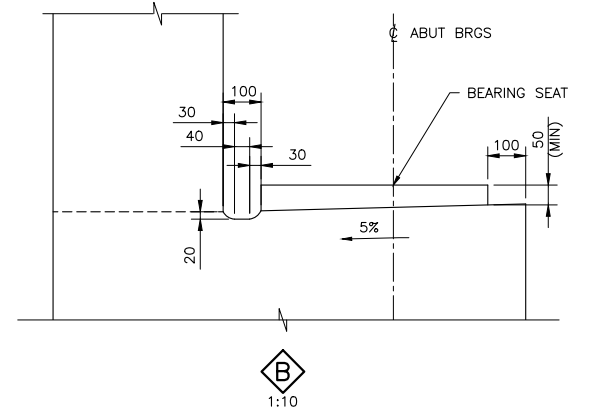
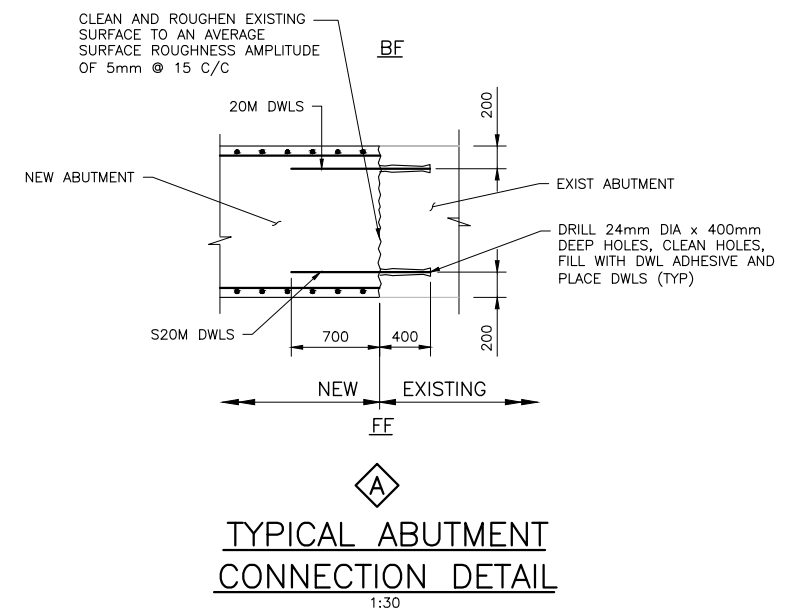
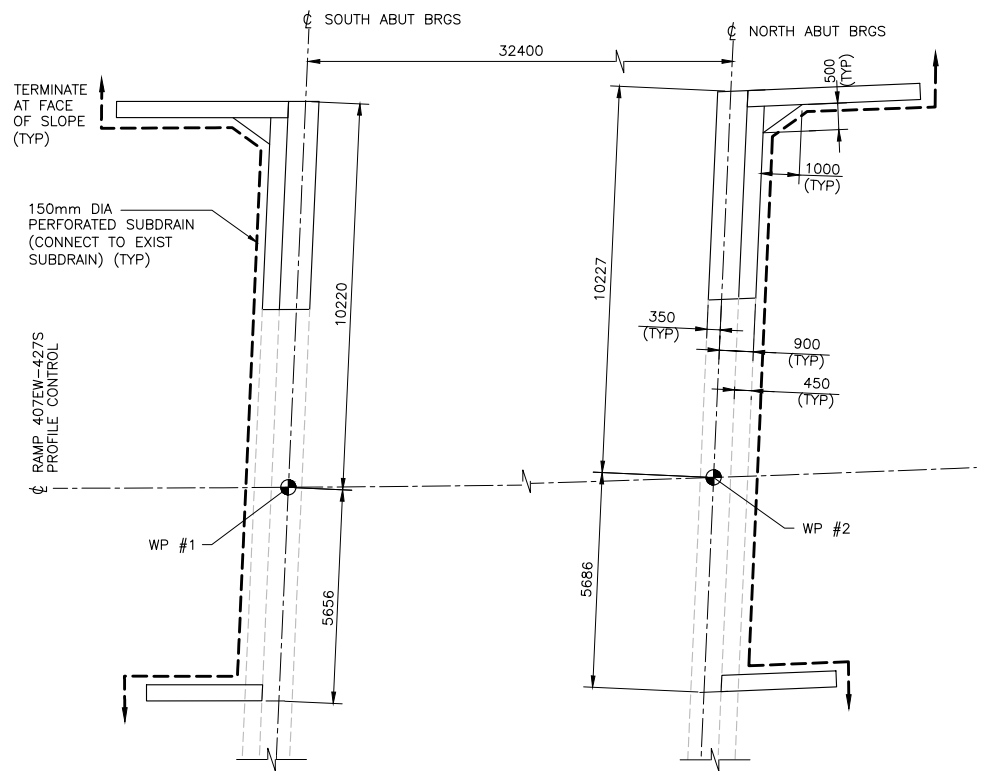
DESIGNED	NIMA MAHMOUDI	
DRAWN	FEI PANG	
CHECKED	SUBOOHI OBAID	
APPROVED LEAD ENG.	TATIANA OJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



HWY 427 EXPANSION HWY 427 RAMP 407EW-427S REHABILITATION R2 SITE 37-1115 REMOVALS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9	STR	B06	DWG	804	B



NOTES:
 1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 803 AND 804.



NOTE:
 CONTRACTOR SHALL PROTECT EXISTING UNDERPASS LIGHTING DURING JACKING PROCEDURE AND INSTALL TEMPORARY LIGHTING IF REQUIRED.

NOTES: NORTH ABUT REINFORCEMENT SHOWN, SOUTH ABUT SIMILAR UNLESS NOTED OTHERWISE

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 DATE PLOTTED: 3/20/2018 10:19:25 AM BY:

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

SCALE :
AS NOTED

DESIGNED	NMA MAHMOUDI	
DRAWN	FEI PANG	
CHECKED	SUBOOHI OBAID	
APPROVED LEAD ENG.	TATIANA OJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



HWY 427 EXPANSION HWY 427 RAMP 407EW-427S REHABILITATION R2 SITE 37-1115 ABUTMENTS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9	STR	B06	DWG	805	B

APPLICABLE STANDARD DRAWINGS:

- OPSD 3102.100 WALLS, ABUTMENT, BACKFILL, DRAIN
- OPSD 3941.200 FIGURES IN CONCRETE, SITE NUMBER AND DATE, LAYOUT
- OPSD 3950.100 JOINTS, CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE

NOTES:

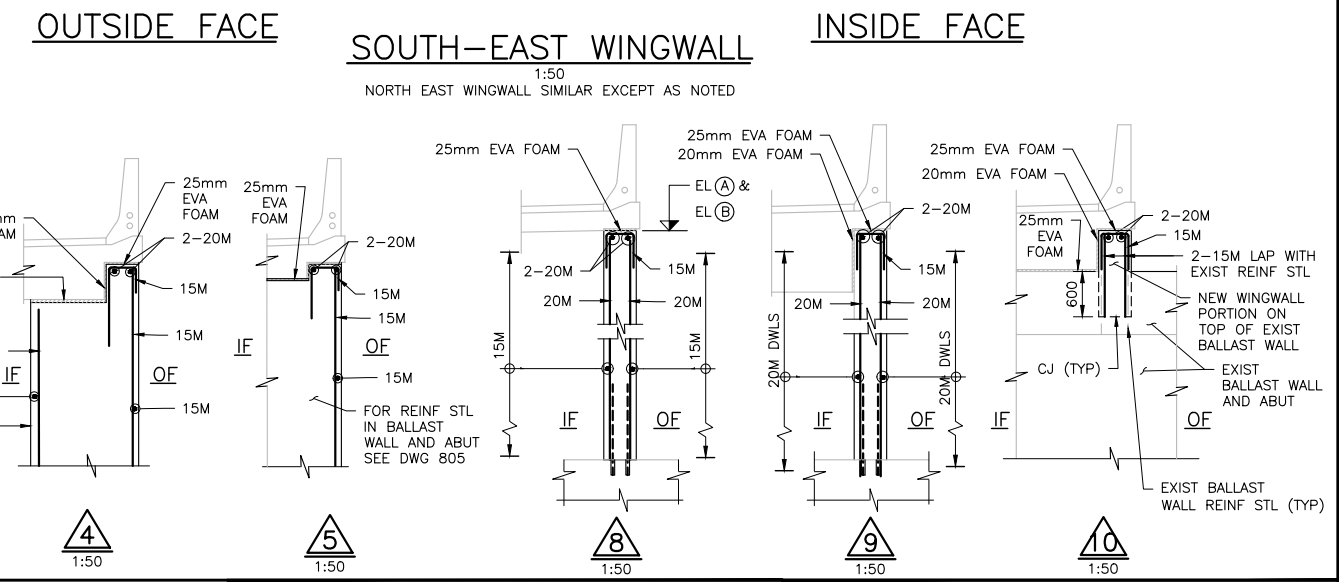
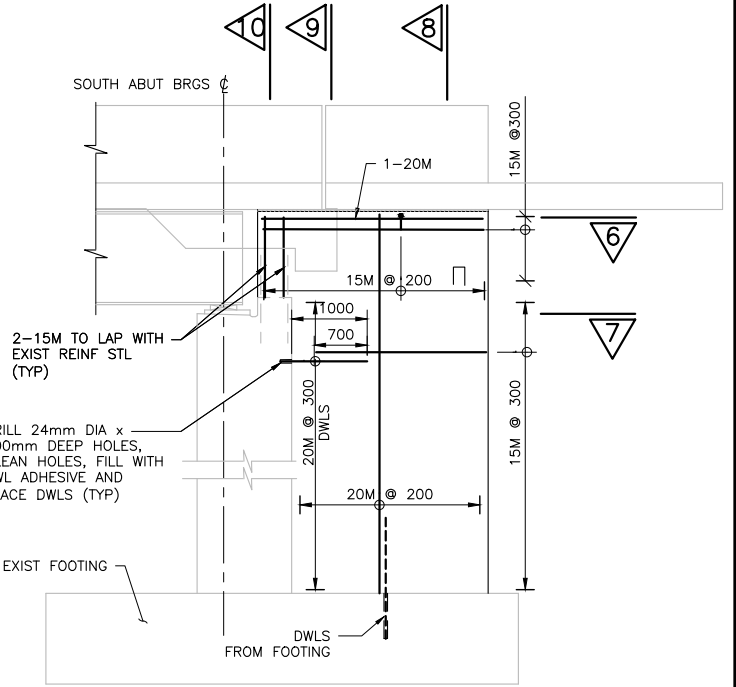
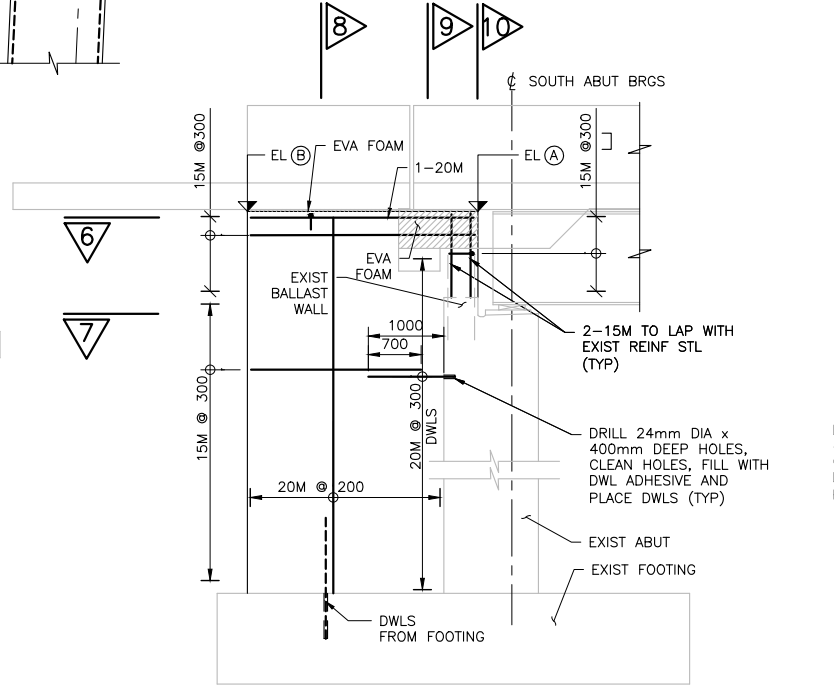
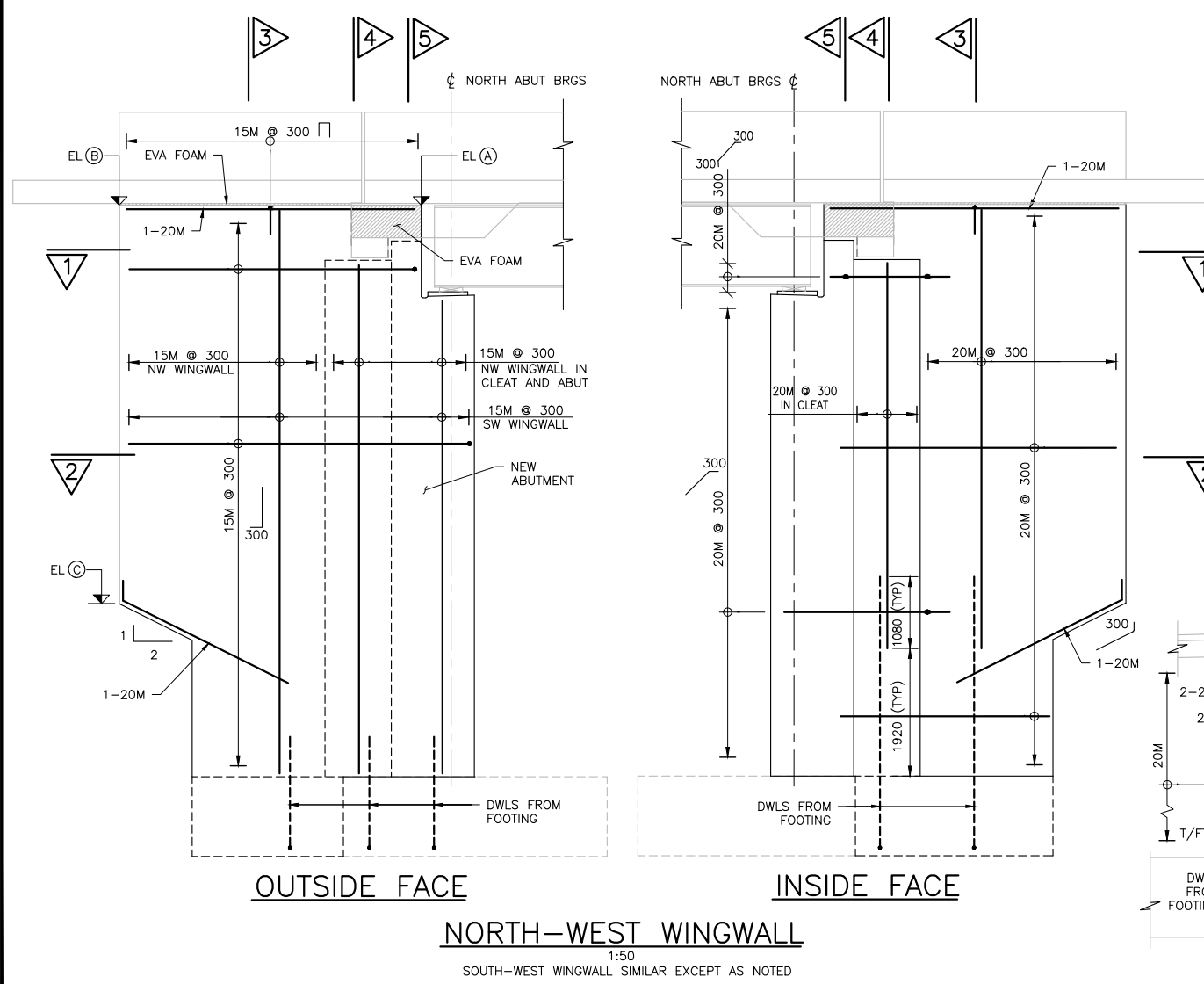
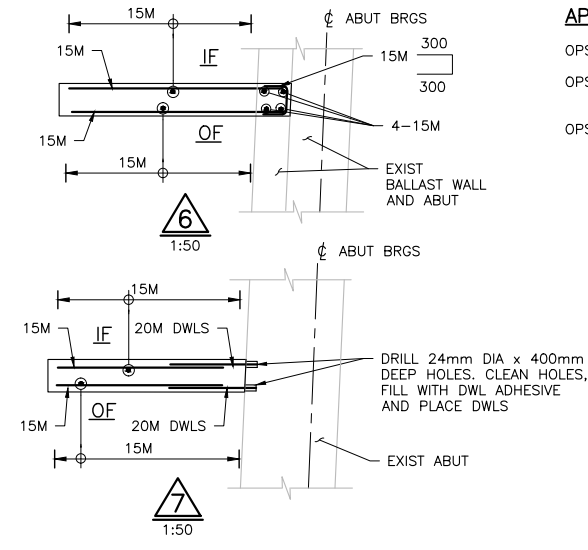
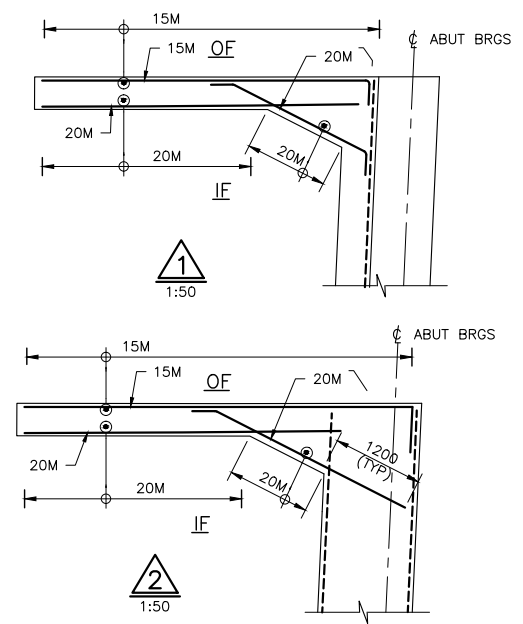
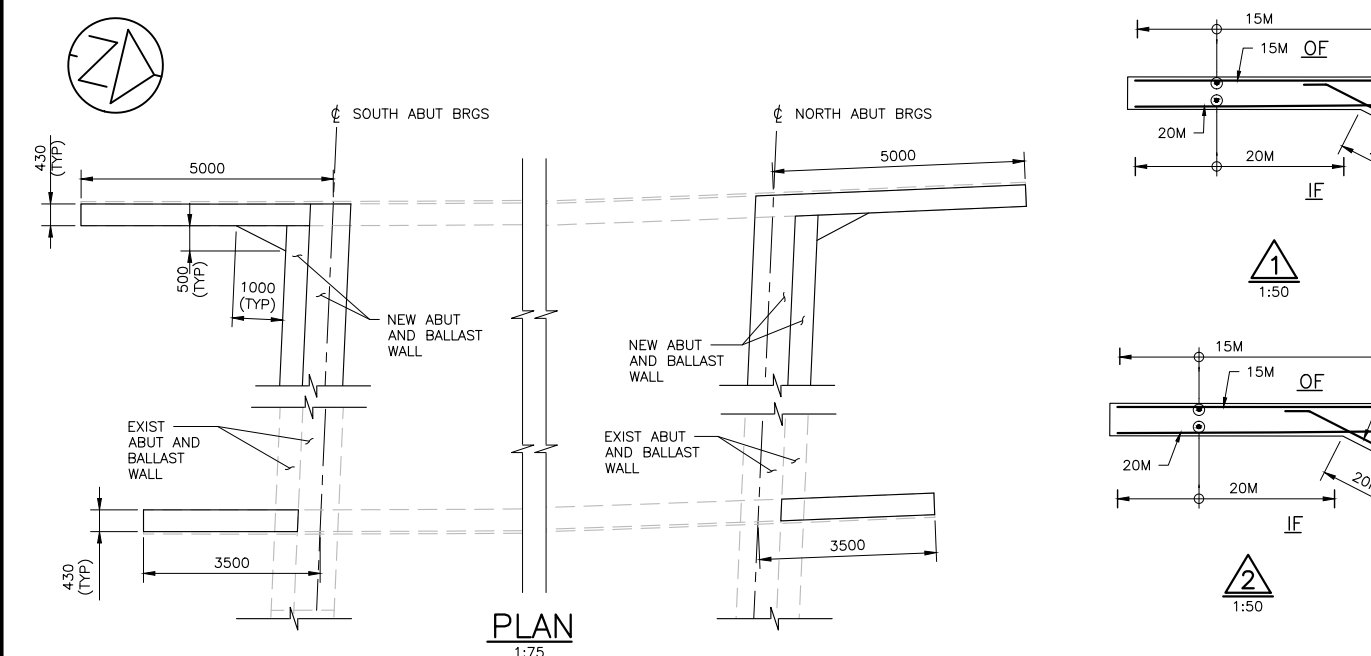
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 800, 803 AND 805.
- TOP OF CLEAT TO BE CAST 35mm BELOW SOFFIT OF DECK DIAPHRAGM.

LIST OF ABBREVIATIONS:

- DWLS DOWELS
- EVA ETHYLENE VINYL ACETATE

WINGWALLS		ELEVATIONS		
LOCATION	ELEVATION (A)	ELEVATION (B)	ELEVATION (C)	
NORTH-WEST WINGWALL	179.108	179.077	174.325	
SOUTH-WEST WINGWALL	179.308	179.344	173.975	
NORTH-EAST WINGWALL	179.700	179.680	-	
SOUTH-EAST WINGWALL	179.900	179.923	-	

MODIFIED	
STANDARD DRAWING JAN 2013	SS105-2
WINGWALL DETAILS FOR BRIDGES	



CAD FILE LOCATION AND NAME: C:\projects\hwy427\dwg\hwy427-d0-9-str-b06-dwg-806.dwg
 MODIFIED: 3/20/2018 10:17:53 AM BY: PANGF
 DATE PLOTTED: 3/20/2018 10:19:26 AM BY:

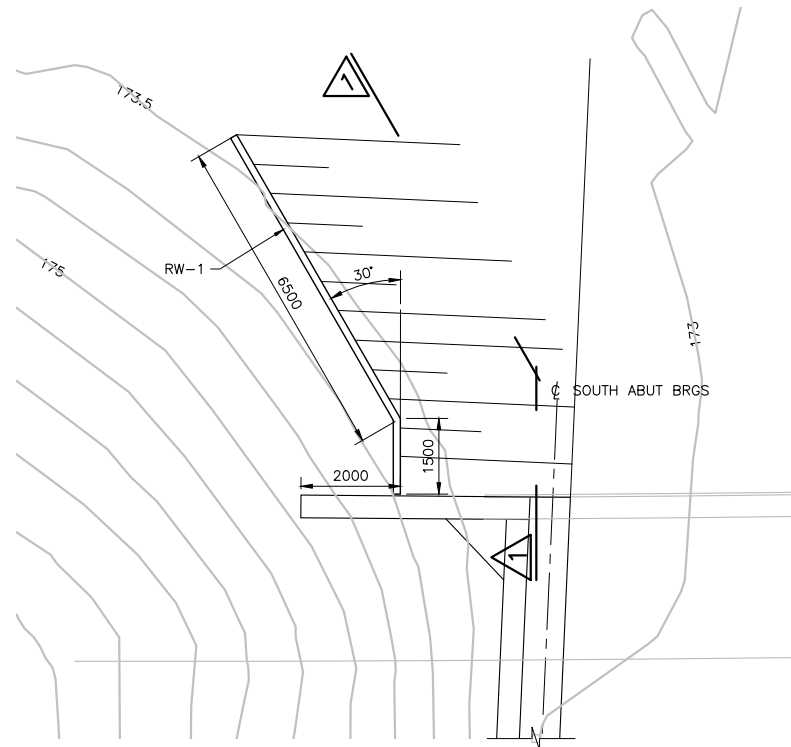
DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

SCALE :
AS NOTED

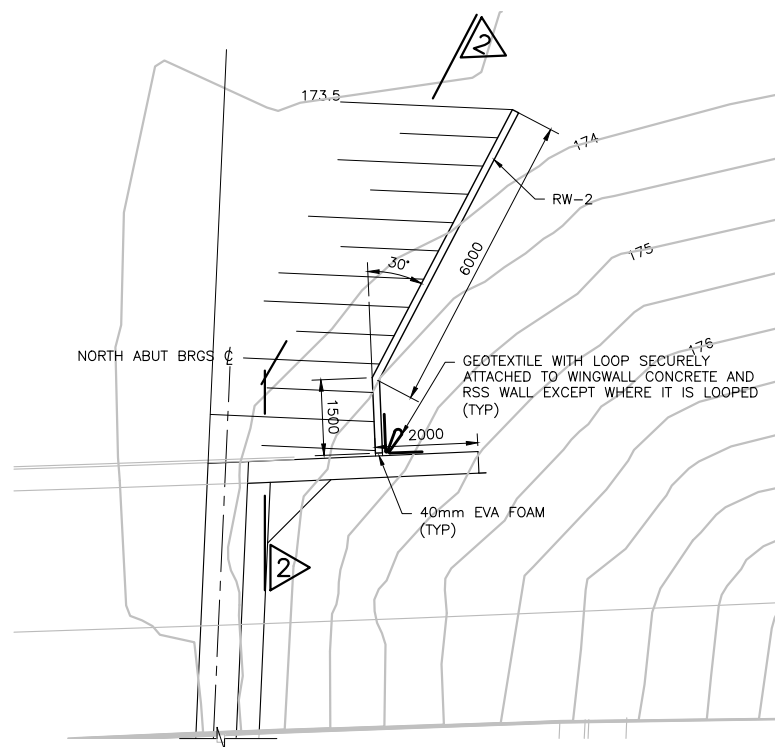
DESIGNED	NMA MAHMOUDI
DRAWN	FEI PANG
CHECKED	SUBOOHI OBAID
APPROVED LEAD ENG.	TATIANA GJALA
APPROVED PROJ. MANAGER	



TITLE							
HWY 427 EXPANSION HWY 427 RAMP 407EW-427S REHABILITATION R2 SITE 37-1115 WINGWALLS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9	STR	B06	DWG	806	B



PLAN
1:75



NOTES:

- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 800 AND 806.
- RETAINED SOIL SYSTEM (RSS) SHALL HAVE THE FOLLOWING ATTRIBUTES:

APPLICATION:	WALL/SLOPE
PERFORMANCE:	HIGH
APPEARANCE:	HIGH
- RSS WALL GRANULAR PAD:

WHERE RSS WALL GRANULAR PAD IS TO BE PLACED ANY TOPSOIL AND SOFT/LOOSE FILL OR NATIVE MATERIAL SHOULD BE STRIPPED FROM THE FOOTPRINT PRIOR TO PLACEMENT OF FILL.

ALL DISTURBED AND NEW EMBANKMENT FILL MUST BE COMPACTED IN ACCORDANCE WITH OPSS 501.

500mm THICK LAYER OF BEDDING MATERIAL CONFORMING TO OPSS GRANULAR 'A' REQUIREMENT SHOULD BE PROVIDED UNDER THE RSS MASS TO PROVIDE A UNIFORM SUBGRADE CONDITION.

GRANULAR 'A' SHOULD BE COMPACTED TO 100% OR STANDARD PROCTOR MAXIMUM DRY DENSITY AT A MOISTURE CONTENT WITHIN 2% OF OPTIMUM.

ENGINEERED FILL PAD MUST EXTEND AT LEAST 500mm BEYOND THE LIMITS OF THE RSS MASS AND LEVELLING STRIP.

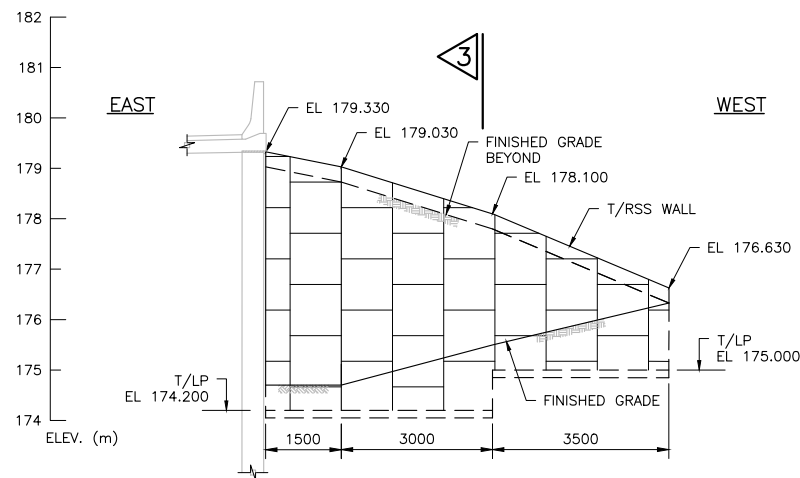
REFER TO GRADING DRAWINGS FOR DETAILS.
- RSS WALL SUPPLIER SHALL PROVIDE PERMANENT PROTECTION TO CSP 300mm PIPES BEHIND THE WALL SURFACE AND SHALL BE INTEGRATED WITH THE RSS SOIL MASS.

LIST OF ABBREVIATIONS:

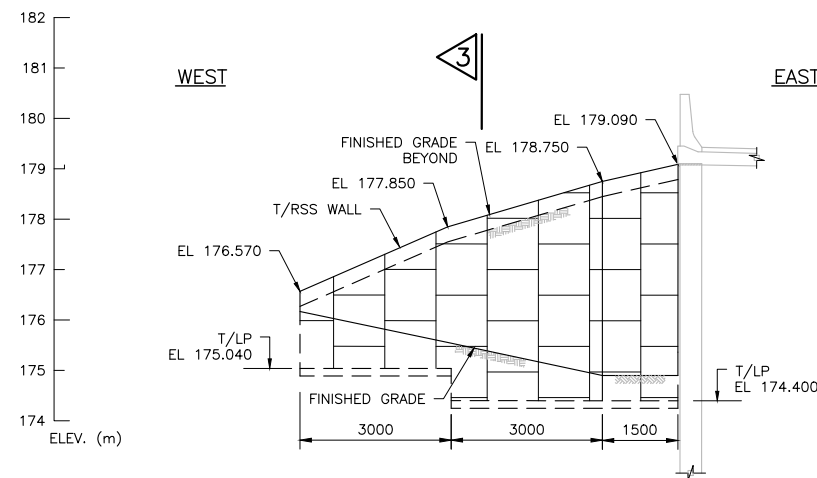
LP LEVELING PAD
WP WORK POINT

SOIL BEARING CAPACITY FOR RSS WALL FOUNDATION:

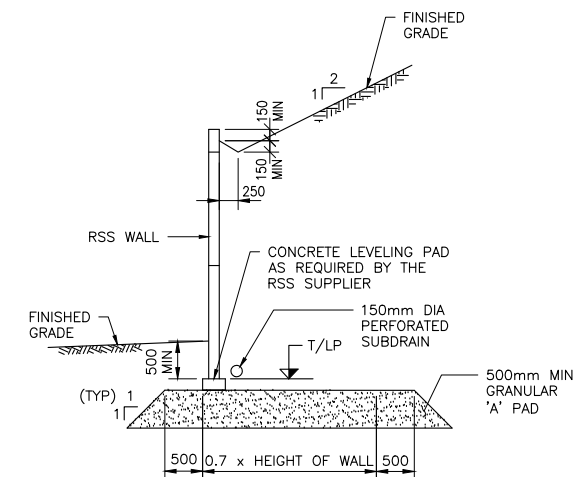
CAPACITY AT SLS: 200KPa
CAPACITY AT ULS: 300KPa



1 RSS WALL RW-1
1:75



2 RSS WALL RW-2
1:75



3
1:50

CAD FILE LOCATION AND NAME: C:\projects\h427-D0-9-STR-B06-LWC-807RSS.dwg
 MODIFIED: 3/20/2018 10:17:52 AM BY: PANGF
 DATE PLOTTED: 3/20/2018 10:19:30 AM BY:

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

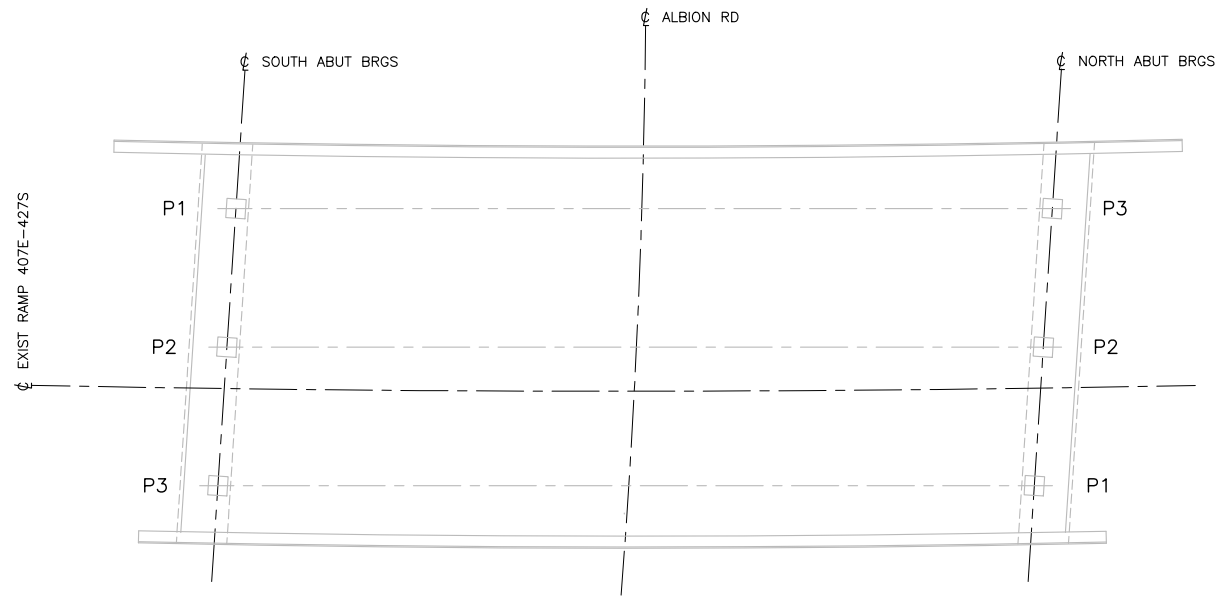
SCALE :

AS NOTED

CONSULTANT	DESIGNED	DATE
	NMA MAHMOUDI	
	DRAWN	FEI PANG
	CHECKED	SUBOOHI OBAID
	APPROVED LEAD ENG.	TATIANA OJALA
	APPROVED PROJ. MANAGER	
	NAME (PRINT)	INIT. DATE



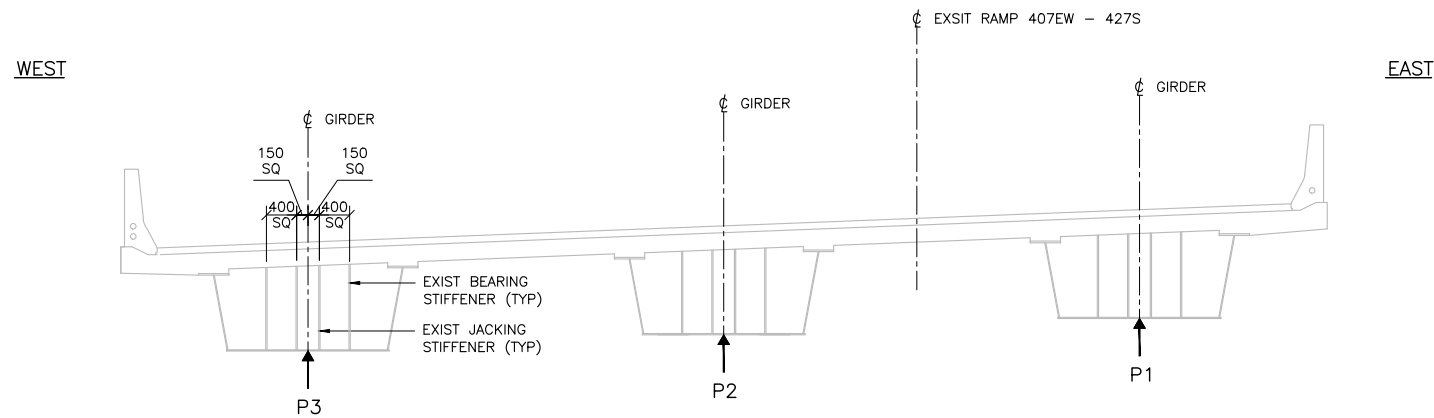
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HWY 427 EXPANSION HWY 427 RAMP 407EW-427S REHABILITATION R2 SITE 37-1115 RETAINED SOIL SYSTEM WALLS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9	STR	B06	DWG	807	B



PLAN
1:150

NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 800 AND 802.
2. JACKING SUPPORT SYSTEM SHOWN ON THE DRAWINGS IS SCHEMATIC ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN OF JACKING SUPPORT SYSTEM AND SHALL SUBMIT DETAILED SHOP DRAWINGS ALONG WITH DESIGN CALCULATIONS AND PROCEDURES TO THE CONTRACT ADMINISTRATOR. ALL DRAWINGS SHALL BE STAMPED BY AN ENGINEER LICENSED IN THE PROVINCE OF ONTARIO.
3. JACKING EQUIPMENT AND PROCEDURES OUTLINED IN THE CONTRACTOR'S SHOP DRAWINGS SHALL BE CERTIFIED IN THE FIELD BY THE ENGINEER RESPONSIBLE FOR THOSE DRAWINGS.
4. THE CONTRACTOR SHALL SITE MEASURE THE EXISTING STRUCTURE AT SUPPORT LOCATIONS TO ENSURE PROPER FIT.
5. TRAFFIC SHALL NOT BE ALLOWED ON THE STRUCTURE DURING JACKING OPERATIONS.
6. THE DECK SHALL BE JACKED UP SIMULTANEOUSLY ACROSS THE ENTIRE WIDTH. JACKING MEASUREMENTS SHALL BE RECORDED AND SUPPLIED TO THE ENGINEER.
7. THE DECK SHALL BE JACKED UP SUFFICIENTLY TO REMOVE PRESSURE ON THE EXISTING BEARINGS AND DISENGAGE THEM FROM THE PINTELS. THE LIFT SHALL BE CONTROLLED SO AS TO AVOID DAMAGING ADJACENT AREAS OF THE STRUCTURE.
8. JACKING REACTIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL SUPPLY JACK CAPACITY OF AT LEAST 150% OF THE THEORETICAL JACKING REACTIONS INDICATED.
9. CONTRACTOR SHALL USE SELF-LOCKING JACKS.
10. STAINLESS STEEL AND TEFLON SURFACES SHALL BE PROTECTED FROM ABRASION OR SCRATCHING AND KEPT CLEAN AT ALL TIMES DURING CONSTRUCTION.
11. TOP AND BASE PLATES FOR JACKS AND TEMPORARY SUPPORT SHALL BE DESIGNED TO SUIT THE BEARING SEAT AND THE DECK SOFFIT GEOMETRY.



UNFACTORED DEAD LOAD (kN)	1000	900	1100
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FINAL GIRDER STRENGTH WILL BE CHECKED UPON RECEIVING OF BRIDGE DECK MOVING PROCEDURE

ABUTMENT ELEVATION – JACKING LOCATIONS AND LOADS

NTS
NORTH ABUTMENT SHOWN, SOUTH ABUTMENT SIMILAR BUT OPPOSITE HAND

CAD FILE LOCATION AND NAME: C:\projects\hwy427\dwg\hwy427-9-STR-806-DWG-806-808.dwg
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 DATE PLOTTED: 3/20/2018 10:19:31 AM BY:

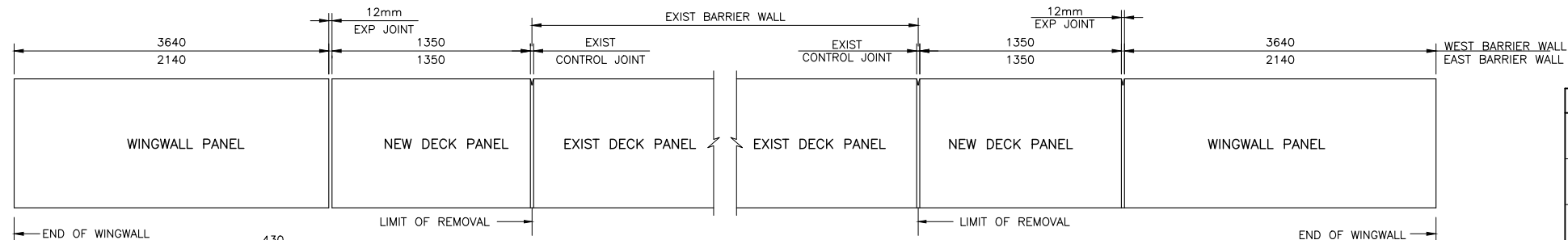
DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
18/03/16	90% SUBMISSION TO CA				
18/01/12	90% SUBMISSION TO CA				

SCALE :
AS NOTED

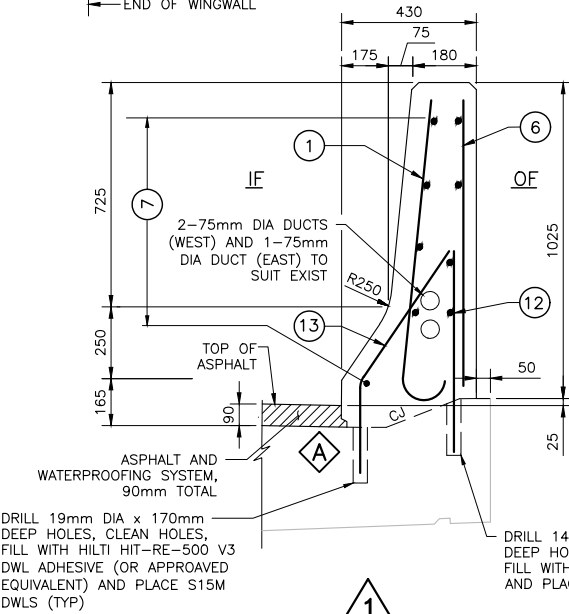
DESIGNED	NIMA MAHMOUDI
DRAWN	FEI PANG
CHECKED	SUBOOHI OBAID
APPROVED LEAD ENG.	TATIANA GJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INT.
DATE	



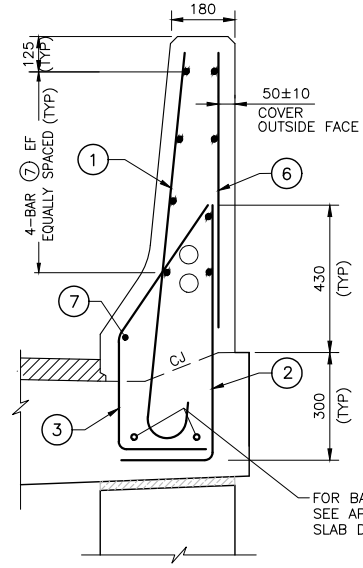
TITLE							
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PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9	STR	B06	DWG	808	B



ELEVATION

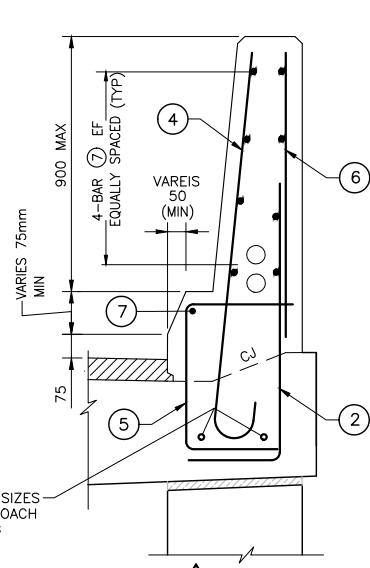


1 BARRIER WALL ON EXIST DECK

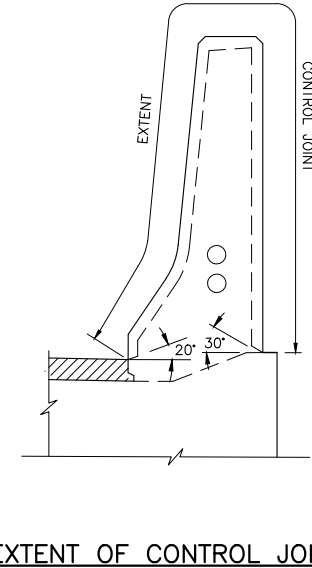


2

3 BARRIER WALL ON WINGWALL SE ONLY



3

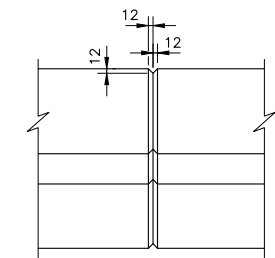


EXTENT OF CONTROL JOINT IN BARRIER WALL

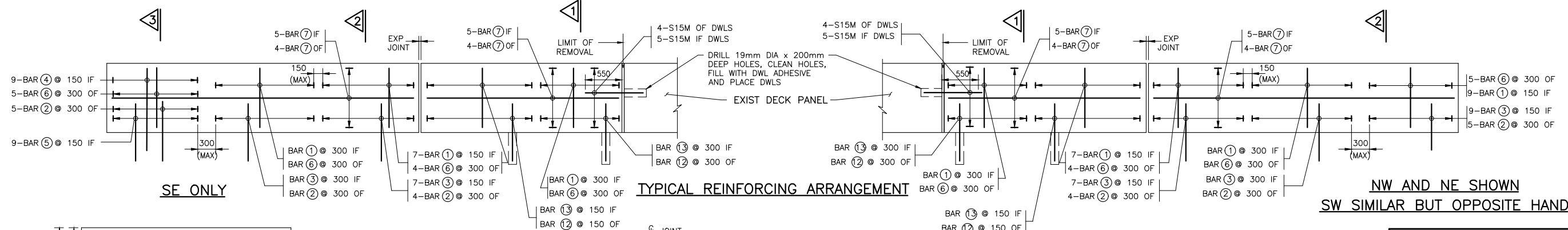
BAR MARK	SIZE	SHAPE
①	S15M	
②	S10M	
③	S15M	
④	S15M	
⑤	S15M	
⑥	S10M	STRAIGHT
⑦	S15M	STRAIGHT
⑧	S15M	
⑨	S10M	STRAIGHT, LENGTH VARIES
⑩	S15M	
⑪	S15M	STRAIGHT
⑫	S10M	580
⑬	S15M	

NOTES:

1. SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
2. CONCRETE COVER TO REINFORCING STEEL 60±10mm EXCEPT AS NOTED.
3. REINFORCING STEEL SHALL BE STAINLESS TYPE 316LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500MPa.
4. BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
5. MINIMUM BAR LAP SPLICE TO BE 550mm, UNLESS OTHERWISE SHOWN.
6. LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
7. CONTROL JOINT TO BE FORMED.
8. SAWCUTS NOT PERMITTED.
9. CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
10. OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
11. CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
12. LEGEND: EF - DENOTES EACH FACE
IF - DENOTES INSIDE FACE
OF - DENOTES OUTSIDE FACE
CJ - CONSTRUCTION JOINT
LS - LAP SPLICE

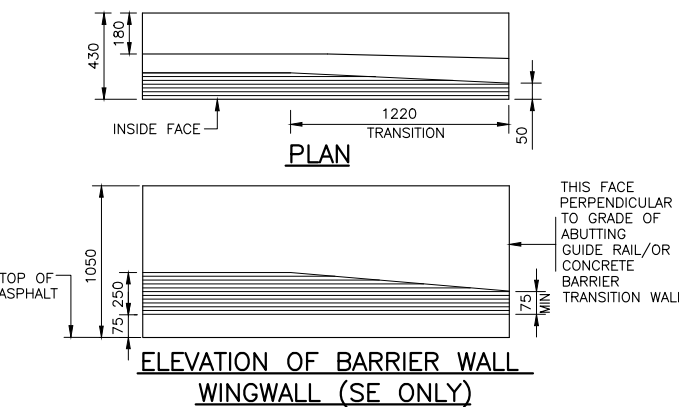


TYPICAL OPTIONAL CONSTRUCTION JOINT

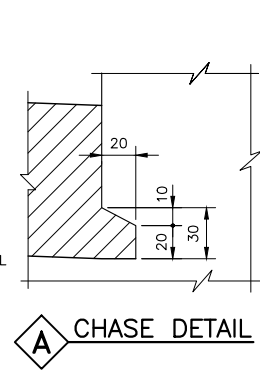


TYPICAL REINFORCING ARRANGEMENT

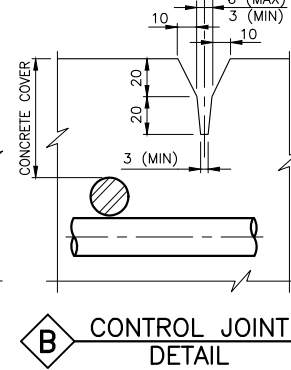
NW AND NE SHOWN SW SIMILAR BUT OPPOSITE HAND



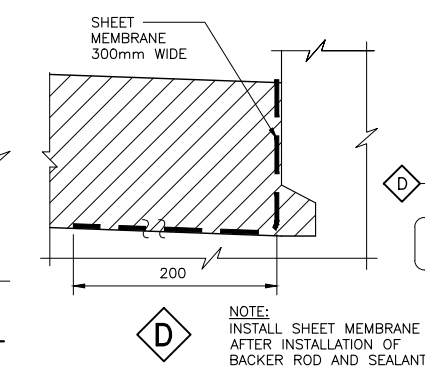
ELEVATION OF BARRIER WALL WINGWALL (SE ONLY)



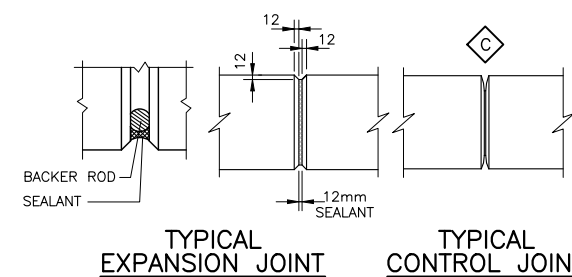
A CHASE DETAIL



B CONTROL JOINT DETAIL



D



TYPICAL EXPANSION JOINT

TYPICAL CONTROL JOINT

MODIFIED	
STANDARD DRAWING SEPTEMBER 2016	SS110-61
BARRIER WALL WITHOUT RAILING, TL-5 (STAINLESS STEEL REBAR)	

CAD FILE LOCATION AND NAME: C:\projects\hwy427\dwg\hwy427-d0-9-str-b06-lwc-809BW.dwg
 MODIFIED: 3/20/2018 10:17:49 AM BY: PANG
 DATE PLOTTED: 3/20/2018 10:19:32 AM BY:

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

SCALE :

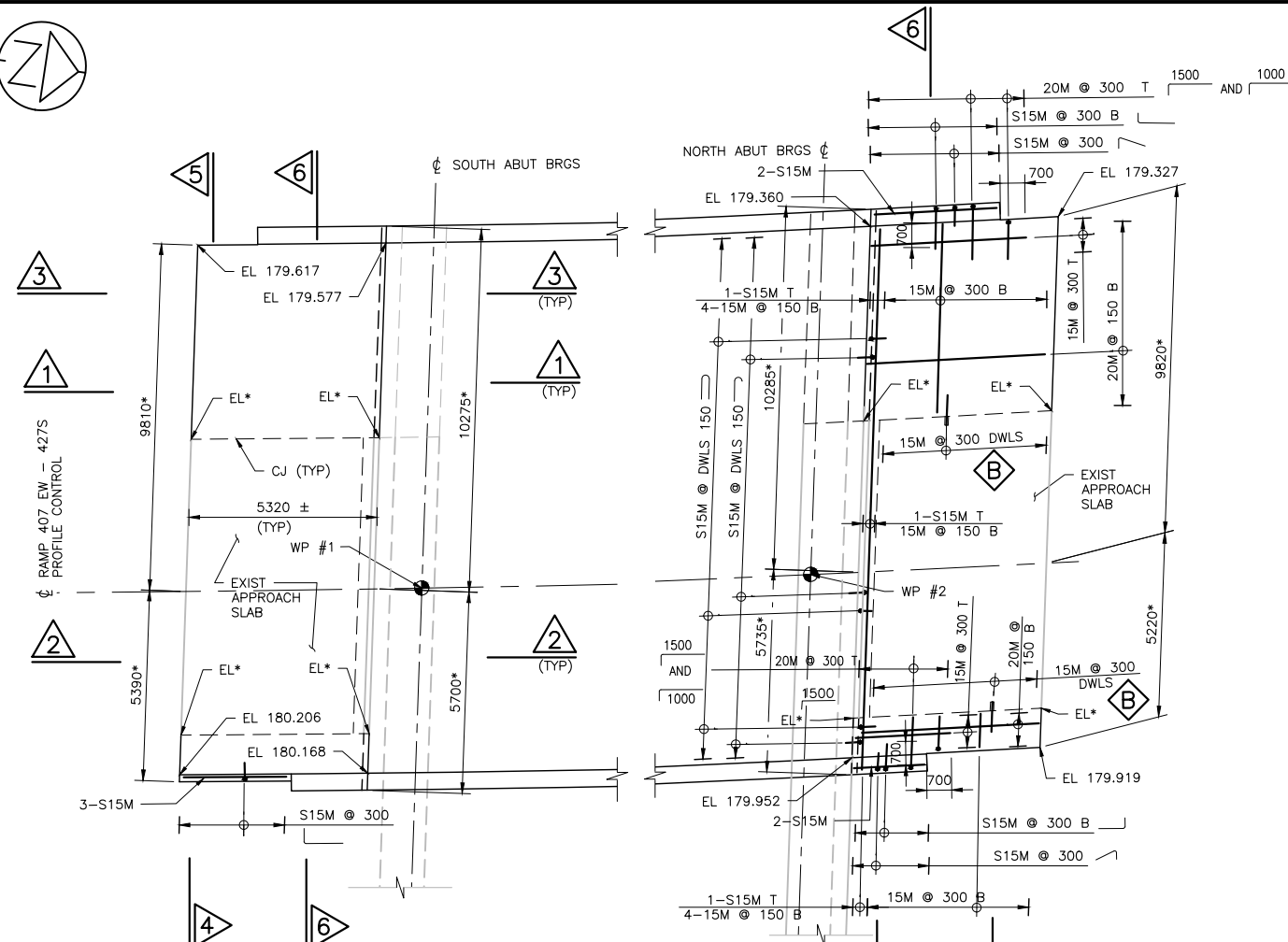
AS NOTED

DESIGNED	NMA MAHMOUDI
DRAWN	FEI PANG
CHECKED	SUBOOHI OBAID
APPROVED LEAD ENG.	TATIANA OJALA
APPROVED PROJ. MANAGER	

CONSULTANT	
NAME (PRINT)	INIT. DATE

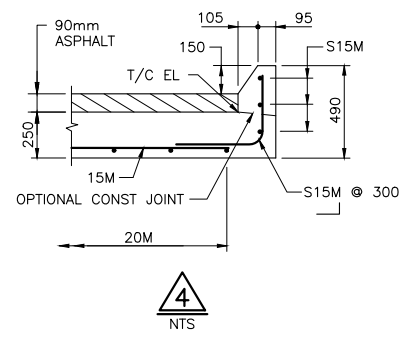


HWY 427 EXPANSION HWY 427 RAMP 407EW-R25 REHABILITATION R2 SITE 37-1115 BARRIER WALL WITHOUT RAILING							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9	STR	B06	DWG	809	B

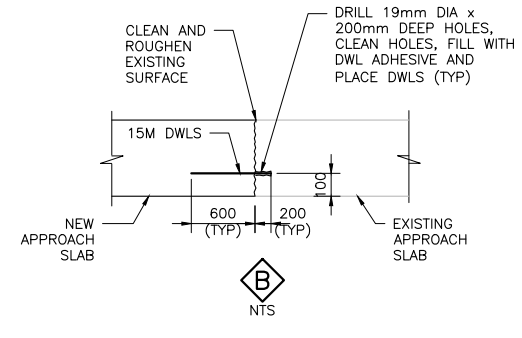


PLAN
1:100

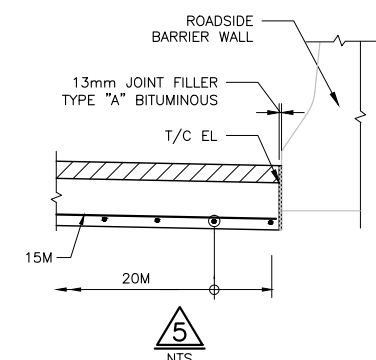
NOTES:
NORTH APPROACH SLAB REINFORCEMENT SHOWN, SOUTH APPROACH SLAB SIMILAR, UNLESS NOTED OTHERWISE
* DIMENSIONS ARE MEASURED FROM PROFILE CONTROL ALONG C ABUT BRGS
EL* ELEVATIONS TO MATCH EXISTING TOP OF CONCRETE ELEVATIONS



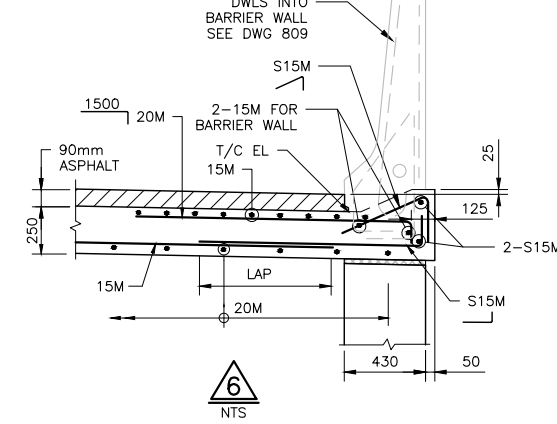
4
NTS



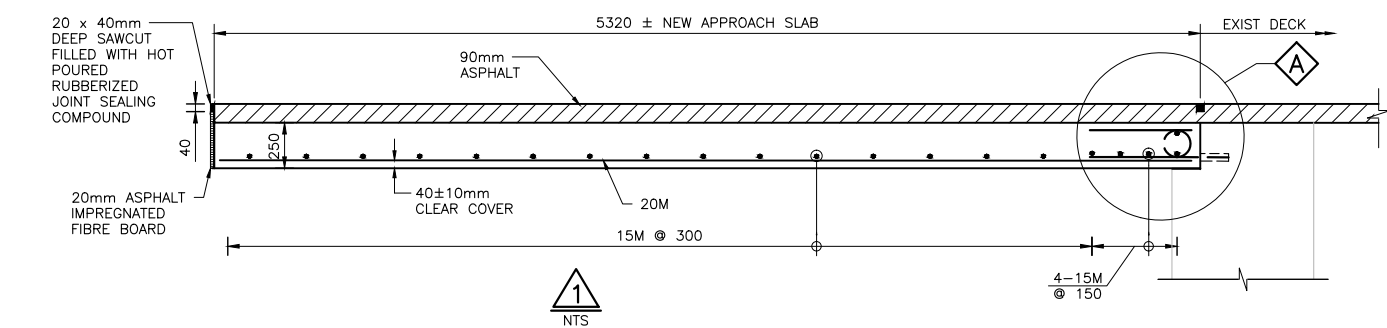
B
NTS



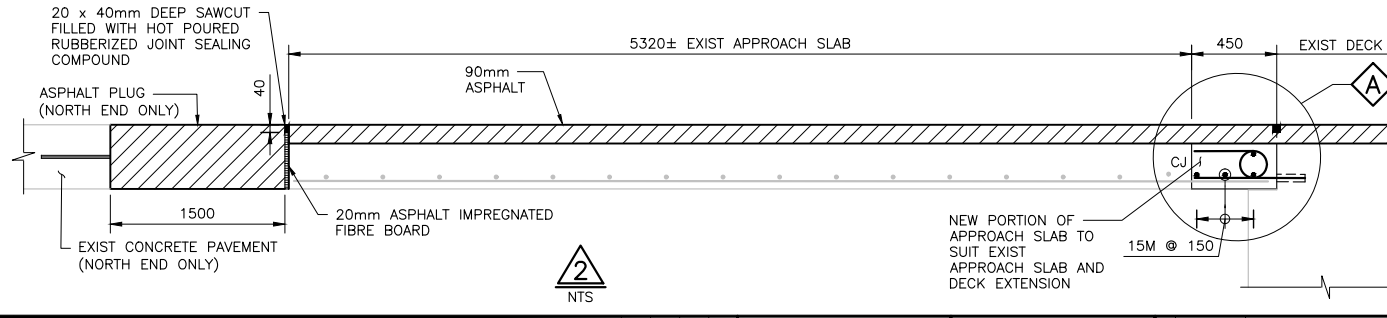
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NTS



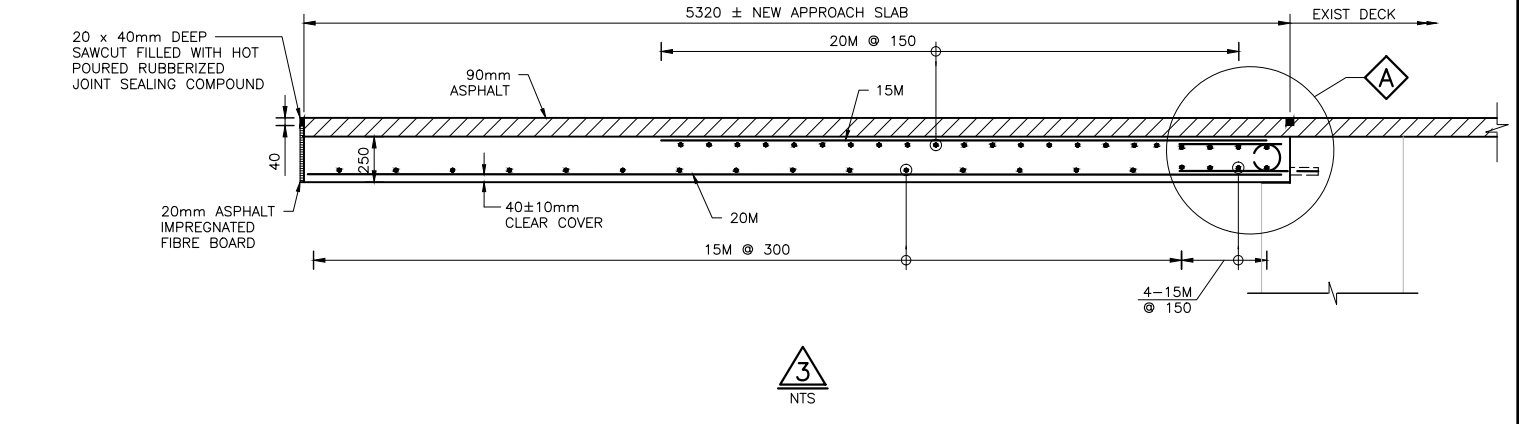
6
NTS



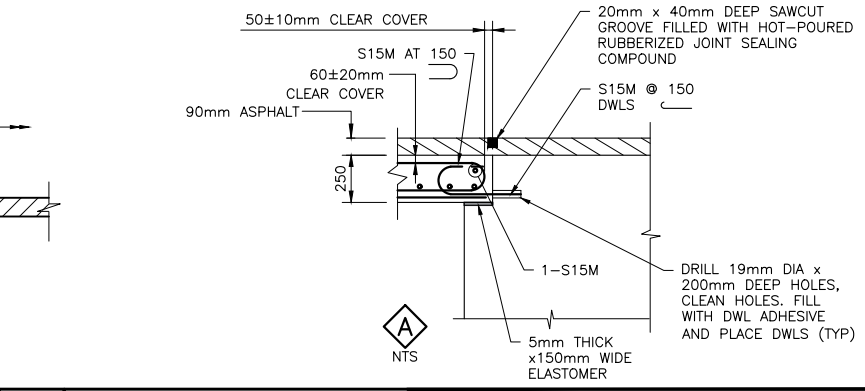
1
NTS



2
NTS



3
NTS



A
NTS

- NOTES:**
- CLEAR COVER TO REINFORCING STEEL 70 ± 20 mm EXCEPT AS NOTED.
 - LAYOUT OF REINFORCING STEEL WILL BE SIMILAR FOR LEFT HAND AND ZERO DEGREE SKEW.
 - STAINLESS STEEL BARS SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500MPa. REINFORCING STEEL SHALL BE GRADE 400W.
 - WATERPROOFING AT JOINT BETWEEN BRIDGE AND APPROACH SLAB TO BE IN ACCORDANCE WITH OPSD 3370.100.
 - WATERPROOFING FOR BRIDGES WITHOUT EXPANSION JOINTS (RIGID FRAMES AND INTEGRAL ABUTMENTS) TO BE IN ACCORDANCE WITH OPSD 3370.101.
 - BAR MARKED WITH PREFIX S DENOTE STAINLESS STEEL BARS.
 - THIS DRAWING TO BE READ IN CONJUNCTION WITH DWGS 800, 802 AND 811.

- APPLICABLE STANDARD DRAWINGS**
- OPSD 3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
 - OPSD 3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS

MODIFIED	
STANDARD DRAWING MARCH 2016	SS116-1
6000 mm APPROACH SLAB	

CAD FILE LOCATION AND NAME: C:\projects\hwy427\hwy427-d0-9-str-b06-lwg-810ap.dwg
 MODIFIED: 3/20/2018 10:17:48 AM BY: PANG
 DATE PLOTTED: 3/20/2018 10:19:35 AM BY:

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

SCALE :
AS NOTED

DESIGNED	NMA MAHMOUDI
DRAWN	FEI PANG
CHECKED	SUBOOHI OBAID
APPROVED LEAD ENG.	TATIANA OJALA
APPROVED PROJ. MANAGER	

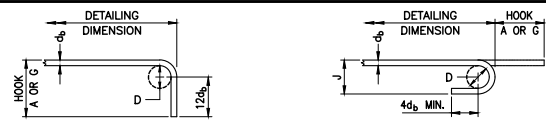
CONSULTANT	
NAME (PRINT)	
INIT.	
DATE	



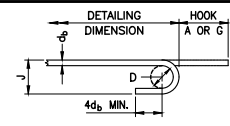
HWY 427 EXPANSION HWY 427 RAMP 407EW-427S REHABILITATION R2 SITE 37-1115 6000mm APPROACH SLAB							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9	STR	B06	DWG	810	B

NOTES:

- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 800 AND 806.



STANDARD 90° HOOK



STANDARD 180° HOOK

MINIMUM BENDING PIN DIAMETER, D, mm

BAR SIZE	STEEL GRADE	
	400R ⁽²⁾	400W
10M	70	60
15M	100	90
20M	120	100
25M	150	150
30M	250	200
35M	300	250
45M	450 ⁽¹⁾	400
55M	600 ⁽¹⁾	550

⁽¹⁾ Special fabrication is required for bends exceeding 90° for bars of these sizes and grade.

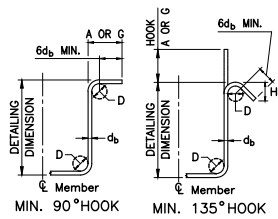
⁽²⁾ For stainless steel, with $F_y = 420$, use the same D as for 400R.

BAR SIZE	STANDARD HOOK DIMENSIONS					
	90° HOOKS			180° HOOKS		
	A OR G (mm)		A OR G (mm)	J (mm)		
	400R	400W	400R	400W	400R	400W
10M	180	180	140	130	90	80
15M	260	250	180	170	130	120
20M	310	300	220	200	160	140
25M	400	400	280	280	200	200
30M	510	490	400	350	310	260
35M	610	590	480	430	370	320
45M	790	770	680	630	540	490
55M	1030	1010	900	850	710	660

NOTE: All Hook Dimensions are according to the CHBDC-2014.

MINIMUM STIRRUP AND TIE HOOK DIMENSIONS

BAR SIZE	BAR DIAM. d_b (mm)	PIN DIAM. D (mm)	90°		135°	
			A OR G (mm)	A OR G (mm)	H (approx.) (mm)	H (approx.) (mm)
10M	11.3	45	100	100	70	70
15M	16.0	65	140	140	100	100
20M	19.5	80	180	175	115	115
25M	25.2	100	230			

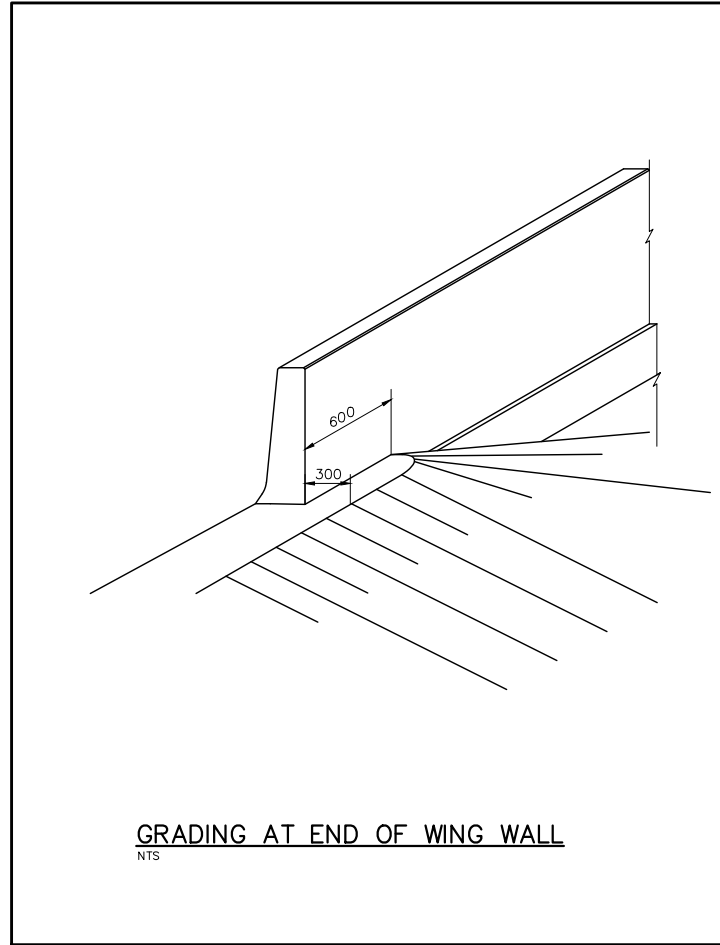


MIN. 90° HOOK MIN. 135° HOOK

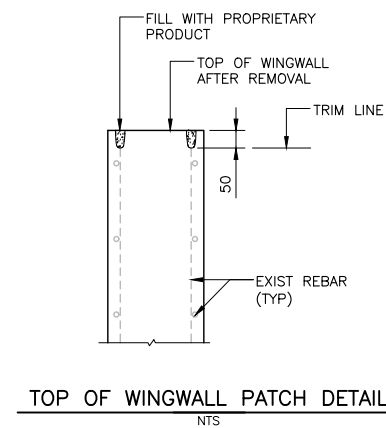
HOOK DIMENSIONS FOR REINFORCING STEEL BARS

Date: SEP 2016 Rev:

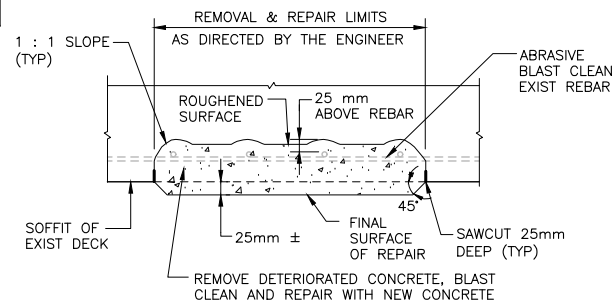
SS12-1



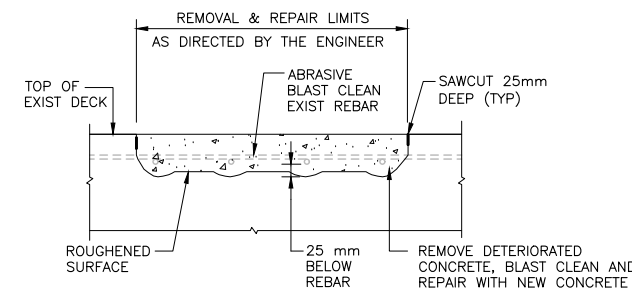
GRADING AT END OF WING WALL



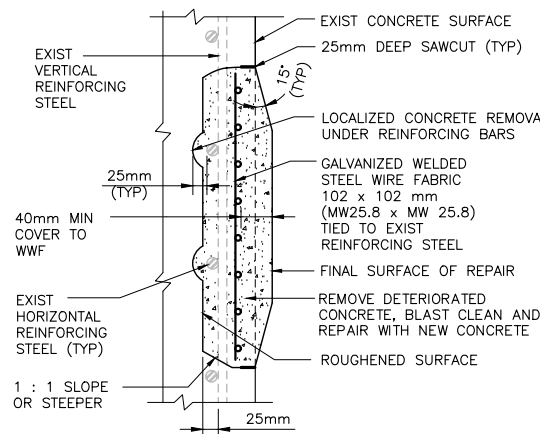
TOP OF WINGWALL PATCH DETAIL



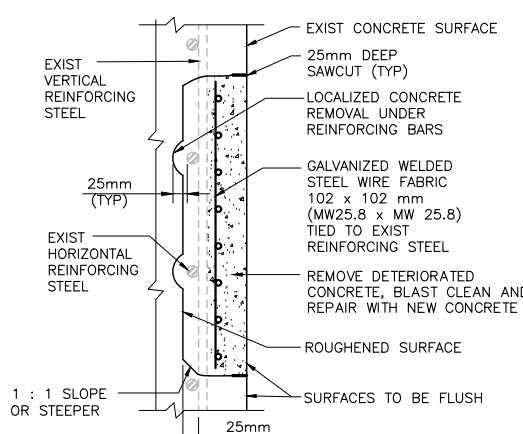
DECK SOFFIT LOCAL CONCRETE REPAIR DETAIL



DECK SURFACE LOCAL CONCRETE REPAIR DETAILS



FOR EXIST CONCRETE COVER < 50 mm



FOR EXIST CONCRETE COVER > = 50 mm

VERTICAL SURFACE LOCAL CONCRETE REPAIR DETAILS

CAD FILE LOCATION AND NAME: C:\projects\wise\wsp-co\wsp-co\project\wise\wsp-co\wsp-co\H427-D0-9-STR-B06-DWG-811.SD.dwg
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 DATE PLOTTED: 3/20/2018 10:19:37 AM BY:

SCALE :

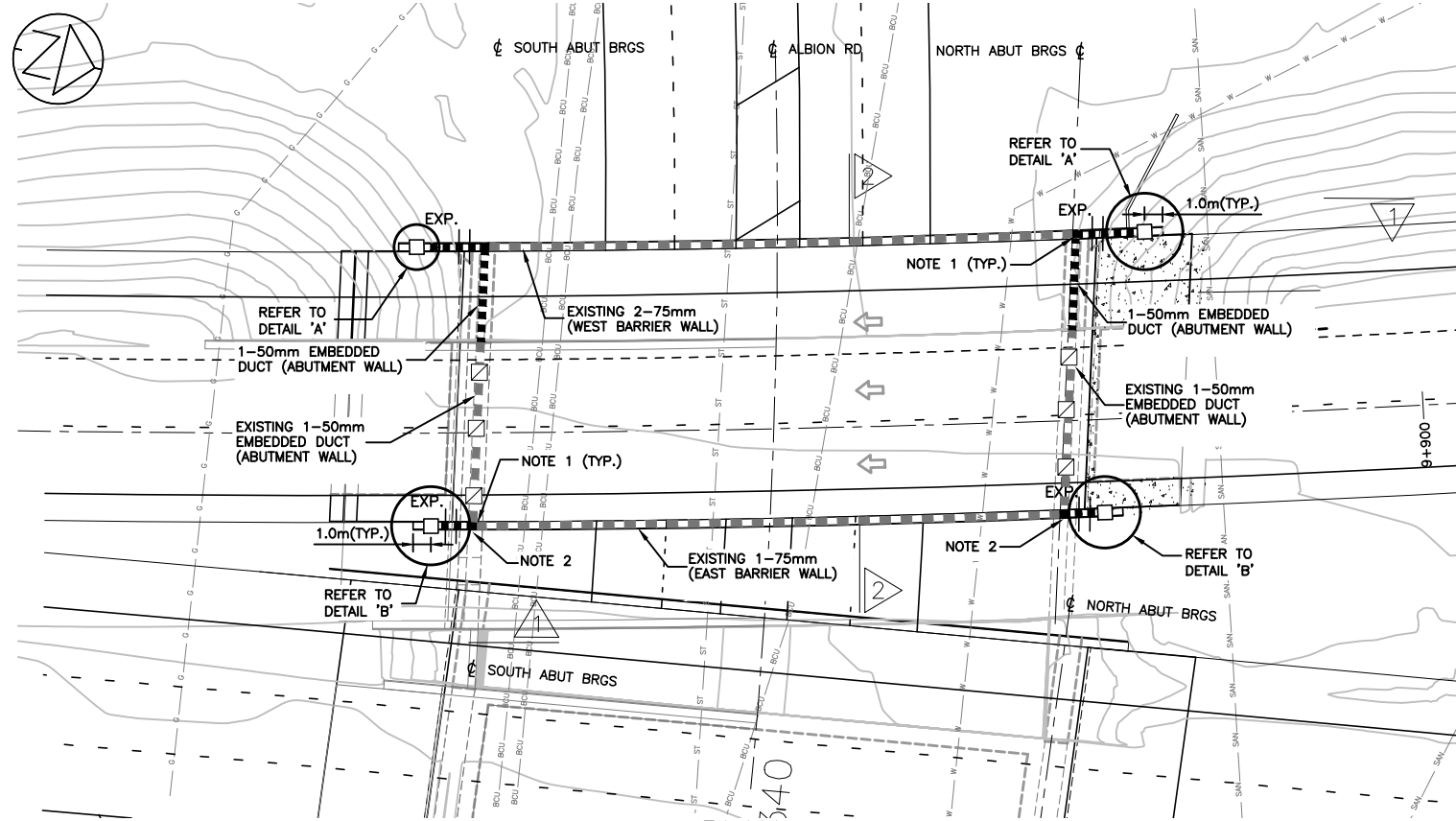
AS NOTED

DESIGNED	NINA MAHMOUDI
DRAWN	FEI PANG
CHECKED	SUBOOHI OBAD
APPROVED LEAD ENG.	TATIANA OJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INIT. DATE

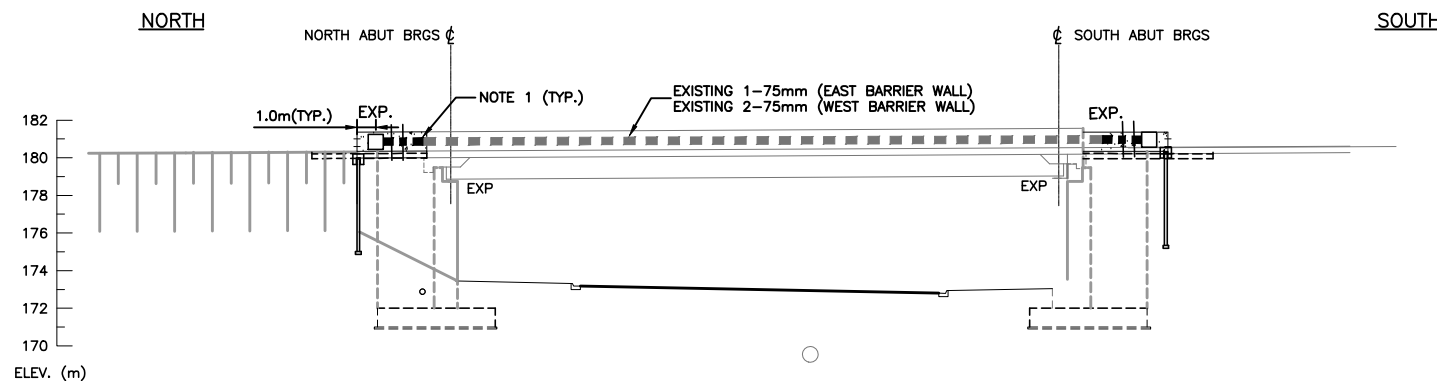


**HWY 427 EXPANSION
 HWY 427 RAMP 407EW-425
 REHABILITATION R2
 SITE 37-1115
 STANDARD DETAILS**

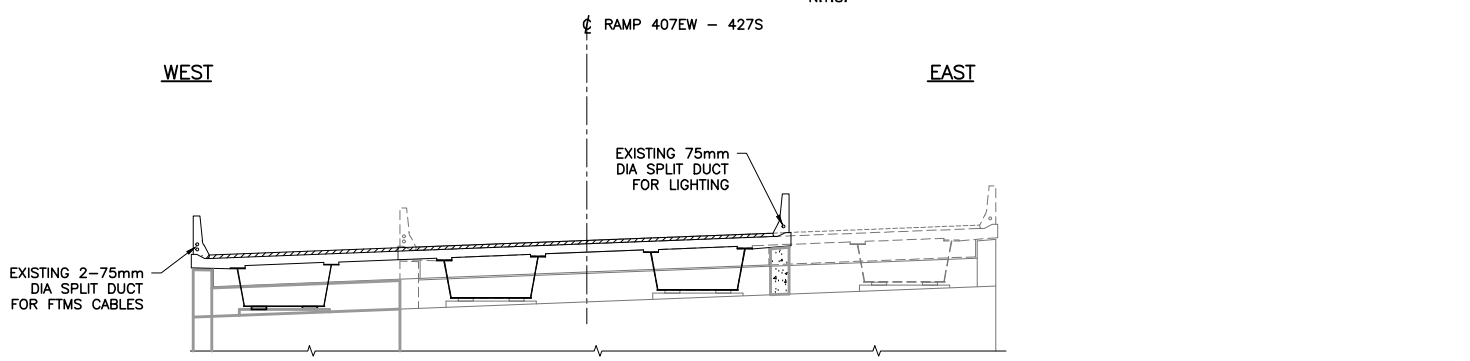
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9	STR	B06	DWG	811	B



PLAN
N.T.S.



ELEVATION 1
N.T.S.



ELEVATION 2
N.T.S.

GENERAL NOTES:

A. FOR UNDERPASS LUMINAIRES REFER TO UNDERPASS LAYOUT DRAWINGS IN PACKAGE 9.

NOTES:

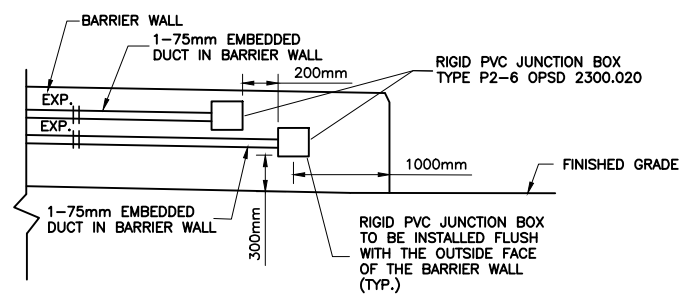
1. CONTRACTOR SHALL CAREFULLY REMOVE SUFFICIENT CONCRETE TO ALLOW FOR INSTALLATION OF A RIGID PVC COUPLING ONTO THE EXISTING EMBEDDED CONDUITS.
2. FOR CONTINUATION OF EMBEDDED DUCTS IN ABUTMENT WALL REFER TO HWY427/ALBION ROAD OVERPASS (STRUCTURE B05) STRUCTURAL DRAWINGS.
3. FOR UNDERGROUND DUCT REFER TO UNDERPASS LAYOUT DRAWINGS IN PACKAGE 9.

APPLICABLE STANDARD DRAWINGS:

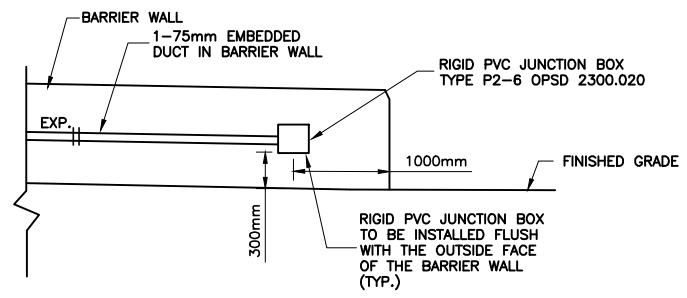
- OPSD 2011.101 - GENERAL SYMBOLS
- OPSD 2011.201 - GENERAL SYMBOLS
- OPSD 2102.010 - UNDERGROUND RIGID DUCT CONNECTION AT CONCRETE STRUCTURE
- OPSD 2302.010 - EMBEDDED WORK DETAIL
- OPSD 2302.020 - EXPANSION AND DEFLECTION FITTING ASSEMBLY
- OPSD 2302.040 - EMBEDDED WORK IN STRUCTURE

SUPPLEMENTARY LEGEND:

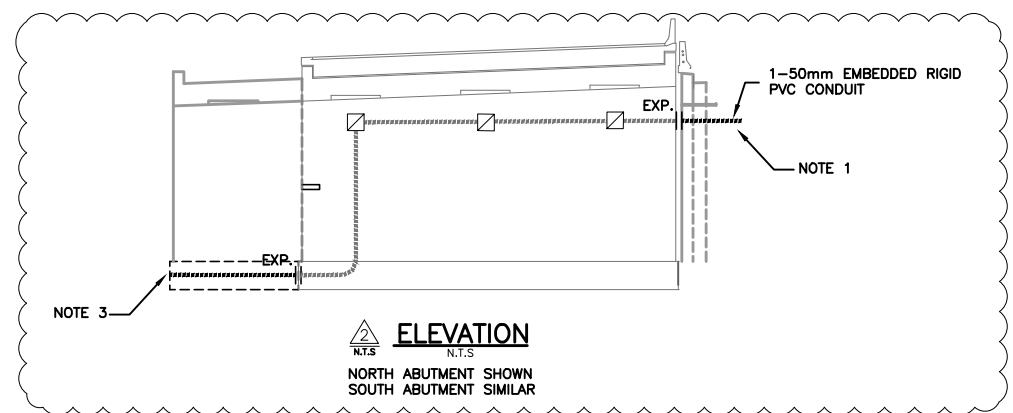
- RIGID JUNCTION BOX EMBEDDED TYPE P2-6 OPSD 2300.020
- EXP. || EXPANSION AND DEFLECTION FITTING ASSEMBLY PER OPSD 2302.02
- EXISTING RIGID JUNCTION BOX EMBEDDED



DETAIL 'A' - TERMINATION OF EMBEDDED DUCT
N.T.S.



DETAIL 'B' - TERMINATION OF EMBEDDED DUCT
N.T.S.



ELEVATION 3
N.T.S.

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 DATE PLOTTED: 3/19/2018 3:38:29 PM BY:

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
18/03/21	90% SUBMISSION TO CA				
18/01/12	90% SUBMISSION TO CA				

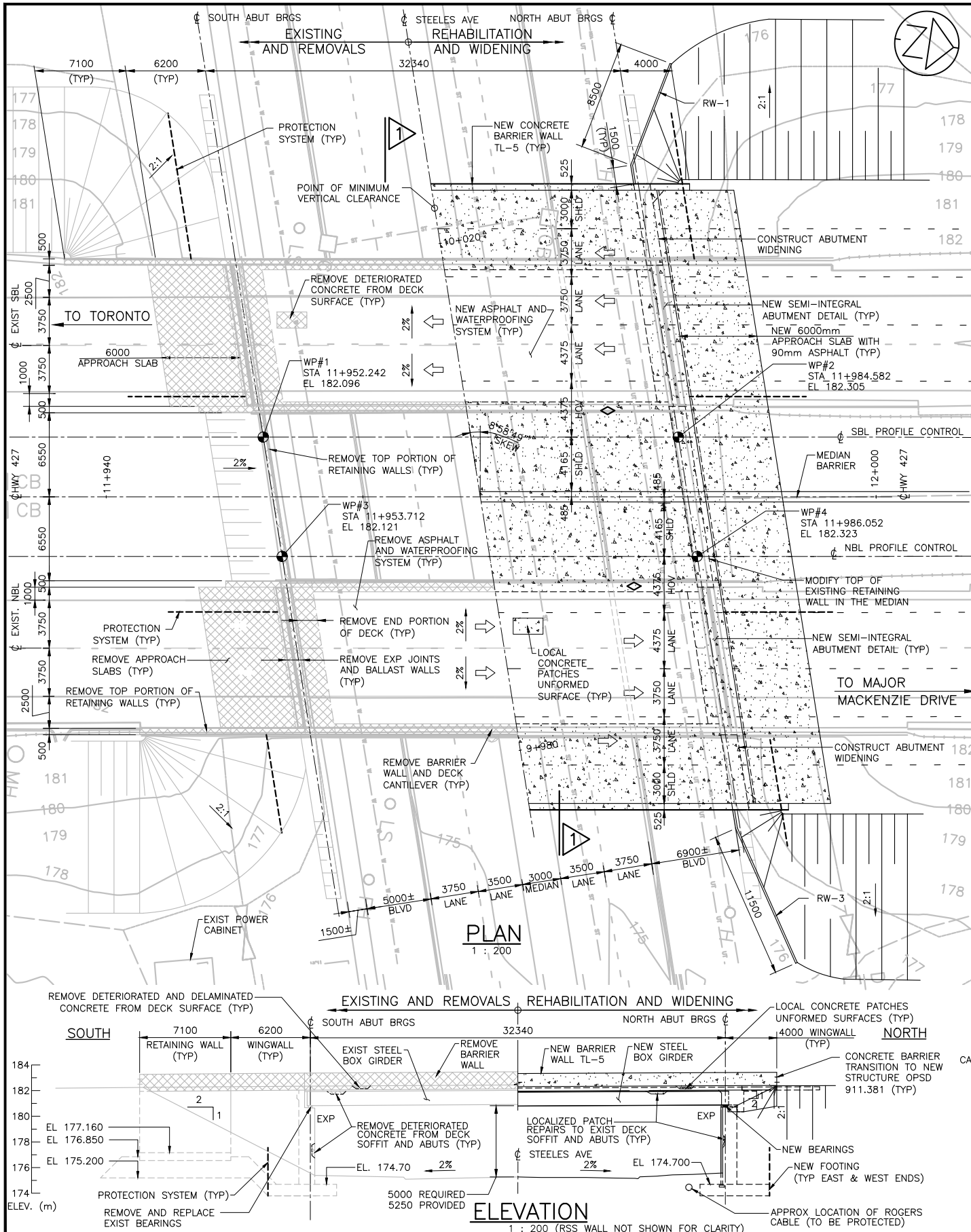
SCALE :

N.T.S.

DESIGNED	MANPREET PANESAR	M.P.
DRAWN	KARMIJIT GILL	K.G.
CHECKED	LENNOX LUE	L.L.
APPROVED LEAD ENG.	MARIO TEDESCO	M.T.
APPROVED PROJ. MANAGER		
NAME (PRINT)		INIT. DATE



TITLE							
HWY 427 EXPANSION HWY 427 RAMP 407EW-427S REHABILITATION R - 1 SITE 37-1115 ELECTRICAL EMBEDDED WORK							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9	STR	B06	DWG	812	B



GENERAL NOTES:

- DESIGN STANDARDS AND CODES:
 - SCHEDULE 15-1 AND SCHEDULE 15-2: PROJECT AGREEMENT
 - DESIGN CODE: CAN/CSA-S6-14
 - MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL MANUAL
 - MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURE REHABILITATION MANUAL
 - ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS)
- LIVE LOAD: CL-625-ONT.
- CLASS OF CONCRETE

MASS CONCRETE	20 MPa
REMAINDER	30 MPa
- CLEAR COVER TO REINFORCING STEEL

FOOTINGS	100 ± 25
DECK	70 ± 20
REMAINDER UNLESS OTHERWISE NOTED	40 ± 10
	70 ± 20
- REINFORCING STEEL
REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa, UNLESS OTHERWISE SPECIFIED.
UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS B.
BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWINGS SS12-1 UNLESS INDICATED OTHERWISE.
- GLASS FIBRE REINFORCED POLYMER (GFRP)
GLASS FIBRE REINFORCED POLYMER (GFRP) REINFORCING BARS SHALL BE GRADE III AS SPECIFIED IN THE CONTRACT DOCUMENTS.
THE NOMINAL DIAMETER, TENSILE MODULUS OF ELASTICITY AND GUARANTEED MINIMUM TENSILE STRENGTH SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.
BAR MARKS WITH THE PREFIX 'GIII' DENOTE GRADE III GFRP BARS.
- ROADWAY CLASSIFICATION: UFD 120.
- PROTECTION SYSTEM SHALL CONFORM TO PERFORMANCE LEVEL 2.
- ALL DIMENSIONS ARE IN MILLIMETERS ALL ELEVATIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

CONSTRUCTION NOTES:

- THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, DETAILS AND ELEVATIONS OF EXISTING STRUCTURE THAT ARE RELEVANT TO THE WORK SHOWN ON THE DRAWINGS PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER AND THE PROPOSED ADJUSTMENT OF THE WORK REQUIRED TO MATCH THE EXISTING STRUCTURE SHALL BE SUBMITTED FOR APPROVAL.
- THE CONTRACTOR SHALL ESTABLISH THE BEARING SEAT ELEVATIONS BY DEDUCTING THE ACTUAL BEARING THICKNESSES FROM THE TOP OF BEARING ELEVATIONS. IF THE ACTUAL BEARING THICKNESSES ARE DIFFERENT FROM THOSE GIVEN WITH THE BEARING DESIGN DATA, THE CONTRACTOR SHALL ADJUST THE REINFORCING STEEL TO SUIT.
- BACKFILL SHALL NOT BE PLACED BEHIND THE SUPERSTRUCTURE UNTIL THE DECK DIAPHRAGM IS IN PLACE AND HAS REACHED 70% OF ITS DESIGN STRENGTH.
- BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH END OF SUPERSTRUCTURE KEEPING THE HEIGHT OF BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.

RETAINED SOIL SYSTEM:

RETAINED SOIL WALLS SHALL HAVE THE FOLLOWING ATTRIBUTES:
APPLICATION: WALL/SLOPE
PERFORMANCE: HIGH
APPEARANCE: HIGH

LEGEND:

- REMOVALS
- NEW CONCRETE
- NEW ASPHALT

APPLICABLE STANDARD DRAWINGS:

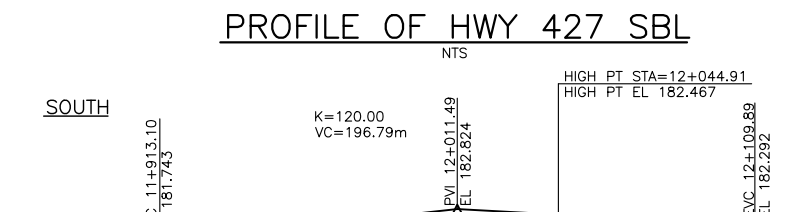
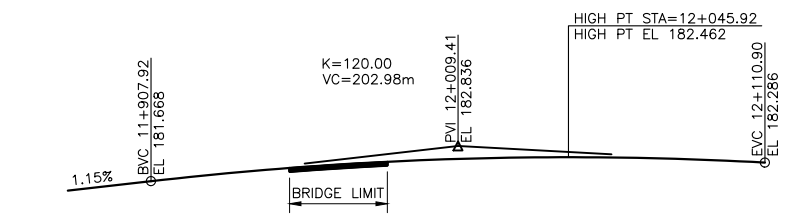
- OPSD 3101.150 WALLS - ABUTMENT, BACKFILL MINIMUM GRANULAR REQUIREMENTS
- OPSD 3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
- OPSD 3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS
- OPSD 3941.200 FIGURES IN CONCRETE - SITE NUMBER AND DATE LAYOUT

LIST OF DRAWINGS:

- 700 GENERAL ARRANGEMENT
- 701 BOREHOLE LOCATION AND SOIL STRATA I
- 702 BOREHOLE LOCATION AND SOIL STRATA II
- 703 CONSTRUCTION STAGING
- 704 FOUNDATION LAYOUT AND DETAILS
- 705 REMOVALS
- 706 ABUTMENTS
- 707 WINGWALLS
- 708 RETAINED SOIL SYSTEM WALLS
- 709 BEARINGS
- 710 STRUCTURAL STEEL I
- 711 STRUCTURAL STEEL II
- 712 STRUCTURAL STEEL III
- 713 STRUCTURAL STEEL IV
- 714 DECK DETAILS I
- 715 DECK DETAILS II
- 716 DECK DETAILS III
- 717 EXTERIOR BARRIER WALL
- 718 INTERIOR BARRIER WALL
- 719 6000mm APPROACH SLAB
- 720 STANDARD DETAILS
- 721 ELECTRICAL EMBEDDED WORK

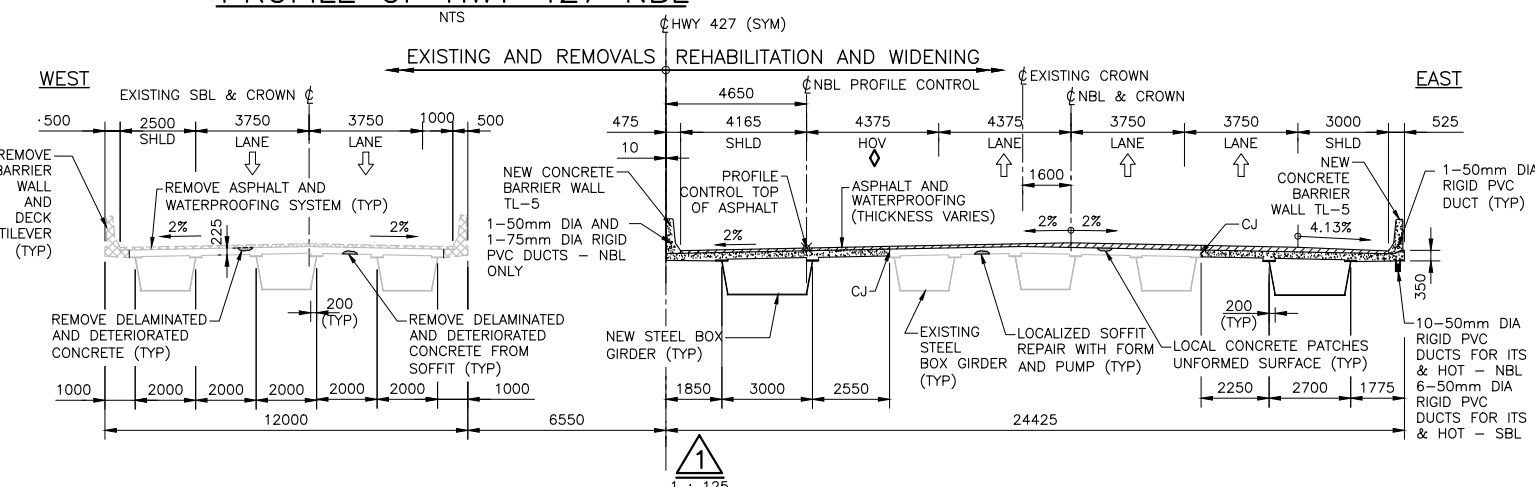
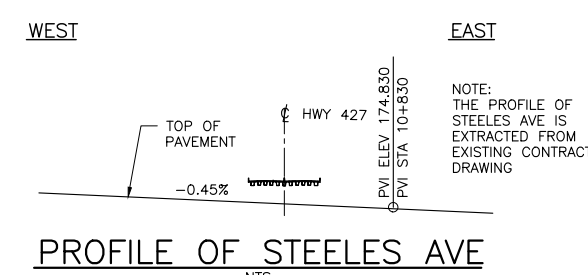
LIST OF ABBREVIATIONS:

- APPROX APPROXIMATE
- HOV HIGH-OCCUPANCY VEHICLE LANE
- PT POINT
- PVI POINT OF VERTICAL INTERSECTION
- T/F TOP OF FOOTING
- WP WORKING POINT



NORTH

NORTH



CAD FILE LOCATION AND NAME: C:\projects\hwy427\dwg\hwy427-d0-9a-str-607-dwg-700ga.dwg
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DATE PLOTTED: 3/19/2018 1:40:02 PM BY: PANG, FEI

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B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

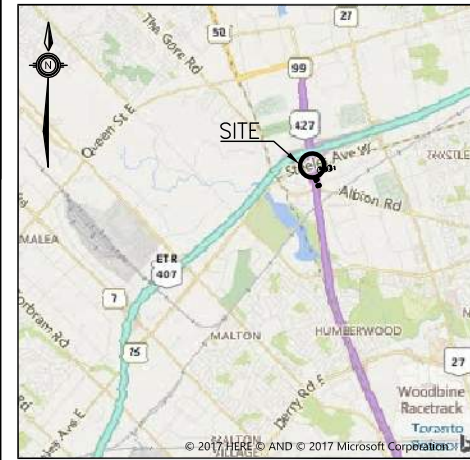
SCALE :
AS NOTED

DESIGNED	SUBOON OHM
DRAWN	SOPHA MILLS
CHECKED	NIMA MAHMOUDI
APPROVED LEAD ENG.	TATIANA GJALA
APPROVED PROJ. MANAGER	



HWY 427 EXPANSION HWY 427 / STEELES AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 GENERAL ARRANGEMENT							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	700	C

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



KEY PLAN

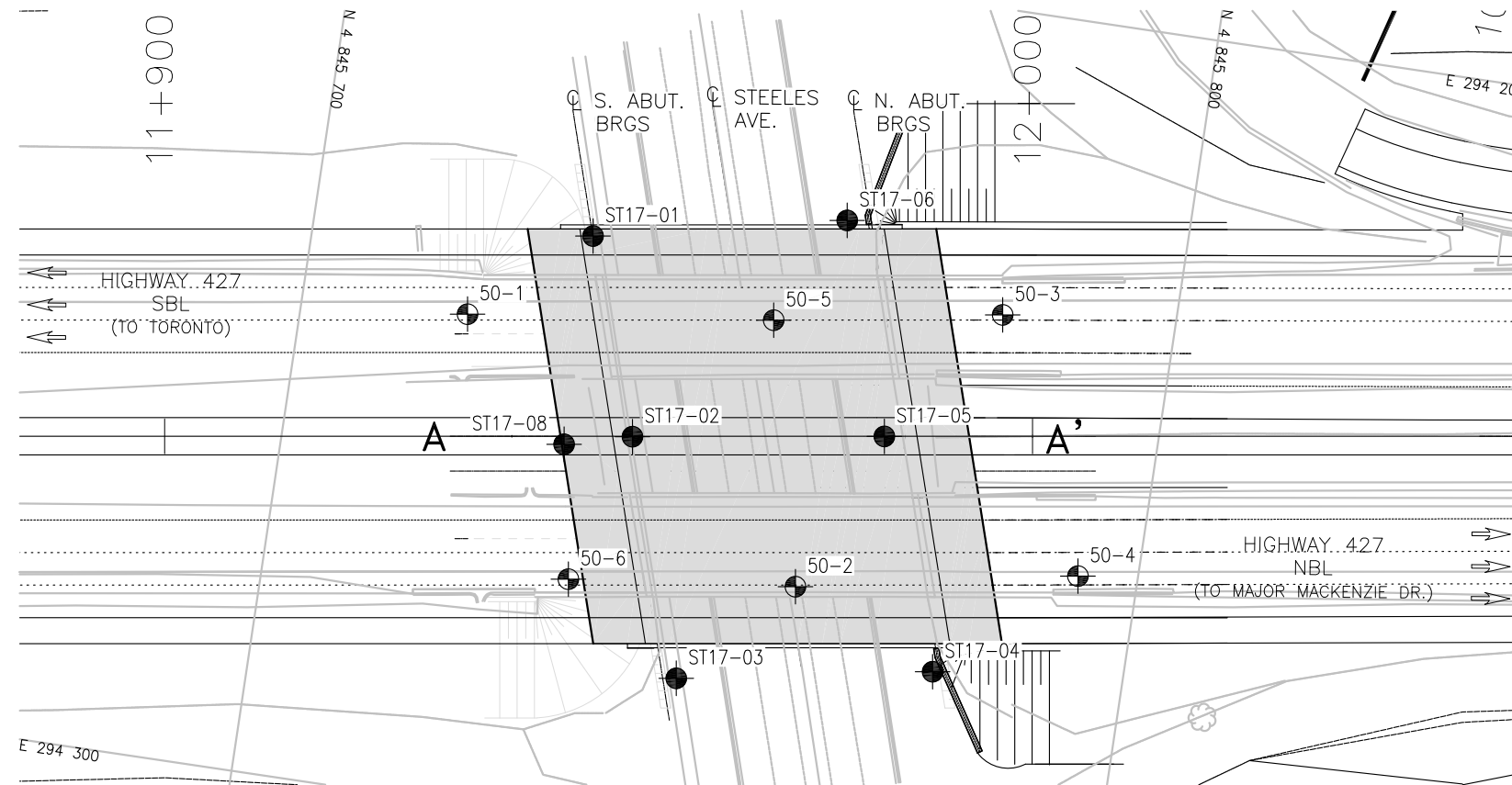
LEGEND

- Borehole (By Thurber)
- ⊕ Borehole (By Others)
- N Blows /0.3m (Std Pen Test, 475J/blow)
- CONE Blows /0.3m (60' Cone, 475J/blow)
- PH Pressure, Hydraulic
- ☼ Water Level
- ☼ Head Artesian Water
- ☼ Piezometer
- 90% Rock Quality Designation (RQD)
- A/R Auger Refusal

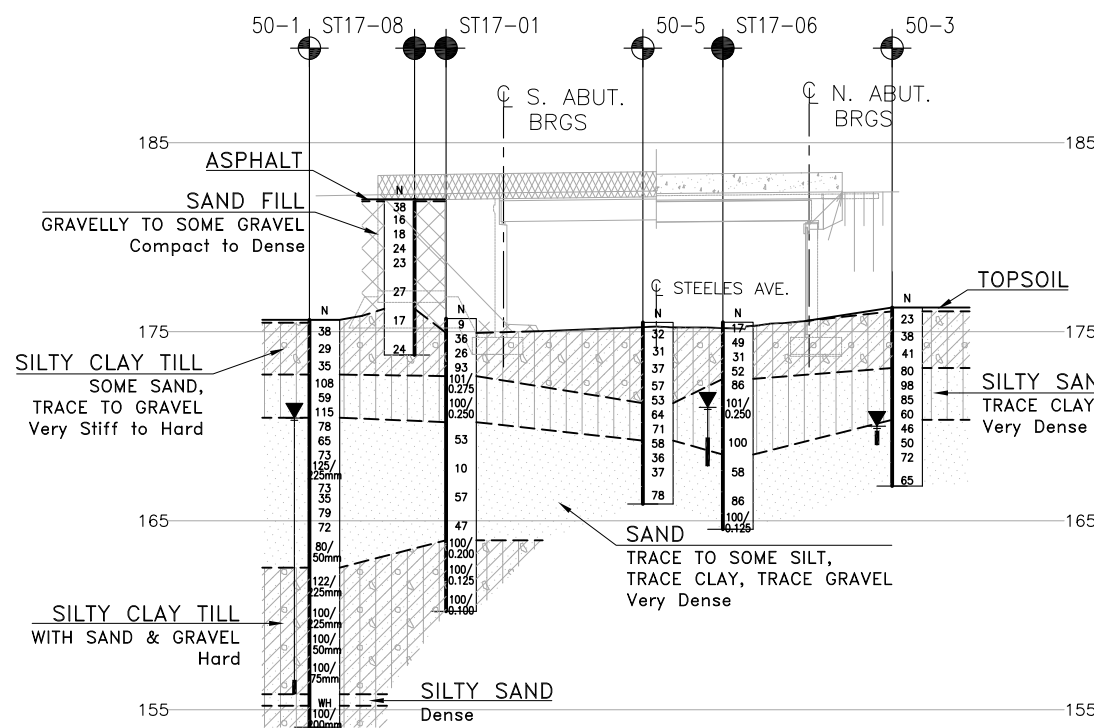
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50-1	175.6	4 845 719.1	294 243.9
50-2	175.4	4 845 761.1	294 269.4
50-3	176.3	4 845 780.1	294 234.9
50-4	176.0	4 845 793.1	294 263.4
50-5	175.5	4 845 754.1	294 239.4
50-6	175.3	4 845 735.1	294 272.4
ST17-01	175.7	4 845 732.1	294 232.9
ST17-02	175.5	4 845 740.0	294 255.1
ST17-03	175.3	4 845 749.1	294 281.9
ST17-04	175.4	4 845 778.2	294 276.8
ST17-05	175.5	4 845 768.7	294 250.8
ST17-06	175.5	4 845 760.8	294 226.8
ST17-08	182.0	4 845 732.3	294 257.1

- NOTES-**
- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
 - 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

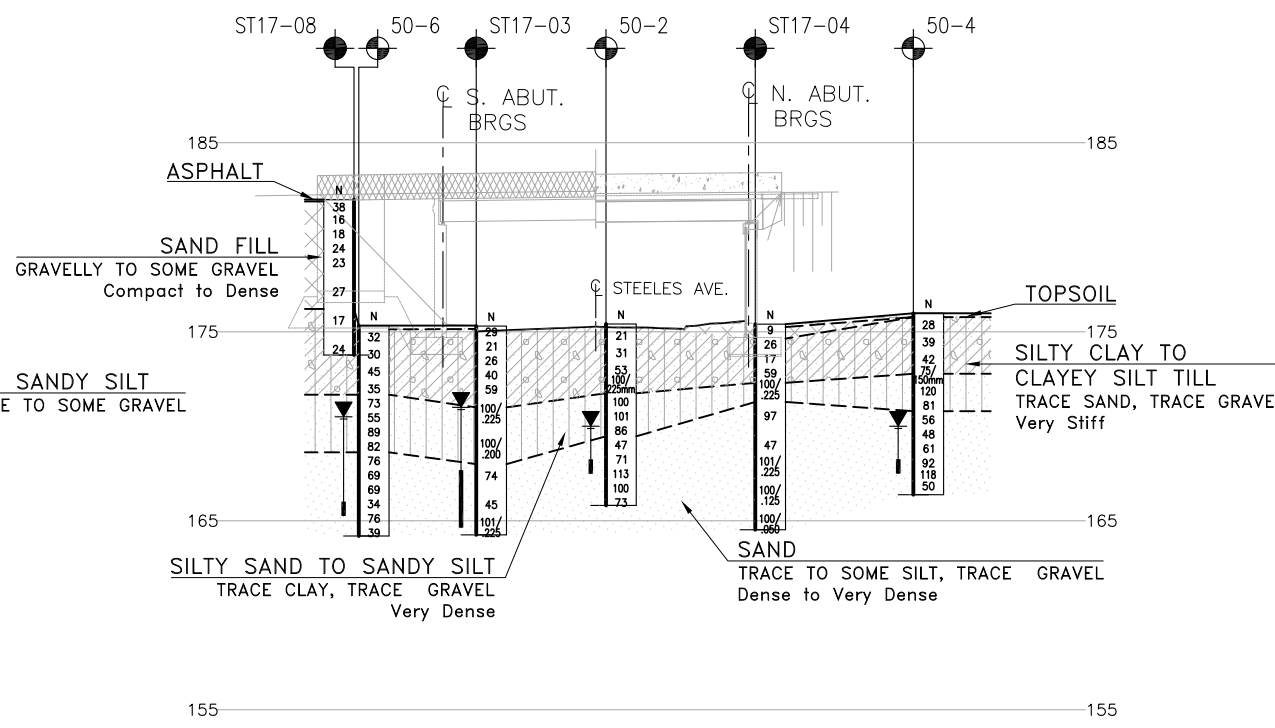
GEOCREs No.



PLAN



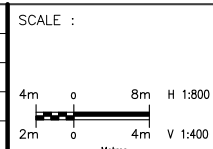
PROFILE ALONG HWY 427 SBL



PROFILE ALONG HWY 427 NBL

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PLOTDATE: 3/20/2018 9:43 AM

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B	18/01/09	90% SUBMISSION TO CA	AN	KS	JL	JL
A	17/10/31	90% SUBMISSION TO CA	AN	KS	JL	JL

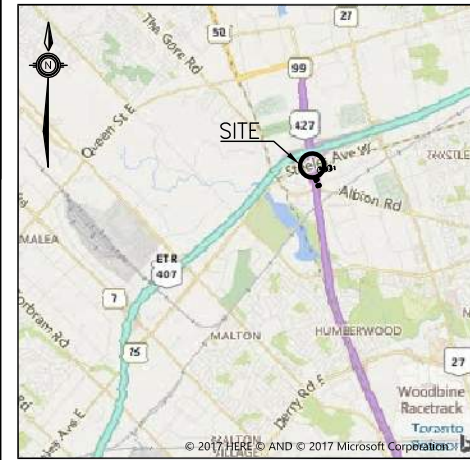


DESIGNED	A. PIASCK	AP	18/03/16
DRAWN	A. NOOR	AN	18/03/16
CHECKED	K. SHI	KS	18/03/16
APPROVED LEAD ENGINEER	J. LEE	JL	18/03/16
APPROVED PROJ. MANAGER	J. LEE	JL	18/03/16



TITLE							
HWY 427 EXPANSION HWY 427 / STEELES AVE. OVERPASS NBL & SBL REHABILITATION AND WIDENING							
BOREHOLE LOCATIONS AND SOIL STRATA I							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	701	C

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



KEYPLAN

LEGEND

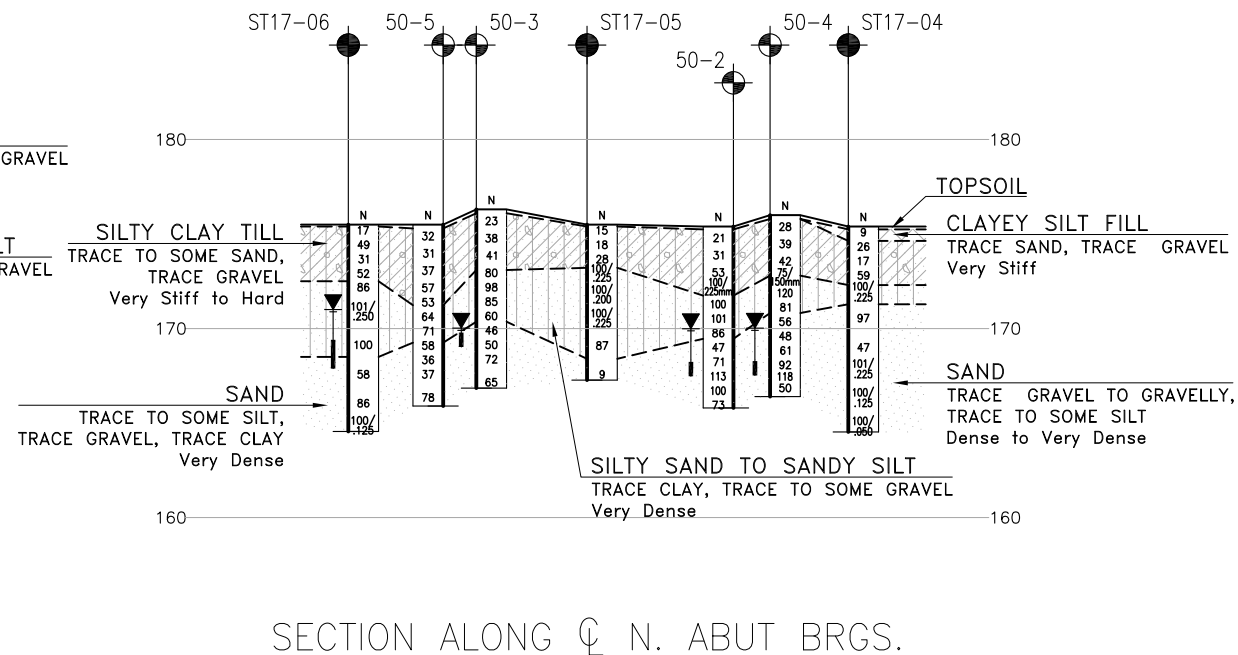
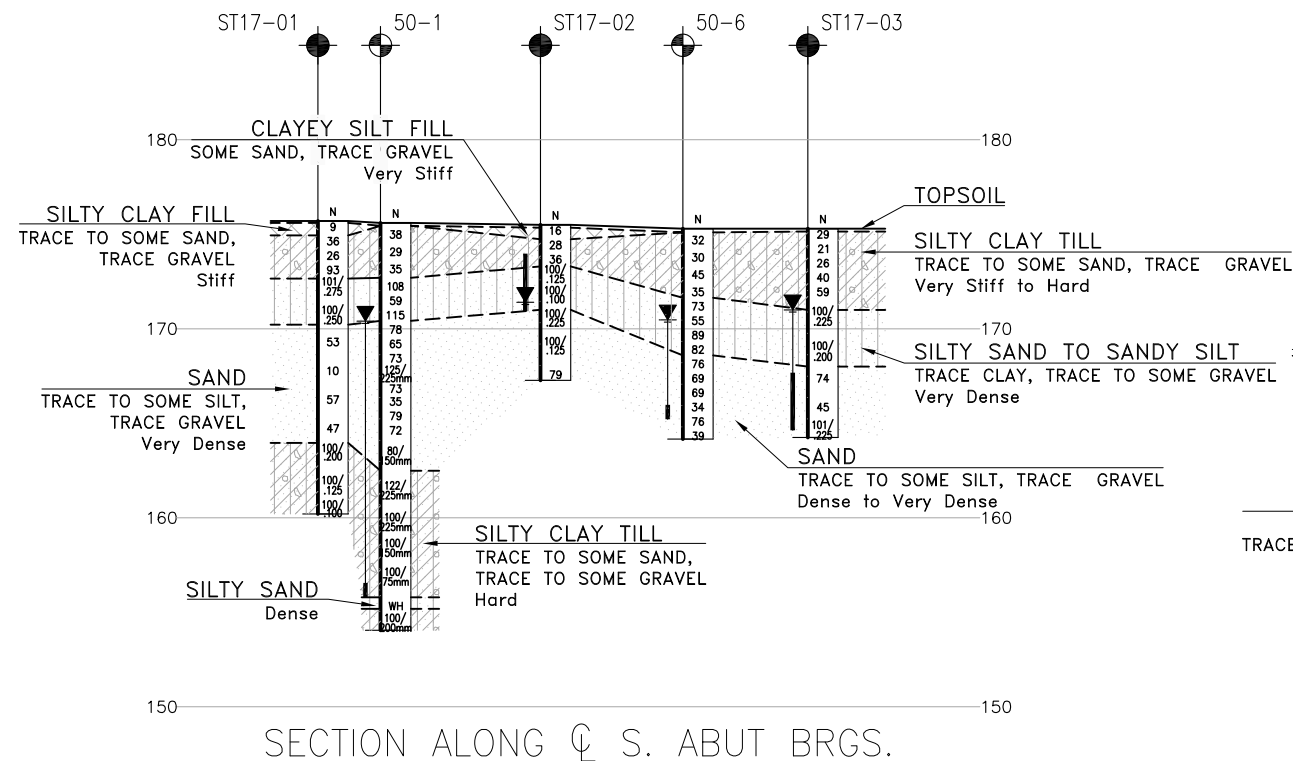
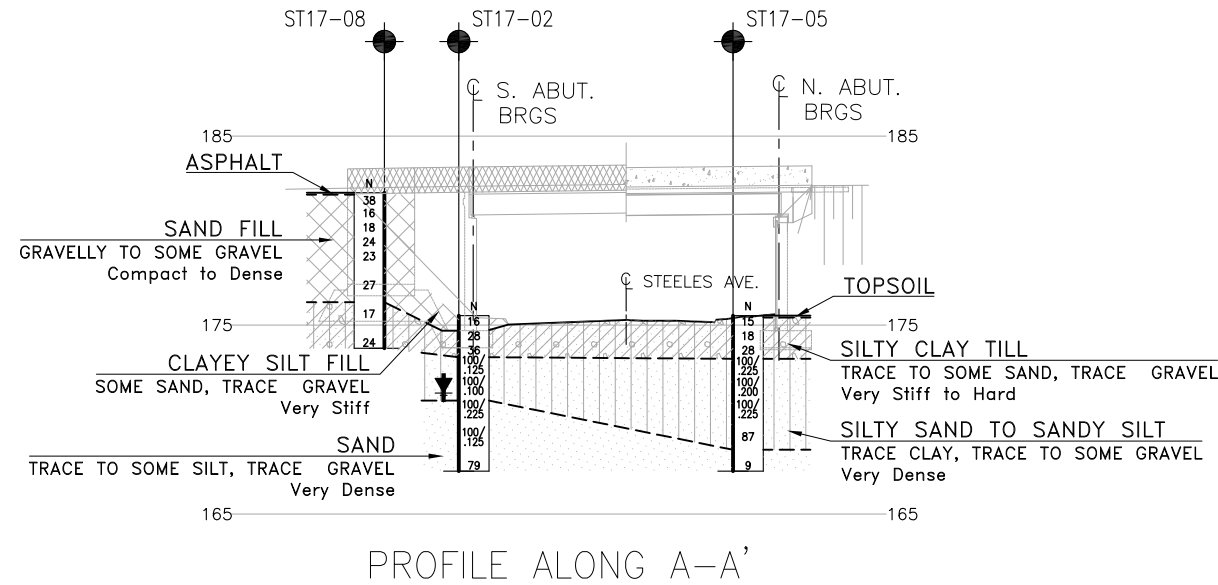
- Borehole (By Thurber)
- Borehole (By Others)
- N Blows /0.3m (Std Pen Test, 475J/blow)
- CONE Blows /0.3m (60' Cone, 475J/blow)
- PH Pressure, Hydraulic
- Water Level
- Head Artesian Water
- Piezometer
- Rock Quality Designation (RQD)
- Auger Refusal

NO	ELEVATION	NORTHING	EASTING
50-1	175.6	4 845 719.1	294 243.9
50-2	175.4	4 845 761.1	294 269.4
50-3	176.3	4 845 780.1	294 234.9
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ST17-01	175.7	4 845 732.1	294 232.9
ST17-02	175.5	4 845 740.0	294 255.1
ST17-03	175.3	4 845 749.1	294 281.9
ST17-04	175.4	4 845 778.2	294 276.8
ST17-05	175.5	4 845 768.7	294 250.8
ST17-06	175.5	4 845 760.8	294 226.8
ST17-08	182.0	4 845 732.3	294 257.1

-NOTES-

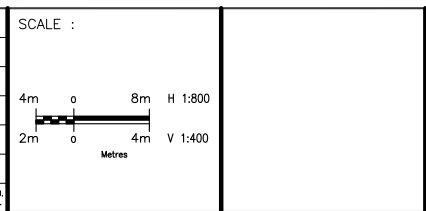
- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEORES No.



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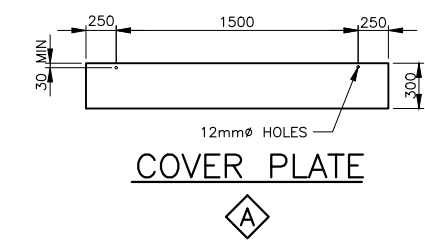
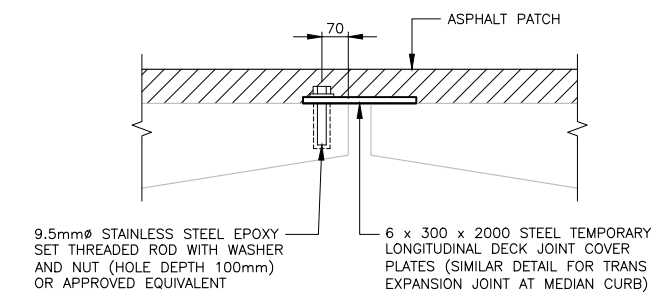
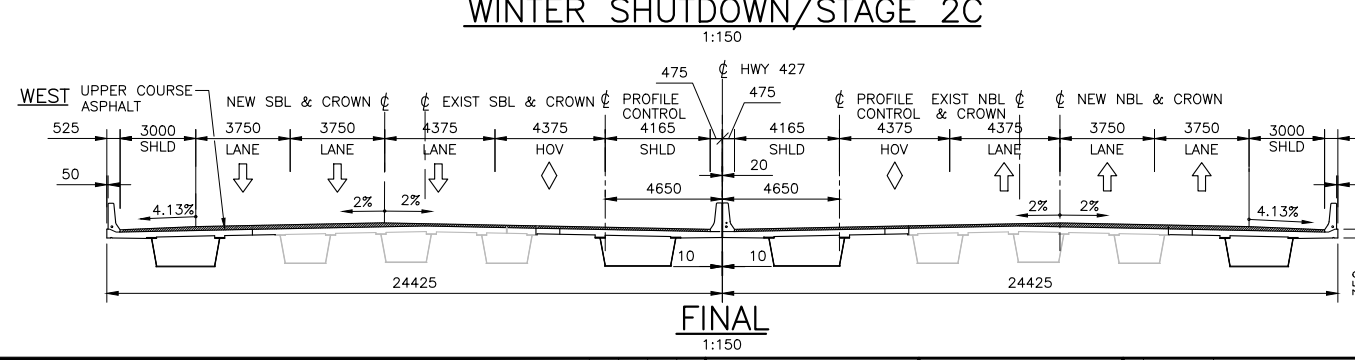
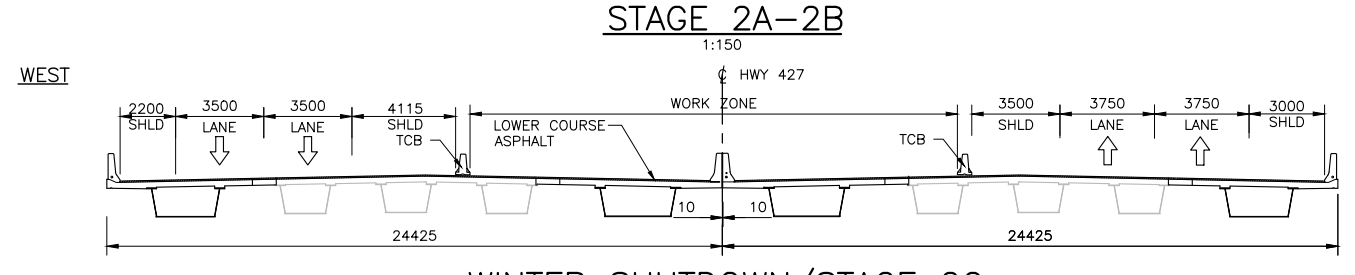
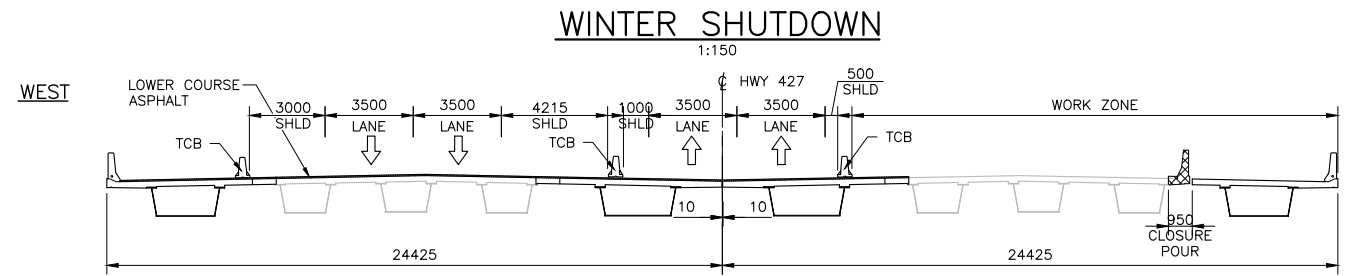
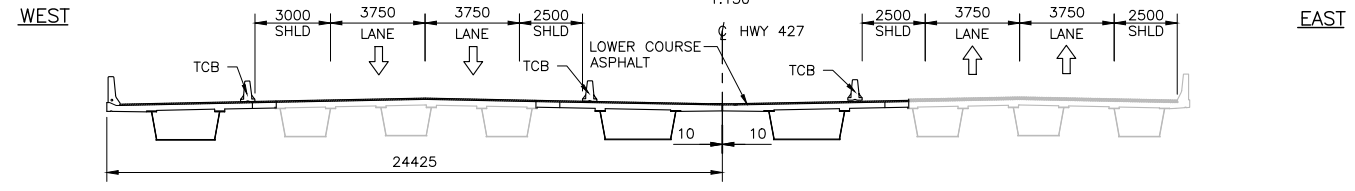
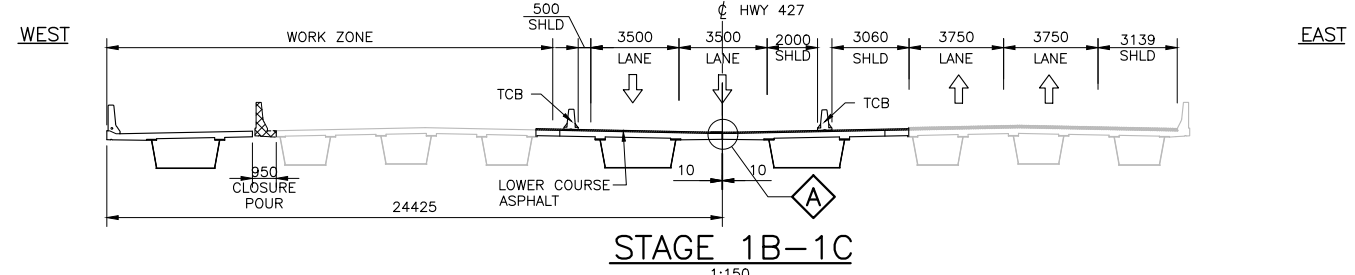
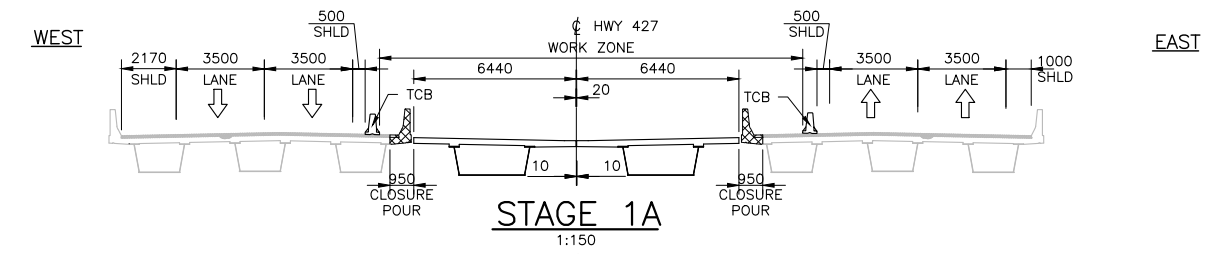
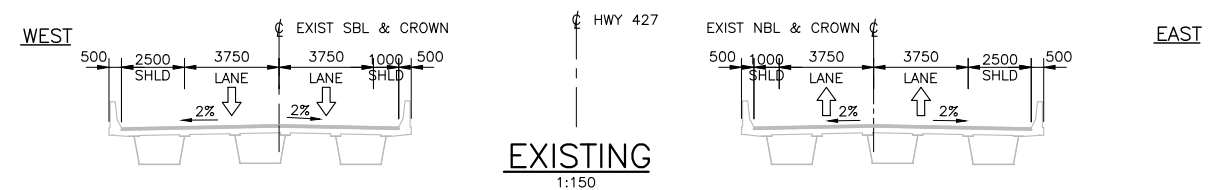
NO.	DATE	REVISIONS	BY	CHK	LEO. ENG.	PROJ. MAN.
C	18/03/16	90% SUBMISSION TO CA	AN	KS	JL	JL
B	18/01/09	90% SUBMISSION TO CA	AN	KS	JL	JL
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DESIGNED	A. PIASOK	AP	18/03/16
DRAWN	A. NOOR	AN	18/03/16
CHECKED	K. SHI	KS	18/03/16
APPROVED LEAD ENGINEER	J. LEE	JL	18/03/16
APPROVED PROJ. MANAGER	J. LEE	JL	18/03/16

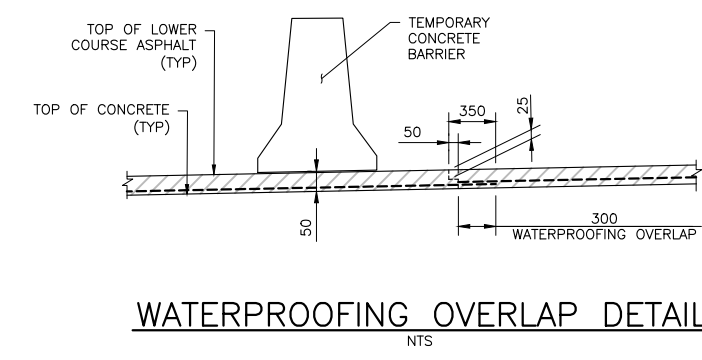


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HWY 427 EXPANSION HWY 427 / STEELES AVE. OVERPASS NBL & SBL REHABILITATION AND WIDENING							
BOREHOLE LOCATIONS AND SOIL STRATA II							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	702	C



TEMPORARY LONGITUDINAL DECK JOINT COVER PLATE

- NOTES:
- COVER PLATE SHALL EXTEND FULL LENGTH OF BRIDGE.
 - CUT ROD FLUSH WITH TOP OF NUT.



- NOTES:**
- SCOPE OF REHABILITATION WORK AND STAGING:**
- EXISTING:**
- JACK EACH SUPERSTRUCTURE AND REPLACE ALL BEARINGS AT ABUTMENTS.
 - PATCH REPAIR EXISTING DECK SOFFIT AND ABUTMENTS.
- STAGE 1A:**
- SHIFT TRAFFIC TO THE EXTERIOR OF THE EXISTING BRIDGES AND INSTALL TEMPORARY TRAFFIC BARRIERS.
 - INSTALL PROTECTION SYSTEM.
 - REMOVE PART OF THE RETAINING WALLS BETWEEN NB AND SB STRUCTURES AND CONSTRUCT BEARING SEAT CORBELS.
 - PLACE NEW BEARINGS AND ERECT NEW STEEL BOX GIRDERS.
 - REMOVE ASPHALT, WATERPROOFING, DETERIORATED AND DELAMINATED CONCRETE FROM EXISTING DECK SURFACE. REMOVE PART OF EXPANSION JOINT ASSEMBLIES, PART OF APPROACH SLABS, INTERIOR BARRIER WALLS, DECK CANTILEVERS, PART OF BALLAST WALLS AND PART OF WINGWALLS.
 - REMOVE PART OF EXISTING DECK ENDS TO FACILITATE CONSTRUCTION OF SEMI-INTEGRAL EXTENSION.
 - INSTALL STEEL BRACINGS BETWEEN EXISTING AND NEW GIRDERS AT ABUTMENTS ONLY.
 - PATCH REPAIR EXISTING DECK AND POUR PART OF CONCRETE DECK OVER NEW GIRDERS AND SEMI-INTEGRAL EXTENSION WITHIN THE WORK ZONE.
 - INSTALL REMAINING STEEL BRACINGS BETWEEN EXISTING AND NEW GIRDERS AFTER THE CONCRETE IN ADJACENT DECK HAS REACHED 30MPa STRENGTH. DO NOT TIGHTEN THE BOLTS.
 - POUR CLOSURE STRIP WHEN CONCRETE IN DECK SLAB AND SEMI-INTEGRAL EXTENSION HAS REACHED 30 MPA STRENGTH.
 - CONSTRUCT PART OF APPROACH SLABS.
 - FASTEN STEEL PLATE OVER THE GAP BETWEEN TWO BRIDGES.
 - WATERPROOF AND PAVE LOWER COURSE ASPHALT. ADDITIONAL LAYER OF 300mm WATERPROOFING PROTECTION BOARD TO BE ADDED AT CONSTRUCTION JOINT.
 - TIGHTEN THE BOLTS OF STEEL BRACINGS.
- STAGE 1B-1C:**
- SHIFT SB TRAFFIC TO THE MEDIAN AND INSTALL TEMPORARY TRAFFIC BARRIERS.
 - ADJUST PROTECTION SYSTEM.
 - CONSTRUCT EXTENSION OF FOOTINGS AND ABUTMENT WALLS TO THE WEST.
 - PLACE NEW BEARINGS AND ERECT NEW STEEL BOX GIRDER.
 - REMOVE ASPHALT, WATERPROOFING, DETERIORATED AND DELAMINATED CONCRETE FROM EXISTING DECK. REMOVE PART OF EXPANSION JOINT ASSEMBLIES, APPROACH SLABS, EXTERIOR BARRIER WALL, DECK CANTILEVER, PART OF BALLAST WALLS AND PART OF WINGWALLS.
 - REMOVE PART OF EXISTING DECK ENDS TO FACILITATE CONSTRUCTION OF SEMI-INTEGRAL EXTENSION.
 - INSTALL STEEL BRACINGS BETWEEN EXISTING AND NEW GIRDER AT ABUTMENTS ONLY.
 - PATCH REPAIR EXISTING DECK AND POUR PART OF CONCRETE DECK OVER NEW GIRDER AND SEMI-INTEGRAL EXTENSION WITHIN THE WORK ZONE.
 - INSTALL REMAINING STEEL BRACINGS BETWEEN EXISTING AND NEW GIRDERS AFTER THE CONCRETE IN ADJACENT DECK HAS REACHED 30MPa STRENGTH. DO NOT TIGHTEN THE BOLTS.
 - POUR CLOSURE STRIP WHEN CONCRETE IN DECK SLAB AND SEMI-INTEGRAL EXTENSION HAS REACHED 30MPa STRENGTH.
 - CONSTRUCT PART OF APPROACH SLABS.
 - REMOVE 350mm OF LOWER COURSE ASPHALT AND 300mm PROTECTION BOARD ADDED AT CONSTRUCTION JOINT. WATERPROOF AND PAVE LOWER COURSE ASPHALT.
 - TIGHTEN THE BOLTS OF STEEL BRACINGS.
- WINTER SHUTDOWN:**
- INSTALL TEMPORARY TRAFFIC BARRIERS TO REINSTATE THE LANE CONFIGURATION SHOWN FOR SBL AND NBL.
- STAGE 2A-2B:**
- SHIFT NB TRAFFIC TO THE MEDIAN AND INSTALL TEMPORARY TRAFFIC BARRIERS.
 - ADJUST PROTECTION SYSTEM.
 - CONSTRUCT EXTENSION OF FOOTINGS AND ABUTMENT WALLS TO THE EAST.
 - REPEAT STEPS 4 TO 13 FROM STAGE 1B-1C FOR SB BRIDGE.
- STAGE 2C:**
- SHIFT TRAFFIC TO CREATE WORK ZONE IN THE MEDIAN.
 - REMOVE ASPHALT AND WATERPROOFING FROM PART OF DECK IN THE MEDIAN.
 - REMOVE TEMPORARY COVER PLATE. CUT STAINLESS STEEL THREADED RODS FLUSH WITH CONCRETE SURFACE.
 - CONSTRUCT MEDIAN BARRIER WALLS.
- POST STAGE 2C:**
- REMOVE TEMPORARY CONCRETE BARRIERS.
 - PAVE UPPER COURSE ASPHALT ON BRIDGE DECK AND APPROACH SLABS.
- LEGEND:**
- XXXXX REMOVALS

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 DATE PLOTTED: 3/19/2018 1:40:06 PM BY:

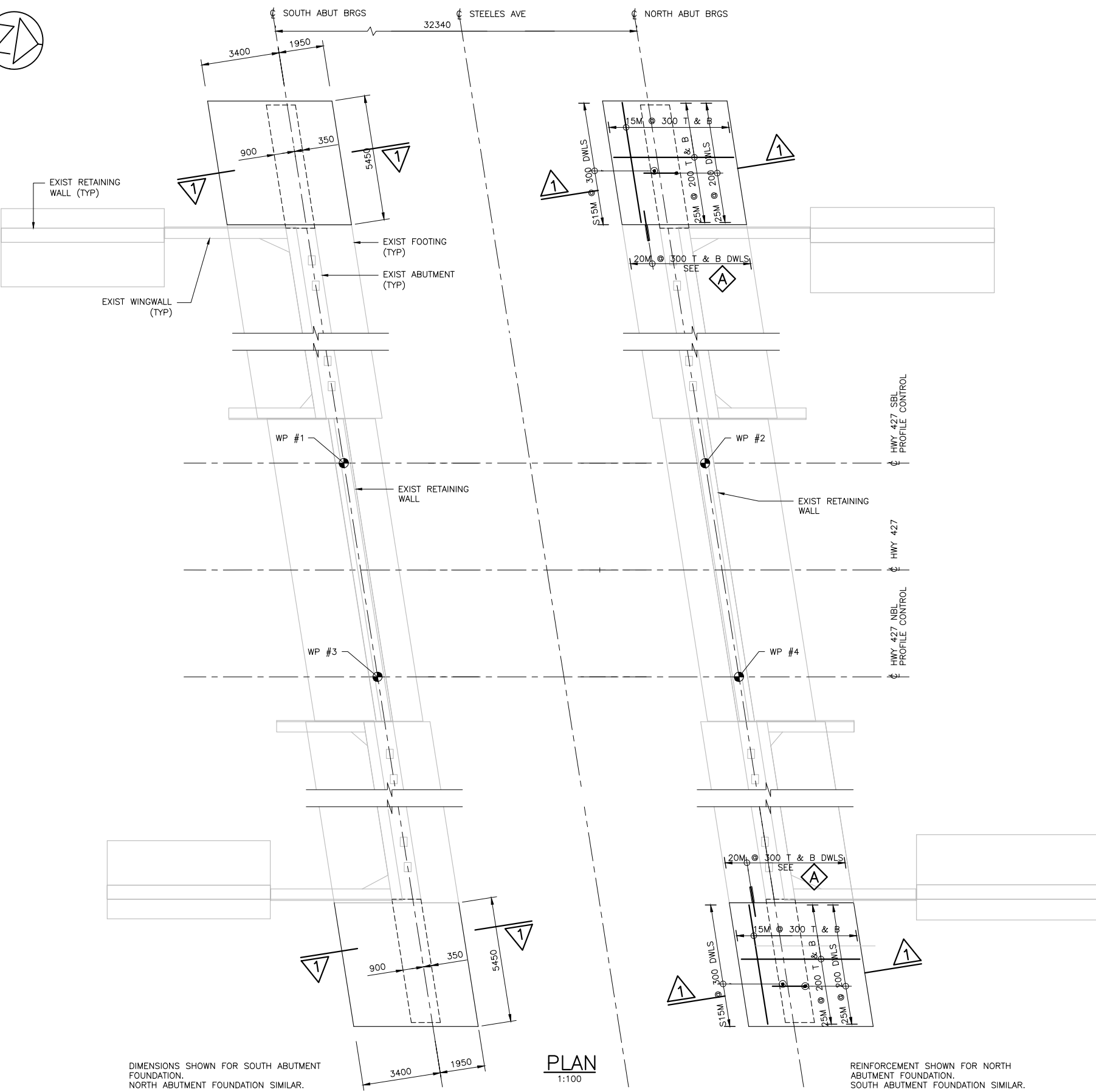
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C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE :
AS NOTED

DESIGNED	SUBOOHI ORND
DRAWN	SOPHA MILLS
CHECKED	NIMA MAHMOUDI
APPROVED LEAD ENG.	TATIANA GJALA
APPROVED PROJ. MANAGER	



<p>HWY 427 EXPANSION HWY 427 / STEELES AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 CONSTRUCTION STAGING</p>							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	703	C



DIMENSIONS SHOWN FOR SOUTH ABUTMENT FOUNDATION.
NORTH ABUTMENT FOUNDATION SIMILAR.

PLAN
1:100

REINFORCEMENT SHOWN FOR NORTH ABUTMENT FOUNDATION.
SOUTH ABUTMENT FOUNDATION SIMILAR.

NOTES:

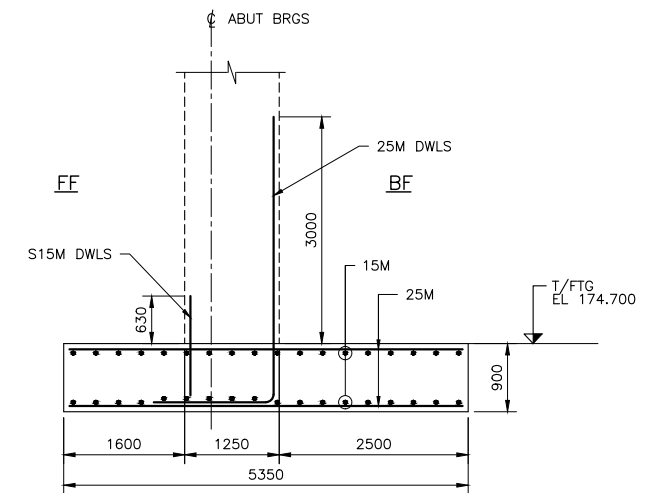
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 700, 703 AND 706.
2. SUBGRADE PREPARATION FOR ABUTMENT FOOTING WIDENING SHALL BE AS PER GEO-TECHNICAL RECOMMENDATIONS.
3. 100mm THICK PROTECTIVE COVER OF MASS CONCRETE SHOULD BE PLACED TO PROTECT THE SUBGRADE.

SOIL BEARING CAPACITY FOR ABUTMENT FOOTINGS:

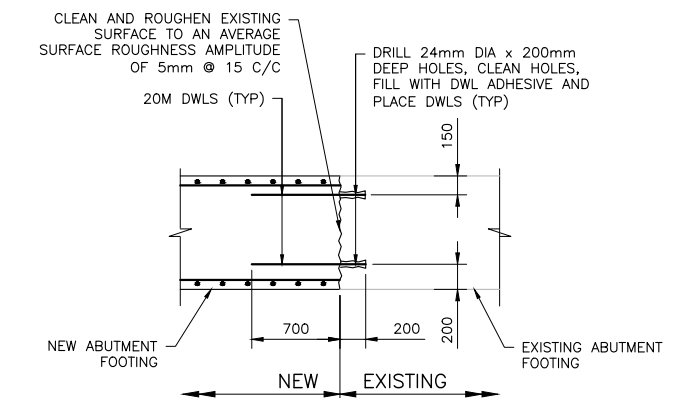
CAPACITY AT SLS: 425 KPa
CAPACITY AT ULS: 650 KPa

LIST OF ABBREVIATIONS:

WP WORKING POINT



1
1:50



A

TYPICAL ABUTMENT FOOTING CONNECTION DETAIL
1:30

CAD FILE LOCATION AND NAME: C:\projects\wsp-co\Projectwise\wsp-co\wsp-co\dm08255\H427-D0-9A-STR-607-DWG-704FD.dwg
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B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

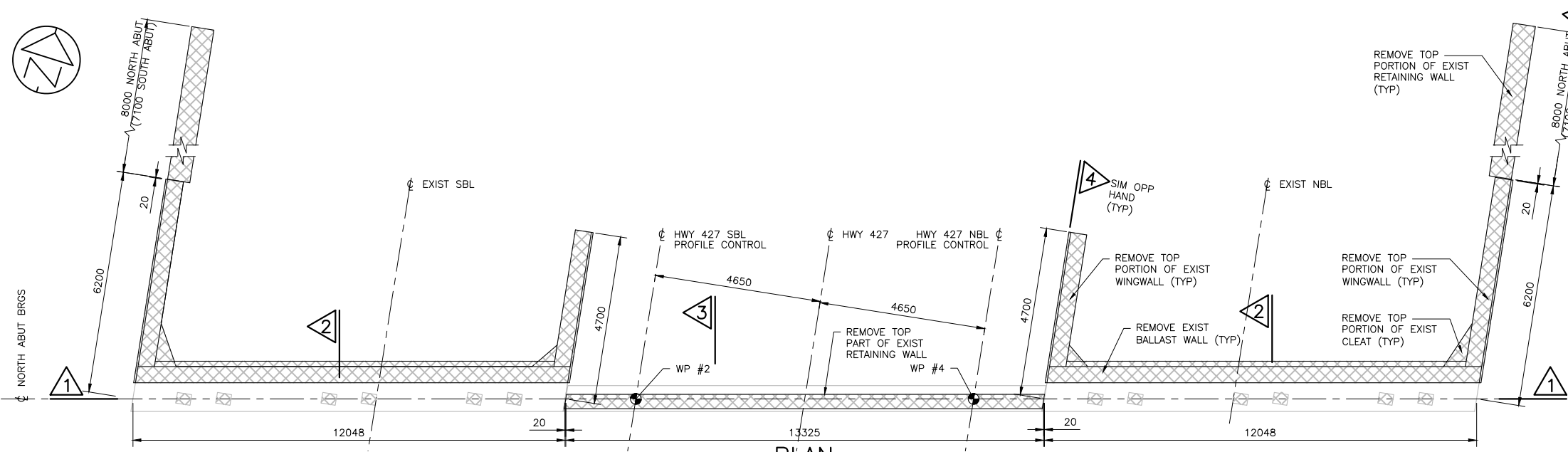
SCALE :

AS NOTED

CONSULTANT	DESIGNED	SUBOOHI OHAD	DATE
CONSULTANT	DRAWN	SOPHA MILLS	
	CHECKED	NIMA MAHMOUDI	
	APPROVED LEAD ENG.	TATIANA GJALA	
	APPROVED PROJ. MANAGER		
		NAME (PRINT)	INIT. DATE

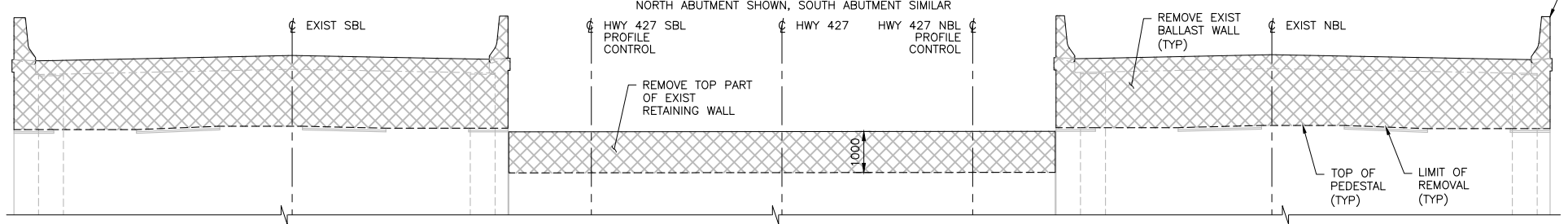


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HWY 427 EXPANSION HWY 427 / STEELES AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 FOUNDATION LAYOUT AND DETAILS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	704	C

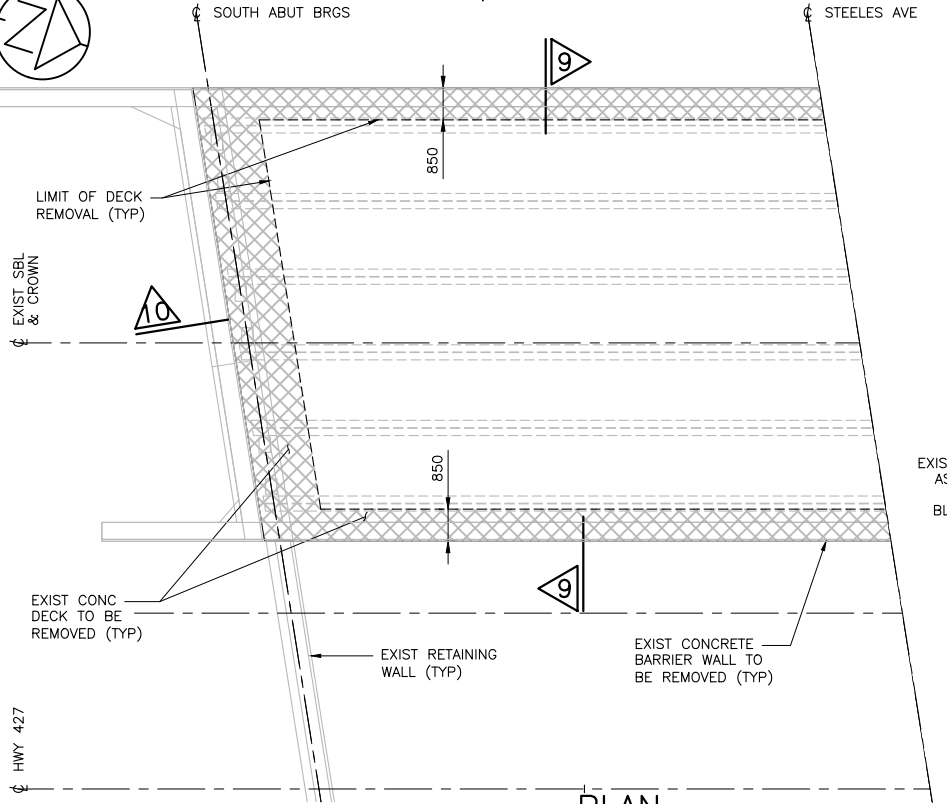


PLAN
1:75

WEST

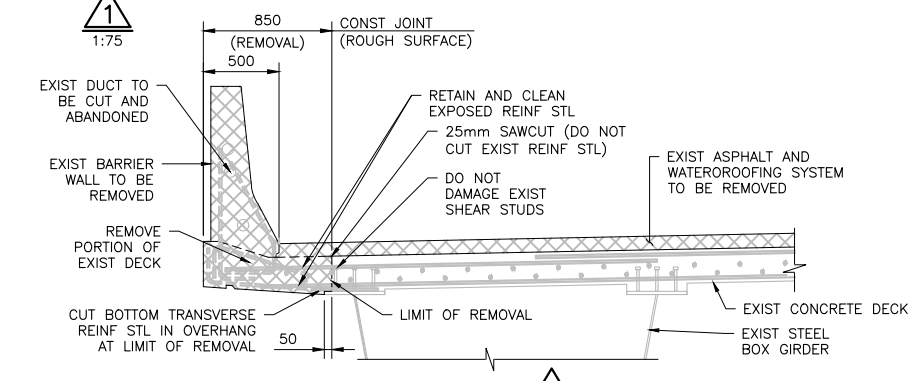


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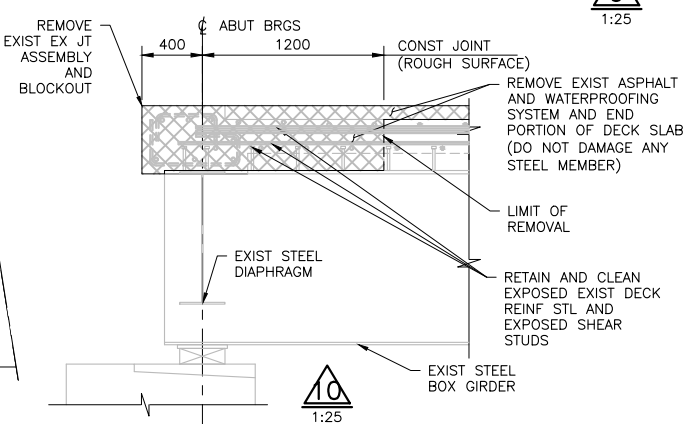


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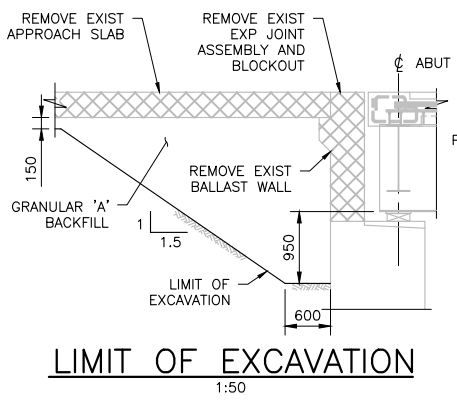
SOUTHBOUND LANE SHOWN, NORTHBOUND LANE SIMILAR



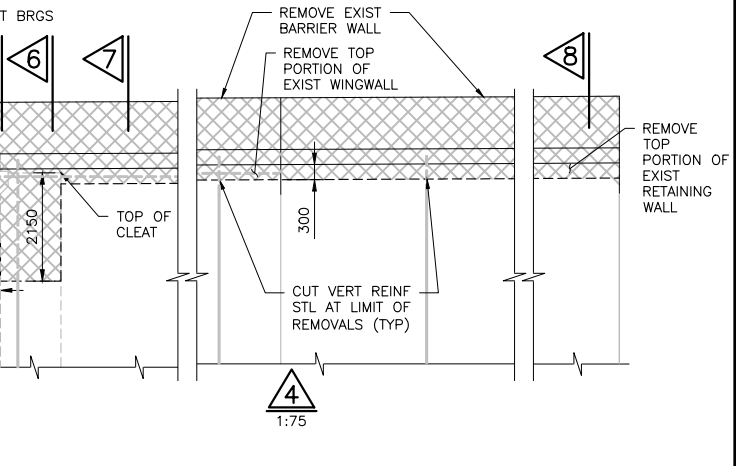
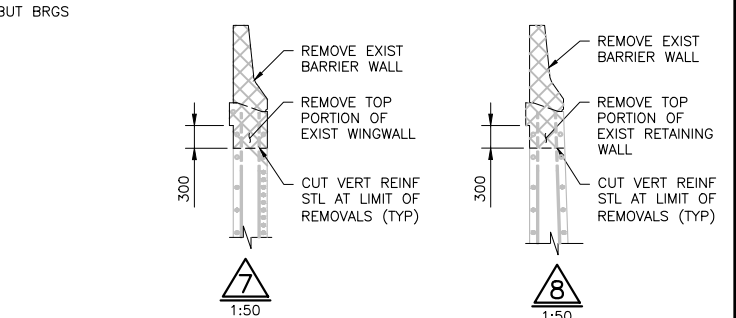
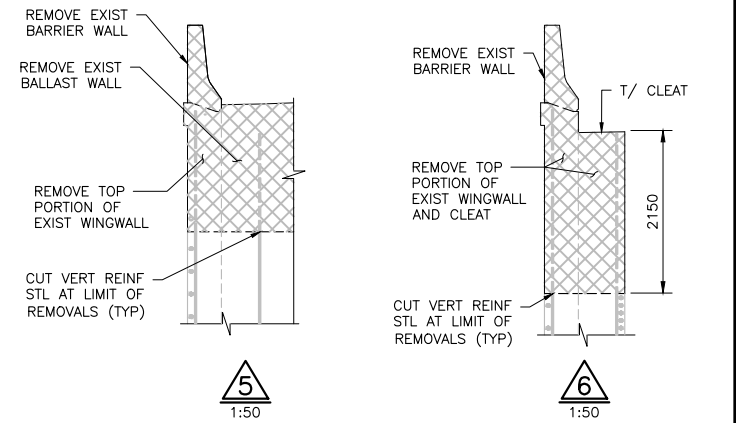
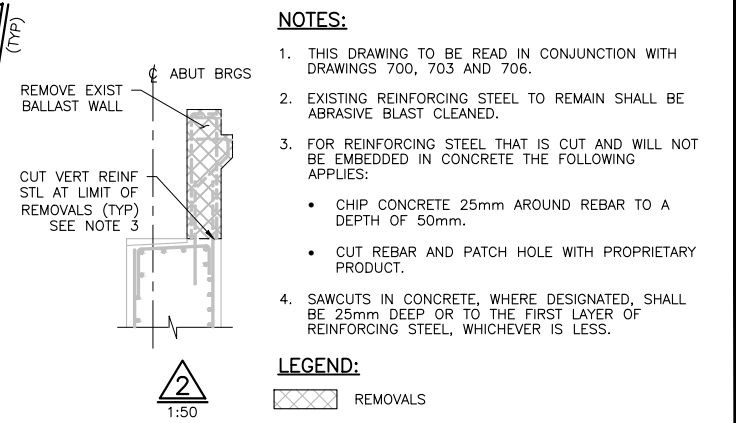
9
1:75



10
1:25



LIMIT OF EXCAVATION
1:50



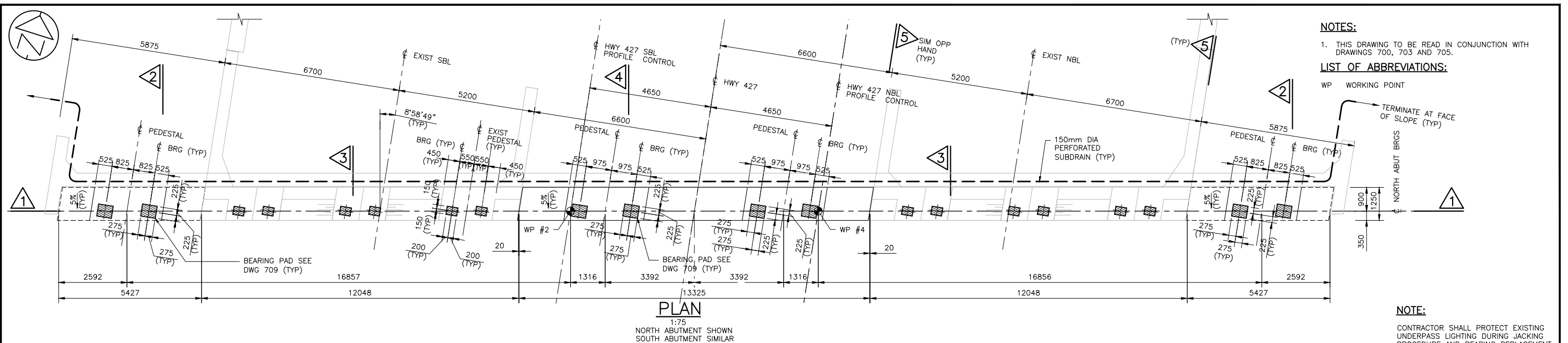
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 DATE PLOTTED: 3/19/2018 1:40:14 PM BY:

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
C	18/03/16	90% SUBMISSION TO CA			
B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

DESIGNED	SUBOOH OBAID	
DRAWN	SOPHA MILLS	
CHECKED	NIMA MAHMOUDI	
APPROVED LEAD ENG.	TATIANA GJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



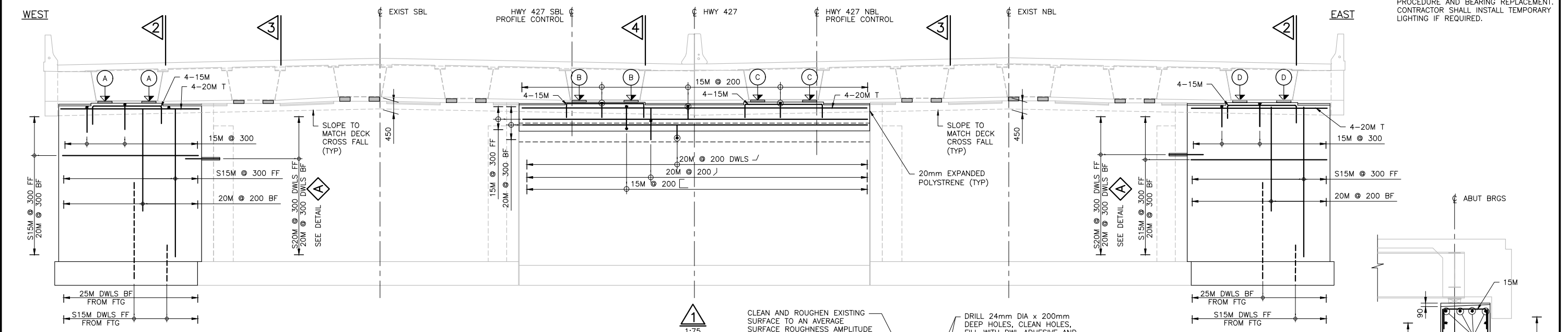
HWY 427 EXPANSION HWY 427 / STEELES AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 REMOVALS							
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H427-D	N	9A	STR	B07	DWG	705	C



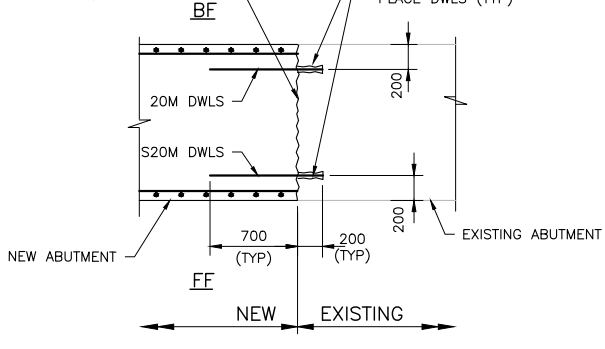
NOTES:
 1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 700, 703 AND 705.

LIST OF ABBREVIATIONS:
 WP WORKING POINT
 TERMINATE AT FACE OF SLOPE (TYP)

NOTE:
 CONTRACTOR SHALL PROTECT EXISTING UNDERPASS LIGHTING DURING JACKING PROCEDURE AND BEARING REPLACEMENT. CONTRACTOR SHALL INSTALL TEMPORARY LIGHTING IF REQUIRED.

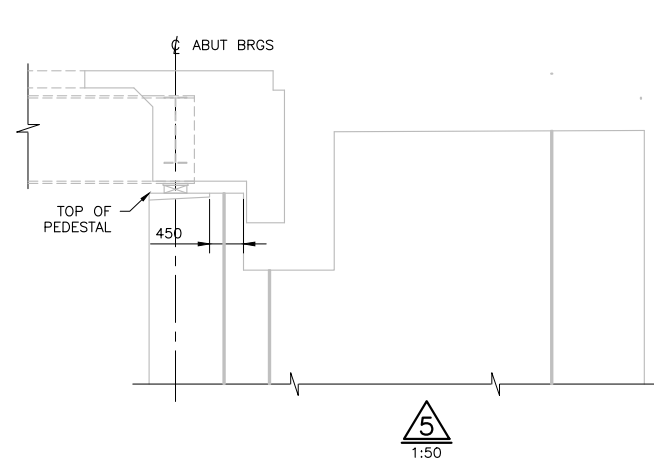
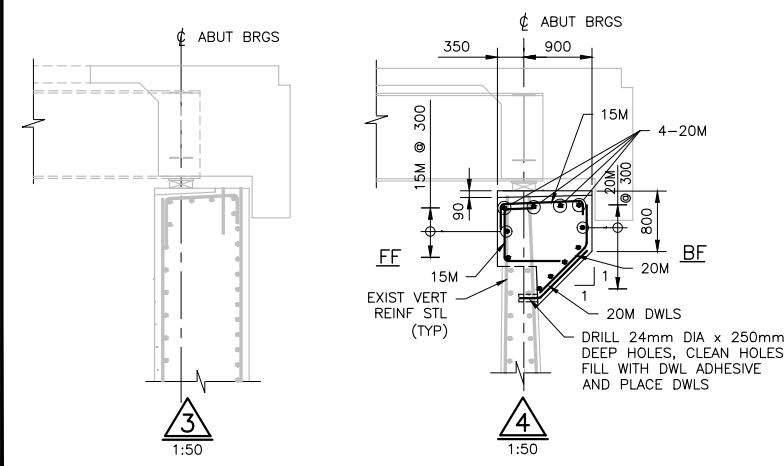
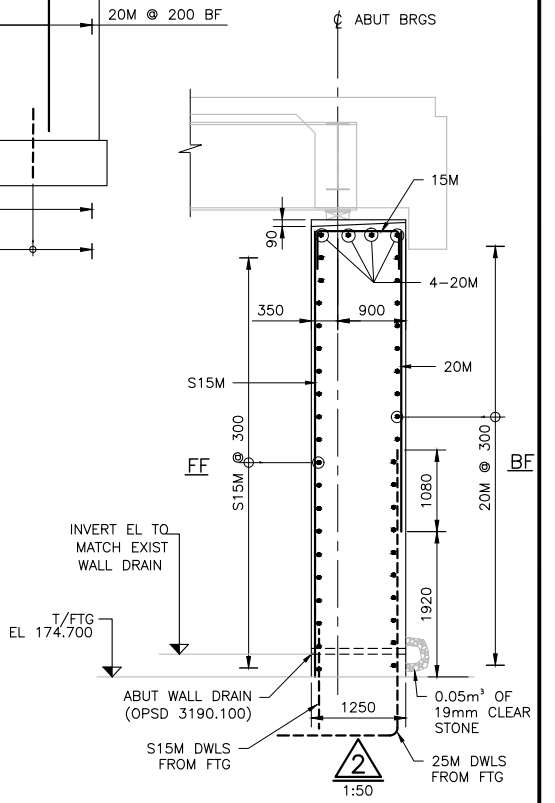


CLEAN AND ROUGHEN EXISTING SURFACE TO AN AVERAGE SURFACE ROUGHNESS AMPLITUDE OF 5mm @ 15 C/C
 DRILL 24mm DIA x 200mm DEEP HOLES, CLEAN HOLES, FILL WITH DWL ADHESIVE AND PLACE DWLS (TYP)



TYPICAL ABUTMENT CONNECTION DETAIL
 1:30

TOP OF BEARING ELEVATIONS	
POINTS	ELEVATIONS
NORTH ABUTMENT (A)	180.707
(B)	180.740
(C)	180.757
(D)	180.752
SOUTH ABUTMENT (A)	180.491
(B)	180.531
(C)	180.553
(D)	180.557



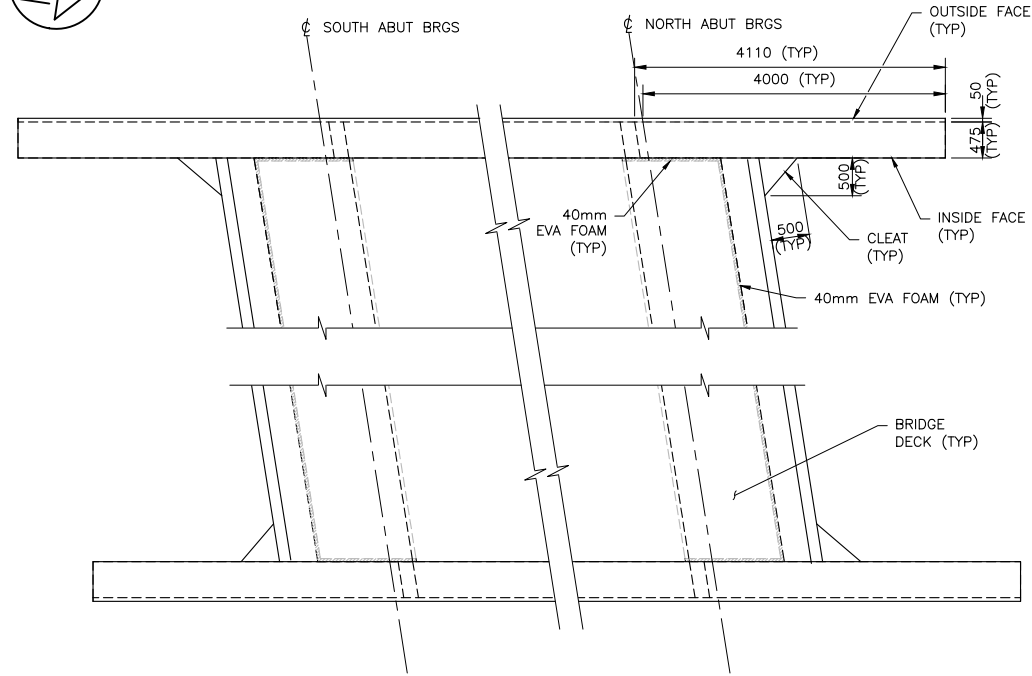
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B 18/01/09	90% SUBMISSION TO CA				
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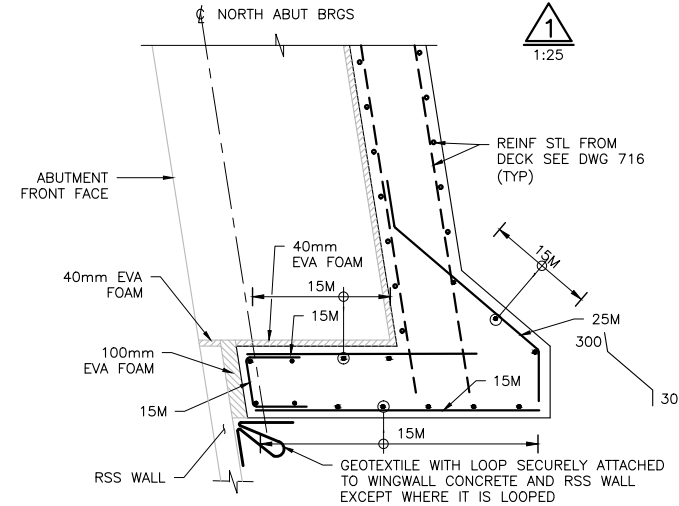
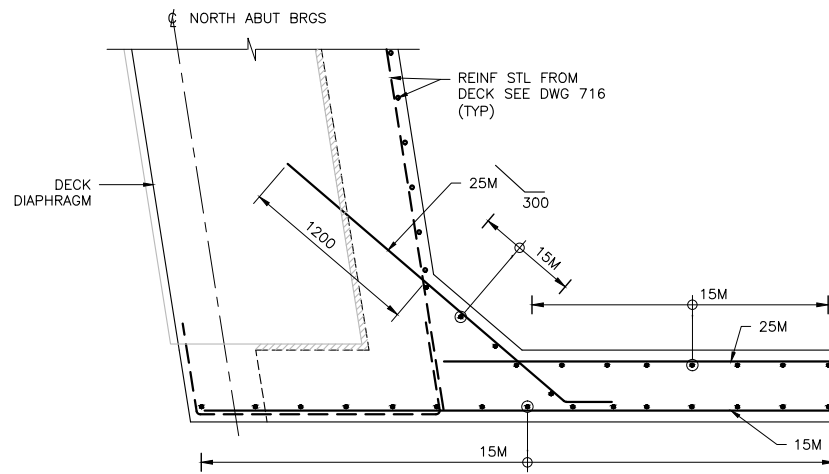
SCALE :	AS NOTED
DESIGNED	SUBOCHI OMBAD
DRAWN	SOPHA MILLS
CHECKED	NIMA MAHMOUDI
APPROVED LEAD ENG.	TATIANA GJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INIT. DATE



HWY 427 EXPANSION HWY 427 / STEELES AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 ABUTMENTS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	706	C



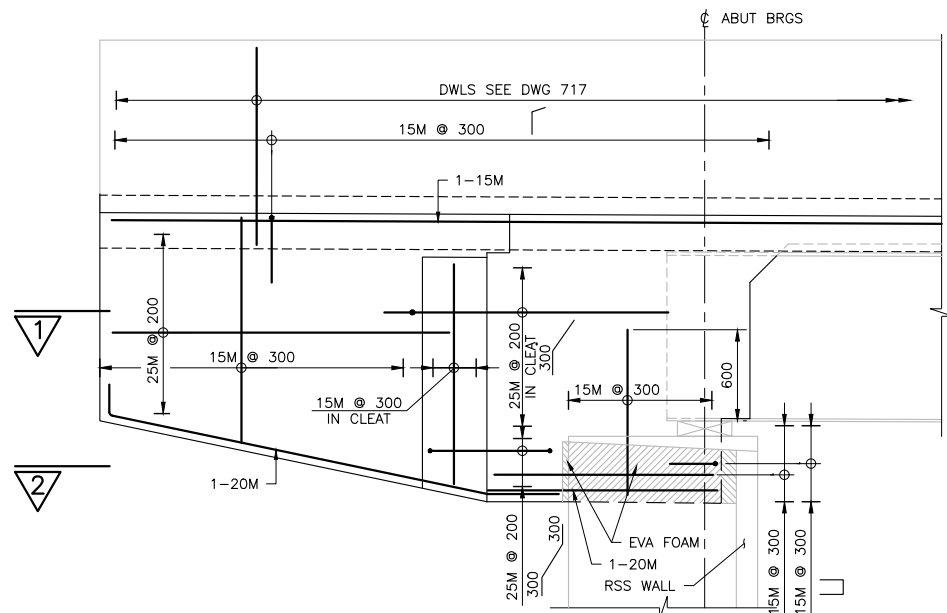
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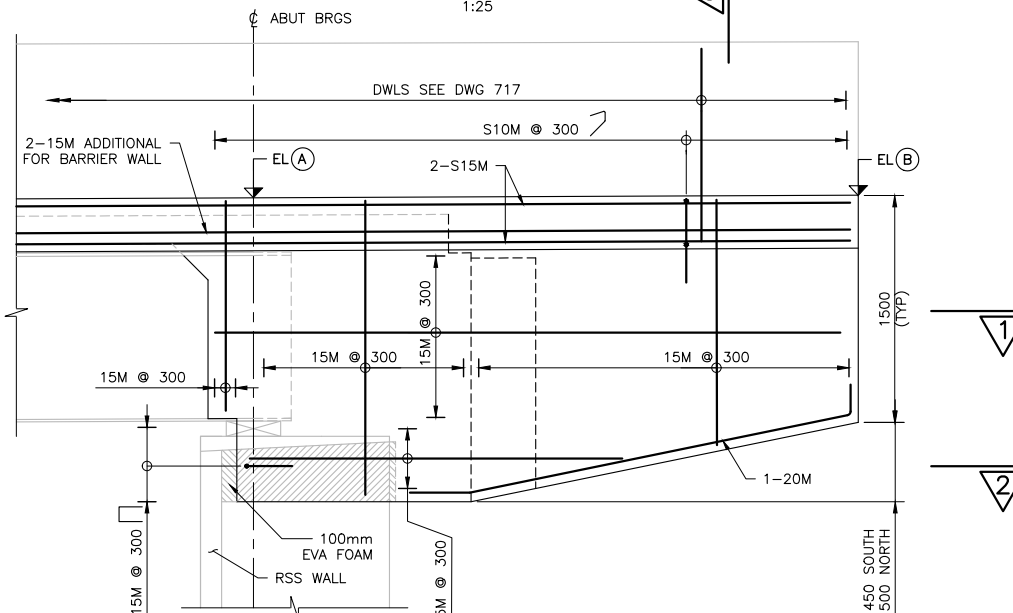
1
1:25

2
1:25

3



INSIDE FACE



OUTSIDE FACE

WINGWALL ELEVATION
1:25

NORTH-EAST WINGWALL SHOWN
NORTH-WEST, SOUTH-WEST
AND SOUTH-EAST SIMILAR
UNLESS NOTED OTHERWISE

NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 700, 703, 716 AND 717.
2. TOP OF CLEAT TO BE CAST 35mm BELOW APPROACH SLAB LEDGE.

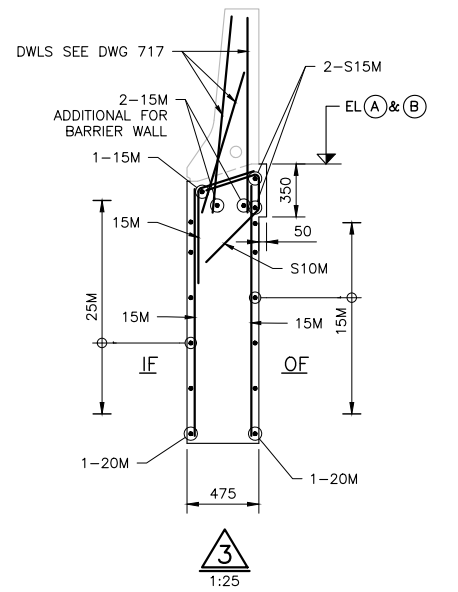
APPLICABLE STANDARD DRAWINGS:

- OPSD 3102.100 WALLS, ABUTMENT, BACKFILL, DRAIN
- OPSD 3941.200 FIGURES IN CONCRETE, SITE NUMBER AND DATE, LAYOUT
- OPSD 3950.100 JOINTS, CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE

LIST OF ABBREVIATIONS:

- DWLS DOWELS
- EVA ETHYLENE VINYL ACETATE
- REINF STL REINFORCING STEEL

WINGWALLS ELEVATIONS		
LOCATION	ELEVATION (A)	ELEVATION (B)
NORTH-WEST WINGWALL	182.215	182.235
SOUTH-WEST WINGWALL	181.997	181.964
NORTH-EAST WINGWALL	182.265	182.283
SOUTH-EAST WINGWALL	182.070	182.040



MODIFIED	
STANDARD DRAWING JAN 2013	SS105-2
WINGWALL DETAILS FOR BRIDGES	

CAD FILE LOCATION AND NAME: C:\projectwise\wsp-ca\wsp-ca\projectwise\wsp-ca\H427-D0-9A-STR-B07-DWG-707\W0.dwg
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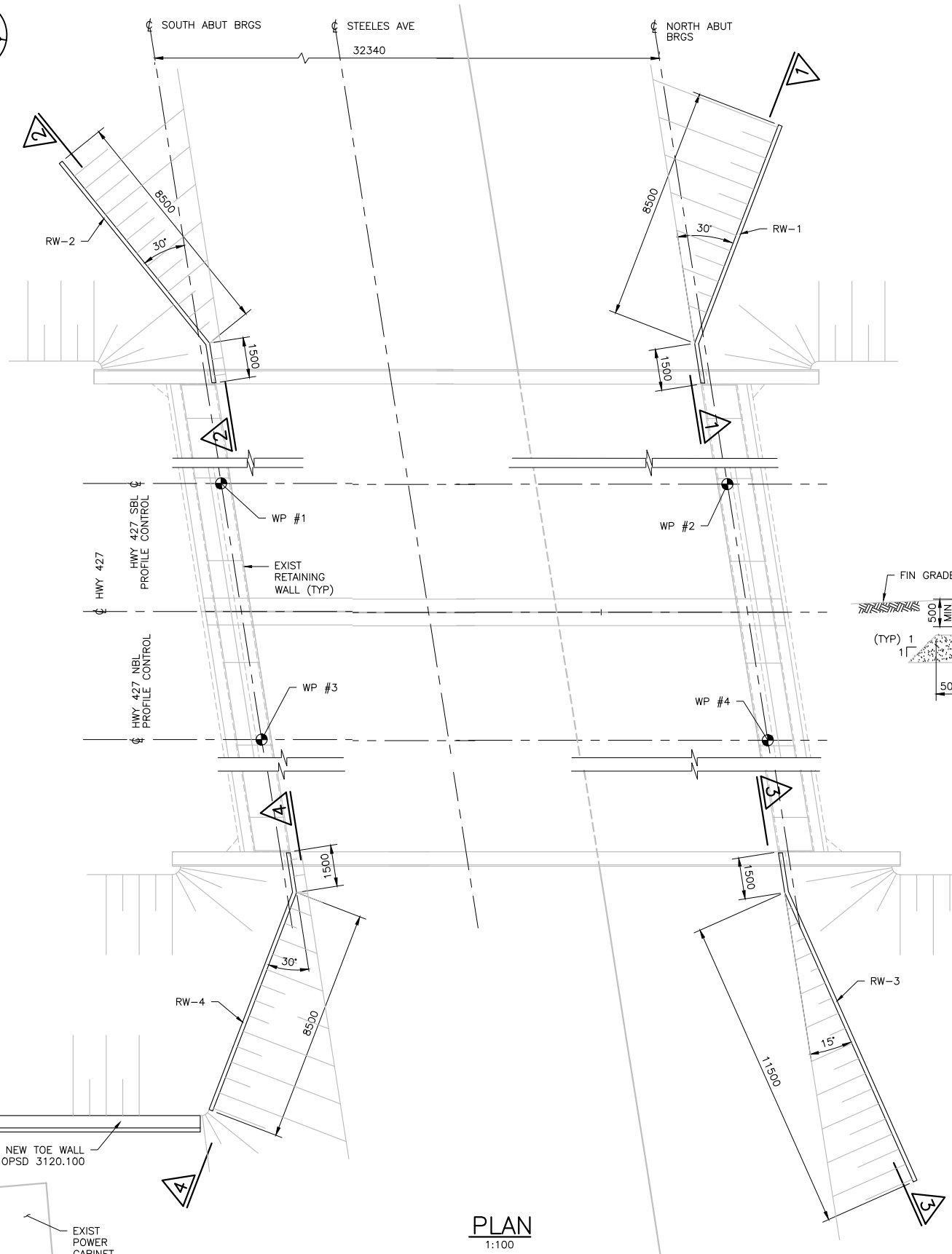
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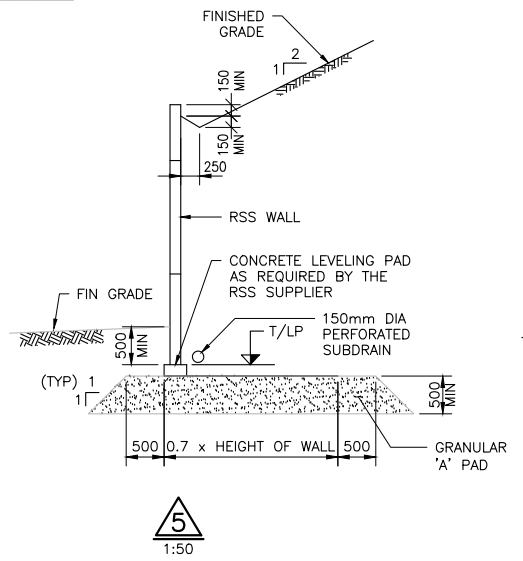
CONSULTANT		
DESIGNED	DRAWN	CHECKED
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APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



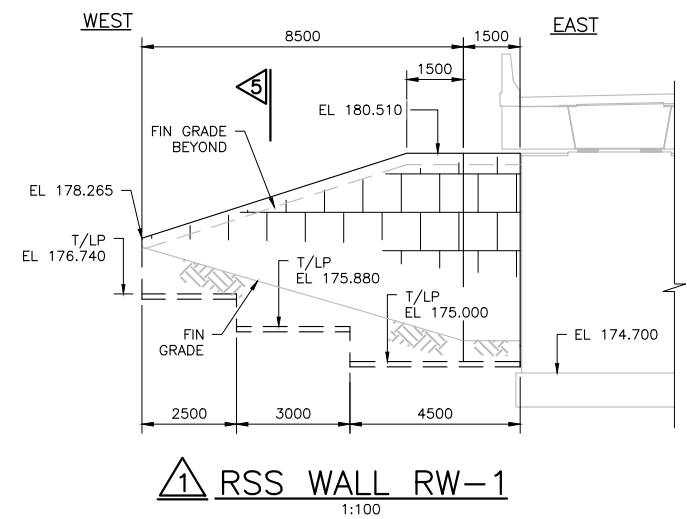
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PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
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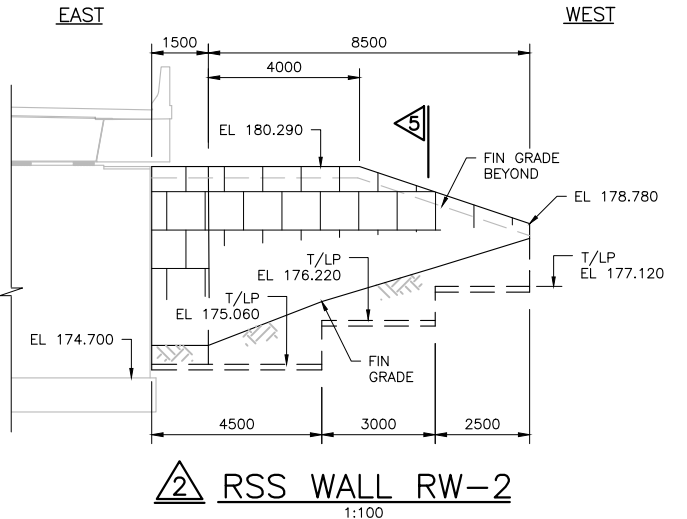
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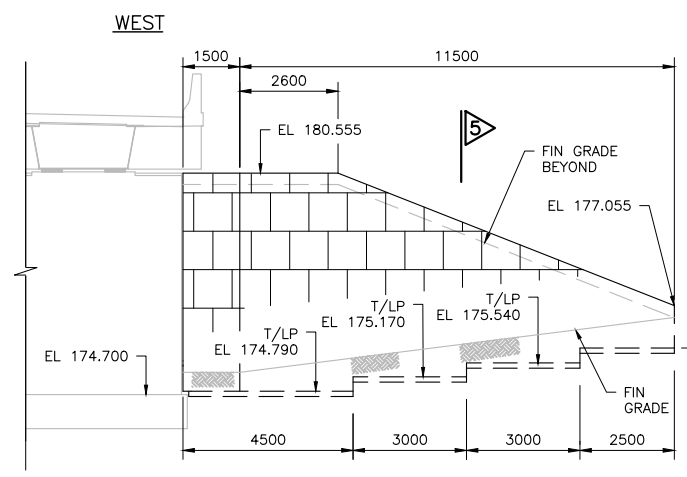
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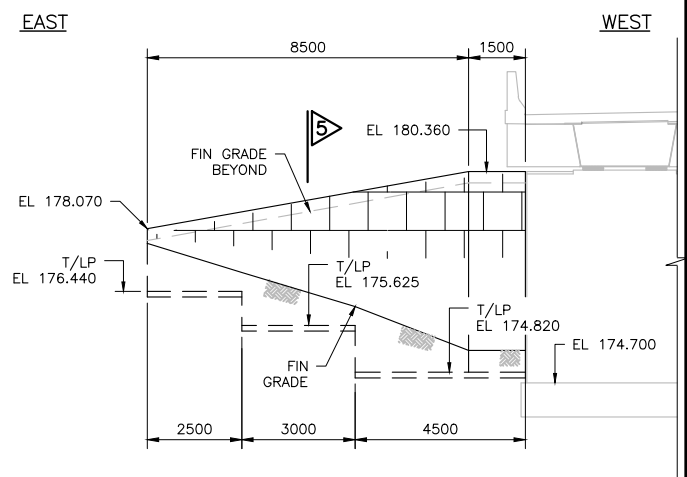
1 RSS WALL RW-1
1:100



2 RSS WALL RW-2
1:100



3 RSS WALL RW-3
1:100



4 RSS WALL RW-4
1:100

NOTES:

- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING 700.
- RETAINED SOIL SYSTEM (RSS) SHALL HAVE THE FOLLOWING ATTRIBUTES:
APPLICATION: WALL/SLOPE
PERFORMANCE: HIGH
APPEARANCE: HIGH
- RSS WALL GRANULAR PAD:
WHERE RSS WALL GRANULAR PAD IS TO BE PLACED ANY TOPSOIL AND SOFT/LOOSE FILL OR NATIVE MATERIAL SHOULD BE STRIPPED FROM THE FOOTPRINT PRIOR TO PLACEMENT OF FILL.
ALL DISTURBED AND NEW EMBANKMENT FILL MUST BE COMPACTED IN ACCORDANCE WITH OPSS 501.
500mm THICK LAYER OF BEDDING MATERIAL CONFORMING TO OPSS GRANULAR 'A' REQUIREMENT SHOULD BE PROVIDED UNDER THE RSS MASS TO PROVIDE A UNIFORM SUBGRADE CONDITION.
GRANULAR 'A' SHOULD BE COMPACTED TO 100% OR STANDARD PROCTOR MAXIMUM DRY DENSITY AT A MOISTURE CONTENT WITHIN 2% OF OPTIMUM.
ENGINEERED FILL PAD MUST EXTEND AT LEAST 500mm BEYOND THE LIMITS OF THE RSS MASS AND LEVELLING STRIP.
REFER TO GRADING DRAWINGS FOR DETAILS.

LIST OF ABBREVIATIONS:

FIN FINISHED
LP LEVELING PAD
WP WORK POINT

SOIL BEARING CAPACITY FOR RSS WALL FOUNDATION:

CAPACITY AT SLS: 200KPa
CAPACITY AT ULS: 300KPa

CAD FILE LOCATION AND NAME: C:\projects\hwy427\dwg\708RW.dwg
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DATE PLOTTED: 3/19/2018 1:40:24 PM

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B	18/01/09	90% SUBMISSION TO CA			
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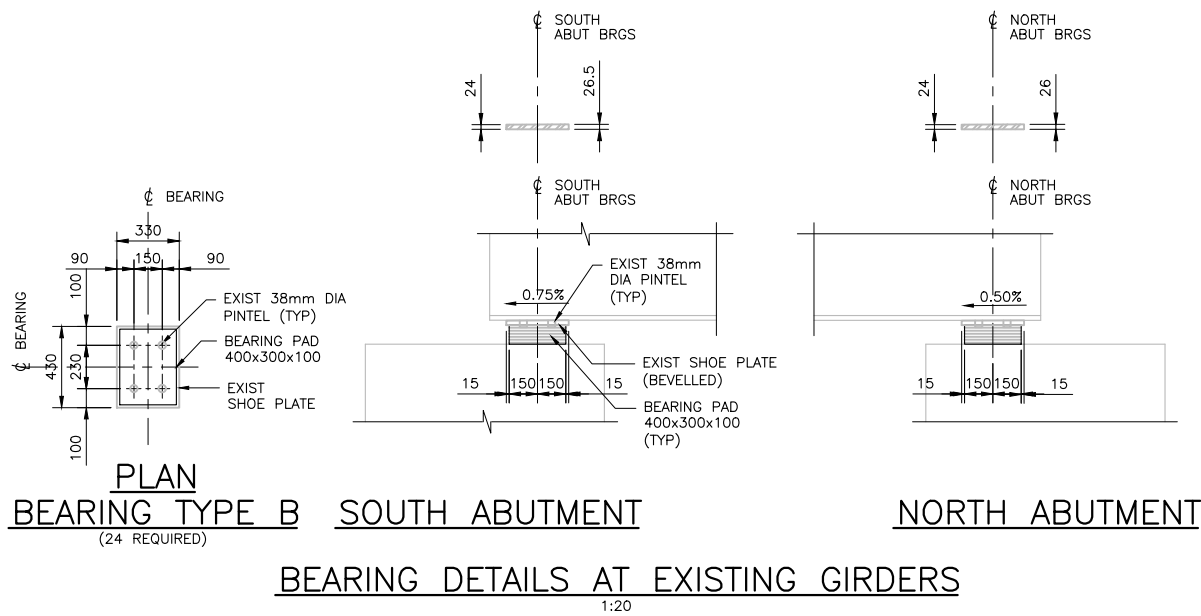
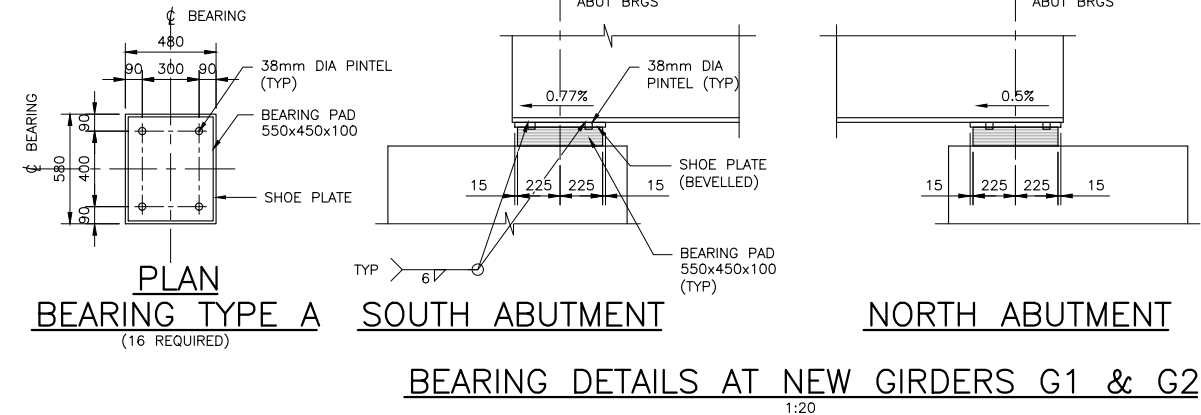
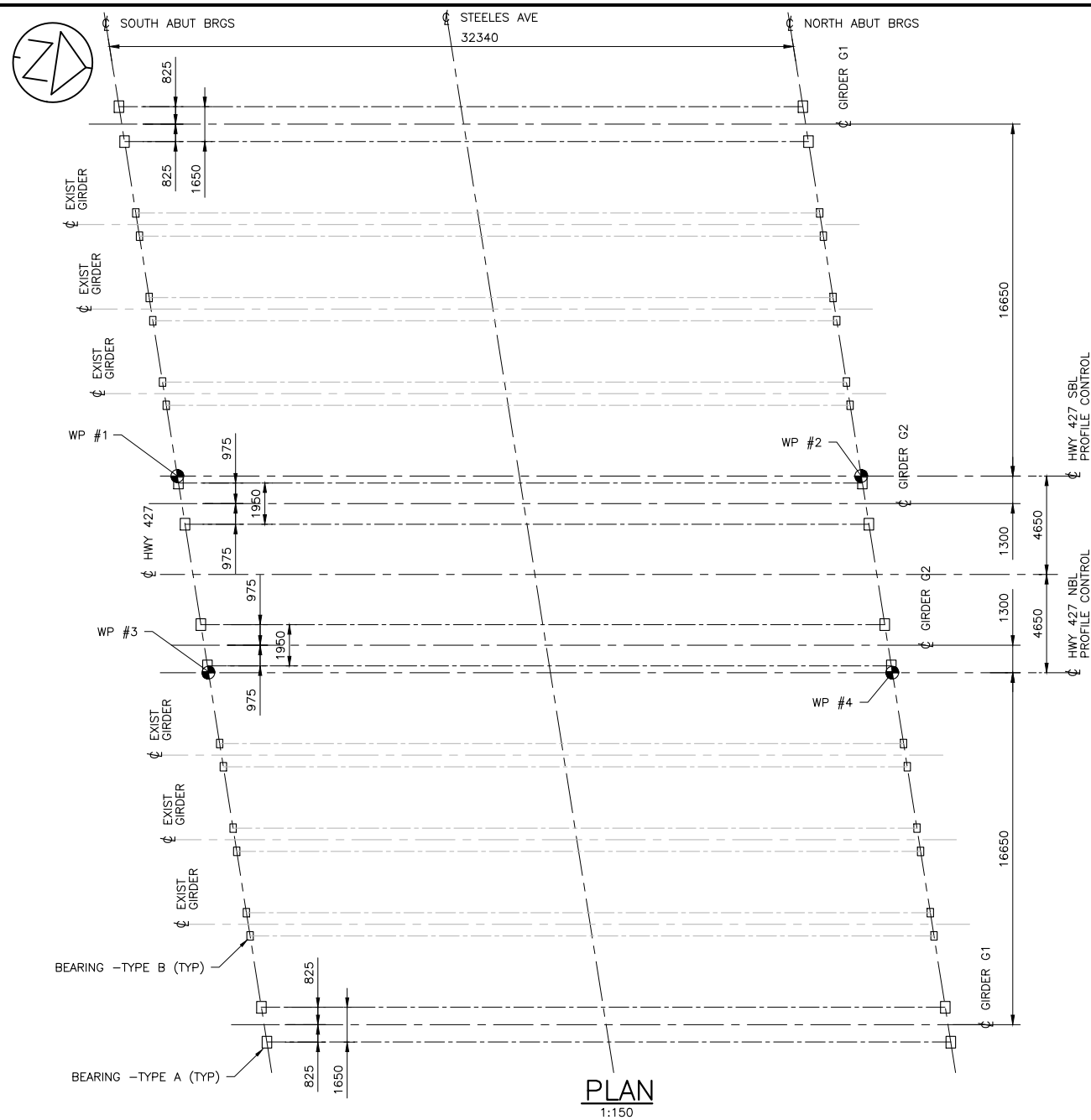
SCALE :

AS NOTED

DESIGNED	SUBOOHI OMBAD	DATE
DRAWN	SOPHA MILLS	
CHECKED	NIMA MAHMOUDI	
APPROVED LEAD ENG.	TATIANA GJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)		INIT. DATE



TITLE							
HWY 427 EXPANSION HWY 427 / STEELES AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 RETAINED SOIL SYSTEM WALLS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	708	C

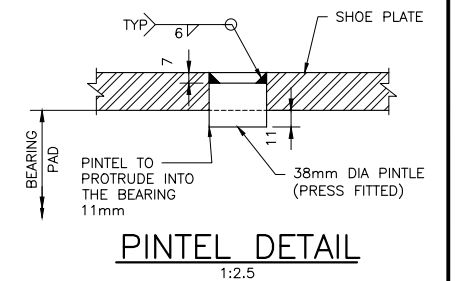


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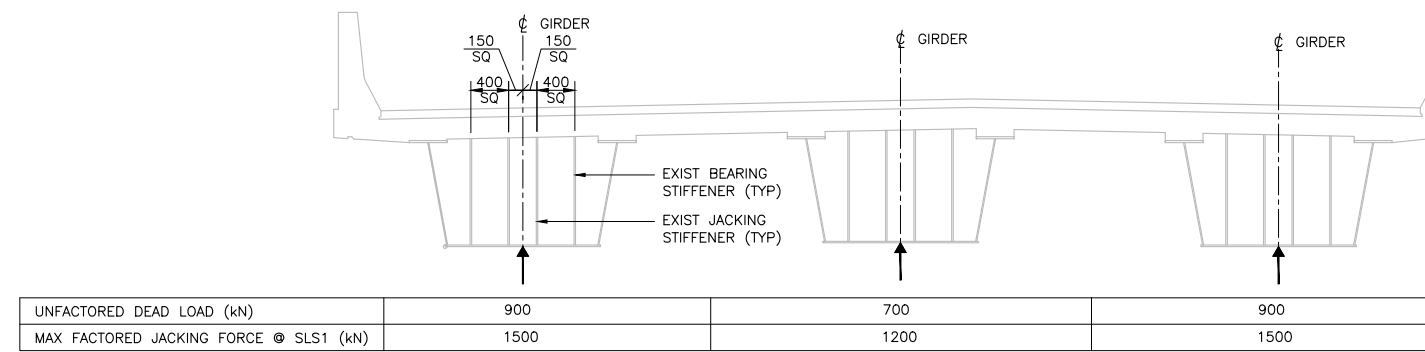
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 700, 703, 711 AND 712.
2. JACKING SUPPORT SYSTEM SHOWN ON THE DRAWINGS IS SCHEMATIC ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN OF JACKING SUPPORT SYSTEM AND SHALL SUBMIT DETAILED SHOP DRAWINGS ALONG WITH DESIGN CALCULATIONS AND PROCEDURES TO THE CONTRACT ADMINISTRATOR. ALL DRAWINGS SHALL BE STAMPED BY AN ENGINEER LICENSED IN THE PROVINCE OF ONTARIO.
3. JACKING EQUIPMENT AND PROCEDURES OUTLINED IN THE CONTRACTOR'S SHOP DRAWINGS SHALL BE CERTIFIED IN THE FIELD BY THE ENGINEER RESPONSIBLE FOR THOSE DRAWINGS.
4. THE CONTRACTOR SHALL SITE MEASURE THE EXISTING STRUCTURE AT SUPPORT LOCATIONS TO ENSURE PROPER FIT.
5. TRAFFIC SHALL NOT BE ALLOWED ON THE STRUCTURE DURING JACKING OPERATIONS. JACKING, TEMPORARY SUPPORT AND BEARING REPLACEMENT SHALL ONLY BE CARRIED OUT AT ONE ABUTMENT AT A TIME.
6. THE DECK SHALL BE JACKED UP SIMULTANEOUSLY ACROSS THE ENTIRE WIDTH. JACKING MEASUREMENTS SHALL BE RECORDED AND SUPPLIED TO THE ENGINEER.
7. THE DECK SHALL BE JACKED UP SUFFICIENTLY TO REMOVE PRESSURE ON THE EXISTING BEARINGS AND FACILITATE THEIR REMOVAL. THE LIFT SHALL BE LIMITED TO A MAXIMUM OF 12mm AND CONTROLLED SO AS TO AVOID DAMAGING ADJACENT AREAS OF THE STRUCTURE.
8. JACKING REACTIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL SUPPLY JACK CAPACITY OF AT LEAST 150% OF THE THEORETICAL JACKING REACTIONS INDICATED.
9. THE CONTRACTOR SHALL PROVIDE LATERAL RESTRAINTS CAPABLE OF RESISTING A LOAD OF NO LESS THAN 10% OF VERTICAL JACKING REACTION DURING REPLACEMENT OF THE BEARINGS. LATERAL RESTRAINTS SHALL BE INSTALLED PRIOR TO REMOVAL OF EXISTING BEARINGS AND REMAIN IN PLACE UNTIL NEW BEARINGS ARE INSTALLED.
10. CONTRACTOR SHALL USE SELF-LOCKING JACKS.
11. STAINLESS STEEL AND TEFLON SURFACES SHALL BE PROTECTED FROM ABRASION OR SCRATCHING AND KEPT CLEAN AT ALL TIMES DURING CONSTRUCTION.
12. TOP AND BASE PLATES FOR JACKS AND TEMPORARY SUPPORT SHALL BE DESIGNED TO SUIT THE BEARING SEAT AND THE DECK SOFFIT GEOMETRY.

LIST OF ABBREVIATIONS:

WP WORKING POINT



BEARING DATA	REQUIREMENTS AT SERVICEABILITY LIMIT STATES LOADING			
	SOUTH ABUTMENT		NORTH ABUTMENT	
	BEARING - TYPE A	BEARING - TYPE B	BEARING TYPE - A	BEARING - TYPE B
DEAD LOAD (kN)	900	500	900	500
TOTAL LOAD (kN)	1400	800	1400	800
MOVEMENT (mm)	±15	±12	±15	±12
MAXIMUM SHEAR RATE	3.49	1.82	3.49	1.82
BEARING SIZE - TYPE A (mm)	550x450x100	400x300x100	550x450x100	400x300x100
NUMBER REQUIRED	8	12	8	12
BEARING TYPE	LAMINATED ELASTOMERIC BEARING	LAMINATED ELASTOMERIC BEARING	LAMINATED ELASTOMERIC BEARING	LAMINATED ELASTOMERIC BEARING



ABUTMENT ELEVATION - JACKING LOCATIONS AND LOADS

NTS
SOUTH ABUTMENT SHOWN, NORTH ABUTMENT SIMILAR

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 DATE PLOTTED: 3/19/2018 1:40:27 PM BY:

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
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B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE :

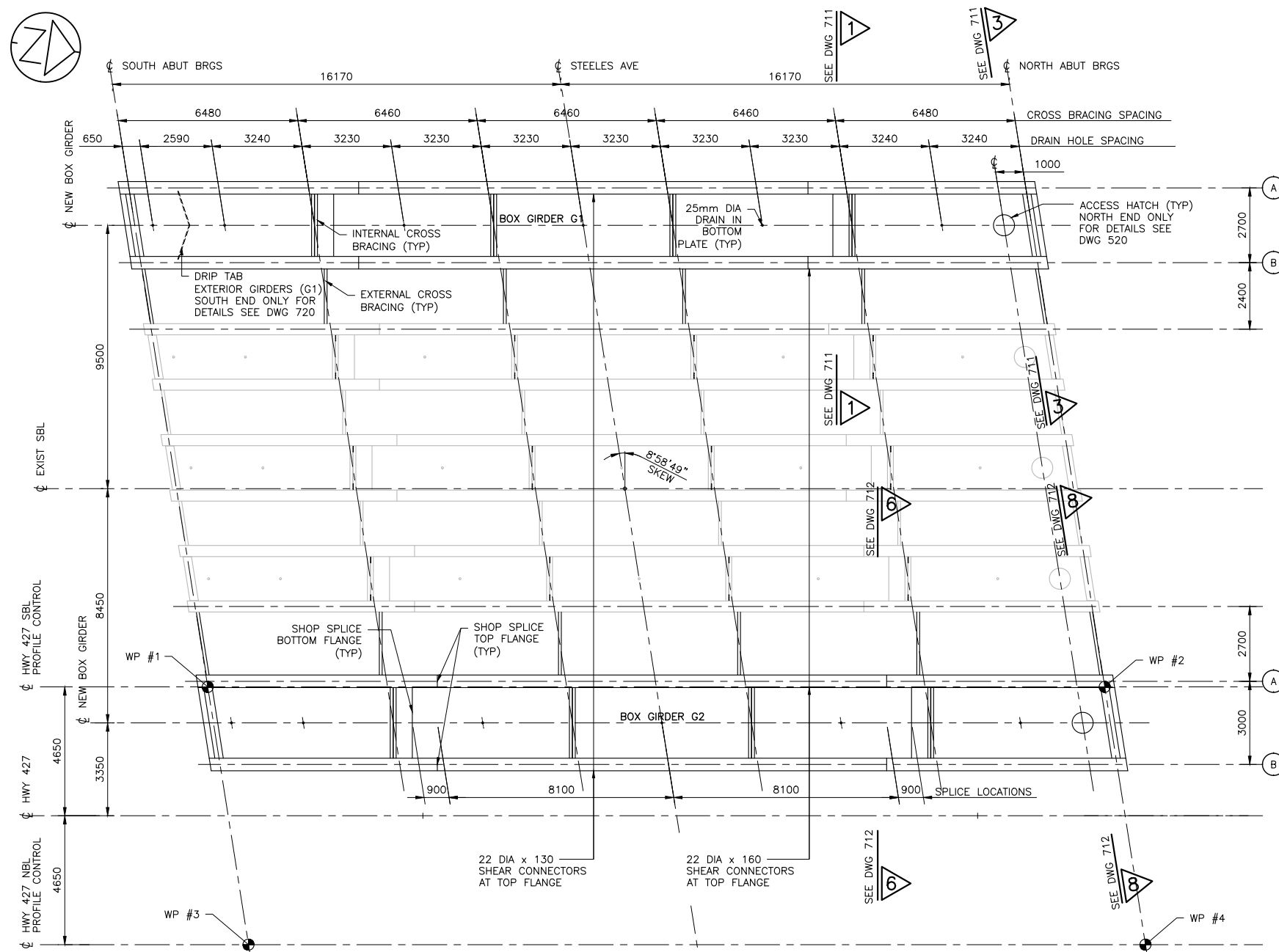
AS NOTED

CONSULTANT	DESIGNED	SUBOOBI OMBAD
	DRAWN	SOPHA MILLS
	CHECKED	NIMA MAHMOUDI
	APPROVED LEAD ENG.	TATIANA GJALA
	APPROVED PROJ. MANAGER	
	NAME (PRINT)	INIT. DATE



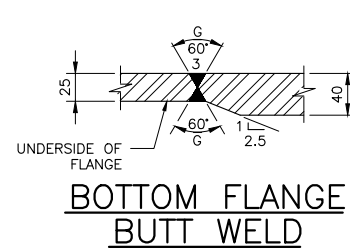
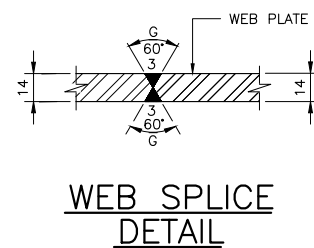
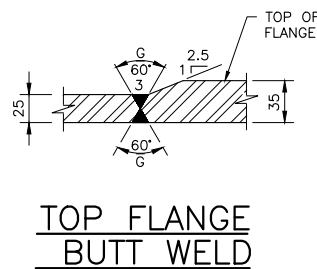
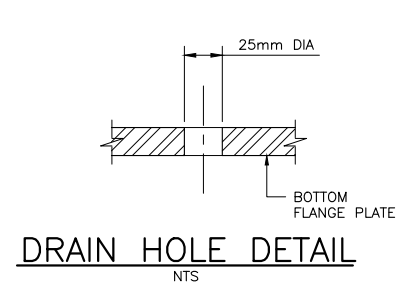
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H427-D	N	9A	STR	B07	DWG	709	C

**HWY 427 EXPANSION
 HWY 427 / STEELES AVE OVERPASS NBL & SBL
 REHABILITATION AND WIDENING R1
 SITE 37-1111
 BEARINGS**

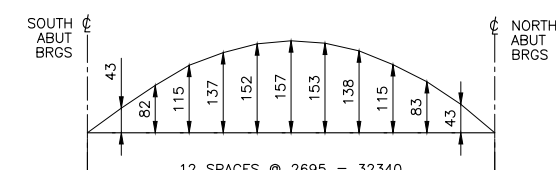
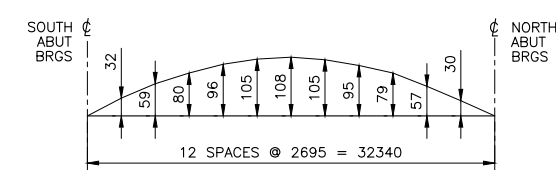
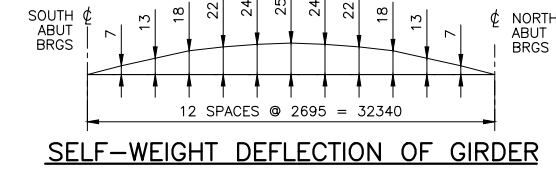


GIRDER LAYOUT

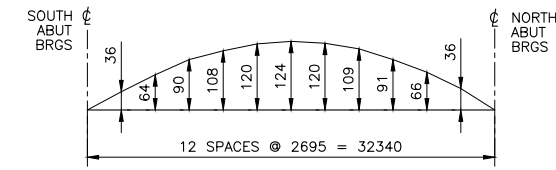
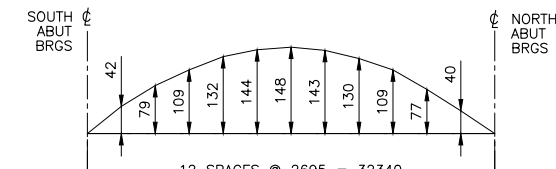
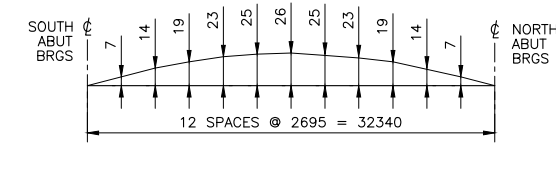
1:100
SOUTHBOUND LANE SHOWN,
NORTHBOUND LANE SIMILAR



SHOP SPLICES
NTS



EXTERIOR GIRDER G1
NTS



INTERIOR GIRDER G2
NTS

- NOTES:**
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 700, 703, 711 AND 712.
- STRUCTURAL STEEL NOTES:**
- ALL STRUCTURAL STEEL SHALL CONFORM TO CSA STANDARD CAN/CSA-G40.20-04/G40.21-04 GRADE 350AT. THE CHARPY IMPACT ENERGY REQUIREMENTS SHALL BE 27 JOULES AND THE TEST TEMPERATURE SHALL BE -20°C. ROLLED SECTIONS SHALL CONFORM TO CSA STANDARD CAN/CSA-G40.20-04/G40.21-04 OR ASTM SPECIFICATION A588.
 - BOLTS ON ATMOSPHERIC CORROSION RESISTANT STEEL SHALL BE ASTM A325 TYPE 3, M22. BOLTS ON COATED STEEL SHALL BE GALVANIZED ASTM A325M TYPE 1, M22. BOLT THREADS SHALL BE EXCLUDED FROM THE SHEAR PLANES.
 - STUD SHEAR CONNECTORS SHALL BE 22mm DIA., AND CONFORM TO ASTM STANDARD A108 AND CSA W59.
 - ALL LENGTHS SHOWN ARE IN THE HORIZONTAL PLANE AND MEASURED AT 20°C.
 - GIRDER SHALL BE CAMBERED TO VALUES SHOWN IN THE RELAXED CAMBER DIAGRAM.
 - RELAXED CAMBER ORDINATES INCLUDE AN ALLOWANCE FOR GIRDER SELF WEIGHT, CONCRETE DECK, SUPERIMPOSED DEAD LOADS AND PROFILE OF HIGHWAY.
 - THE ENDS OF GIRDERS, AND BEARING STIFFENERS SHALL BE TRULY VERTICAL UNDER FULL DEAD LOAD.
 - ALL BUTT WELDS IN FLANGE AND WEB SHOP SPLICES SHALL BE FINISHED FLUSH BY GRINDING WHERE NECESSARY IN THE DIRECTION OF APPLIED STRESSES. IF RELOCATION OR ADDITIONAL SHOP SPLICES ARE REQUIRED, THEIR LOCATION SHALL BE APPROVED BY THE ENGINEER.
 - UNLESS OTHERWISE NOTED THE MINIMUM FILLET WELD SHALL BE AS FOLLOWS:

MATERIAL THICKNESS OF THICKER PART JOINED (mm)	MINIMUM SIZE OF SINGLE PASS FILLET WELD (mm)
TO 12 INCLUSIVE	5
OVER 12 TO 20	6
OVER 20 TO 40	8
OVER 40 TO 60	10

- THE CONTRACTOR SHALL ENSURE THE STABILITY OF ALL COMPONENTS DURING HANDLING, TRANSPORTATION AND ERECTION AND UNTIL STRUCTURAL STEEL IS IN ITS FINAL LOCATION WITH ALL PERMANENT BRACING, CONNECTIONS AND SUPPORTS IN PLACE AND THE CONCRETE IN THE DECK HAS REACHED 75% OF ITS SPECIFIED STRENGTH.
- ALL STRUCTURAL STEEL SURFACES, EXCEPT DIAPHRAGMS, SHALL BE COATED AS FOLLOWS: FROM ENDS OF THE GIRDERS TO 600mm BEYOND THE FRONT FACE OF THE ABUTMENT. THE COLOUR OF THE TOPCOAT SHALL BE 504-217 BROWN (1-GP-12C).
- COATING OF NEW STRUCTURAL STEEL SHALL BE A THREE COAT EPOXY-ZINC, EPOXY, POLYURETHANE SYSTEM IN ACCORDANCE WITH CONTRACT DOCUMENTS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE GIRDER ERECTION PROCEDURES AND METHODOLOGY, AND SHALL ENSURE THE TOTAL LOADS INCLUDING ANY ADDITIONAL LOADINGS RESULTING FROM THE GIRDER ERECTION OPERATION/METHODOLOGY WILL NOT EXCEED THE CAPACITIES OF THE EXISTING BRIDGE MEMBERS/COMPONENTS AS PER THE CHBDC REQUIREMENTS.

LIST OF ABBREVIATIONS:

SYMM SYMMETRICAL
WP WORKING POINT

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DATE PLOTTED: 3/19/2018 1:40:31 PM BY:

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B	18/01/09	90%			
A	17/10/31	90%			

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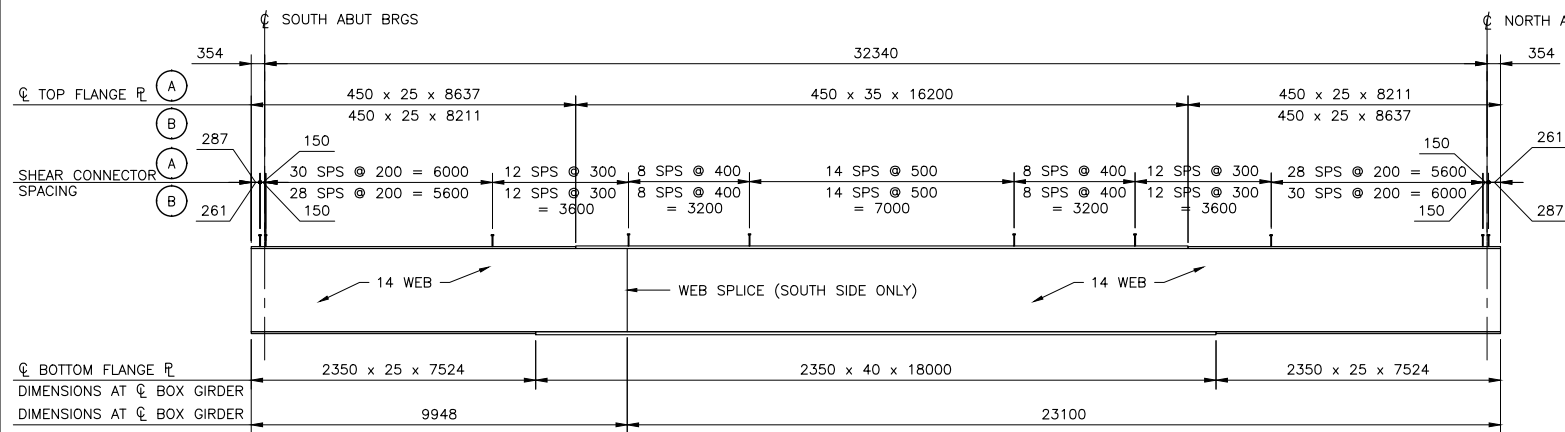
AS NOTED

DESIGNED: SUBOCHI OBIAD
DRAWN: SOPHA MILLS
CHECKED: NIMA MAHMOUDI
APPROVED LEAD ENG.: TATIANA GJALA
APPROVED PROJ. MANAGER:

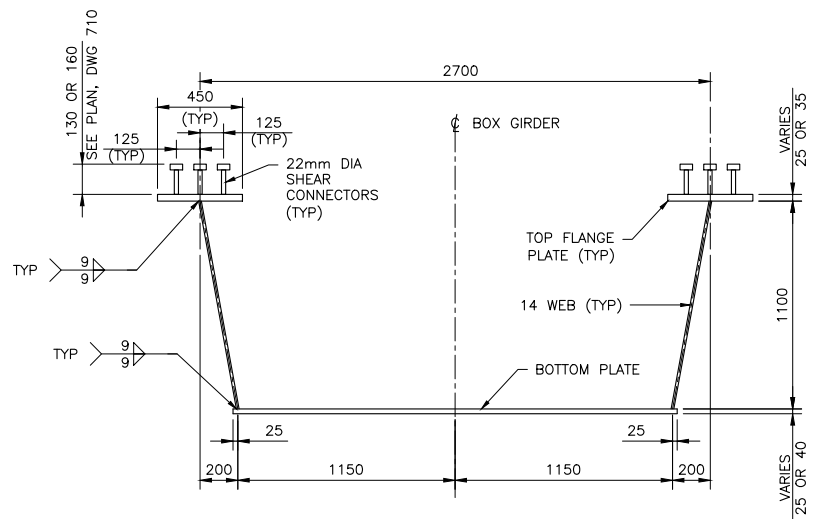
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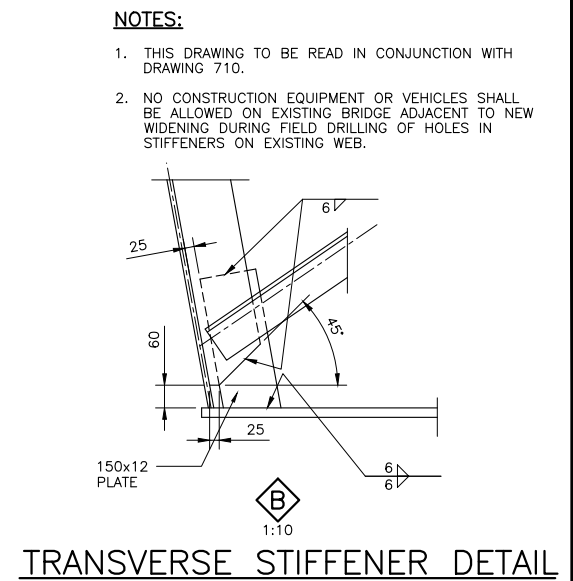
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HWY 427 EXPANSION HWY 427 / STEELES AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 STRUCTURAL STEEL I							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	710	C



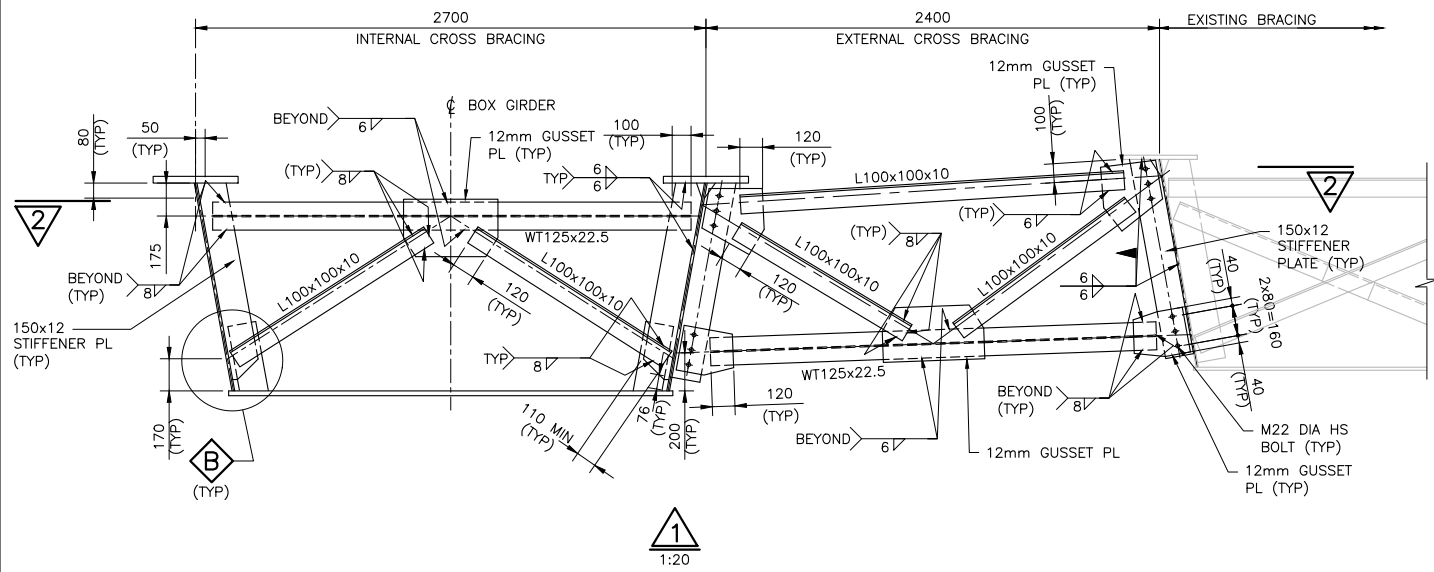
NOTE: WEB VERTICAL STIFFENERS, NOT SHOWN FOR CLARITY.
BOX GIRDER G1 ELEVATION
 HORIZ 1:100
 VERT 1:50



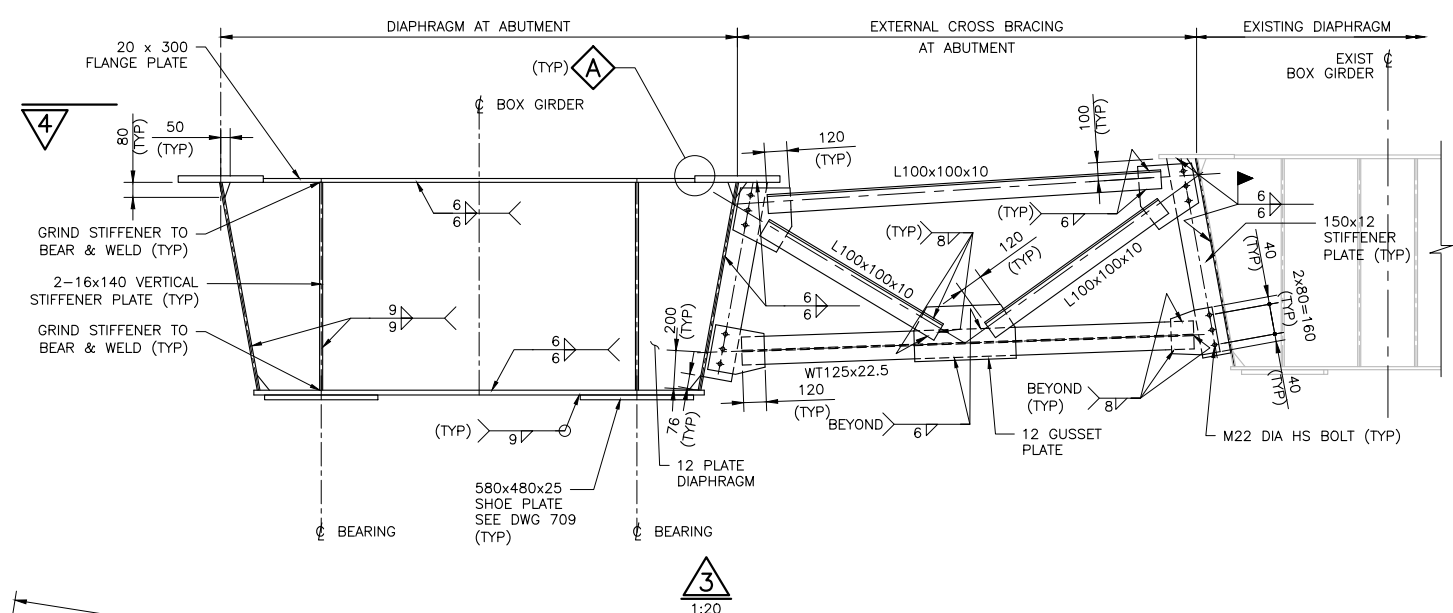
TYPICAL G1 BOX GIRDER SECTION
 1:20



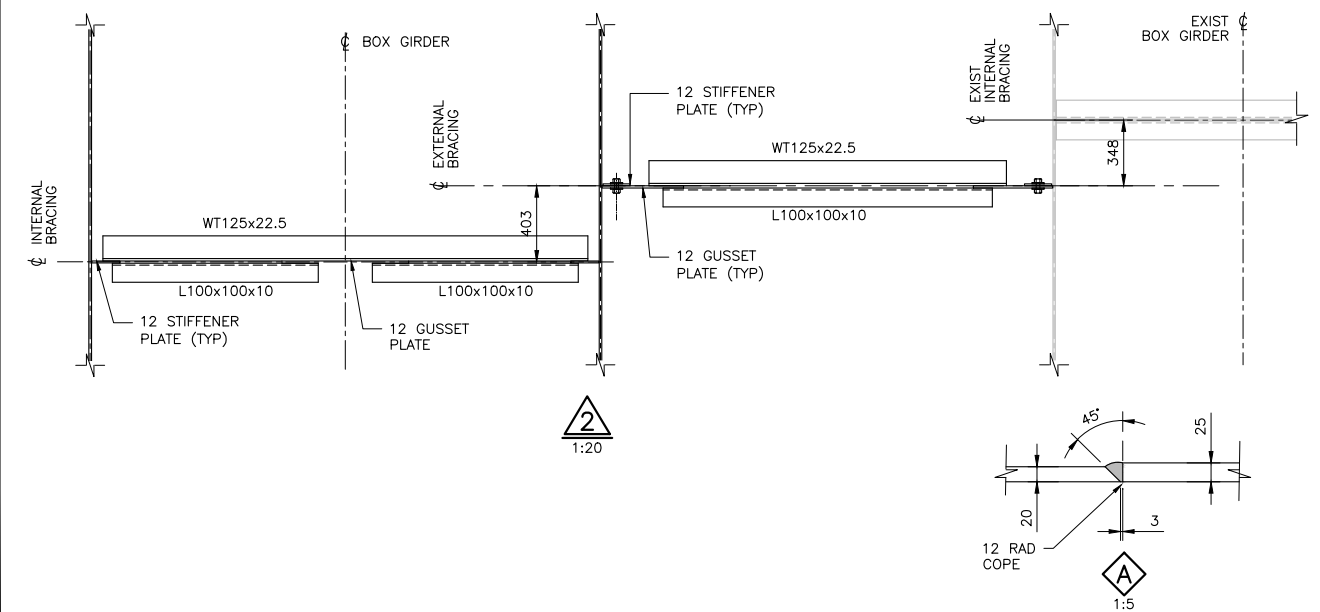
TRANSVERSE STIFFENER DETAIL
 1:10



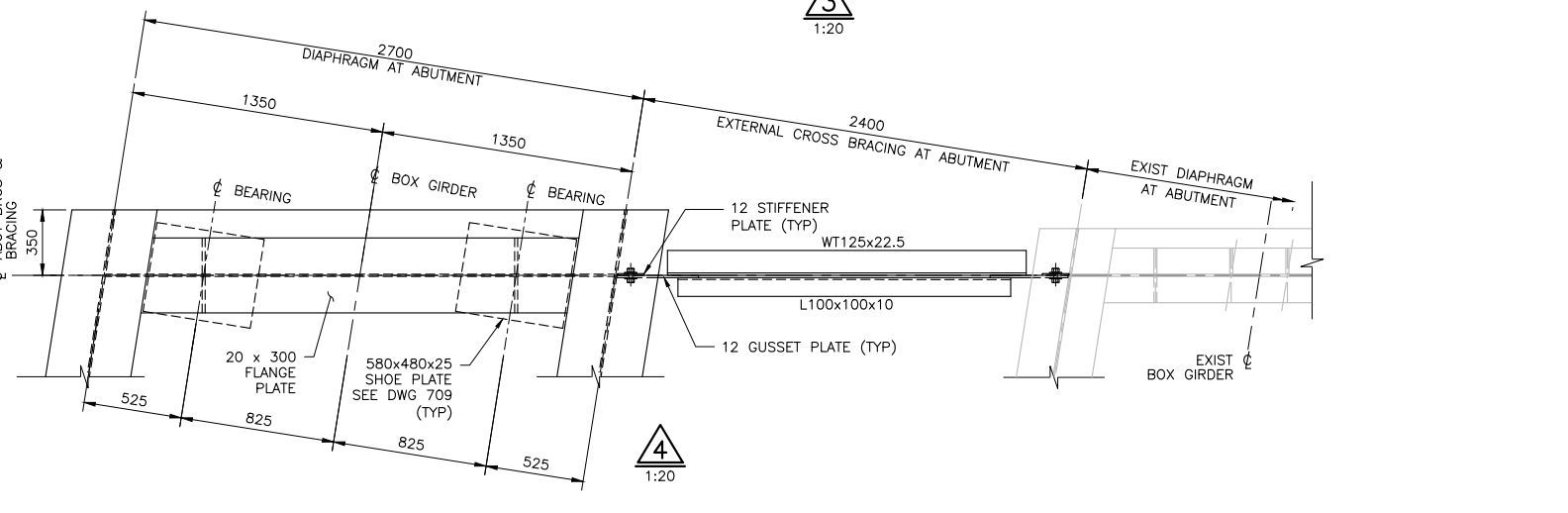
1
 1:20



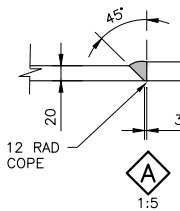
3
 1:20



2
 1:20



4
 1:20



A
 1:5

- NOTES:**
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING 710.
 2. NO CONSTRUCTION EQUIPMENT OR VEHICLES SHALL BE ALLOWED ON EXISTING BRIDGE ADJACENT TO NEW WIDENING DURING FIELD DRILLING OF HOLES IN STIFFENERS ON EXISTING WEB.

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 DATE PLOTTED: 3/19/2018 1:59:40 PM BY:

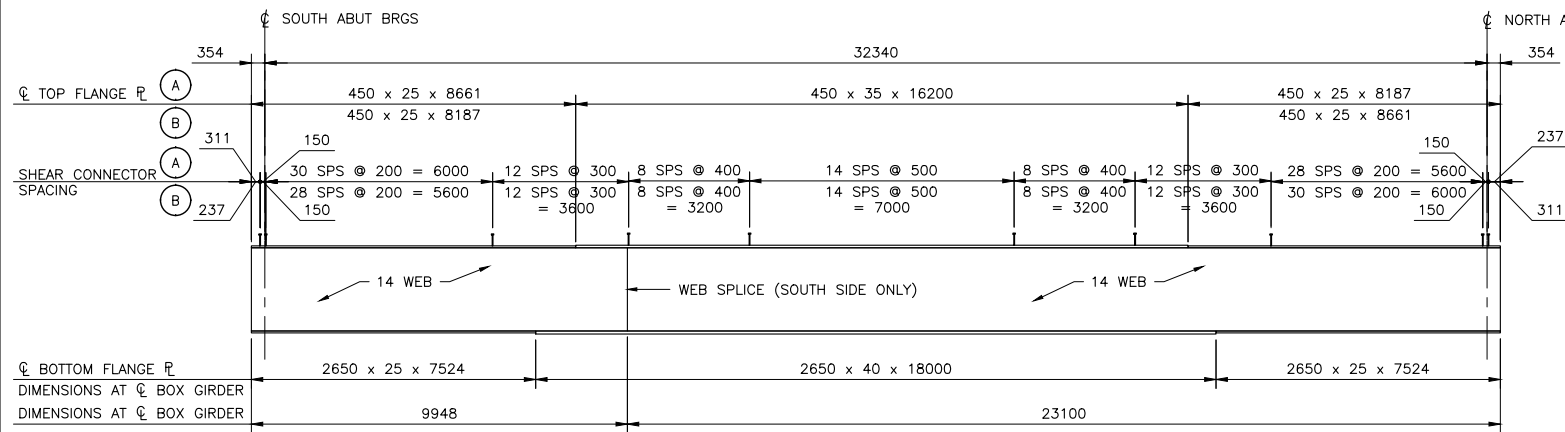
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C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE :
 AS NOTED

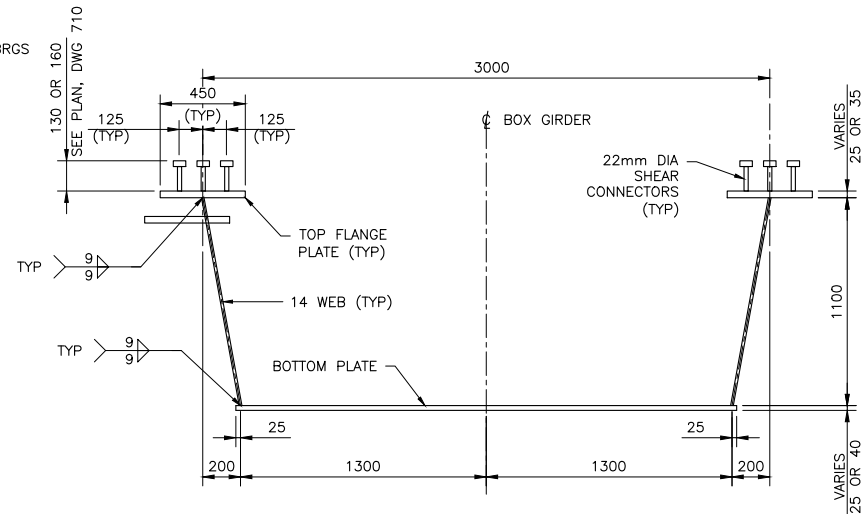
DESIGNED	SUBOOHI OMBAD	
DRAWN	SOPHA MILLS	
CHECKED	NIMA MAHMOUDI	
APPROVED LEAD ENG.	TATIANA GJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



HWY 427 EXPANSION HWY 427 / STEELES AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 STRUCTURAL STEEL II							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
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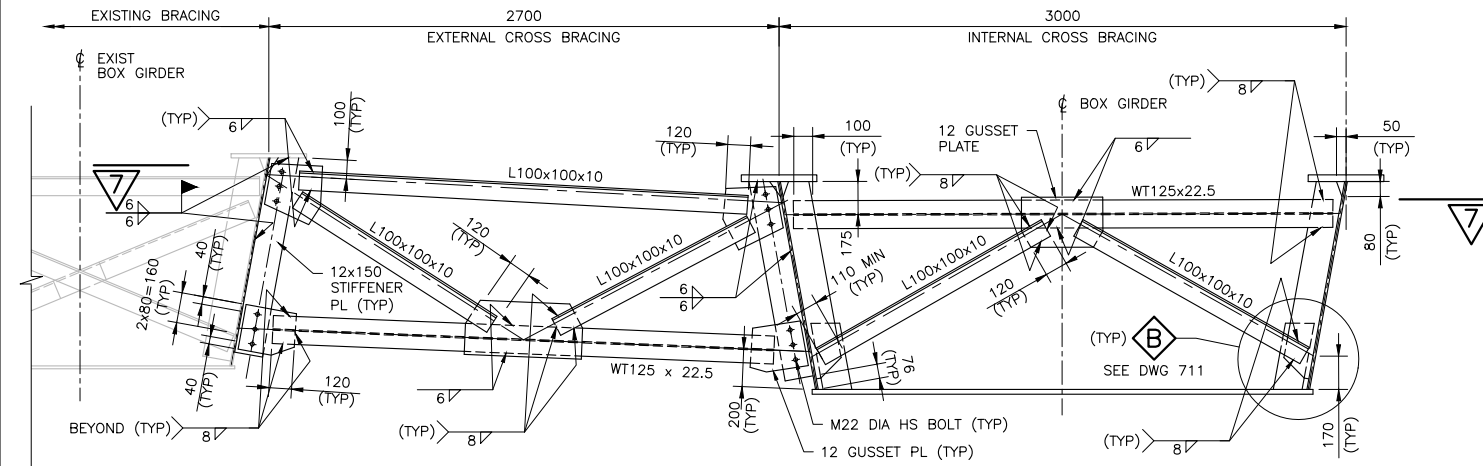


NOTE: WEB VERTICAL STIFFENERS, NOT SHOWN FOR CLARITY.
BOX GIRDER G2 ELEVATION
 HORIZ 1:100
 VERT 1:50

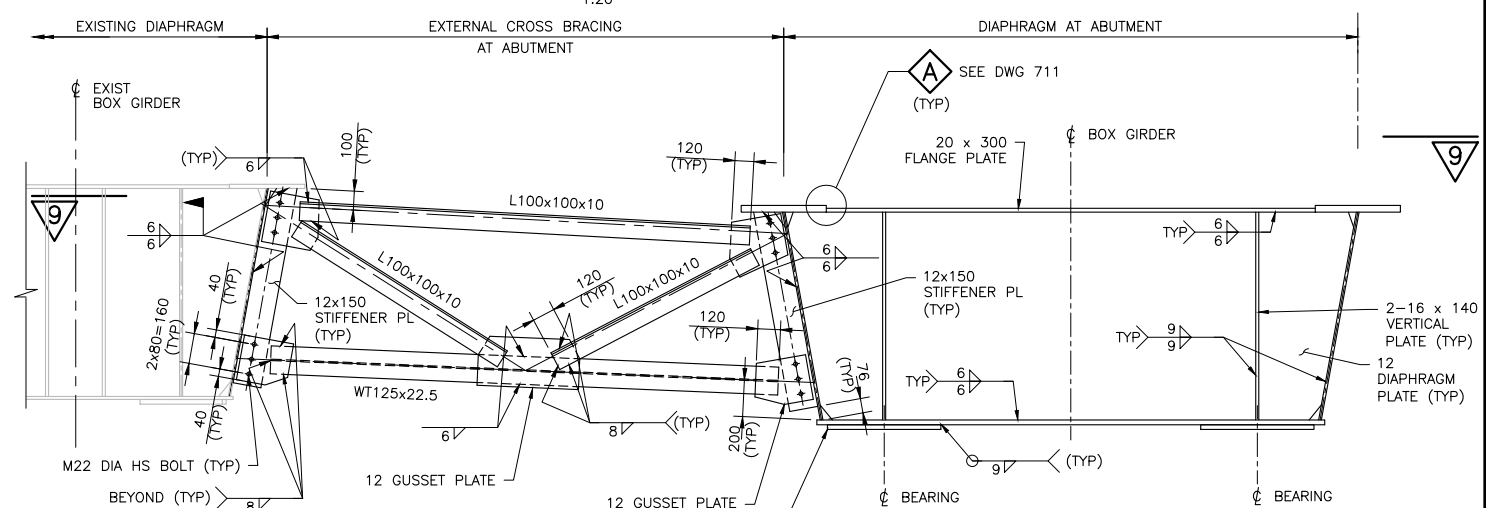


TYPICAL G2 BOX GIRDER SECTION
 1:20

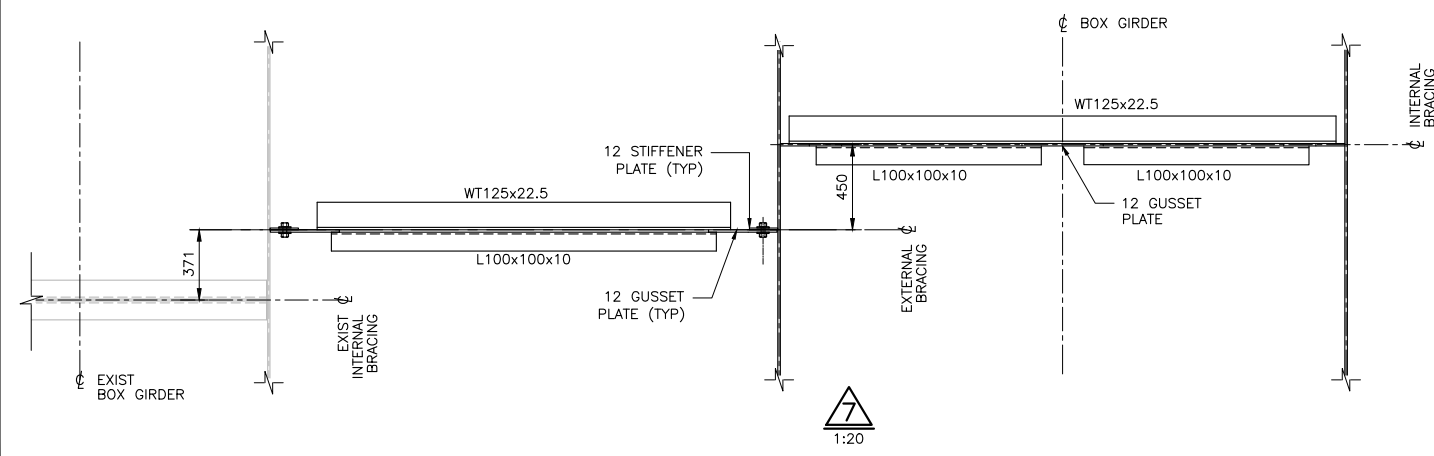
- NOTES:**
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 710.
 2. NO CONSTRUCTION EQUIPMENT OR VEHICLES SHALL BE ALLOWED ON EXISTING BRIDGE ADJACENT TO NEW WIDENING DURING FIELD DRILLING OF HOLES IN STIFFENERS ON EXISTING WEB.



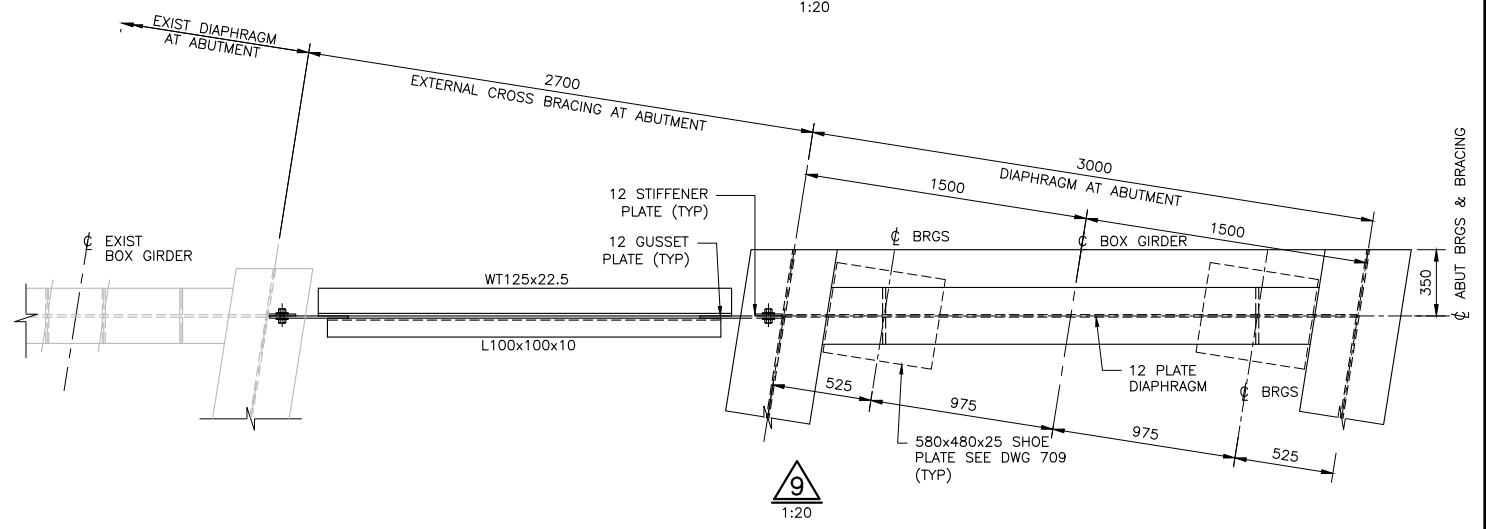
6
 1:20



8
 1:20



7
 1:20



9
 1:20

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 DATE PLOTTED: 3/19/2018 1:59:43 PM BY:

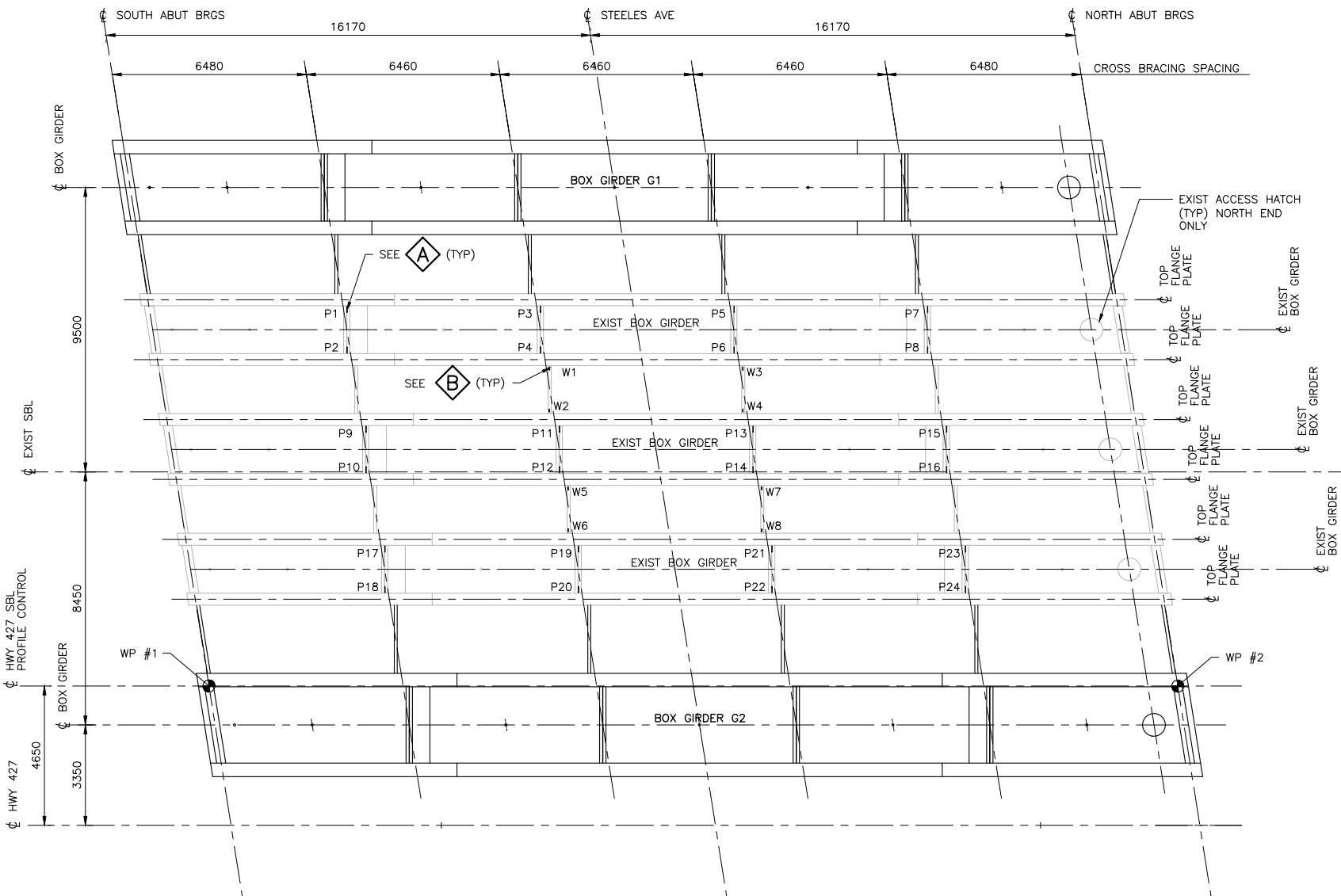
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C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE :
 AS NOTED

DESIGNED	SUBOOHI OMBAD		
DRAWN	SOPHA MILLS		
CHECKED	NIMA MAHMOUDI		
APPROVED LEAD ENG.	TATIANA GJALA		
APPROVED PROJ. MANAGER			
	NAME (PRINT)	INT.	DATE

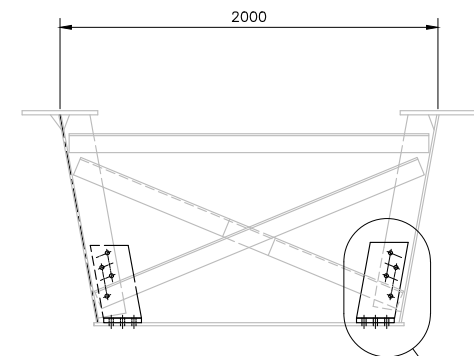


HWY 427 EXPANSION HWY 427 / STEELES AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 STRUCTURAL STEEL III							
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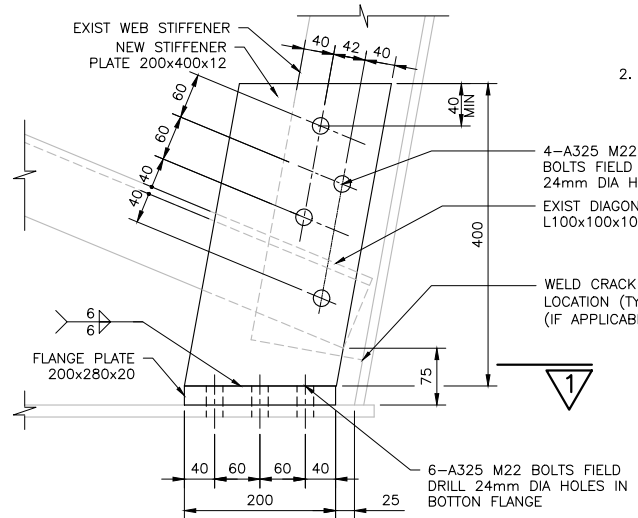
GIRDER LAYOUT

1:100
SOUTHBOUND LANE SHOWN, NORTHBOUND LANE SIMILAR
NOTE:
1. P1 TO P24 REPRESENT STIFFENER TO WEB WELD LOCATIONS.
2. W1 TO W8 REPRESENT BOTTOM CHORD TO GUSSET PLATE WELD LOCATIONS.



EXISTING INTERNAL CROSS BRACING

1:20



EXISTING TRANSVERSE STIFFENER RETROFIT DETAIL

1:5

NOTE:
THE CONTRACTOR SHALL CHECK AND VERIFY ALL EXISTING DIMENSIONS AND ANGLES IN THE FIELD AND CONFIRM THAT SUFFICIENT EDGE DISTANCES ARE AVAILABLE FOR THE BOLTS. ANY DISCREPANCY OR SHORTAGE OF AVAILABLE EDGE DISTANCE SHALL BE REPORTED TO THE ENGINEER AND THE PROPOSED MODIFICATION SHALL BE SUBMITTED FOR APPROVAL.

NOTES:
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 700 AND 703.

TRANSVERSE STIFFENER RETROFIT PROCEDURES (FOR EXISTING BOX GIRDERS):

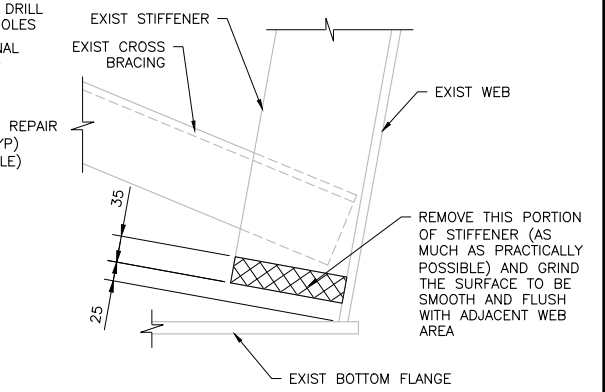
1. FIELD DRILL HOLES IN BOTTOM FLANGE PLATE OF THE BUILD-UP T-SECTION WITH 6-A325 M22 BOLTS.
2. FIELD DRILL HOLES IN EXISTING DIAGONAL ANGLE, BOTTOM FLANGE AND STIFFENER PLATE.
3. FIX THE WEB OF THE BUILD-UP T-SECTION TO THE EXISTING STIFFENER WITH 4-325 M22 BOLTS.

WELD REPAIR:

- STRUCTURAL STEEL REPAIR – TYPE A**
REMOVE 35mm WIDTH FROM BOTTOM OF STIFFENER AS DETAILED AND GRIND THE WEB SURFACE TO SMOOTH FINISH AS SPECIFIED.
- STRUCTURAL STEEL REPAIR – TYPE B**
THE EXISTING CRACKED WELDS SHALL BE REMOVED BY GRINDING AND REPAIRED BY RE-WELDING TO MATCH EXISTING WELD SIZE.

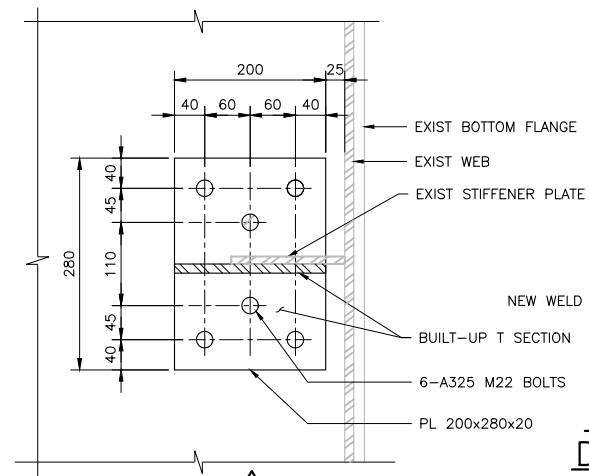
CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS OF THE EXISTING STRUCTURE THAT ARE RELEVANT TO THE WORK SHOWN ON THE DRAWINGS PRIOR TO COMMENCEMENT OF THE WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER AND THE PROPOSED ADJUSTMENT OF THE WORK REQUIRED TO MATCH THE EXISTING STRUCTURE SHALL BE SUBMITTED FOR APPROVAL.
2. RETROFIT TRANSVERSE STIFFENER AT INTERIOR CROSS BRACING CONNECTION FOR EACH EXISTING BOX GIRDER (48 CONNECTIONS TOTAL).



STRUCTURAL STEEL REPAIR TYPE A

1:5



EXISTING BOTTOM CHORD RETROFIT DETAIL AT EXTERNAL CROSS BRACING

1:5

LIST OF ABBREVIATIONS:
WP WORKING POINT

SCALE :

AS NOTED

DESIGNED	SUBOOHI OBAID
DRAWN	SOPHA MILLS
CHECKED	NIMA MAHMOUDI
APPROVED LEAD ENG.	TATIANA OJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INIT. DATE

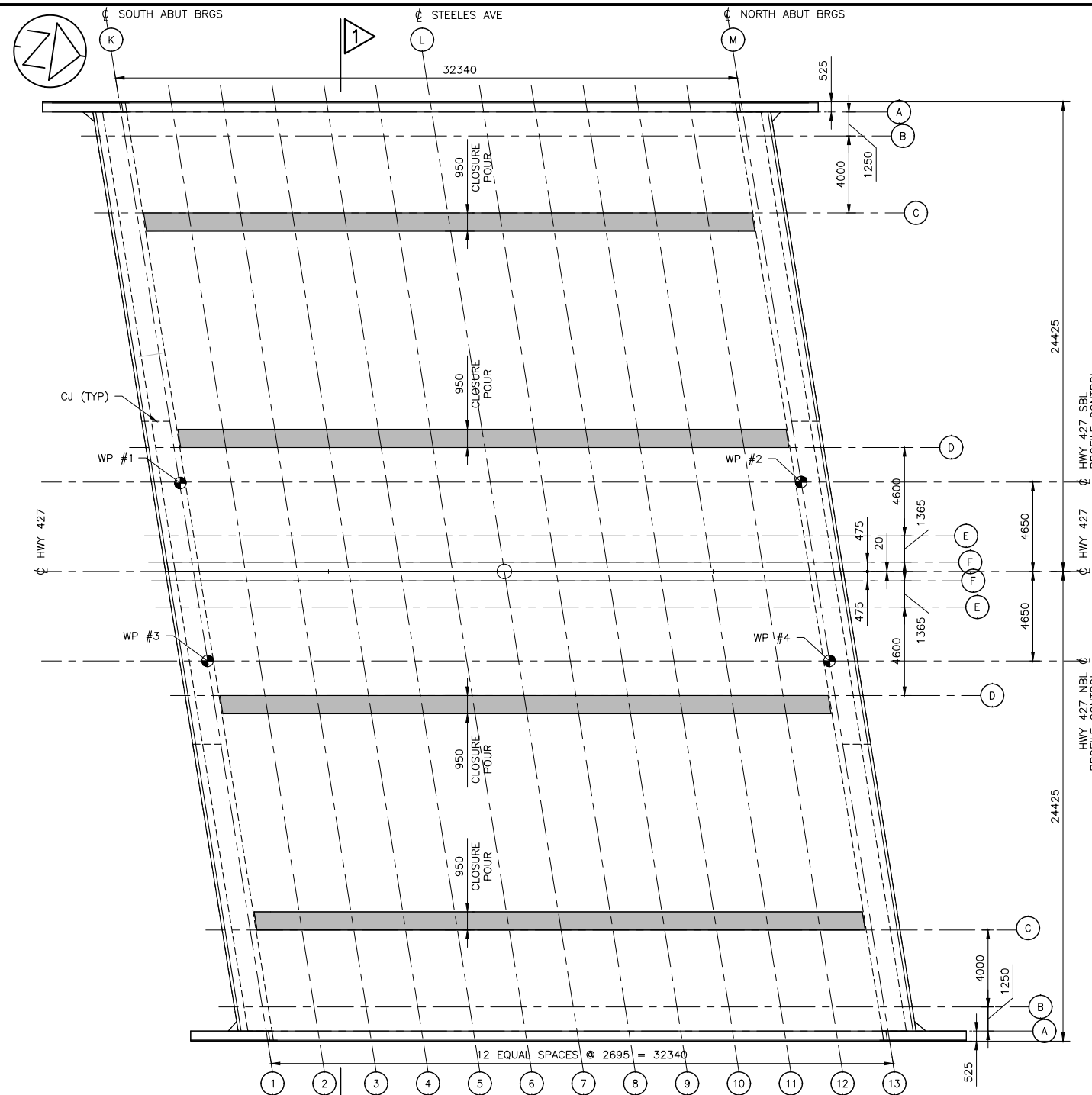


TITLE
**HWY 427 EXPANSION
HWY 427 / STEELES AVE OVERPASS NBL & SBL
REHABILITATION AND WIDENING R1
SITE 37-1111
STRUCTURAL STEEL IV**

PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	713	C

CAD FILE LOCATION AND NAME: C:\projects\wise\wsp-co\wsp-co\feipang\dmad6255\H427-D0-9A-STR-B07-DWG-71355.dwg
 MODIFIED: 3/19/2018 1:18:27 PM BY: PANGF
 DATE PLOTTED: 3/19/2018 1:59:48 PM

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				



SCREED ELEVATIONS – SOUTHBOUND LANE

GRID	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬
(A)	181.882	181.941	181.998	182.051	182.089	182.122	182.146	182.160	182.163	182.159	182.146	182.124	182.099
(B)	181.909	181.963	182.014	182.061	182.096	182.127	182.150	182.164	182.169	182.169	182.160	182.144	182.126
(C)	181.995	182.032	182.065	182.093	182.120	182.143	182.162	182.177	182.189	182.199	182.204	182.209	182.209
(D)	182.040	182.082	182.118	182.153	182.182	182.208	182.229	182.244	182.255	182.259	182.262	182.259	182.249
(E)	181.953	182.006	182.053	182.096	182.131	182.159	182.179	182.192	182.198	182.200	182.190	182.176	182.161
(F)	181.928	181.983	182.034	182.079	182.116	182.144	182.165	182.177	182.182	182.182	182.168	182.152	182.135

ELEVATIONS ON TOP OF STEEL GIRDER – SOUTHBOUND LANE

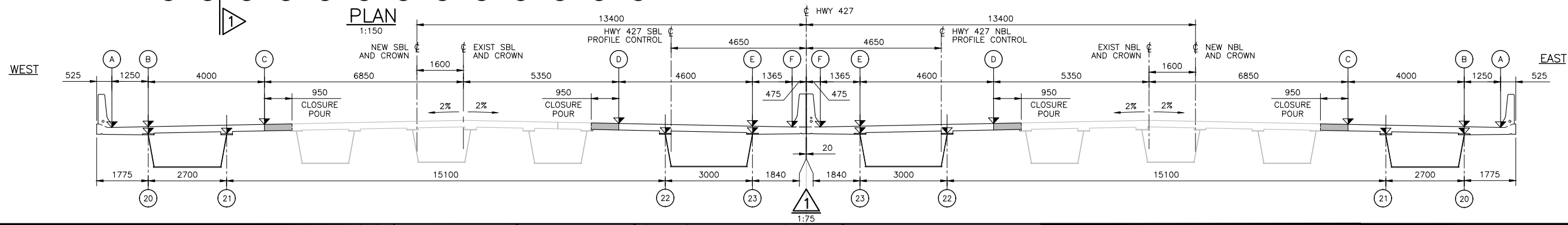
GRID	⑳	㉑	㉒	㉓
(K)	181.664	181.668	181.705	181.708
(L)	181.905	181.859	181.907	181.934
(M)	181.881	181.883	181.914	181.916

SCREED ELEVATIONS – NORTHBOUND LANE

GRID	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬
(A)	181.954	182.011	182.066	182.117	182.154	182.184	182.207	182.219	182.220	182.214	182.199	182.175	182.149
(B)	181.978	182.030	182.079	182.124	182.158	182.187	182.208	182.221	182.224	182.222	182.211	182.193	182.173
(C)	182.054	182.090	182.121	182.147	182.173	182.194	182.212	182.225	182.237	182.245	182.248	182.251	182.251
(D)	182.069	182.111	182.146	182.181	182.209	182.234	182.255	182.269	182.279	182.283	182.285	182.282	182.271
(E)	181.972	182.024	182.071	182.113	182.148	182.176	182.196	182.209	182.214	182.215	182.205	182.191	182.176
(F)	181.943	181.998	182.048	182.093	182.130	182.158	182.178	182.191	182.195	182.195	182.181	182.165	182.147

ELEVATIONS ON TOP OF STEEL GIRDER – NORTHBOUND LANE

GRID	⑳	㉑	㉒	㉓
(K)	181.733	181.730	181.730	181.727
(L)	181.963	181.912	181.929	181.951
(M)	181.928	181.926	181.933	181.931



NOTES:
 1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 700 AND 703.

LIST OF ABBREVIATIONS:
 WP WORKING POINT

APPLICABLE STANDARD DRAWINGS:
 OPSD 3310.100 DECK, GIRDERS, CONCRETE, METHOD OF OBTAINING SCREED ELEVATIONS
 OPSD 3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
 OPSD 3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS
 OPSD 3390.100 DECK, DRIP CHANNEL
 OPSD 3950.100 JOINTS, CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE

CAD FILE LOCATION AND NAME: C:\projectwise\wsp-co\wsp-co\feipang\fdms06255\H427-D0-9A-STR-607-DWG-714DK.dwg
 MODIFIED: 3/19/2018 1:18:37 PM BY: PANGF
 DATE PLOTTED: 3/19/2018 1:59:51 PM BY:

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
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B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

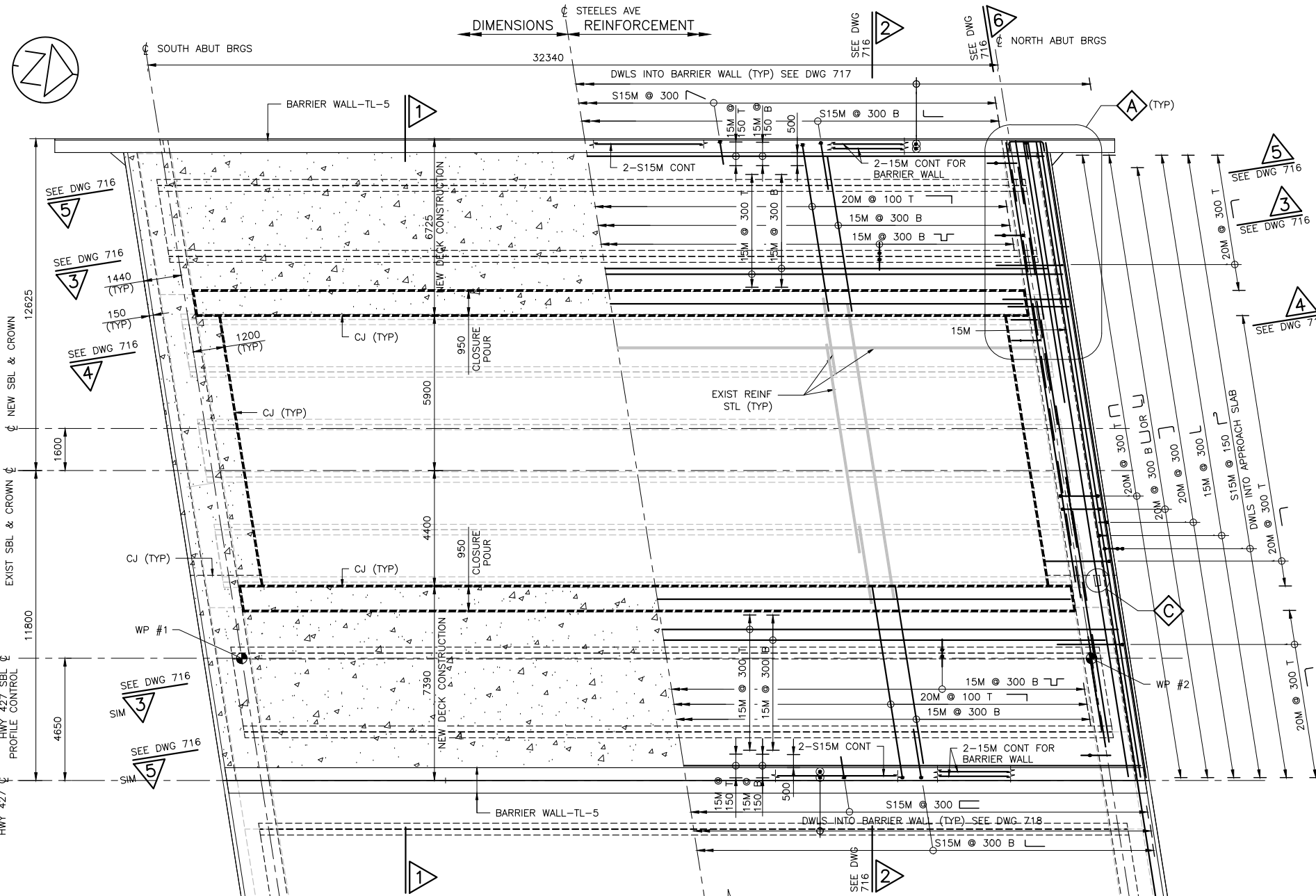
SCALE :
 AS NOTED

DESIGNED	SUBOOHI OBRAD
DRAWN	SOPHA MILLS
CHECKED	NIMA MAHMOUDI
APPROVED LEAD ENG.	TATIANA GJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INIT.
	DATE

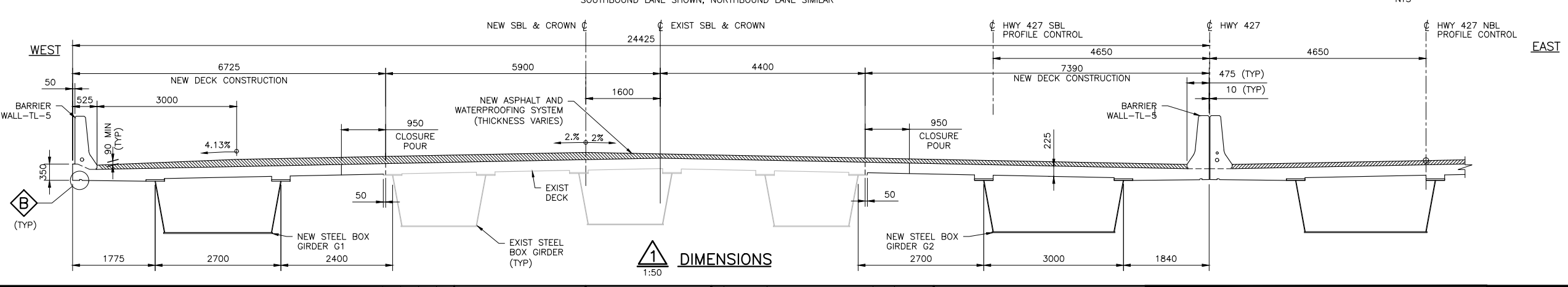


**HWY 427 EXPANSION
 HWY 427 / STEELES AVE OVERPASS NBL & SBL
 REHABILITATION AND WIDENING R1
 SITE 37-1111
 DECK DETAILS I**

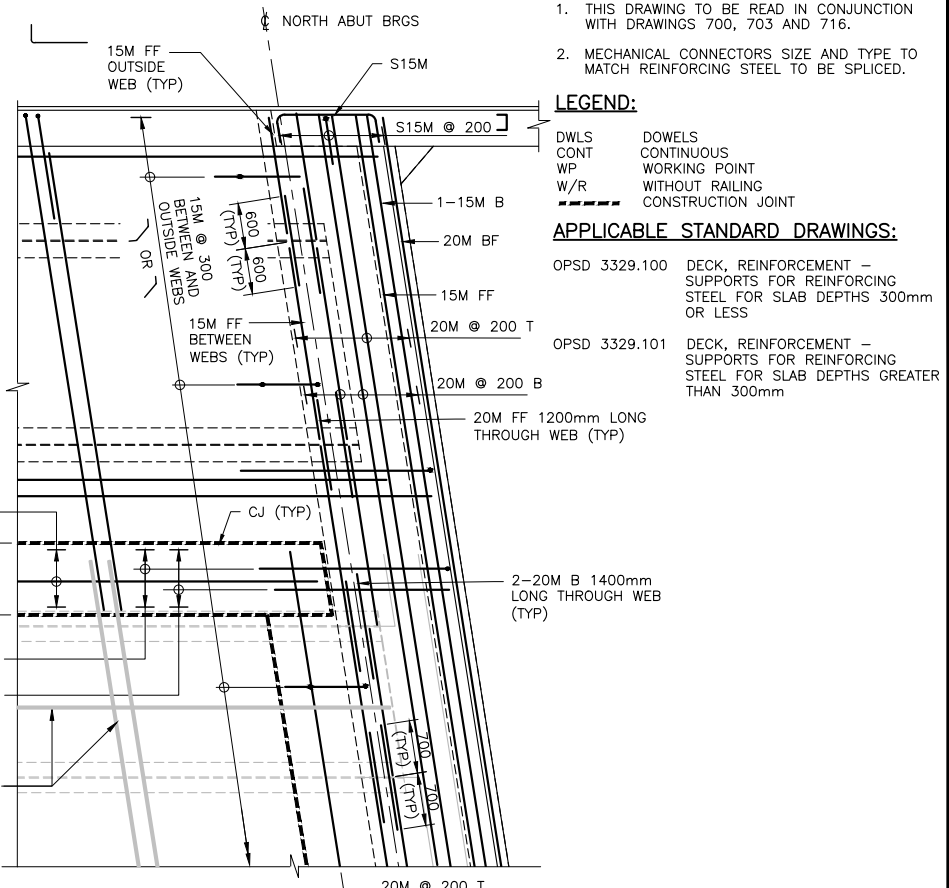
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H427-D	N	9A	STR	B07	DWG	714	C



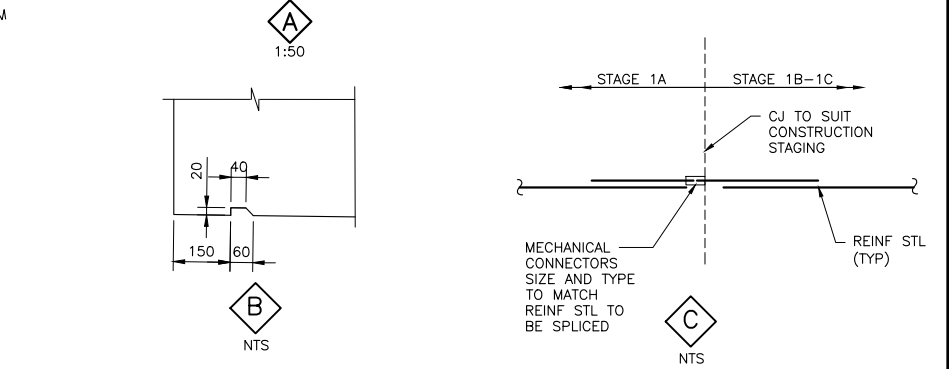
PLAN
1:100
SOUTHBOUND LANE SHOWN, NORTHBOUND LANE SIMILAR



1 DIMENSIONS
1:50



CLOSURE STRIP TYPICAL DETAILS



PROVIDE MECHANICAL CONNECTORS AT CJ FOR ALL TRANSVERSE REINF STL

NOTES:
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 700, 703 AND 716.
2. MECHANICAL CONNECTORS SIZE AND TYPE TO MATCH REINFORCING STEEL TO BE SPLICED.

LEGEND:
DWLS CONT W/R --- DOWELS CONTINUOUS WORKING POINT WITHOUT RAILING CONSTRUCTION JOINT

APPLICABLE STANDARD DRAWINGS:
OPSD 3329.100 DECK, REINFORCEMENT - SUPPORTS FOR REINFORCING STEEL FOR SLAB DEPTHS 300mm OR LESS
OPSD 3329.101 DECK, REINFORCEMENT - SUPPORTS FOR REINFORCING STEEL FOR SLAB DEPTHS GREATER THAN 300mm

CAD FILE LOCATION AND NAME: C:\projectwise\wsp-co\wsp-co\feipang\dmad6255\H427-D0-9A-STR-607-DWG-715DWG.dwg
MODIFIED: 3/19/2018 1:19:13 PM BY: PANGF
DATE PLOTTED: 3/19/2018 1:59:54 PM BY:

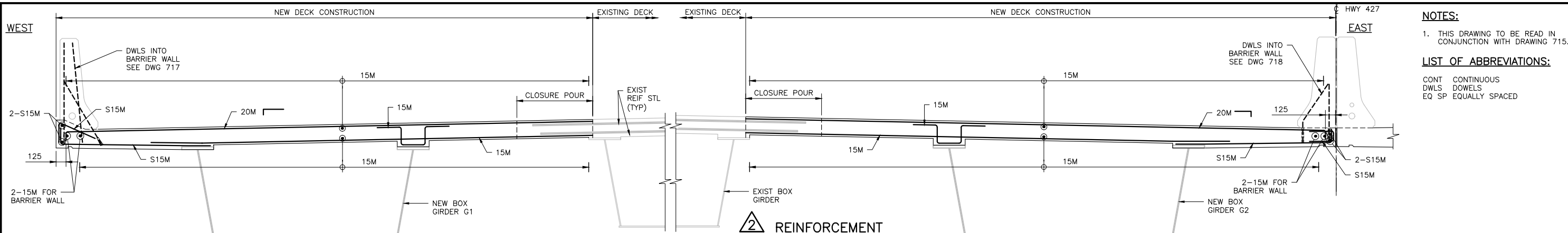
DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE :
AS NOTED

DESIGNED	SUBOOHI OMBAD	
DRAWN	SOPHA MILLS	
CHECKED	NIMA MAHMOUDI	
APPROVED LEAD ENG.	TATIANA GJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE

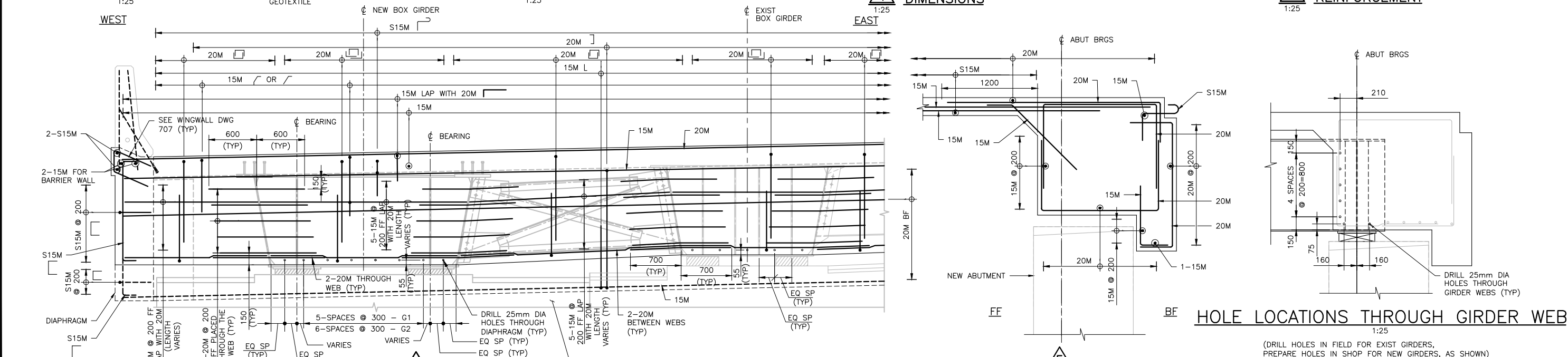
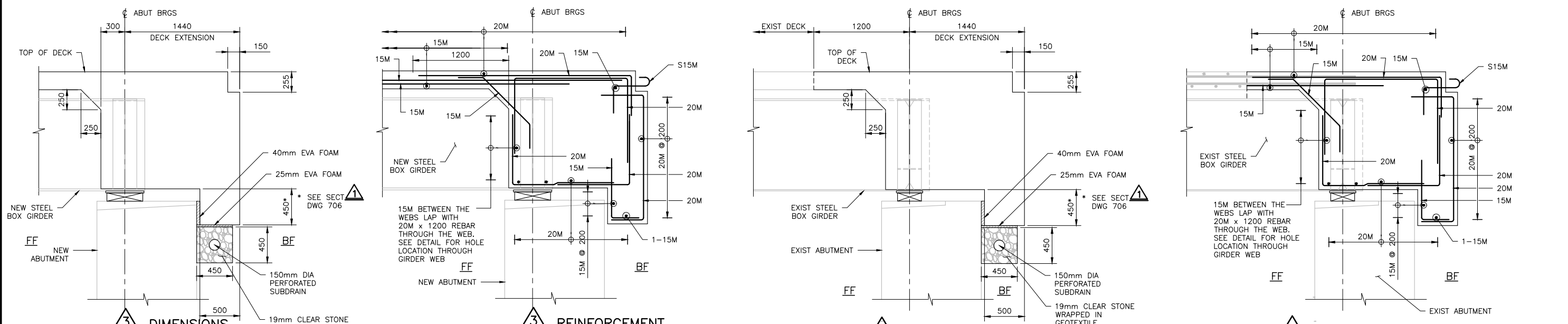


TITLE						
HWY 427 EXPANSION						
HWY 427 / STEELES AVE OVERPASS NBL & SBL						
REHABILITATION AND WIDENING R1						
SITE 37-1111						
DECK DETAILS II						
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER
H427-D	N	9A	STR	B07	DWG	715
						C



- NOTES:**
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING 715.
- LIST OF ABBREVIATIONS:**
- CONT CONTINUOUS
DWLS DOWELS
EQ SP EQUALLY SPACED

2 REINFORCEMENT
1:25



HOLE LOCATIONS THROUGH GIRDER WEB
1:25

(DRILL HOLES IN FIELD FOR EXIST GIRDERS. PREPARE HOLES IN SHOP FOR NEW GIRDERS, AS SHOWN)

CAD FILE LOCATION AND NAME: C:\project\wise\wsp-co\wsp-co\wsp-co\h427-d0-9a-str-b07-dwg-71bdk.dwg
 MODIFIED: 3/19/2018 1:19:25 PM BY: PANG
 DATE PLOTTED: 3/19/2018 1:59:58 PM BY:

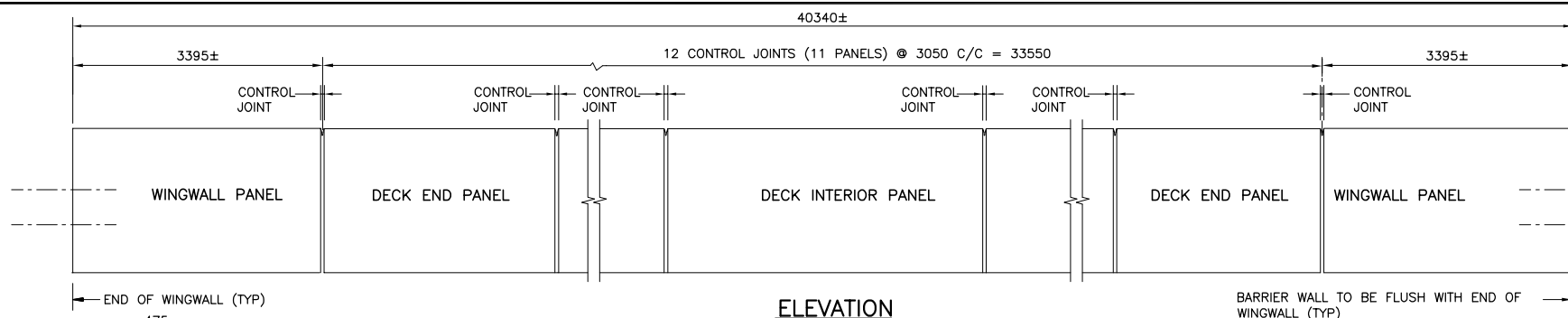
DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
C	18/03/16	90% SUBMISSION TO CA			
B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

SCALE : AS NOTED

DESIGNED	SUBOOH ORANI		
DRAWN	SOPHA MILLS		
CHECKED	NAMA MAHMOUDI		
APPROVED LEAD ENG.	TATIANA QJALA		
APPROVED PROJ. MANAGER			
NAME (PRINT)		INIT.	DATE



HWY 427 EXPANSION HWY 427 / STEeles AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 DECK DETAILS III							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	716	C



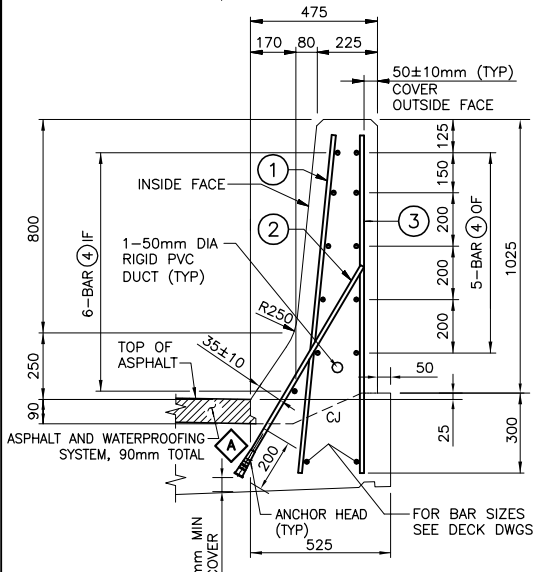
ELEVATION

FOR ANCHORAGE DETAILS SEE GENERAL ARRANGEMENT DWG (TYP)

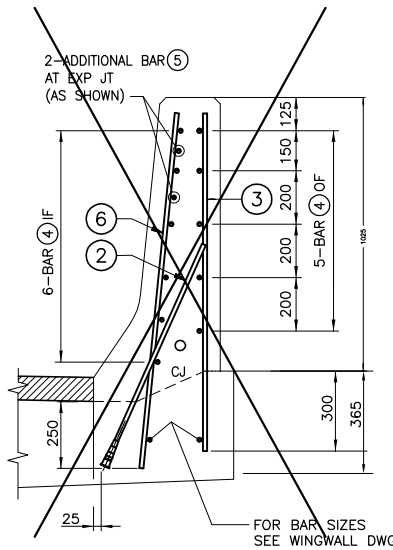
- NOTES:**
1. SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
 2. CONCRETE COVER TO REINFORCING BAR 60±10mm EXCEPT AS NOTED.
 3. REINFORCING SHALL BE GRADE III (GIII) GLASS FIBRE REINFORCED POLYMER (GFRP) SUPPLIED AS COMBAR BY SCHÖCK OR AS V-ROD HEADED BAR BY PULTRALL.
 4. SIZE IN THE BAR SCHEDULE INDICATES DESIGNATED BAR DIAMETER AND SHALL HAVE A NOMINAL CROSS SECTIONAL AREA ACCORDING TO CAN/CSA S-807.
 5. ANCHOR HEAD OF GFRP REBAR SHALL HAVE A MINIMUM GUARANTEED PULL OUT STRENGTH (Fp) AS FOLLOWS:

SIZE	Fp (kN)
GIII-15M WITH HEAD	100

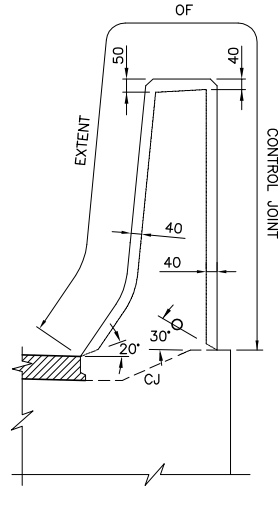
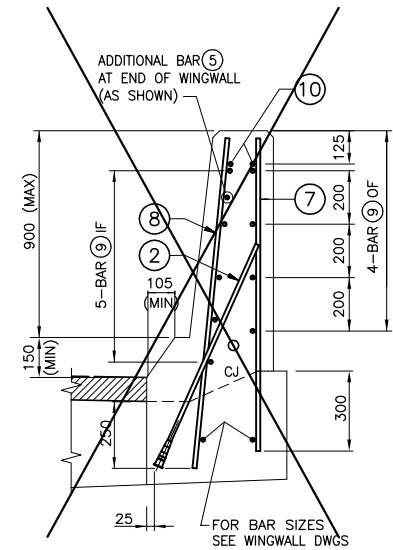
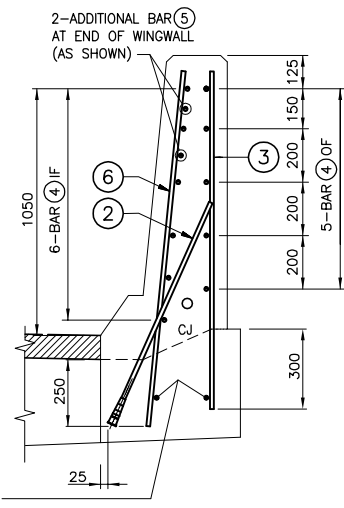
6. BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
7. MINIMUM BAR LAP SPLICE TO BE 640mm, UNLESS OTHERWISE SHOWN.
8. LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
9. CONTROL JOINT TO BE FORMED.
10. SAWCUTS NOT PERMITTED.
11. CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
12. OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
13. CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
14. LEGEND: EF - DENOTES EACH FACE
IF - DENOTES INSIDE FACE
OF - DENOTES OUTSIDE FACE
CJ - CONSTRUCTION JOINT



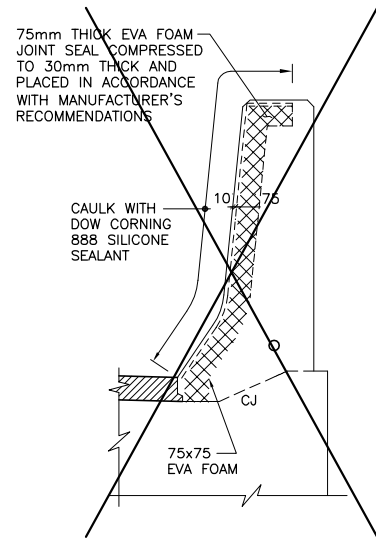
BARRIER WALL ON DECK
TYPICAL DIMENSIONS



BARRIER WALL ON WINGWALL
TYPICAL REINFORCING

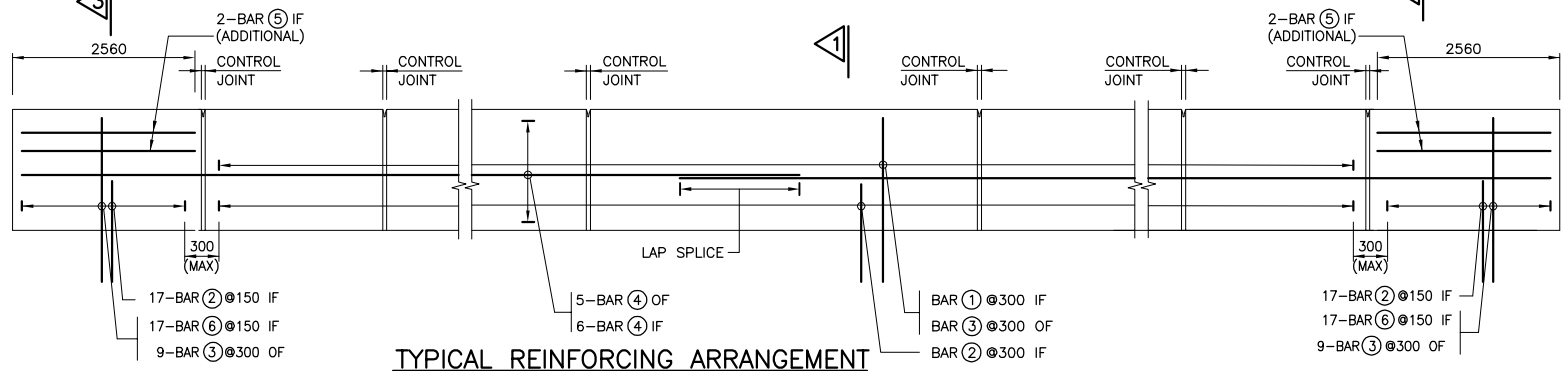


EXTENT OF CONTROL JOINT IN BARRIER WALL

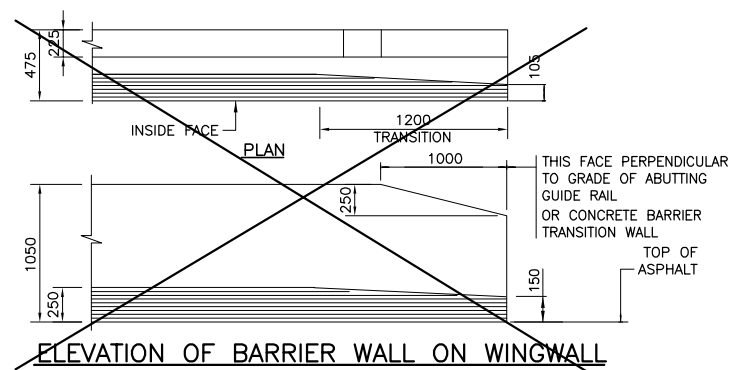


EXTENT OF EXPANSION JOINT IN BARRIER WALL

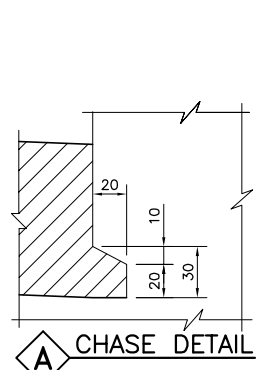
BAR MARK	SIZE	SHAPE
1	GIII-15M	STRAIGHT
2	GIII-15M WITH ANCHOR HEAD	STRAIGHT ← 910 →
3	GIII-13M	STRAIGHT
4	GIII-15M	STRAIGHT
5	GIII-15M	STRAIGHT
6	GIII-15M	STRAIGHT
7	GIII-13M	STRAIGHT LENGTH VARIES
8	GIII-15M	STRAIGHT LENGTH VARIES
9	GIII-13M	STRAIGHT
10	GIII-15M	STRAIGHT



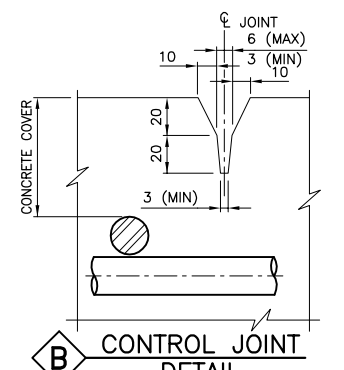
TYPICAL REINFORCING ARRANGEMENT



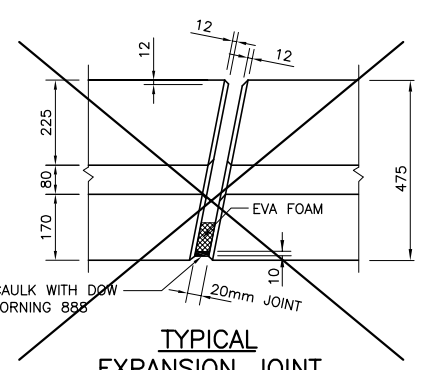
ELEVATION OF BARRIER WALL ON WINGWALL



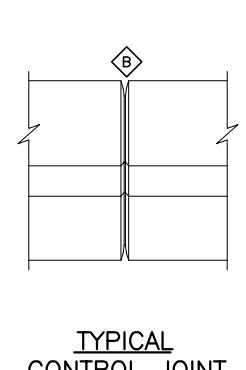
A CHASE DETAIL



B CONTROL JOINT DETAIL



TYPICAL EXPANSION JOINT



TYPICAL CONTROL JOINT

MODIFIED	
STANDARD DRAWING SEPTEMBER 2016	SS110-92
BARRIER WALL WITHOUT RAILING, TL-5 (GFRP REBAR WITH ANCHOR HEAD)	

CAD FILE LOCATION AND NAME: C:\projects\hwy427\hwy427-00-9A-STR-B07-DWG-717BW.dwg
 MODIFIED: 3/19/2018 1:18:41 PM BY: PANGF
 DATE PLOTTED: 3/19/2018 2:05:26 PM BY:

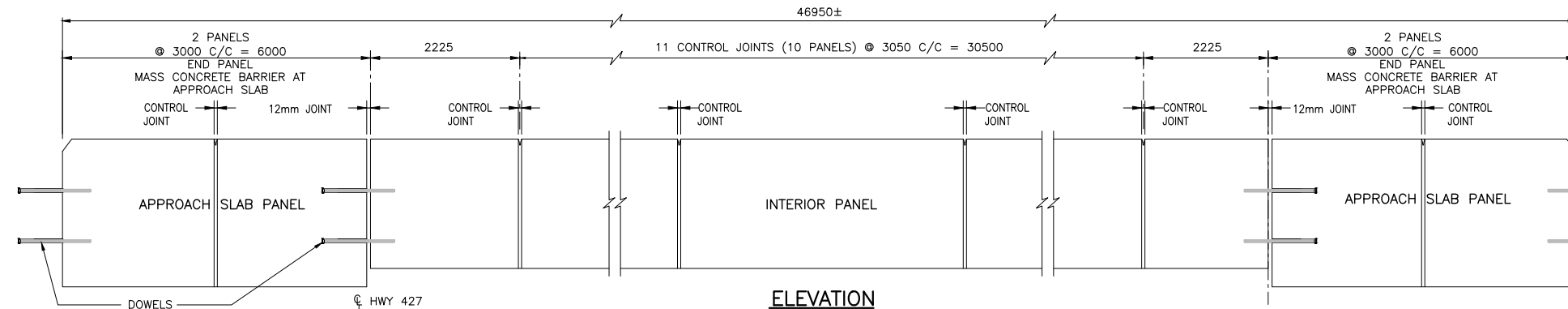
DATE	REVISIONS	BY	CHK	LEAD	PROJ
C	18/03/16	90% SUBMISSION TO CA			
B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

SCALE :
AS NOTED

DESIGNED	SUBOOHI OBAD
DRAWN	SOPHA MILLS
CHECKED	NIMA MAHMOUDI
APPROVED LEAD ENG.	TATIANA OJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INT. DATE

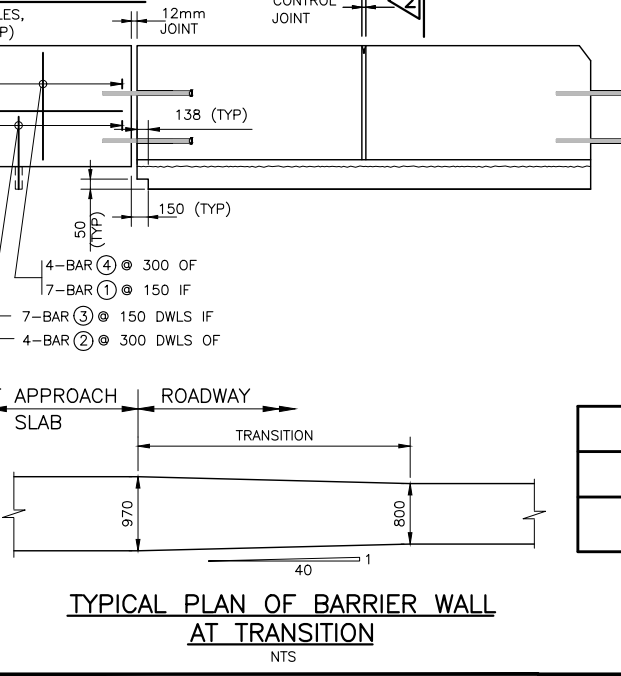
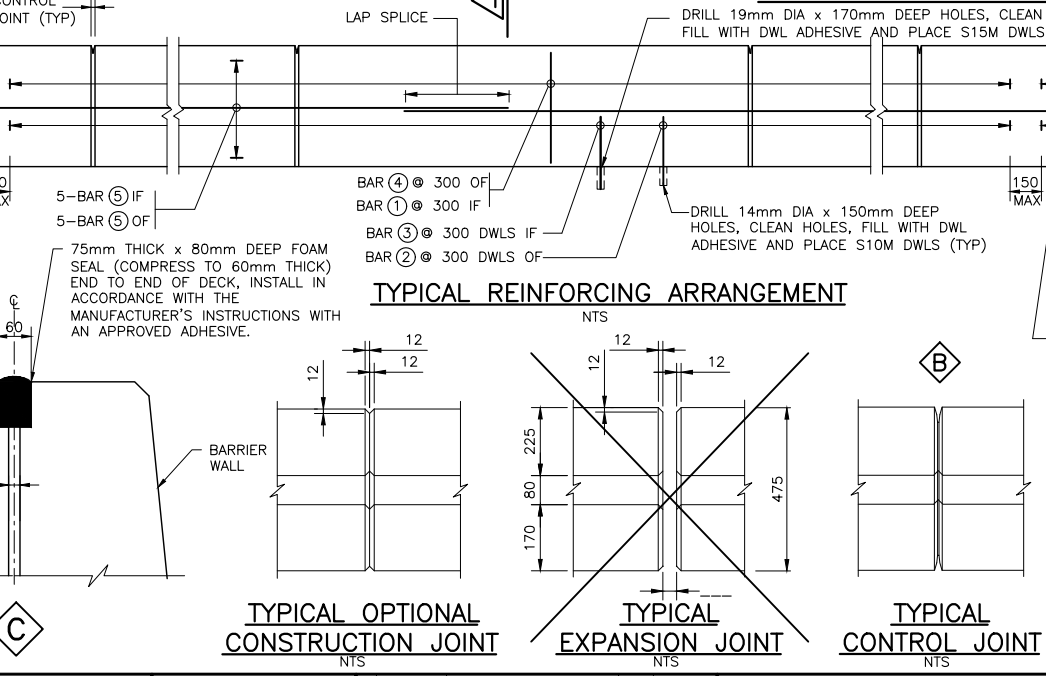
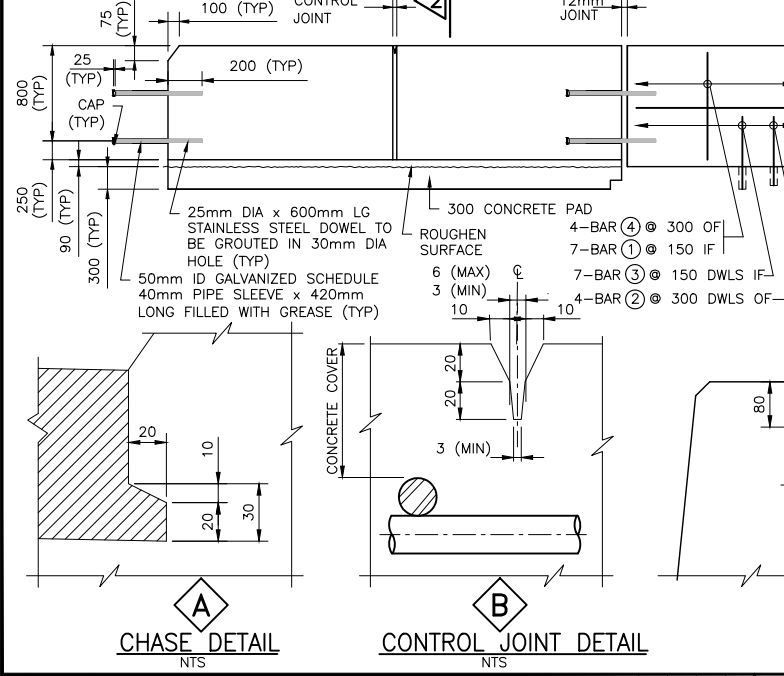
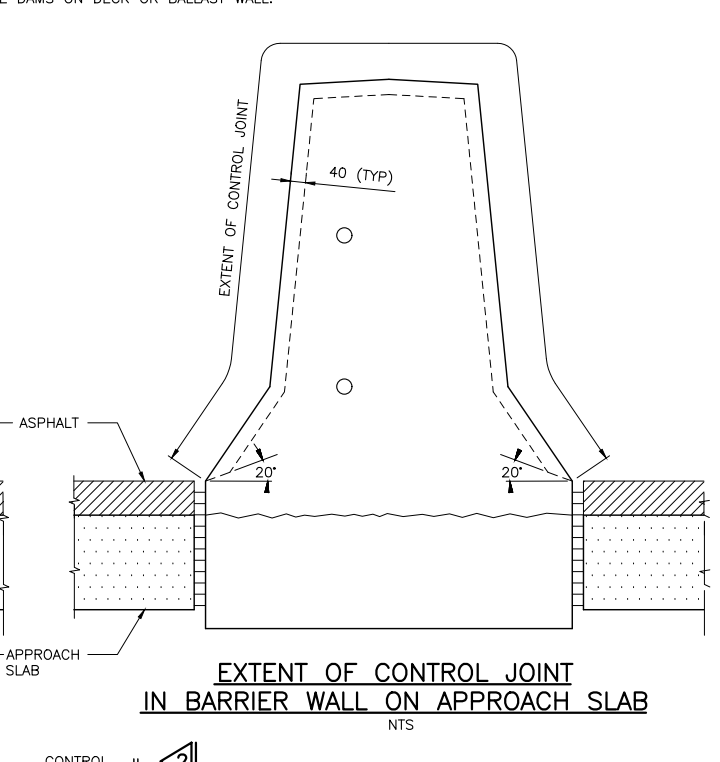
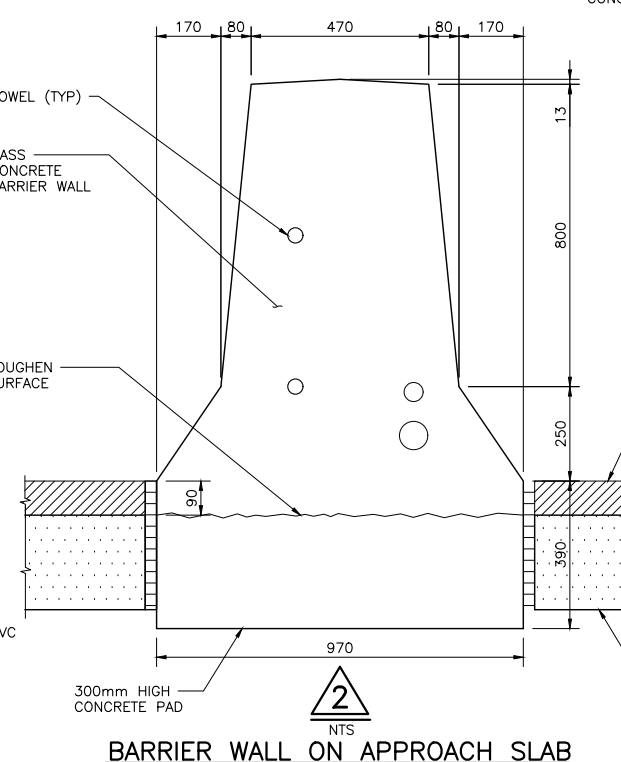
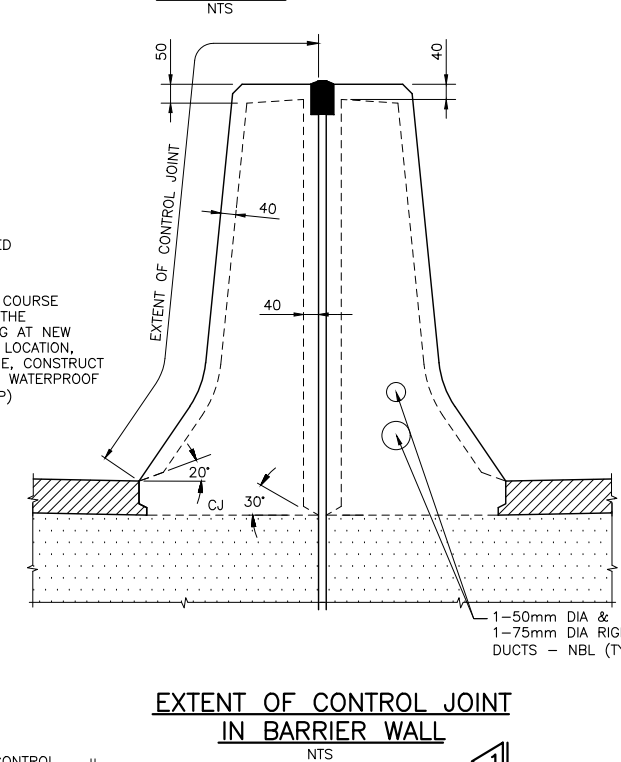
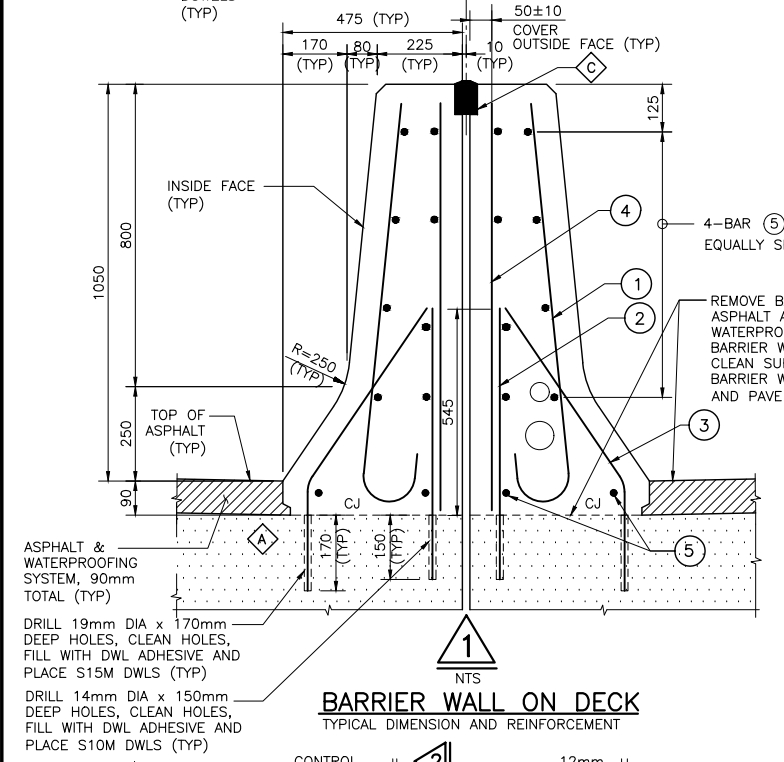


TITLE							
HWY 427 EXPANSION HWY 427 / STEELES AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 EXTERIOR BARRIER WALL							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	717	C



NOTES:

1. SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
2. CONCRETE COVER TO REINFORCING STEEL 60±10mm EXCEPT AS NOTED.
3. REINFORCING STEEL SHALL BE STAINLESS TYPE 316LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500MPa.
4. BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
5. MINIMUM BAR LAP SPLICE TO BE 550mm, UNLESS OTHERWISE SHOWN.
6. LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
7. CONTROL JOINT TO BE FORMED.
8. SAWCUTS NOT PERMITTED.
9. CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
10. OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
11. CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
12. LEGEND: EF - DENOTES EACH FACE
IF - DENOTES INSIDE FACE
OF - DENOTES OUTSIDE FACE
CJ - CONSTRUCTION JOINT
LS - LAP SPLICE



BAR MARK	SIZE	SHAPE
①	S15M	
②	S10M DWLS	
③	S15M DWLS	
④	S10M	STRAIGHT
⑤	S15M	STRAIGHT

MODIFIED	
STANDARD DRAWING SEPTEMBER 2016	SS110-61
BARRIER WALL WITHOUT RAILING, TL-5 (STAINLESS STEEL REBAR)	

CAD FILE LOCATION AND NAME: C:\projects\wise\wsp-ca\wsp-ca\feipang\dmdb255\H427-D0-9A-STR-607-DWG-71.BBw.dwg
 MODIFIED: 3/19/2018 1:18:49 PM BY: PANG
 DATE PLOTTED: 3/19/2018 2:00:05 PM BY:

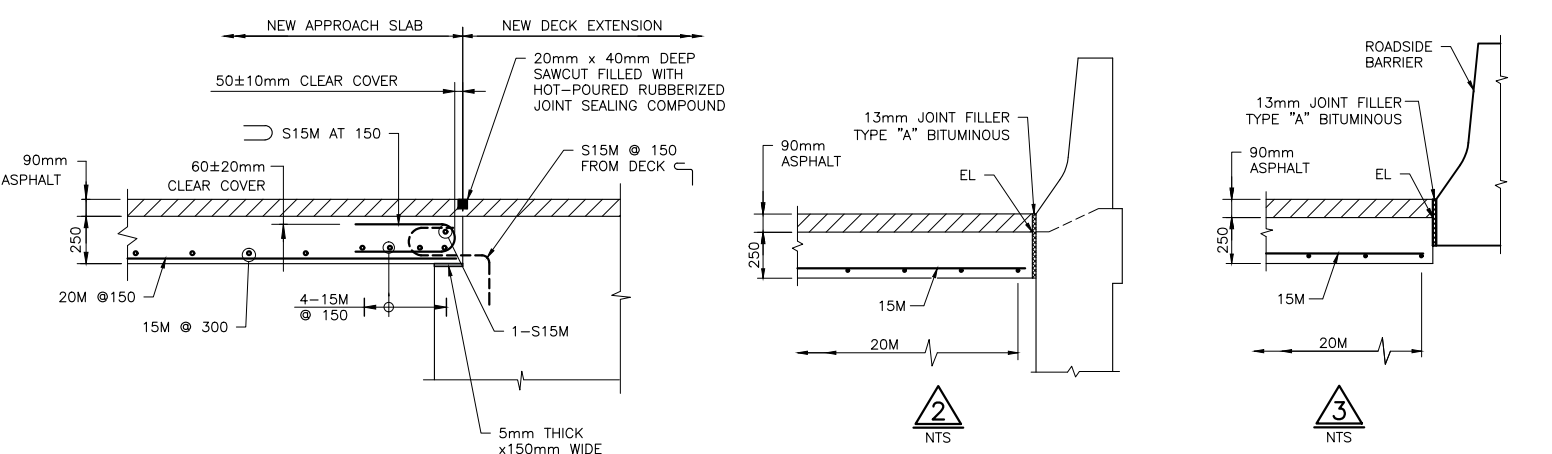
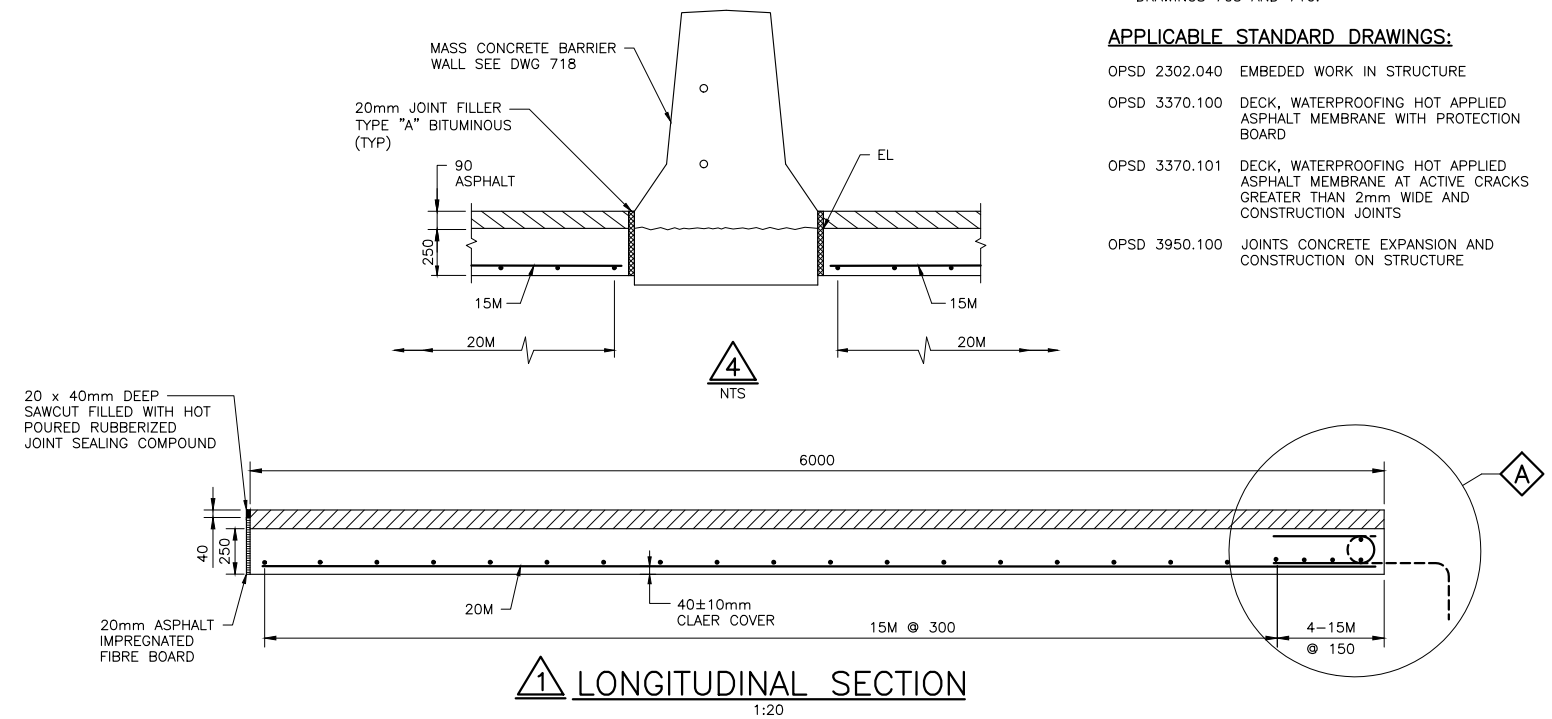
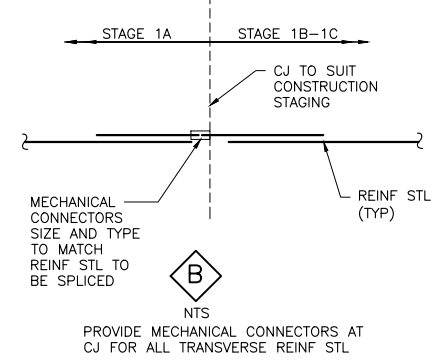
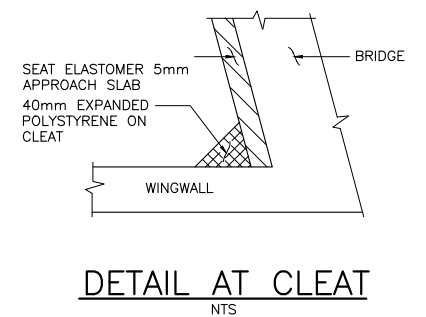
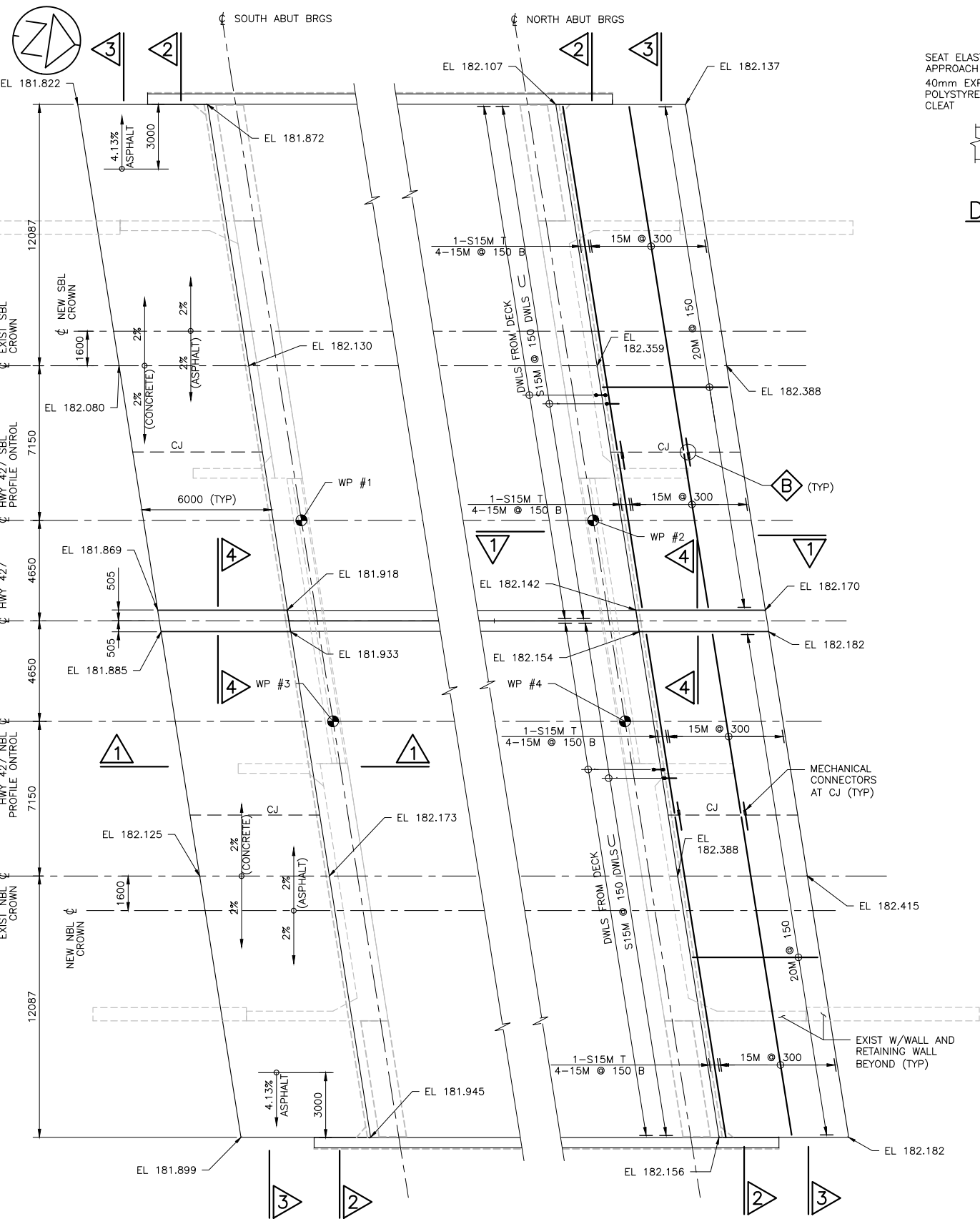
DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE :
AS NOTED

DESIGNED	SUBOOHI ORANI
DRAWN	SOPHA MILLS
CHECKED	NIMA MAHMOUDI
APPROVED LEAD ENG.	TATIANA GJALA
APPROVED PROJ. MANAGER	



HWY 427 EXPANSION HWY 427 / STEEL AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 INTERIOR BARRIER WALL							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	718	C



- NOTES:**
- CLEAR COVER TO REINFORCING STEEL 70 ± 20 mm EXCEPT AS NOTED.
 - LAYOUT OF REINFORCING STEEL WILL BE SIMILAR FOR LEFT HAND AND ZERO DEGREE SKEW.
 - STAINLESS STEEL BARS SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500MPa. REINFORCING STEEL SHALL BE GRADE 400W.
 - ~~WATERPROOFING AT JOINT BETWEEN BRIDGE AND APPROACH SLAB TO BE IN ACCORDANCE WITH OPSD-3370-100.~~
 - WATERPROOFING FOR BRIDGES WITHOUT EXPANSION JOINTS (RIGID FRAMES AND INTEGRAL ABUTMENTS) TO BE IN ACCORDANCE WITH OPSD 3370.101.
 - BARS MARKED WITH PREFIX S DENOTE STAINLESS STEEL BARS.
 - THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 703 AND 716.

- APPLICABLE STANDARD DRAWINGS:**
- OPSD 2302.040 EMBEDDED WORK IN STRUCTURE
 - OPSD 3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
 - OPSD 3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS
 - OPSD 3950.100 JOINTS CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE

MODIFIED	
STANDARD DRAWING MARCH 2016	SS116-1
6000 mm APPROACH SLAB	

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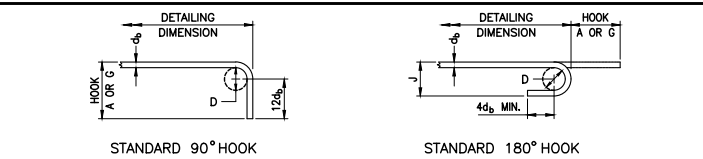
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C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE :
AS NOTED

DESIGNED	SUBOOHI OBRAD	
DRAWN	SOPHA MILLS	
CHECKED	NIMA MAHMOUDI	
APPROVED LEAD ENG.	TATIANA GJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



HWY 427 EXPANSION HWY 427 / STEELES AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING R1 SITE 37-1111 6000mm APPROACH SLAB							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	719	C



STANDARD 90° HOOK STANDARD 180° HOOK

MINIMUM BENDING PIN DIAMETER, D, mm

BAR SIZE	STEEL GRADE	
	400R(2)	400W
10M	70	60
15M	100	90
20M	120	100
25M	150	150
30M	250	200
35M	300	250
45M	450 (1)	400
55M	600 (1)	550

(1) Special fabrication is required for bends exceeding 90° for bars of these sizes and grade.
(2) For stainless steel, with $F_y = 420$, use the same D as for 400R.

STANDARD HOOK DIMENSIONS

BAR SIZE	90° HOOKS		180° HOOKS			
	A OR G (mm)		A OR G (mm)		J (mm)	
	400R	400W	400R	400W	400R	400W
10M	180	180	140	130	90	80
15M	260	250	180	170	130	120
20M	310	300	220	200	160	140
25M	400	400	280	280	200	200
30M	510	490	400	350	310	260
35M	610	590	480	430	370	320
45M	790	770	680	630	540	490
55M	1030	1010	900	850	710	660

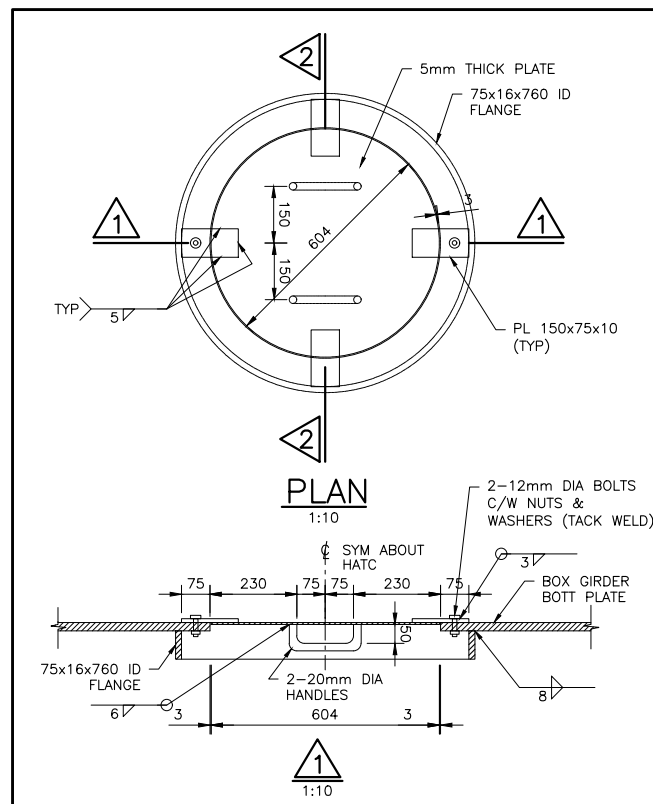
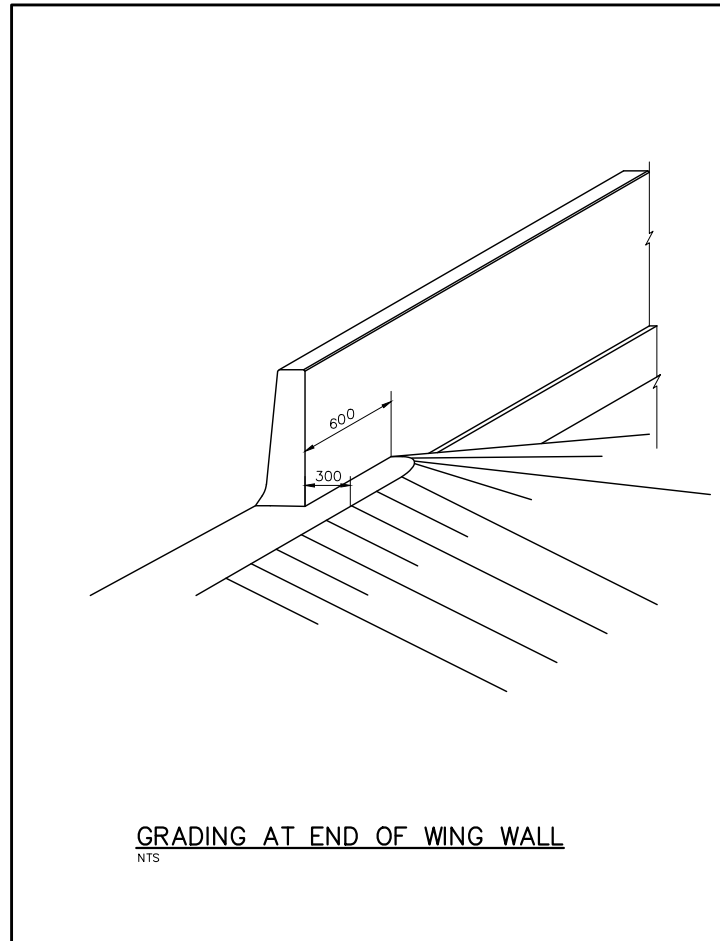
NOTE: All Hook Dimensions are according to the CHBDC-2014.

MINIMUM STIRRUP AND TIE HOOK DIMENSIONS

BAR SIZE	BAR DIAM. d_b (mm)	PIN DIAM. D (mm)	90°		135°	
			A OR G (mm)	A OR G (mm)	H (approx.) (mm)	H (approx.) (mm)
10M	11.3	45	100	100	70	70
15M	16.0	65	140	140	100	100
20M	19.5	80	180	175	115	115
25M	25.2	100	230			

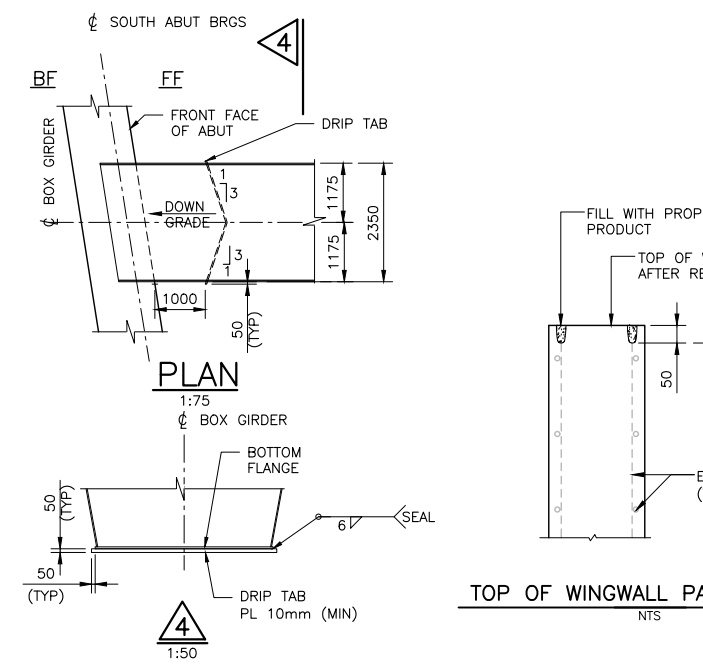
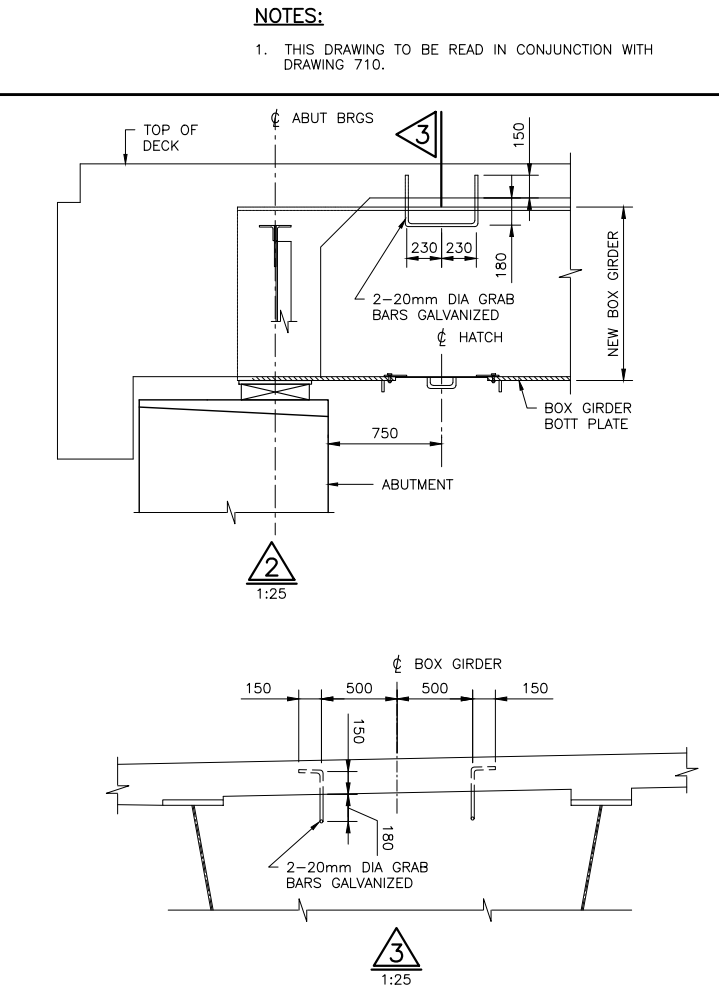
HOOK DIMENSIONS FOR REINFORCING STEEL BARS

Date: SEP 2016 Rev: SS12-1

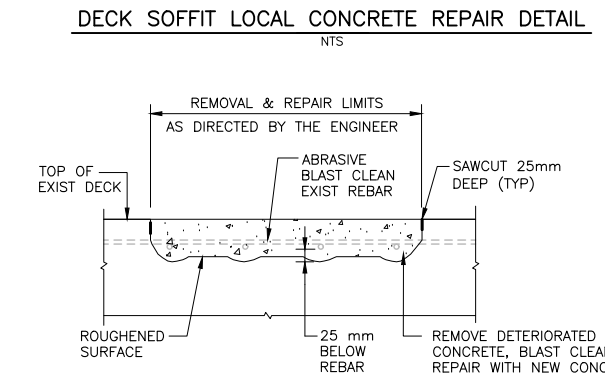
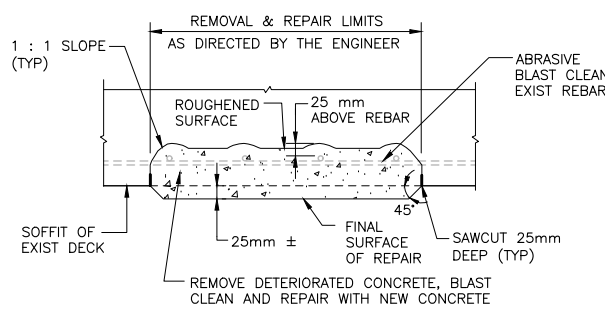


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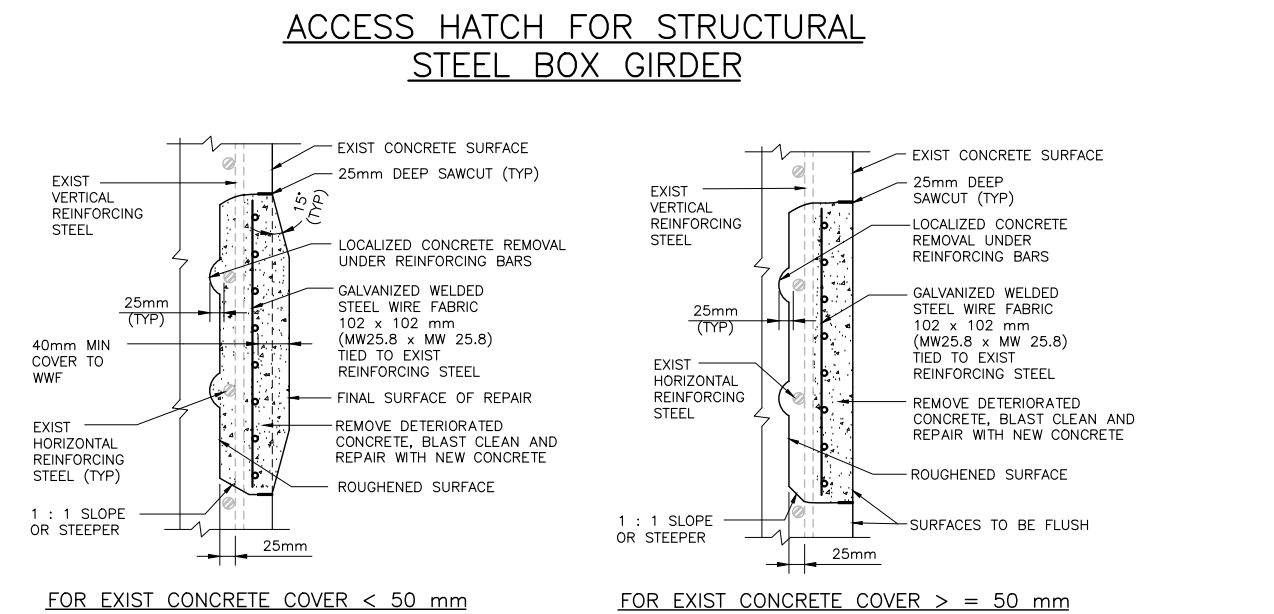
- TYPE OF STEEL TO BE THE SAME AS FOR BOX GIRDER.
- ALL BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A325.
- ALL BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH CSA SPECIFICATION G164.
- GALVANIZED GRAB BARS TO BE PROVIDED BY STRUCTURAL STEEL SUPPLIER.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHER SHOWN.



TYPICAL DRIP TAB DETAILS



DECK SURFACE LOCAL CONCRETE REPAIR DETAILS



VERTICAL SURFACE LOCAL CONCRETE REPAIR DETAILS NTS

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 DATE PLOTTED: 3/19/2018 2:00:13 PM BY:

SCALE : AS NOTED

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B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

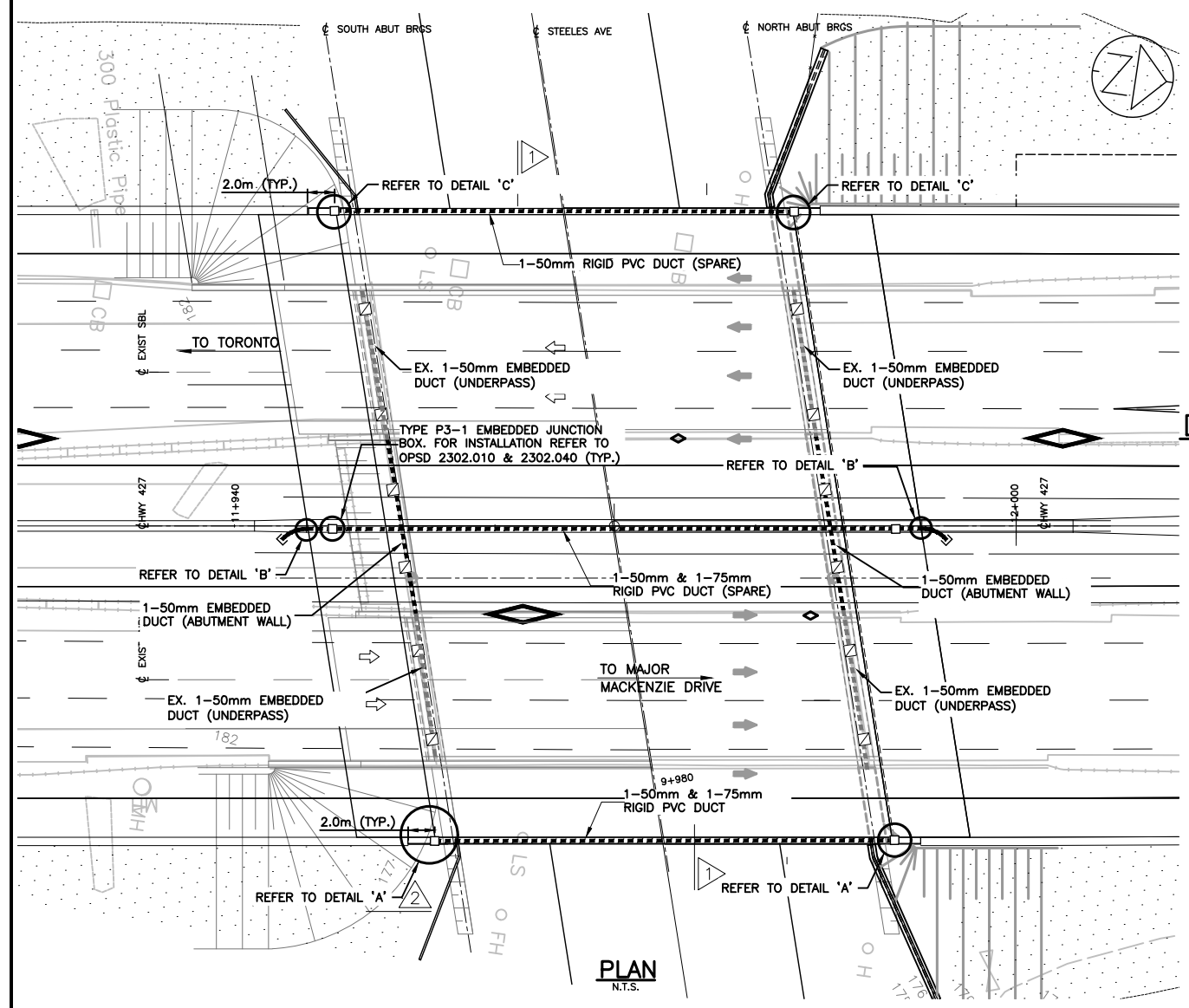
DESIGNED	SUBOOHI GHANI	
DRAWN	SOPHA MILLS	
CHECKED	NIMA MAHMOUDI	
APPROVED LEAD ENG.	TATIANA GJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



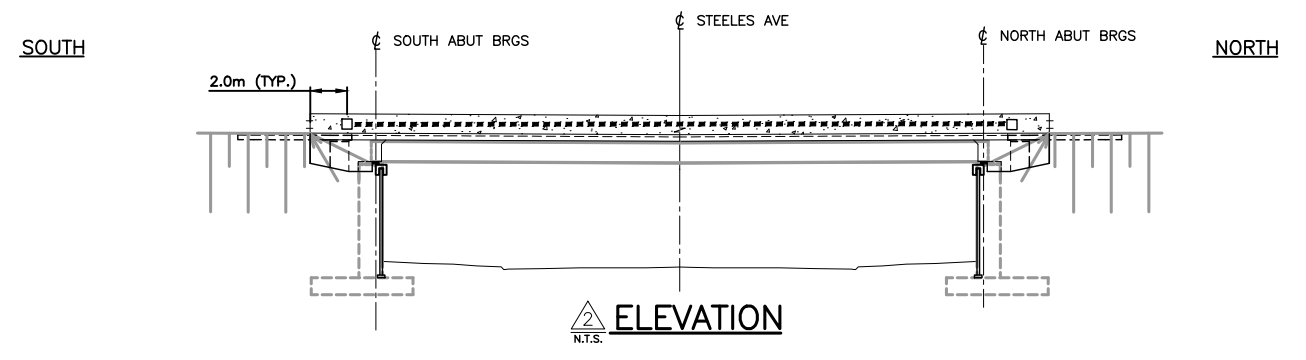
HWY 427 EXPANSION
HWY 427 / STEEL AVE OVERPASS NBL & SBL
REHABILITATION AND WIDENING R1
SITE 37-1111
STANDARD DETAILS

PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	720	C

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 DATE PLOTTED: 3/17/2018 2:16:41 PM BY: GILL, KARMIJIT



PLAN
N.T.S.



ELEVATION
N.T.S.

GENERAL NOTE(S):

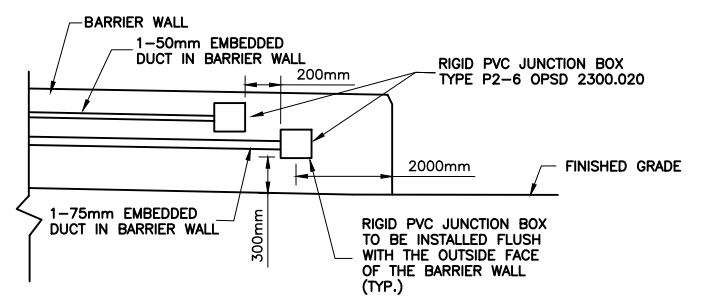
A. FOR UNDERPASS LUMINAIRES REFER TO ELECTRICAL LAYOUTS IN PACKAGE 9.

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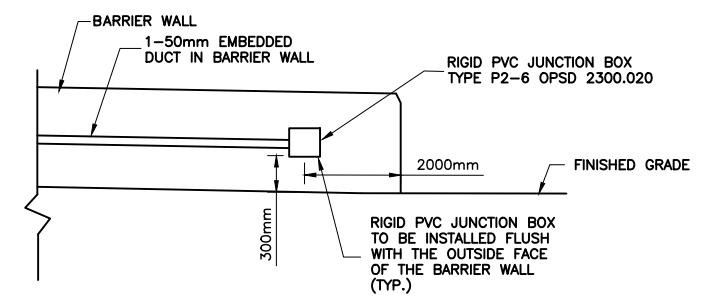
- OPSD 2011.101 - GENERAL SYMBOLS
- OPSD 2011.201 - GENERAL SYMBOLS
- OPSD 2102.010 - UNDERGROUND RIGID DUCT CONNECTION AT CONCRETE STRUCTURE
- OPSD 2302.010 - EMBEDDED WORK DETAIL
- OPSD 2302.020 - EXPANSION AND DEFLECTION FITTING ASSEMBLY
- OPSD 2302.040 - EMBEDDED WORK IN STRUCTURE

SUPPLEMENTARY LEGEND:

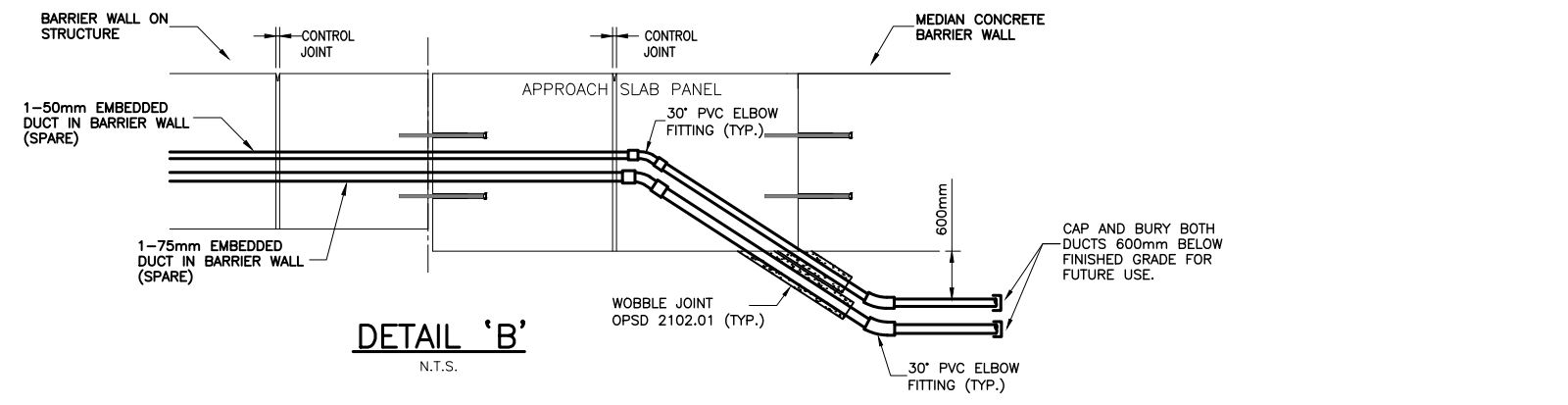
- RIGID JUNCTION BOX EMBEDDED TYPE P2-6 OPSD 2300.020 C/W GALVANIZED STEEL COVER
- EXP. EXPANSION AND DEFLECTION FITTING ASSEMBLY PER OPSD 2302.02
- EXISTING RIGID JUNCTION BOX EMBEDDED TYPE P2-4 OPSD 2300.020



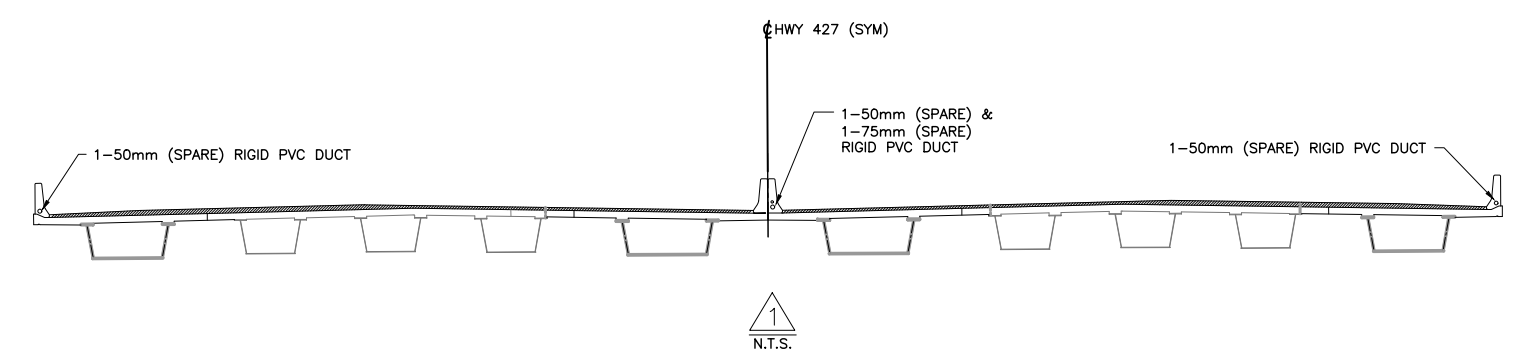
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N.T.S.



DETAIL 'C' - TERMINATION OF EMBEDDED DUCTS
N.T.S.



DETAIL 'B'
N.T.S.



1
N.T.S.

NO.	DATE	REVISIONS
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B	18/01/09	90% SUBMISSION TO CA
A	17/10/31	90% SUBMISSION TO CA
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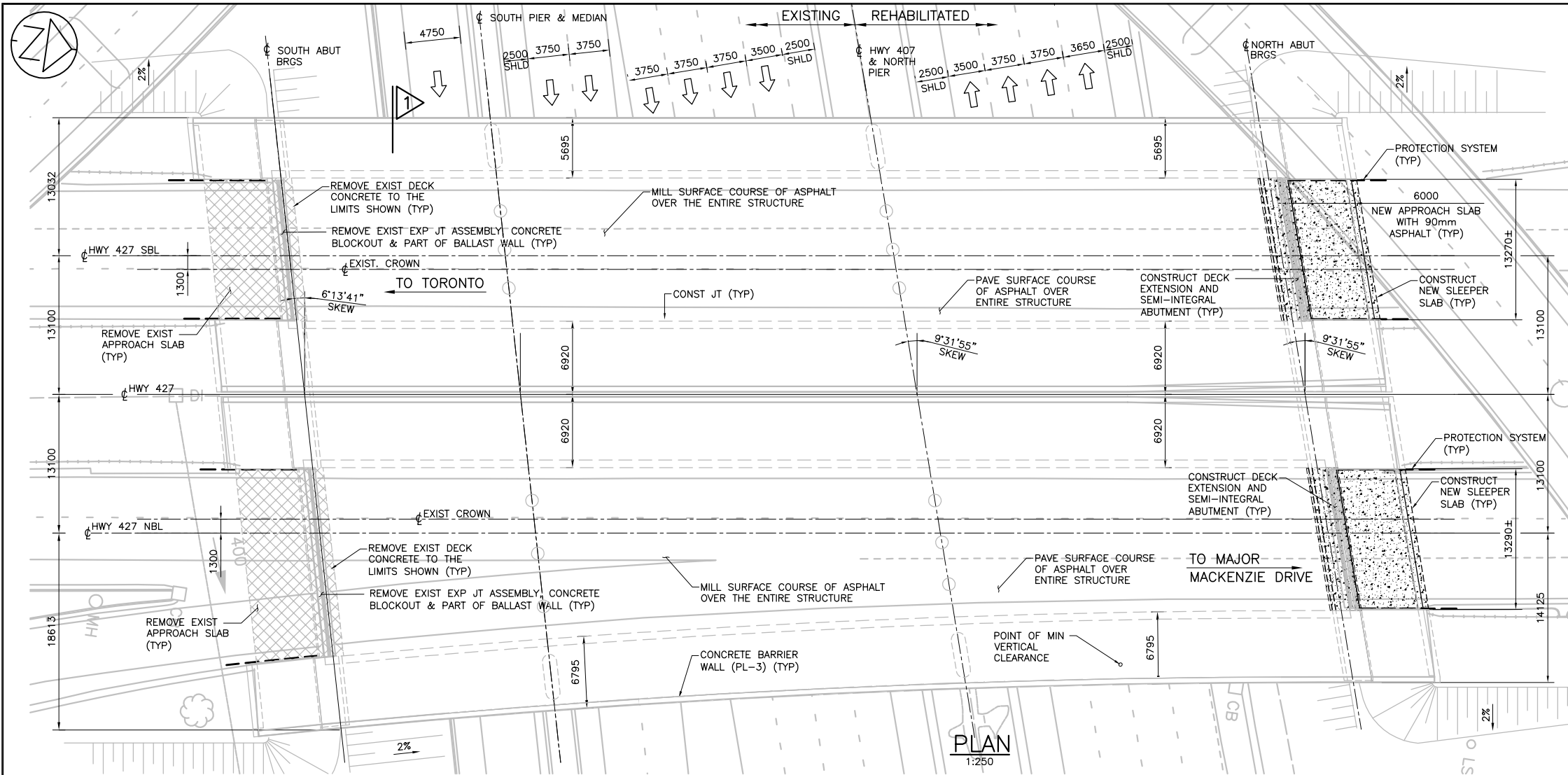
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BY	CHK	LEAD DISC.	PROJ. MAN.

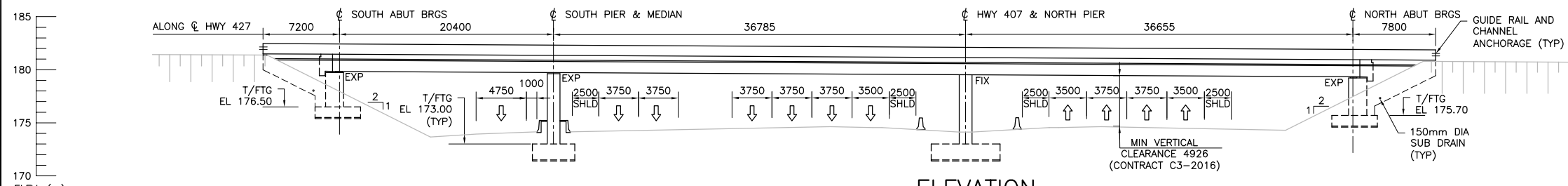
DESIGNED	MANPREET PANESAR	M.P.
DRAWN	KARMIJIT GILL	K.G.
CHECKED	NATALIA MAHABIR	N.M.
APPROVED LEAD ENG.	MARIO TEDESCO	M.T.
APPROVED PROJ. MANAGER		
	NAME (PRINT)	INT. DATE



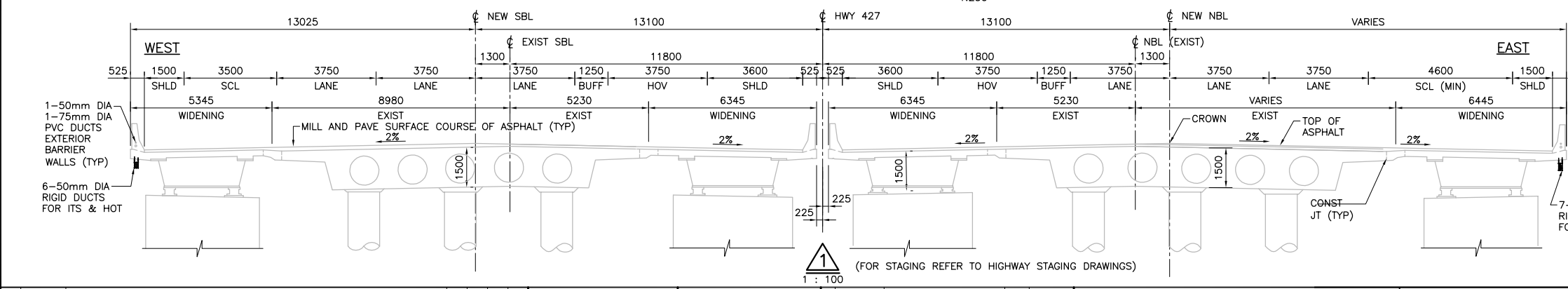
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HWY 427 EXPANSION HWY 427 / STEELES AVE OVERPASS NBL & SBL REHABILITATION AND WIDENING SITE 37-1111 ELECTRICAL EMBEDDED WORK						
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	REVISION NUMBER
H427-D	N	9A	STR	B07	DWG	721 C



PLAN
1:250



ELEVATION
1:250



1
1 : 100 (FOR STAGING REFER TO HIGHWAY STAGING DRAWINGS)

GENERAL NOTES:

- DESIGN STANDARDS AND CODES:
 - SCHEDULE 15-1 AND SCHEDULE 15-2: PROJECT AGREEMENT
 - DESIGN CODE: CAN/CSA-S6-14
 - MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL MANUAL
 - MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURE REHABILITATION MANUAL
 - ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS)

- LIVE LOAD: CL-625-ONT.
- CLASS OF CONCRETE 30 MPa
- CLEAR COVER TO REINFORCING STEEL

DECK		
TOP	70±20	
BOTTOM	40±10	
REMAINDER UNLESS OTHERWISE NOTED	70±20	

- REINFORCING STEEL
 REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
 BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
 STAINLESS REINFORCING STEEL SHALL BE TYPE 316 LN OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa, UNLESS OTHERWISE SPECIFIED.
 UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS B.
 BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWINGS SS12-1 UNLESS INDICATED OTHERWISE.
- ROADWAY CLASSIFICATION: UFD 120.
- PROTECTION SYSTEM SHALL CONFORM TO PERFORMANCE LEVEL 2.
- ALL DIMENSIONS ARE IN MILLIMETERS ALL ELEVATIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

CONSTRUCTION NOTES:

- SAWCUTS IN CONCRETE, WHERE DESIGNATED, SHALL BE 25mm DEEP OR TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS.
- EXISTING REINFORCING STEEL WHICH IS EXPOSED DURING CONCRETE REMOVALS AND WHICH IS TO REMAIN SHALL BE ABRASIVE BLAST CLEANED.
- THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE WORK AND ALL DETAILS ON SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADJUST DIMENSIONS OF THE WORK AS REQUIRED TO SUIT EXISTING CONDITIONS.
- BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH END OF SUPERSTRUCTURE KEEPING THE HEIGHT OF BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
- ALL EXPOSED EDGES TO RECEIVE A 20x20 CHAMFER.

APPLICABLE STANDARD DRAWINGS:

- OPSD 3101.150 WALLS - ABUTMENT, BACKFILL MINIMUM GRANULAR REQUIREMENTS
- OPSD 3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
- OPSD 3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS

LIST OF ABBREVIATIONS:

- WP WORKING POINT

LEGEND:

- [Cross-hatched symbol] REMOVALS
- [Dotted symbol] NEW CONCRETE

LIST OF DRAWINGS:

- 800 GENERAL ARRANGEMENT
- 801 CONSTRUCTION STAGING
- 802 REMOVALS
- 803 NEW CONSTRUCTION I
- 804 NEW CONSTRUCTION II
- 805 6000mm APPROACH SLAB
- 806 EXPANSION JOINT AND SLEEPER SLAB
- 807 STRIP SEAL EXPANSION JOINT FOR SLEEPER SLAB
- 808 STANDARD DETAILS

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C	18/03/16	90% SUBMISSION TO CA			
B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

SCALE :
AS NOTED

DESIGNED	ANDREW HACHBORN
DRAWN	ELENA TSENTER
CHECKED	TATIANA QJALA
APPROVED LEAD ENG.	TATIANA QJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	
INT.	
DATE	



<p style="text-align: center;">HWY 427 EXPANSION HWY 427 NBL & SBL @ HWY 407 OVERPASSES REHABILITATION R1 SITE 37-1167/8 GENERAL ARRANGEMENT</p>							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B08	DWG	800	C

NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DWG 800 AND HIGHWAY STAGING DRAWINGS.

SCOPE OF REHABILITATION WORK AND STAGING:

STAGE 2-A:

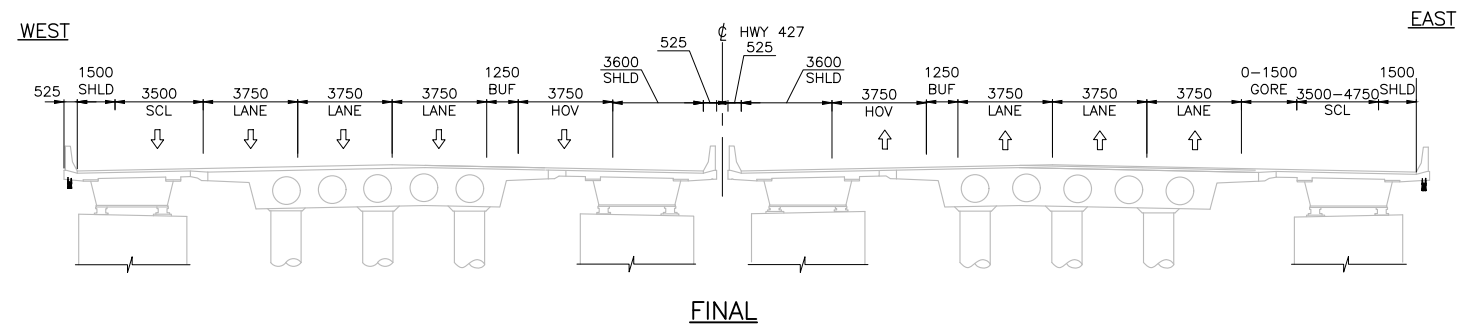
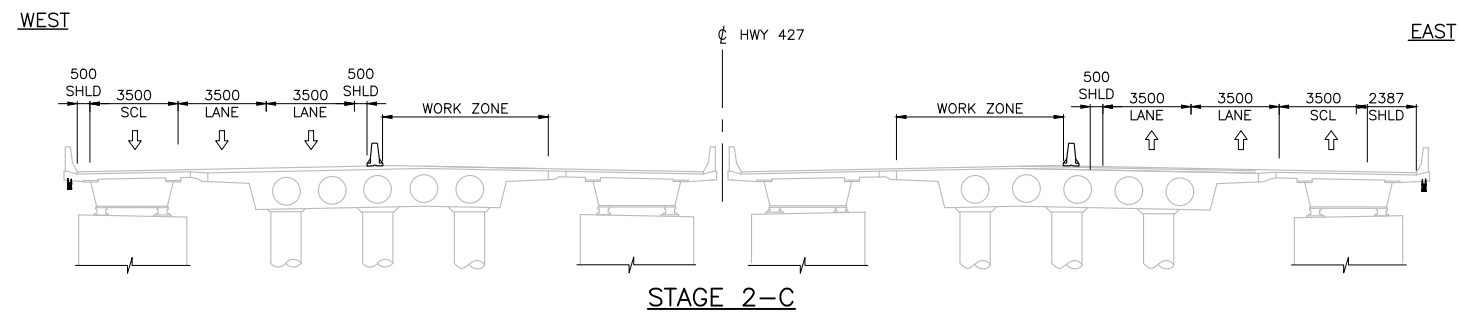
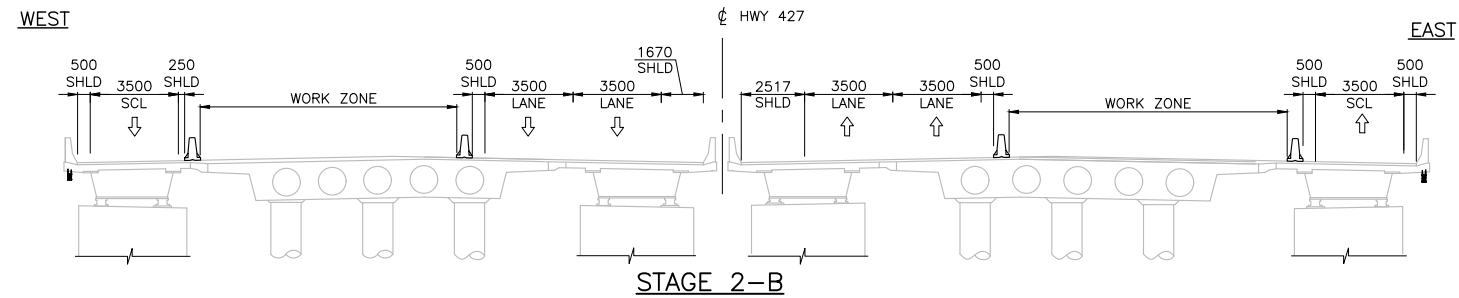
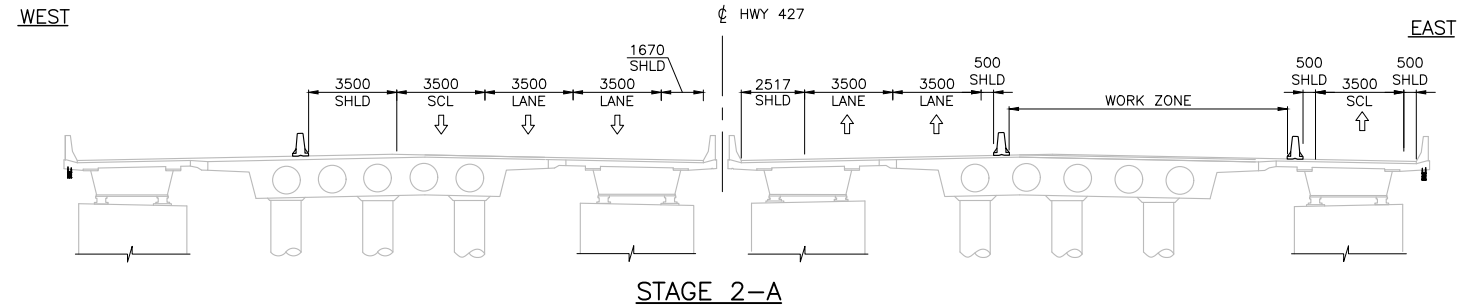
1. SHIFT SB TRAFFIC TO THE MEDIAN AND NB TRAFFIC PART TO THE MEDIAN AND PART TO THE EAST OF THE EXISTING BRIDGES AND INSTALL TEMPORARY TRAFFIC BARRIERS.
2. INSTALL PROTECTION SYSTEM.
3. REMOVE PART OF ASPHALT AND WATERPROOFING, PART OF EXPANSION JOINT ASSEMBLIES, PART OF APPROACH SLABS AND PART OF BALLAST WALLS.
4. REMOVE PART OF EXISTING DECK ENDS TO FACILITATE CONSTRUCTION OF SEMI-INTEGRAL EXTENSION.
5. CONSTRUCT PARTS OF SEMI-INTEGRAL EXTENSION AND CONNECT TO THE PREVIOUSLY CONSTRUCTED WIDENED PORTION OF THE BRIDGES.
6. CONSTRUCT PART OF SLEEPER SLABS AND APPROACH SLABS.
7. WATERPROOF AND PAVE.

STAGE 2-B:

1. SHIFT SB TRAFFIC PARTIALLY TO THE WEST.
2. MODIFY PROTECTION SYSTEM.
3. REPEAT STEPS 3 TO 7 FROM STAGE 2-A.

STAGE 2-C:

1. SHIFT SB AND NB TRAFFIC TO THE WEST AND EAST RESPECTIVELY.
2. MODIFY PROTECTION SYSTEM.
3. REPEAT STEPS 3 TO 7 FROM STAGE 2-A.



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DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
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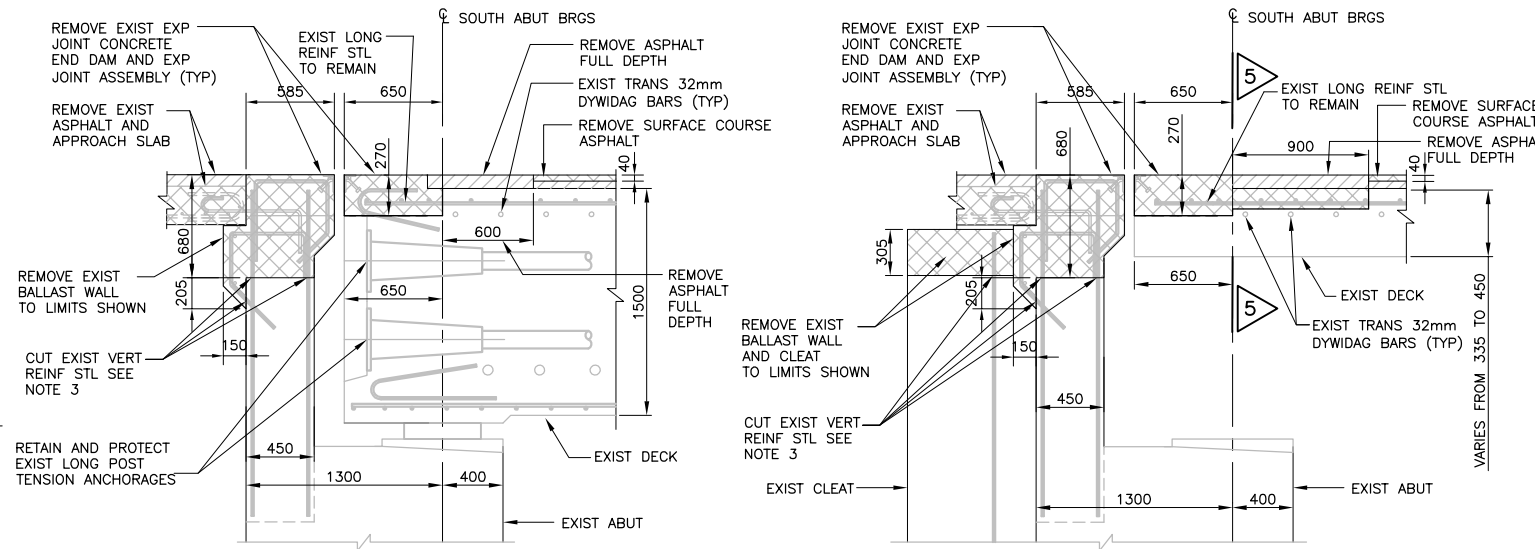
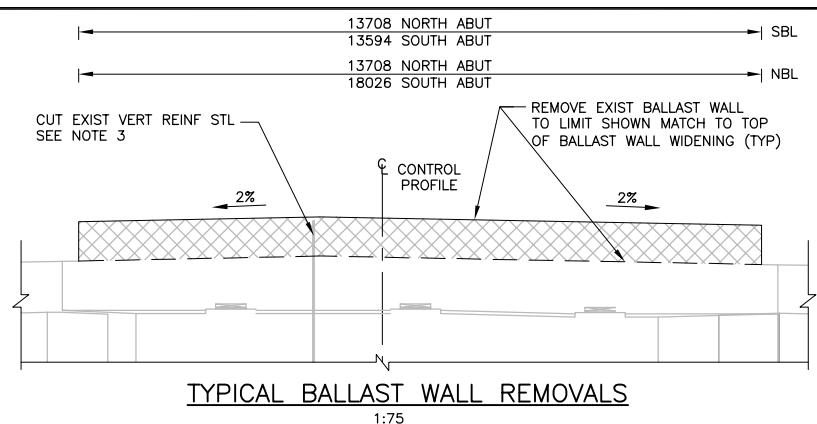
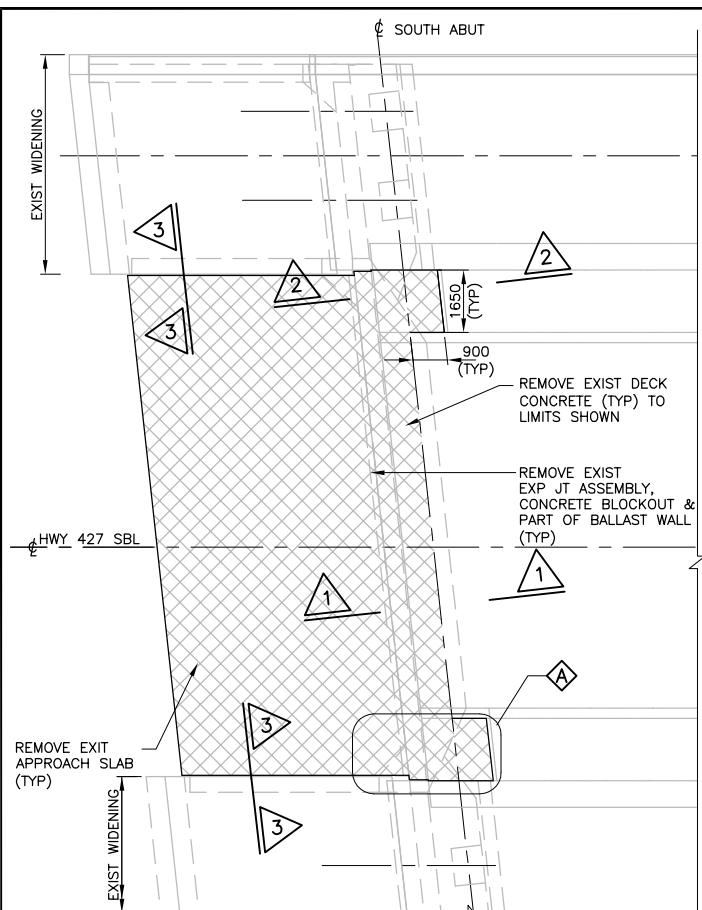
AS NOTED

DESIGNED	ANDREW HACHBORN
DRAWN	ELENA TSENTER
CHECKED	TATIANA OJALA
APPROVED LEAD ENG.	TATIANA OJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	
INIT.	
DATE	

CONSULTANT	
DESIGNED	ANDREW HACHBORN
DRAWN	ELENA TSENTER
CHECKED	TATIANA OJALA
APPROVED LEAD ENG.	TATIANA OJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	
INIT.	
DATE	

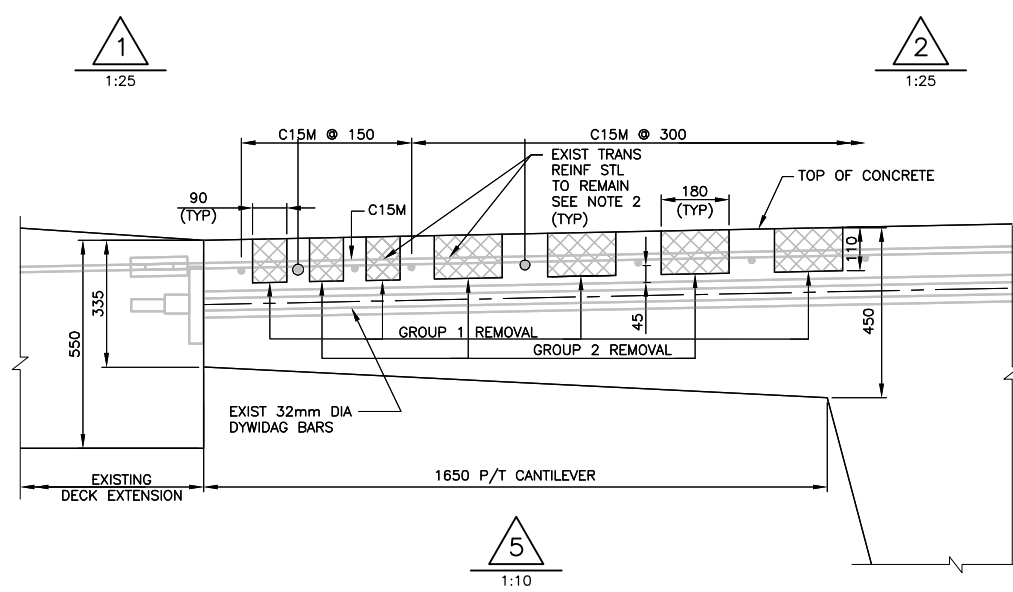
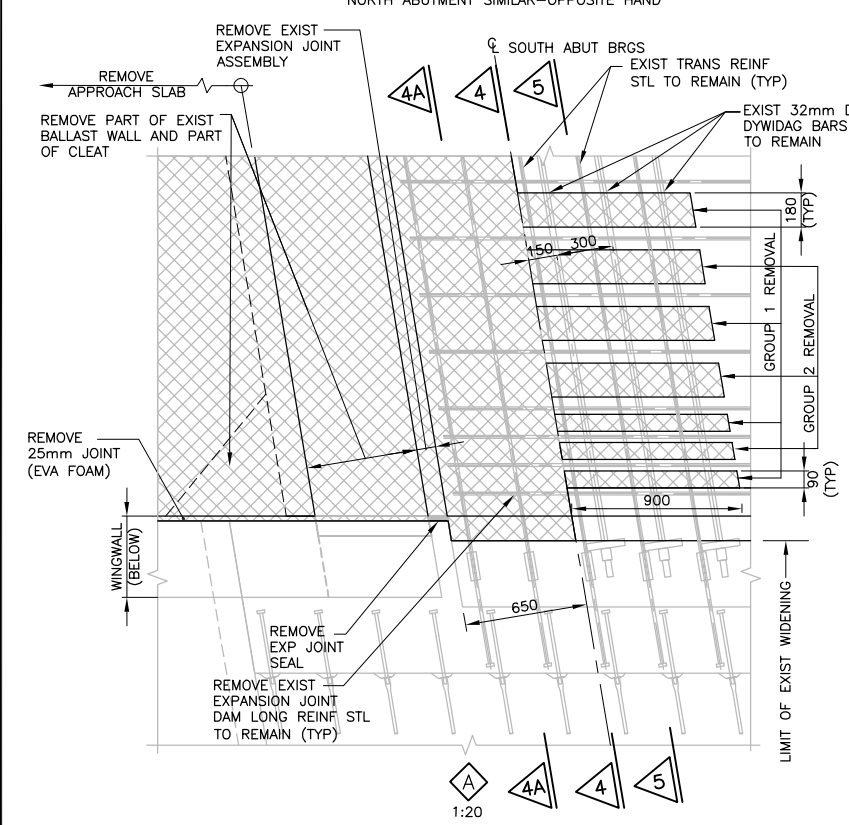
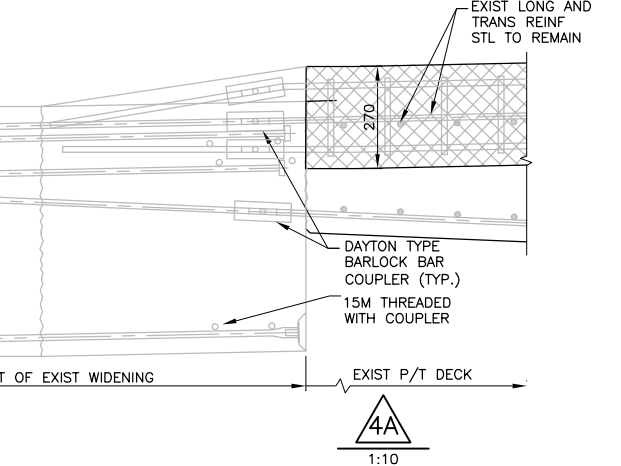
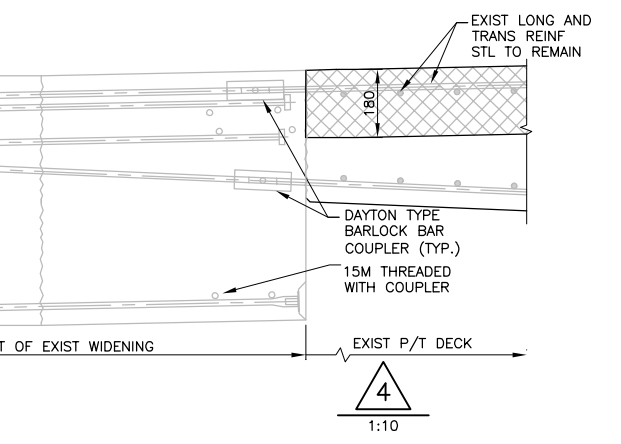
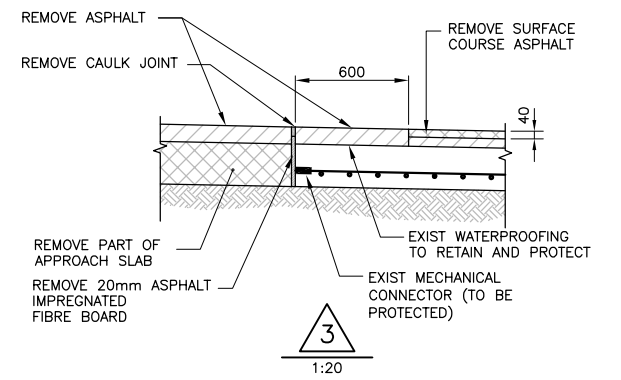


TITLE HWY 427 EXPANSION HWY 427 NBL & SBL @ HWY 407 OVERPASSES REHABILITATION R1 SITE 37-1167/8 CONSTRUCTION STAGING							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B08	DWG	801	C



- NOTES:**
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DWG 800.
 - EXISTING REINFORCING STEEL TO REMAIN SHALL BE ABRASIVE BLAST CLEANED.
 - FOR REINFORCING STEEL THAT IS CUT AND WILL NOT BE EMBEDDED IN CONCRETE THE FOLLOWING APPLIES:
CHIP CONCRETE 25mm AROUND REBAR TO A DEPTH OF 50mm.
CUT REBAR AND PATCH HOLE WITH PROPRIETARY PRODUCT.
 - SAWCUTS IN CONCRETE, WHERE DESIGNATED, SHALL BE 25mm DEEP OR TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS.

- LEGEND:**
- REINFORCING STEEL
 - LONGITUDINAL
 - CONCRETE REMOVALS
 - LIMIT OF REMOVAL



- NOTES:**
- REMOVE EXISTING CONCRETE USING CHIPPING HAMMER TO 50mm BELOW EXISTING TRANSVERSE REINFORCING STEEL. DO NOT DAMAGE TRANSVERSE REINFORCING STEEL AND DYWIDAG BARS BELOW.
 - CENTER REMOVALS GROUP BETWEEN EXISTING REINFORCING STEEL.
 - EXISTING BARS SHALL BE LOCATED EITHER BY MAPPING OR BY FULL REMOVAL OF CONCRETE IN THE BLOCKOUT.

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 DATE PLOTTED: 3/19/2018 2:40:50 PM BY:

DATE	REVISIONS	BY	CHK	LEAD	PROJ.
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B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

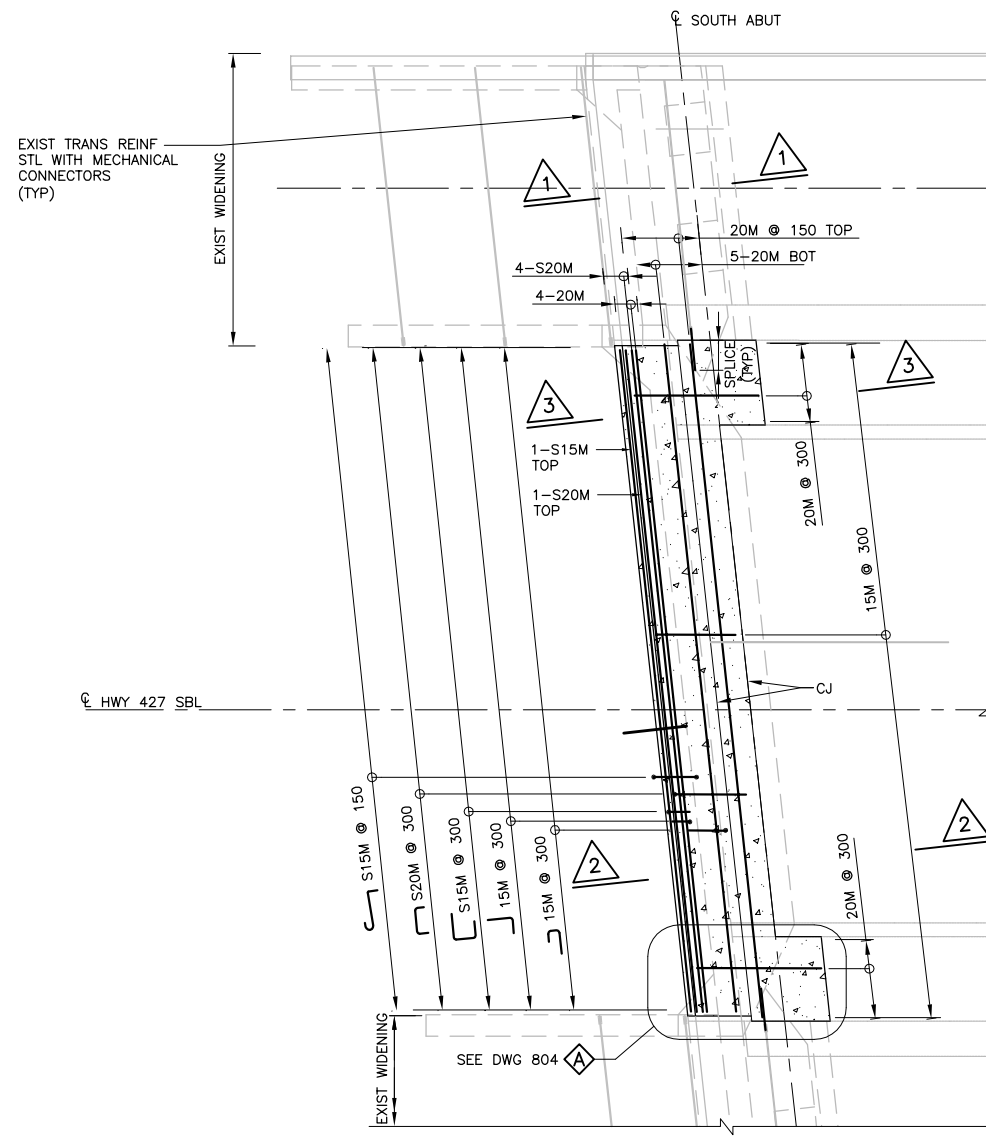
SCALE : AS NOTED

DESIGNED	ANDREW HACHBORN	
DRAWN	ELENA TSENIER	
CHECKED	TATIANA QJALA	
APPROVED LEAD ENG.	TATIANA QJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INT.	DATE

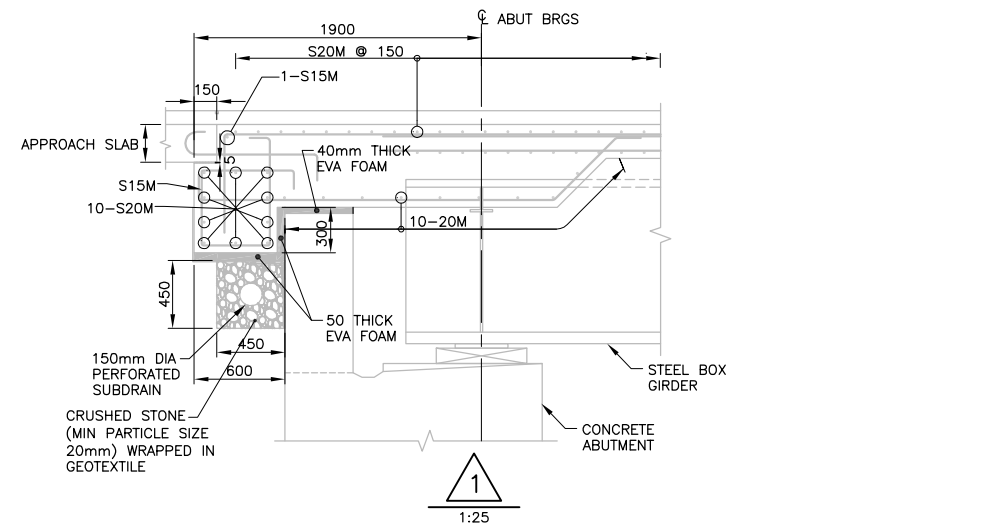


HWY 427 EXPANSION HWY 427 NBL & SBL @ HWY 407 OVERPASSES REHABILITATION R1 SITE 37-1167/8 REMOVALS							
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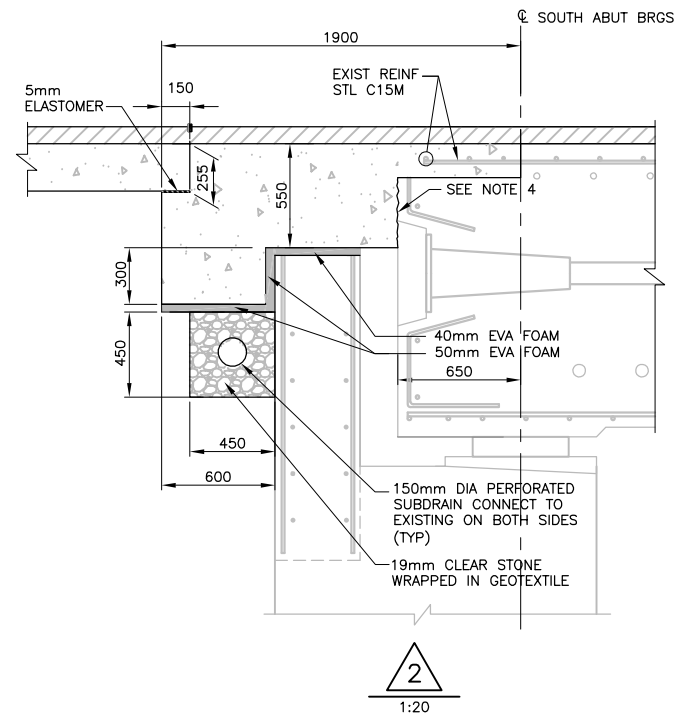
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PLAN
1:75

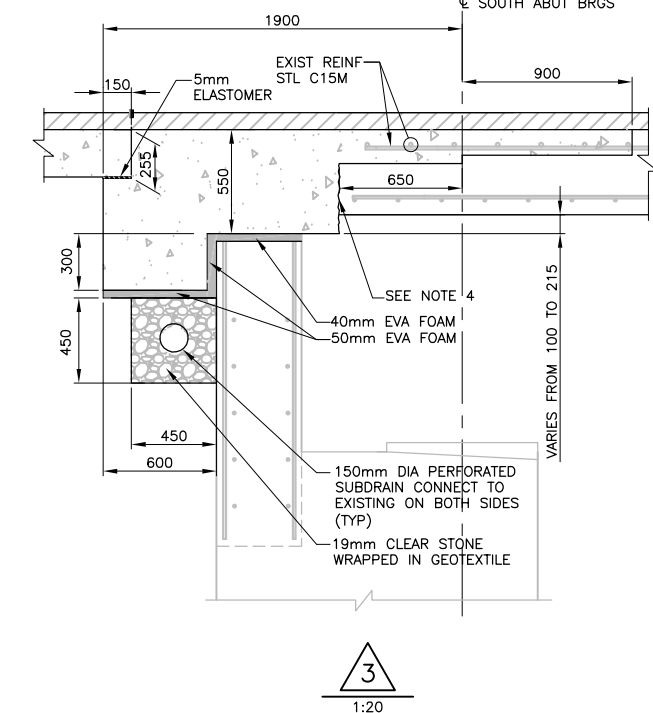


1
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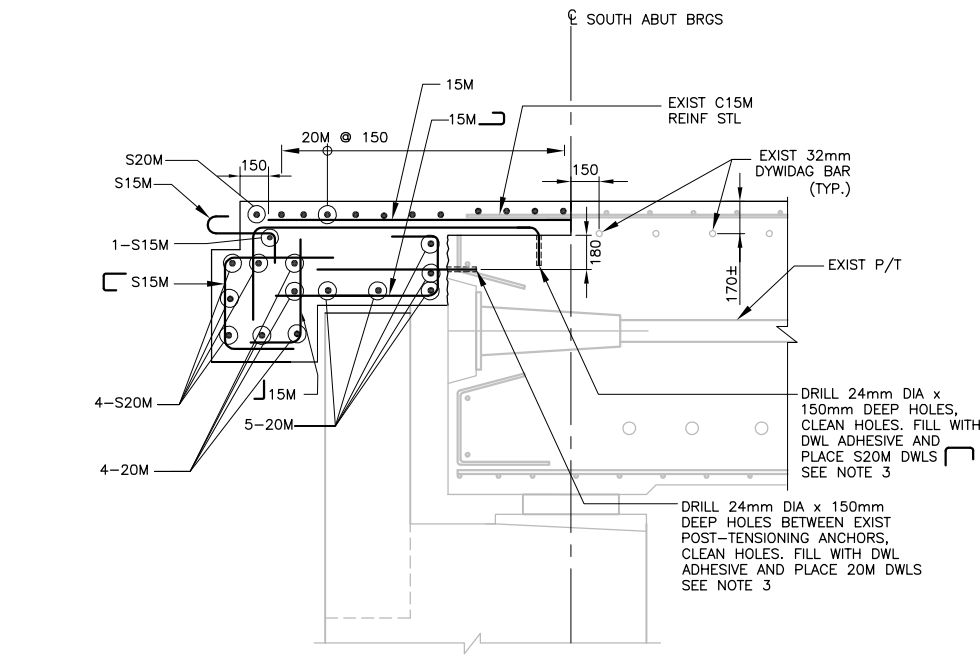


2
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DIMENSIONS



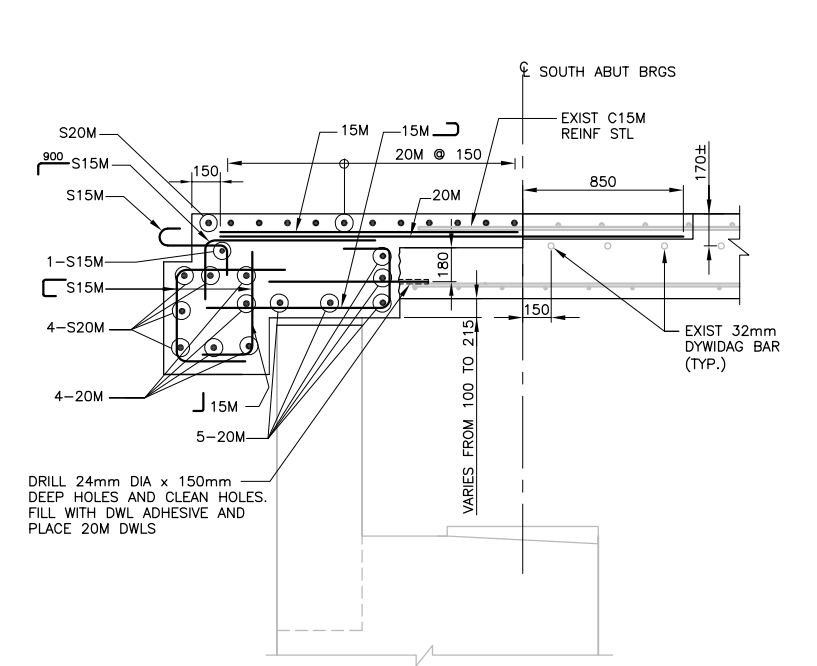
3
1:20



2
1:20

REINFORCEMENT

NOTE: CONNECT ALL TRANSVERSE REINFORCING STEEL TO EXISTING DECK EXTENSION USING MECHANICAL CONNECTORS IN THE EXTENSION.



3
1:20

NOTES:

- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 802 AND 804.
- BAR COUPLERS:
- TOP COUPLERS TO BE STAINLESS STEEL.
- WHERE NEW REINFORCEMENT IS SPLICED WITH EXIST. EPOXY COATED TOP BARS, USE EPOXY COATED BARLOCK TYPE COUPLERS.
- CONTRACTOR TO CHIP EXIST. CONCRETE LOCALLY TO LOCATE EXIST. POST-TENSIONING BARS BEFORE DRILLING (TYP.)
- CLEAN AND ROUGHEN EXIST. SURFACE TO AN AVERAGE SURFACE ROUGHNESS AMPLITUDE OF 5mm @ 15 C/C.

APPLICABLE STANDARD DRAWING

- OPSD 3329.100 DECK, REINFORCEMENT - SUPPORTS FOR REINFORCING STEEL FOR SLAB DEPTHS 300mm OF LESS.
- OPSD 3329.101 DECK, REINFORCEMENT - SUPPORTS FOR REINFORCING STEEL FOR SLAB DEPTHS GREATER THAN 300mm.
- OPSD 3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
- OPSD 3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2MM WIDE AND CONSTRUCTION JOINTS

LEGEND:

NEW CONCRETE

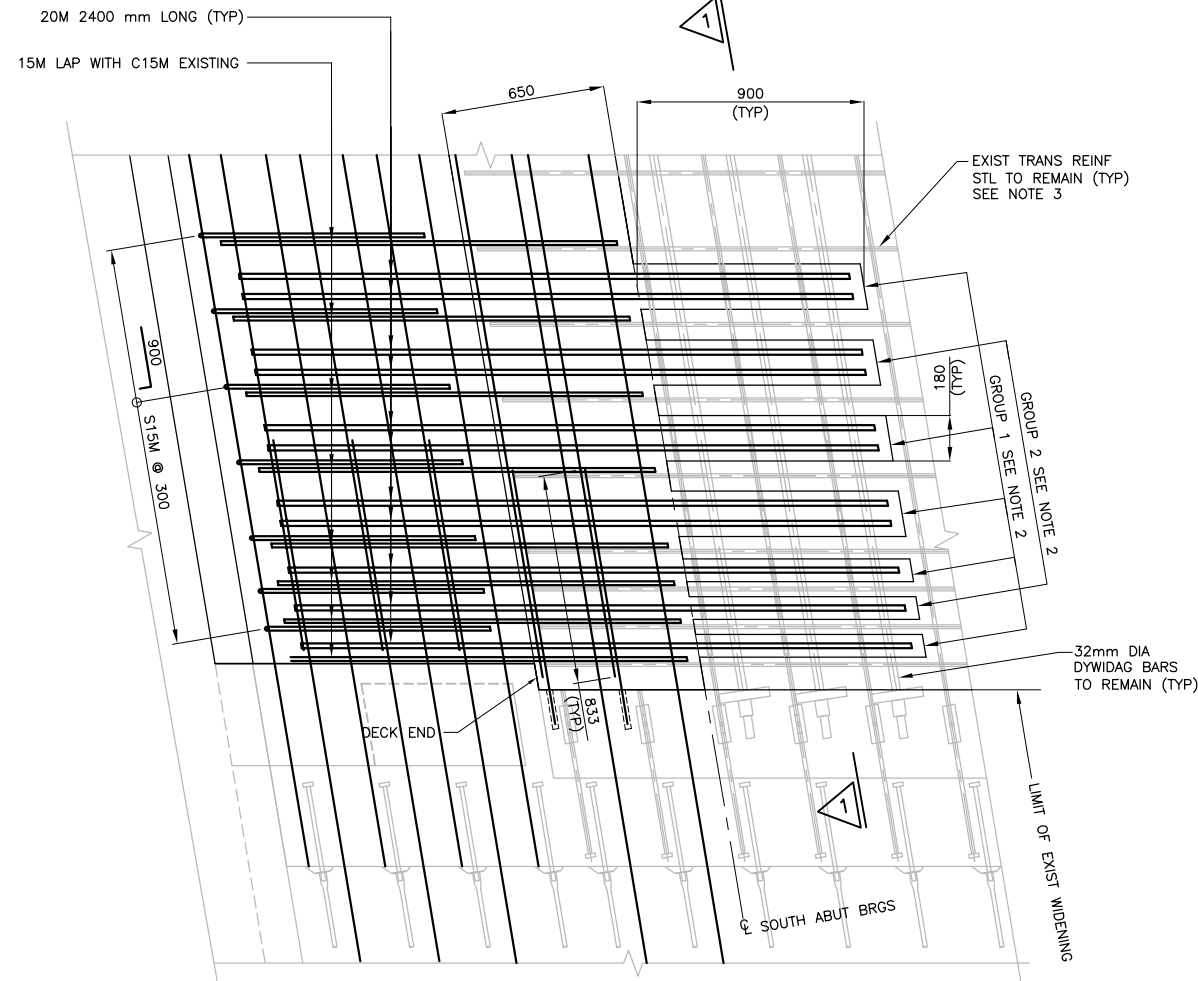
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B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

SCALE :
AS NOTED

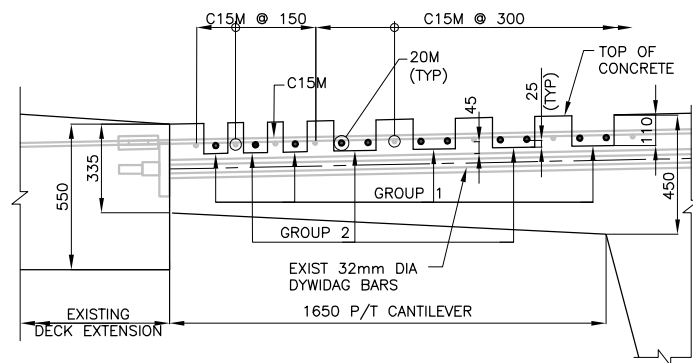
DESIGNED	ANDREW HACHBORN
DRAWN	NINA SHIRAZI
CHECKED	TATIANA QJALA
APPROVED LEAD ENG.	TATIANA QJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INT. DATE



TITLE						
HWY 427 EXPANSION HWY 427 NBL & SBL @ HWY 407 OVERPASSES REHABILITATION R1 SITE 37-1167/8 NEW CONSTRUCTION I						
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER
H427-D	N	9A	STR	B08	DWG	803
						REVISION NUMBER
						C



A
1:15



1
1:15

NOTES:

- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING 803.
- CONTRACTOR SHALL EXERCISE EXTREME CARE DURING CONCRETE REMOVAL TO PREVENT DAMAGE TO EXISTING REINFORCING AND TENDONS, INCLUDING ANY EXPOSED CABLE SHEATHING AND GROUT.
- SAWCUT SHALL BE LIMITED TO A MAXIMUM DEPTH OF 20mm FROM THE TOP OF THE DECK CONCRETE SURFACE OR TO TOP OF REINFORCING STEEL, WHICHEVER IS SMALLER.
- CONCRETE REMOVALS AND PLACEMENT SHALL BE GROUPED AS INDICATED ON THE DRAWING.
- CONCRETE REMOVALS IN GROUP 2 SLOTS SHALL NOT COMMENCE UNTIL CONCRETE THAT HAS BEEN PLACED IN GROUP 1 SLOTS HAS REACHED 70% OF ITS SPECIFIED 28-DAY STRENGTH.
- A CEMENTITIOUS BONDING AGENT SHALL BE APPLIED TO CONCRETE SURFACES PRIOR TO CONCRETING.
- CONCRETE FOR FILLING THE SLOTS IN GROUPS 1 AND 2 SHALL BE 35 MPA STRENGTH WITH 9.5mm MAXIMUM SIZE AGGREGATE

CAD FILE LOCATION AND NAME: C:\projects\wise\wsp-co\wsp-co-fei-pang\dfs\6258\H427-00-9A-STR-B08-DWG-B04NC.dwg
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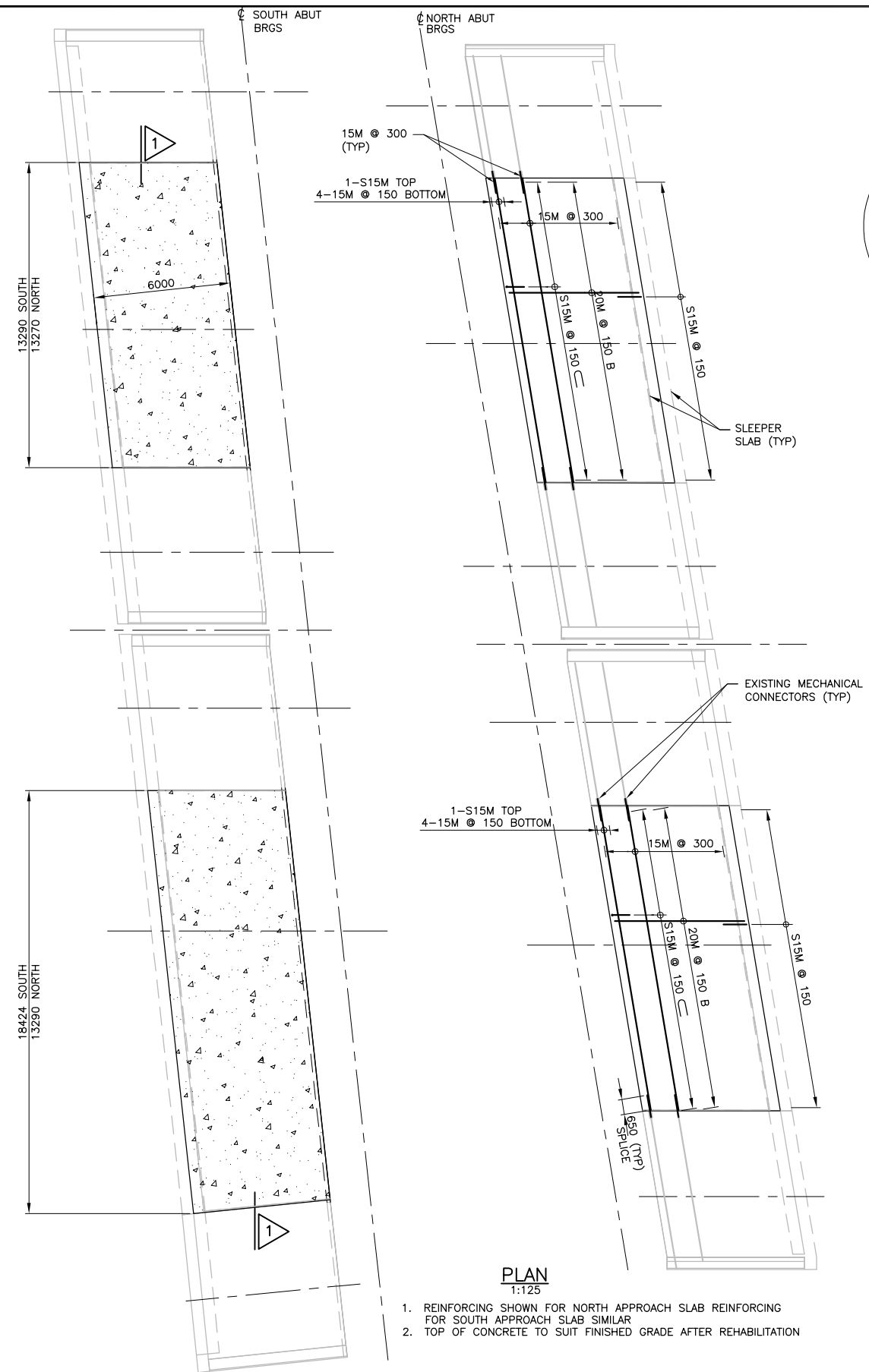
DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE :
AS NOTED

CONSULTANT		DESIGNED	ANDREW HACHBORN
DRAWN	ELENA TSENER	CHECKED	TATIANA QJALA
APPROVED LEAD ENG.	TATIANA QJALA	APPROVED PROJ. MANAGER	
NAME (PRINT)	INT.	DATE	

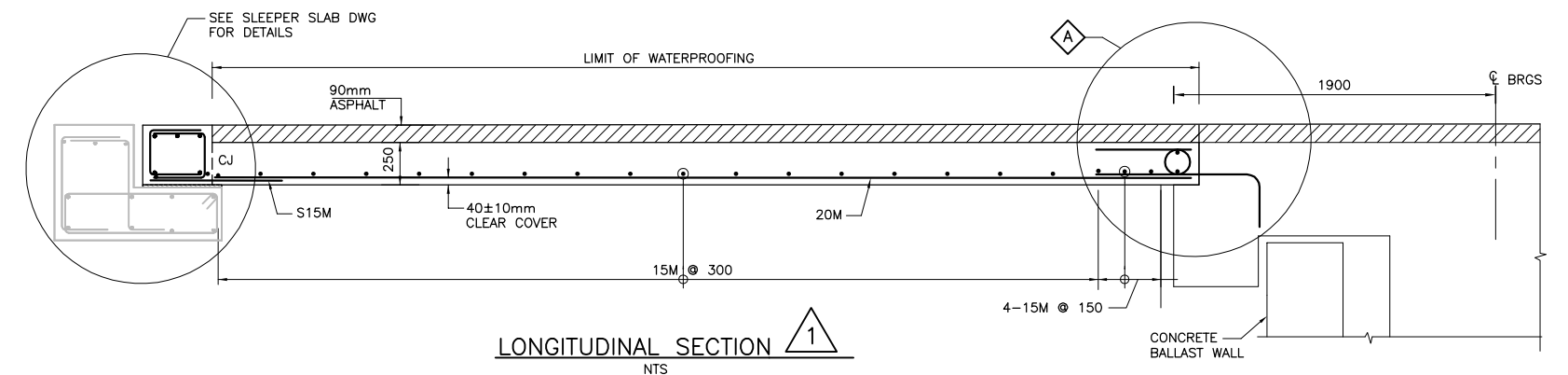


TITLE							
HWY 427 EXPANSION							
HWY 427 NBL & SBL @ HWY 407 OVERPASSES							
REHABILITATION R1							
SITE 37-1167/8							
NEW CONSTRUCTION II							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
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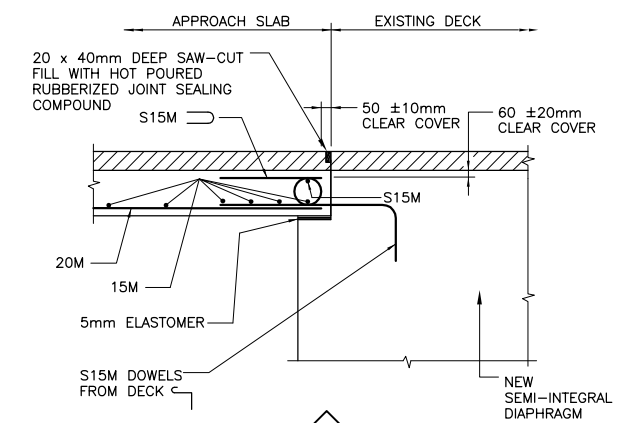
PLAN
1:125

1. REINFORCING SHOWN FOR NORTH APPROACH SLAB REINFORCING FOR SOUTH APPROACH SLAB SIMILAR
2. TOP OF CONCRETE TO SUIT FINISHED GRADE AFTER REHABILITATION



LONGITUDINAL SECTION
NTS

NOTE: CONNECT ALL TRANSVERSE REINF STEEL TO EXISTING PART OF APPROACH SLAB USING EXISTING MECHANICAL CONNECTORS.



FOR BRIDGES WITHOUT EXPANSION JOINTS
NTS

NOTES:

1. CLEAR COVER TO REINFORCING STEEL 70 ± 20 mm EXCEPT AS NOTED.
2. LAYOUT OF REINFORCING STEEL WILL BE SIMILAR FOR LEFT HAND AND ZERO DEGREE SKEW.
3. STAINLESS STEEL BARS SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPA. REINFORCING STEEL SHALL BE GRADE 400W.
4. WATERPROOFING AT JOINT BETWEEN BRIDGE AND APPROACH SLAB TO BE IN ACCORDANCE WITH OPSD-3370.1000.
5. WATERPROOFING FOR BRIDGES WITHOUT EXPANSION JOINTS (RIGID FRAMES AND INTEGRAL ABUTMENTS) TO BE IN ACCORDANCE WITH OPSD-3370.1010.
6. BARS MARK WITH PREFIX S DENOTE STAINLESS STEEL BARS.

APPLICABLE STANDARD DRAWINGS

- OPSD-3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
- OPSD-3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS

MODIFIED	
STANDARD DRAWING MARCH 2016	SS116-1
6000 mm APPROACH SLAB	

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DATE	REVISIONS	BY	CHK	LEAD	PROJ.
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B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

SCALE :

AS NOTED

DESIGNED	ANDREW HACHBORN	
DRAWN	ELENA TSENIER	
CHECKED	TATIANA QJALA	
APPROVED LEAD ENG.	TATIANA QJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INT.	DATE



HWY 427 EXPANSION HWY 427 NBL & SBL @ HWY 407 OVERPASSES REHABILITATION R1 SITE 37-1167/8 6000mm APPROACH SLAB							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
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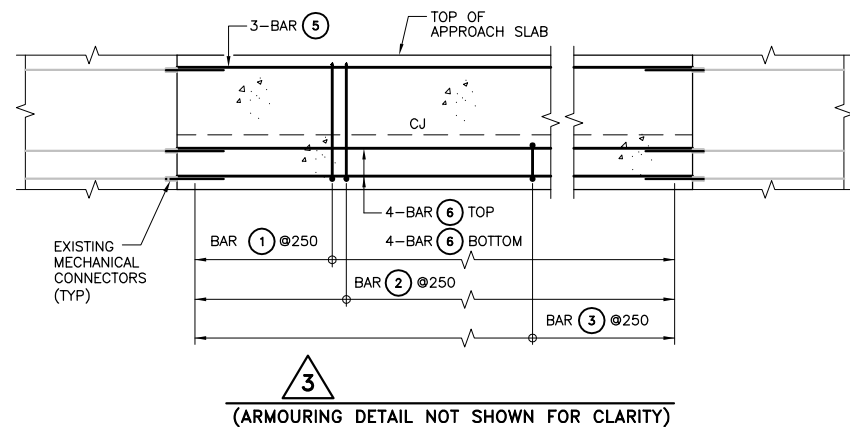
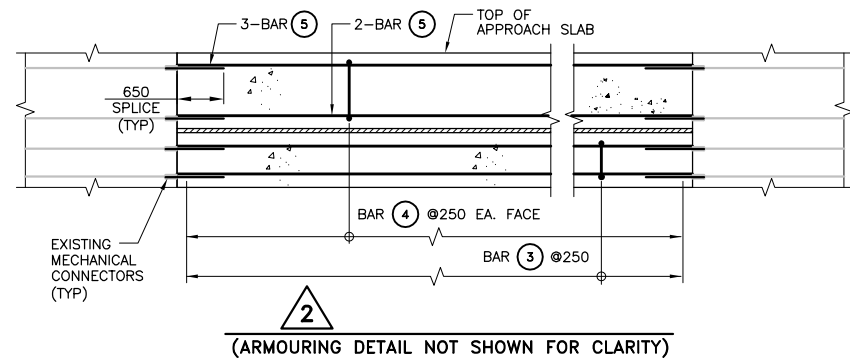
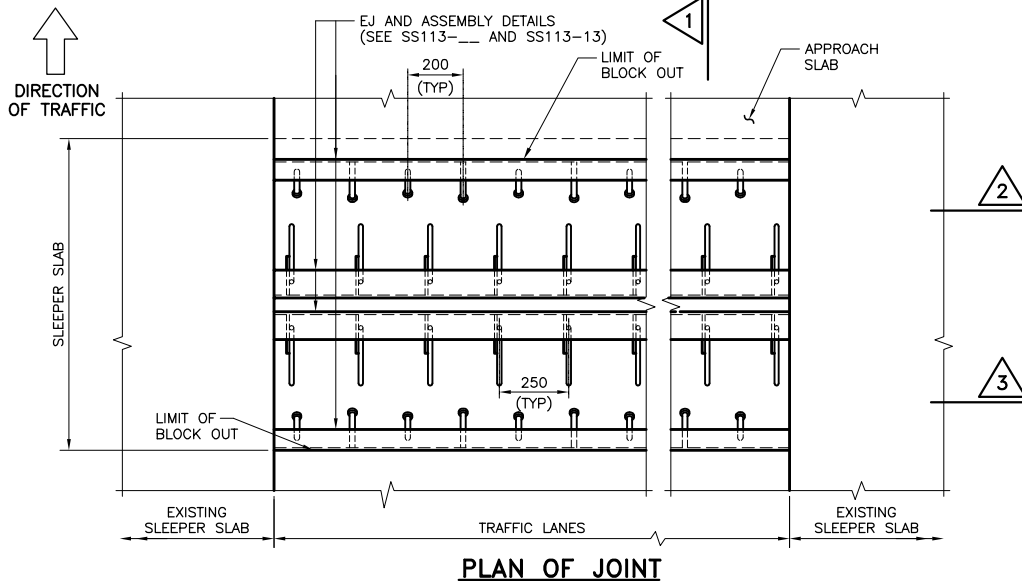
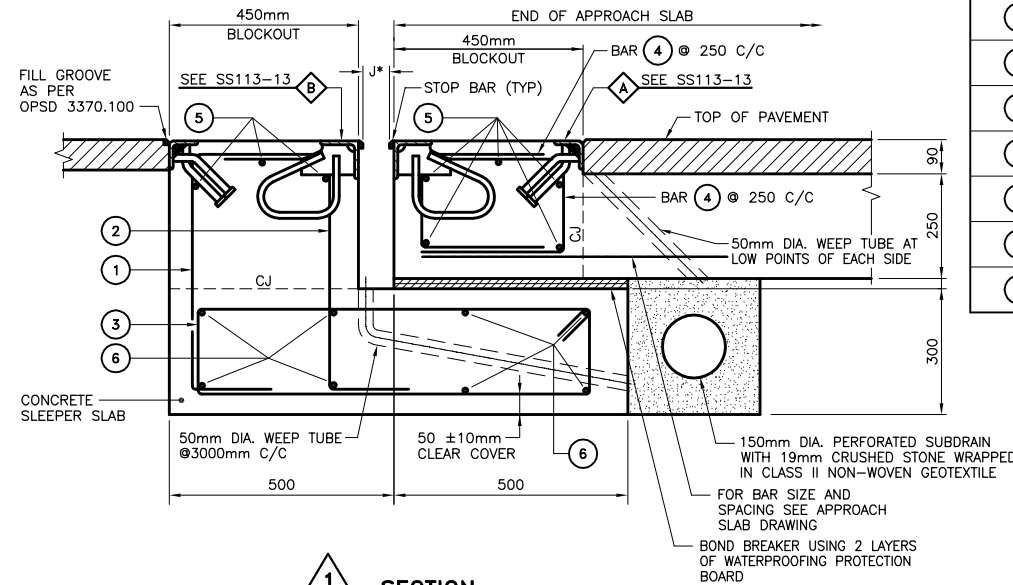


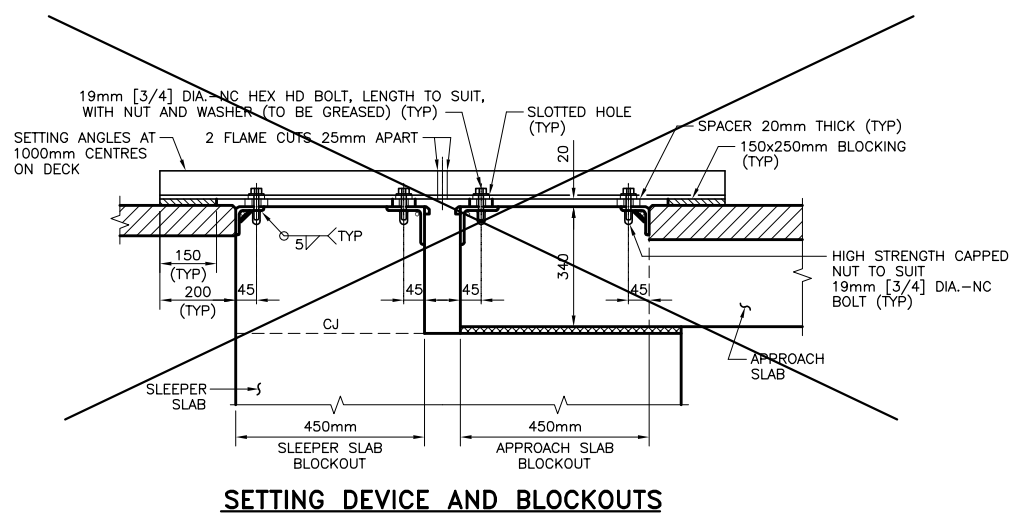
TABLE OF DESIGN REQUIREMENTS

EXP. JOINT LOCATION	MTO GAP RATING (mm)		DESIGN MOVEMENT	* "J" AT INSTALLATION TEMPERATURE (C)								
	MIN	MAX		-5'	0'	5'	10'	15'	20'	25'	30'	
N. SIDE	40	100	28									
S. SIDE	40	100	40									

* DIMENSION 'J' MEASURED PERPENDICULAR TO CENTRELINE OF EXPANSION JOINT. THE CONTRACTOR SHALL USE THE FIRST STAGE OBSERVED 'J' GAP TO INSTALL THE SECOND STAGE.



1 SECTION (EXPANSION JOINT SEAL NOT SHOWN)
NOTE: J* TO MATCH GAP IN EXISTING SLEEPER SLABS.



BAR MARK	SIZE	SHAPE
1	S15M	310 180
2	S15M	300 180
3	15M	160 860
4	S15M	200 310
5	S15M	STRAIGHT
6	15M	STRAIGHT
7	S15M	180 445
8	S15M	STRAIGHT
9	S15M	180 670

NOTES:

- THIS DRAWING SHOWS EXPANSION JOINT AND SLEEPER SLAB AT THE END OF APPROACH SLAB OF INTEGRAL AND SEMI- INTEGRAL ABUTMENT BRIDGES AND THIS DETAIL IS ONLY APPLICABLE FOR CONCRETE BRIDGES GREATER THAN 100m IN LENGTH AND STEEL BRIDGES GREATER THAN 75m IN LENGTH.
- CLASS OF CONCRETE TO BE 30MPa.
- REINFORCEMENT STEEL SHALL BE GRADE 400W. STAINLESS STEEL SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPA. BARS MARKED WITH PREFIX S DENOTE STAINLESS STEEL BARS.
- COVER TO REINFORCING STEEL 70 ±20mm EXCEPT AS NOTED.
- EXPANSION JOINT SHALL BE IN ACCORDANCE WITH THE DESIGNATED SOURCES FOR MATERIALS LIST DSM 9.40.27, TYPE C.
- EXPANSION JOINT ASSEMBLY CONSTRUCTION AND MATERIAL SHALL BE ACCORDING TO OPSS 920 AND OPSS 1210, AND AS SPECIFIED IN THE CONTRACT DOCUMENTS.
- JOINT ASSEMBLY SHALL BE COMPLETELY SHOP ASSEMBLED (EXCEPT FOR SEALS) AND PRESET TO DIMENSION 'J' FOR 15°C AND ADJUSTED IN THE FIELD TO SUIT INSTALLATION TEMPERATURE.
- JOINT ASSEMBLY INSTALLATION TEMPERATURE SHALL BE TAKEN AS MEAN SHADE AIR TEMPERATURE AT STRUCTURE PRIOR TO JOINT INSTALLATION AS FOLLOWS:
- FOR CONCRETE STRUCTURES - 48 HOURS
- FOR STEEL STRUCTURES - 24 HOURS
- FIELD SPLICES IN JOINT ASSEMBLY ARE ONLY PERMITTED AT STAGED CONSTRUCTION, AND/OR AS SHOWN ON THE CONTRACT DRAWINGS.
- FIELD SPlice DETAILS AT STAGED CONSTRUCTION FOR ARMOURING PLATES AND NOSING ANGLES SHALL REFER TO DRAWING SS113-13.
- IF THE JOINT ARMOURING FOR A SKEW STRUCTURE IS SPLICED AT A CROWN, THE SPLICE SHALL BE DETAILED PARALLEL TO THE CENTRELINE OF THE TRAFFIC LANE.
- SETTING ANGLES SHALL BE FLAME CUT ACCORDING TO OPSS 920, BUT IN NO CASE PRIOR TO CONCRETE REACHING INITIAL SET.
- AFTER CURING OF THE CONCRETE HAS BEEN COMPLETED, THE SETTING DEVICES MAY BE REMOVED. THE VOIDS UNDER THE ARMOURING ANGLE AND NOSING ANGLE SHALL THEN BE PRESSURE INJECTED.
- PREFORMED SEALS SHALL HAVE MINIMUM THICKNESS OF 5mm OR AS PER DSM.
- ALL STEEL RETAINER SURFACES COMING IN CONTACT WITH PREFORMED SEAL SHALL BE CLEANED PRIOR TO INSTALLATION OF THE SEAL.
- PREFORMED SEALS SHALL BE INSTALLED AFTER JOINT ASSEMBLY HAS BEEN CAST, STYROFOAM OR FILLER BETWEEN APPROACH SLAB AND SLEEPER SLAB REMOVED, AND EXPANSION GAP CLEARED OF ANY DEBRIS.
- HEADED CONCRETE ANCHORS IN NOSING ANGLES SHALL BE LOCATED WITHIN 75mm OF EITHER SIDE OF FIELD SPLICES.
- PROTECT INJECTION HOSE AND FITTINGS ADJACENT TO FIELD SPlice DURING WELDING AND REMOVE PROTECTION PRIOR TO PLACING OF CONCRETE IN BLOCKOUT.
- FOR SKEWED STRUCTURE, WORKING DRAWING SHALL BE DETAILED TO SUIT GEOMETRY OF STRUCTURE.
- ALL JOINT ANCHORAGES SHALL BE DETAILED ON WORKING DRAWINGS PERPENDICULAR TO THE EXPANSION JOINT ON BOTH THE APPROACH SLAB SIDE AND THE SLEEPER SLAB SIDE EXCEPT STRUCTURE SKEWED FROM OVER 15' AND UP TO 45' SHALL HAVE ANCHORAGES DETAILED 30' OFFSET FROM THE PERPENDICULAR TO THE EXPANSION JOINT ON THE APPROACH SLAB SIDE.

LEGEND:

- [] DENOTED FASTENER SIZE IN INCHES
- CJ DENOTED CONSTRUCTION JOINT

MODIFIED	
STANDARD DRAWING SEPTEMBER 2016	SS113-36
EXPANSION JOINT AND SLEEPER SLAB FOR INTEGRAL AND SEMI-INTEGRAL ABUTMENT BRIDGES (MOVEMENT > 40mm)	

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 DATE PLOTTED: 3/19/2018 2:48:34 PM BY: PANGF

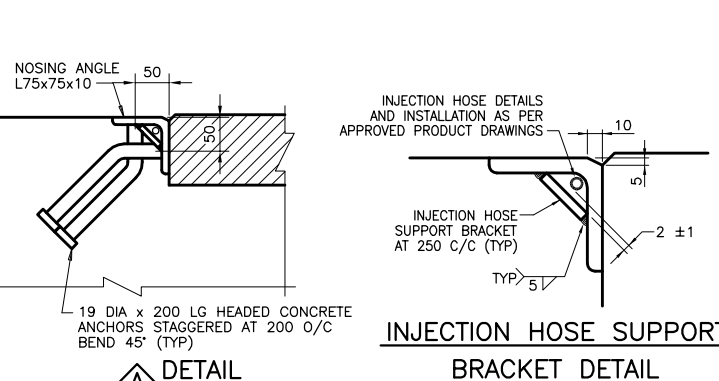
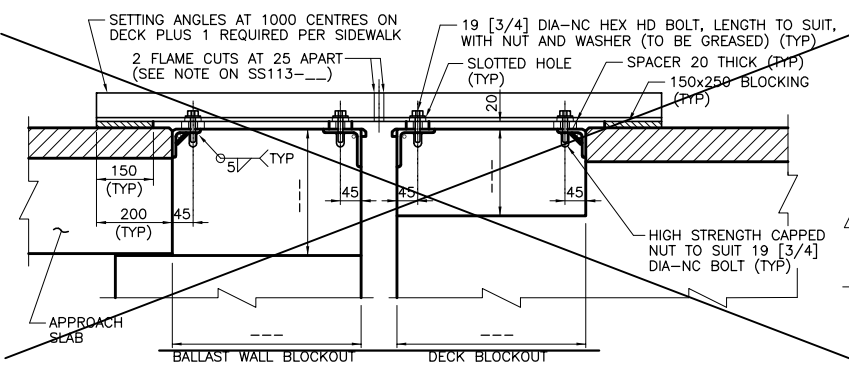
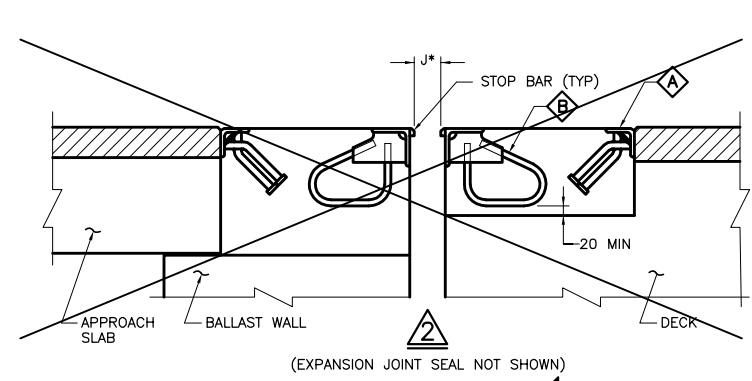
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C	18/03/16	90% SUBMISSION TO CA			
B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

SCALE :
AS NOTED

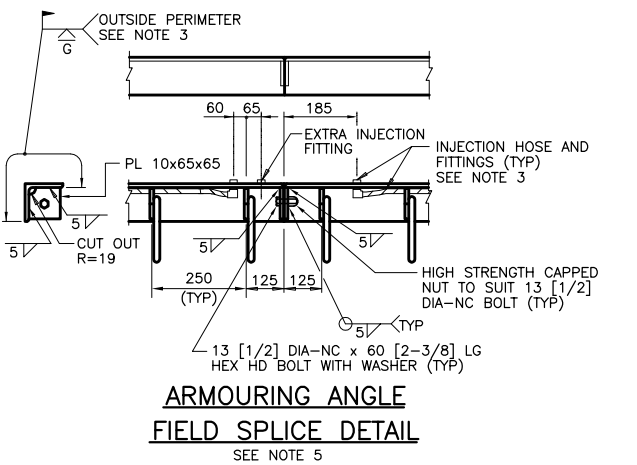
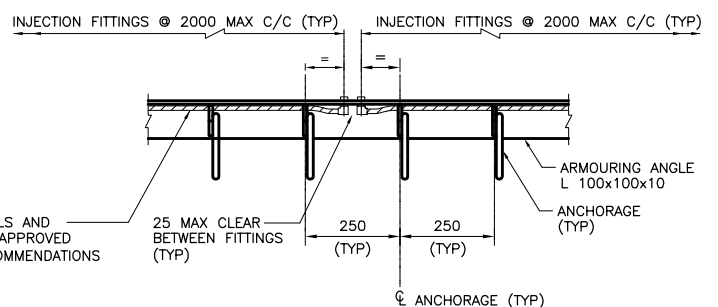
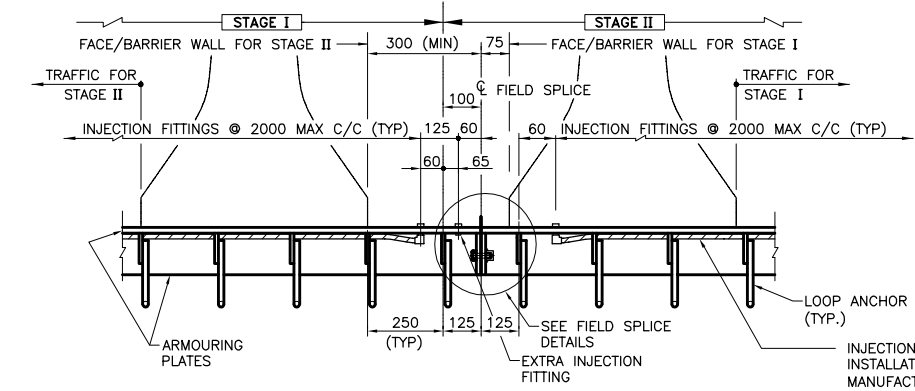
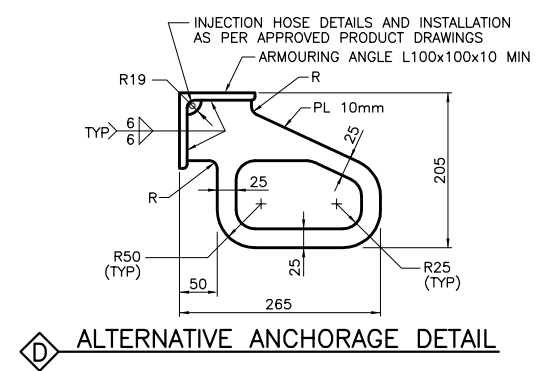
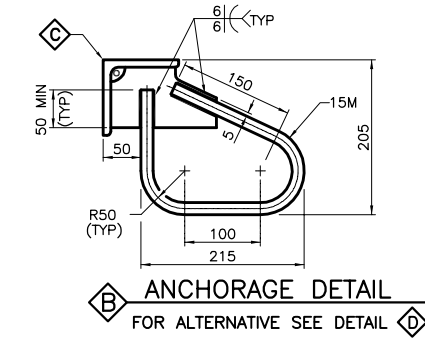
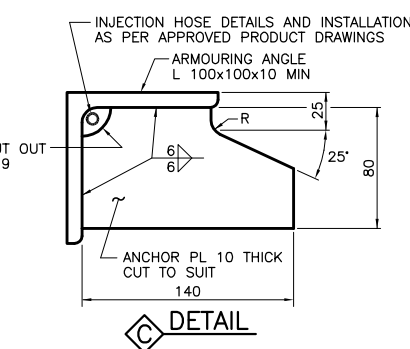
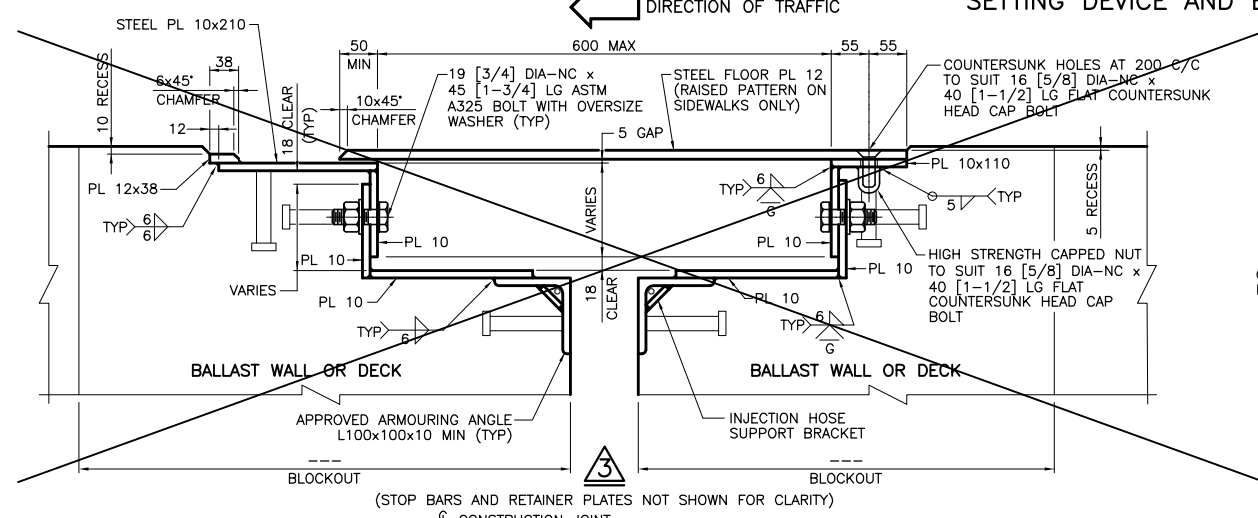
DESIGNED	ANDREW HACHBORN
DRAWN	ELENA TSENIER
CHECKED	TATIANA QJALA
APPROVED LEAD ENG.	TATIANA QJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INT. DATE



HWY 427 EXPANSION HWY 427 NBL & SBL @ HWY 407 OVERPASSES REHABILITATION R1 SITE 37-1167/8 EXPANSION JOINT AND SLEEPER SLAB							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B08	DWG	806	C



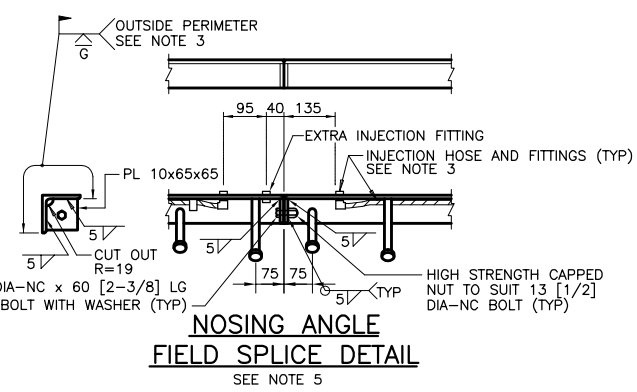
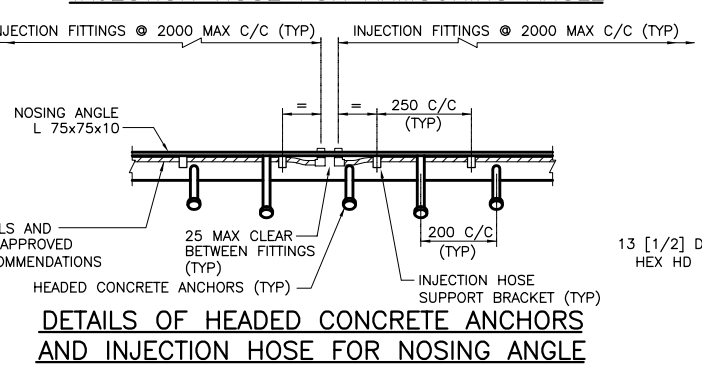
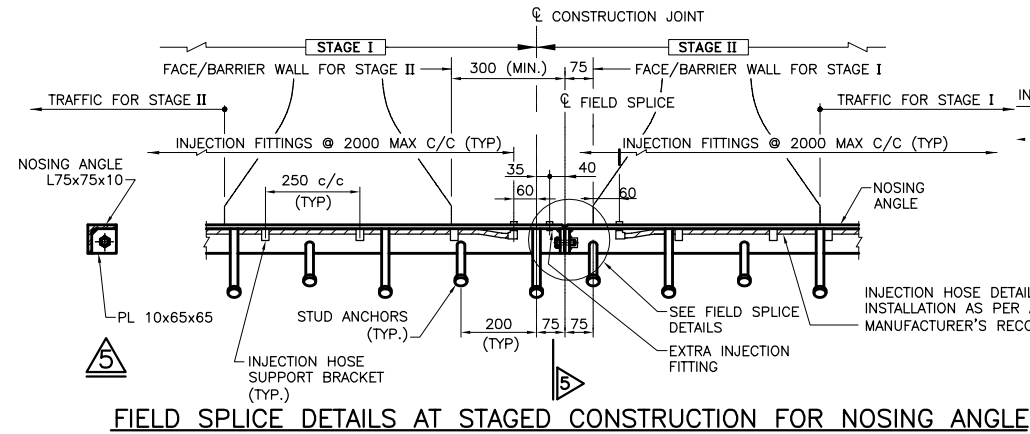
- NOTES:**
- FOR DETAILS OF REINFORCING IN EXPANSION JOINT BLOCKOUT, SEE DECK AND ABUTMENT REINFORCING DRAWINGS.
 - HEADED CONCRETE ANCHORS IN NOSING ANGLES SHALL BE LOCATED WITHIN 75mm OF EITHER SIDE OF FIELD SPLICES.
 - PROTECT INJECTION HOSE AND FITTINGS ADJACENT TO FIELD SPLICE DURING WELDING AND REMOVE PROTECTION PRIOR TO PLACING OF CONCRETE IN BLOCKOUT.
 - THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING SS113-36.
 - USE FULL PENETRATION FIELD WELD IF SPLICE DETAIL NOT POSSIBLE.
 - LEGEND: [] - DENOTES FASTENER SIZE IN INCHES.



FIELD SPLICE DETAILS AT STAGED CONSTRUCTION FOR ARMORING ANGLE

DETAILS OF ANCHORAGE AND INJECTION HOSE FOR ARMORING ANGLE

ARMORING ANGLE FIELD SPLICE DETAIL



FIELD SPLICE DETAILS AT STAGED CONSTRUCTION FOR NOSING ANGLE

DETAILS OF HEADED CONCRETE ANCHORS AND INJECTION HOSE FOR NOSING ANGLE

NOSING ANGLE FIELD SPLICE DETAIL

MODIFIED	
STANDARD DRAWING OCTOBER 2013	SS113-13
STRIP SEAL EXPANSION JOINT - TYPE "C" DETAILS	

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DATE	REVISIONS	BY	CHK	LEAD	PROJ. MAN.
C	18/03/16	90% SUBMISSION TO CA			
B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

SCALE :
AS NOTED

DESIGNED	ANDREW HACHBORN
DRAWN	ELENA TSENIER
CHECKED	TATIANA QJALA
APPROVED LEAD ENG.	TATIANA QJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INT. DATE



HWY 427 EXPANSION HWY 427 NBL & SBL @ HWY 407 OVERPASSES REHABILITATION R1 SITE 37-1167/8 STRIP SEAL EXPANSION JOINT-TYPE "C" DETAILS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
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 MODIFIED: 3/19/2018 2:32:08 PM BY: PANGF
 DATE PLOTTED: 3/19/2018 2:44:43 PM BY:

STANDARD 90° HOOK

STANDARD 180° HOOK

MINIMUM BENDING PIN DIAMETER, D, mm

BAR SIZE	STEEL GRADE	
	400R (2)	400W
10M	70	60
15M	100	90
20M	120	100
25M	150	150
30M	250	200
35M	300	250
45M	450 (1)	400
55M	600 (1)	550

(1) Special fabrication is required for bends exceeding 90° for bars of these sizes and grade.
 (2) For stainless steel, with Fy = 500, use the same D as for 400R.

STANDARD HOOK DIMENSIONS

BAR SIZE	90° HOOKS		180° HOOKS			
	A OR G (mm)		A OR G (mm)		J (mm)	
	400R	400W	400R	400W	400R	400W
10M	180	180	140	130	90	80
15M	260	250	180	170	130	120
20M	310	300	220	200	160	140
25M	400	400	280	280	200	200
30M	510	490	400	350	310	260
35M	610	590	480	430	370	320
45M	790	770	680	630	540	490
55M	1030	1010	900	850	710	660

NOTE: All Hook Dimensions are according to the CHBDC-2014.

MINIMUM STIRRUP AND TIE HOOK DIMENSIONS

BAR SIZE	BAR DIAM. db (mm)	PIN DIAM. D (mm)	90°		135°	
			A OR G (mm)	A OR G (mm)	H (approx.) (mm)	H (approx.) (mm)
10M	11.3	45	100	100	70	70
15M	16.0	65	140	140	100	100
20M	19.5	80	180	175	115	115
25M	25.2	100	230			

MIN. 90° HOOK

MIN. 135° HOOK

HOOK DIMENSIONS FOR REINFORCING STEEL BARS

Date	Sept. 2016	Rev	
SS12-1			

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
18/03/16	90% SUBMISSION TO CA				
18/01/09	90% SUBMISSION TO CA				
17/10/31	90% SUBMISSION TO CA				

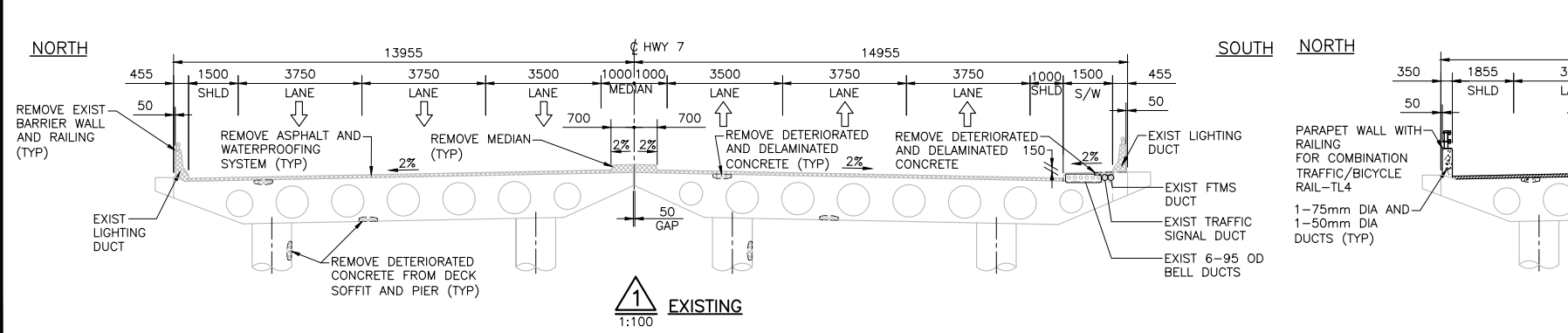
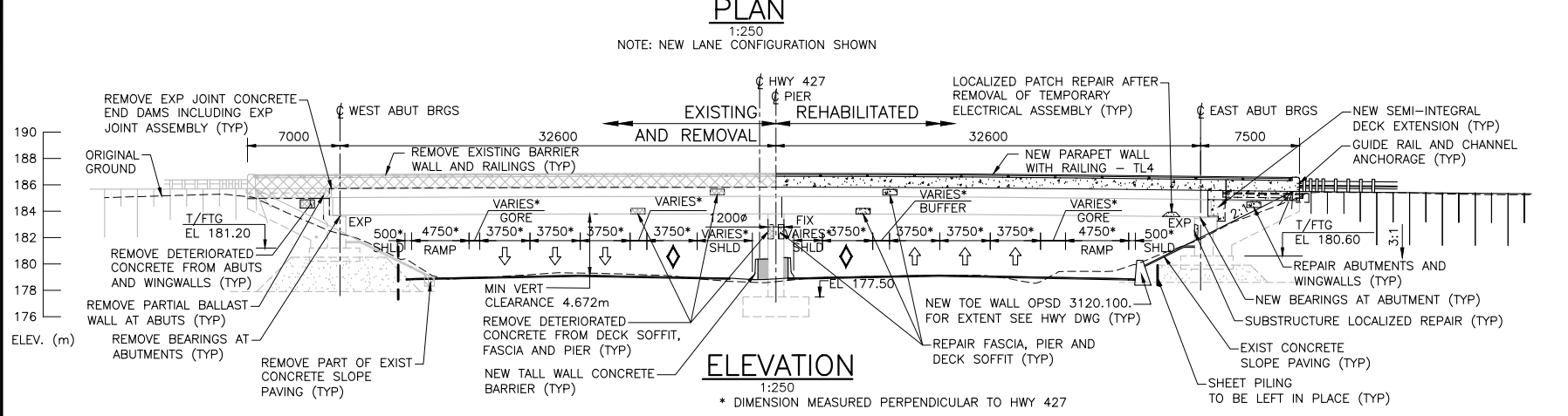
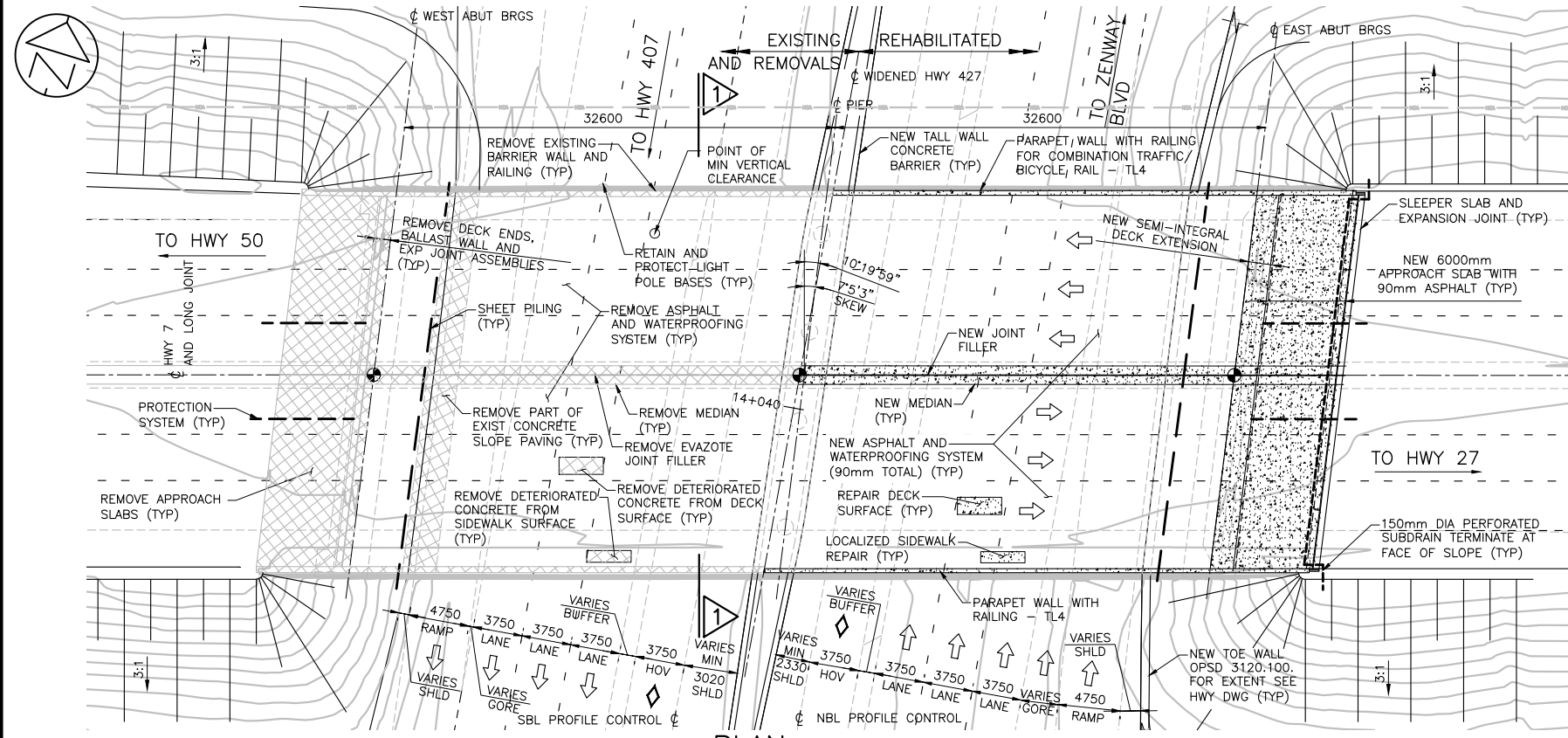
SCALE :

AS NOTED

CONSULTANT	DESIGNED	ANDREW HACHBORN
	DRAWN	ELENA TSENIER
	CHECKED	TATIANA QJALA
	APPROVED LEAD ENG.	TATIANA QJALA
	APPROVED PROJ. MANAGER	
	NAME (PRINT)	INT. DATE



TITLE							
HWY 427 EXPANSION HWY 427 NBL & SBL @ HWY 407 OVERPASSES REHABILITATION R1 SITE 37-1167/8 STANDARD DETAILS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B08	DWG	808	C



LIST OF DRAWINGS:

- 900 GENERAL ARRANGEMENT
- 901 CONSTRUCTION STAGING
- 902 JACKING DETAILS
- 903 REMOVALS I
- 904 REMOVALS II
- 905 NEW CONSTRUCTION I
- 906 NEW CONSTRUCTION II
- 907 NEW CONSTRUCTION III
- 908 NEW CONSTRUCTION IV
- 909 BEARINGS
- 910 PARAPET WALL WITH RAILING ON SIDEWALK, TL-4
- 911 PARAPET WALL FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4
- 912 RAILING FOR PARAPET WALL
- 913 RAILING ON PARAPET WALL FOR COMBINATION TRAFFIC/BICYCLE
- 914 600mm APPROACH SLAB
- 915 EXPANSION JOINT AND SLEEPER SLAB STRIP SEAL EXPANSION JOINT FOR SLEEPER SLAB
- 917 DETAILS OF CONCRETE SLOPE PAVING
- 918 STANDARD DETAILS
- 919 ELECTRICAL EMBEDDED WORKS

LIST OF ABBREVIATIONS:

- LONG LONGITUDINAL
- T/FTG TOP OF FOOTING
- HOV HIGH OCCUPANCY VEHICLE

LEGEND:

- REMOVALS
- NEW CONCRETE
- NEW ASPHALT

GENERAL NOTES:

1. DESIGN STANDARDS AND CODES:
 - SCHEDULE 15-1 AND SCHEDULE 15-2: PROJECT AGREEMENT
 - DESIGN CODE: CAN/CSA-S6-14
 - MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL MANUAL
 - MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURE REHABILITATION MANUAL
 - ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS)
2. LIVE LOAD: CL-625-ONT.
3. CLASS OF CONCRETE 30 MPa.
4. CLEAR COVER TO REINFORCING STEEL

DECK	TOP	70 ± 20
	BOTTOM	40 ± 10
REMAINDER UNLESS OTHERWISE NOTED 70 ± 20		
5. REINFORCING STEEL

REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.

BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.

STAINLESS REINFORCING STEEL SHALL BE TYPE 316 LN OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa, UNLESS OTHERWISE SPECIFIED. UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS B.

BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWINGS SS12-1 UNLESS INDICATED OTHERWISE.
6. ROADWAY CLASSIFICATION: RAD 100.
7. PROTECTION SYSTEM SHALL CONFORM TO PERFORMANCE LEVEL 2.
8. ALL DIMENSIONS ARE IN MILLIMETERS ALL ELEVATIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

CONSTRUCTION NOTES:

1. SAWCUTS IN CONCRETE, WHERE DESIGNATED, SHALL BE 25MM DEEP OR TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS.
2. EXISTING REINFORCING STEEL WHICH IS EXPOSED DURING CONCRETE REMOVALS AND WHICH IS TO REMAIN SHALL BE ABRASIVE BLAST CLEANED.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE WORK AND ALL DETAILS ON SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADJUST DIMENSIONS OF THE WORK AS REQUIRED TO SUIT EXISTING CONDITIONS.
4. BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH END OF SUPERSTRUCTURE KEEPING THE HEIGHT OF BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
5. ALL EXPOSED EDGES TO RECEIVE A 20x20 CHAMFER.

APPLICABLE STANDARD DRAWINGS:

- OPSD 3101.150 WALLS - ABUTMENT, BACKFILL MINIMUM GRANULAR REQUIREMENTS
- OPSD 3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
- OPSD 3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS
- OPSD 3419.100 BARRIERS AND RAILINGS - STEEL GUIDE RAIL AND CHANNEL ANCHORAGE
- OPSD 3941.200 FIGURES IN CONCRETE - SITE NUMBER AND DATE LAYOUT

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 DATE PLOTTED: 3/19/2018 11:55:42 AM BY:

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B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

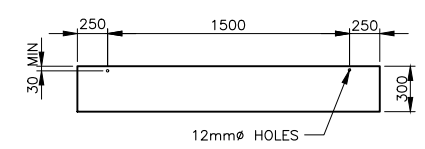
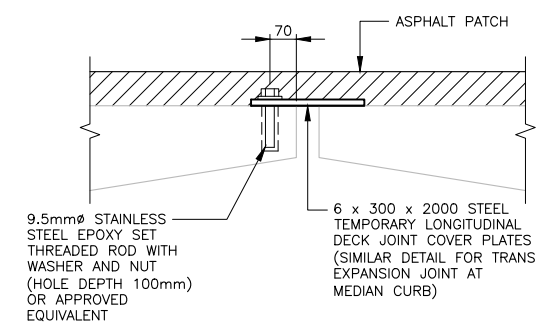
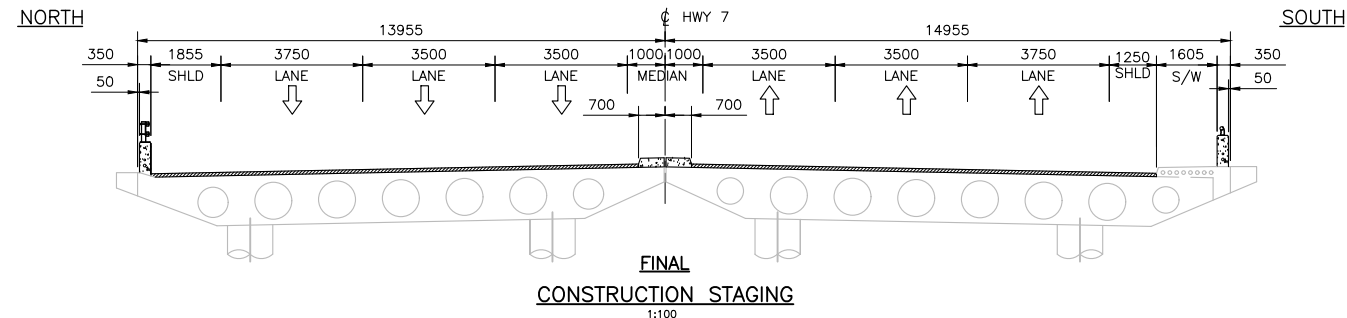
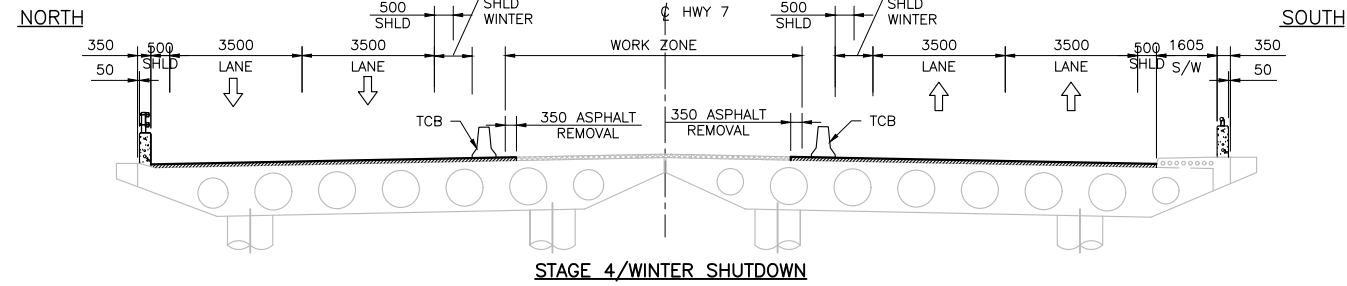
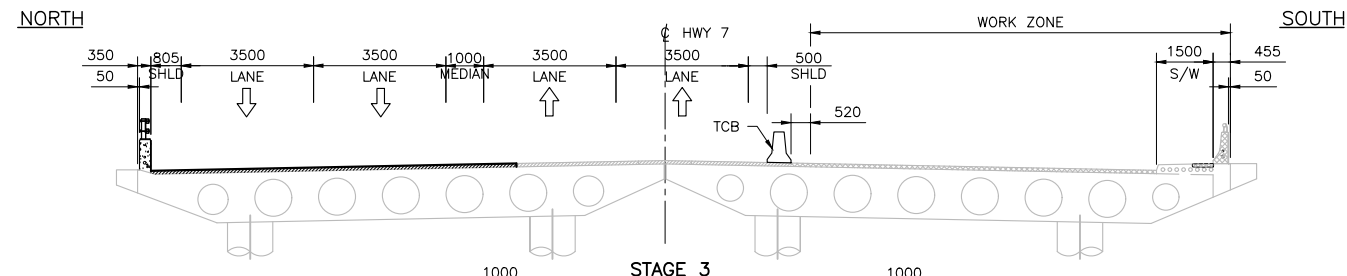
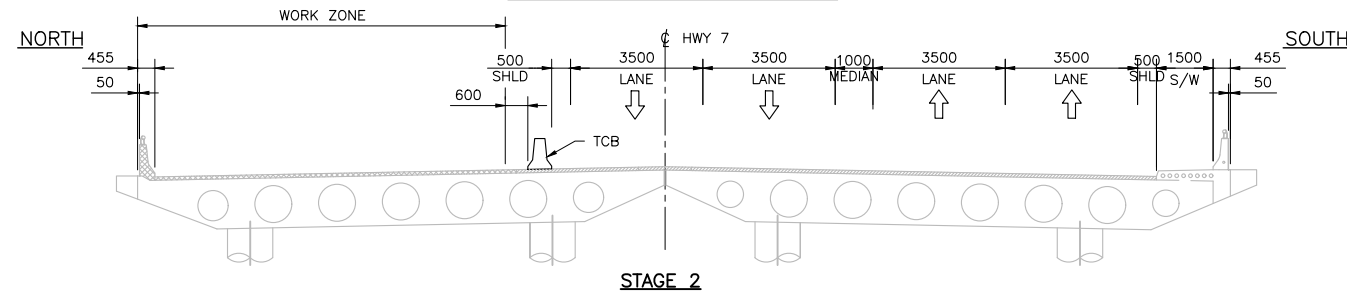
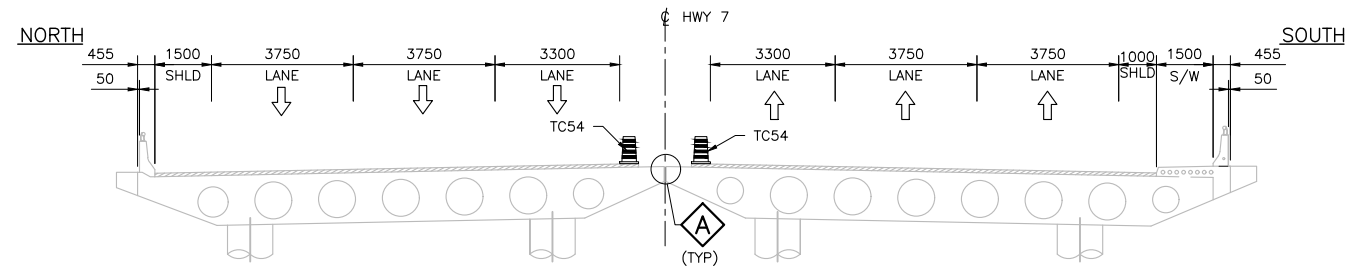
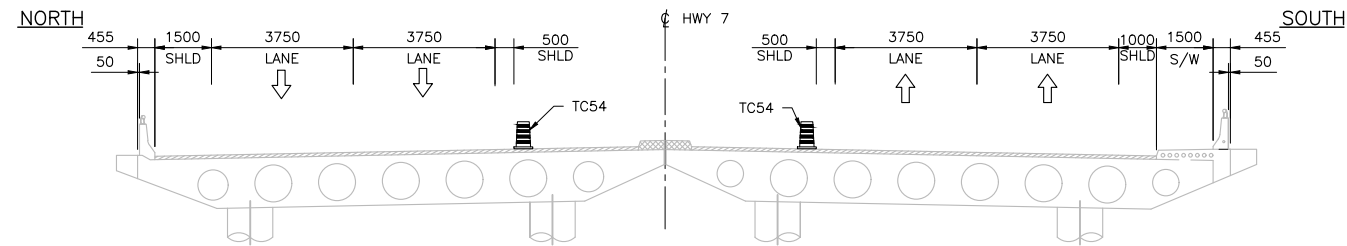
SCALE :
AS NOTED

DESIGNED	SUBOOHI OBADI
DRAWN	PATRICK TSANG
CHECKED	NINA SHIRAZI
APPROVED LEAD ENG.	TATIANA GJALA
APPROVED PROJ. MANAGER	

CONSULTANT	
NAME (PRINT)	
INIT.	
DATE	



HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 GENERAL ARRANGEMENT							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
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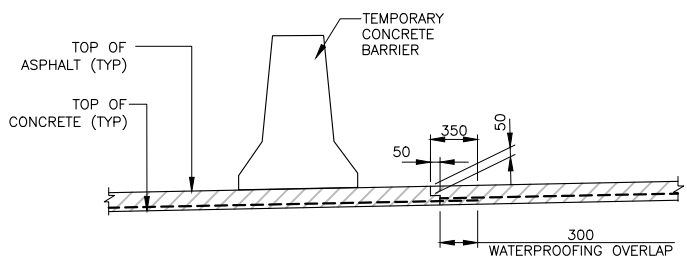


COVER PLATE

TEMPORARY LONGITUDINAL DECK JOINT COVER PLATE

NTS

- NOTES:
- COVER PLATE SHALL EXTEND FULL LENGTH OF BRIDGE.
 - CUT ROD FLUSH WITH TOP OF NUT.



WATERPROOFING OVERLAP DETAIL

NTS

NOTES:

- THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT AND HIGHWAY STAGING DRAWINGS.

SCOPE OF REHABILITATION WORK AND STAGING

STAGE 1:

- REPAIR SUBSTRUCTURE AND DECK SOFFIT. REPLACE ABUTMENT BEARINGS.
- SHIFT TRAFFIC TO OUTSIDE OF BRIDGES.
- INSTALL TEMPORARY TRAFFIC BARRIERS.
- INSTALL DEBRIS PLATFORM, REMOVE CONCRETE MEDIAN, FASTEN STEEL PLATE OVER THE GAP BETWEEN TWO BRIDGES AND PAVE.

STAGE 2:

- RE-ARRANGE TEMPORARY TRAFFIC BARRIERS TO ALLOW SHIFT OF TRAFFIC TO THE EB BRIDGE AND THE MEDIAN.
- REMOVE EXISTING ASPHALT AND WATERPROOFING FROM DECK.
- REMOVE EXISTING BARRIER WALL, RAILING AND POSTS.
- REMOVE PART OF APPROACH SLAB.
- INSTALL ROADWAY PROTECTION SYSTEM AS REQUIRED.
- EXCAVATE BEHIND ABUTMENTS.
- REMOVE PART OF BALLAST WALLS INCLUDING EXPANSION JOINT CONCRETE END DAMS AND EXPANSION JOINT ASSEMBLY. REMOVE PART OF WINGWALLS.
- REMOVE DELAMINATED AND DETERIORATED CONCRETE FROM THE DECK SURFACE AND ENDS.
- PATCH REPAIR EXISTING DECK. RECONSTRUCT PART OF WINGWALLS AND CONSTRUCT PART OF SEMI-INTEGRAL ABUTMENT DETAIL.
- CONSTRUCT NEW PARAPET WALL AND INSTALL NEW RAILING AND POSTS.
- BACKFILL BEHIND ABUTMENT.
- CONSTRUCT PART OF APPROACH SLABS.
- WATERPROOF AND PAVE ASPHALT. ADDITIONAL LAYER OF 300mm WATERPROOFING PROTECTION BOARD TO BE ADDED AT CONSTRUCTION JOINT.

STAGE 3:

- RE-ARRANGE TEMPORARY TRAFFIC BARRIERS TO ALLOW SHIFT OF TRAFFIC TO THE WB BRIDGE AND THE MEDIAN.
- REMOVE EXISTING ASPHALT AND WATERPROOFING FROM DECK.
- REMOVE PART OF CONCRETE SIDEWALK ON DECK, BARRIER WALL, RAILING AND POSTS.
- REMOVE PART OF APPROACH SLAB AND SIDEWALK ON APPROACHES.
- REPEAT STEPS 9 TO 15.
- CONSTRUCT PART OF APPROACH SLABS AND SIDEWALK ON APPROACHES.
- WATERPROOF AND PAVE ASPHALT. ADDITIONAL LAYER OF 300mm WATERPROOFING PROTECTION BOARD TO BE ADDED AT CONSTRUCTION JOINT.

STAGE 4:

- RE-ARRANGE TEMPORARY TRAFFIC BARRIERS TO SHIFT TRAFFIC TO THE OUTSIDE OF BRIDGES.
- REMOVE EXISTING ASPHALT AND WATERPROOFING FROM DECK.
- REMOVE TEMPORARY COVER PLATE, CUT STAINLESS STEEL THREADED RODS FLUSH WITH CONCRETE SURFACE.
- RECONSTRUCT MEDIAN CURBS.
- EXCAVATE BEHIND ABUTMENTS.
- REMOVE PART OF BALLAST WALLS INCLUDING EXPANSION JOINT CONCRETE END DAMS AND EXPANSION JOINT ASSEMBLY.
- REMOVE DELAMINATED AND DETERIORATED CONCRETE FROM THE DECK ENDS.
- CONSTRUCT PART OF SEMI-INTEGRAL ABUTMENT DETAIL.
- BACKFILL BEHIND ABUTMENTS AND CONSTRUCT PART OF APPROACH SLABS AND MEDIAN CURB.
- REMOVE 350mm OF ASPHALT AND 300mm OF PROTECTION BOARD FROM STAGE 2 AND STAGE 3.
- WATERPROOF AND PAVE ASPHALT.

PRE-FINAL:

- REMOVE TOP COURSE OF ASPHALT AND REPAVE.

LEGEND:

- REMOVALS
- NEW CONCRETE
- NEW ASPHALT

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B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

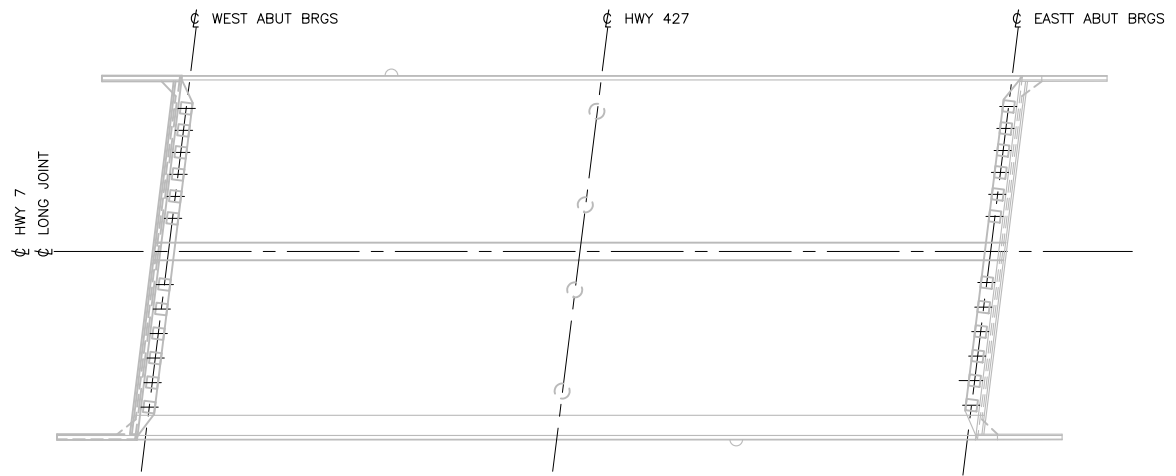
SCALE :
AS NOTED

DESIGNED: SUBOOHI OBADI
 DRAWN: PATRICK TSANG
 CHECKED: NINA SHIRAZI
 APPROVED LEAD ENG.: TATIANA QJALA
 APPROVED PROJ. MANAGER:

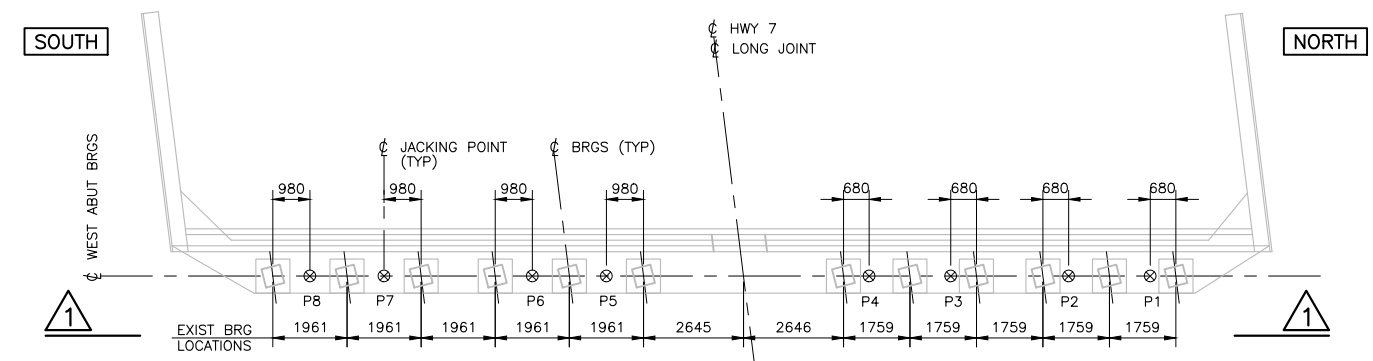
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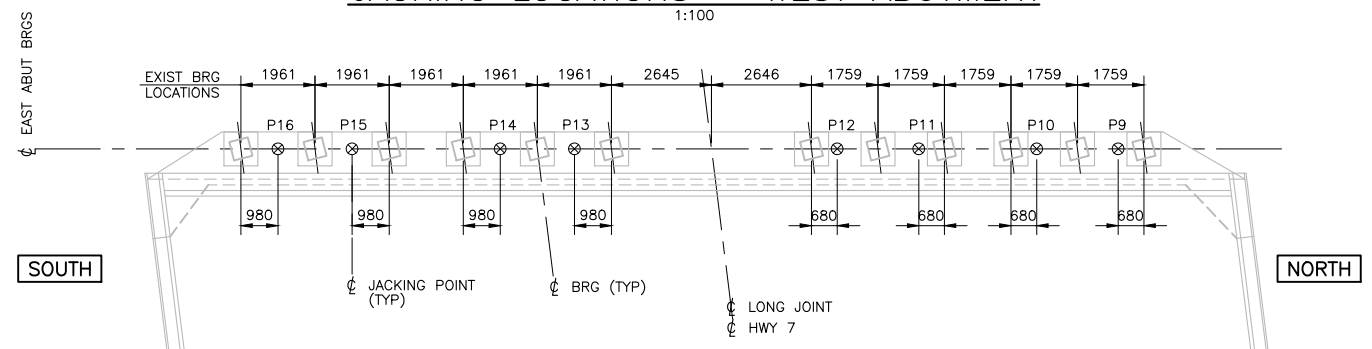
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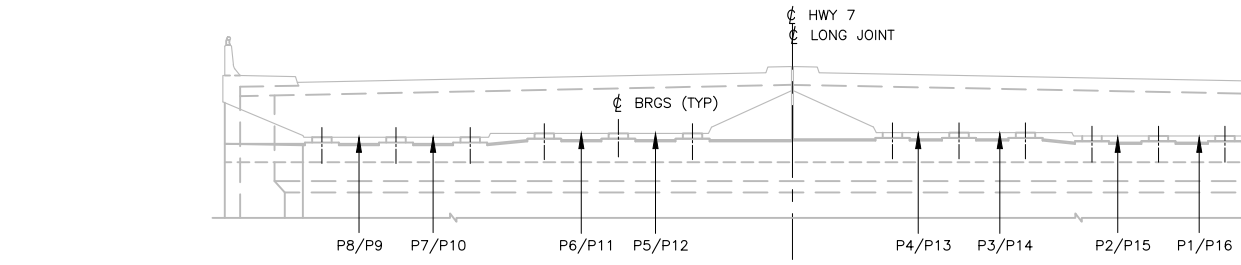
PLAN
1:300



JACKING LOCATIONS – WEST ABUTMENT
1:100



JACKING LOCATIONS – EAST ABUTMENT
1:100



UNFACTORED DEAD LOAD (KN)	P8/P9	P7/P10	P6/P11	P5/P12	P4/P13	P3/P14	P2/P15	P1/P16
	2000	300	300	2100	1900	300	300	2300
MAX FACTORED JACKING FORCE (KN)	2600	650	650	3000	2500	650	650	3100

JACKING LOADS
1:100

NOTES:

- SEE NOTES ON GENERAL ARRANGEMENT DWG 900 AND CONSTRUCTION STAGING DWG 901.
- JACKING SUPPORT SYSTEM SHOWN ON THE DRAWINGS IS SCHEMATIC ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN OF JACKING SUPPORT SYSTEM AND SHALL SUBMIT DETAILED SHOP DRAWINGS ALONG WITH DESIGN CALCULATIONS AND PROCEDURES TO THE CONTRACT ADMINISTRATOR. ALL DRAWINGS SHALL BE STAMPED BY AN ENGINEER LICENSED IN THE PROVINCE OF ONTARIO.
- JACKING EQUIPMENT AND PROCEDURES OUTLINED IN THE CONTRACTOR'S SHOP DRAWINGS SHALL BE CERTIFIED IN THE FIELD BY THE ENGINEER RESPONSIBLE FOR THOSE DRAWINGS.
- THE CONTRACTOR SHALL SITE MEASURE THE EXISTING STRUCTURE AT SUPPORT LOCATIONS TO ENSURE PROPER FIT.
- TRAFFIC SHALL NOT BE ALLOWED ON THE STRUCTURE DURING JACKING OPERATIONS. JACKING, TEMPORARY SUPPORT AND BEARING REPLACEMENT SHALL ONLY BE CARRIED OUT AT ONE ABUTMENT AT A TIME.
- THE DECK SHALL BE JACKED UP SIMULTANEOUSLY ACROSS THE ENTIRE WIDTH. JACKING MEASUREMENTS SHALL BE RECORDED AND SUPPLIED TO THE ENGINEER.
- THE DECK SHALL BE JACKED UP SUFFICIENTLY TO REMOVE PRESSURE ON THE EXISTING BEARINGS AND FACILITATE THEIR REMOVAL. THE LIFT SHALL BE LIMITED TO A MAXIMUM OF 8mm AND CONTROLLED SO AS TO AVOID DAMAGING ADJACENT AREAS OF THE STRUCTURE.
- JACKING REACTIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL SUPPLY JACK CAPACITY OF AT LEAST 150% OF THE THEORETICAL JACKING REACTIONS INDICATED.
- THE CONTRACTOR SHALL PROVIDE LATERAL RESTRAINTS CAPABLE OF RESISTING A LOAD OF NO LESS THAN 10% OF VERTICAL JACKING REACTION DURING REPLACEMENT OF THE BEARINGS. LATERAL RESTRAINTS SHALL BE INSTALLED PRIOR TO REMOVAL OF EXISTING BEARINGS AND REMAIN IN PLACE UNTIL NEW BEARINGS ARE INSTALLED.
- CONTRACTOR SHALL USE SELF-LOCKING JACKS.
- STAINLESS STEEL AND TEFLON SURFACES SHALL BE PROTECTED FROM ABRASION OR SCRATCHING AND KEPT CLEAN AT ALL TIMES DURING CONSTRUCTION.
- TOP AND BASE PLATES FOR JACKS AND TEMPORARY SUPPORT SHALL BE DESIGNED TO SUIT THE BEARING SEAT AND THE DECK SOFFIT GEOMETRY. TAPERED PLATES WILL BE REQUIRED. THE CONTRACTOR SHALL ESTABLISH THE PLATE SIZE SUCH THAT CONTACT PRESSURE UNDER JACKING OR TEMPORARY SUPPORT LOADS AT SLS IS NOT GREATER THAN 25 MPa.

LEGEND:

- LONG LONGITUDINAL
- ⊕ EXIST BEARING
- ⊗ JACKING POINTS

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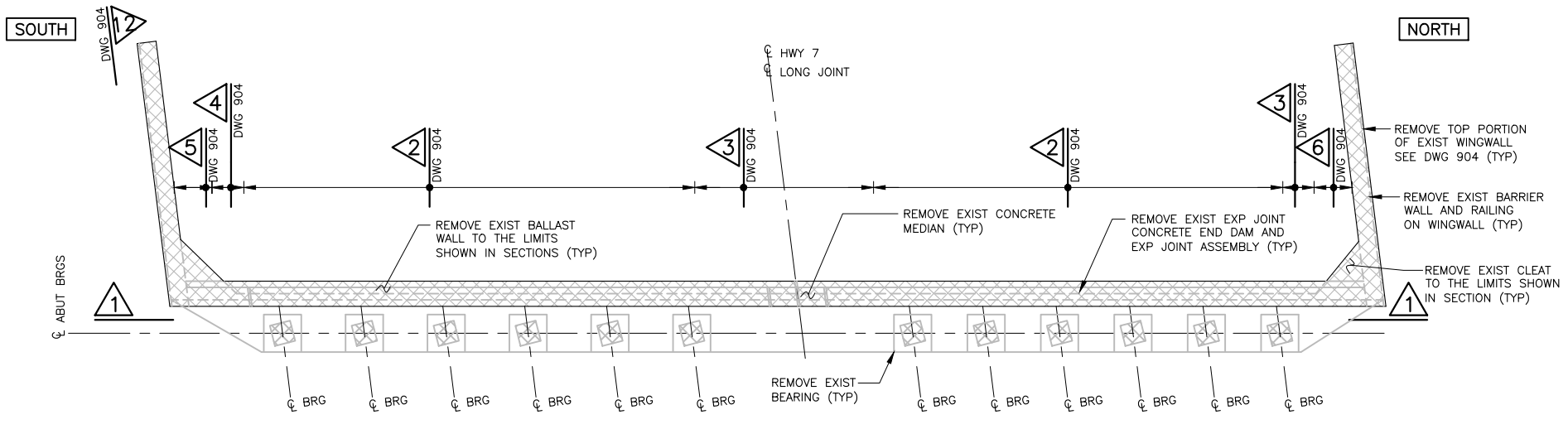
AS NOTED

DESIGNED	SUBOOHI OBAID
DRAWN	PATRICK TSANG
CHECKED	NINA SHIRAZI
APPROVED LEAD ENG.	TATIYANA QJALA
APPROVED PROJ. MANAGER	

NAME (PRINT)	INIT.	DATE



HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 JACKING DETAILS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	902	C



SUBSTRUCTURE REMOVALS PLAN

1:75
 WEST ABUTMENT SHOWN
 EAST ABUTMENT SIMILAR - OPPOSITE HAND
 NOTE: EXIST APPROACH SLAB, SOUTH SIDEWALK AND CURBS TO BE REMOVED - NOT SHOWN FOR CLARITY

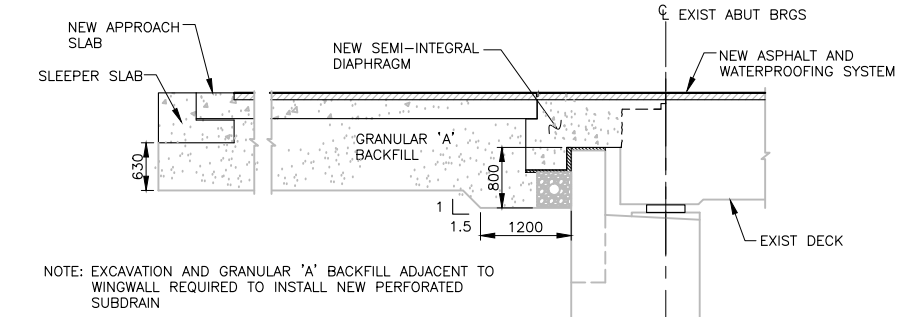
- NOTES:**
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DWG 900, 901 AND 904.
 - EXISTING REINFORCING STEEL TO REMAIN SHALL BE ABRASIVE BLAST CLEANED.
 - FOR REINFORCING STEEL THAT IS CUT AND WILL NOT BE EMBEDDED IN CONCRETE THE FOLLOWING APPLIES:
 - CHIP CONCRETE 25mm AROUND REBAR TO A DEPTH OF 50mm.
 - CUT REBAR AND PATCH HOLE WITH PROPRIETARY PRODUCT.
 - SAWCUTS IN CONCRETE, WHERE DESIGNATED, SHALL BE 25mm DEEP OR TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS.

LIST OF ABBREVIATIONS:

REINF STL REINFORCING STEEL
 LONG LONGITUDINAL

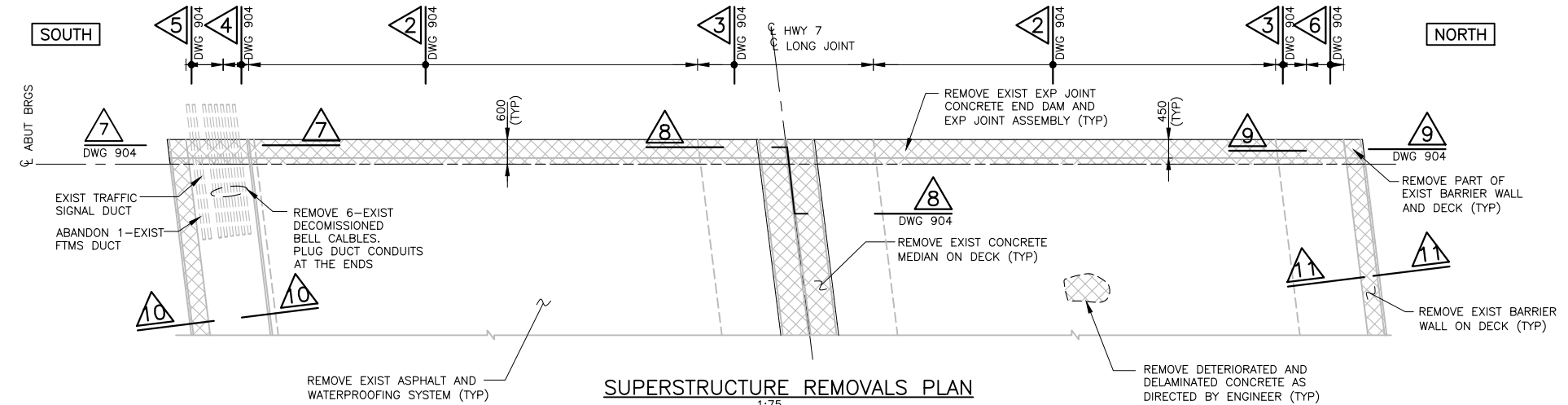
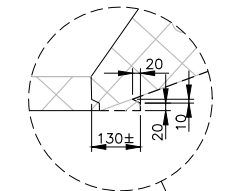
LEGEND:

CONCRETE REMOVALS
 - - - - - LIMIT OF REMOVAL



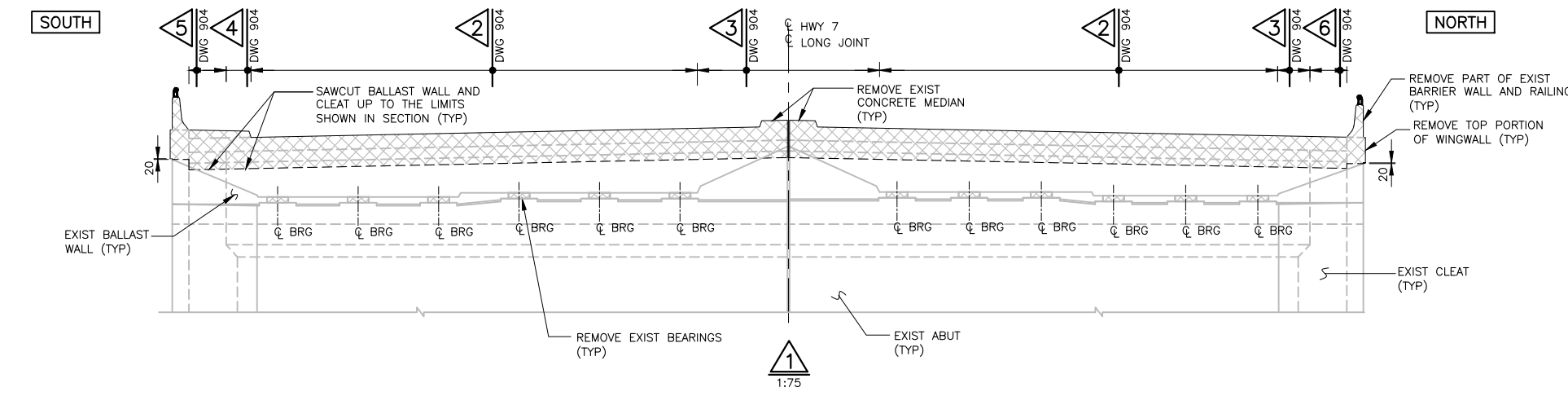
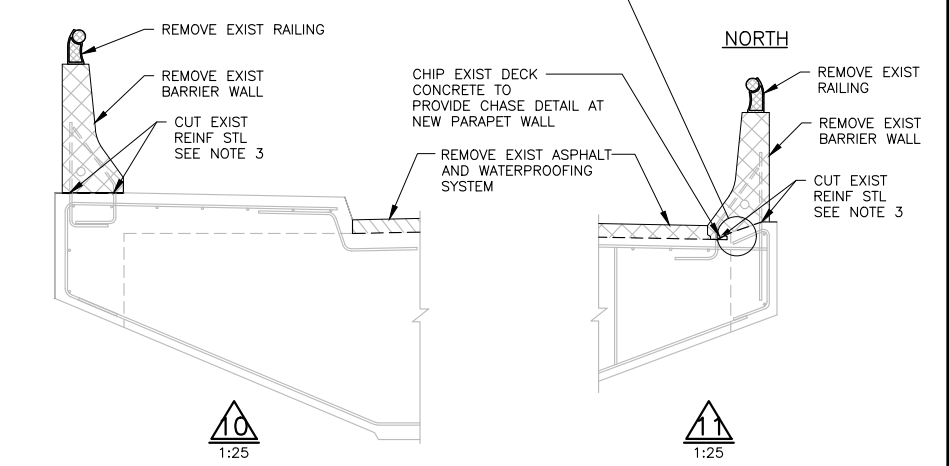
LIMITS OF EXCAVATION AND GRANULAR FILL

NTS



SUPERSTRUCTURE REMOVALS PLAN

1:75
 WEST ABUTMENT SHOWN
 EAST ABUTMENT SIMILAR - OPPOSITE HAND



SUBSTRUCTURE REMOVALS PLAN

1:75
 WEST ABUTMENT SHOWN
 EAST ABUTMENT SIMILAR - OPPOSITE HAND

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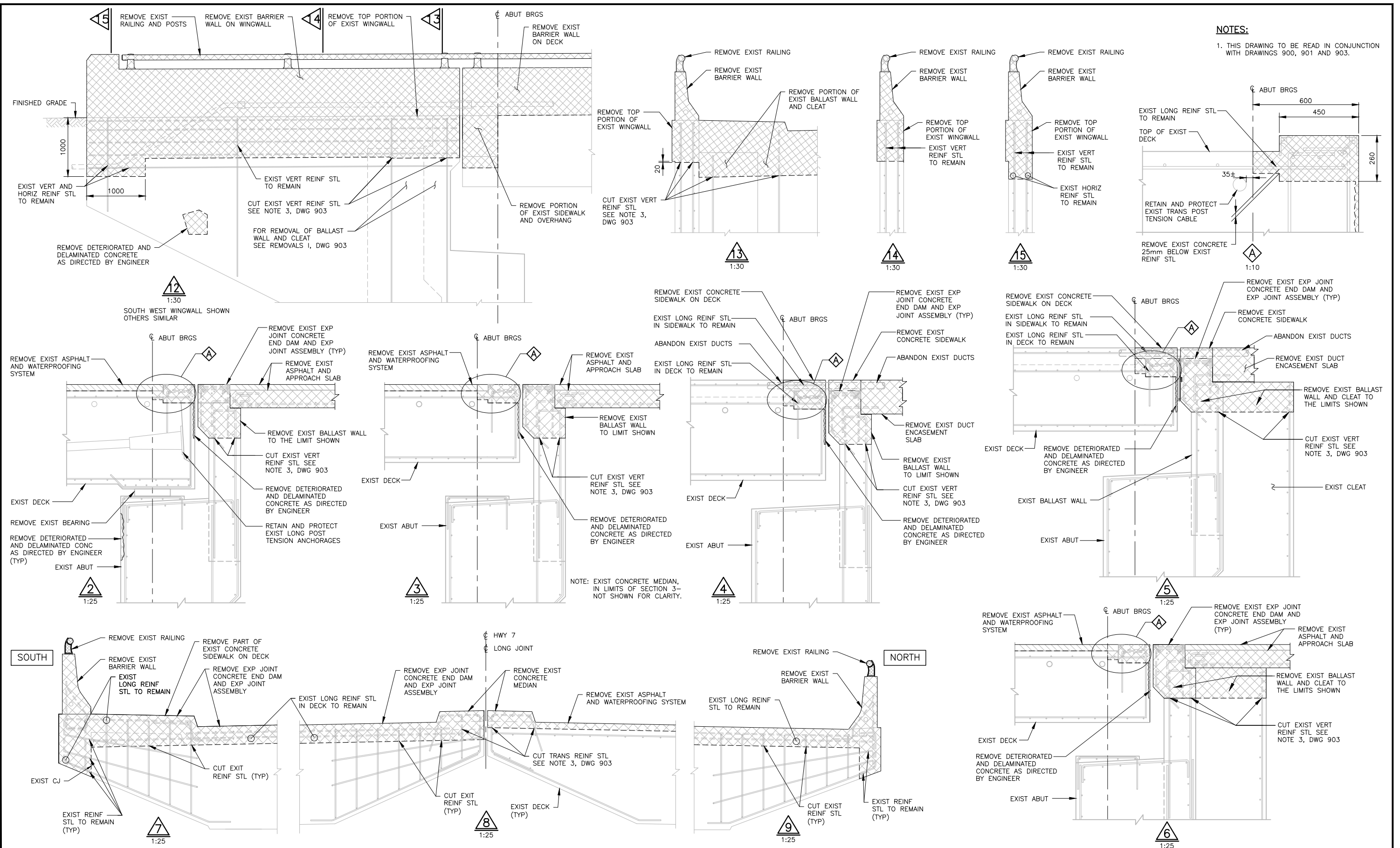
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C	18/03/16	90% SUBMISSION TO CA			
B	18/01/09	90% SUBMISSION TO CA			
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SCALE :		AS NOTED	
DESIGNED	SUBOOHI OBAID		
DRAWN	PATRICK TSANG		
CHECKED	NINA SHIRAZI		
APPROVED LEAD ENG.	TATIANA OJALA		
APPROVED PROJ. MANAGER			
NAME (PRINT)	INIT.	DATE	



TITLE						
HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 REMOVALS I						
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER
H427-D	N	9A	STR	B09	DWG	903
						REVISION NUMBER
						C

NOTES:
 1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 900, 901 AND 903.



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SCALE :
AS NOTED

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

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APPROVED LEAD ENG.	TATIANA QJALA
APPROVED PROJ. MANAGER	
CONSULTANT	
NAME (PRINT)	INT.
DATE	



HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 REMOVALS II							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	904	C

NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 900, 901, 903, 904 AND 906.

LIST OF ABBREVIATIONS:

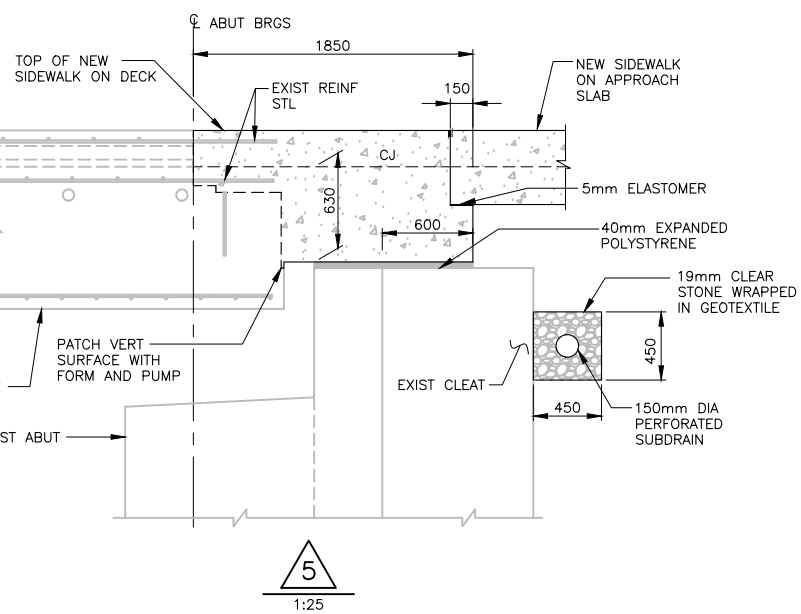
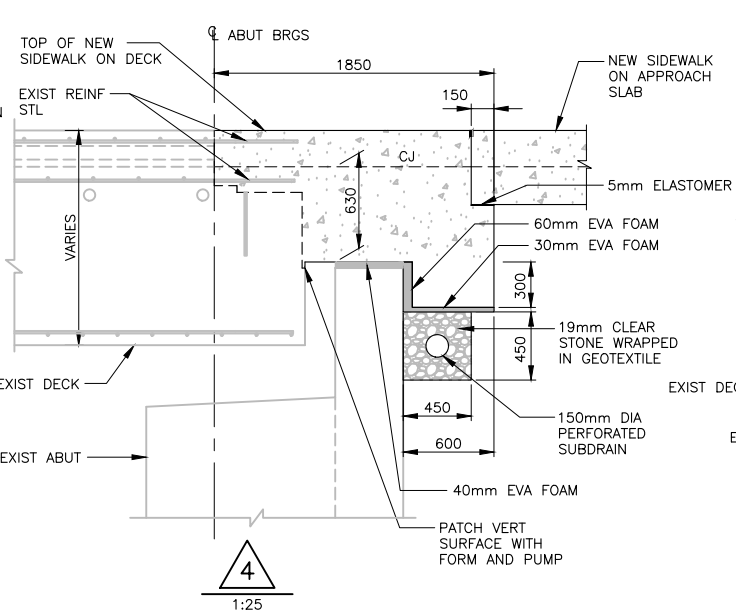
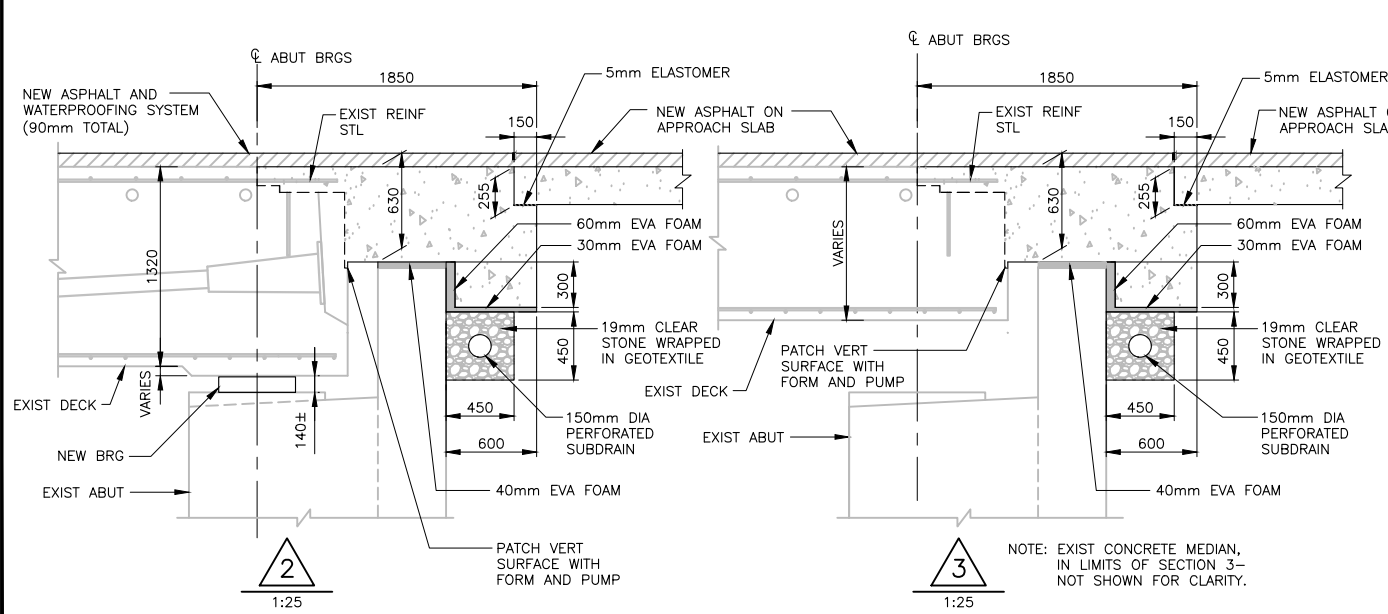
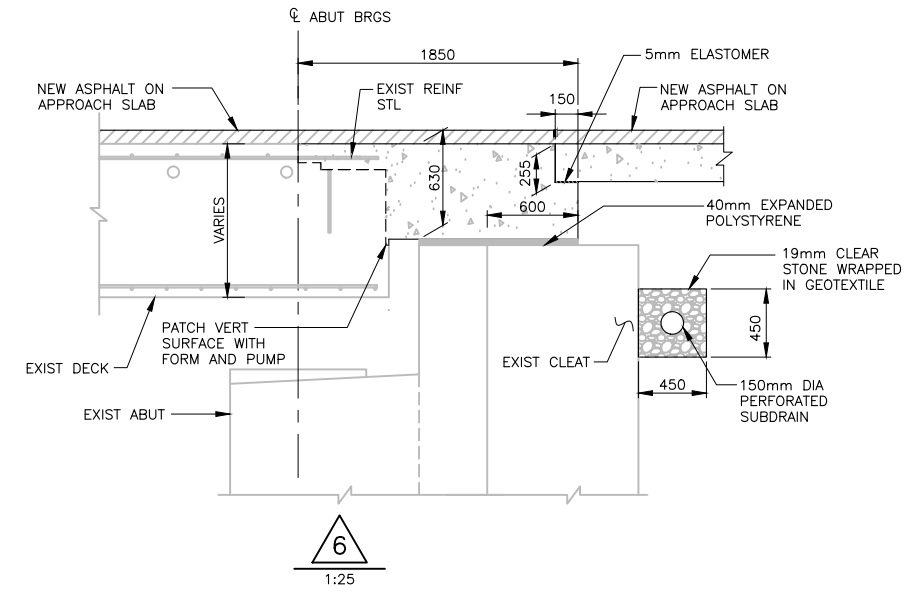
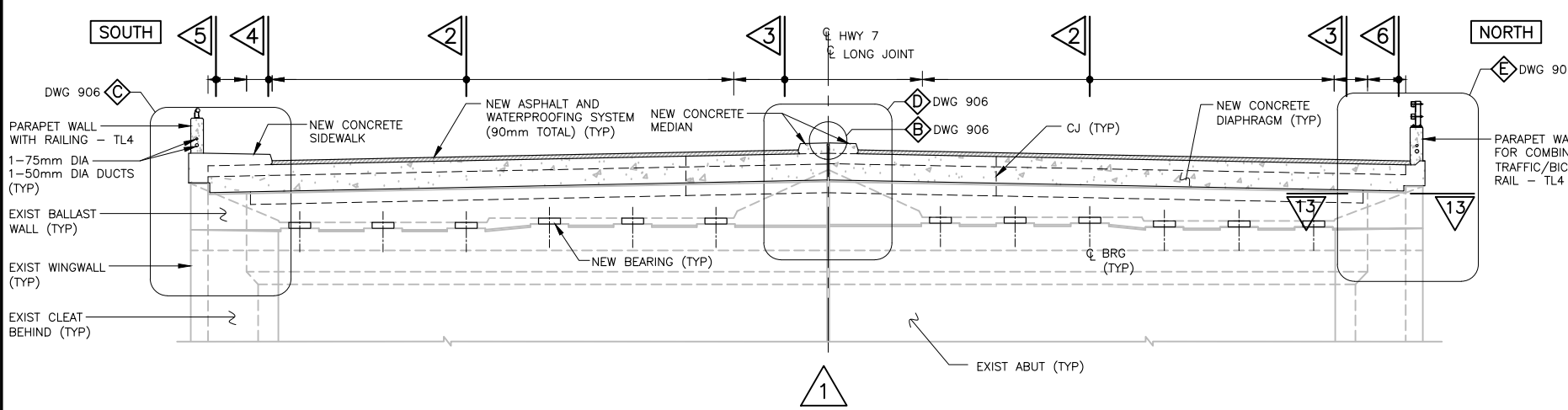
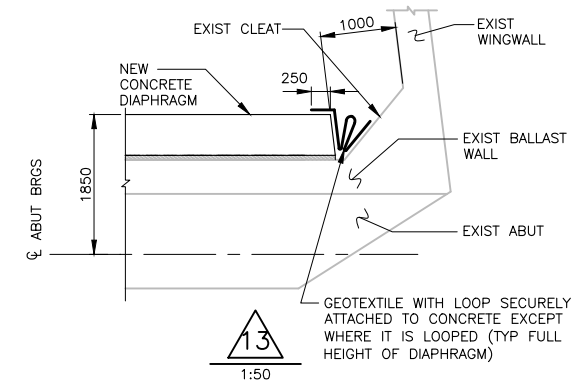
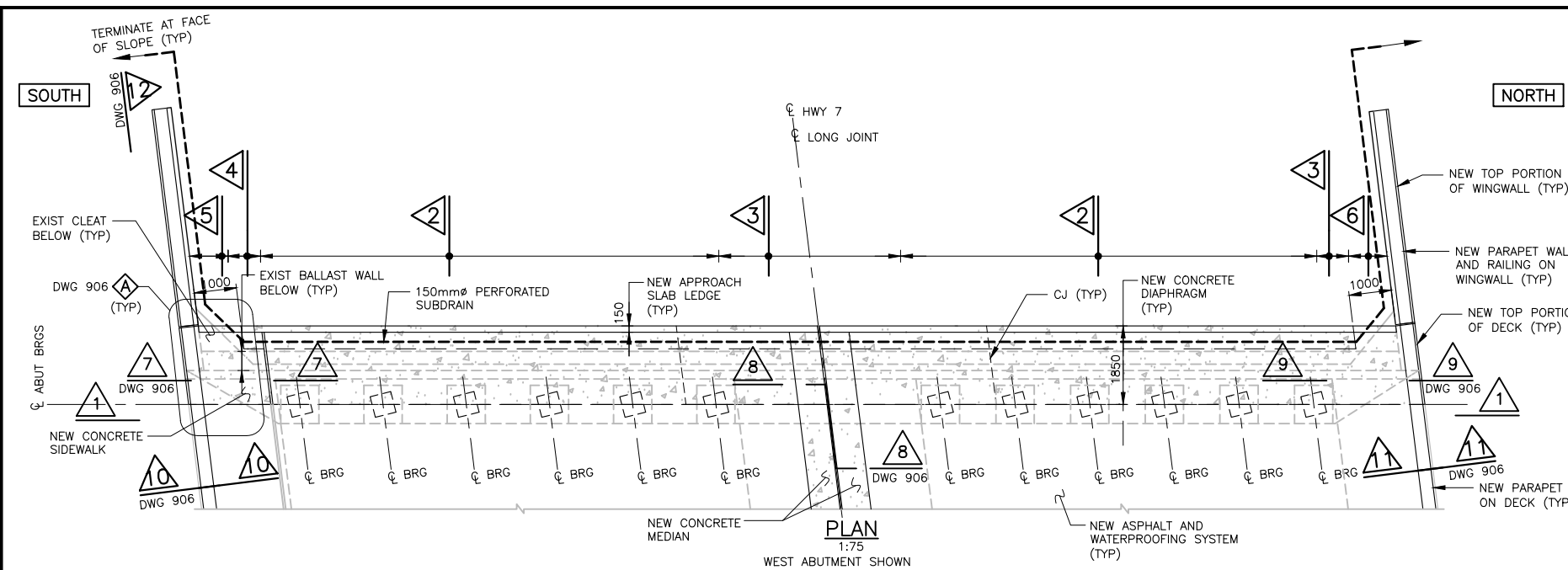
EVA ETHYLENE VINYL ACETATE
LONG LONGITUDINAL

LEGEND:

NEW CONCRETE
 NEW ASPHALT

APPLICABLE STANDARD DRAWING

OPSD 3329.100 DECK, REINFORCEMENT - SUPPORTS FOR REINFORCING STEEL FOR SLAB DEPTHS 300mm OF LESS.
OPSD 3329.101 DECK, REINFORCEMENT - SUPPORTS FOR REINFORCING STEEL FOR SLAB DEPTHS GREATER THAN 300mm.
OPSD 3390.100 DECK, DRIP CHANNEL.
OPSD 3950.100 JOINTS - CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE.



NOTE: EXIST CONCRETE MEDIAN, IN LIMITS OF SECTION 3 - NOT SHOWN FOR CLARITY.

CAD FILE LOCATION AND NAME: C:\projects\h427\h427-d0-9a-str-609-dwg-905nc.dwg
MODIFIED: 3/19/2018 10:03:22 AM BY: PANGF
DATE PLOTTED: 3/19/2018 11:55:59 AM BY:

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

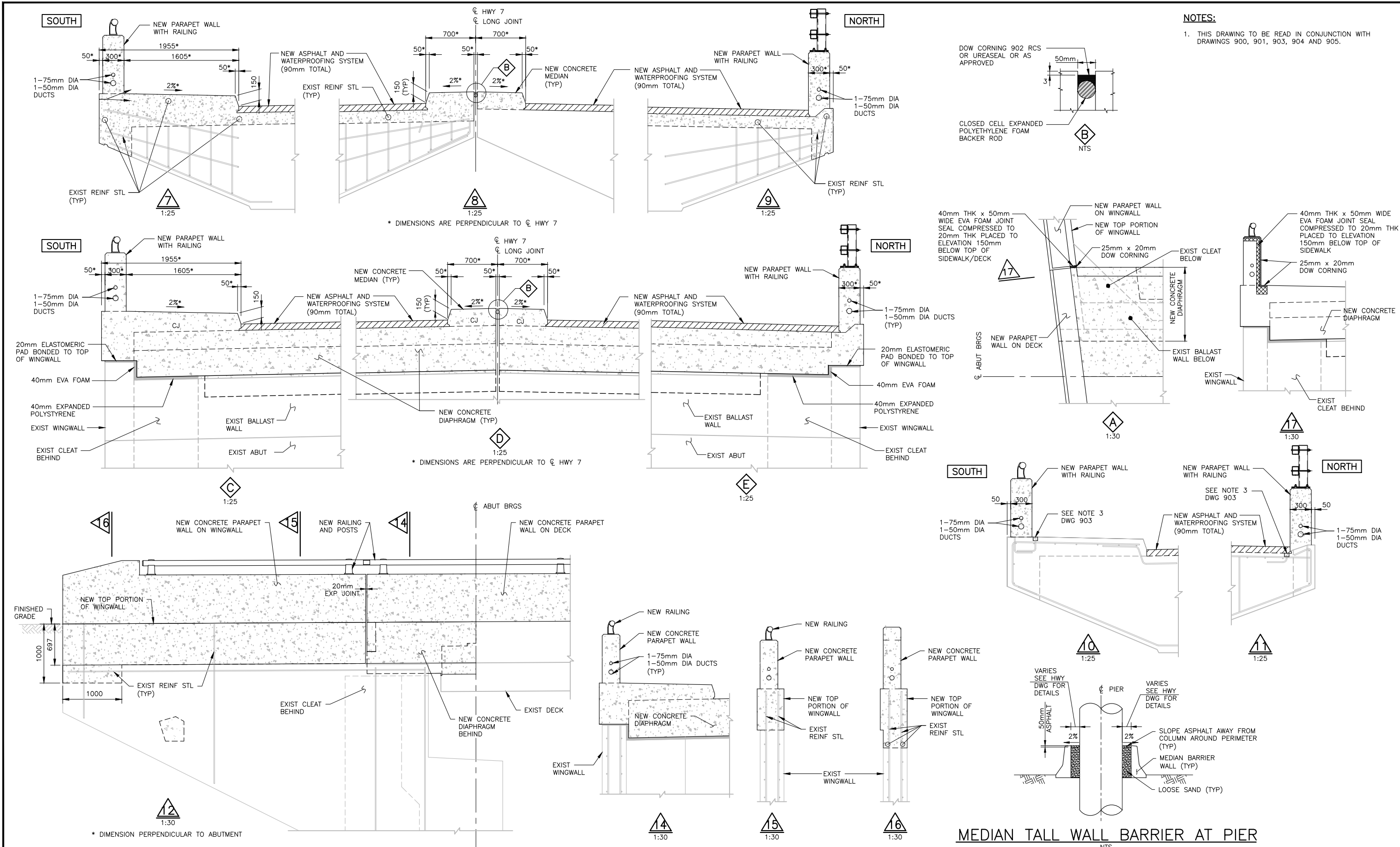
SCALE :
AS NOTED

DESIGNED	SUBOOHI OBAID
DRAWN	PATRICK TSANG
CHECKED	NINA SHIRAZI
APPROVED LEAD ENG.	TATIANA QJALA
APPROVED PROJ. MANAGER	
CONSULTANT	
NAME (PRINT)	INIT. DATE



<p>HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 NEW CONSTRUCTION I</p>							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	905	C

NOTES:
 1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 900, 901, 903, 904 AND 905.



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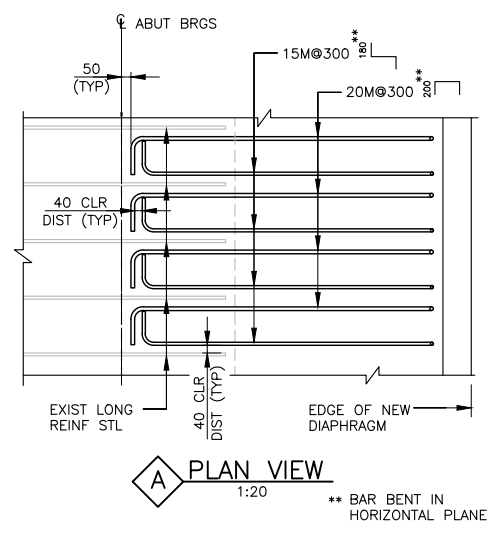
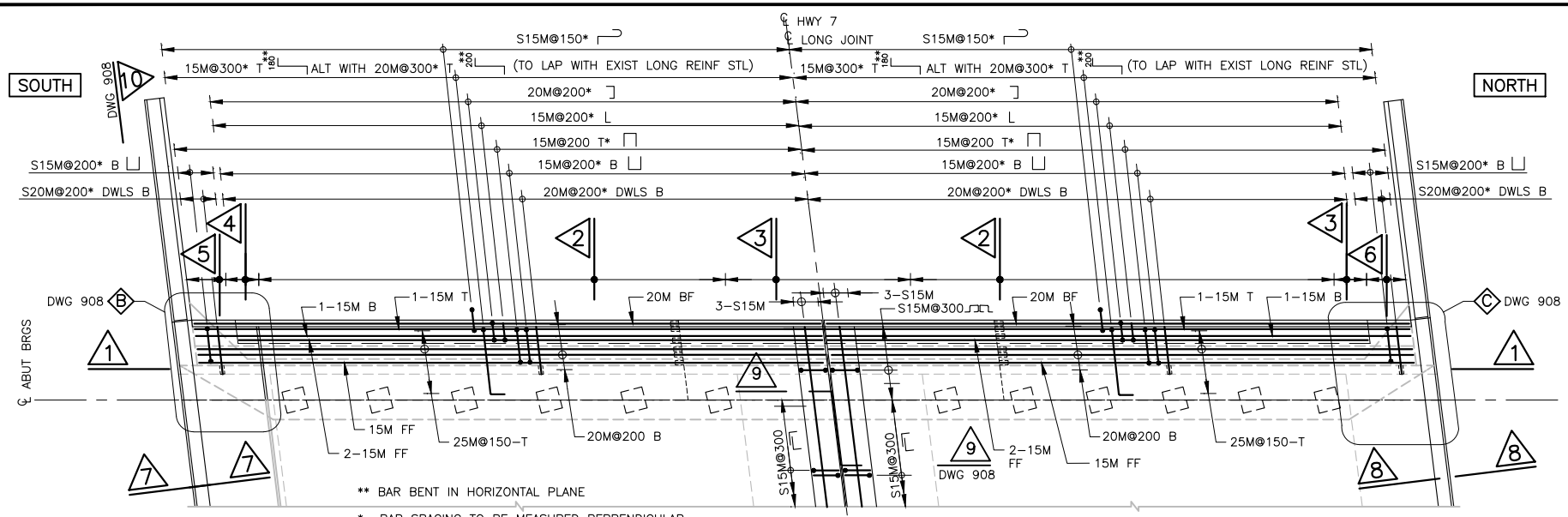
DATE	REVISIONS	BY	CHK	LEAD	PROJ. MGR.
18/03/16	90% SUBMISSION TO CA				
18/01/09	90% SUBMISSION TO CA				
17/10/31	90% SUBMISSION TO CA				

SCALE :
 AS NOTED

DESIGNED	SUBOOHI GHANI
DRAWN	PATRICK TSANG
CHECKED	NINA SHIRAZI
APPROVED LEAD ENGR.	TATIANA QJALA
APPROVED PROJ. MANAGER	



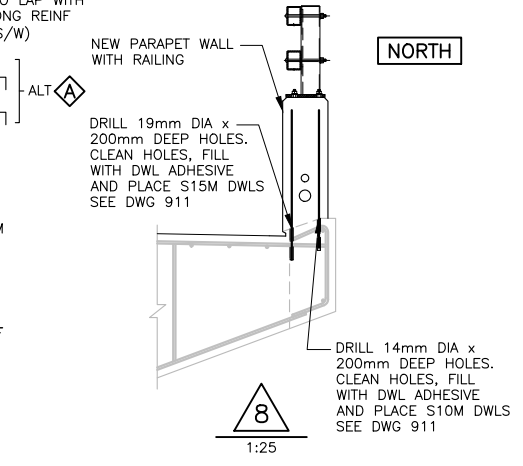
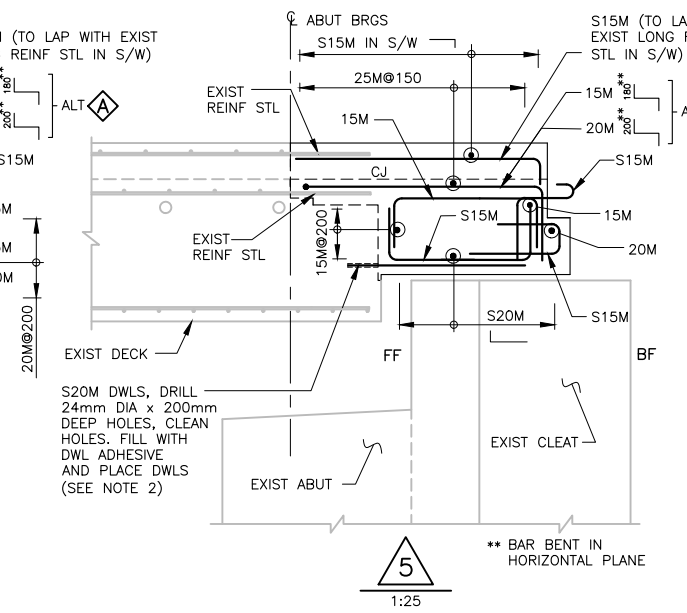
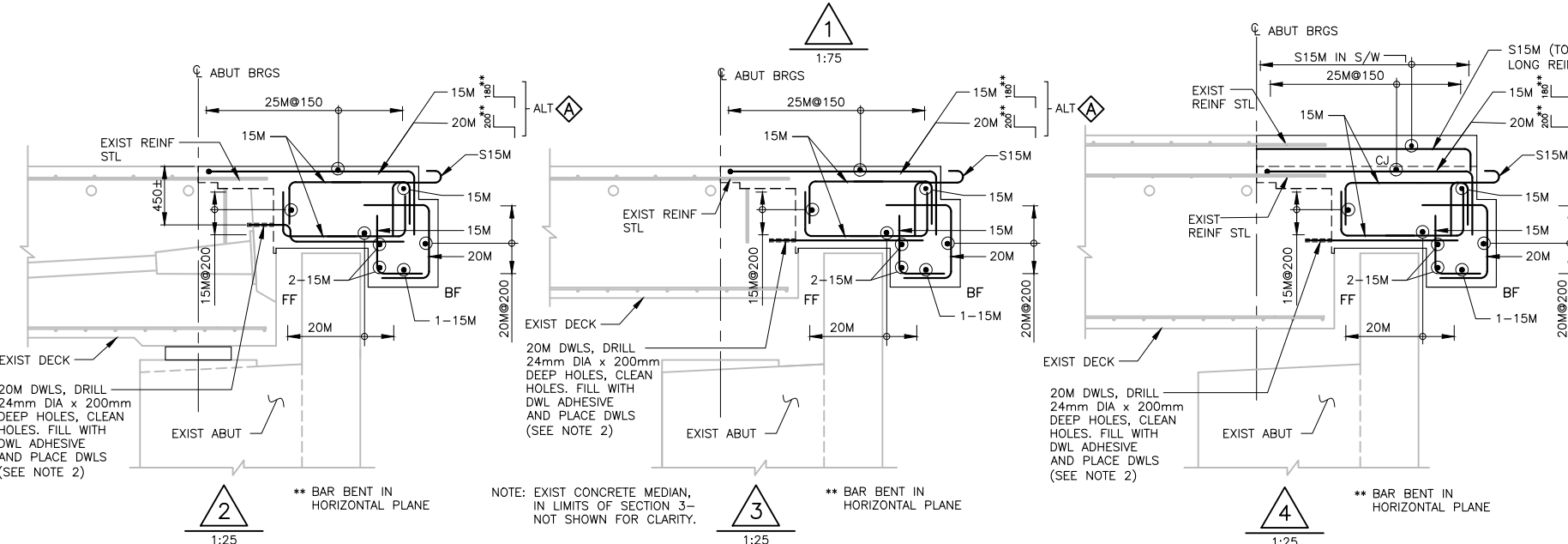
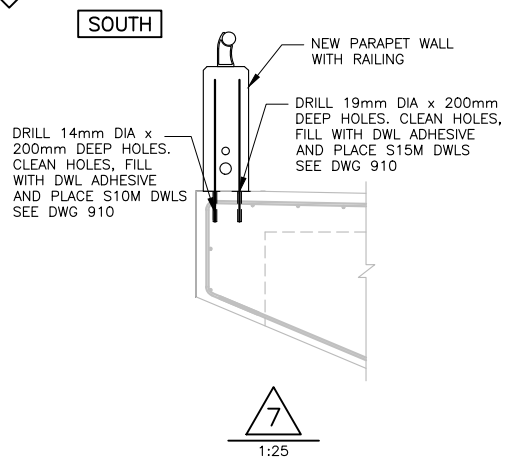
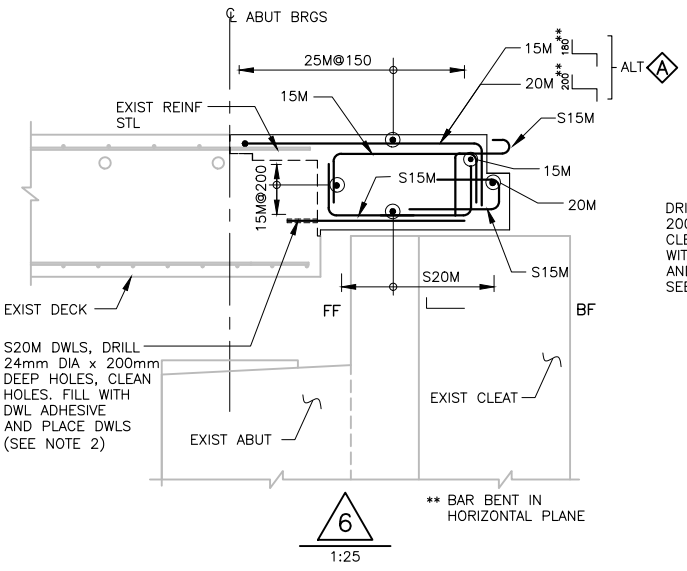
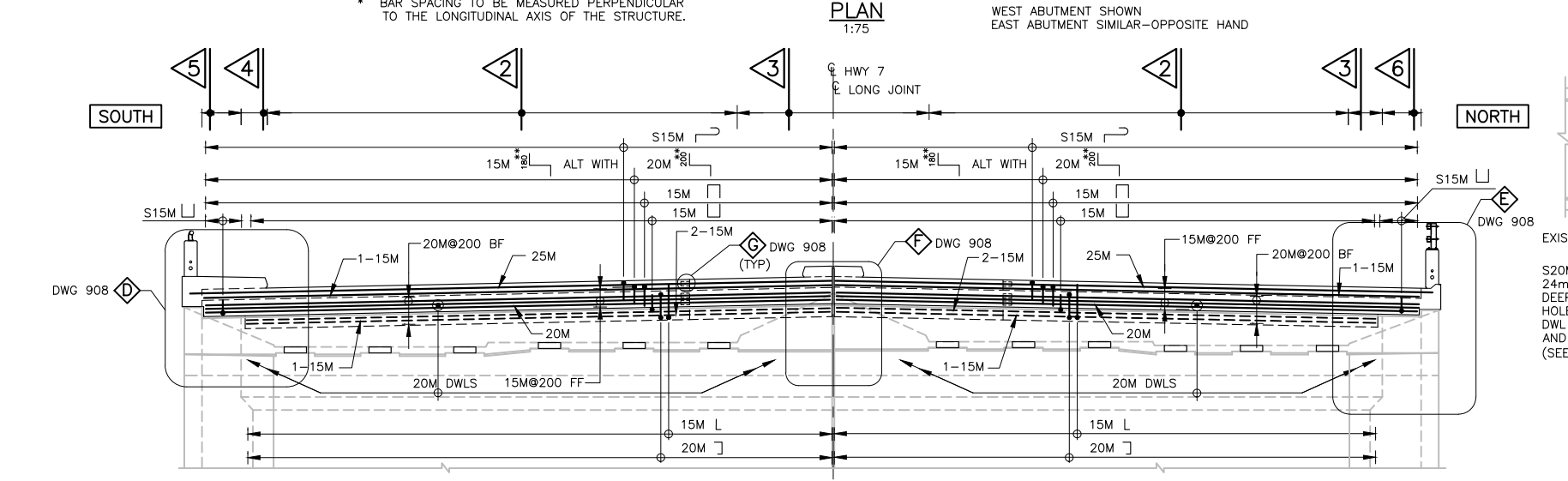
HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 NEW CONSTRUCTION II							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	906	C



- NOTES:**
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 900, 901, 905, 906 AND 908.
 - HOLES TO BE DRILLED AFTER DETERIORATED AND DELAMINATED CONCRETE HAS BEEN REMOVED.

- LIST OF ABBREVIATIONS:**
- CLR DIST CLEAR DISTANCE
 - EQ SP EQUALLY SPACED
 - LONG LONGITUDINAL
 - REINF STL REINFORCING STEEL

- APPLICABLE STANDARD DRAWINGS**
- OPSD 3329.100 DECK, REINFORCEMENT - SUPPORTS FOR REINFORCING STEEL FOR SLAB DEPTHS 300mm OR LESS
 - OPSD 3329.101 DECK, REINFORCEMENT - SUPPORTS FOR REINFORCING STEEL FOR SLAB DEPTHS GREATER THAN 300mm



DATE	REVISIONS	BY	CHK	LEAD	PROJ
C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE : AS NOTED

DESIGNED	SUBOOHI GBAD
DRAWN	PATRICK TSANG
CHECKED	NINA SHIRAZI
APPROVED LEAD ENGR.	TATIANA GJALA
APPROVED PROJ. MANAGER	

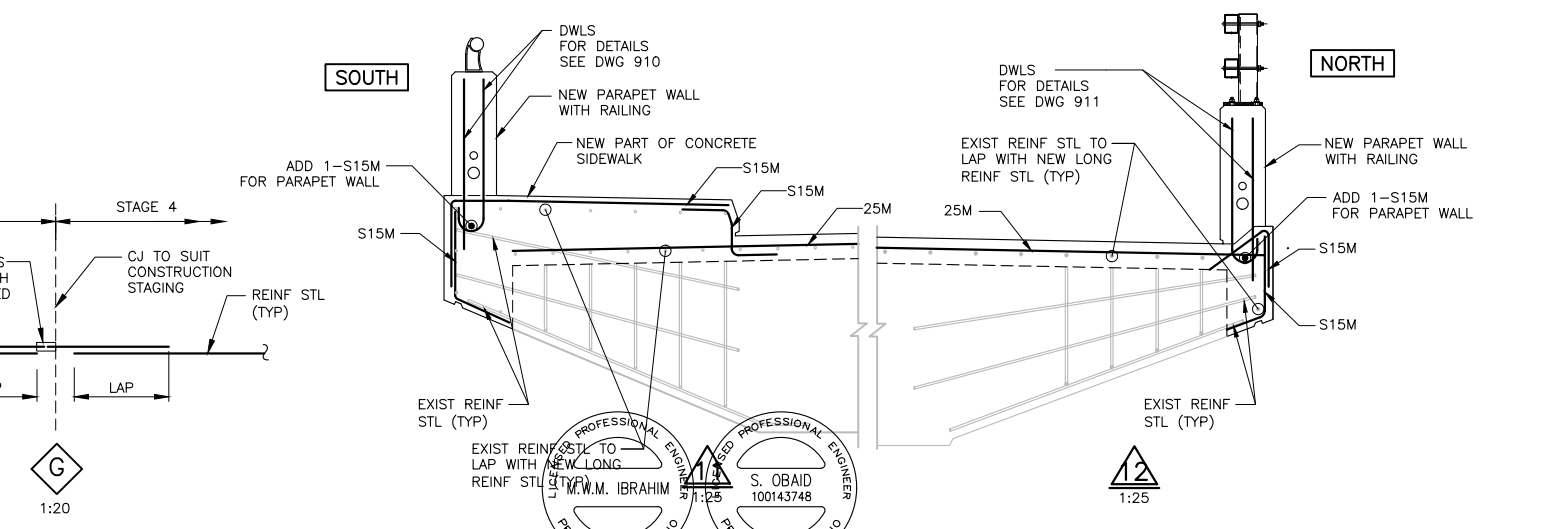
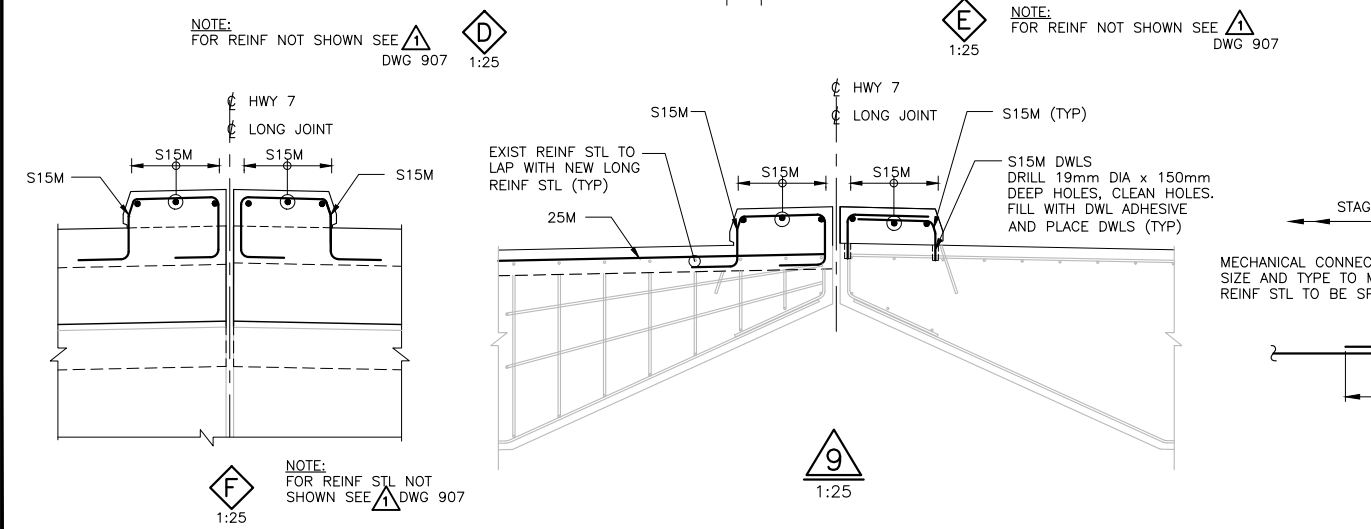
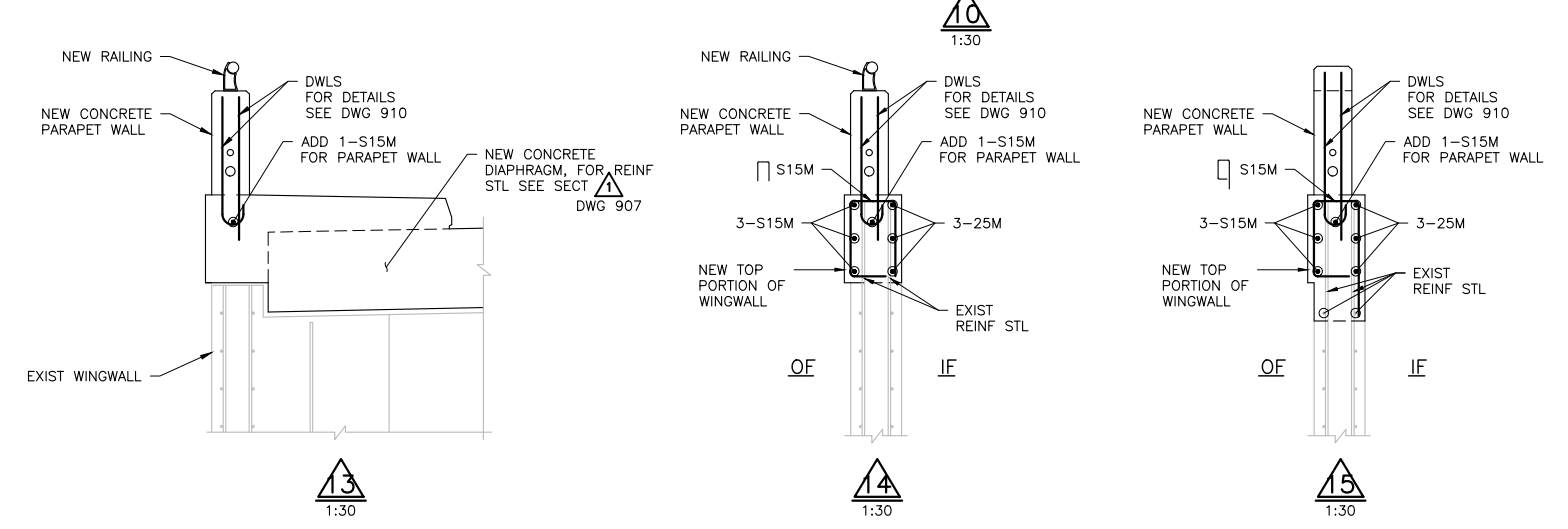
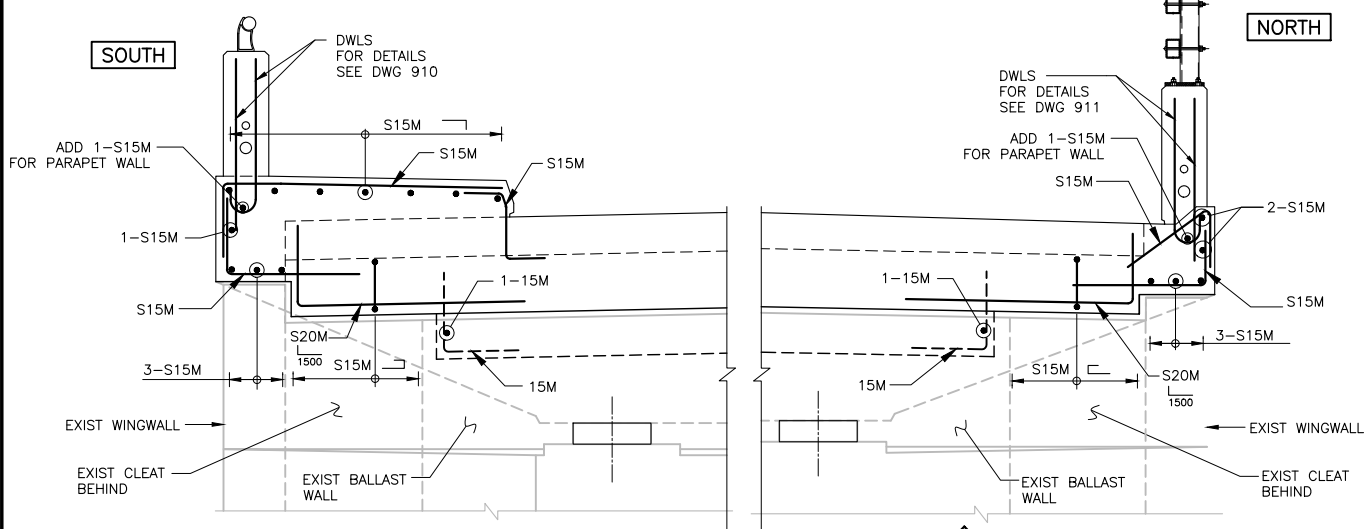
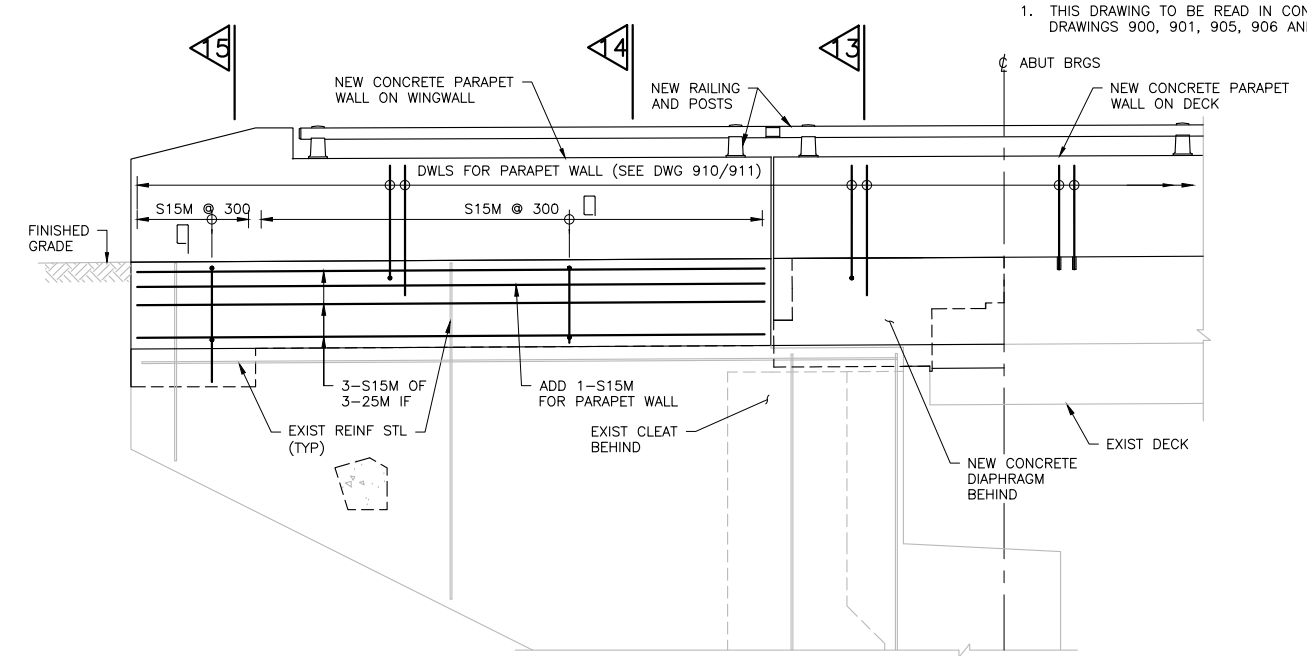
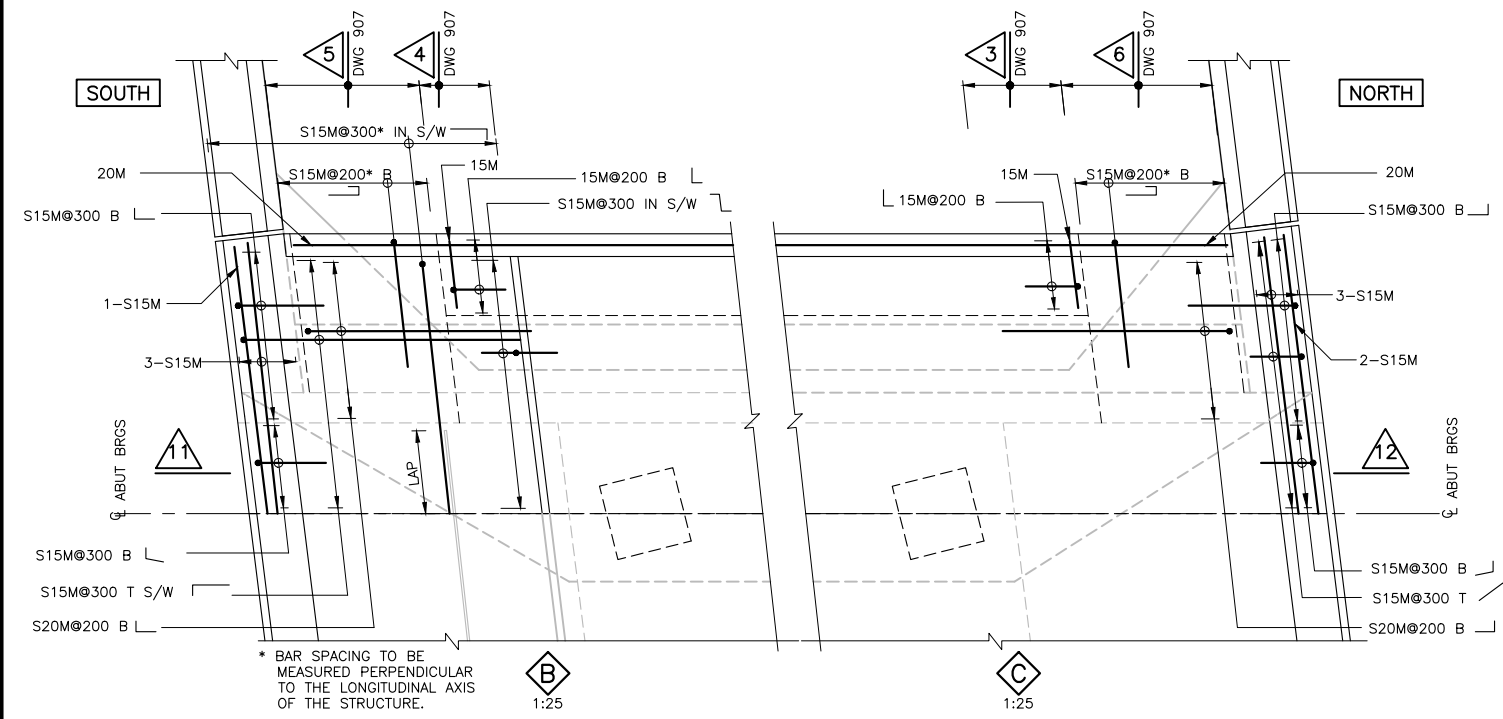


PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	907	C

CAD FILE LOCATION AND NAME: C:\projects\h427-00-9A-STR-B09-DWG-907NOC.dwg
 MODIFIED: 3/19/2018 10:03:37 AM BY: PANGF
 DATE PLOTTED: 3/19/2018 11:58:07 AM BY:

NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 900, 901, 905, 906 AND 907.



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 MODIFIED: 3/19/2018 10:03:41 AM BY: PANG
 DATE PLOTTED: 3/19/2018 11:56:11 AM BY:

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE :
AS NOTED

DESIGNED	SUBOOHI OBAID
DRAWN	PATRICK TSANG
CHECKED	NINA SHIRAZI
APPROVED LEAD ENG.	TATIANA QJALA
APPROVED PROJ. MANAGER	



<p>HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 NEW CONSTRUCTION IV</p>							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	908	C

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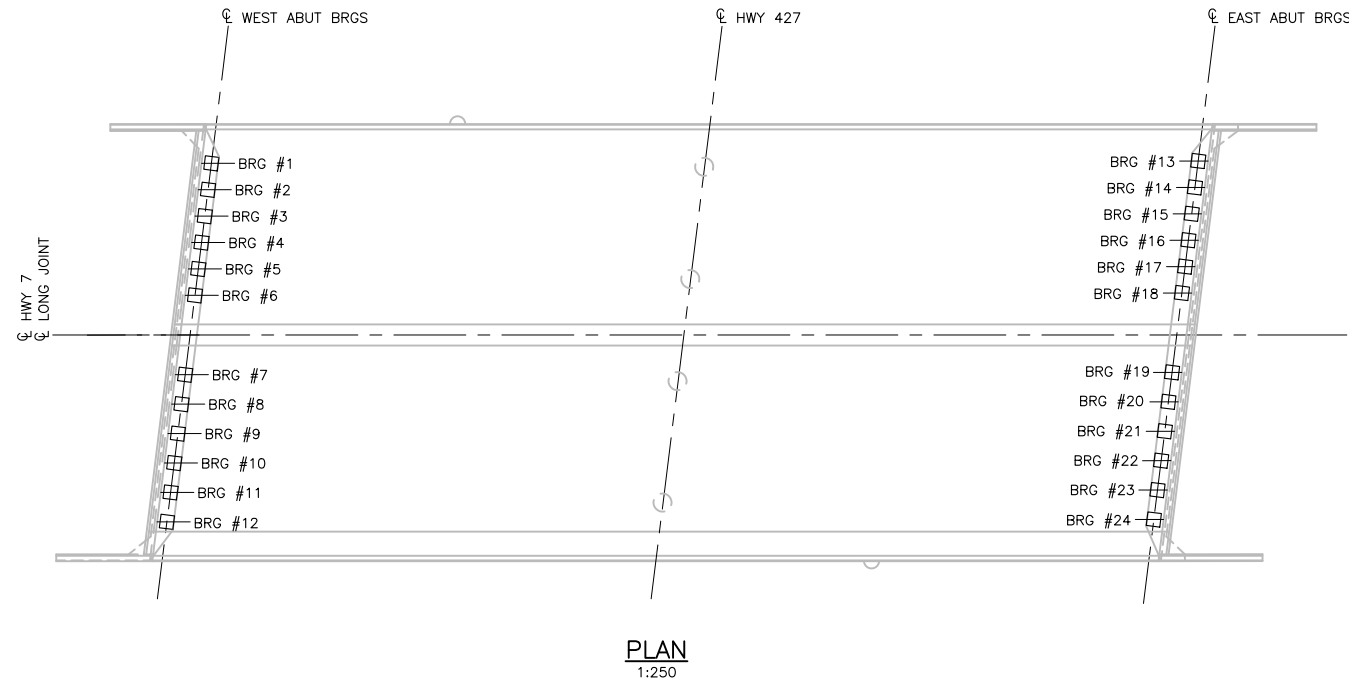
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DWGS 900, 901, 903 AND 905.

LIST OF ABBREVIATIONS:

LONG LONGITUDINAL

LEGEND:

⊕ NEW BEARING



BEARING DESIGN DATA:

ABUTMENTS - BEARING #1, 2, 3, 4, 5, 6, 13, 14, 15, 16, 17, 18

BEARING DATA	REQUIREMENTS AT SERVICEABILITY LIMIT STATES LOADING
DEAD LOAD (kN)	1080
TOTAL LOAD (kN)	1560
MOVEMENT (mm)	±25
MAXIMUM ALLOWABLE SHEAR RATE @ 20° C (kN/mm)	1.68
BEARING SIZE (mm)	550x450x140
NUMBER REQUIRED	12
BEARING TYPE	LAMINATED ELASTOMERIC

BEARING DESIGN DATA:

ABUTMENTS - BEARING #7, 8, 9, 10, 11, 12, 19, 20, 21, 22, 23, 24

BEARING DATA	REQUIREMENTS AT SERVICEABILITY LIMIT STATES LOADING
DEAD LOAD (kN)	1110
TOTAL LOAD (kN)	1555
MOVEMENT (mm)	±25
MAXIMUM ALLOWABLE SHEAR RATE @ 20° C (kN/mm)	1.68
BEARING SIZE (mm)	550x450x140
NUMBER REQUIRED	12
BEARING TYPE	LAMINATED ELASTOMERIC

CAD FILE LOCATION AND NAME: C:\projects\wise\wsp-ca\wsp-ca\project\wise\wsp-ca\wsp-ca\dm06253\H427-D0-9A-STR-B09-DWG-909B6.dwg
 MODIFIED: 3/19/2018 10:03:45 AM BY: PANGF
 DATE PLOTTED: 3/19/2018 11:56:14 AM BY:

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
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B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

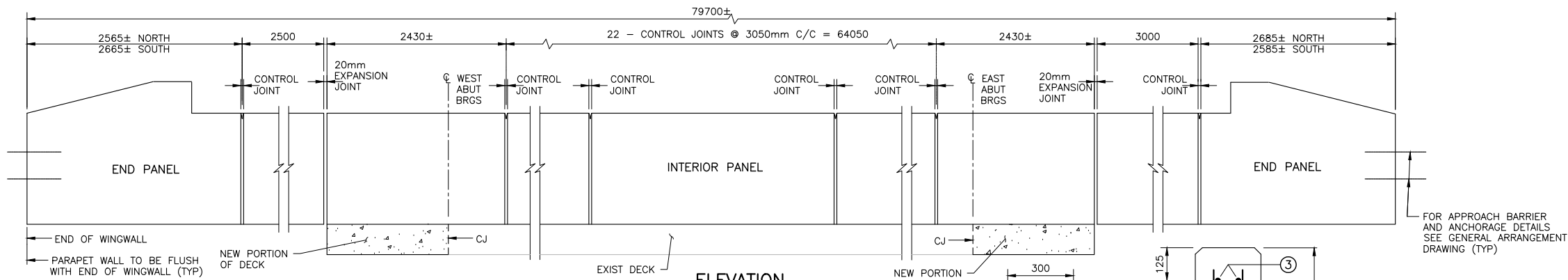
SCALE :

AS NOTED

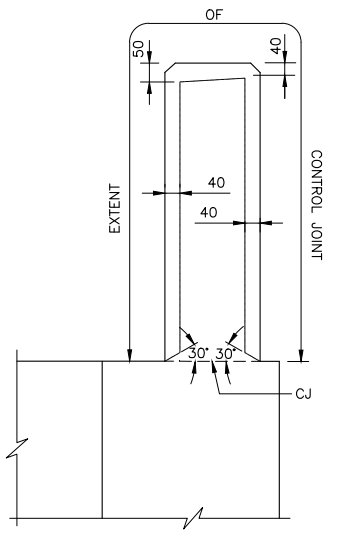
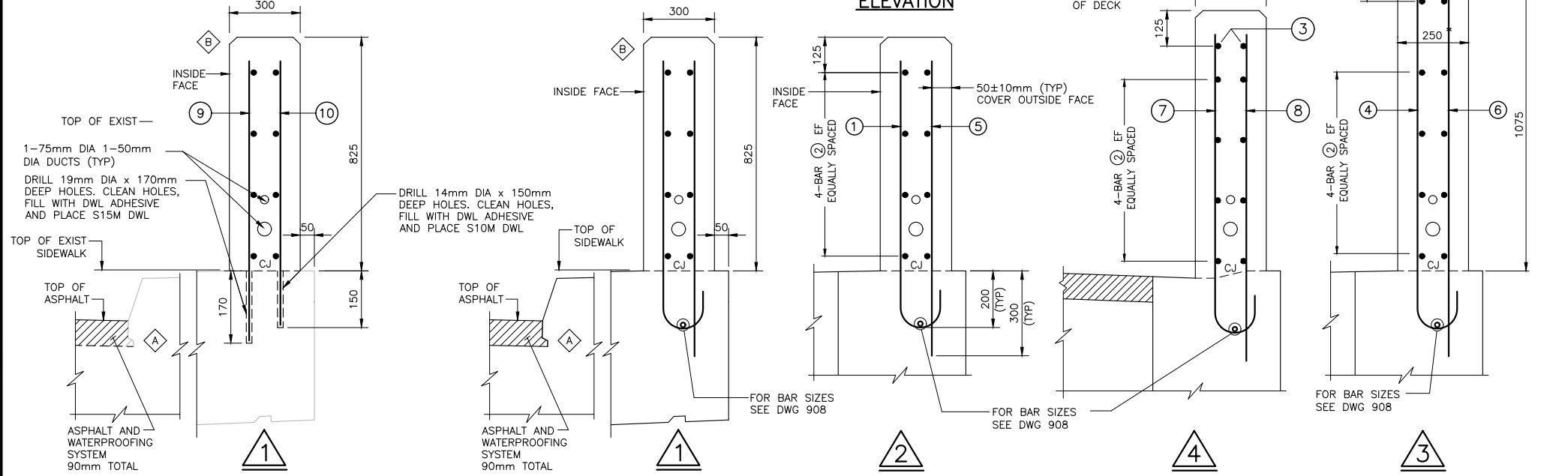
DESIGNED	SUBOOHI OBAID	
DRAWN	PATRICK TSANG	
CHECKED	NINA SHIRAZI	
APPROVED LEAD ENG.	TATIANA OJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



TITLE							
HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 BEARINGS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	909	C

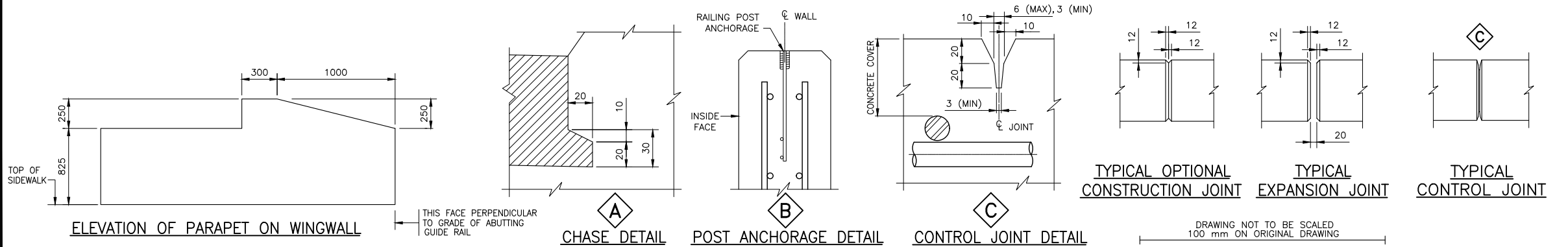
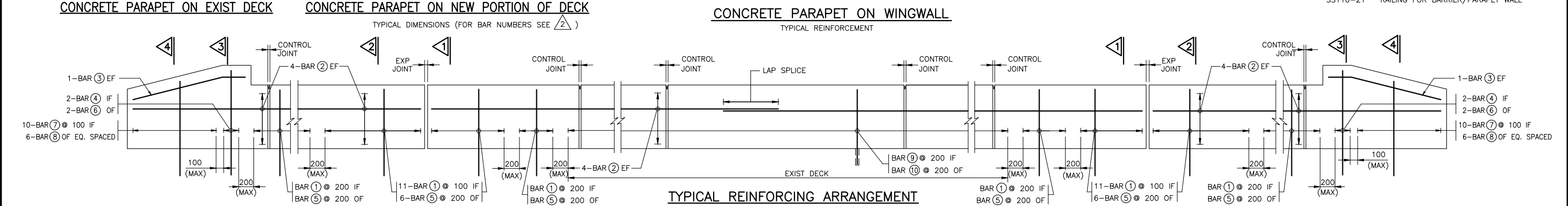


- NOTES:**
1. SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
 2. CONCRETE COVER TO REINFORCING STEEL 60 ±10mm EXCEPT AS NOTED.
 3. REINFORCING STEEL SHALL BE STAINLESS TYPE 316LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500MPa.
 4. BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
 5. MINIMUM BAR LAP SPLICE TO BE 550mm.
 6. LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
 7. CONTROL JOINT TO BE FORMED.
 8. SAWCUTS NOT PERMITTED.
 9. CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
 10. OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
 11. CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
 12. LEGEND: EF - DENOTES EACH FACE
IF - DENOTES INSIDE FACE
OF - DENOTES OUTSIDE FACE
CJ - CONSTRUCTION JOINT



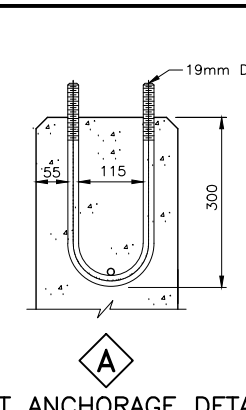
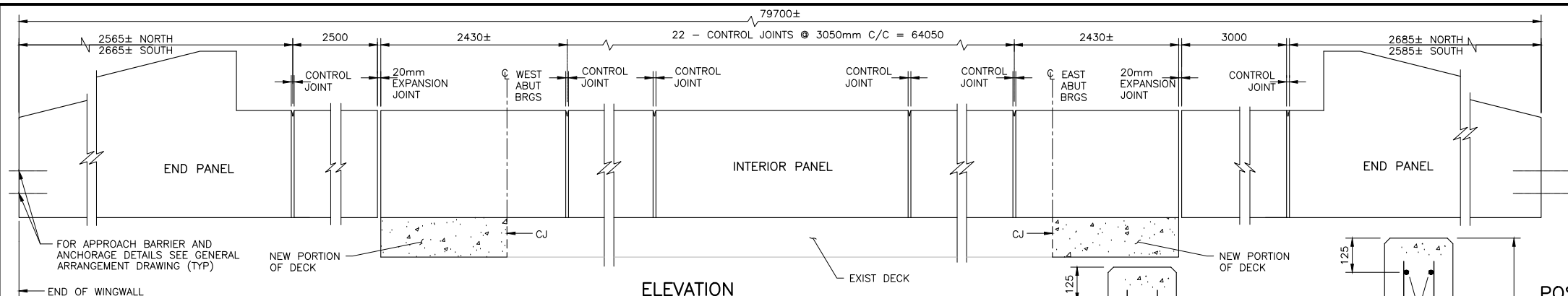
BAR MARK	SIZE	SHAPE
①	S15M	
②	S15M	STRAIGHT
③	S15M	
④	S15M	
⑤	S10M	STRAIGHT
⑥	S10M	STRAIGHT
⑦	S15M	
⑧	S10M	STRAIGHT, LENGTH VARIES
⑨	S15M	STRAIGHT
⑩	S10M	STRAIGHT

APPLICABLE STANDARD DRAWINGS
SS110-21 RAILING FOR BARRIER/PARAPET WALL

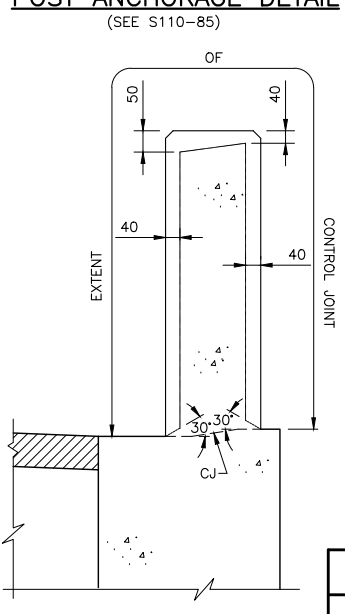
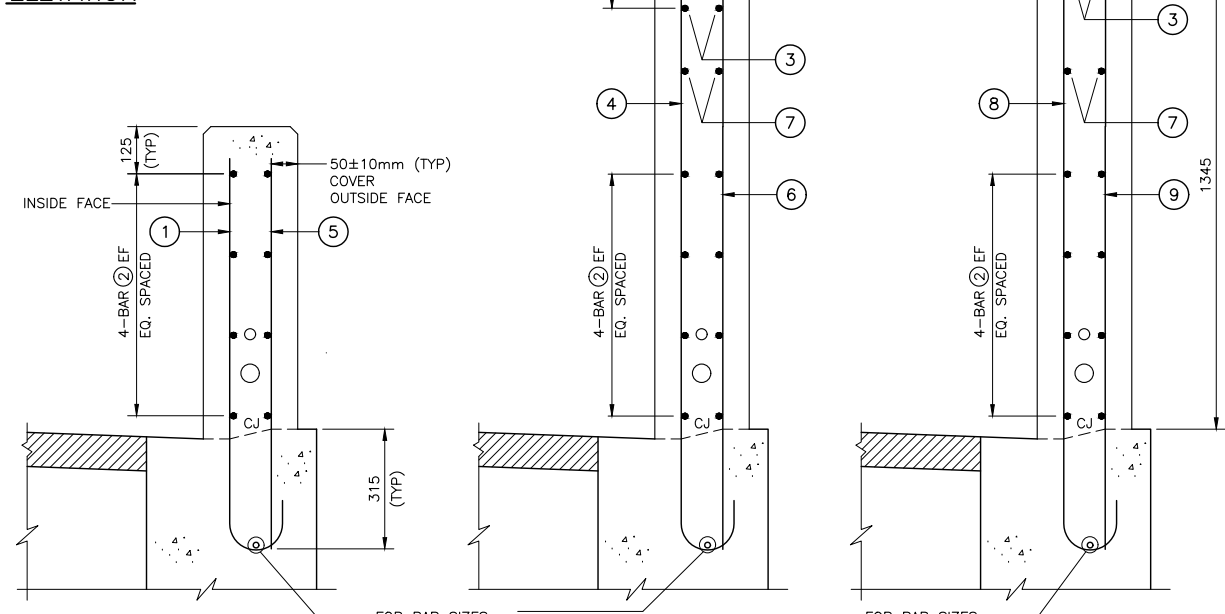
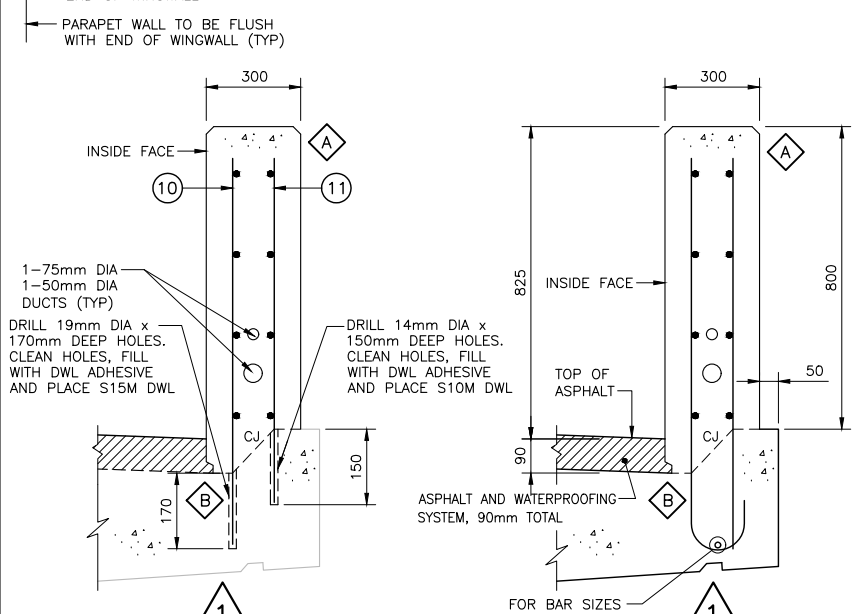


MODIFIED
STANDARD DRAWING
SEPTEMBER 2016
SS110-57
PARAPET WALL WITH RAILING ON SIDEWALK, TL-4
(STAINLESS STEEL REBAR)

CAD FILE LOCATION AND NAME: C:\projects\hwy427\h427-d0-9a-str-609-dwg-910p.mxd MODIFIED: 3/19/2018 10:03:47 AM BY: PANGF DATE PLOTTED: 3/19/2018 12:12:33 PM BY:		SCALE : AS NOTED	DESIGNED: SUBOOHI OBADI DRAWN: PATRICK TSANG CHECKED: NINA SHIRAZI APPROVED LEAD ENG.: TATIANA QJALA APPROVED PROJ. MANAGER:			TITLE HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 PARAPET WALL WITH RAILING ON SIDEWALK TL-4
C 18/03/16 90% SUBMISSION TO CA B 18/01/09 90% SUBMISSION TO CA A 17/10/31 90% SUBMISSION TO CA	REVISIONS BY CHK LEAD DISC. PROJ. MAN.	DATE	NAME (PRINT) INT. DATE	PROJECT ID. H427-D STAGE IDENTIFIER N DESIGN PACKAGE NUMBER 9A DISCIPLINE STR STRUCTURE NUMBER B09 DOCUMENT TYPE DWG DRAWING NUMBER 910 REVISION NUMBER C		



- NOTES:**
1. SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
 2. CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
 3. CONCRETE COVER TO REINFORCING STEEL 60 ±10mm EXCEPT AS NOTED.
 4. REINFORCING STEEL SHALL BE STAINLESS TYPE 316LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500MPa.
 5. BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
 6. MINIMUM BAR LAP SPLICE TO BE 550mm UNLESS OTHERWISE SHOWN.
 7. LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
 8. CONTROL JOINT TO BE FORMED.
 9. SAWCUTS NOT PERMITTED.
 10. CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
 11. OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
- LEGEND:
 EF - DENOTES EACH FACE
 IF - DENOTES INSIDE FACE
 OF - DENOTES OUTSIDE FACE
 CJ - CONSTRUCTION JOINT



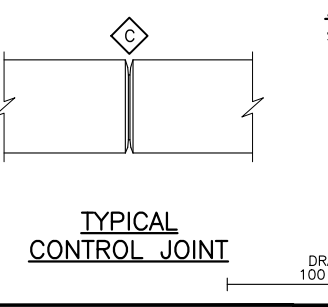
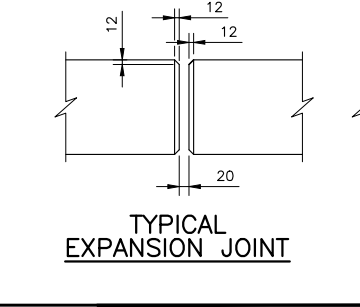
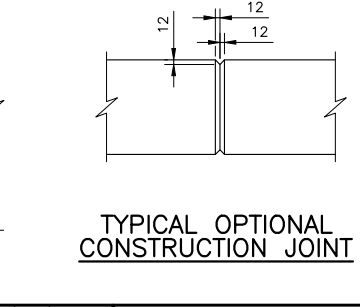
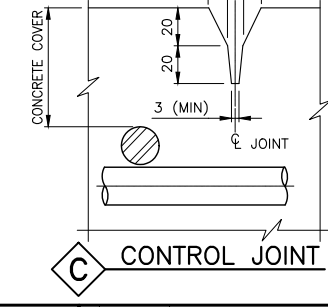
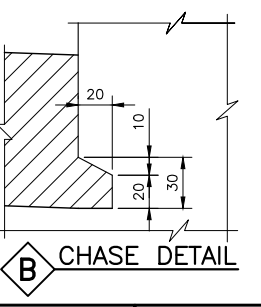
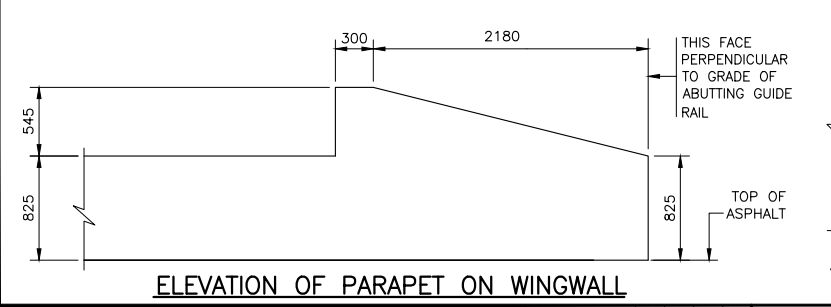
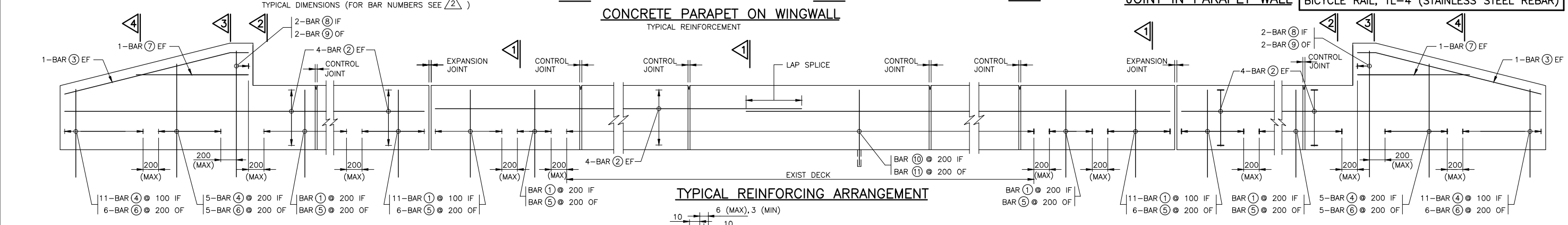
BAR MARK	SIZE	SHAPE
①	S15M	
②	S15M	STRAIGHT
③	S15M	
④	S15M	
⑤	S10M	STRAIGHT
⑥	S10M	STRAIGHT LENGTH VARIES
⑦	S15M	STRAIGHT
⑧	S15M	
⑨	S10M	STRAIGHT
⑩	S15M	STRAIGHT
⑪	S10M	STRAIGHT

CONCRETE PARAPET ON EXIST DECK (1) CONCRETE PARAPET ON NEW PORTION OF DECK (2)

CONCRETE PARAPET ON WINGWALL (4)

EXTENT OF CONTROL JOINT IN PARAPET WALL

MODIFIED
 STANDARD DRAWING SEPTEMBER 2016 **SS110-82**
 PARAPET WALL FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4 (STAINLESS STEEL REBAR)



- APPLICABLE STANDARD DRAWINGS:**
- SS110-85 RAILING ON PARAPET/BARRIER FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4

SCALE : AS NOTED

DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

DESIGNED	SUBOOHI OBAID
DRAWN	PATRICK TSANG
CHECKED	NINA SHIRAZI
APPROVED LEAD ENG.	TATIANA QJALA
APPROVED PROJ. MANAGER	

NAME (PRINT)	INIT.	DATE



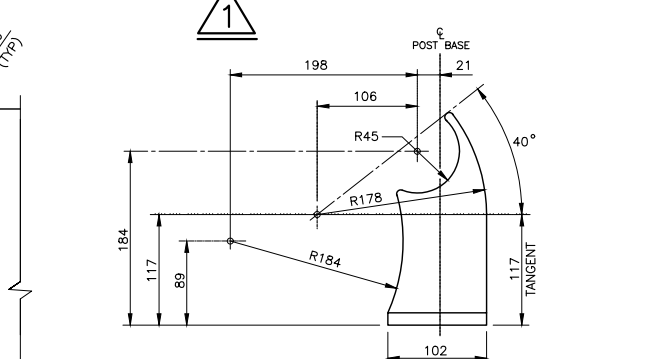
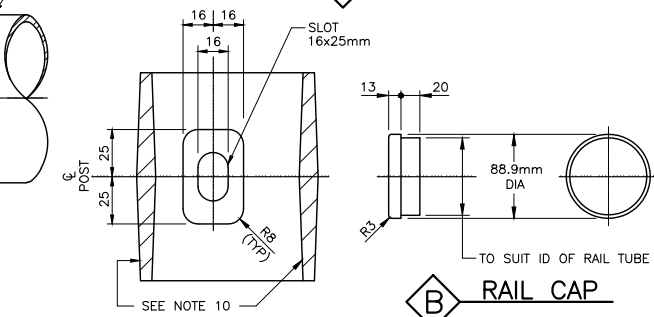
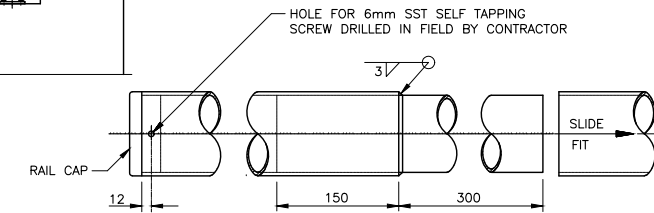
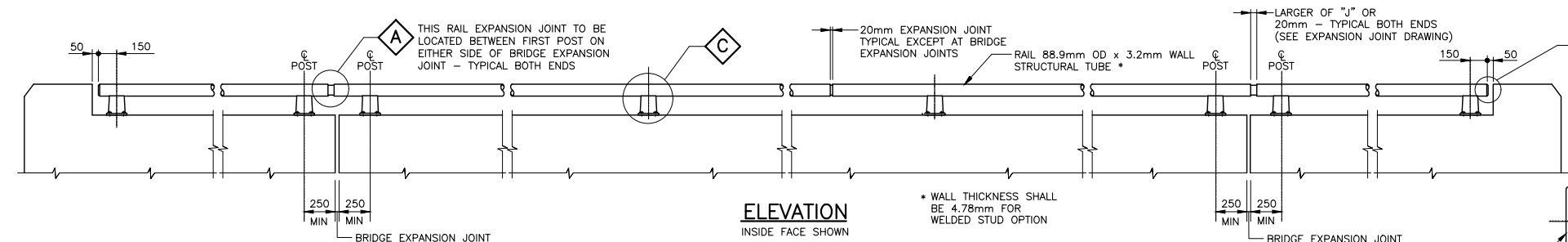
HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330

PARAPET WALL FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4

PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	911	C

CAD FILE LOCATION AND NAME: C:\projects\hwy427\h427-d0-9a-str-609-dwg-911.dwg
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 DATE PLOTTED: 3/19/2018 12:12:38 PM BY:

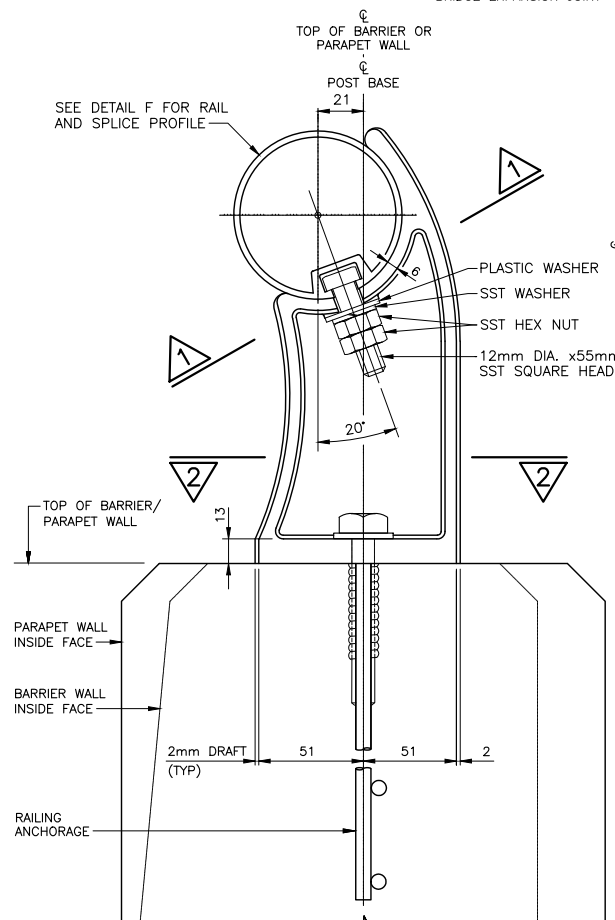
DRAWING NOT TO BE SCALED
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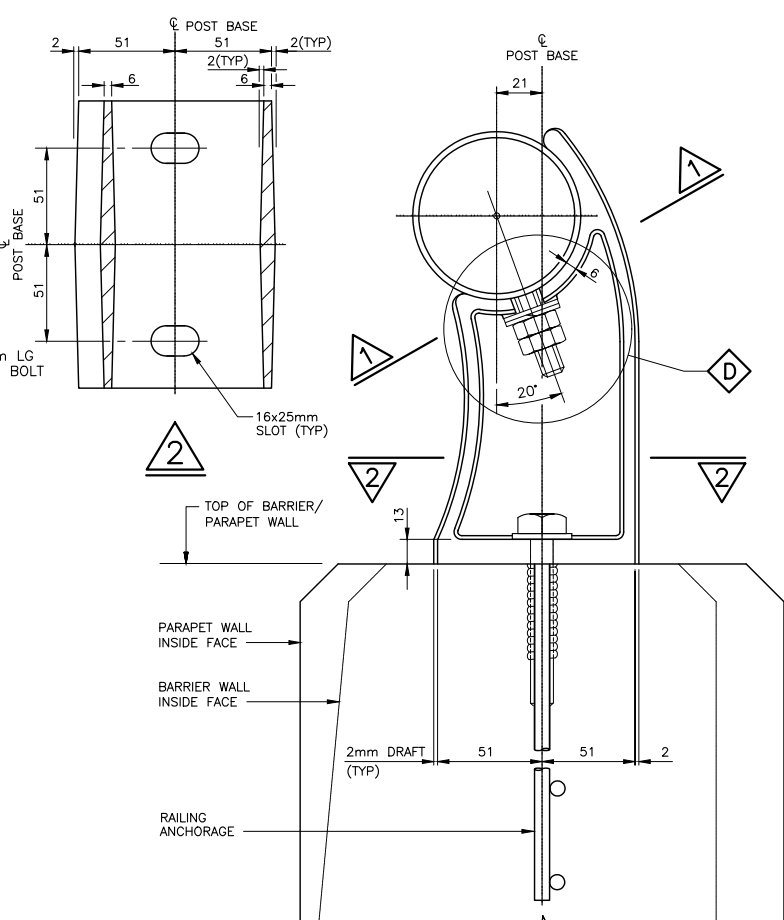
POST DETAILS

POST* SPACING FOR STEEL RAIL	MAXIMUM 3500mm
POST* SPACING FOR ALUMINUM RAIL	2500mm

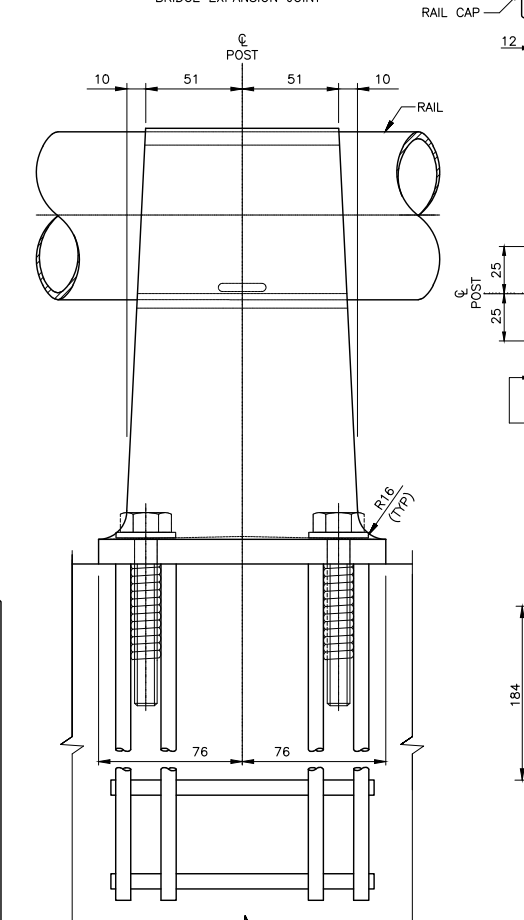
* POSTS MAY BE STEEL OR ALUMINUM



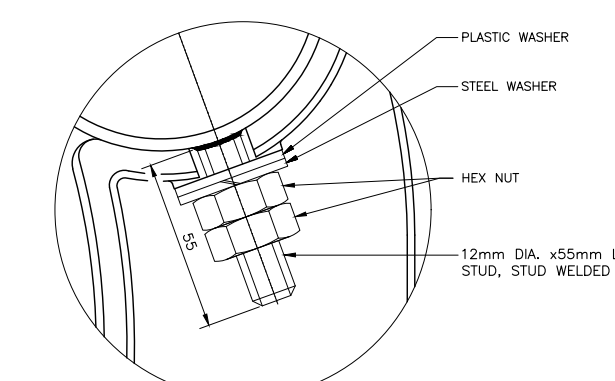
TYPICAL CROSS SECTION ALUMINUM RAIL OPTION



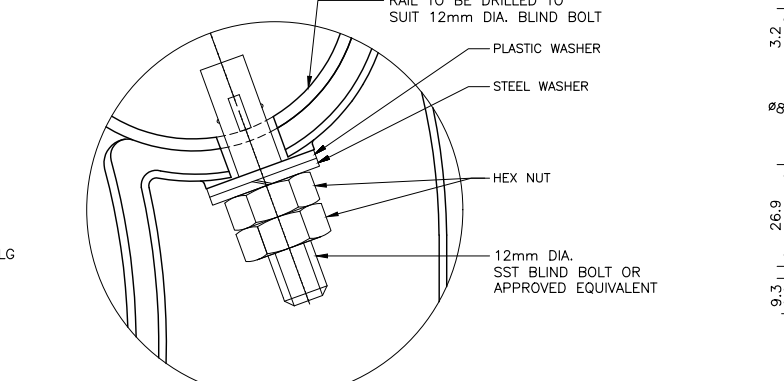
TYPICAL CROSS SECTION STEEL RAIL OPTION



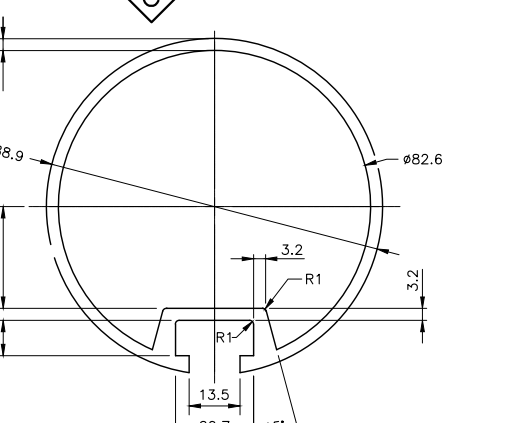
BACK VIEW



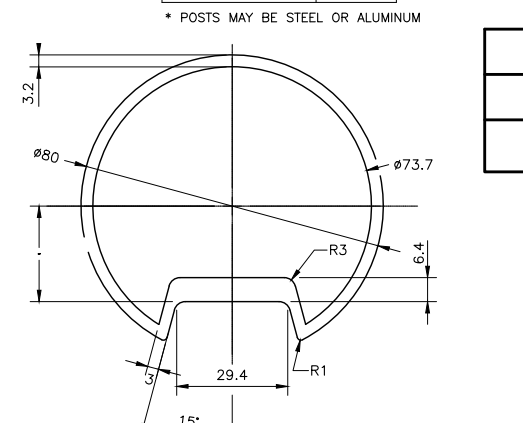
DETAIL FULL-THREADED WELDED STUD (FOR ALTERNATIVE SEE E)



DETAIL BLIND BOLT



RAIL PROFILE



DETAIL SPLICE PROFILE EXTRUDED ALUMINUM RAIL

- NOTES:**
- ALL NON-STAINLESS STEEL BOLT, NUT AND WASHER FOR FASTENING STEEL RAIL TO POSTS SHALL BE HOT-DIP GALVANIZED.
 - ALL WELDED STUDS OR BLIND BOLTS OR SQUARE HEAD BOLTS SHALL BE INSTALLED AT THE MIDDLE OF THE SLOT AND SHALL BE TIGHTENED TO A CONDITION THAT WILL ALLOW RAIL MOVEMENT.
 - RAILS SHALL BE SUPPLIED IN LENGTHS TO BE ATTACHED TO A MINIMUM OF THREE (3) POSTS EXCEPT WHEN THE WINGWALL LENGTH OF A BRIDGE WITH EXPANSION JOINTS DOES NOT PERMIT THIS. IN THIS CASE, THE RAIL LENGTH CAN BE ATTACHED TO TWO (2) POSTS ON THE WINGWALL.
 - POST AND ANCHORAGES TO INCLUDE ALL BOLTS AND WASHERS.
 - RAILING ANCHORAGE TO BE PLACED PRIOR TO CONCRETING.
 - RAIL SHALL BE PRESENT TO FOLLOW ROAD CURVATURE WHERE RADIUS IS LESS THAN 150m.
 - RAIL POSTS SHALL BE SET PERPENDICULAR TO GRADE.
 - WHERE LAYOUT OF POSTS IS NOT SHOWN, POST LOCATION SHALL BE DETERMINED BY THE CONTRACTOR.
 - WHEN CONNECTING TO EXISTING RAILING, RAIL MUST BE MADE CONTINUOUS AND POST SPACING DETERMINED WITH REFERENCE TO EXISTING POSTS.
 - THE COMBINATION OF STEEL RAIL AND ALUMINUM POSTS IS PERMITTED.
 - WHEN AN EXTRUDED POST IS USED, THE ALLOY SHALL BE 6061 ALLOY T-6 HEAT TREATED. THE POST DIMENSIONS SHALL NOT BE SMALLER THAN THE DETAILS SHOWN IN THE DRAWING. WALLS OF EXTRUDED POST ARE NOT TAPERED AND SHALL HAVE A UNIFORM THICKNESS OF 8mm MINIMUM.
 - WHEN A CAST POST IS USED THE ALLOY SHALL BE A444.0-T4.
 - RAIL CAP MATERIAL SHALL BE STEEL OR ALUMINUM. RAIL CAP CAN BE SAND CAST 356 ALUMINUM ALLOY. RAIL CAP TO INCLUDE SST SELF TAPPING FASTENERS.

- NOTES FOR STEEL RAIL OPTION:**
- RAIL SHALL BE STRUCTURAL TUBING GRADE 350W.
 - STEEL IN POST SHALL BE CAST STEEL SUPPLIED IN ACCORDANCE WITH ASTM A27/A27M-08 GRADE 65-35.
 - GALVANIZE RAIL TUBING MATING SURFACES TO HAVE A 2 ±0.5mm GAP ALL ROUND TO ENSURE A SLIDE FIT.
 - FULL THREAD STUDS, WASHERS AND NUTS FOR FASTENING RAIL TO POST SHALL CONFORM TO ASTM A108.
 - POSTS AND RAILS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
 - RAIL MAY BE CUT AS REQUIRED IN FIELD WITH PIPE CUTTERS, CUT TO BE REPAIRED AS SPECIFIED IN OPSS 908.

- NOTES FOR ALUMINUM RAIL OPTION:**
- ALUMINUM RAIL SHALL BE 6061 ALLOY T-6 HEAT TREATED.
 - STAINLESS STEEL BOLTS, WASHERS AND LOCK NUTS SHALL BE TYPE 304 ACCORDING TO ASTM A314.

LEGEND:
SST - STAINLESS STEEL

APPLICABLE STANDARD DRAWINGS
OPSD 3419.150 BARRIERS AND RAILINGS - STEEL SINGLE RAILING ANCHORAGE

MODIFIED	
STANDARD DRAWING MARCH 2015	SS110-21
RAILING FOR BARRIER/PARAPET WALL	

DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

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DATE PLOTTED: 3/19/2018 12:12:43 PM BY:

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C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE :
AS NOTED

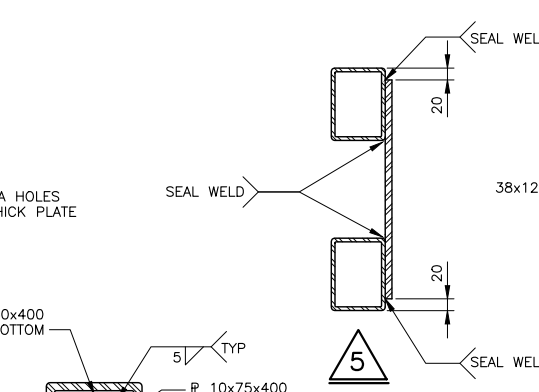
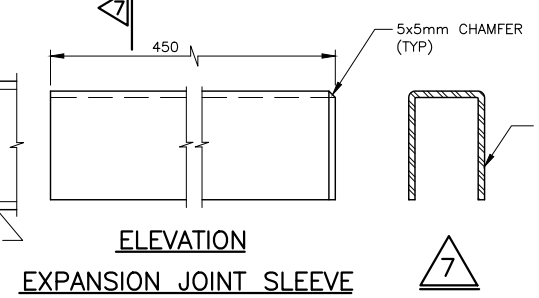
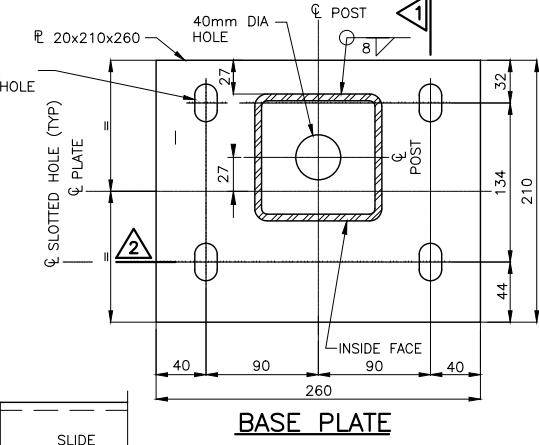
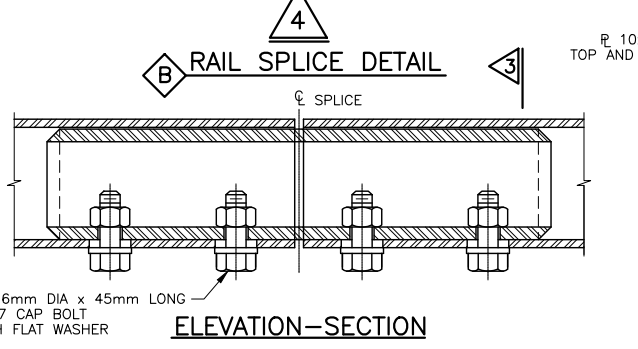
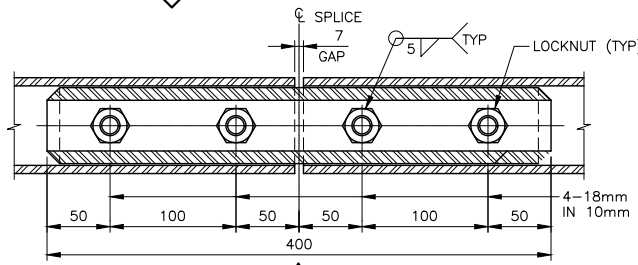
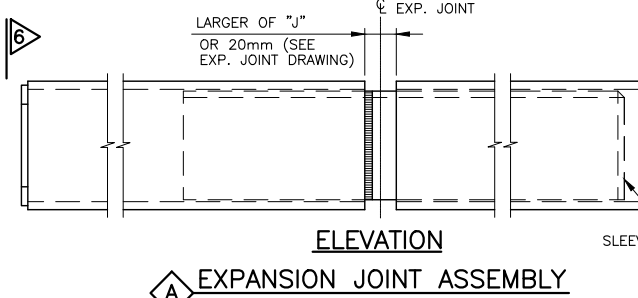
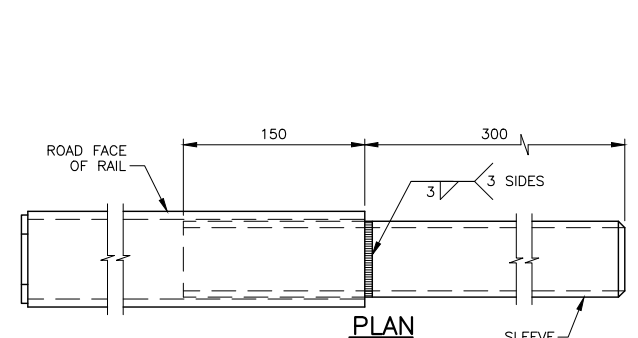
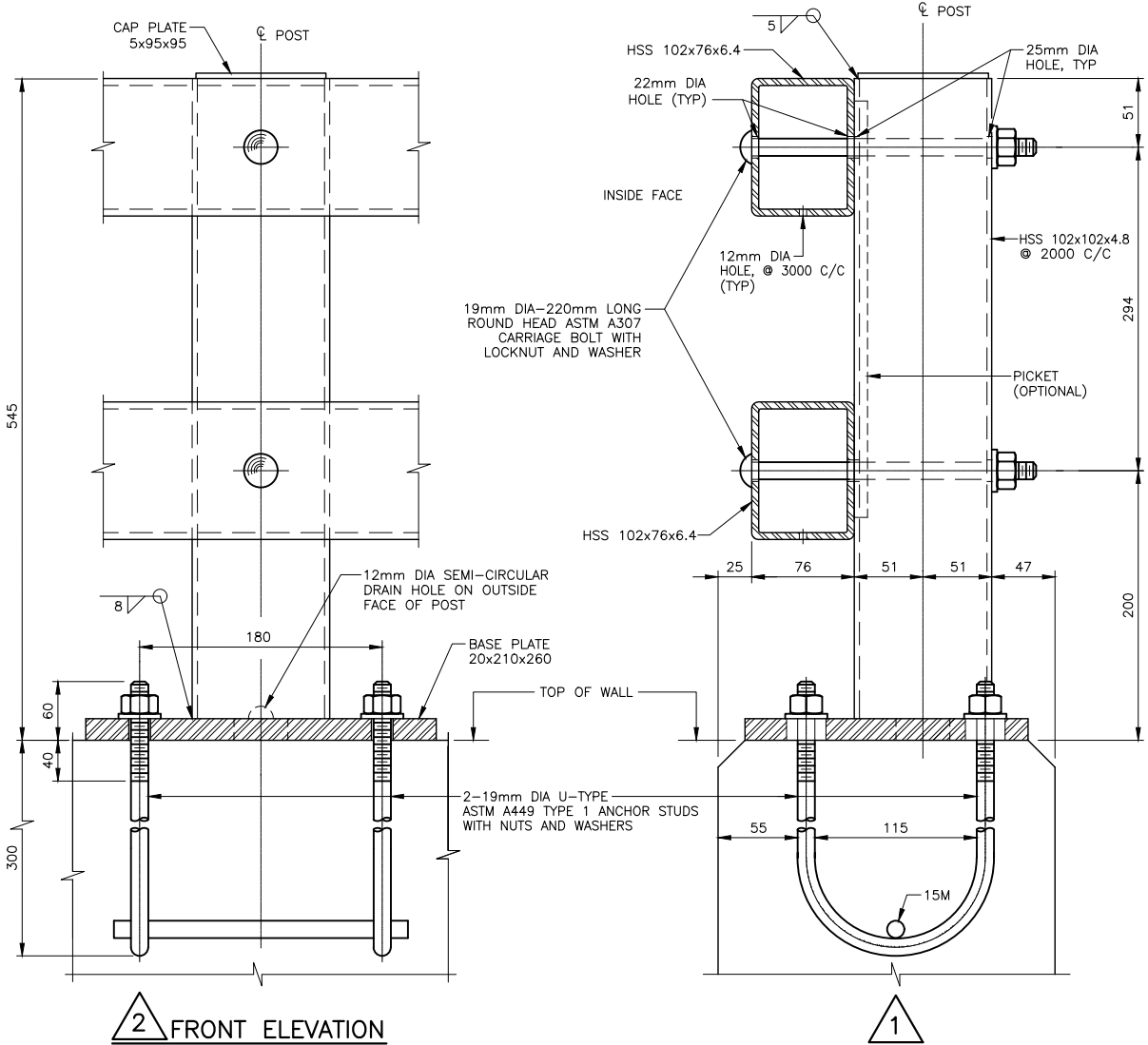
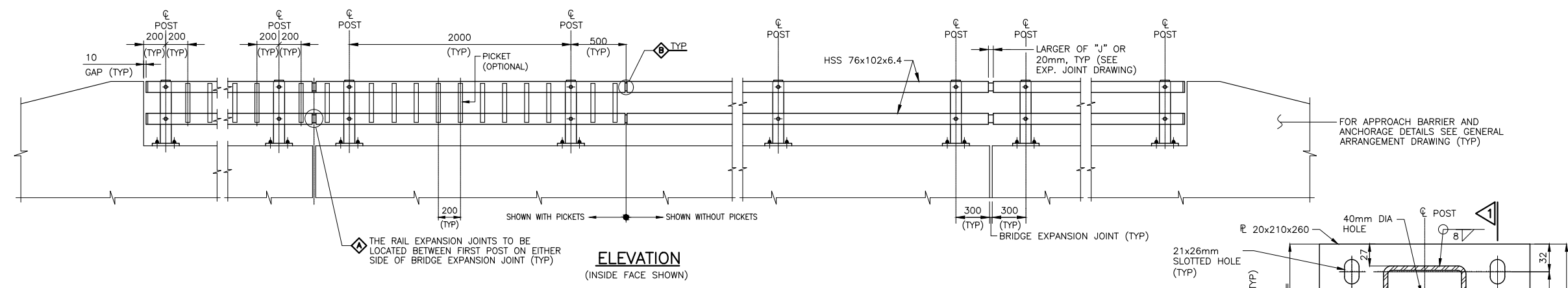
DESIGNED	SUBOOHI OBAID
DRAWN	PATRICK TSANG
CHECKED	NINA SHIRAZI
APPROVED LEAD ENG.	TATIANA QJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INIT. DATE



HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 RAILING FOR PARAPET WALL							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	912	C

- NOTES:**
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING 911.
 - RAIL ELEMENTS AND POSTS SHALL BE HOLLOW STRUCTURAL SECTIONS GRADE 350W, CLASS C.
 - STEEL PLATES SHALL BE GRADE 350W.
 - ANCHOR STUDS, WASHERS AND NUTS SHALL BE ACCORDING TO ASTM A449.
 - BOLTS, WASHERS AND NUTS FOR FASTENING GUIDE RAILS TO POST SHALL CONFORM TO ASTM A307.
 - RAIL SHALL BE SUPPLIED IN LENGTHS TO BE ATTACHED TO A MINIMUM OF THREE (3) POSTS EXCEPT WHEN THE WINGWALL LENGTH OF A BRIDGE WITH EXPANSION JOINTS DOES NOT PERMIT THIS. IN THIS CASE, THE RAIL LENGTH SHALL BE ATTACHED TO TWO (2) POSTS ON THE WINGWALL.
 - GALVANIZING ON MATING SURFACES OF RAILS TO HAVE UNIFORM THICKNESS NOT EXCEEDING 0.15 mm TO ENSURE SLIDING FIT.
 - RAIL, POSTS AND RAIL SPLICES SHALL BE HOT DIP GALVANIZED. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION.
 - BOLTS, ANCHOR STUDS, PLATES, WASHERS AND NUTS SHALL BE HOT DIP GALVANIZED. LOCKNUTS SHALL BE ZINC PLATED ACCORDING TO ASTM-B695.
 - RAILS SHALL BE PREBENT TO FOLLOW ROAD CURVATURE WHERE RADIUS IS LESS THAN 150 METRES.
 - RAIL POSTS SHALL BE SET PERPENDICULAR TO GRADE.
 - RAIL MAY BE CUT AS REQUIRED IN FIELD. CUT TO BE SURFACE TREATED WITH A ZINC TOUCH-UP SOLDER, GALVAGUARD OR APPROVED EQUIVALENT.
 - WHEN CONNECTING TO EXISTING RAILING, RAIL MUST BE MADE CONTINUOUS AND POST SPACING DETERMINED WITH REFERENCE TO EXISTING POSTS.
 - GROUT SHALL NOT BE USED UNDER BASE PLATES. THIN PAD OF OF EPOXY GROUT MAY BE USED WHEN REQUIRED FOR FILLING THE VOIDS UNDER THE BASE PLATE.
 - BOLTS IN RAIL SPLICES SHALL BE TIGHTENED TO A CONDITION THAT WILL ALLOW RAIL MOVEMENT.
 - HOLES FOR HSS RAILING SHALL BE DRILLED IN FIELD.
 - POST ANCHORING NUTS SHALL BE TIGHTENED TO A SNUG FIT CONDITION AND GIVEN AN ADDITIONAL 1/3 OF A TURN.

- ADDITIONAL NOTES FOR PICKET:**
- PICKET SHALL BE 38x12 STEEL BAR GRADE 300W.
 - HOT DIP GALVANIZING OF RAILING SHALL BE AFTER ADDITION OF PICKETS.



MODIFIED
STANDARD DRAWING SEPTEMBER 2016
SS110-85
RAILING ON PARAPET FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4

DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

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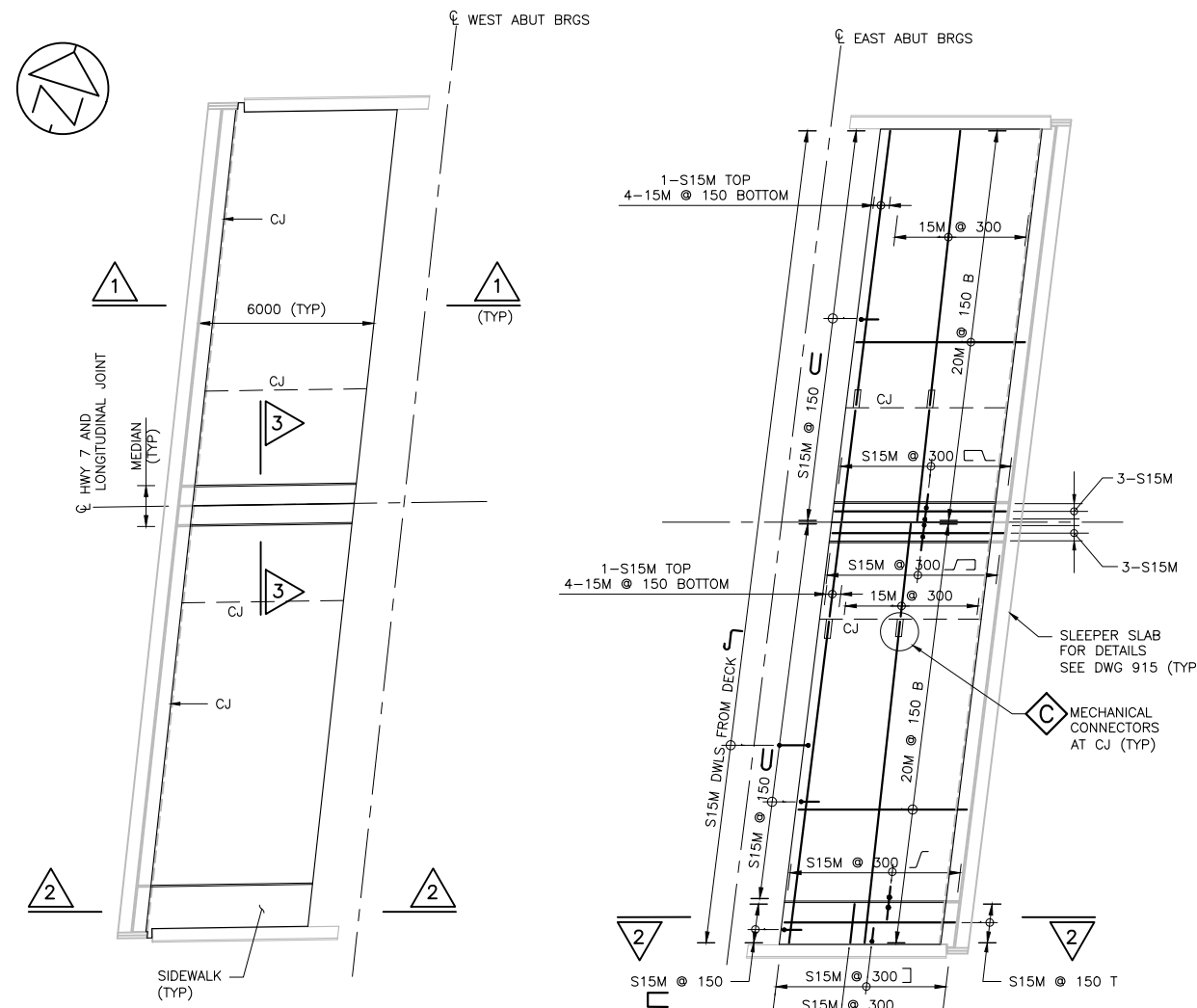
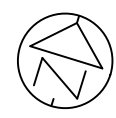
DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
C	18/03/16	90% SUBMISSION TO CA			
B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

SCALE :
AS NOTED

DESIGNED	DRAWN	CHECKED	APPROVED LEAD ENG.	APPROVED PROJ. MANAGER
SUBOOHI OBAID	PATRICK TSANG	NINA SHIRAZI	TATIANA OJALA	
NAME (PRINT)	INIT.	DATE		

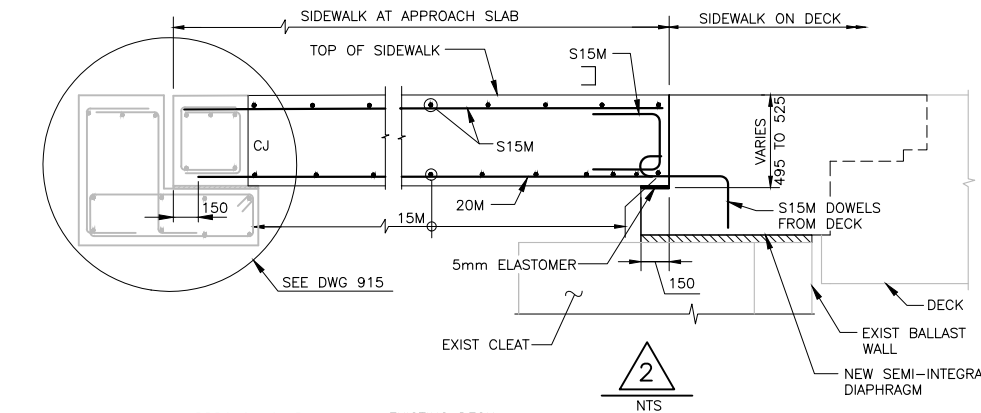


TITLE							
HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330							
RAILING ON PARAPET WALL FOR COMBINATION TRAFFIC/BICYCLE							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	913	C

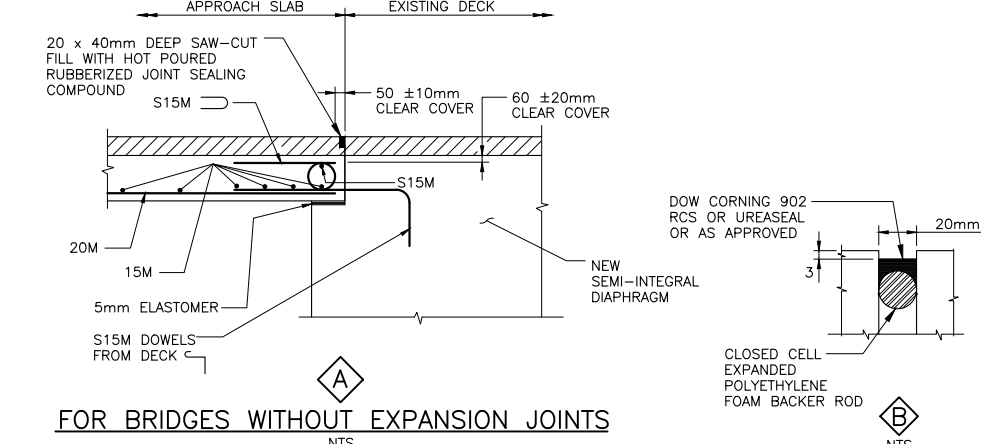


1. REINFORCING SHOWN FOR EAST APPROACH SLAB
REINFORCING FOR WEST APPROACH SLAB SIMILAR
2. TOP OF CONCRETE TO SUIT FINISHED GRADE
AFTER REHABILITATION

PLAN
1:125

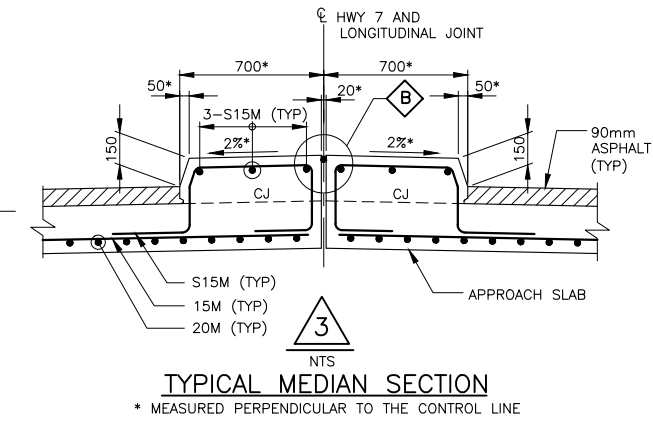


2
NTS



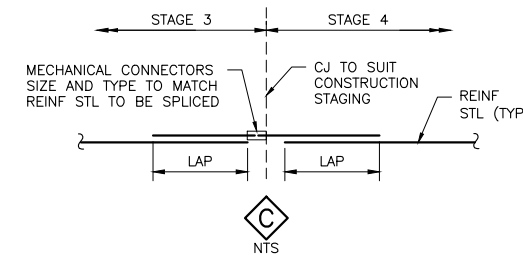
A
NTS

FOR BRIDGES WITHOUT EXPANSION JOINTS



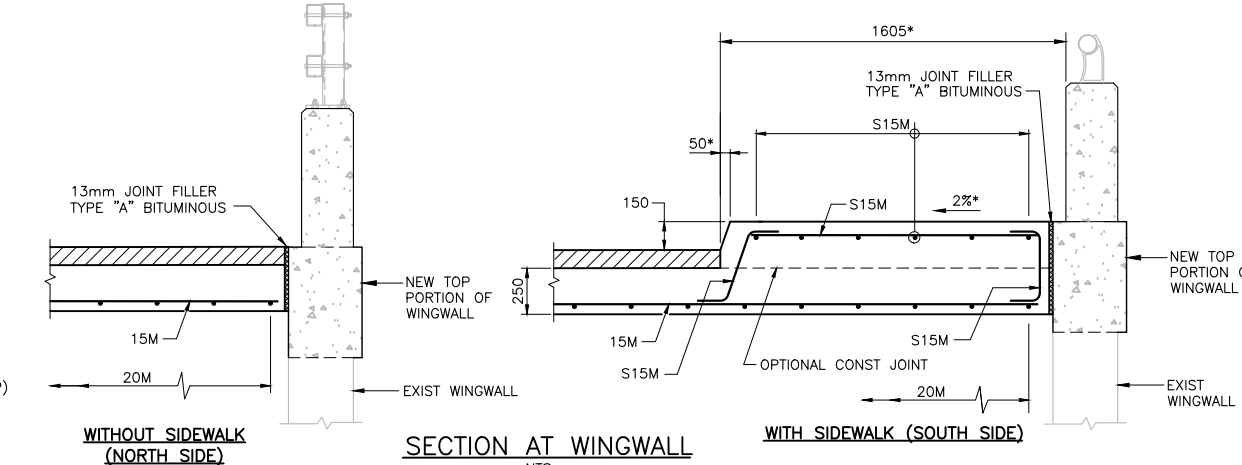
3
NTS

TYPICAL MEDIAN SECTION
* MEASURED PERPENDICULAR TO THE CONTROL LINE



C
NTS

PROVIDE MECHANICAL CONNECTORS AT CJ FOR ALL TRANSVERSE REINF STL

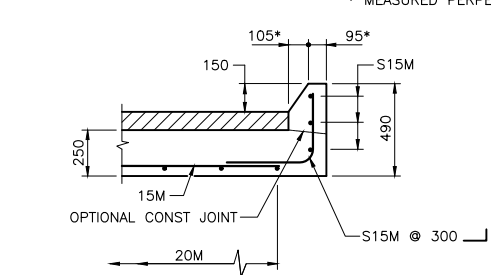


WITHOUT SIDEWALK
(NORTH SIDE)

SECTION AT WINGWALL

WITH SIDEWALK (SOUTH SIDE)

* MEASURED PERPENDICULAR TO THE CONTROL LINE

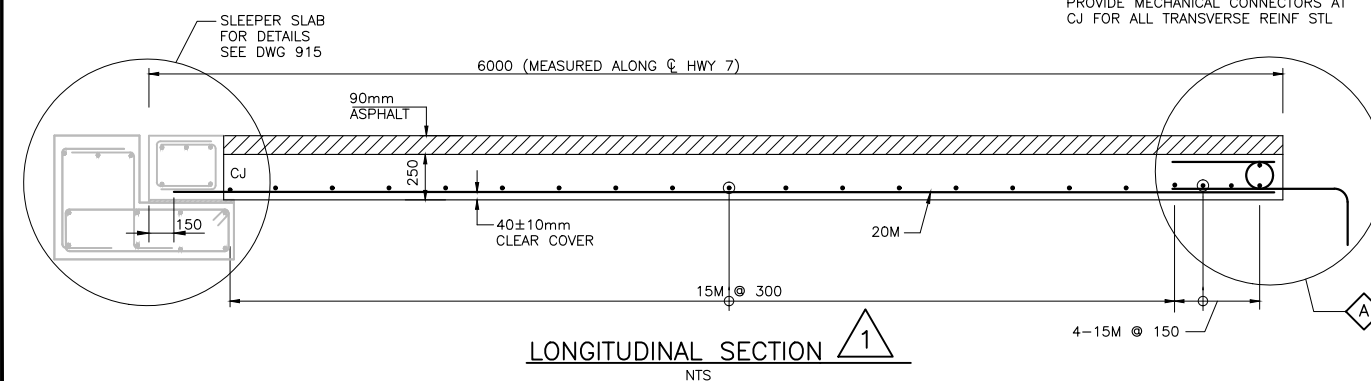


WITHOUT SIDEWALK
(NORTH WEST SIDE ONLY)

SECTION BEYOND WINGWALL

WITH SIDEWALK
(SOUTH WEST SIDE ONLY)

* MEASURED PERPENDICULAR TO THE CONTROL LINE



LONGITUDINAL SECTION
NTS

- NOTES:
1. CLEAR COVER TO REINFORCING STEEL 70 ± 20 mm EXCEPT AS NOTED.
 2. LAYOUT OF REINFORCING STEEL WILL BE SIMILAR FOR LEFT HAND AND ZERO DEGREE SKEW.
 3. STAINLESS STEEL BARS SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPA. REINFORCING STEEL SHALL BE GRADE 400W.
 4. WATERPROOFING AT JOINT BETWEEN BRIDGE AND APPROACH SLAB TO BE IN ACCORDANCE WITH OPSD-3370.1000.
 5. WATERPROOFING FOR BRIDGES WITHOUT EXPANSION JOINTS (RIGID FRAMES AND INTEGRAL ABUTMENTS) TO BE IN ACCORDANCE WITH OPSD-3370.1010.
 6. BARS MARK WITH PREFIX S DENOTE STAINLESS STEEL BARS.

- APPLICABLE STANDARD DRAWINGS
- | | |
|---------------|---|
| OPSD-3370.100 | DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD |
| OPSD-3370.101 | DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS |

CAD FILE LOCATION AND NAME: C:\projects\wise\wsp-co\wsp-co\projects\wise\wsp-co\H427-D0-9A-STR-B09-DWG-914.dwg
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 DATE PLOTTED: 3/19/2018 12:25:54 PM BY:

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B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

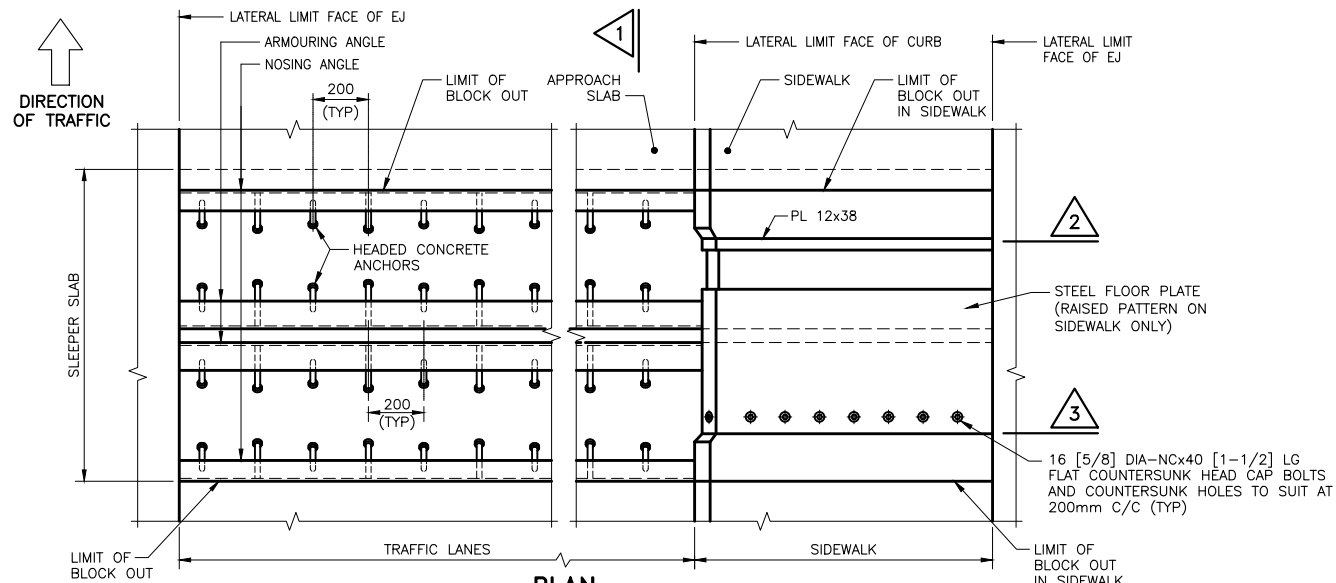
SCALE :
AS NOTED

DESIGNED	SUBOOHI OBAID
DRAWN	PATRICK TSANG
CHECKED	NINA SHIRAZI
APPROVED LEAD ENG.	TATIANA QJALA
APPROVED PROJ. MANAGER	

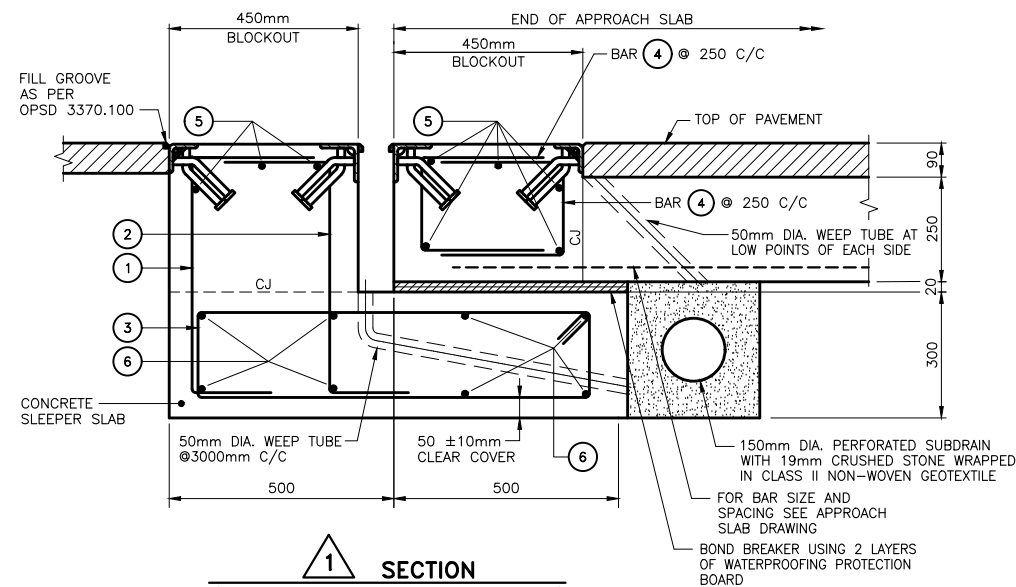


MODIFIED	
STANDARD DRAWING MARCH 2016	SS116-1
6000 mm APPROACH SLAB	

HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 6000mm APPROACH SLAB							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	914	C



PLAN
(FOR EJ AND ASSEMBLY DETAILS SEE SS113-19)

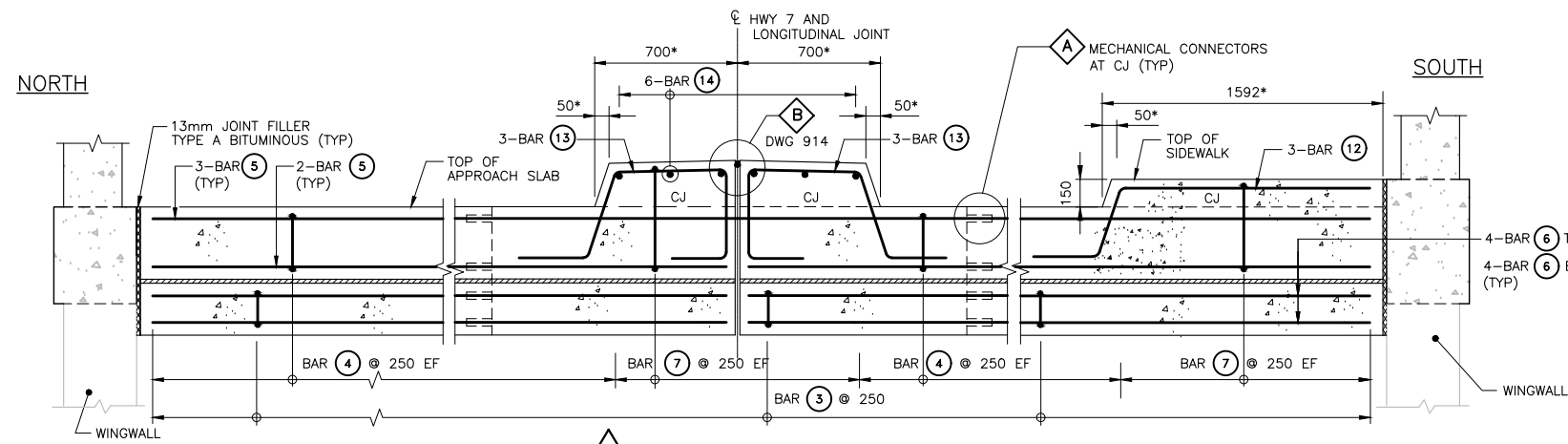


SECTION 1
(EXPANSION JOINT SEAL NOT SHOWN)

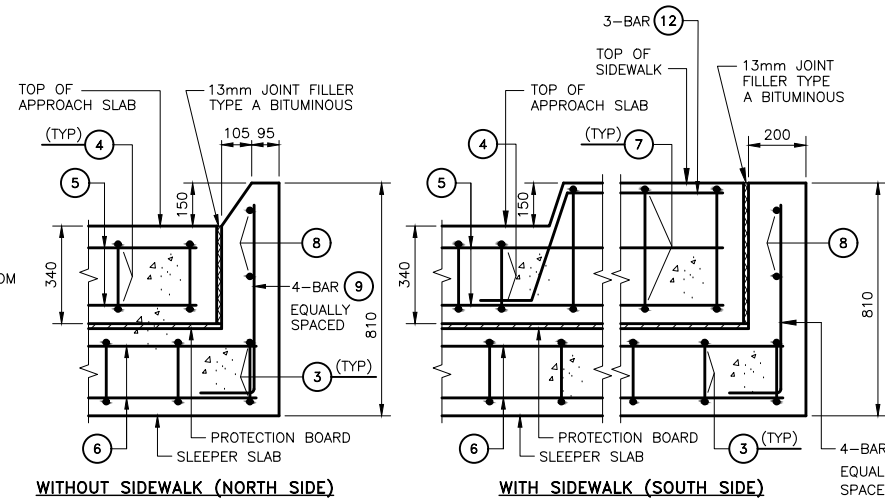
- NOTES:**
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 914 AND 916.
 - CLASS OF CONCRETE TO BE 30MPa.
 - REINFORCEMENT STEEL SHALL BE GRADE 400W. STAINLESS STEEL SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPA. BARS MARKED WITH PREFIX S DENOTE STAINLESS STEEL BARS.
 - COVER TO REINFORCING STEEL 70 ± 20mm EXCEPT AS NOTED.
 - FOR SKEWED STRUCTURE, WORKING DRAWING SHALL BE DETAILED TO SUIT GEOMETRY OF STRUCTURE.

- LEGEND:**
- [] - DENOTED FASTENER SIZE IN INCHES
 - EJ - DENOTED EXPANSION JOINT
 - CJ - DENOTED CONSTRUCTION JOINT

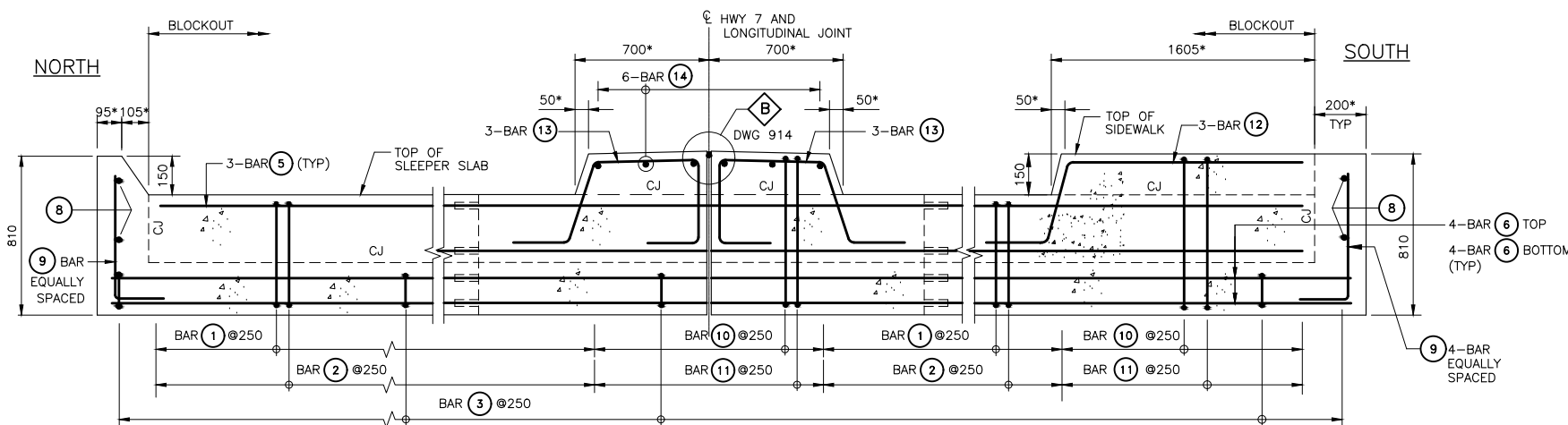
BAR MARK	SIZE	SHAPE
1	S15M	310 520 180
2	S15M	300 520 180
3	15M	160 860
4	S15M	200 310
5	S15M	STRAIGHT
6	15M	STRAIGHT
7	S15M	350 310
8	S15M	STRAIGHT
9	S15M	180 670
10	S15M	310 670 180
11	S15M	300 670 180
12	S15M	STRAIGHT
13	S15M	STRAIGHT
14	S15M	STRAIGHT



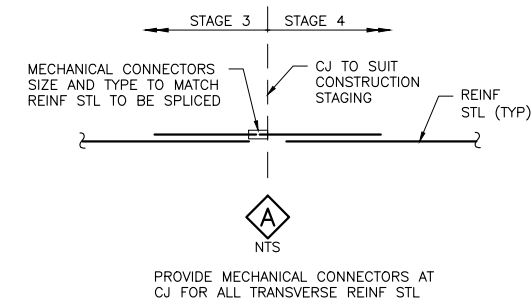
SECTION 2
SECTION AT WINGWALL (EAST APPROACH SLAB ONLY)
(ARMOURING DETAIL NOT SHOWN FOR CLARITY)



SECTION 2
SECTION BEYOND WINGWALL



SECTION 3
SECTION BEYOND WINGWALL
(ARMOURING DETAIL NOT SHOWN FOR CLARITY)



SECTION 3
SECTION BEYOND WINGWALL

MODIFIED	
STANDARD DRAWING SEPTEMBER 2016	SS113-37
EXPANSION JOINT AND SLEEPER SLAB FOR INTEGRAL AND SEMI-INTEGRAL ABUTMENT BRIDGES (10mm < MOVEMENT < 40mm)	



SECTION 3
SECTION BEYOND WINGWALL

CAD FILE LOCATION AND NAME: C:\projects\ss113-37\H427-D0-9A-STR-009-DWG-915.dwg
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 DATE PLOTTED: 3/19/2018 12:13:00 PM BY:

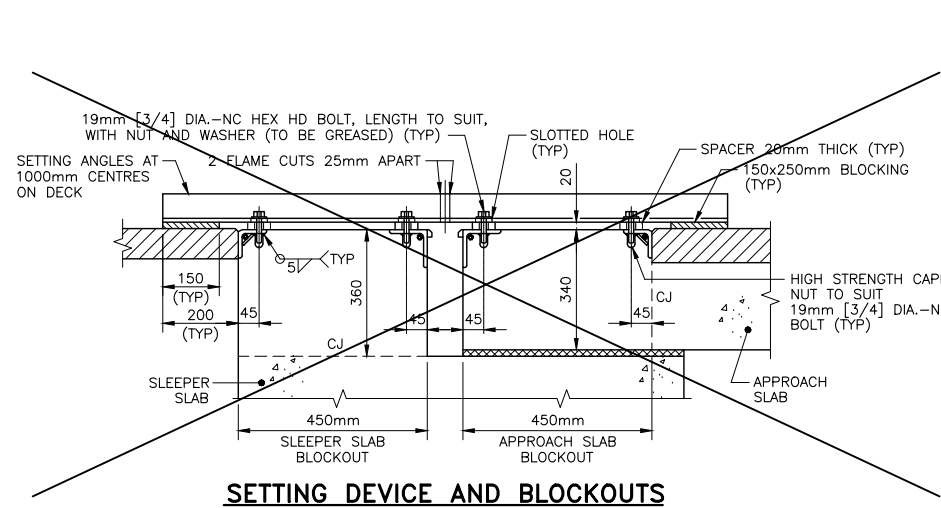
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C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE :
AS NOTED

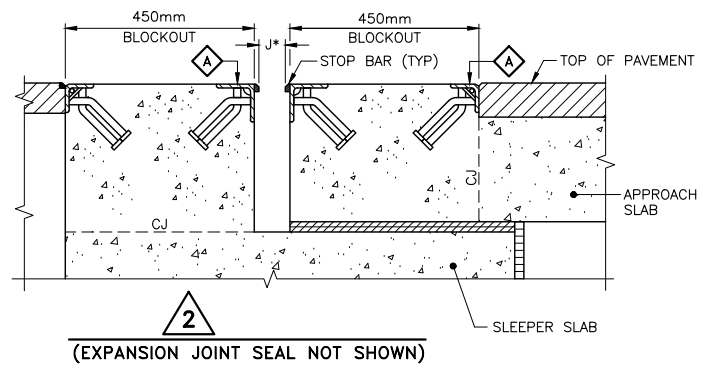
DESIGNED	SUBOOHI OBAID	
DRAWN	PATRICK TSANG	
CHECKED	NINA SHIRAZI	
APPROVED LEAD ENG.	TATIANA QJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



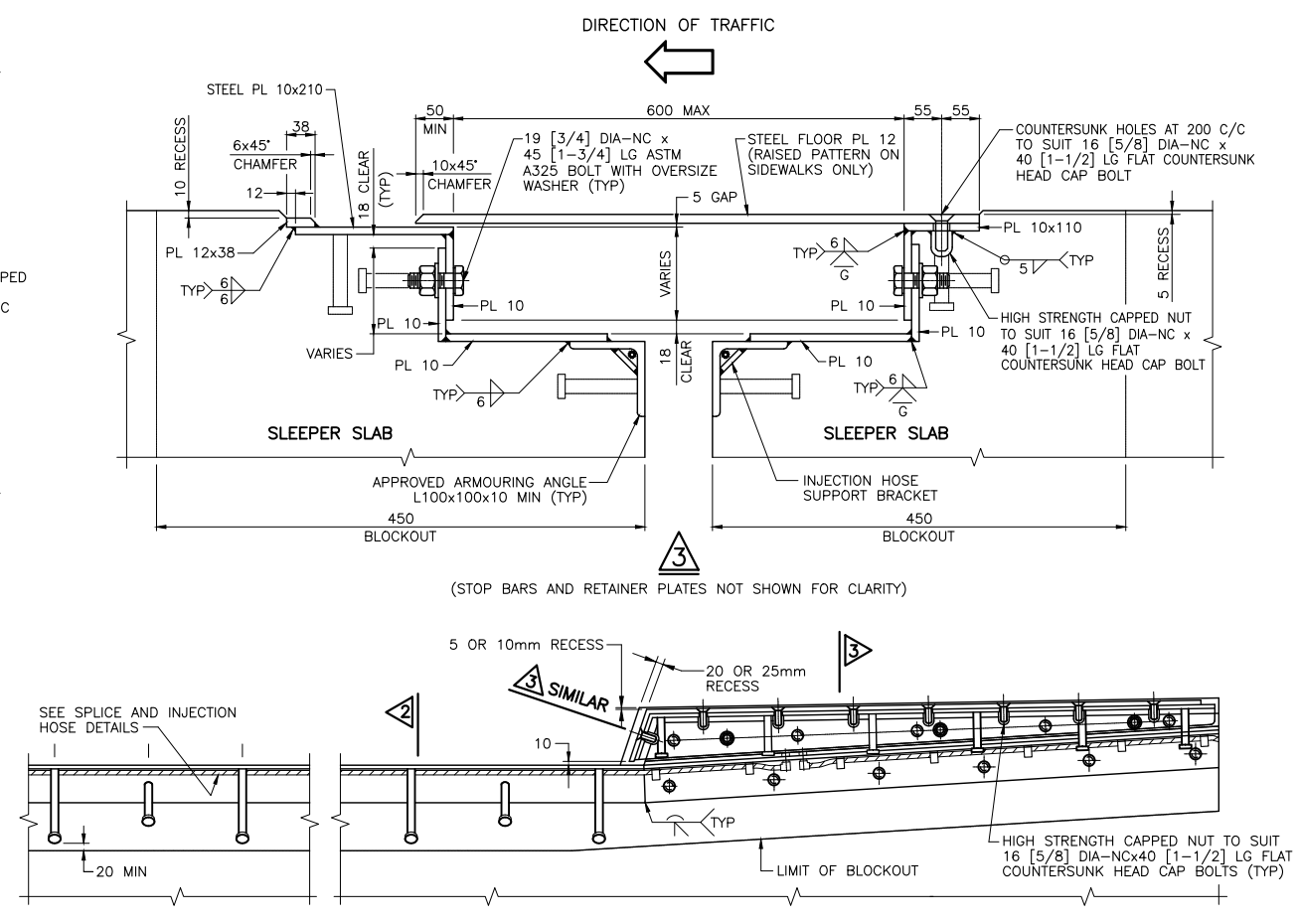
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HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 EXPANSION JOINT AND SLEEPER SLAB							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
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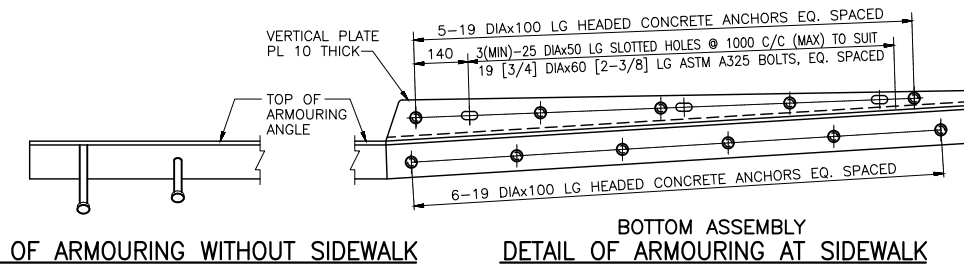
SETTING DEVICE AND BLOCKOUTS



SECTION AT EXPANSION JOINT

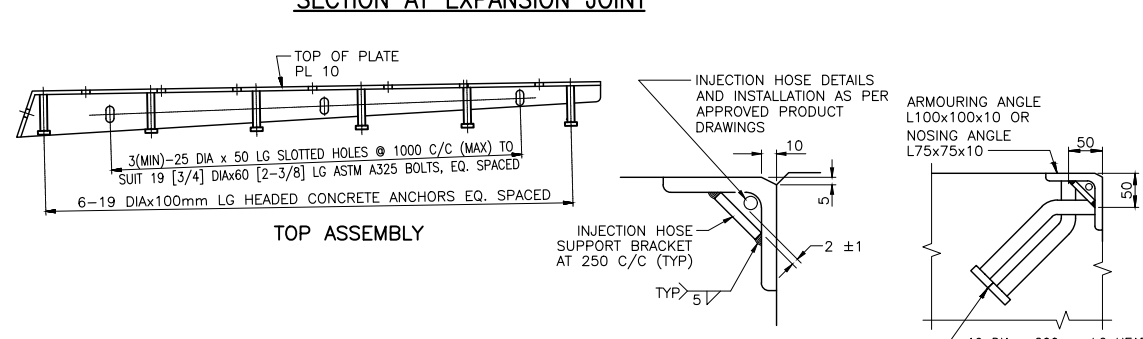


SECTION AT EXPANSION JOINT



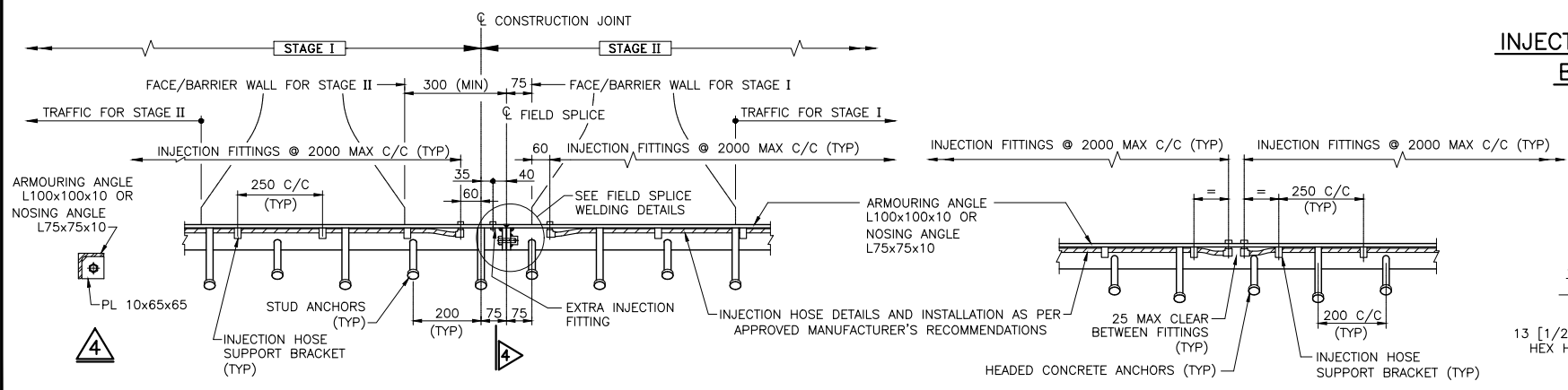
DETAIL OF ARMOURING WITHOUT SIDEWALK

DETAIL OF ARMOURING AT SIDEWALK



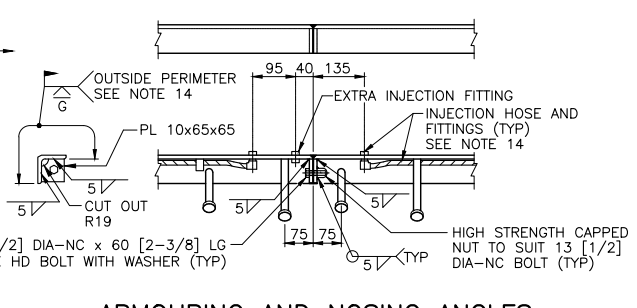
TOP ASSEMBLY

INJECTION HOSE SUPPORT BRACKET DETAIL



FIELD SPLICE DETAILS AT STAGED CONSTRUCTION FOR ARMOURING AND NOSING ANGLES

DETAILS OF HEADED CONCRETE ANCHORS AND INJECTION HOSE FOR ARMOURING AND NOSING ANGLES



ARMOURING AND NOSING ANGLES FIELD SPLICE DETAIL

- NOTES:**
- THIS DRAWING SHOWS EXPANSION JOINT AND SLEEPER SLAB AT THE END OF APPROACH SLAB OF INTEGRAL AND SEMI-INTEGRAL ABUTMENT BRIDGES WITH A MOVEMENT BETWEEN 10 AND 40MM.
 - EXPANSION JOINT TO BE SUPPLIED BY MANUFACTURERS LISTED IN DSM 9.40.27 FOR THE SUPPLY OF TYPE 'C' STRIP SEAL EXPANSION JOINT.
 - EXPANSION JOINT ASSEMBLY CONSTRUCTION AND MATERIAL SHALL BE ACCORDING TO OPSS 920 AND OPSS 1210, AND AS SPECIFIED IN THE CONTRACT DOCUMENTS.
 - JOINT ASSEMBLY SHALL BE COMPLETELY SHOP ASSEMBLED (EXCEPT FOR SEALS) AND PRESET TO DIMENSION 'J' FOR 15°C AND ADJUSTED IN THE FIELD TO SUIT INSTALLATION TEMPERATURE.
 - JOINT ASSEMBLY INSTALLATION TEMPERATURE SHALL BE TAKEN AS MEAN SHADE AIR TEMPERATURE AT STRUCTURE PRIOR TO JOINT INSTALLATION AS FOLLOWS:
 - FOR CONCRETE STRUCTURES - 48 HOURS
 - FOR STEEL STRUCTURES - 24 HOURS
 - FIELD SPLICES IN JOINT ASSEMBLY ARE ONLY PERMITTED AT STAGED CONSTRUCTION, AND/OR AS SHOWN ON THE CONTRACT DRAWINGS.
 - IF THE JOINT ARMOURING FOR A SKEW STRUCTURE IS SPLICED AT A CROWN, THE SPLICE SHALL BE DETAILED PARALLEL TO THE CENTRELINE OF THE TRAFFIC LANE.
 - SETTING ANGLES SHALL BE FLAME CUT ACCORDING TO OPSS 920, BUT IN NO CASE PRIOR TO CONCRETE REACHING INITIAL SET.
 - AFTER CURING OF THE CONCRETE HAS BEEN COMPLETED, THE SETTING DEVICES MAY BE REMOVED. THE VOIDS UNDER THE ARMOURING ANGLE AND NOSING ANGLE SHALL THEN BE PRESSURE INJECTED.
 - PREFORMED SEALS SHALL HAVE MINIMUM THICKNESS OF 5mm OR AS PER DSM.
 - ALL STEEL RETAINER SURFACES COMING IN CONTACT WITH PREFORMED SEAL SHALL BE CLEANED PRIOR TO INSTALLATION OF THE SEAL.
 - PREFORMED SEALS SHALL BE INSTALLED AFTER JOINT ASSEMBLY HAS BEEN CAST, STYROFOAM OR FILLER BETWEEN APPROACH SLAB AND SLEEPER SLAB REMOVED, AND EXPANSION GAP CLEARED OF ANY DEBRIS.
 - PROTECT INJECTION HOSE AND FITTINGS ADJACENT TO FIELD SPLICE DURING WELDING AND REMOVE PROTECTION PRIOR TO PLACING OF CONCRETE IN BLOCKOUT.
 - ALL JOINT ANCHORAGES SHALL BE DETAILED ON WORKING DRAWINGS PERPENDICULAR TO THE EXPANSION JOINT ON BOTH THE APPROACH SLAB SIDE AND THE SLEEPER SLAB SIDE EXCEPT STRUCTURE SKEWED FROM OVER 15° AND UP TO 45° SHALL HAVE ANCHORAGES DETAILED 30° OFFSET FROM THE PERPENDICULAR TO THE EXPANSION JOINT ON THE APPROACH SLAB SIDE.
 - LEGEND: [] DENOTES FASTENER SIZE IN INCHES
EJ - DENOTES EXPANSION JOINT

ADDITIONAL NOTES FOR BOLTS:

- 19 [3/4] DIAMETER BOLTS SHALL BE IN ACCORDANCE WITH WITH ASTM A325. ALL BOLTS USED IN 25 DIA. x 50 LONG SLOTTED HOLES SHALL BE INSTALLED WITH OVERSIZE WASHERS.
- 16 [5/8] DIAMETER FLAT COUNTERSUNK HEAD CAP BOLTS SHALL BE IN ACCORDANCE WITH ASTM F835.
- ALL BOLTS SHALL BE INSTALLED USING MOLY50 LUBRICANT.
- ALL BOLTS SHALL BE TENSIONED USING THE TURN-OF-NUT TIGHTENING METHOD IN ACCORDANCE WITH CAN/CSA S6-14.

TABLE OF DESIGN REQUIREMENTS (TO BE FULLY COMPLETED BY DESIGNER)

EXP. JOINT LOCATION	MTO GAP RATING (mm)		DESIGN MOVEMENT	* "J" AT INSTALLATION TEMPERATURE (C)							
	MIN	MAX		-5°	0°	5°	10°	15°	20°	25°	30°
WEST AND EAST ABUT	35	100	25	51	49	47	45	43	41	39	37

* DIMENSION 'J' MEASURED PERPENDICULAR TO CENTRELINE OF EXPANSION JOINT. WHERE MIN. AND MAX. FOR JOINT SUPPLIED DIFFER FROM THOSE SHOWN IN TABLE, 'J' DIMENSIONS SHALL BE REVISED BY CONTRACTOR AND SHOWN ON SHOP DRAWINGS. FOR STAGED CONSTRUCTION ON STRUCTURES OTHER THAN POST-TENSIONED, THE CONTRACTOR SHALL USE THE FIRST STAGE OBSERVED 'J' GAP TO INSTALL THE SECOND STAGE.

** MTO GAP, MEASURED BETWEEN PROJECTING FACES OF STEEL CLAMPING BAR, IS TAKEN FROM DSM 9.40.27, TYPE 'C'.

*** CALCULATED TOTAL MOVEMENT AT SLS OCCURRING AFTER TIME OF JOINT INSTALLATION. (MEASURED PARALLEL TO CENTRELINE OF STRUCTURE)

MODIFIED

STANDARD DRAWING
SEPTEMBER 2016

SS113-19

STRIP SEAL EXPANSION JOINT FOR SLEEPER SLAB

DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

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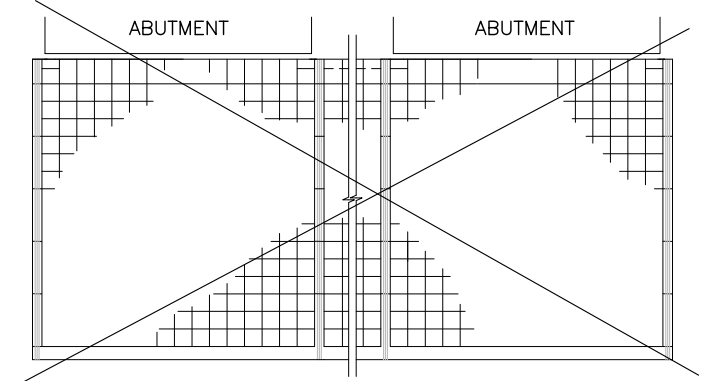
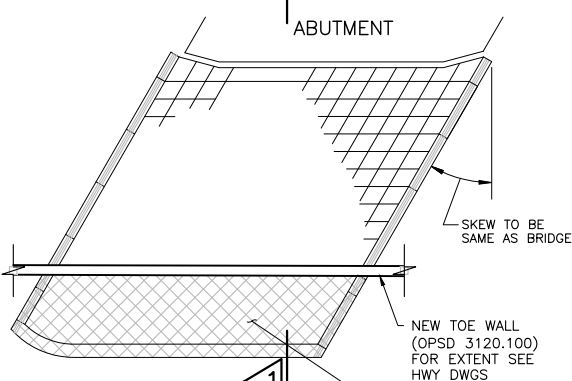
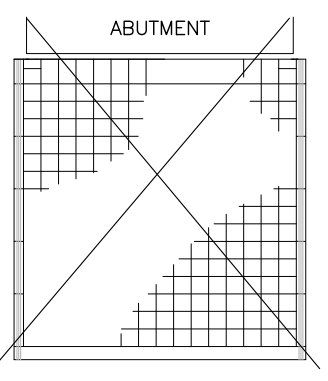
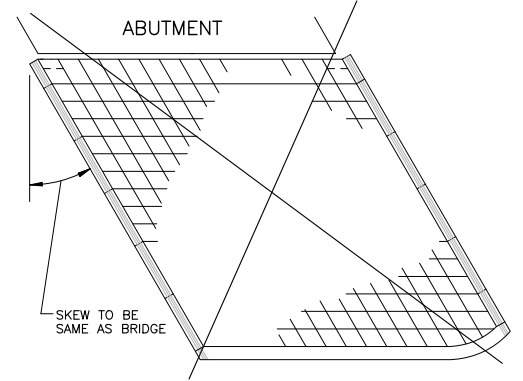
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C	18/03/16	90% SUBMISSION TO CA			
B	18/01/09	90% SUBMISSION TO CA			
A	17/10/31	90% SUBMISSION TO CA			

SCALE : AS NOTED

DESIGNED	SUBOOHI OBAID	
DRAWN	PATRICK TSANG	
CHECKED	NINA SHIRAZI	
APPROVED LEAD ENG.	TATIANA OJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INT.	DATE



PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
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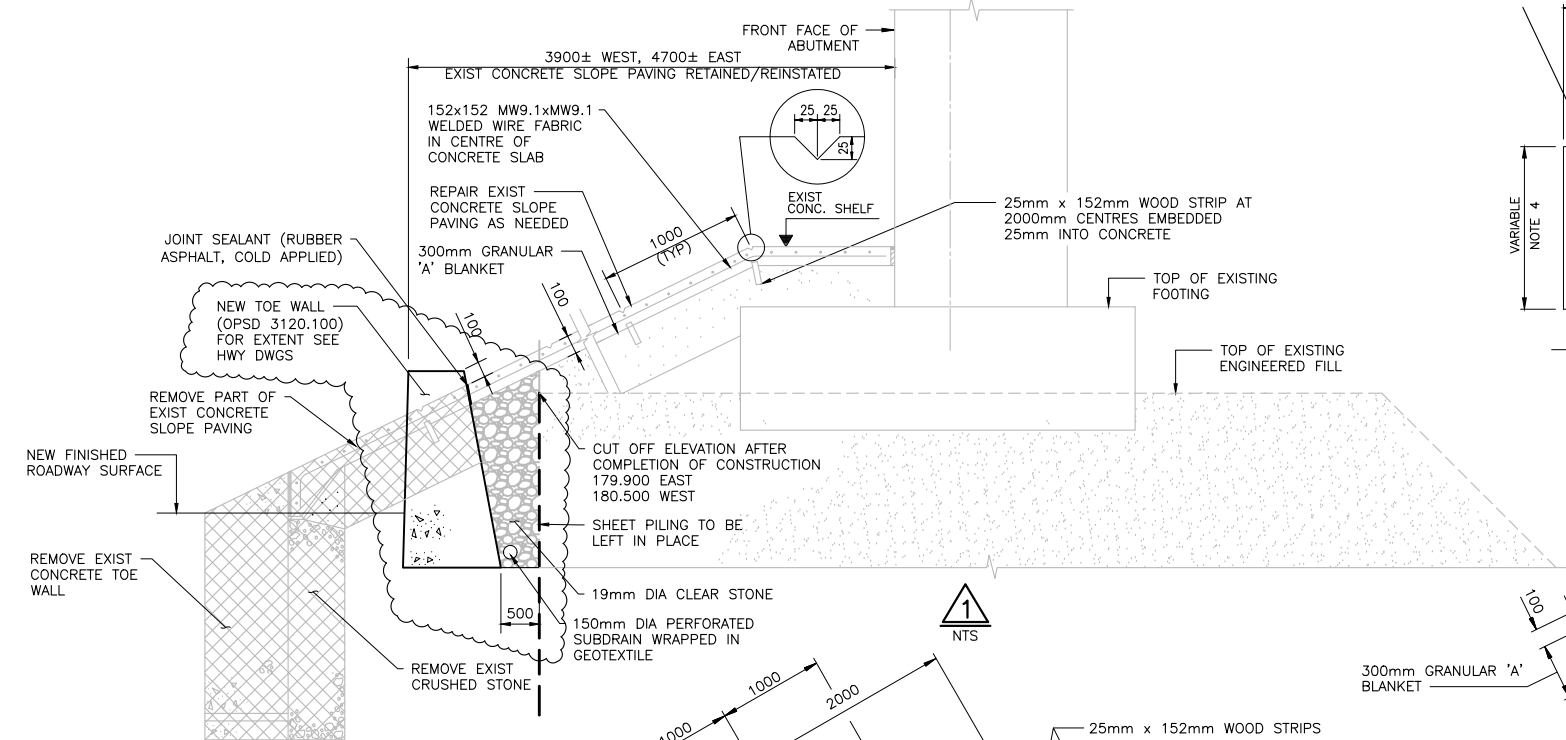


NOTES:
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DWG 900 AND 901.

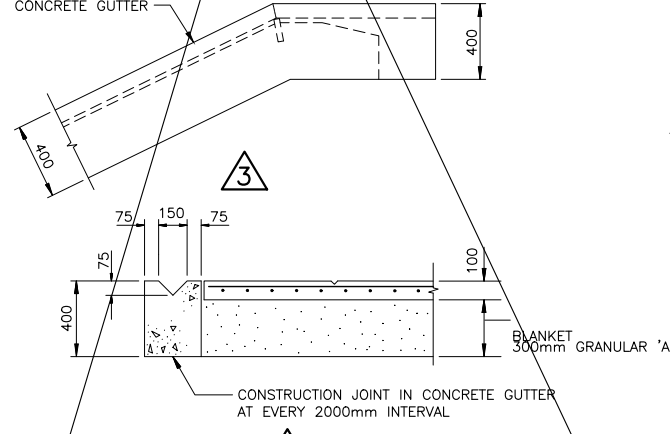
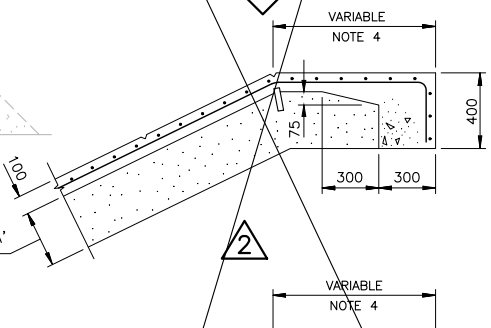
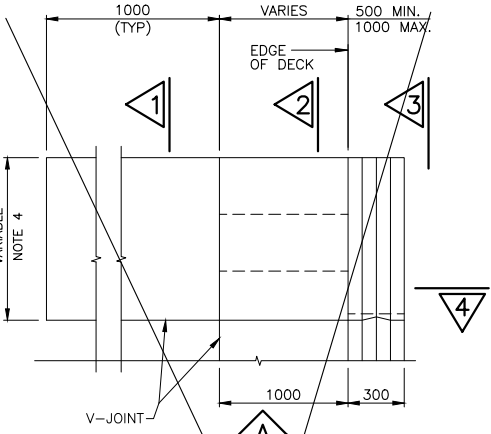
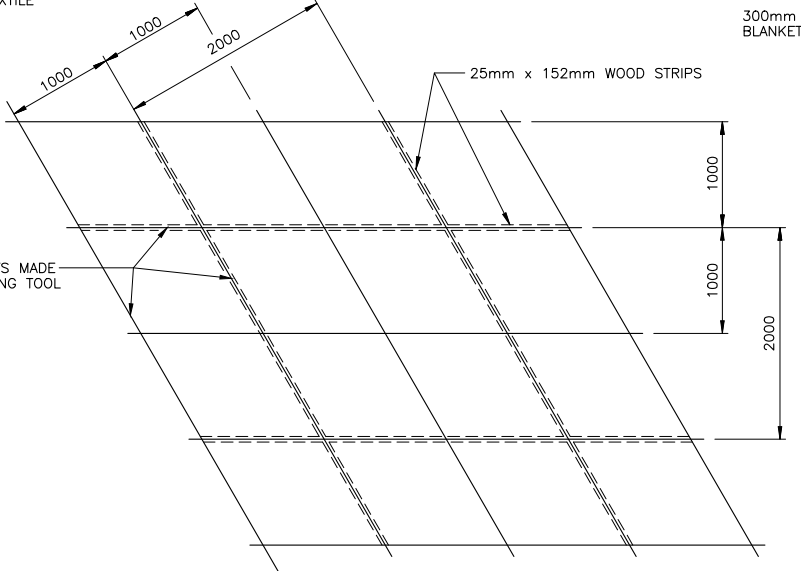
LEGEND:
[Hatched Box] REMOVALS

SLOPE PAVING LAYOUTS

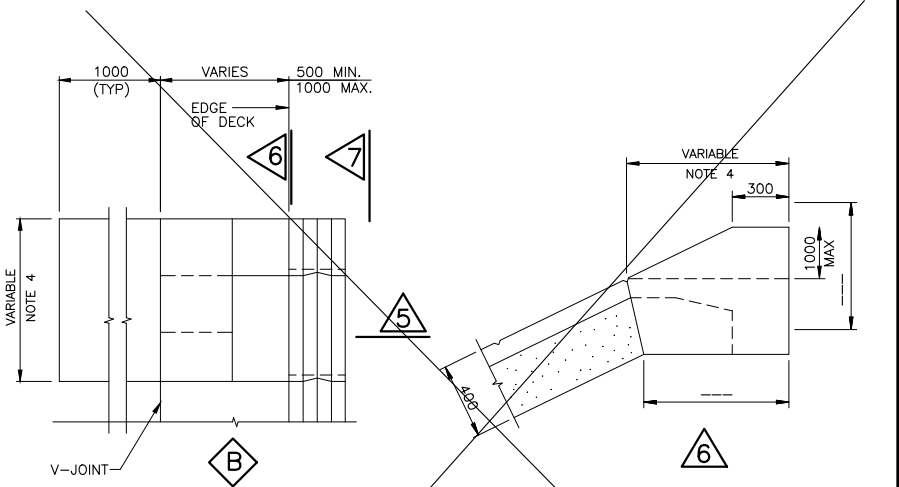
TWIN BRIDGES



WALL DETAILS TO FOLLOW



DETAIL WITHOUT RETAINING WALL



OPTIONAL DETAIL WITH RETAINING WALL

MODIFIED
STANDARD DRAWING DECEMBER 2003
SS116-10
DETAILS OF CONCRETE SLOPE PAVING

CAD FILE LOCATION AND NAME: C:\projects\hwy427\dwg\917CP.dwg
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C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE :
AS NOTED

DESIGNED	SUBOOHI OBAID
DRAWN	PATRICK TSANG
CHECKED	NINA SHIRAZI
APPROVED LEAD ENG.	TATIANA GJALA
APPROVED PROJ. MANAGER	



TITLE							
HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 DETAILS OF CONCRETE SLOPE PAVING							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	917	C

STANDARD 90° HOOK

STANDARD 180° HOOK

MINIMUM BENDING PIN DIAMETER, D, mm

BAR SIZE	STEEL GRADE	
	400R (2)	400W
10M	70	60
15M	100	90
20M	120	100
25M	150	150
30M	250	200
35M	300	250
45M	450 (1)	400
55M	600 (1)	550

(1) Special fabrication is required for bends exceeding 90° for bars of these sizes and grade.
(2) For stainless steel, with $F_y = 500$, use the same D as for 400R.

STANDARD HOOK DIMENSIONS

BAR SIZE	90° HOOKS		180° HOOKS		J (mm)	
	A OR G (mm)		A OR G (mm)		400R	
	400R	400W	400R	400W	400R	400W
10M	180	180	140	130	90	80
15M	260	250	180	170	130	120
20M	310	300	220	200	160	140
25M	400	400	280	280	200	200
30M	510	490	400	350	310	260
35M	610	590	480	430	370	320
45M	790	770	680	630	540	490
55M	1030	1010	900	850	710	660

NOTE: All Hook Dimensions are according to the CHBDC-2014.

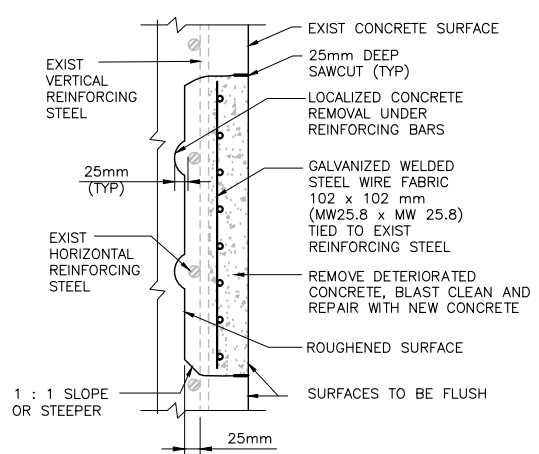
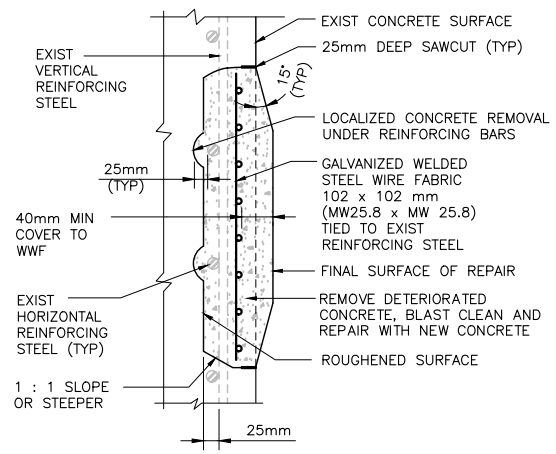
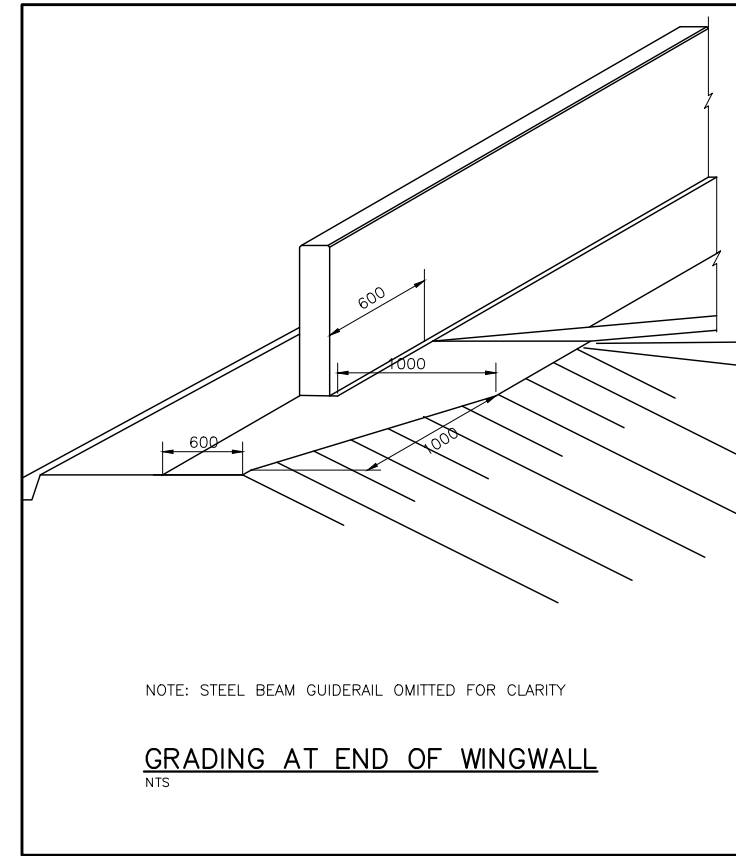
MINIMUM STIRRUP AND TIE HOOK DIMENSIONS

BAR SIZE	BAR DIAM. d_b (mm)	PIN DIAM. D (mm)	90°		135°	
			A OR G (mm)	A OR G (mm)	H (approx.) (mm)	H (approx.) (mm)
10M	11.3	45	100	100	70	70
15M	16.0	65	140	140	100	100
20M	19.5	80	180	175	115	115
25M	25.2	100	230	230	140	140

MIN. 90° HOOK MIN. 135° HOOK

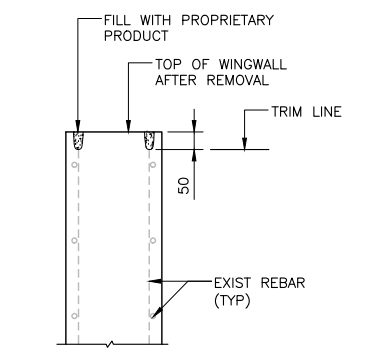
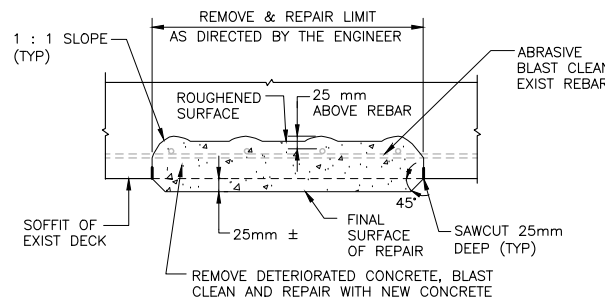
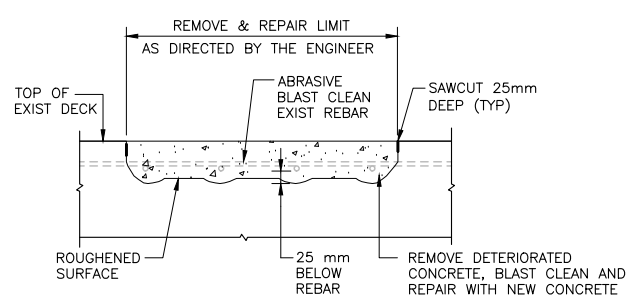
HOOK DIMENSIONS FOR REINFORCING STEEL BARS

SS12-1



VERTICAL SURFACE LOCAL CONCRETE REPAIR DETAILS

NTS



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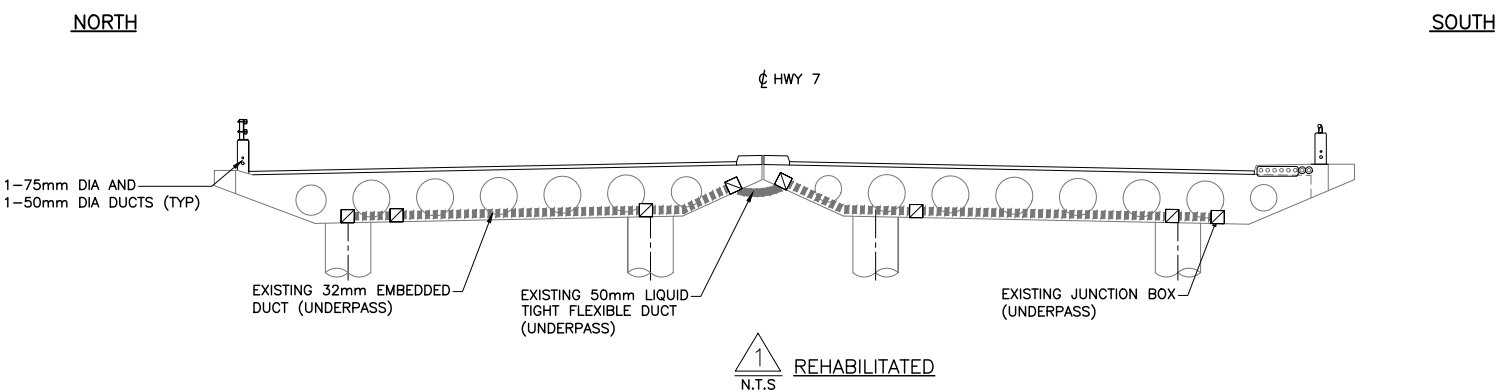
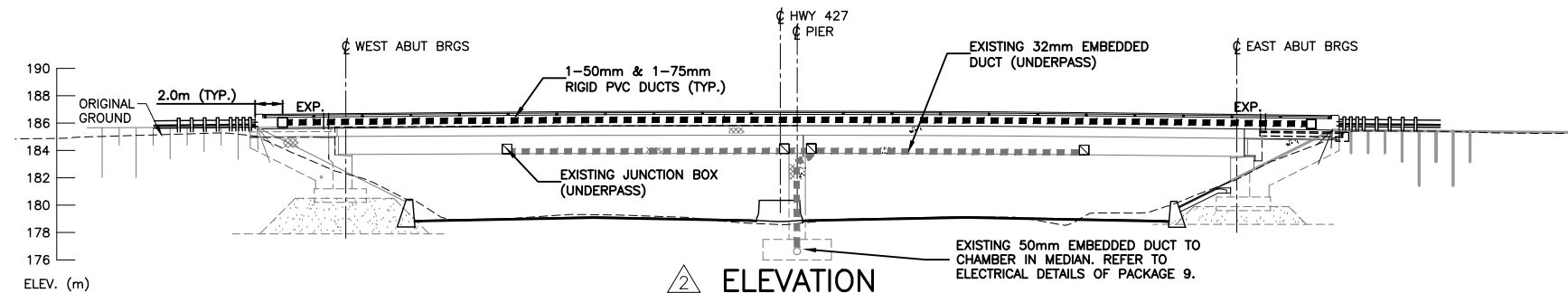
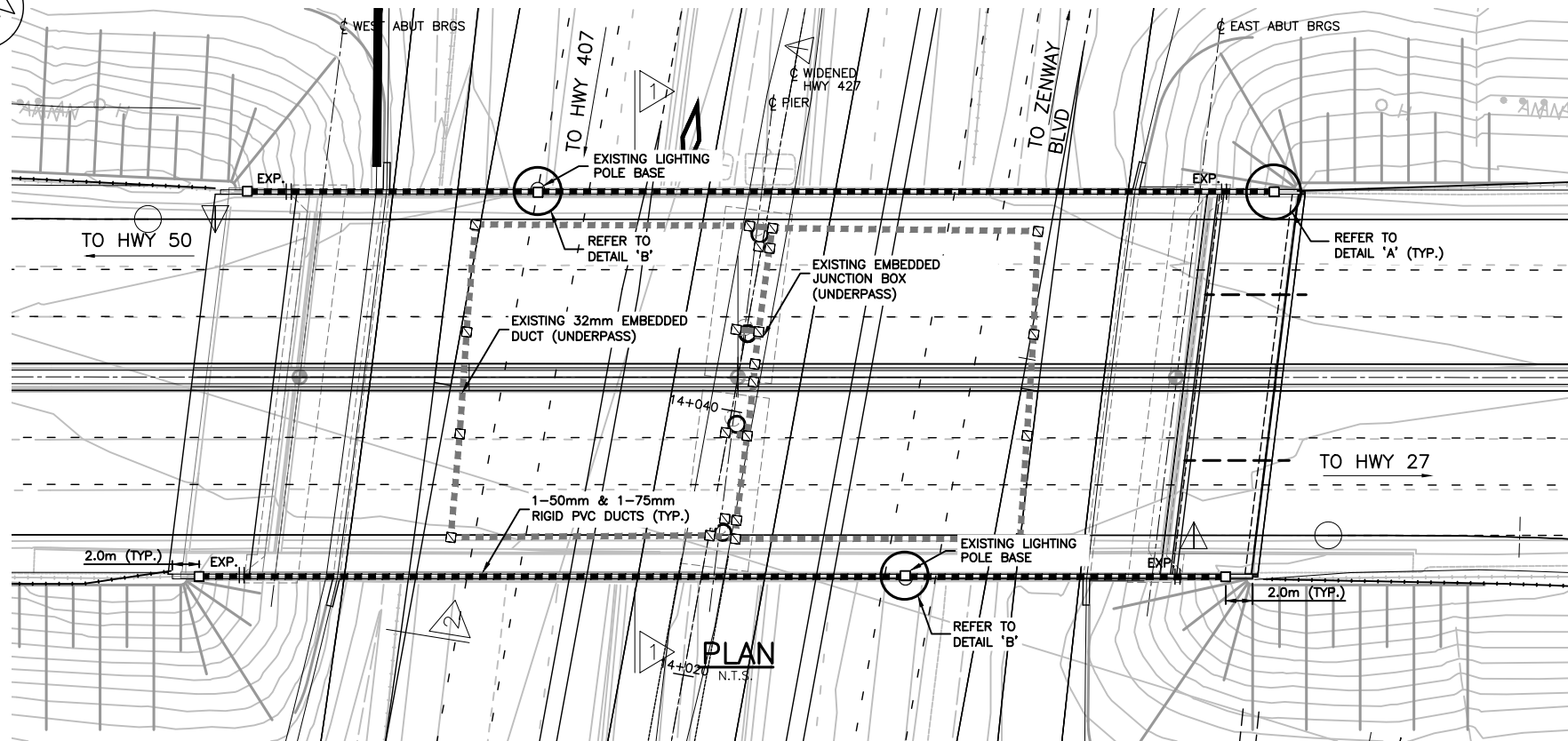
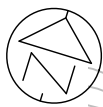
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C 18/03/16	90% SUBMISSION TO CA				
B 18/01/09	90% SUBMISSION TO CA				
A 17/10/31	90% SUBMISSION TO CA				

SCALE : AS NOTED

DESIGNED	SUBOOHI OBAID	
DRAWN	PATRICK TSANG	
CHECKED	NINA SHIRAZI	
APPROVED LEAD ENG.	TATIYANA QJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



TITLE							
HWY 427 EXPANSION HWY 427 / HWY 7 UNDERPASS REHABILITATION - R1 SITE 37-330 STANDARD DETAILS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	9A	STR	B09	DWG	918	C



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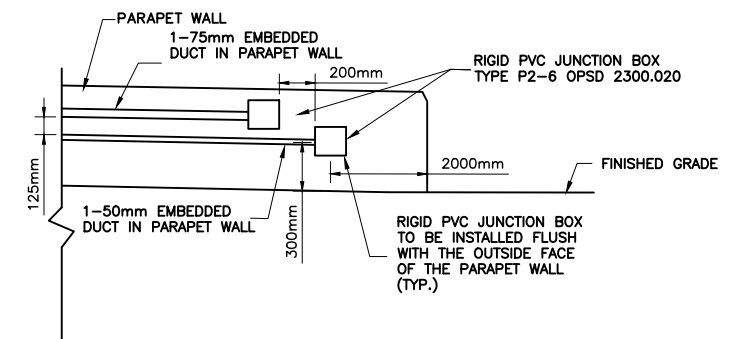
- CONTRACTOR SHALL CAREFULLY REMOVE SUFFICIENT CONCRETE TO ALLOW FOR INSTALLATION OF A RIGID PVC COUPLING ONTO THE EXISTING EMBEDDED CONDUITS.

APPLICABLE STANDARD DRAWINGS:

- OPSD 2011.101 - GENERAL SYMBOLS
- OPSD 2011.201 - GENERAL SYMBOLS
- OPSD 2302.020 - EXPANSION AND DEFLECTION FITTING ASSEMBLY

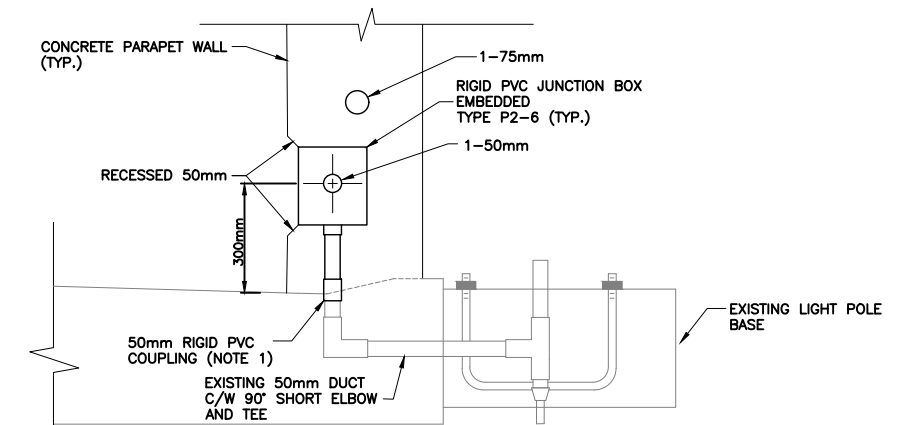
SUPPLEMENTARY LEGEND:

- RIGID JUNCTION BOX EMBEDDED TYPE P2-6 OPSD 2300.020 C/W GALVANIZED STEEL COVER
- EXISTING RIGID JUNCTION BOX EMBEDDED TYPE P2-4 OPSD 2300.020
- EXP. II EXPANSION AND DEFLECTION FITTING ASSEMBLY PER OPSD 2302.02



DETAIL 'A' - TERMINATION OF EMBEDDED DUCT

N.T.S.



DETAIL 'B'

N.T.S.

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B	18/01/09				
A	17/10/31				

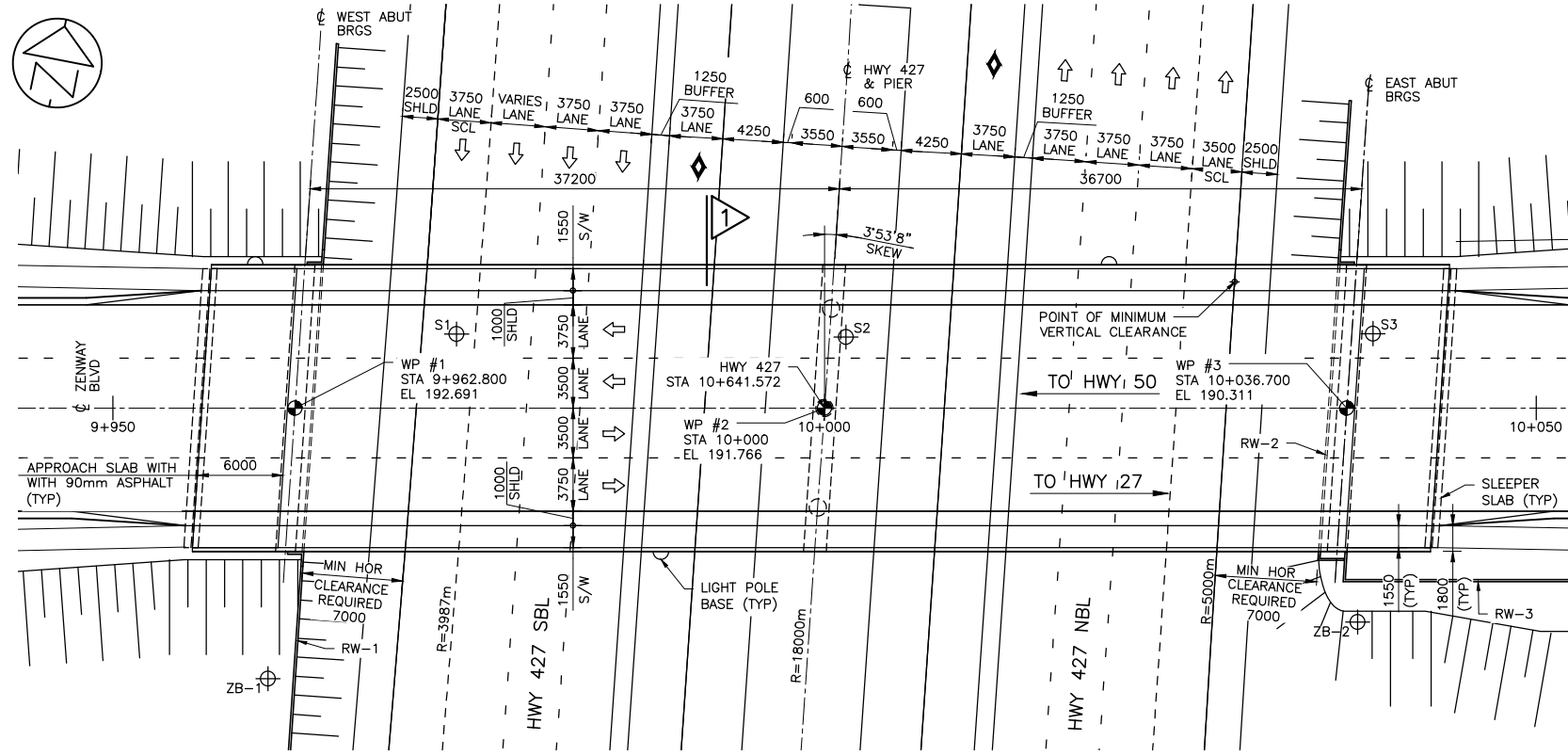
SCALE : N.T.S.

DESIGNED	MANPREET PANESAR	M.P.
DRAWN	KARMIJT GILL	K.G.
CHECKED	NATALIA MAHABIR	N.M.
APPROVED LEAD ENG.	MARIO TEDESCO	M.T.
APPROVED PRJL. MANAGER		

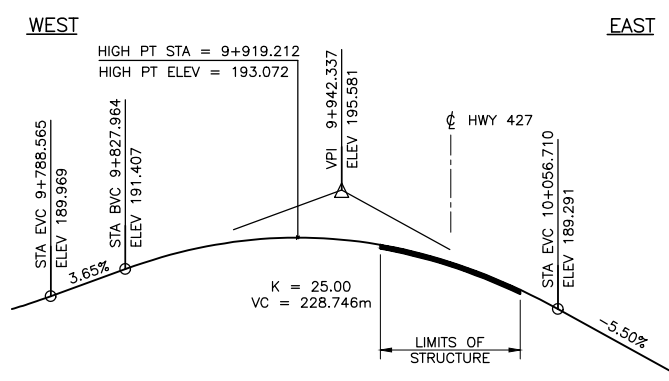


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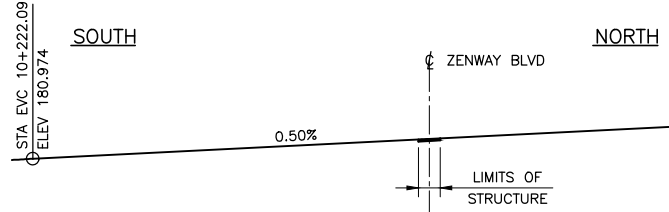
**HWY 427 EXPANSION
HWY 427 / HWY 7 UNDERPASS
REHABILITATION - R1
SITE 37-330
ELECTRICAL EMBEDDED WORK**



PLAN
1:250



PROFILE OF ZENWAY BLVD
NTS



PROFILE OF HWY 427
NTS

- GENERAL NOTES:**
- DESIGN STANDARDS AND CODES:
 - SCHEDULE 15-1 AND SCHEDULE 15-2: PROJECT AGREEMENT
 - DESIGN CODE: CAN/CSA-S6-14
 - MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL MANUAL
 - ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS)
 - LIVE LOAD: CL-625-ONT.
 - CLASS OF CONCRETE

PRECAST GIRDERS	60 MPa (HPC)
PRECAST DECK PANELS	40 MPa
REMAINDER	30 MPa
 - CLEAR COVER TO REINFORCING STEEL

FOOTINGS	100 ± 25
DECK	
TOP	70 ± 20
BOTTOM	40 ± 10
REMAINDER UNLESS OTHERWISE NOTED	70 ± 20
 - REINFORCING STEEL

REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.

BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.

STAINLESS REINFORCING STEEL SHALL BE TYPE 316 LN OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa, UNLESS OTHERWISE SPECIFIED.

UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS B.

BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWINGS SS12-1 UNLESS INDICATED OTHERWISE.
 - GLASS FIBRE REINFORCED POLYMER (GFRP)

GLASS FIBRE REINFORCED POLYMER (GFRP) REINFORCING BARS SHALL BE GRADE I, GRADE II OR GRADE III AS SPECIFIED IN THE CONTRACT DOCUMENTS.

THE NOMINAL DIAMETER, TENSILE MODULUS OF ELASTICITY AND GUARANTEED MINIMUM TENSILE STRENGTH SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.

BAR MARKS WITH THE PREFIX GI DENOTE GRADE I GFRP BARS, BAR MARKS WITH THE PREFIX GII DENOTE GRADE II GFRP BARS AND BAR MARKS WITH THE PREFIX GIII DENOTE GRADE III GFRP BARS.

APPLICABLE STANDARD DRAWINGS:

- | | |
|---------------|---|
| OPSD 3000.100 | FOUNDATION PILES - STEEL H-PILE DRIVING SHOE |
| OPSD 3101.150 | WALLS - ABUTMENT, BACKFILL MINIMUM GRANULAR REQUIREMENTS |
| OPSD 3370.100 | DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD |
| OPSD 3370.101 | DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS |
| OPSD 3419.100 | BARRIERS AND RAILINGS - STEEL GUIDE RAIL AND CHANNEL ANCHORAGE |
| OPSD 3941.200 | FIGURES IN CONCRETE - SITE NUMBER AND DATE LAYOUT |

LIST OF DRAWINGS:

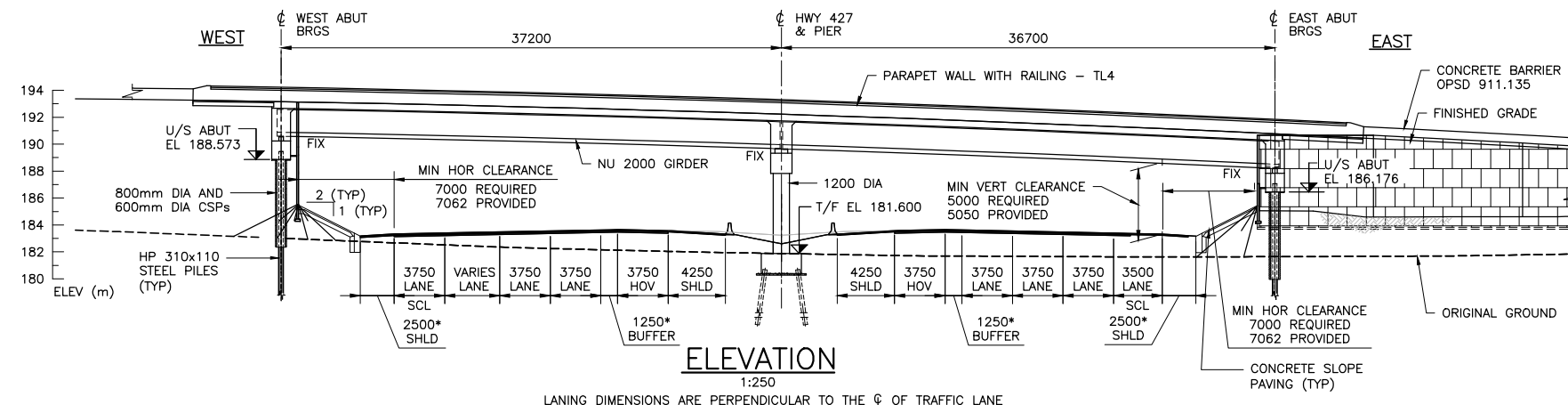
- | | |
|-----|---|
| 500 | GENERAL ARRANGEMENT |
| 501 | BOREHOLE LOCATIONS AND SOIL STRATA |
| 502 | FOUNDATION LAYOUT AND FOOTING REINFORCEMENT |
| 503 | ABUTMENT DETAILS AND REINFORCEMENT |
| 504 | RETAINED SOIL SYSTEM WALL LAYOUT I |
| 505 | RETAINED SOIL SYSTEM WALL LAYOUT II |
| 506 | PIER DETAILS AND REINFORCEMENT |
| 507 | PRESTRESSED NU GIRDERS AND BEARINGS (NU 2000) |
| 508 | PRESTRESSED NU GIRDER - DETAILS |
| 509 | DECK LAYOUT & SCREED ELEVATIONS |
| 510 | PRECAST DECK PANEL LAYOUT |
| 511 | PRECAST DECK PANELS FOR CONCRETE GIRDERS - DETAIL I |
| 512 | PRECAST DECK PANELS FOR CONCRETE GIRDERS - DETAIL II |
| 513 | DECK REINFORCEMENT |
| 514 | PARAPET WALL WITH RAILING ON SIDEWALK, TL-4 (GFRP REBAR) |
| 515 | RAILING ON PARAPET |
| 516 | 6000mm APPROACH SLAB |
| 517 | EXPANSION JOINT AND SLEEPER SLAB (10mm < MOVEMENT <= 40mm) |
| 518 | STRIP SEAL EXPANSION JOINT FOR SLEEPER SLAB (10mm < MOVEMENT <= 40mm) |
| 519 | DETAILS OF CONCRETE SLOPE PAVING |
| 520 | STANDARD AND MISCELLANEOUS DETAILS |
| 521 | PILE DRIVING CONTROL |
| 522 | ELECTRICAL EMBEDDED WORK |

LIST OF ABBREVIATIONS:

- | | |
|-----|--------------------------------|
| CIP | CAST IN PLACE |
| VPI | VERTICAL POINT OF INTERSECTION |
| WP | WORKING POINT |
| T/F | TOP OF FOOTING |

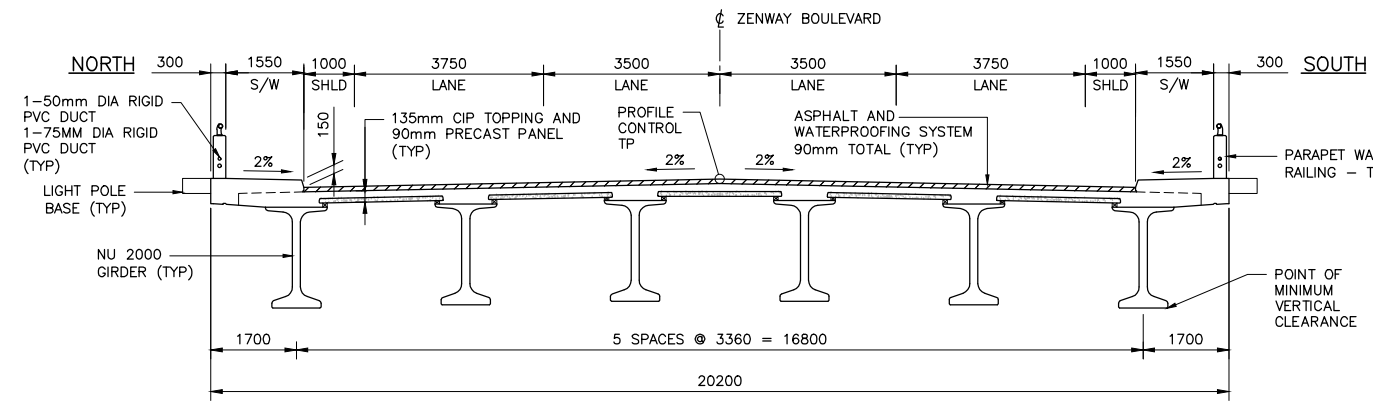
LEGEND:

- | | |
|--|----------|
| | BOREHOLE |
|--|----------|



ELEVATION
1:250

LANING DIMENSIONS ARE PERPENDICULAR TO THE CL OF TRAFFIC LANE
SPAN LENGTHS ARE ALONG THE CL



1
1:75

DIMENSIONS ARE PERPENDICULAR TO CL OF TRAFFIC LANE

CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP-SONIA.PAN\DWG\427-D0-1-STR-B10-DWG-5006A.DWG
 MODIFIED: 1/11/2018 4:05:13 PM BY: MEDEMA
 DATE PLOTTED: 1/11/2018 4:21:41 PM BY: PANG, SONIA

NO.	DATE	REVISIONS	BY	CHK	LEAD	PROJ. MAN.
B	18/03/16	90% SUBMISSION TO CA				
A	18/01/12	90% SUBMISSION TO CA				

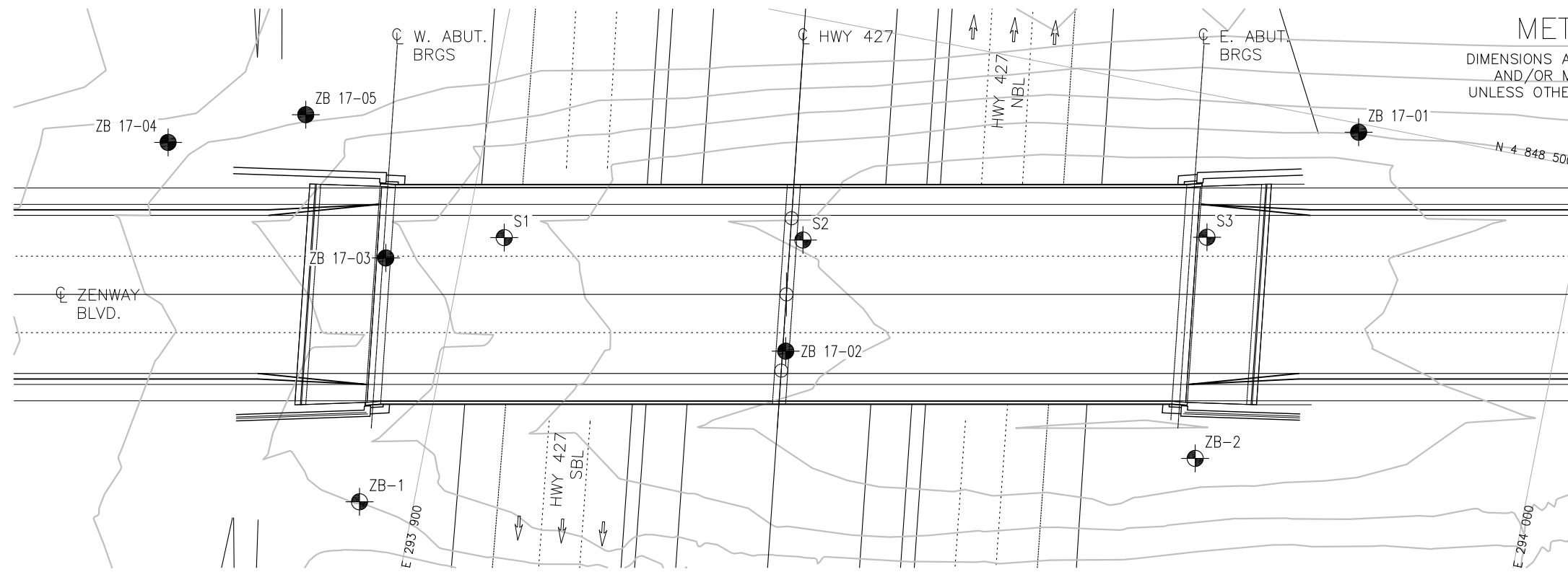
SCALE :

AS NOTED

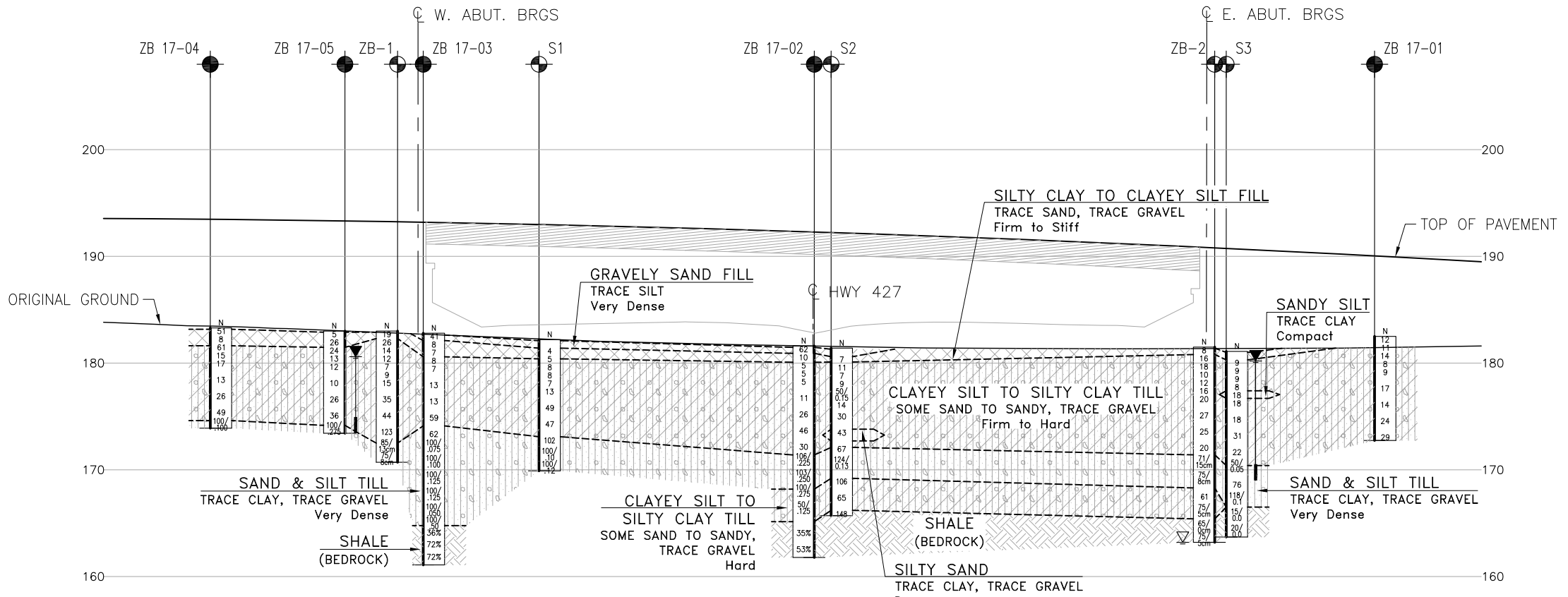
DESIGNED	ZHONG LIU
DRAWN	JENNIFER MEDEMA
CHECKED	MICHAEL HATCH
APPROVED LEAD ENG.	TATIANA GJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	
INIT.	
DATE	



TITLE							
HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS							
GENERAL ARRANGEMENT							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	500	B



PLAN



PROFILE ALONG ZENWAY BLVD

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



KEYPLAN

LEGEND

- Borehole (By Thurber)
- ⊕ Borehole (By Others)
- N Blows /0.3m (Std Pen Test, 475J/blow)
- CONE Blows /0.3m (60' Cone, 475J/blow)
- PH Pressure, Hydraulic
- ∇ Water Level
- ↕ Head Artesian Water
- ⊖ Piezometer
- 90% Rock Quality Designation (RQD)
- A/R Auger Refusal

NO	ELEVATION	NORTHING	EASTING
S1	182.2	4 848 474.8	293 903.5
S2	181.4	4 848 479.8	293 930.4
S3	181.1	4 848 487.1	293 966.7
ZB 17-01	182.5	4 848 499.2	293 978.5
ZB 17-02	181.6	4 848 469.5	293 930.8
ZB 17-03	182.8	4 848 470.9	293 893.2
ZB 17-04	183.3	4 848 477.5	293 871.6
ZB 17-05	183.0	4 848 482.4	293 883.5
ZB-1	183.0	4 848 448.5	293 895.1
ZB-2	181.5	4 848 467.0	293 969.5

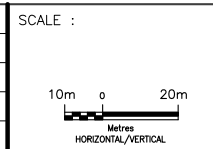
-NOTES-

- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOGRES No.

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PLOTDATE: 3/20/2018 9:53 AM

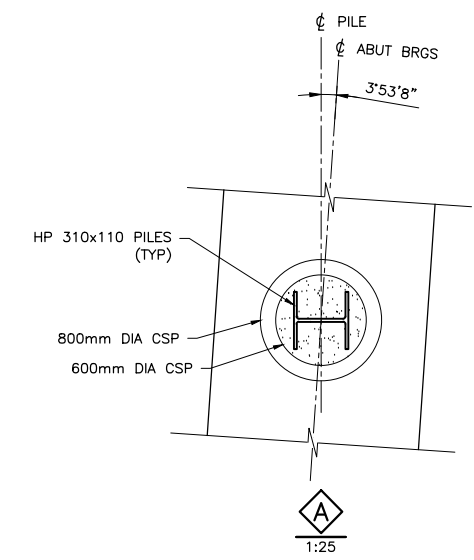
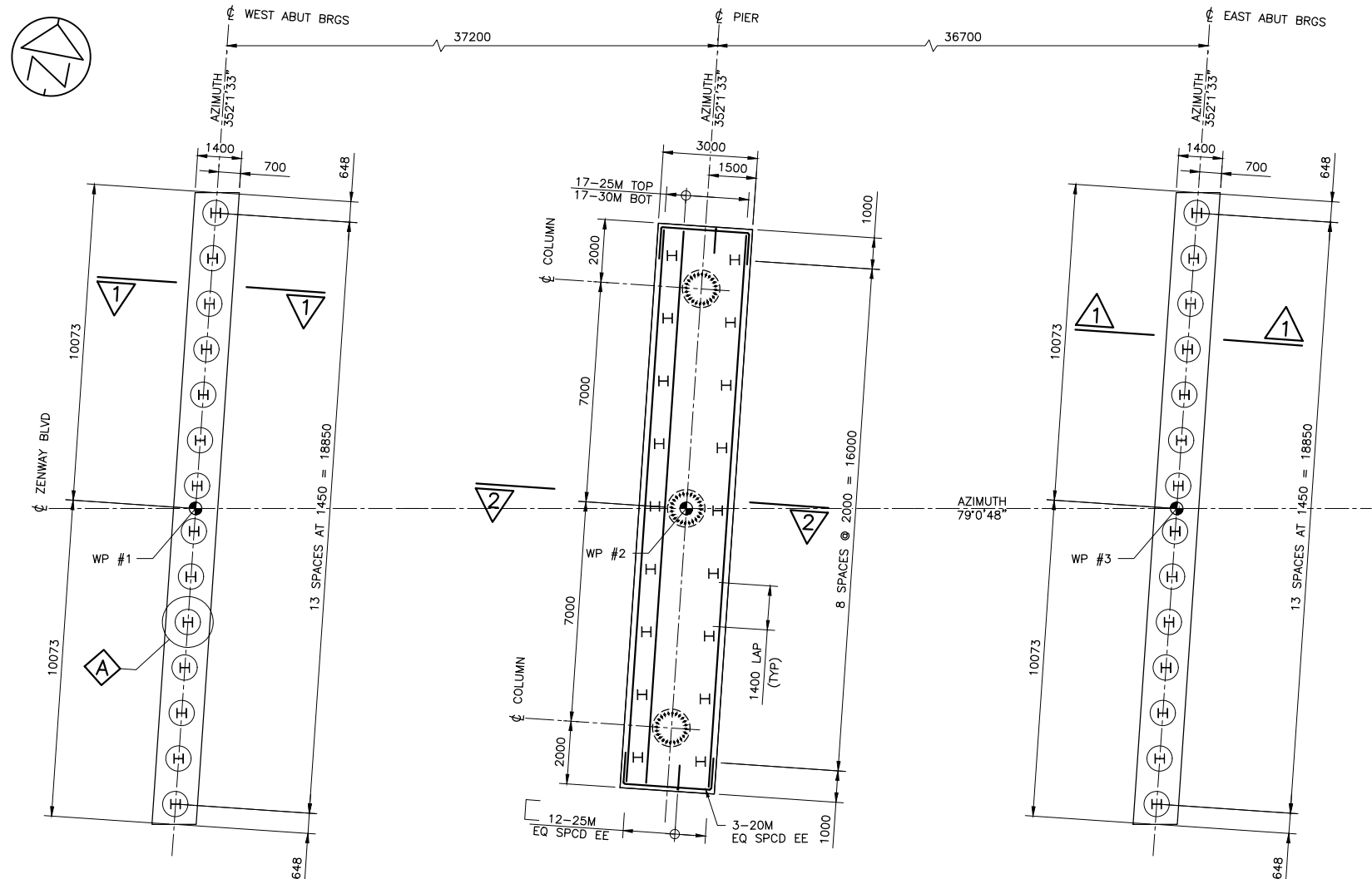
NO.	DATE	REVISIONS	BY	CHK	LEAD ENG.	PROJ. MGR.
B	18/03/16	90% SUBMISSION TO CA	AN	MB	JL	JL
A	18/01/12	90% SUBMISSION TO CA	AN	MB	JL	JL



DESIGNED	M. BOUCHER	MB	18/03/16
DRAWN	A. NOOR	AN	18/03/16
CHECKED	J. LEE	JL	18/03/16
APPROVED LEAD ENGINEER	J. LEE	JL	18/03/16
APPROVED PROJ. MANAGER	J. LEE	JL	18/03/16
NAME (PRINT)	INT.	DATE	



TITLE						
HWY 427 EXPANSION HIGHWAY 427 AT ZENWAY BLVD UNDERPASS						
BOREHOLE LOCATIONS AND SOIL STRATA						
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE TYPE	DOCUMENT TYPE	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	501 B



- NOTES:**
- PILE SPACING IS MEASURED AT THE UNDERSIDE OF ABUTMENTS.
 - PILE LENGTHS SHOWN ARE THE THEORETICAL LENGTHS BELOW CUT-OFF AND ARE BASED ON ESTIMATED TIP ELEVATIONS. FINAL LENGTH SHALL BE DETERMINED ON SITE FROM PILING DRIVING RECORDS AND HILEY TEST RESULTS.
 - FOR PILE DRIVING CONTROL AND INFORMATION ON HAMMER ENERGY, REFER TO SS103-11.
 - ALL PILES TO BE HP 310x110 STEEL 'H' PILES WITH REINFORCED PILE TIPS FROM AN APPROVED MANUFACTURER SUCH AS TITUS STEEL (STANDARD H-POINTS), OR APPROVED EQUIVALENT.
 - PILE SPLICES SHALL BE AS PER OPSD 3000.1500 IN ACCORDANCE WITH OPSS 903.
 - EACH PILE AT THE PIER LOCATION SHALL BE PRE-AUGERED TO 1.0 m ABOVE THE REPORTED BEDROCK ELEVATION TO FACILITATE PENETRATION OF THE PILE THROUGH THE HARD AND VERY DENSE SOIL STRATA.
 - PRE-AUGERING EQUIPMENT AT THE PIER SHALL BE CONTINUOUS FLIGHT AUGER, 150 TO 200 mm DIAMETER
 - CARE MUST BE TAKEN WHEN DRIVING PILES TO BEDROCK OR VERY DENSE/HARD TILL WITH COBBLES OR BOULDERS TO AVOID OVERDRIVING AND DAMAGE TO THE PILES. IF PILE DAMAGE/MISALIGNMENT OCCURS, PDA TESTING MAY BE REQUIRED TO ASSESS PILE CAPACITY AND INTEGRITY.
 - ALL REBAR LAPS SHALL BE STAGGERED.

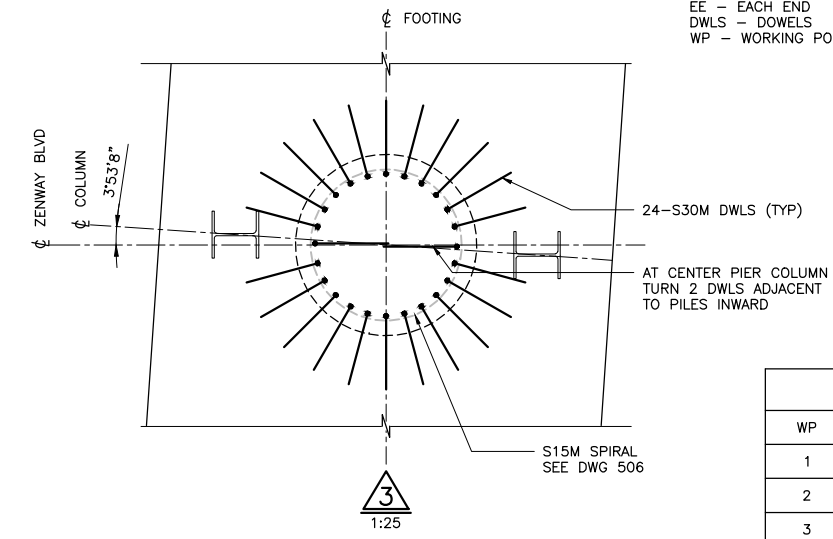
PILE DESIGN DATA:

ABUTMENTS
PILE CAPACITY AT SLS: 1400 kN
PILE CAPACITY AT ULS: 1600 kN

PIER
PILE CAPACITY AT SLS: NOT GOVERN
PILE CAPACITY AT ULS: 2000 kN

APPLICABLE STANDARD DRAWING:
OPSD 3000.100 FOUNDATION PILES STEEL H-PILE DRIVING SHOE
OPSD 3000.150 FOUNDATION PILES STEEL H-PILE SPLICE

LIST OF ABBREVIATIONS:
EE - EACH END
DWLS - DOWELS
WP - WORKING POINT



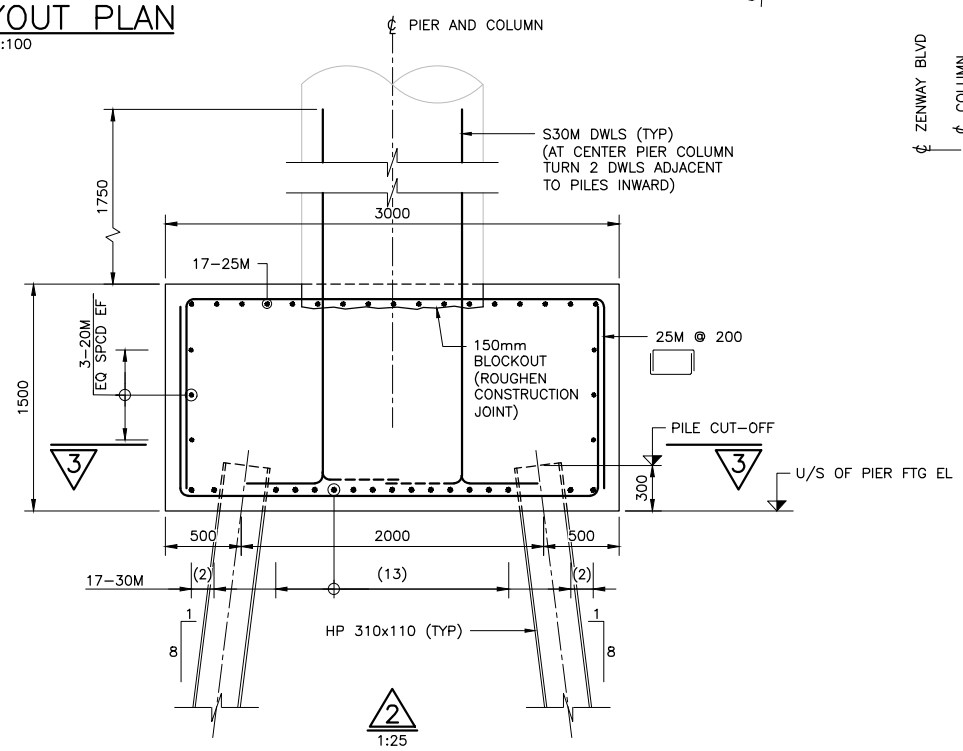
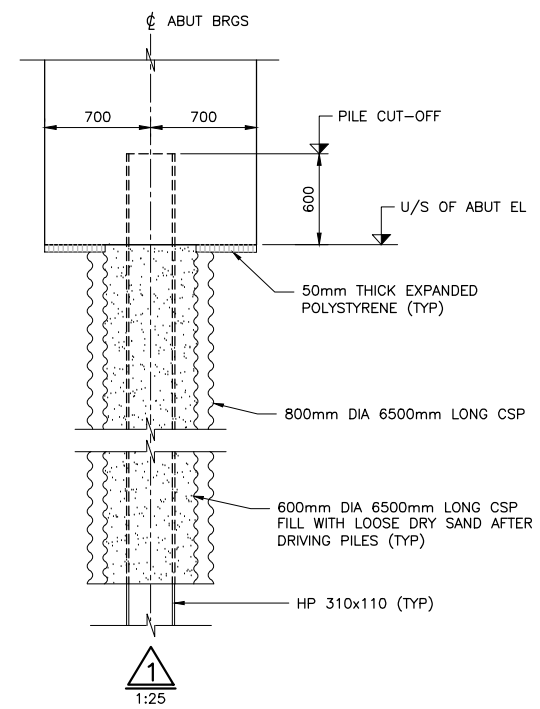
WORKING POINT

WP	STATION	NORTHING	EASTING
1	9+962.800	4848467.528	293893.351
2	10+000.000	4848474.618	293929.870
3	10+036.700	4848481.612	293965.897

PILE DATA

LOCATION	U/S OF ABUT	U/S PIER FTG	PILE CUT-OFF	EST TIP EL	NO. PILES	BATTER
WEST ABUTMENT	188.573	-	189.173	173.0*	14	VERTICAL
PIER	-	180.100	180.400	165.1	18	1:8
EAST ABUTMENT	186.176	-	186.776	170.5*	14	VERTICAL

* ESTIMATED HIGHEST ELEVATION TO BE DRIVEN TO OR BELOW. FINAL PILE LENGTH SHALL BE DETERMINED ON SITE BASED ON ACHIEVING THE DESIGN PILE CAPACITY AS DETERMINED BY HILEY'S TEST RESULTS.



CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP-SONIA.PANG\DMSC4443\H427-DO-1-STR-B10-DWG-502FD.DWG
MODIFIED: 1/5/2018 1:54:28 PM BY: PANGS
DATE PLOTTED: 1/5/2018 1:55:27 PM BY: PANG, SONIA

SCALE :
AS NOTED

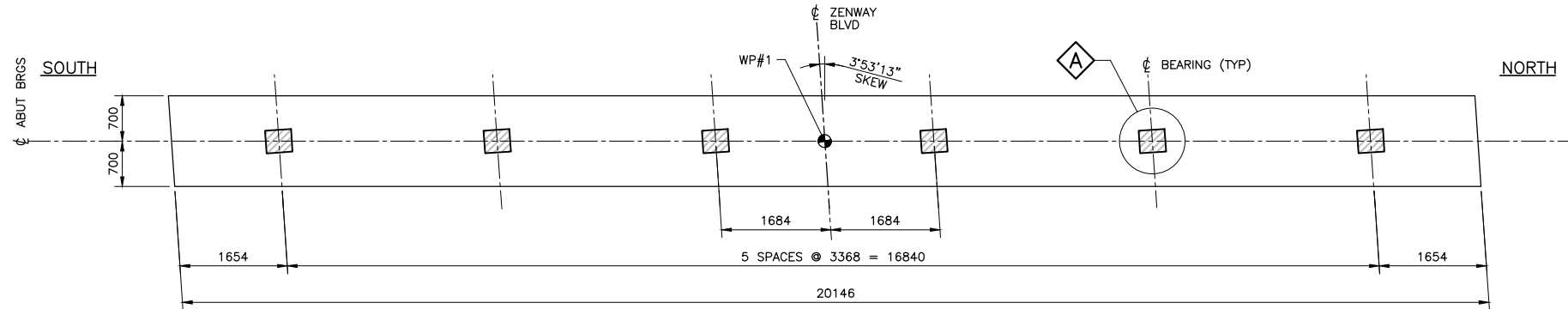
DATE	REVISIONS	BY	CHK	LEAD	PROJ
B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

DESIGNED	TOM GILOT	
DRAWN	SHARON HUNG	
CHECKED	ZHONG LIU	
APPROVED LEAD ENGR.	TATIANA QJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



HWY 427 EXPANSION
HWY 427
AT ZENWAY BLVD UNDERPASS
FOUNDATION LAYOUT
AND FOOTING REINFORCEMENT

PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	502	B

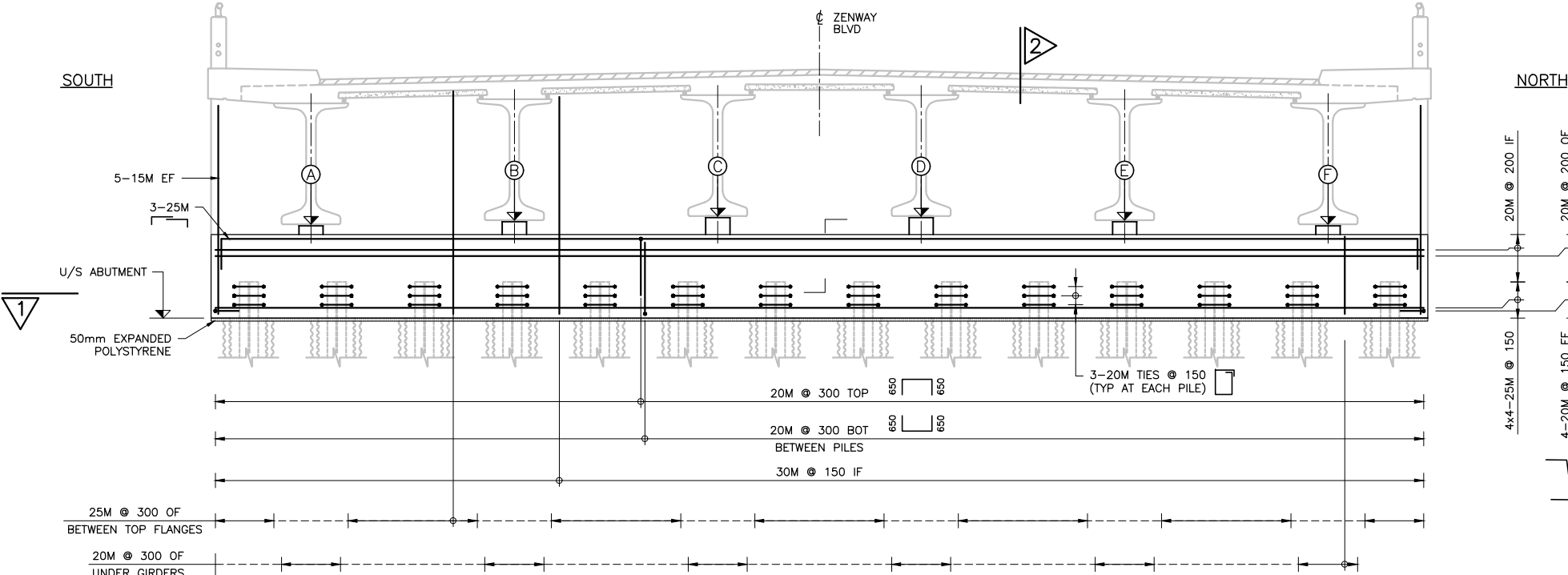


PLAN - ABUTMENT

1:50
WEST ABUTMENT SHOWN
EAST ABUTMENT SIMILAR - OPPOSITE HAND UNO

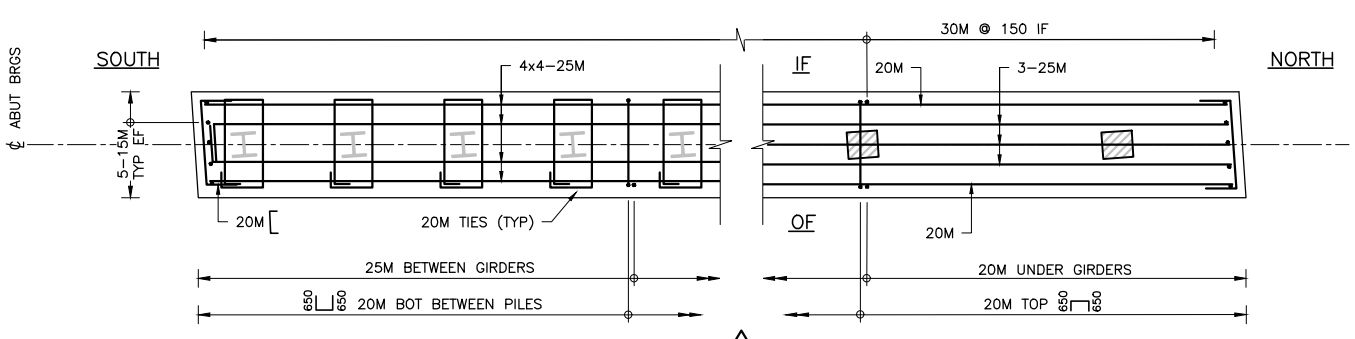
TOP OF BEARING ELEVATIONS*							
GIRDER LINES	(A) (SOUTH)	(B)	(C)	(D)	(E)	(F) (NORTH)	
ELEVATIONS	WEST ABUT	190.164	190.227	190.290	190.286	190.215	190.144
	EAST ABUT	187.800	187.856	187.913	187.902	187.824	187.746

* SEE CONSTRUCTION NOTES ON GENERAL ARRANGEMENT DRAWING



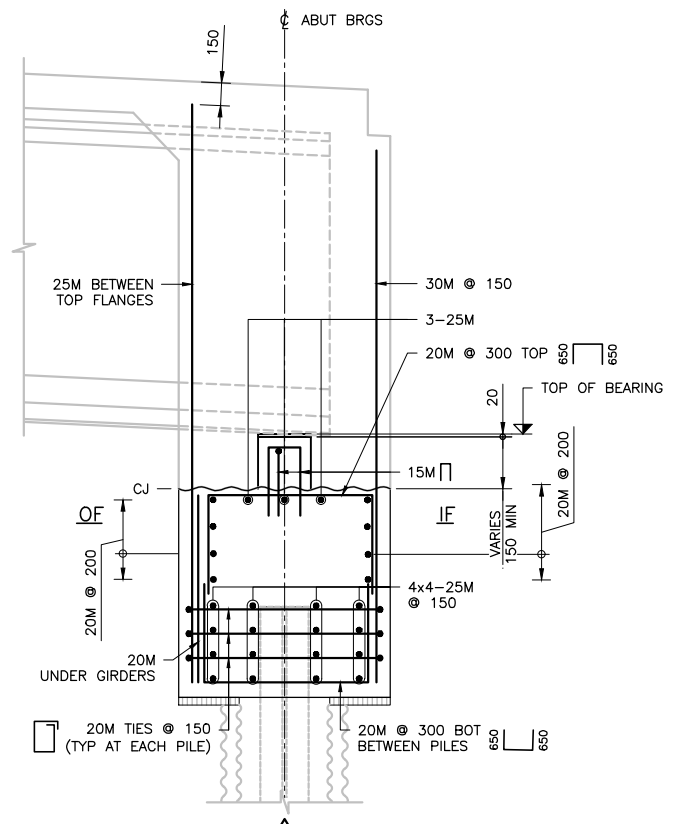
WEST ABUTMENT ELEVATION

1:50
WEST ABUTMENT REINFORCEMENT SHOWN
EAST ABUTMENT REINFORCEMENT SIMILAR - OPPOSITE HAND UNO



PEDESTAL DETAIL

1:25



REINFORCEMENT

1:25

NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 500, 502 AND 513.

LIST OF ABBREVIATIONS:

WP WORKING POINT

CONSTRUCTION SEQUENCE:

1. DRIVE ABUTMENT PILES. PILE ORIENTATION AND SPACING AS PER DRAWING 502.
2. CONSTRUCT CONCRETE ABUTMENT UP TO THE BEARING SEAT LEVEL. THE CONTRACTOR SHALL SUPPLY TEMPORARY BRACING FOR THE ABUTMENTS AND WINGWALLS TO ENSURE STABILITY DURING CONSTRUCTION.
3. PLACE BEARING PADS AND ERECT GIRDERS. SURFACES ON THE GIRDER EMBEDDED IN THE ABUTMENT SHALL BE ABRASIVE BLAST CLEANED.
4. CAST THE DECK, TOP SECTION OF THE ABUTMENTS AND TOP SECTION OF WINGWALLS ABOVE THE BEARING SEAT ELEVATION IN THE SAME POUR.
5. FORMWORK AND LATERAL BRACING FOR ABUTMENTS SHALL NOT BE REMOVED UNTIL DECK AND DIAPHRAGM CONCRETE HAS REACHED 70% OF ITS 28 DAY DESIGN STRENGTH.
6. 20M LAPS = 700 mm
25M LAPS = 1100 mm

CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP_SONIA_PANG\DMSC4443\H427-00-1-STR-B10-DWG-503AB.DWG
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 DATE PLOTTED: 1/5/2018 1:33:11 PM BY: PANG, SONIA

DATE	REVISIONS	BY	CHK	LEAD	PROJ
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18/01/12	90% SUBMISSION TO CA				

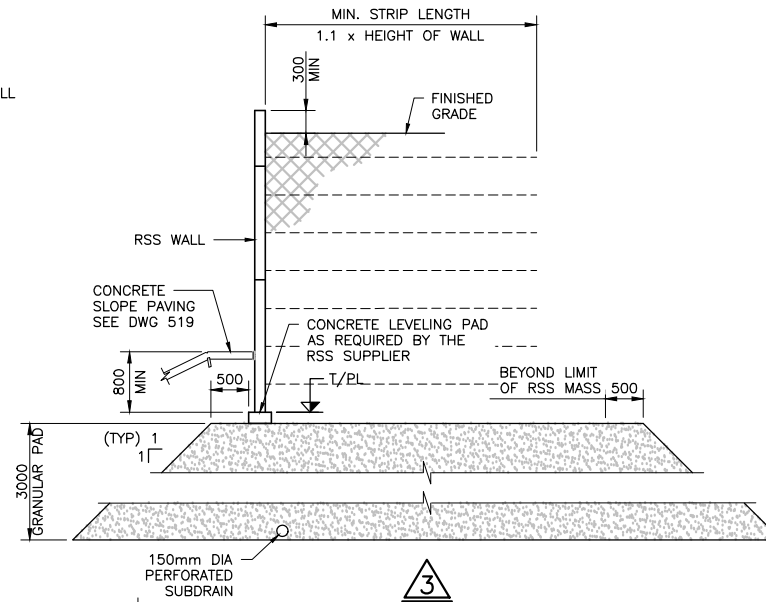
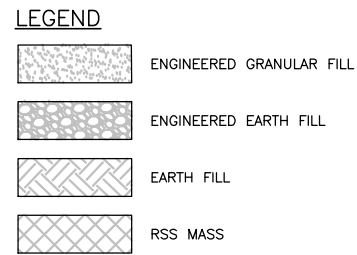
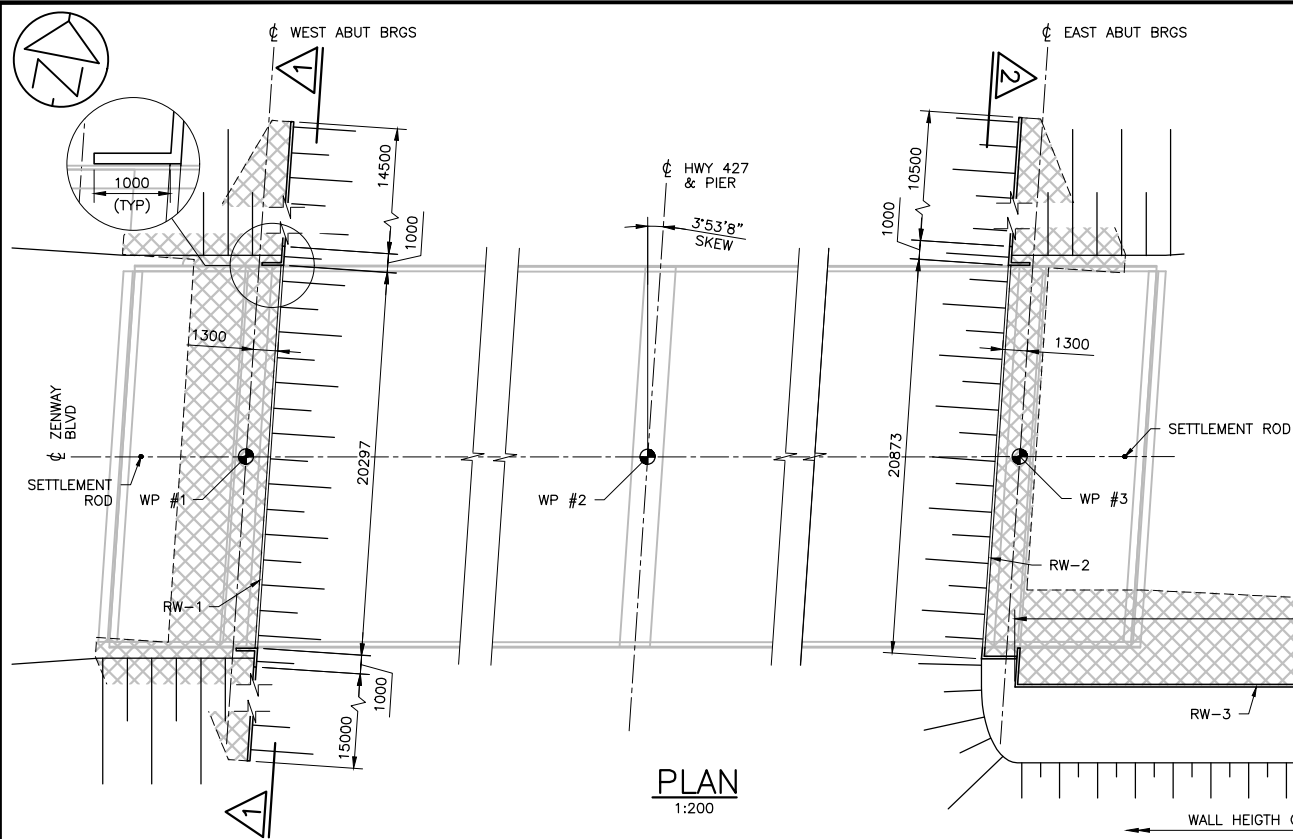
SCALE :

AS NOTED

DESIGNED	HOSSEIN AZIM	
DRAWN	JOSHUA ROSE	
CHECKED	ZHONG LIU	
APPROVED LEAD ENGR.	TATIANA QJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



TITLE							
HWY 427 EXPANSION							
HWY 427							
AT ZENWAY BLVD UNDERPASS							
ABUTMENT DETAILS AND REINFORCEMENT							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	503	B



NOTES:

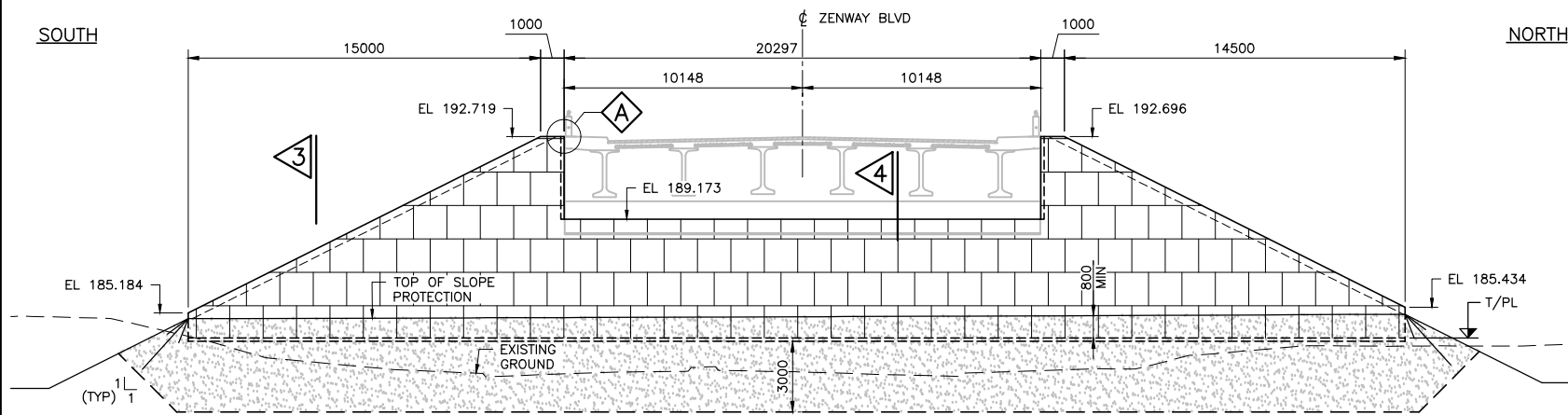
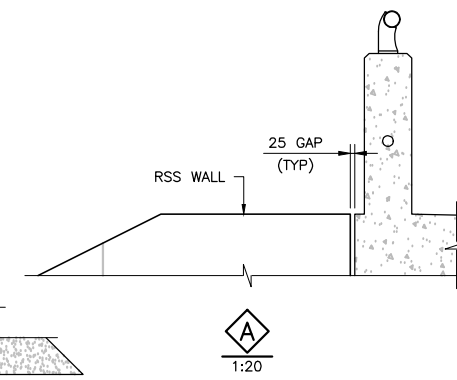
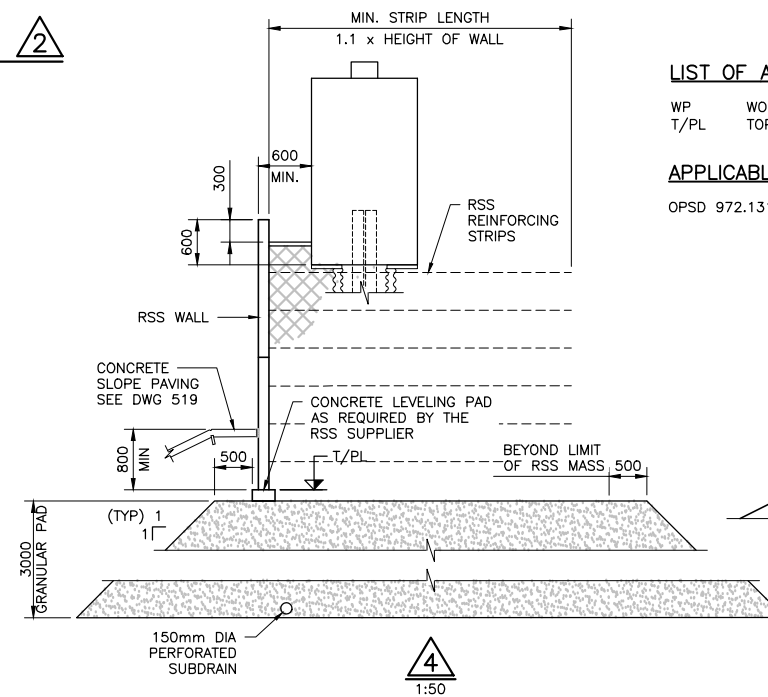
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING 500.
- RSS WALL GRANULAR PAD:
WHERE RSS WALL GRANULAR PAD IS TO BE PLACED ANY TOPSOIL AND SOFT/LOOSE FILL OR NATIVE MATERIAL SHOULD BE STRIPPED FROM THE FOOTPRINT PRIOR TO PLACEMENT OF FILL.
ALL NEW EMBANKMENT FILL MUST BE COMPACTED IN ACCORDANCE WITH OPSS 501.
500mm THICK LAYER OF BEDDING MATERIAL CONFORMING TO OPSS GRANULAR 'A' REQUIREMENT SHOULD BE PROVIDED UNDER THE RSS MASS TO PROVIDE A UNIFORM SUBGRADE CONDITION.
THE ENGINEERED GRANULAR FILL AND THE ENGINEERED EARTH FILL SHOULD BE COMPACTED TO 100% OF STANDARD PROCTOR MAXIMUM DRY DENSITY AT A MOISTURE CONTENT WITHIN 2% OF OPTIMUM.
ENGINEERED FILL PAD MUST EXTEND AT LEAST 500mm BEYOND THE LIMITS OF THE RSS MASS AND LEVELING STRIP.
REFER TO GRADING DRAWINGS FOR DETAILS.
- RSS WALL SUPPLIER SHALL PROVIDE PERMANENT PROTECTION TO CSP BEHIND THE WALL SURFACE AND SHALL BE INTEGRATED WITH THE RSS SOIL MASS.
- SETTLEMENT RODS SHALL BE PLACED 5m BEHIND EACH ABUTMENT FACE, ON THE CENTRELINE OF ZENWAY BLVD, PRIOR TO FILL PLACEMENT. SETTLEMENT ROD DETAILS CAN BE FOUND IN PACKAGE H427-D-N-9B-HWY-000-DWG-0072-A.

LIST OF ABBREVIATIONS:

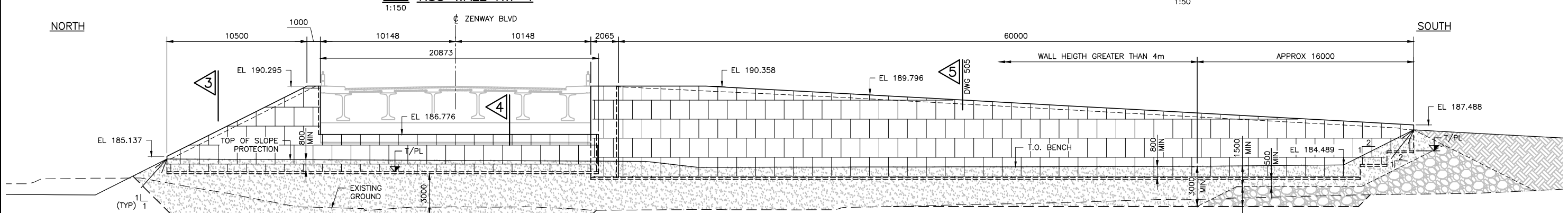
WP WORKING POINT
T/PL TOP OF LEVELING PAD

APPLICABLE STANDARD DRAWINGS:

OPSD 972.131 FENCE, CHAIN-LINK INSTALLATION-CONCRETE BARRIER



1 RSS WALL RW-1
1:150



2 RSS WALLS RW-2 AND RW-3
1:150

CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP_SCOTT.CLAYTON\DWG\4443\H427-00-1-STR-B10-DWG-504RW.DWG
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DATE PLOTTED: 1/10/2018 1:48:47 PM BY: CLAYTON, SCOTT.M

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A	18/01/12	90% SUBMISSION TO CA

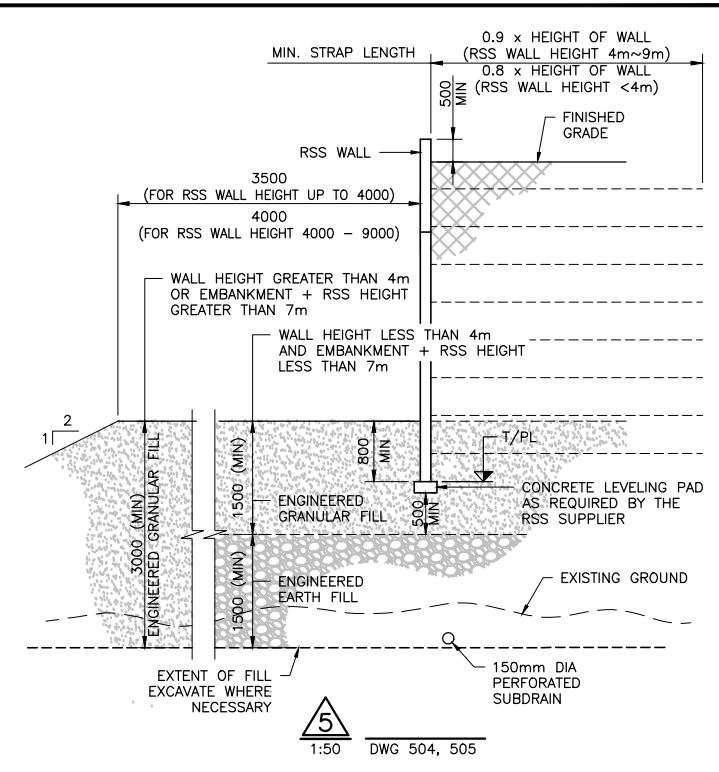
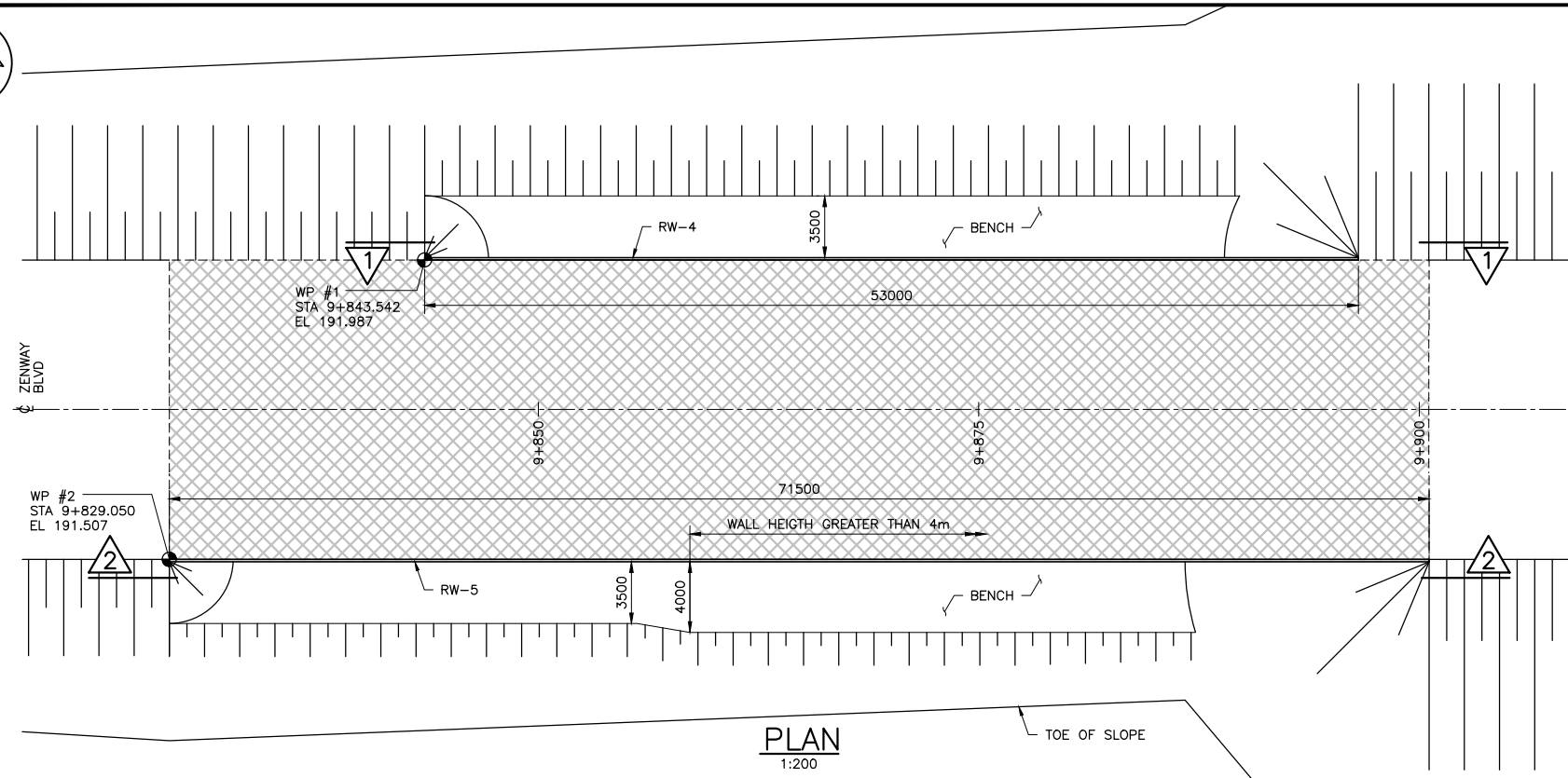
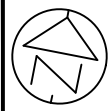
SCALE :

AS NOTED

DESIGNED	ZHONG LIU
DRAWN	SHARON HUNG
CHECKED	MICHAEL HATCH
APPROVED LEAD ENGR.	TATIANA QJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INIT. DATE



HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS RETAINED SOIL SYSTEMS WALL LAYOUT I							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	504	B



NOTES:

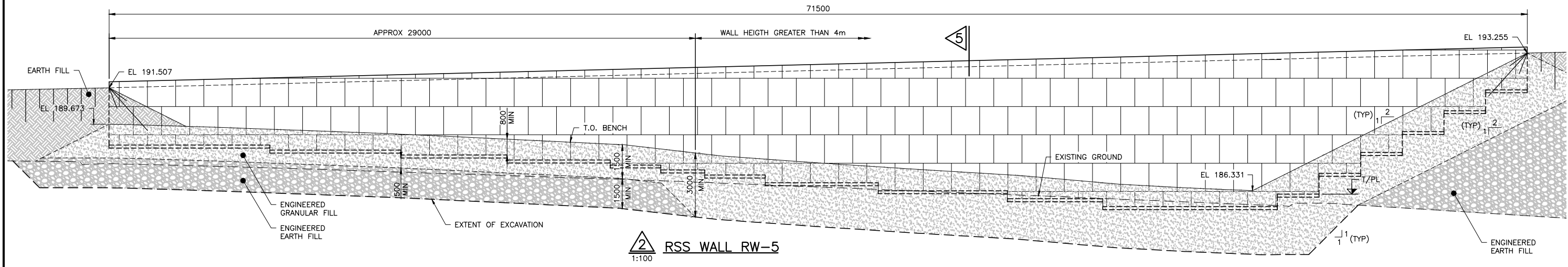
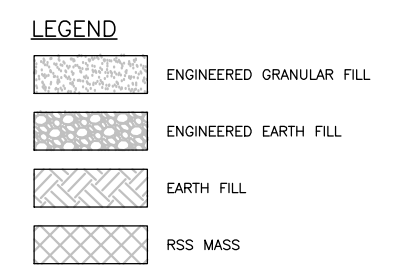
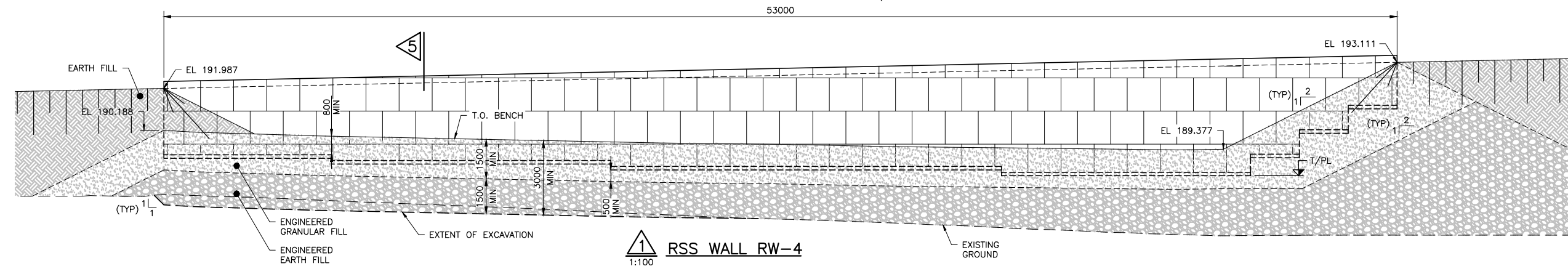
- RSS WALL GRANULAR PAD:
WHERE RSS WALL GRANULAR PAD IS TO BE PLACED ANY TOPSOIL AND SOFT/LOOSE FILL OR NATIVE MATERIAL SHOULD BE STRIPPED FROM THE FOOTPRINT PRIOR TO PLACEMENT OF FILL.
ALL NEW EMBANKMENT FILL MUST BE COMPACTED IN ACCORDANCE WITH OPSS 501.
500mm THICK LAYER OF BEDDING MATERIAL CONFORMING TO OPSS GRANULAR 'A' REQUIREMENT SHOULD BE PROVIDED UNDER THE RSS MASS TO PROVIDE A UNIFORM SUBGRADE CONDITION.
THE ENGINEERED GRANULAR FILL AND THE ENGINEERED EARTH FILL SHOULD BE COMPACTED TO 100% OF STANDARD PROCTOR MAXIMUM DRY DENSITY AT A MOISTURE CONTENT WITHIN 2% OF OPTIMUM.
ENGINEERED FILL PAD MUST EXTEND AT LEAST 500mm BEYOND THE LIMITS OF THE RSS MASS AND LEVELLING STRIP.
REFER TO GRADING DRAWINGS FOR DETAILS.
- RSS WALL SUPPLIER SHALL PROVIDE PERMANENT PROTECTION TO CSP BEHIND THE WALL SURFACE AND SHALL BE INTEGRATED WITH THE RSS SOIL MASS.

LIST OF ABBREVIATIONS:

WP WORKING POINT
T/PL TOP OF LEVELING PAD

APPLICABLE STANDARD DRAWINGS:

OPSD 972.131 FENCE, CHAIN-LINK INSTALLATION-CONCRETE BARRIER



CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP_SONIA_PANG\DMSC4443\H427-DO-1-STR-B10-DWG-506RW.DWG
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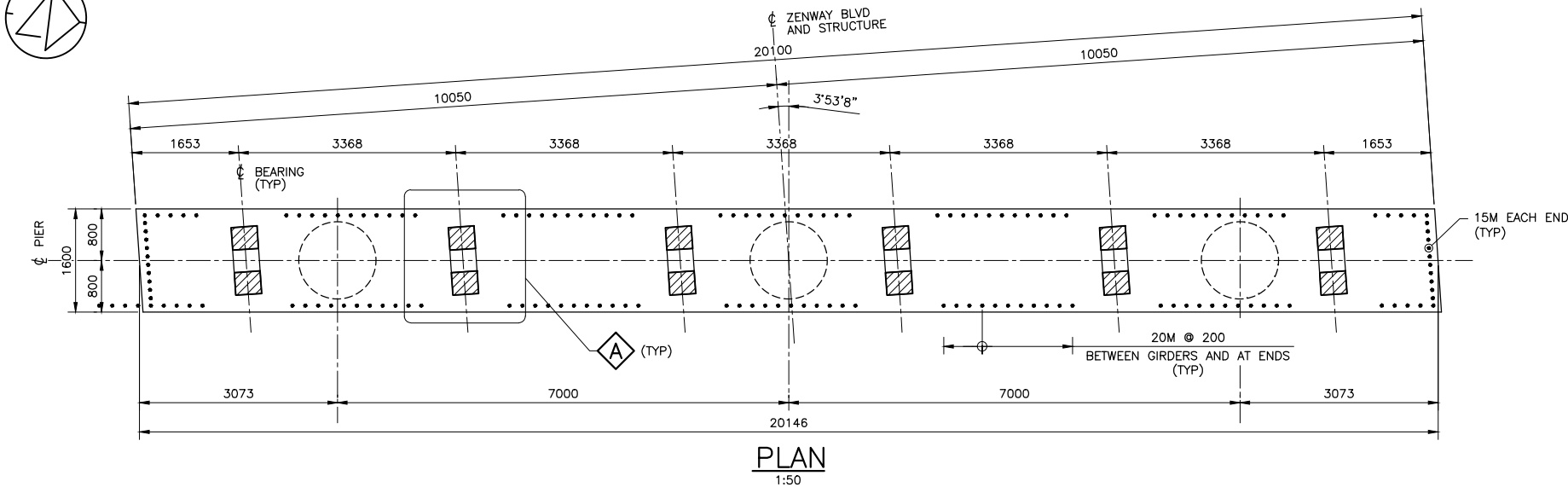
NO.	DATE	REVISIONS
B	18/03/16	90% SUBMISSION TO CA
A	18/01/12	90% SUBMISSION TO CA

SCALE :
AS NOTED

DESIGNED	ZHONG LIU
DRAWN	SCOTT CLAYTON
CHECKED	MICHAEL HATCH
APPROVED LEAD ENGR.	TATIANA QJALA
APPROVED PROJ. MANAGER	



TITLE							
HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS RETAINED SOIL SYSTEMS WALL LAYOUT II							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE TYPE	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	505	B

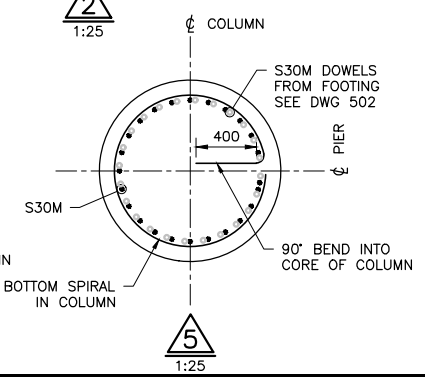
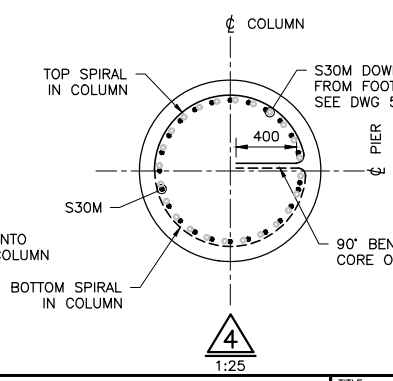
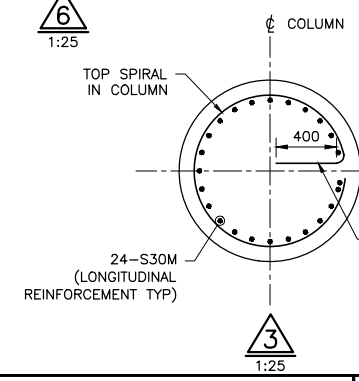
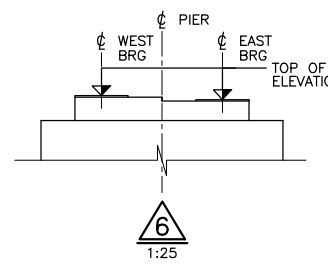
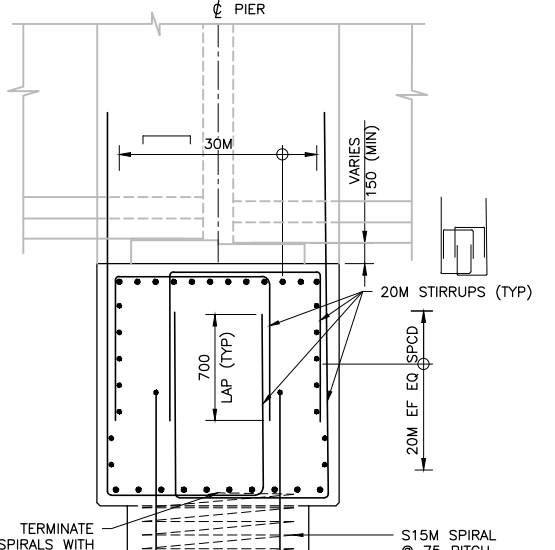
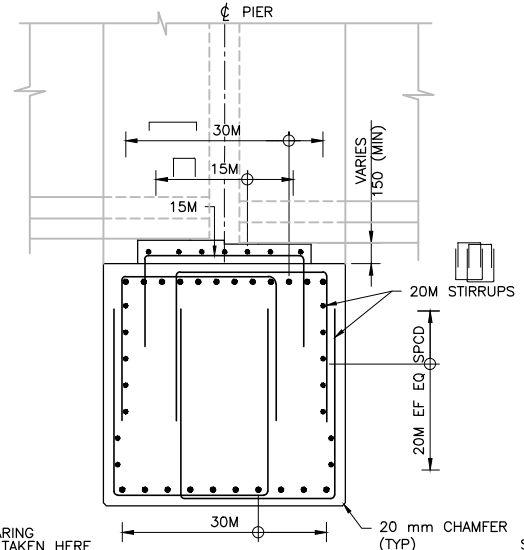
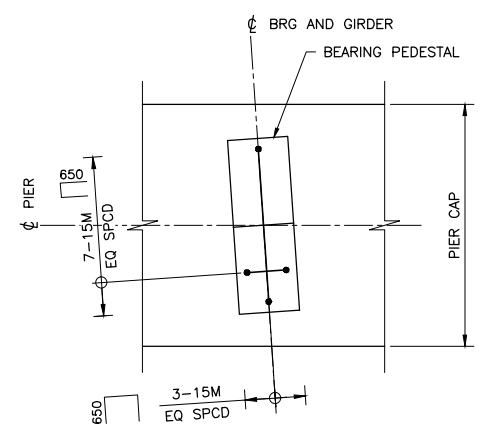
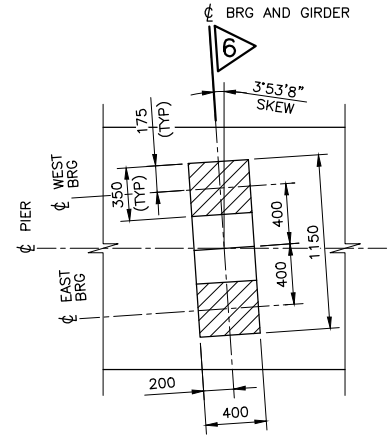
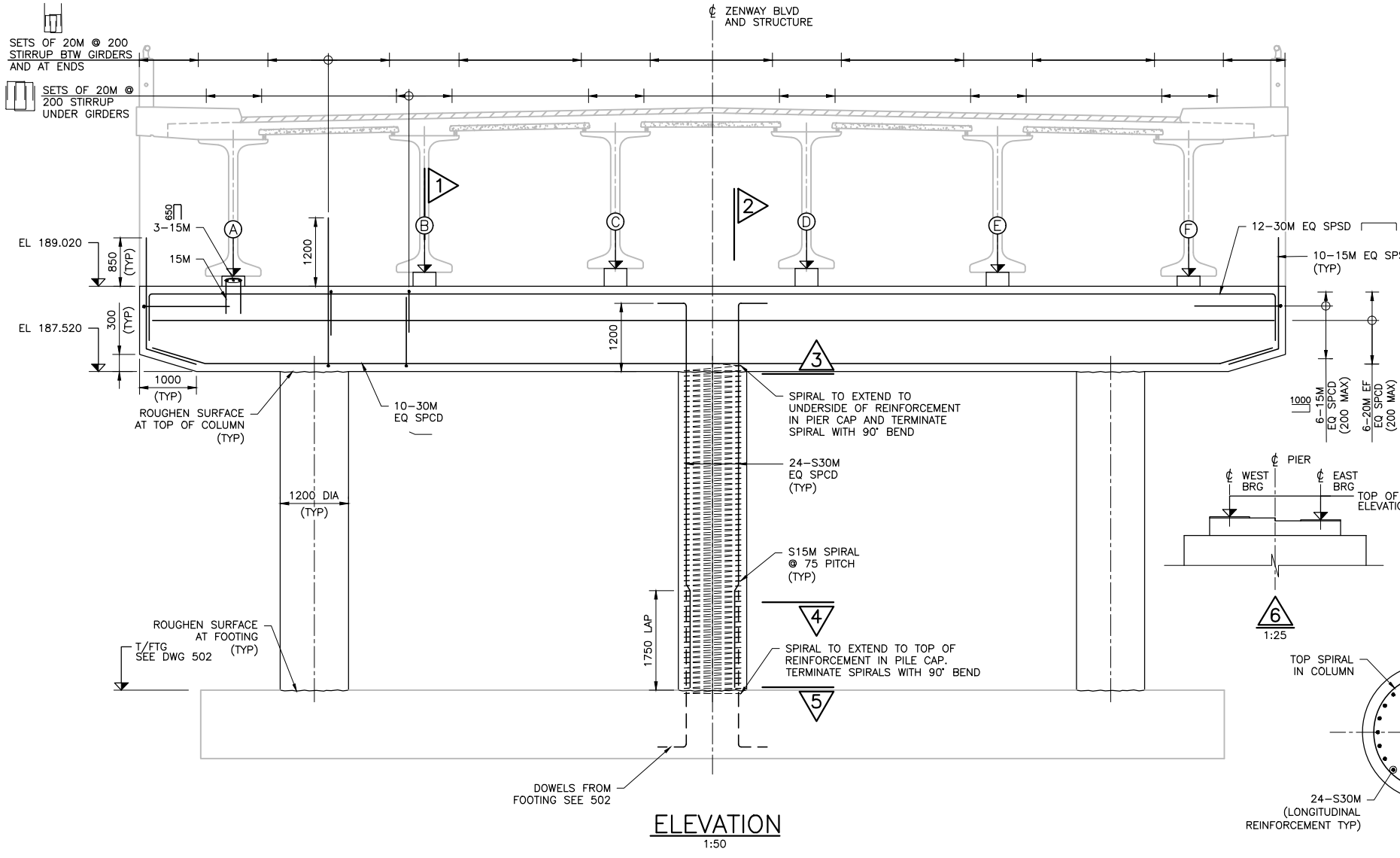


TOP OF BEARING ELEVATIONS*						
GIRDER LINES	A	B	C	D	E	F
WEST BRG	189.260	189.319	189.379	189.372	189.297	189.223
EAST BRG	189.234	189.294	189.354	189.346	189.271	189.197

* SEE CONSTRUCTION NOTES ON GENERAL ARRANGEMENT DRAWING

NOTES:
1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DWG. 502

LIST OF ABBREVIATIONS:
SPSD SPACED



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 DATE PLOTTED: 1/5/2018 2:37:09 PM BY: PANG, SONIA

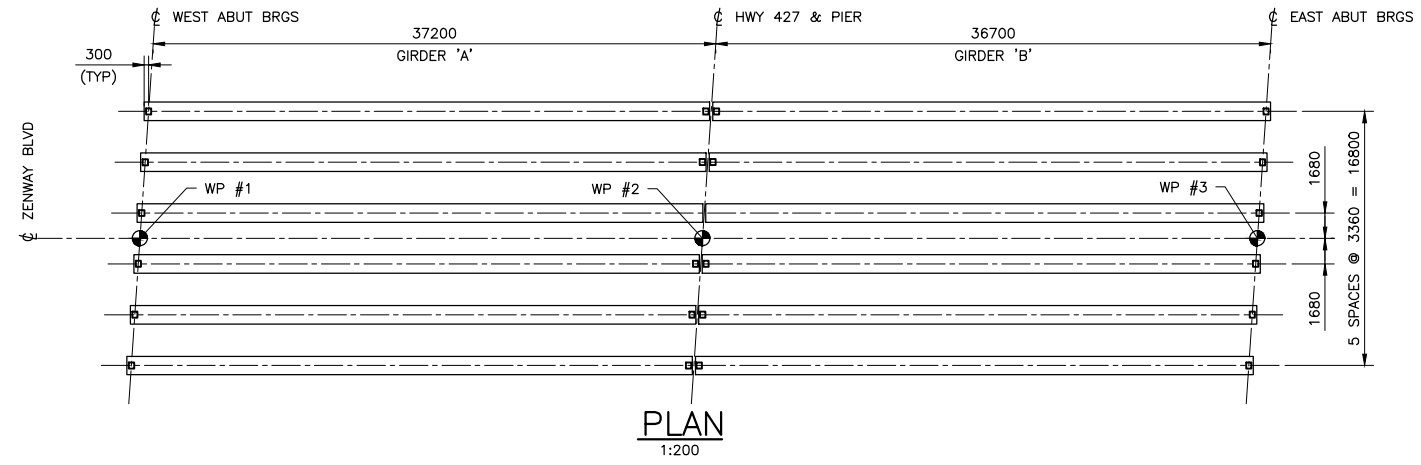
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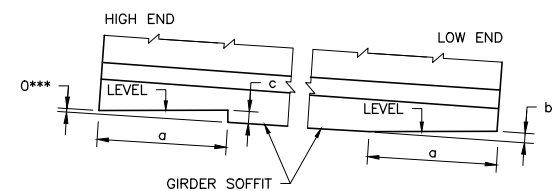
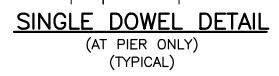
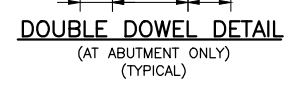
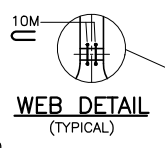
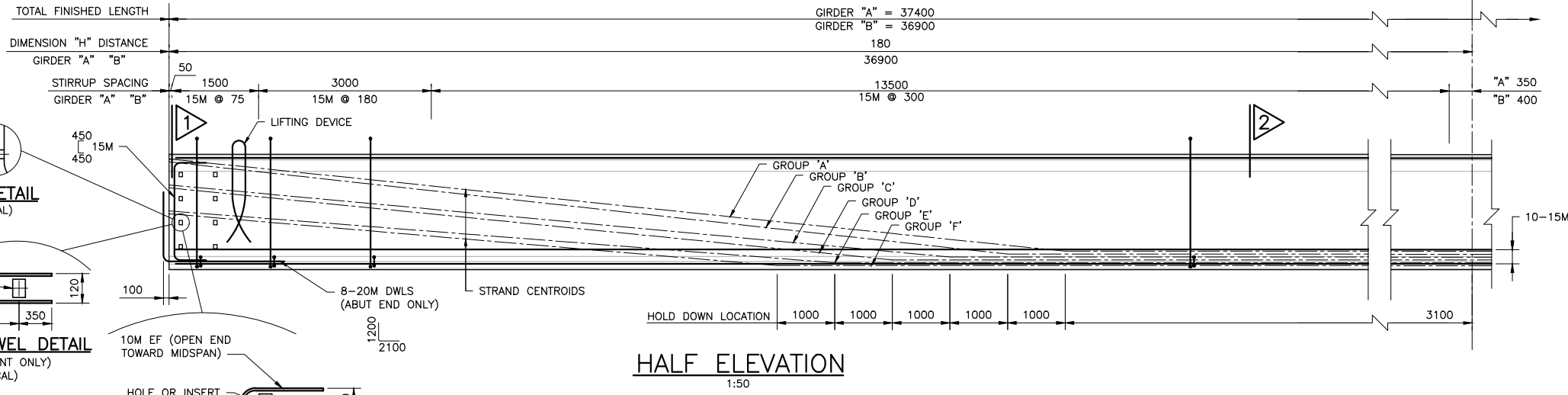
DESIGNED	HOSSEN AZMI	HOA
DRAWN	SHARON HUNG	SH
CHECKED	ZHONG LIU	ZL
APPROVED LEAD ENGR	TATIANA QJALA	TD
APPROVED PROJ. MANAGER		
NAME (PRINT)		INIT. DATE



TITLE							
HWY 427 EXPANSION							
HWY 427							
AT ZENWAY BLVD UNDERPASS							
PIER DETAILS AND REINFORCEMENT							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	506	B

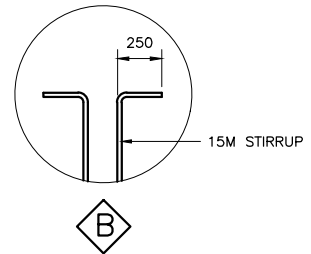
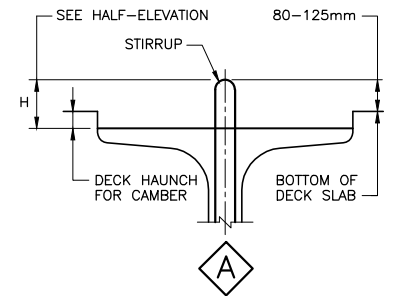
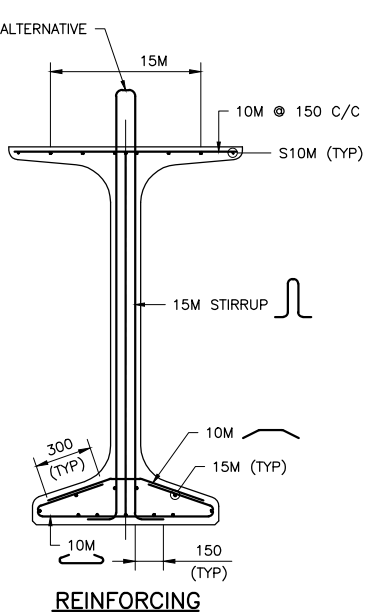
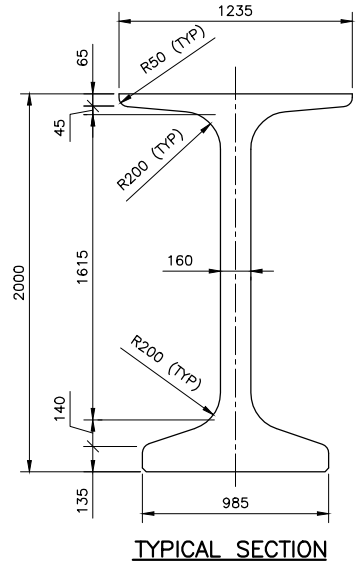
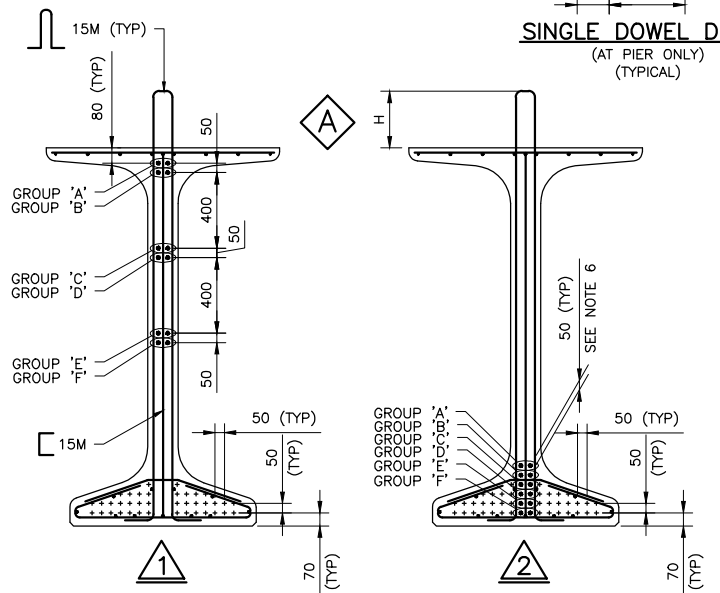


- NOTES:**
1. PRESTRESSING STEEL SHALL BE LOW-RELAXATION SEVEN WIRE STRANDS, SIZE DESIGNATION 15, GRADE 1860.
 2. MINIMUM BREAKING STRENGTH OF STRAND 261kN.
 3. JACKING FORCE PER STRAND 195 kN.
 4. FORCE PER STRAND AFTER ALL LOSSES 158 kN.
 5. THE ELAPSED TIME INTERVAL BETWEEN JACKING OF STRANDS AND TRANSFER SHALL NOT BE LESS THAN 15 HOURS.
 6. PRESTRESSING STRANDS SHALL BE SPACED VERTICALLY AT A MINIMUM OF 150mm IN THE VICINITY OF RECTANGULAR HOLES OR INSERTS FOR 20M DOWELS.
 7. CLASS OF CONCRETE:
PRECAST GIRDERS 60 MPa
 8. MIN. CONCRETE STRENGTH AT TRANSFER 45 MPa.
 9. REINFORCING STEEL SHALL BE GRADE 400W.
 10. CLEAR COVER TO REINFORCING STEEL UNLESS SHOWN OTHERWISE:
-SOFFIT OF BEAM (EXCEPT UNDERCUT) 46 +15mm/-5mm
-TOP OF BEAM 30 +15mm/-5mm
-UNDERCUT OF BEAM AND ELSEWHERE 25 + 5mm/-5mm
 11. FOR BRIDGES ON GRADES EXCEEDING 3%, THE ENDS OF GIRDERS SHALL BE CAST SO THAT THEY ARE VERTICAL WHEN ERRECTED.
 12. DRAWING TO BE READ IN CONJUNCTION WITH SS107-22.
 13. NO WELDING SHALL BE PERMITTED UNLESS APPROVED BY THE OWNER.
 14. GIRDERS SHALL BE TEMPORARILY ANCHORED AND BRACED TO THE ABUTMENTS AND PIER UNTIL THE CONCRETE DECK REACHES 70% OF ITS SPECIFIED 28-DAY STRENGTH. AT MINIMUM, TEMPORARY GIRDER BRACING TYPE II SHALL BE PROVIDED AS DEFINED IN SECTION 7.2.5 OF DIVISION 2 OF THE MTO STRUCTURAL MANUAL DATED AUGUST 2014. THE CONTRACTOR SHALL DETERMINE THE BRACING MEMBER SIZES, ANCHORAGE, AND ANY ADDITIONAL BRACING AS REQUIRED BY THEIR DESIGN.



GIRDER TYPE	a	b	c
A	600	19	12
B	600	28	18

*** NO UNDERCUT TO BE PROVIDED AT HIGH END



GIRDER SOFFIT DETAIL AT BEARINGS

NU2000

STANDARD DRAWING SEPT, 2016	MODIFIED SS107-22
PRESTRESSED NU GIRDERS AND BEARINGS (NU 2000)	

CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP_SONIA\DWG\SS107-22-STR-B10-DWG-507P6.DWG
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A 18/01/12	90% SUBMISSION TO CA				

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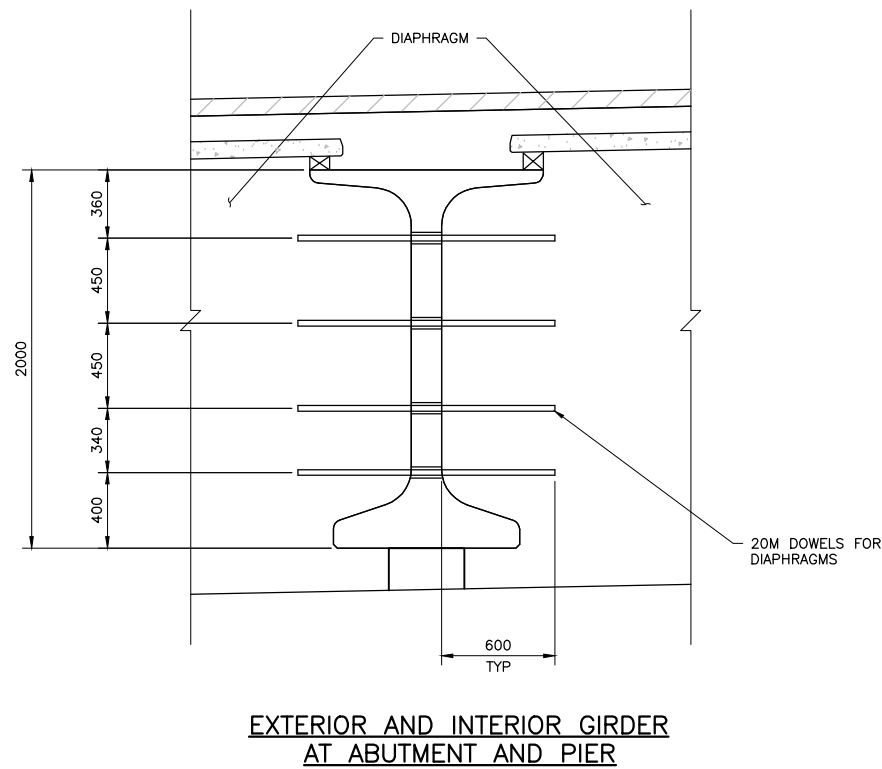
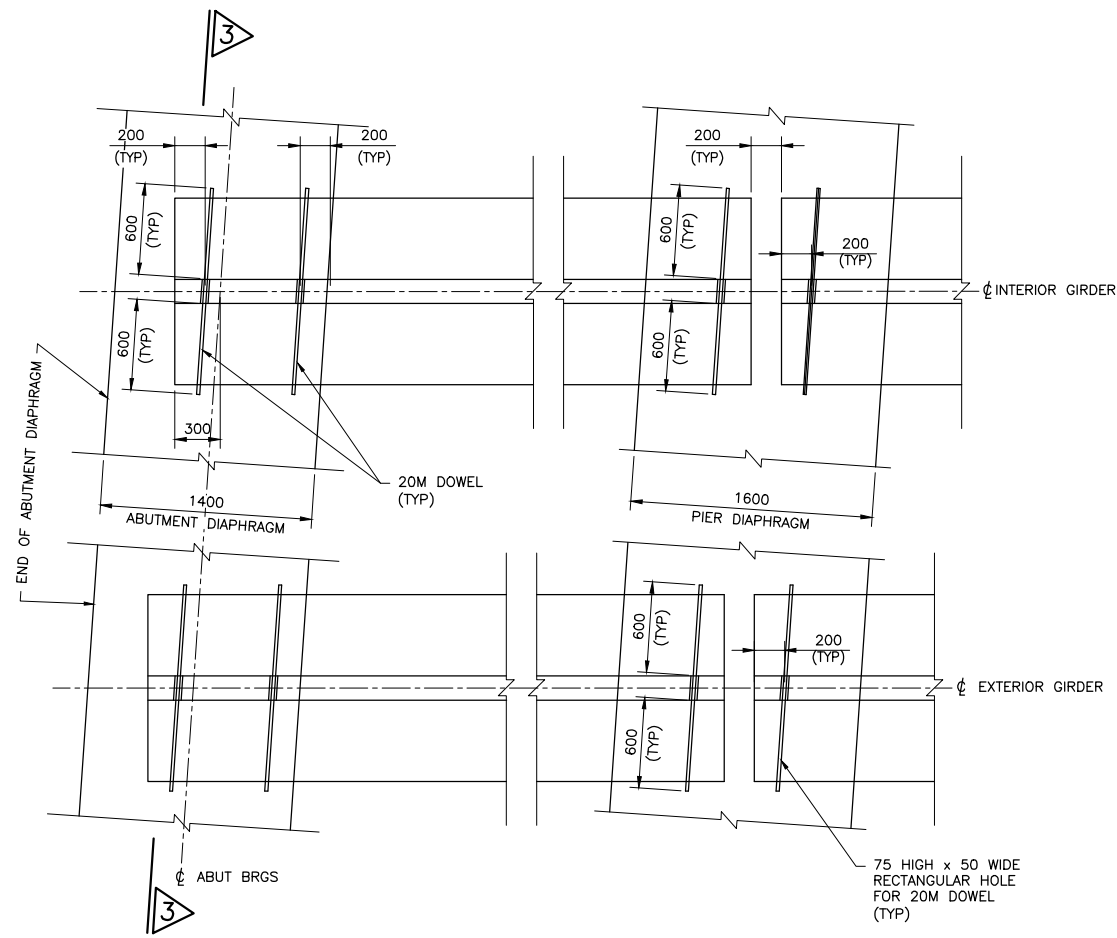
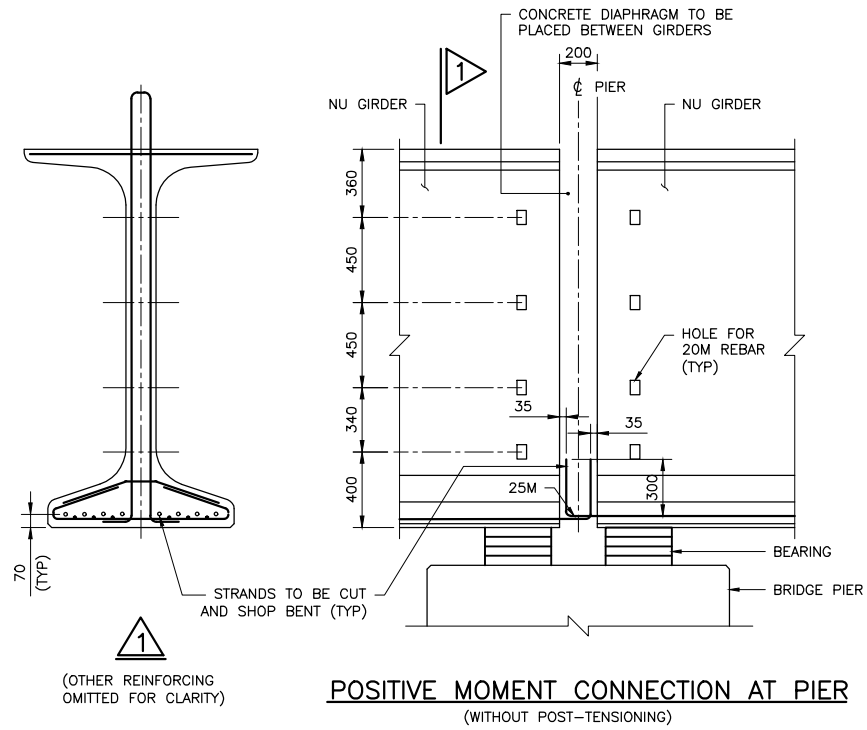
AS NOTED

DESIGNED	ZHONG LIU
DRAWN	SHARON HUNG
CHECKED	HOSSEIN AZMI
APPROVED LEAD ENGR.	TATIANA QJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INIT. DATE



TITLE HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS PRESTRESSED NU GIRDERS AND BEARINGS (NU 2000)						
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER
H427-D	N	1	STR	B10	DWG	507
						B

- NOTES:**
1. THIS DRAWING SHOWS TYPICAL DETAILS FOR PRESTRESSED NU GIRDERS AND IS TO BE READ IN CONJUNCTION WITH DRAWING SS107-22.
 2. DOWEL INSERTS SHALL BE ZINC PLATED OR HOT-DIP GALVANIZED.
 3. DOWEL INSERTS SHALL BE CAPABLE OF DEVELOPING A FORCE IN TENSION OF 20kN AT SERVICEABILITY LIMIT STATE LOADING.
 4. FOR THE DIAPHRAGM, THE PRECASTER WILL SUPPLY THE THREADED INSERTS AND THE MATCHING DIAPHRAGM DOWELS FOR THE EXTERIOR GIRDERS ONLY.
 5. 20M DEFORMED BAR DOWELS FOR EXTERIOR GIRDERS SHALL BE THREADED AT ONE END TO MATCH INSERTS.
 6. AT END OF GIRDERS WHICH ARE NOT TO BE ENCASED IN CONCRETE, STRANDED ENDS SHALL BE RECESSED AND GROUTED, AND GIRDER END FACE SHALL BE PAINTED WITH TWO COATS OF ASPHALTIC PAINT.
 7. DIMENSION MAY BE ADJUSTED TO ENSURE NO INTERFERENCE WITH DEFLECTED STRANDS.



BEARING DATA	REQUIREMENTS AT SERVICEABILITY LIMIT STATES LOADING		
	WEST ABUTMENT	PIER	EAST ABUTMENT
DEAD LOAD (kN)	1450	1100	1450
TOTAL LOAD (kN)	N/A	N/A	N/A
MOVEMENT (mm)	N/A	N/A	N/A
MAXIMUM SHEAR RATE (kN/mm)	N/A	N/A	N/A
BEARING SIZE (mm)	400x350x20	400x350x20	400x350x20
NUMBER REQUIRED	6	12	6
BEARING TYPE	PLAIN	PLAIN	PLAIN

STANDARD DRAWING SEPT, 2016		MODIFIED SS107-24
PRESTRESSED NU GIRDERS - DETAILS		

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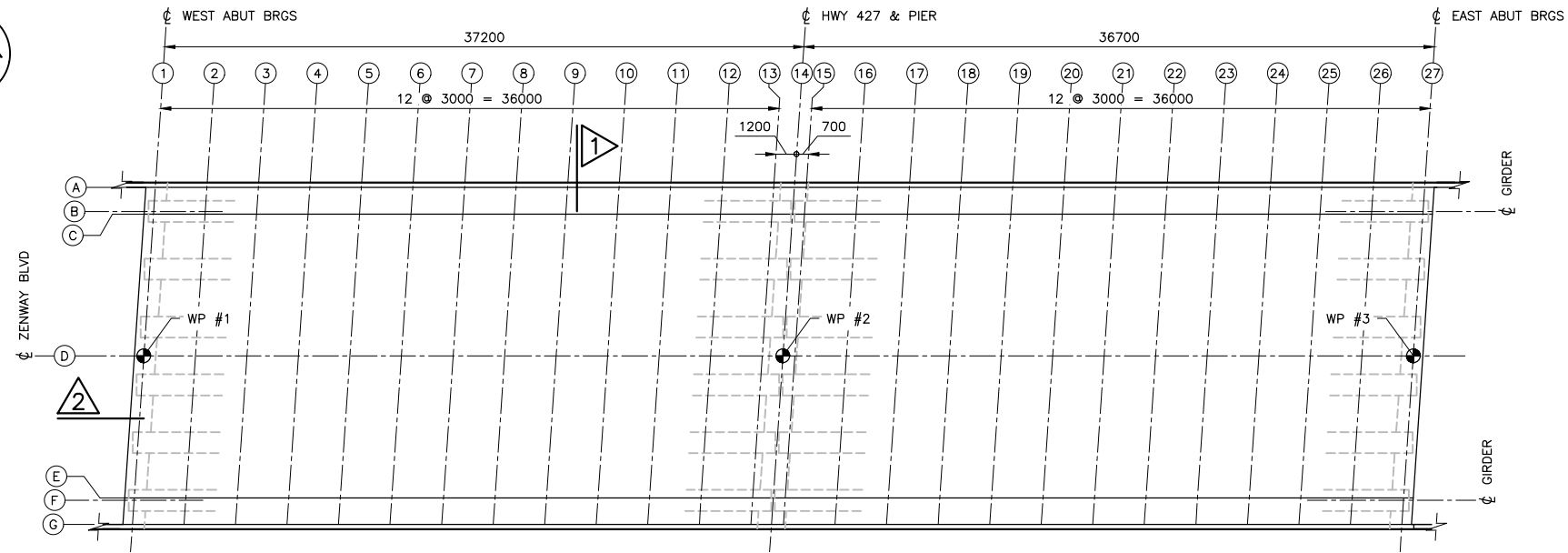
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DESIGNED	ZHONG LIU		
DRAWN	SHARON HUNG		
CHECKED	HOSSEIN AZMI		
APPROVED LEAD ENGR.	TATIANA QJALA		
APPROVED PROJ. MANAGER			
NAME (PRINT)		INIT.	DATE

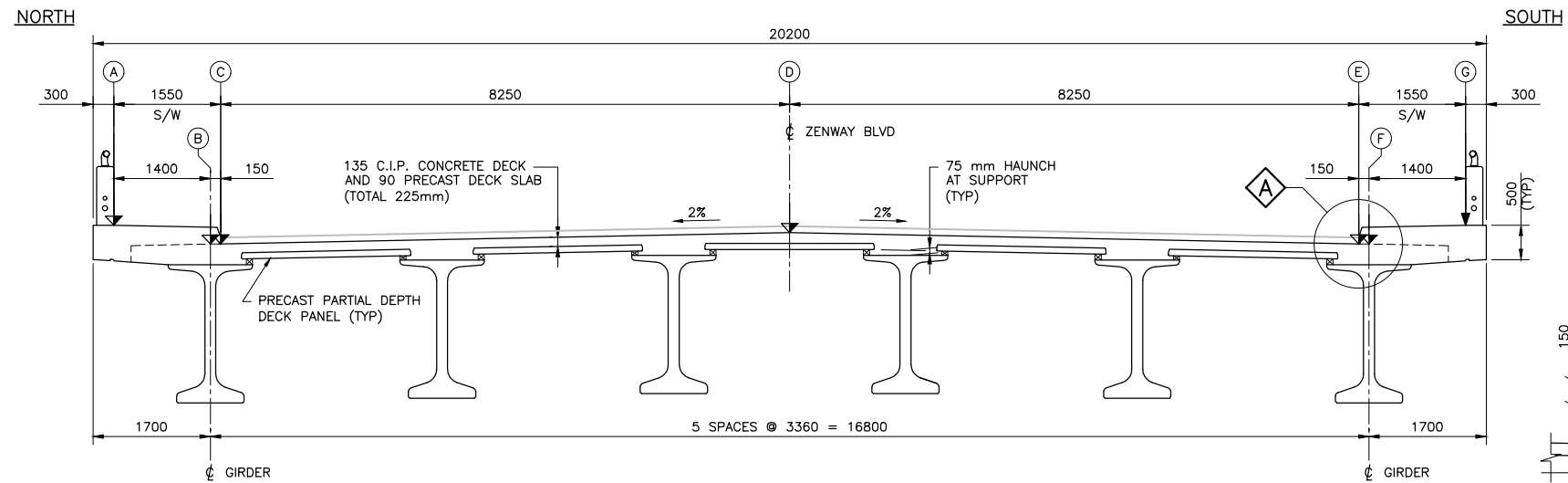


TITLE HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS PRESTRESSED NU GIRDER DETAILS							
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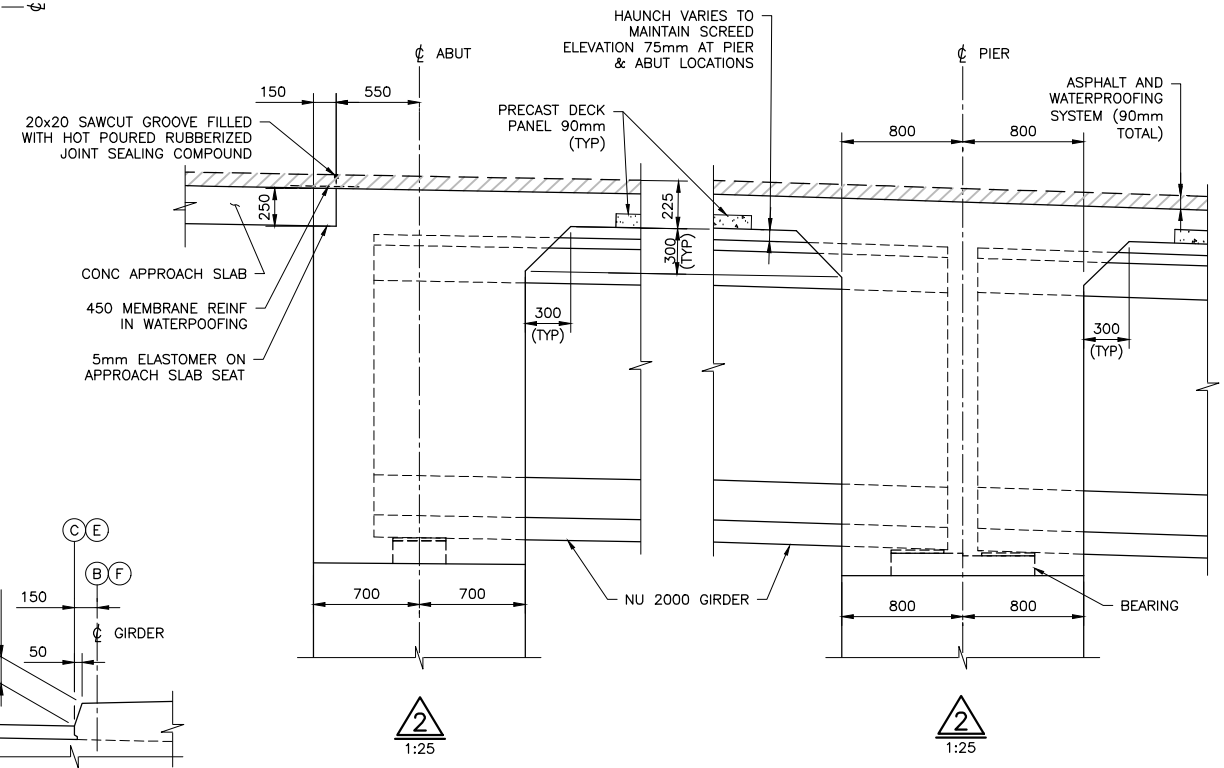


PLAN

1:200
NOTE: PRECAST DECK PANELS NOT SHOWN FOR CLARITY.



1
1:50



A
1:25

NOTES:

1. ALL DIAPHRAGMS SHALL BE CAST INTEGRAL WITH DECK SLAB AND CONCRETE IN DIAPHRAGMS SHALL BE VIBRATED THOROUGHLY.
2. SCREED ELEVATIONS ARE TO TOP OF CONCRETE.
3. SCREEN ELEVATIONS SHOWN IN TABLE INCLUDE AN ALLOWANCE FOR ROADWAY PROFILE, WEIGHT OF DECK SLAB AND SUPERIMPOSED DEAD LOAD.
4. CONCRETE IN DECK SLAB SHALL BE RETARDED USING A TYPE "Rx" RETARDER FOR THE DURATION OF THE POUR.
5. CONCRETE SHALL REMAIN IN PLASTIC IN POURING OF SEGMENTS WITH THE SAME SEQUENCE NUMBER.
6. MINIMUM CONCRETE STRENGTH OF PREVIOUS DECK POUR SHALL BE 20MPa BEFORE PROCEEDING WITH THE NEXT POUR.
7. CONCRETE IN BARRIER WALLS AND SIDEWALK SHALL NOT BE PLACED UNTIL ALL CONCRETE IN DECK SLAB HAS REACHED A STRENGTH OF 20MPa.
8. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DWG. 503, 510 AND 513.

SCREED ELEVATIONS (m)

GRID No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
A	192.696	192.654	192.608	192.557	192.500	192.436	192.364	192.288	192.204	192.113	192.016	191.912	191.804	191.760	191.739	191.651	191.558	191.461	191.357	191.247	191.130	191.006	190.876	190.737	190.595	190.446	190.295
B	192.423	192.381	192.336	192.285	192.228	192.164	192.093	192.016	191.932	191.842	191.744	191.641	191.533	191.489	191.469	191.380	191.287	191.191	191.087	190.977	190.860	190.736	190.606	190.467	190.325	190.177	190.026
C	192.426	192.385	192.339	192.288	192.232	192.168	192.096	192.019	191.935	191.845	191.748	191.644	191.537	191.493	191.472	191.384	191.291	191.194	191.090	190.981	190.863	190.739	190.609	190.471	190.328	190.180	190.029
D	192.601	192.560	192.515	192.465	192.408	192.346	192.275	192.199	192.116	192.026	191.928	191.826	191.719	191.676	191.655	191.568	191.475	191.380	191.276	191.167	191.051	190.928	190.798	190.660	190.518	190.371	190.221
E	192.446	192.406	192.362	192.312	192.257	192.194	192.123	192.048	191.966	191.876	191.781	191.678	191.572	191.529	191.508	191.421	191.330	191.235	191.132	191.024	190.908	190.785	190.656	190.520	190.378	190.231	190.082
F	192.443	192.403	192.359	192.309	192.254	192.191	192.121	192.046	191.963	191.874	191.778	191.676	191.570	191.526	191.506	191.419	191.327	191.232	191.130	191.021	190.905	190.783	190.654	190.517	190.376	190.229	190.079
G	192.719	192.678	192.635	192.585	192.530	192.467	192.397	192.322	192.240	192.150	192.055	191.952	191.847	191.803	191.783	191.696	191.605	191.510	191.407	191.299	191.183	191.061	190.932	190.795	190.654	190.507	190.358

APPLICABLE STANDARD DRAWINGS:

- OPSD-3310.100 DECK GIRDERS, CONCRETE, METHOD OF OBTAINING SCREEN ELEVATIONS.
- OPSD-3329.100 DECK REINFORCEMENT SUPPORTS FOR REINFORCING STEEL FOR SLAB DEPTH 300 mm OR LESS.
- OPSD-3370.100 DECK, WATERPROOFING, HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD.
- OPSD-3370.101 DECK, WATERPROOFING, HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2 mm WIDE AND CONSTRUCTION JOINTS.
- OPSD-3390.100 DECK, DRIP CHANNEL.
- OPSD-3950.100 JOINTS CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE.

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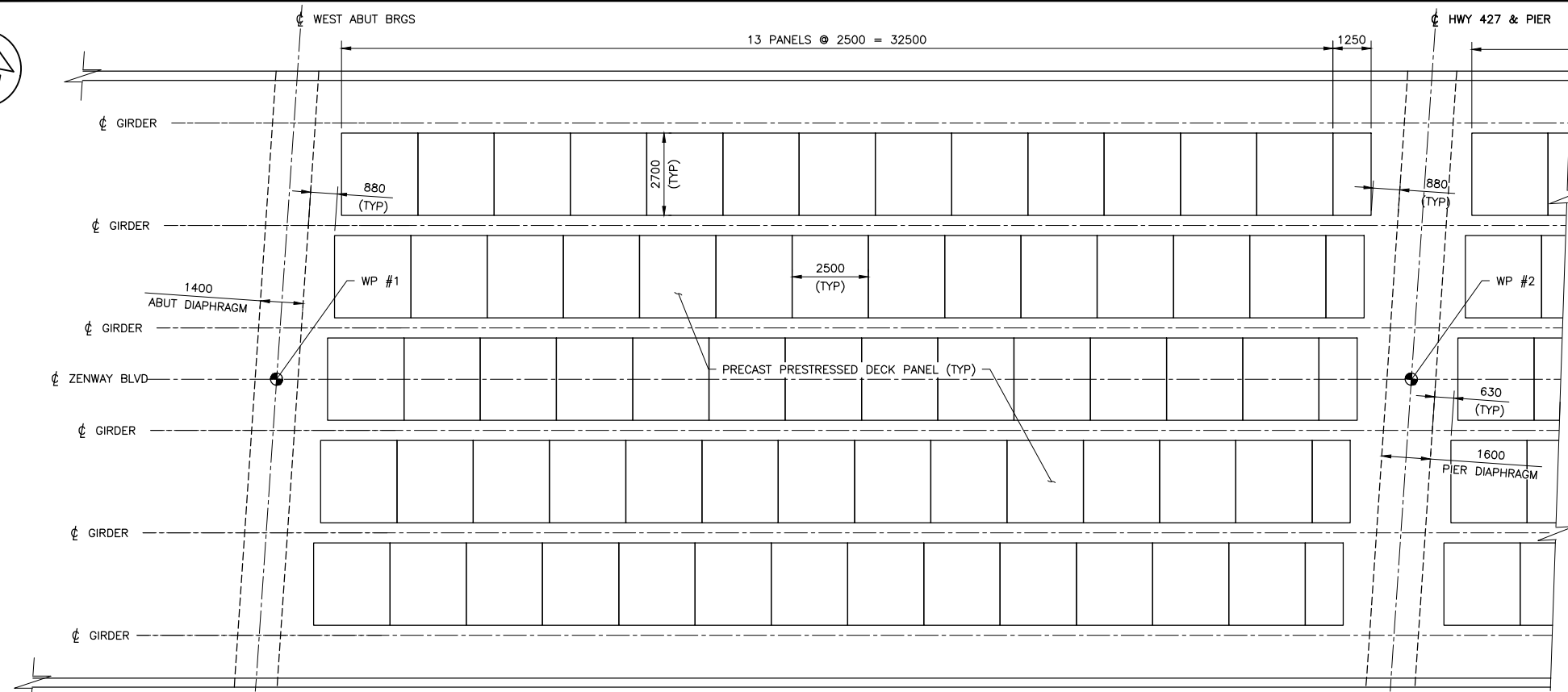
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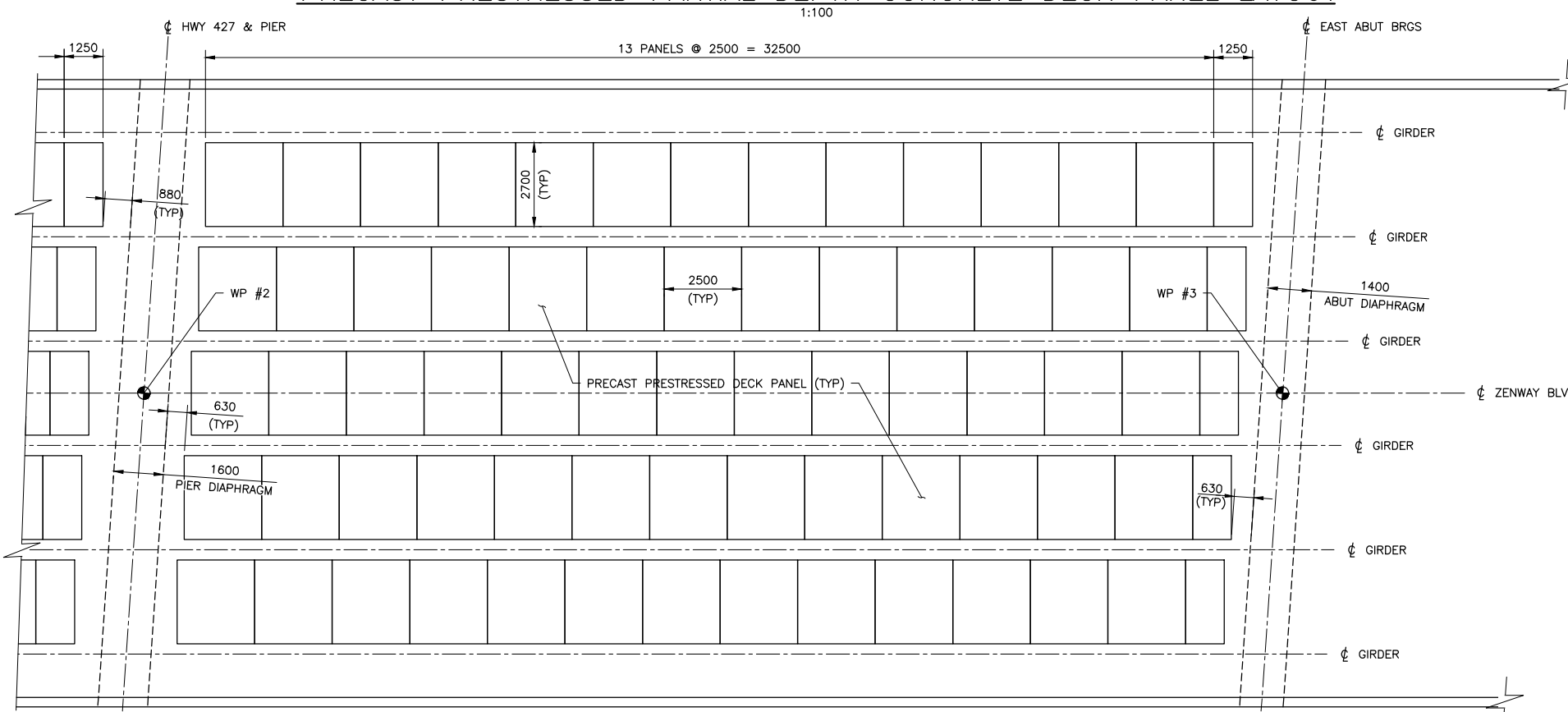
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DRAWN	SONIA PANG
CHECKED	MICHAEL HATCH
APPROVED LEAD ENGR.	TATIANA QJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INIT. DATE



HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS							
DECK LAYOUT AND SCREED ELEVATIONS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	509	B



PRECAST PRESTRESSED PARTIAL DEPTH CONCRETE DECK PANEL LAYOUT



PRECAST PRESTRESSED PARTIAL DEPTH CONCRETE DECK PANEL LAYOUT

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DWG 509, 511 AND 512.

LIST OF ABBREVIATIONS:

WP WORKING POINT

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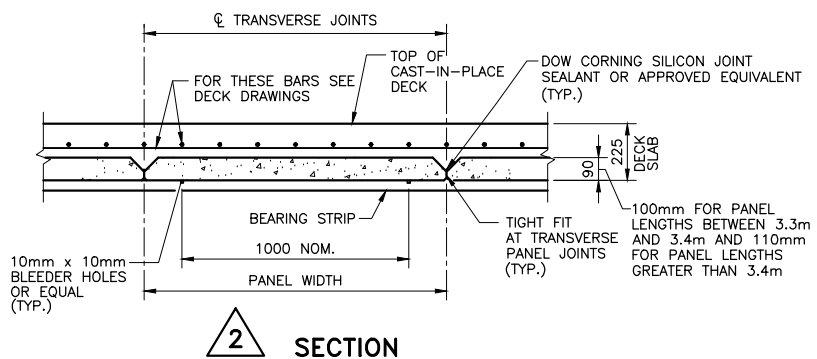
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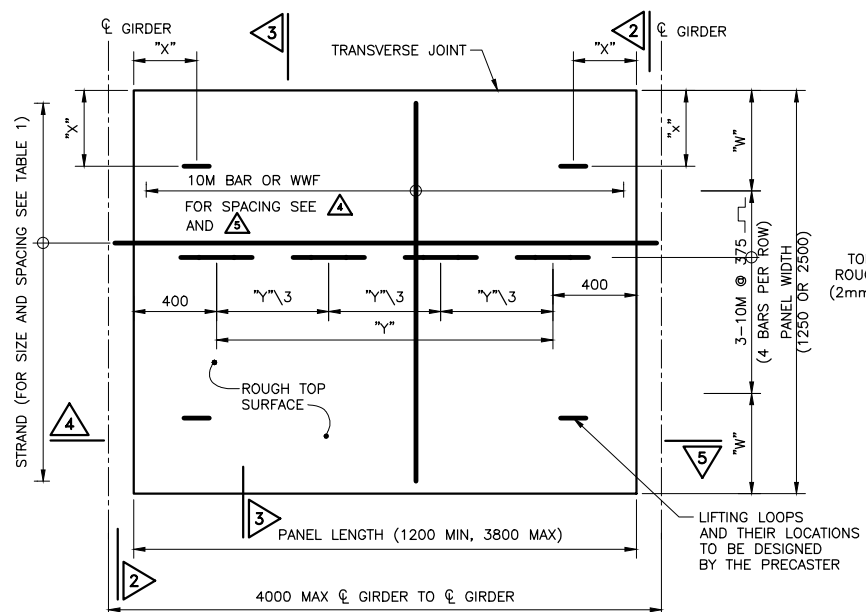
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DRAWN	SONIA PANG
CHECKED	MICHAEL HATCH
APPROVED LEAD ENGR.	TATIANA GJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INIT. DATE



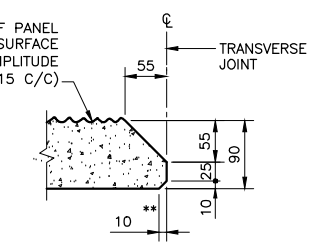
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HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS PRECAST DECK PANEL LAYOUT							
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H427-D	N	1	STR	B10	DWG	510	B



SECTION 2

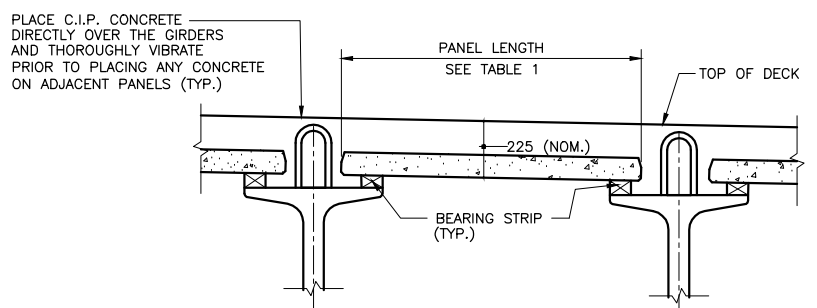


PLAN OF TYPICAL PRESTRESSED DECK PANEL (ALL PANEL LENGTHS)

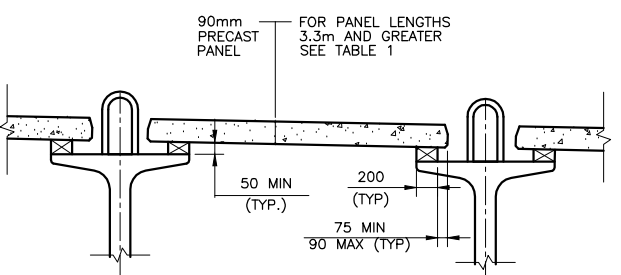


SECTION 3

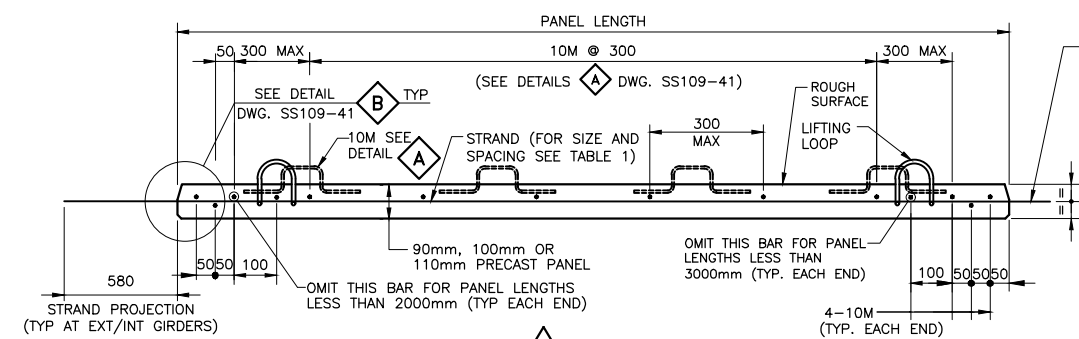
** TERMINATE THE BOTTOM CHAMFER 150mm FROM THE ENDS OF PANEL.



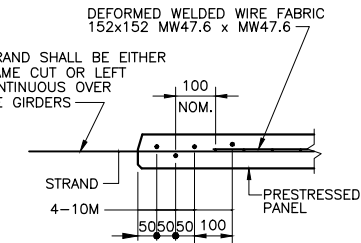
HALF SECTIONS



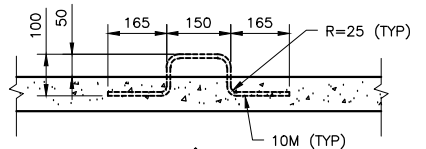
BEARING STRIP SUPPORT DETAIL



SECTION 4 PRESTRESSED PANEL



SECTION 5 (ALTERNATE DETAIL WITH WWF) (PRESTRESSED PANELS ONLY)



TRANSFER REBAR DETAIL

TABLE OF PRESTRESS DATA														
PANEL LENGTH (m)	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8
STRAND DIA (mm)	9 mm DIA													
STRAND SPACING (mm)	300	300	300	300	275	250	225	175	150	125	100	100	75	75
JACKING FORCE (kN)	77 kN													
BREAKING STRENGTH (kN)	102 kN													
PANEL THICKNESS (mm)	90 mm													
SEE SECTION A AND DETAILS C & D														

GENERAL NOTES:

- THESE DRAWINGS SHOW DETAILS FOR STAY-IN-PLACE PRECAST CONCRETE BRIDGE DECK PANELS FOR USE WITH CONCRETE GIRDERS.
- PRECAST DECK PANELS MAY BE USED AS AN ALTERNATIVE TO FALSEWORK.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DWG. SS109-41 AND THE ASSOCIATED SPECIAL PROVISIONS FOR PRECAST PANELS.
- THE TOTAL COMPOSITE DECK SLAB THICKNESS SHALL BE 225mm.
- SHOP DRAWINGS SHOWING PANEL LAYOUT AND ASSOCIATED CONSTRUCTION DETAILS SHALL BE PRODUCED BY THE CONTRACTOR.
- PANELS WITH LENGTHS GREATER THAN 2.5m SHALL BE AT LEAST 30 DAYS OLD BEFORE INSTALLATION.
- THE BEARING STRIPS THAT ARE USED TO SUPPORT THE PANEL PRIOR TO POURING THE CAST-IN-PLACE TOPPING SHALL BE DETAILED BY THE PRECASTER AND SHALL REMAIN IN PLACE EXCEPT WHEN USED WITH A TIMBER SUPPORT SYSTEM.
- THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE PANELS DURING CONSTRUCTION.
- THE LONGITUDINAL REINFORCEMENT PLACED DIRECTLY ON THE PRECAST PANEL SHALL NOT HAVE LAP SPLICES OVER THE TRANSVERSE PANEL JOINTS.

DESIGN CRITERIA:

- ASSUMED CONSTRUCTION LOADING 2.4 kPa OF DECK SURFACE AREA.
- THE DECK PANELS ARE DESIGNED AS NON COMPOSITE TO SUPPORT THE DEAD LOAD OF THE PANEL, THE CAST-IN-PLACE CONCRETE TOPPING, 2.4 kPa OF CONSTRUCTION LOADING AND DESIGNED COMPOSITELY TO SUPPORT 90mm OF ASPHALT AND CHBDC TRAFFIC LOADS.
- PANELS WITH LENGTHS EQUAL TO OR GREATER THAN 1400mm SHALL BE PRESTRESSED.
- PANELS WITH LENGTHS LESS THAN 1400mm MAY BE UNSTRESSED.
- SLS DESIGN LIMIT FOR FLEXURAL STRESS FOR PRESTRESSED PANELS IS 2.5 MPa MAXIMUM TENSION AT THE MIDSPAN BOTTOM OF THE PANEL.
- IF THE CONCRETE STRENGTH OF THE CORRESPONDING CAST-IN-PLACE DECK IS GREATER THAN 40 MPa, THEN THE STRENGTH OF THE PRECAST PANEL SHALL BE INCREASED TO MATCH.
- WHEN THE REQUIRED PANEL LENGTH FALLS BETWEEN THOSE VALUES LISTED IN TABLE No.1 THEN USE THE STRAND SPACING FOR THE LARGER LISTED PANEL LENGTH.

MATERIALS:

- CONCRETE STRENGTHS**
30 MPa at STRAND RELEASE AND 40 MPa AT 28 DAYS
- PRESTRESSING STEEL**
PRESTRESSING STEEL SHALL BE LOW RELAXATION SEVEN WIRE STRAND, SIZE DESIGNATION 9 mm DIA. GRADE 1860 MPa AND SHALL MEET THE REQUIREMENTS OF CSA STANDARD G279-1982.
- REINFORCING STEEL**
REINFORCING STEEL SHALL BE GRADE 400W AND IN ACCORDANCE WITH CAN/CSA STANDARD G30.18-09.
- WIRE FABRIC**
DEFORMED WELDED WIRE FABRIC SHALL CONFORM TO CSA G30.15-M1983 (R1991)

STANDARD DRAWING AUG, 2015		MODIFIED SS109-40	
PRECAST DECK PANELS FOR CONCRETE GIRDERS - DETAILS I			

CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP-SONIA.PANG\DMSC4443\H427-00-1-STR-B10-DWG-511.PD.DWG
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18/03/16	90% SUBMISSION TO CA				
18/01/12	90% SUBMISSION TO CA				

SCALE :

AS NOTED

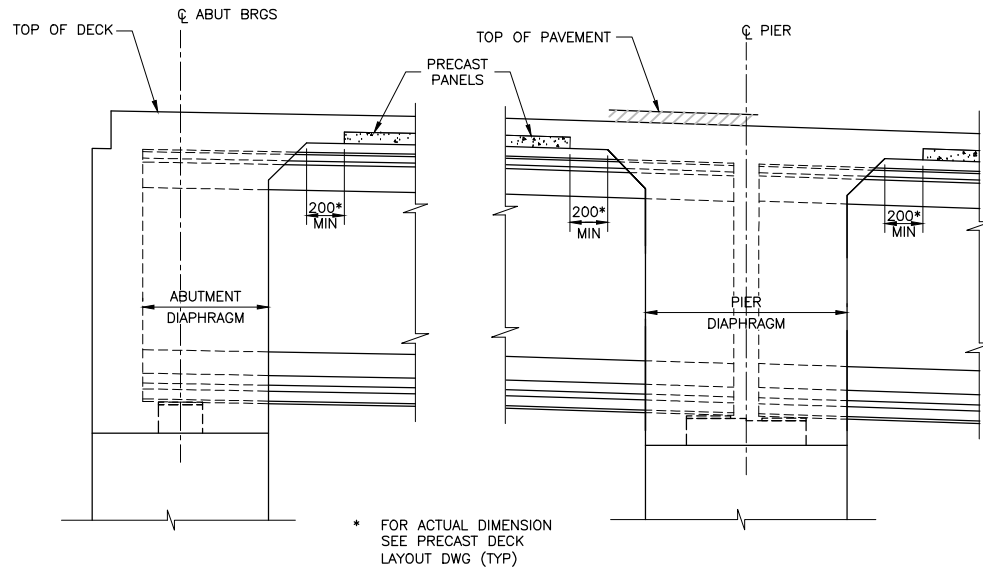
DESIGNED	ZHONG LIU	
DRAWN	SONIA PANG	
CHECKED	MICHAEL HATCH	
APPROVED LEAD ENGR.	TATIANA OJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



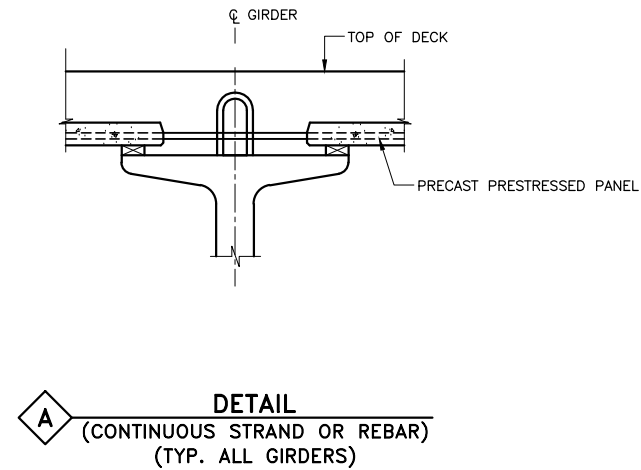
TITLE HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS PRECAST DECK PANEL FOR CONCRETE GIRDER - DETAIL I							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	511	B

GENERAL NOTES:

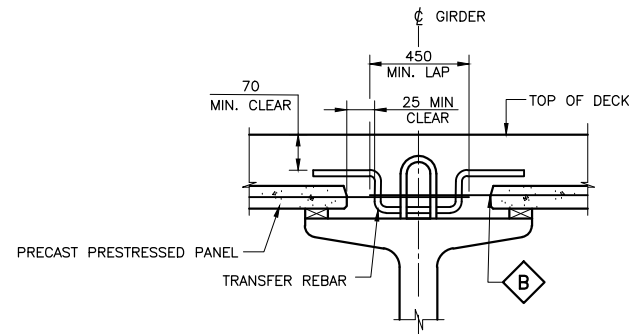
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DWG. SS109-40.
- THE EFFECTIVE TOP FLANGE DESIGN WIDTH FOR GIRDER INTERFACE SHEAR SHALL BE THE CLEAR HORIZONTAL DISTANCE BETWEEN EDGES OF ADJACENT PANELS.
- THE CONTRACTOR SHALL FIELD MEASURE OR TAKE SURVEY ELEVATIONS OF THE ACTUAL CAMBER ON THE GIRDER BEFORE DETAILING THE BEARING STRIP HEIGHTS.



AT ABUTMENT **AT PIER**
TYPICAL PLACING DETAILS FOR NU GIRDERS

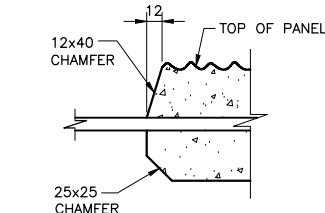


DETAIL A
(CONTINUOUS STRAND OR REBAR)
(TYP. ALL GIRDERS)

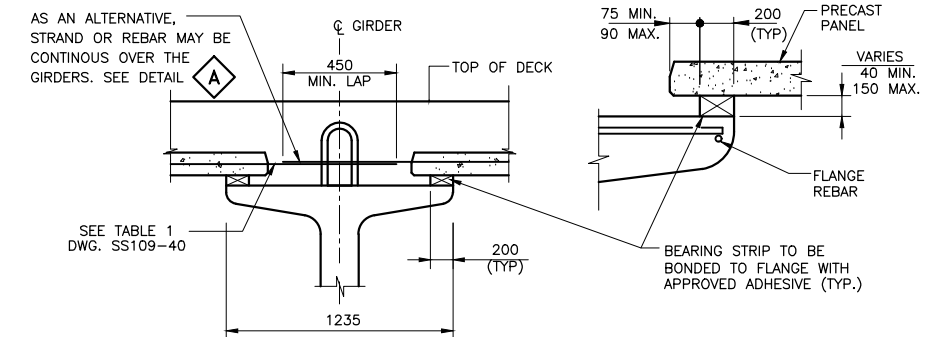


SECTION OF TRANSFER REBAR

NOTE:
 USE TRANSFER REBAR WHEN TOP OF GIRDER STIRRUP IS LESS THAN 25mm ABOVE TOP OF PANEL OR HAUNCH HEIGHT EXCEEDS 100mm.



CHAMFER DETAIL



ASSEMBLY DETAILS

STANDARD DRAWING AUG, 2015		MODIFIED SS109-41
PRECAST DECK PANELS FOR CONCRETE GIRDERS - DETAILS II		

CAD FILE LOCATION AND NAME: C:\PROJECTWISE\WSP-CA\WSP_SONIA.PANG\DMSC4443\4427-DO-1-STR-B10-DWG-512PDD.DWG
 MODIFIED: 1/11/2018 3:48:31 PM BY: PANGS
 DATE PLOTTED: 1/11/2018 3:50:16 PM BY: PANG, SONIA

DATE	REVISIONS	BY	CHK	LEAD	PROJ. MGR.
18/03/16	90% SUBMISSION TO CA				
18/01/12	90% SUBMISSION TO CA				

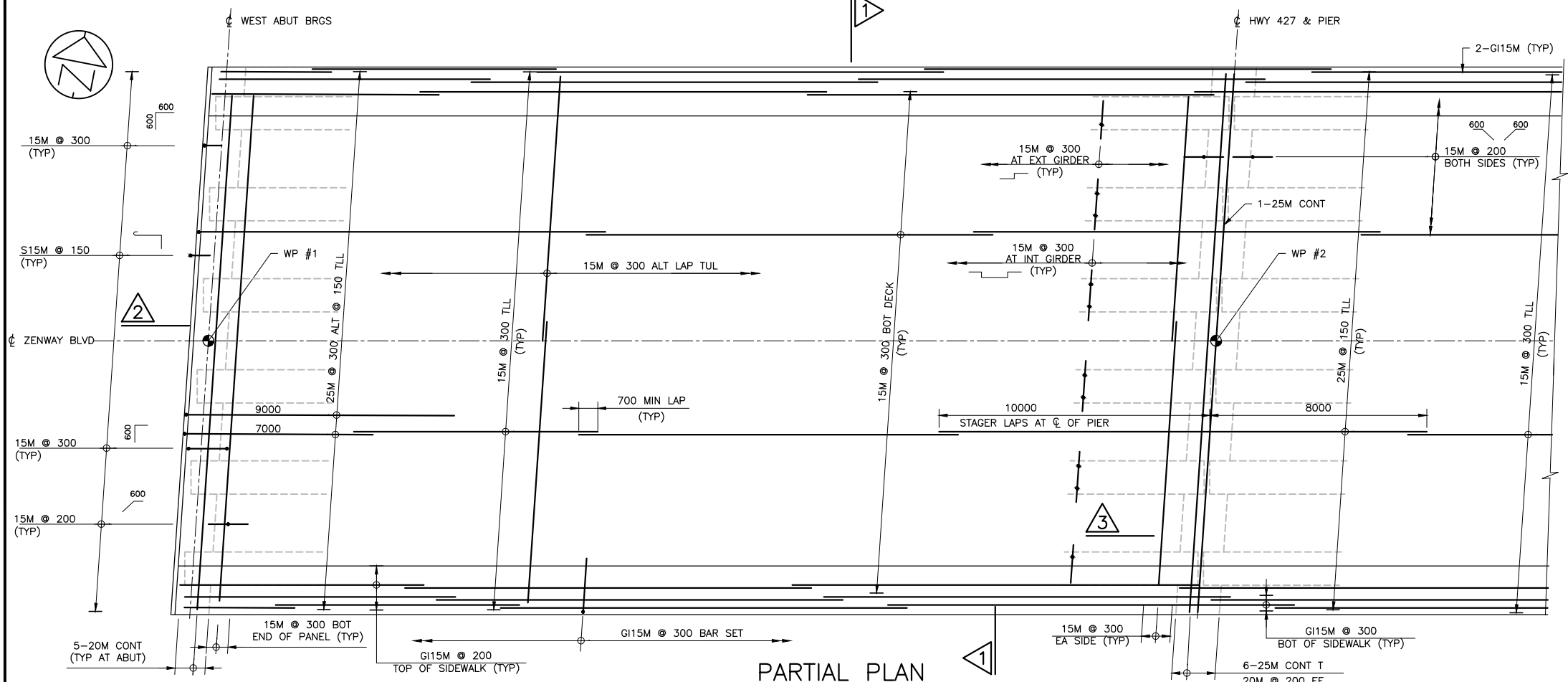
SCALE :

AS NOTED

DESIGNED	ZHONG LIU		
DRAWN	SONIA PANG		
CHECKED	MICHAEL HATCH		
APPROVED LEAD ENGR.	TATIANA QJALA		
APPROVED PROJ. MGR.			
NAME (PRINT)	INIT.	DATE	

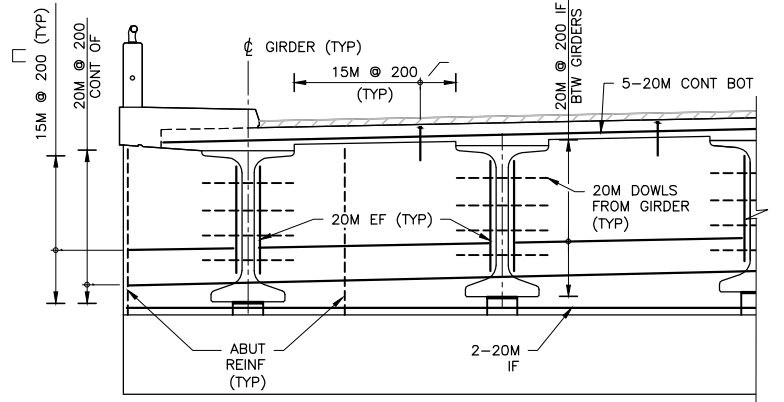


HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS PRECAST DECK PANEL FOR CONCRETE GIRDER - DETAIL II							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	512	B

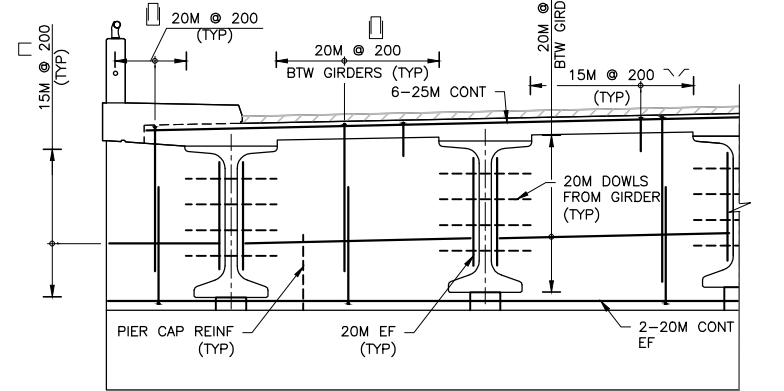


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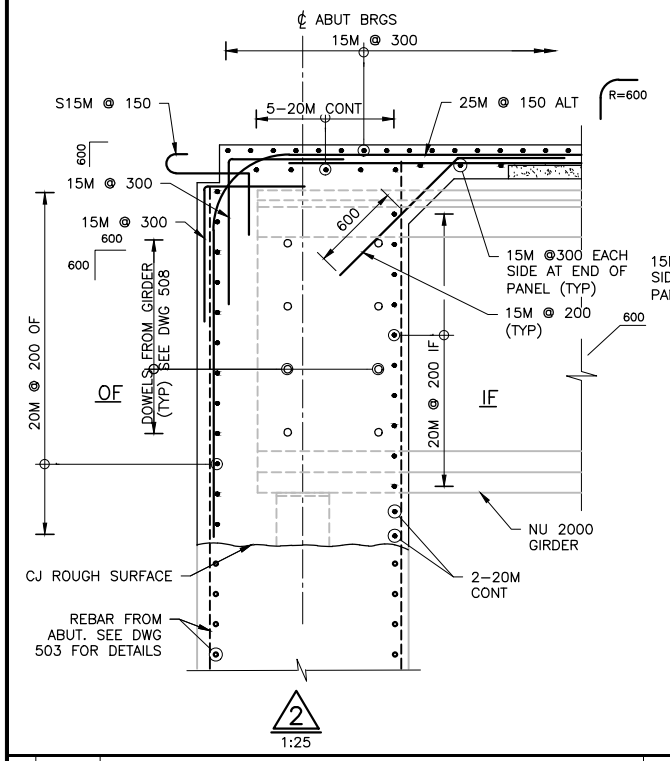
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING 503, 506, 507 AND 510.
2. ALL LAPS SHALL BE STAGGERED.



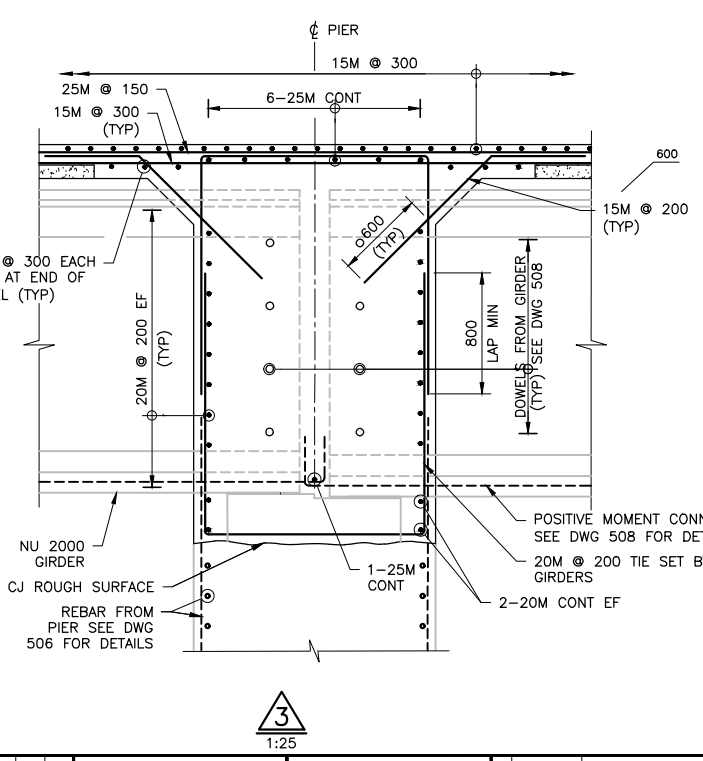
ABUT DIAPHRAGM
1:50



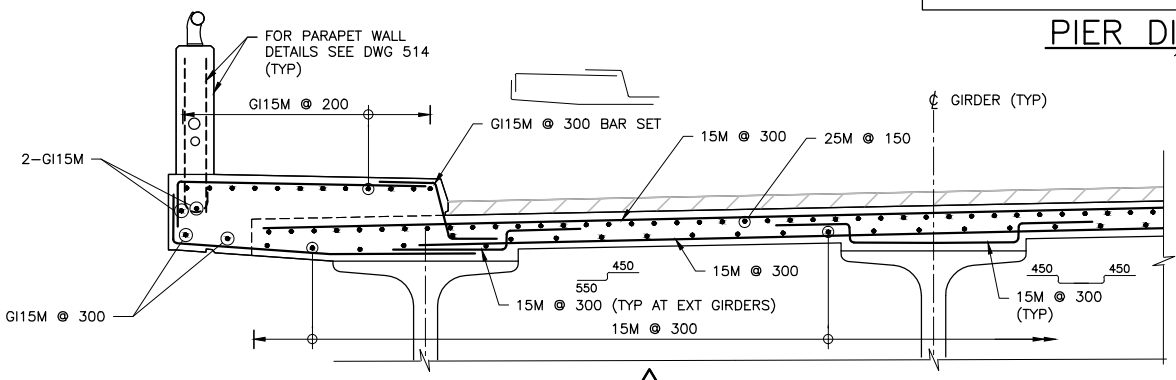
PIER DIAPHRAGM
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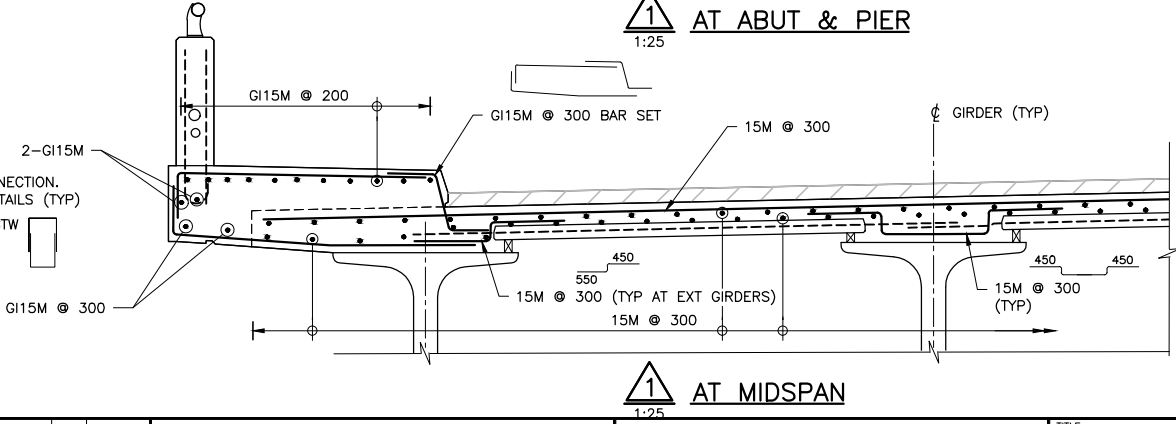
2
1:25



3
1:25



1
1:25
AT ABUT & PIER



1
1:25
AT MIDSPAN

LIST OF ABBREVIATIONS

- WP WORKING POINT
- INT INTERIOR
- EXT EXTERIOR
- BTW BETWEEN
- TUL TOP UPPER LEVEL
- TLL TOP LOWER LEVEL

CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP-SONIA.PANG\DMSC4443\H427-00-1-STR-B10-DWG-513DR.DWG
 MODIFIED: 1/11/2018 9:13:57 AM BY: PANGS
 DATE PLOTTED: 1/11/2018 9:14:20 AM BY: PANG, SONIA

DATE	REVISIONS	BY	CHK	LEAD	PROJ
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18/01/12	90% SUBMISSION TO CA				

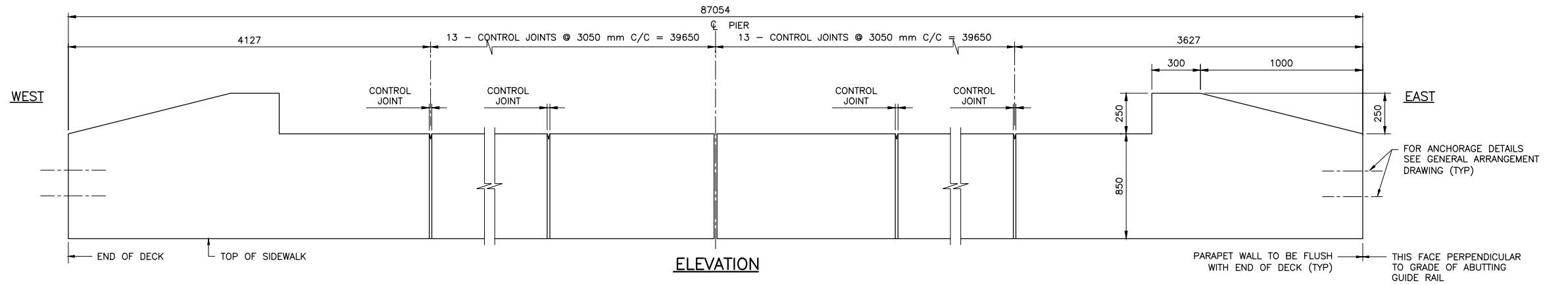
SCALE :
AS NOTED

DESIGNED	HOSSEN AZIM
DRAWN	SONIA PANG
CHECKED	ZHONG LIU
APPROVED	TATIANA QJALA
PREPARED	
PROJ. MANAGER	

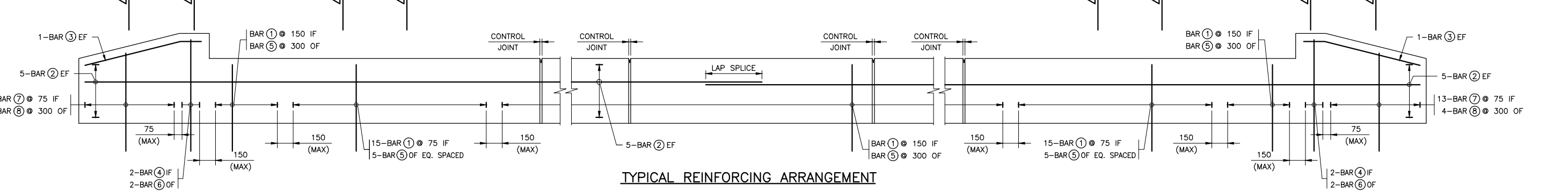
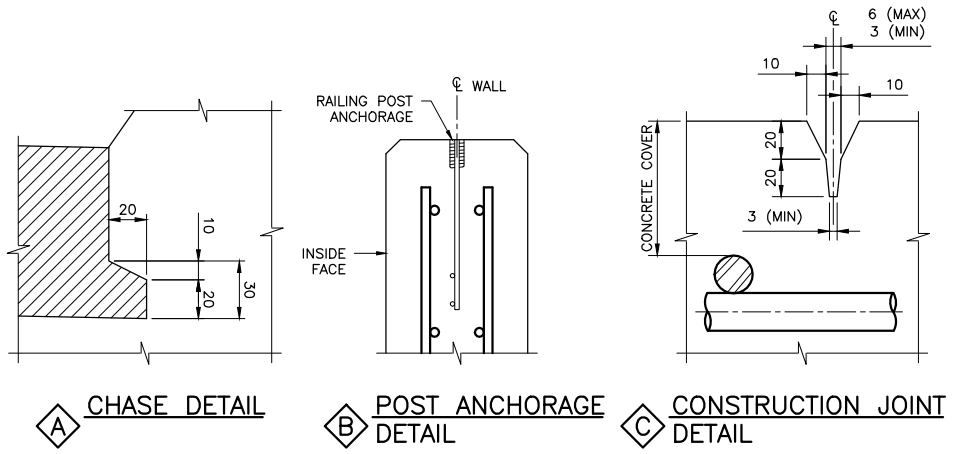
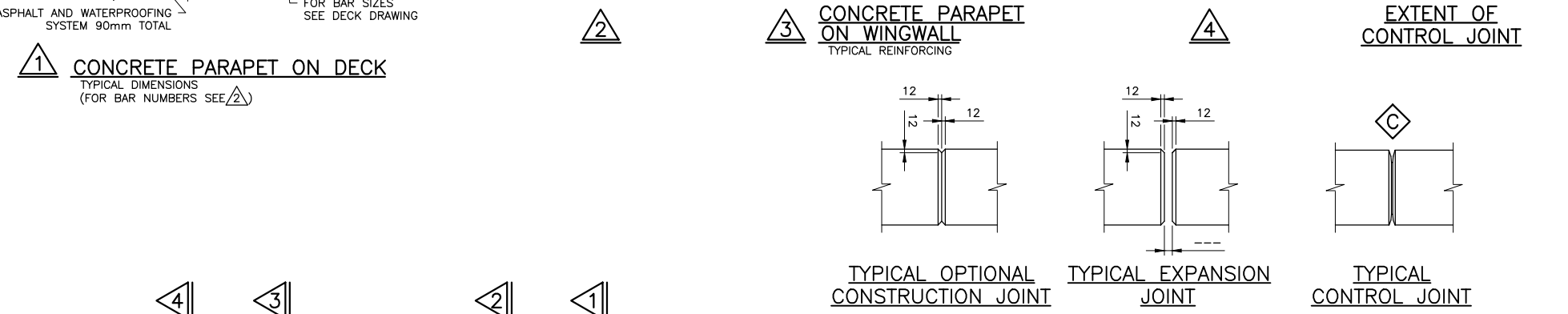
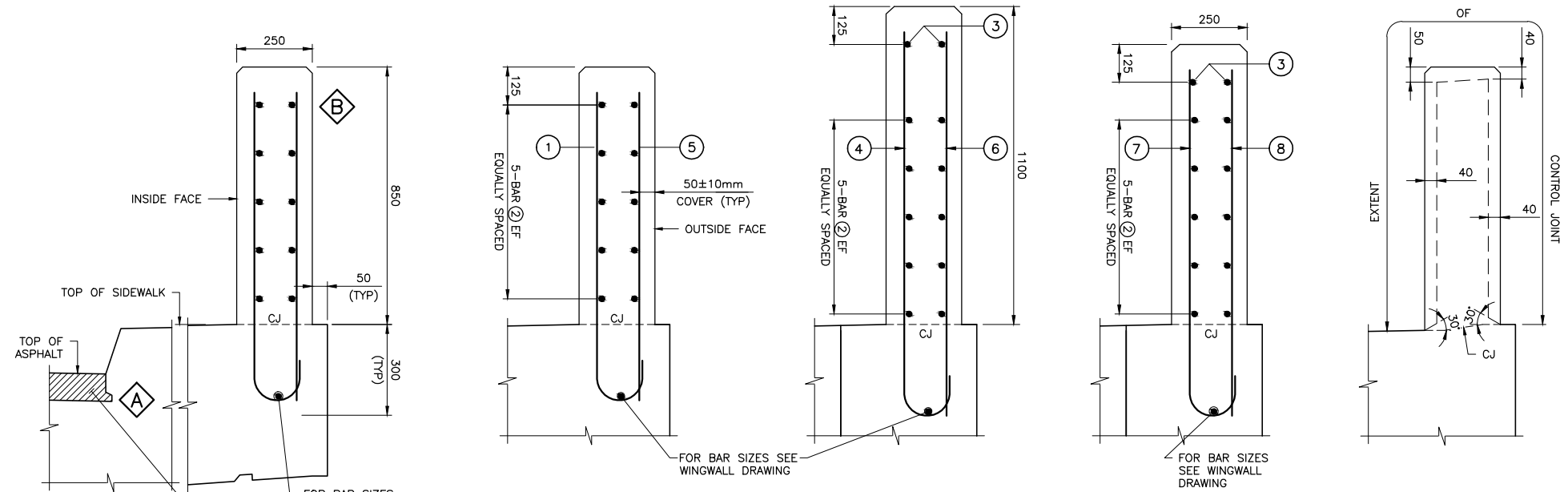


TITLE							
HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS							
DECK REINFORCEMENT							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	513	B

- NOTES:**
- SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
 - CONCRETE COVER TO REINFORCING BAR 60±10mm EXCEPT AS NOTED.
 - REINFORCING SHALL BE GLASS FIBRE REINFORCED POLYMER (GFRP) GRADE I. SIZE IN THE BAR SCHEDULE INDICATES GFRP GRADE AND DESIGNATED BAR DIAMETER, AND SHALL HAVE A CROSS SECTIONAL AREA ACCORDING TO CAN/CSA S-807.
 - BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
 - MINIMUM BAR LAP SPLICE TO BE 550mm, UNLESS OTHERWISE SHOWN.
 - LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
 - CONTROL JOINT TO BE FORMED.
 - SAWCUTS NOT PERMITTED.
 - CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
 - OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
 - CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
 - THIS STANDARD DRAWING MAY BE SUBSTITUTED WITH STANDARD DRAWING SS110-98.
 - LEGEND: EF - EACH FACE
IF - INSIDE FACE
OF - OUTSIDE FACE
CJ - CONSTRUCTION JOINT



BAR MARK	SIZE	SHAPE
①	GI-20M	
②	GI-15M	STRAIGHT
③	GI-15M	
④	GI-20M	
⑤	GI-15M	STRAIGHT
⑥	GI-15M	STRAIGHT
⑦	GI-20M	
⑧	GI-15M	STRAIGHT LENGTH VARIES



DATE	REVISIONS	BY	CHK	LEAD	PROJ
18/03/16	90% SUBMISSION TO CA				
18/01/12	90% SUBMISSION TO CA				

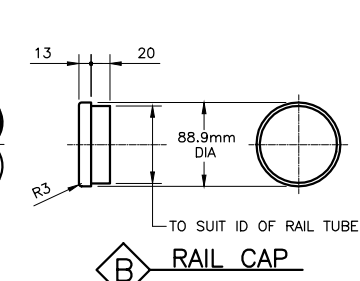
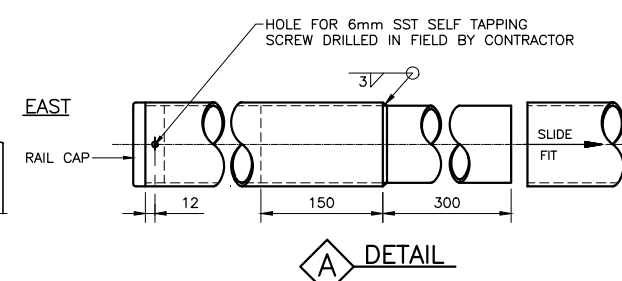
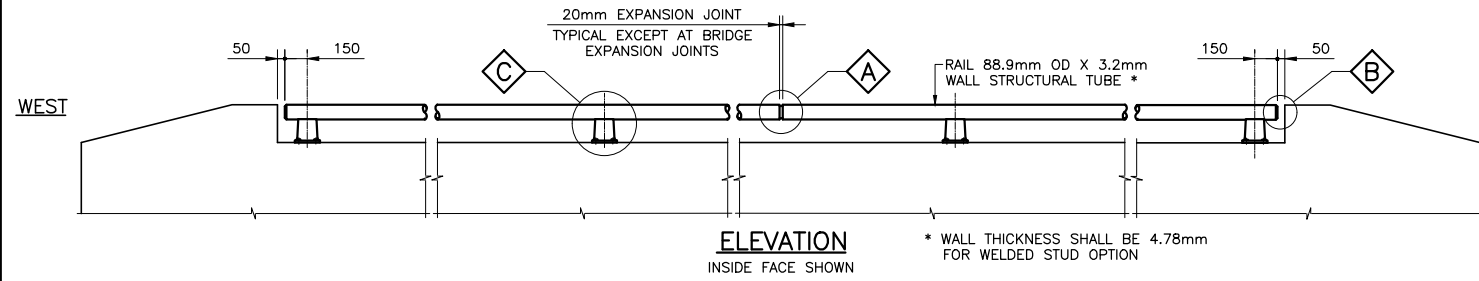
SCALE :
AS NOTED

DESIGNED	HOSSEIN AZIM
DRAWN	JOSHUA ROSE
CHECKED	ZHONG LIU
APPROVED	TATIANA QJALA
LEAD ENGR.	
APPROVED	
PROJ. MANAGER	

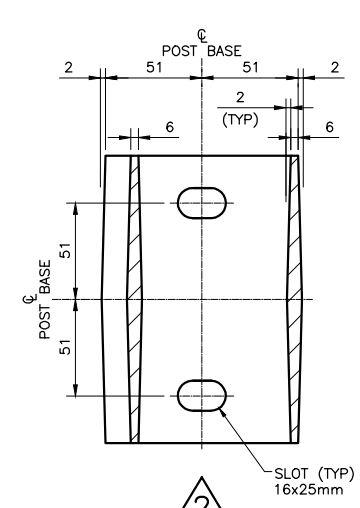
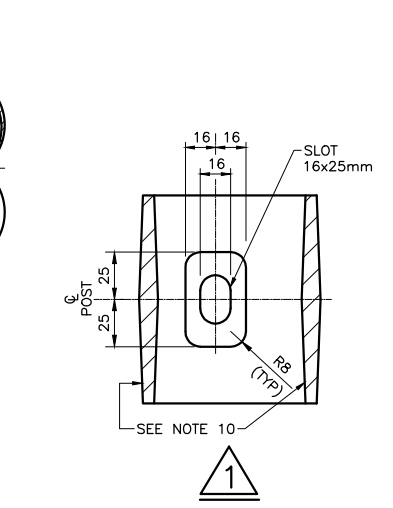
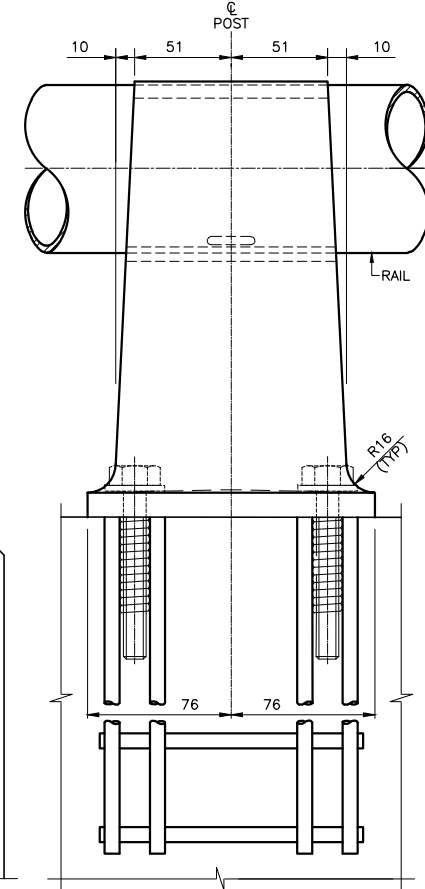
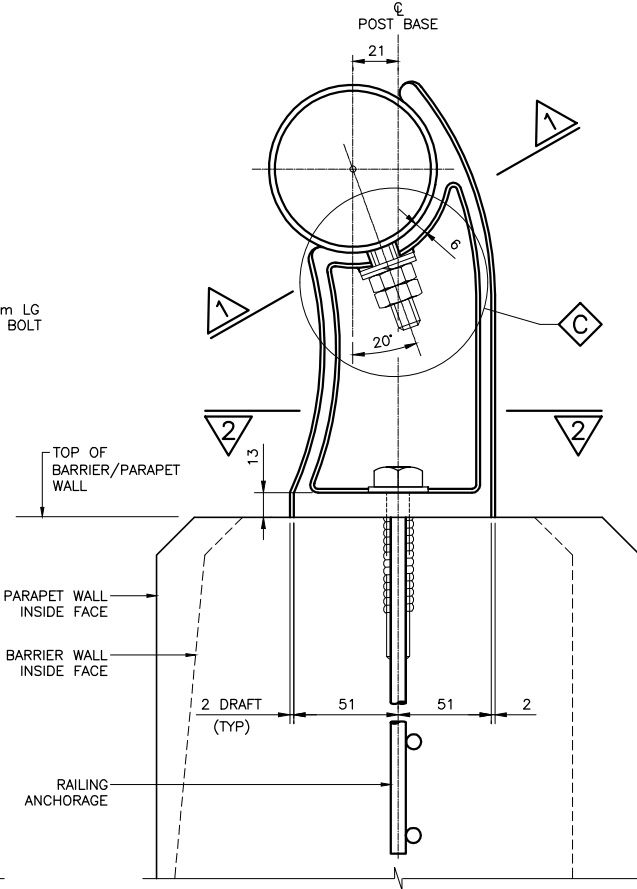
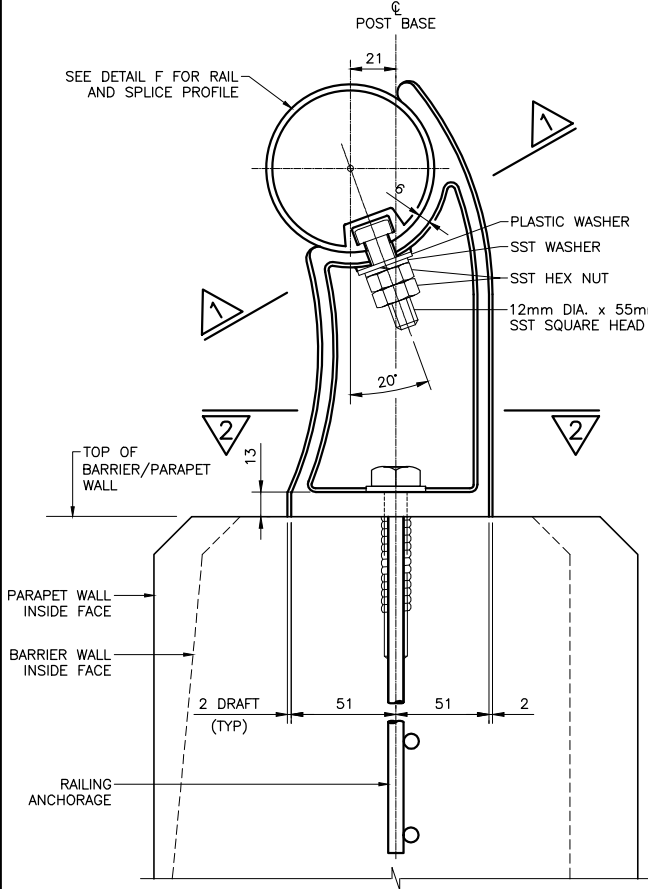


HWY 427 EXPANSION							
HWY 427							
AT ZENWAY BLVD UNDERPASS							
PARAPET WALL WITH RAILING ON SIDEWALK, TL-4 (GFRP REBAR)							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	514	B

CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP-SONIA.PANG\DMSC4443\H427-00-1-STR-B10-DWG-514BA.DWG
 MODIFIED: 1/4/2018 3:01:12 PM BY: PANGS
 DATE PLOTTED: 1/5/2018 3:17:58 PM BY: PANG, SONIA



- NOTES:**
- ALL NON-STAINLESS STEEL BOLT, NUT AND WASHER FOR FASTENING STEEL RAIL TO POSTS SHALL BE HOT-DIP GALVANIZED.
 - ALL WELDED STUDS OR BLIND BOLTS OR SQUARE HEAD BOLTS SHALL BE INSTALLED AT THE MIDDLE OF THE SLOT AND SHALL BE TIGHTENED TO A CONDITION THAT WILL ALLOW RAIL MOVEMENT.
 - RAILS SHALL BE SUPPLIED IN LENGTHS TO BE ATTACHED TO A MINIMUM OF THREE (3) POSTS EXCEPT WHEN THE WINGWALL LENGTH OF A BRIDGE WITH EXPANSION JOINTS DOES NOT PERMIT THIS. IN THIS CASE, THE RAIL LENGTH CAN BE ATTACHED TO TWO (2) POSTS ON THE WINGWALL.
 - POST AND ANCHORAGES TO INCLUDE ALL BOLTS AND WASHERS.
 - RAILING ANCHORAGE TO BE PLACED PRIOR TO CONCRETING.
 - RAIL SHALL BE PRE-BENT TO FOLLOW ROAD CURVATURE WHERE RADIUS IS LESS THAN 150m.
 - RAIL POSTS SHALL BE SET PERPENDICULAR TO GRADE.
 - WHERE LAYOUT OF POSTS IS NOT SHOWN, POST LOCATION SHALL BE DETERMINED BY THE CONTRACTOR.
 - WHEN CONNECTING TO EXISTING RAILING, RAIL MUST BE MADE CONTINUOUS AND POST SPACING DETERMINED WITH REFERENCE TO EXISTING POSTS.
 - THE COMBINATION OF STEEL RAIL AND ALUMINUM POSTS IS PERMITTED.
 - WHEN AN EXTRUDED POST IS USED, THE ALLOY SHALL BE 6061 ALLOY T-6 HEAT TREATED. THE POST DIMENSIONS SHALL NOT BE SMALLER THAN THE DETAILS SHOWN IN THE DRAWING. WALLS OF EXTRUDED POST ARE NOT TAPERED AND SHALL HAVE A UNIFORM THICKNESS OF 8mm MINIMUM.
 - WHEN A CAST POST IS USED THE ALLOY SHALL BE A444.0-T4.
 - RAIL CAP MATERIAL SHALL BE STEEL OR ALUMINUM. RAIL CAP CAN BE SAND CAST 356 ALUMINUM ALLOY. RAIL CAP TO INCLUDE SST SELF TAPPING FASTENERS.



- NOTES FOR STEEL RAIL OPTION:**
- RAIL SHALL BE STRUCTURAL TUBING GRADE 350W.
 - STEEL IN POST SHALL BE CAST STEEL SUPPLIED IN ACCORDANCE WITH ASTM A27/A27M-08 GRADE 65-35.
 - GALVANIZE RAIL TUBING MATING SURFACES TO HAVE A 2 ±0.5mm GAP ALL AROUND TO ENSURE A SLIDE FIT.
 - FULL THREAD STUDS, WASHERS AND NUTS FOR FASTENING RAIL TO POST SHALL CONFORM TO ASTM A108.
 - POSTS AND RAILS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
 - RAIL MAY BE CUT AS REQUIRED IN FIELD WITH PIPE CUTTERS, CUT TO BE REPAIRED AS SPECIFIED IN OPSS 908.

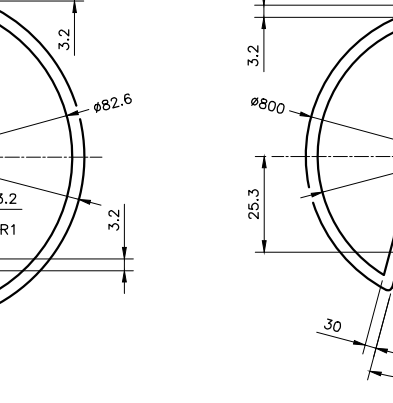
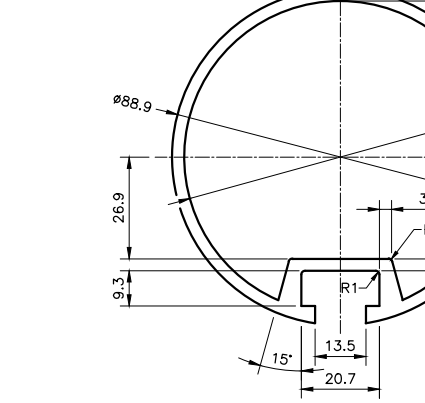
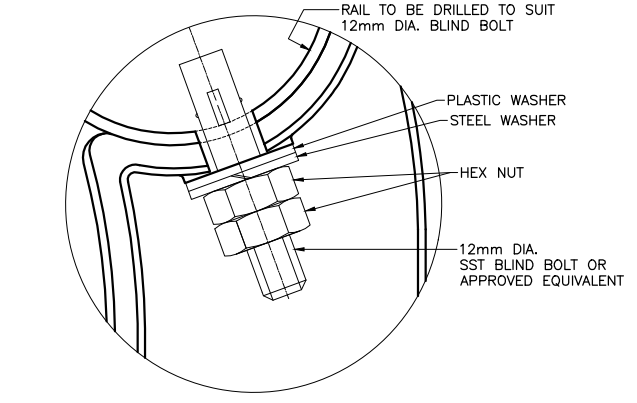
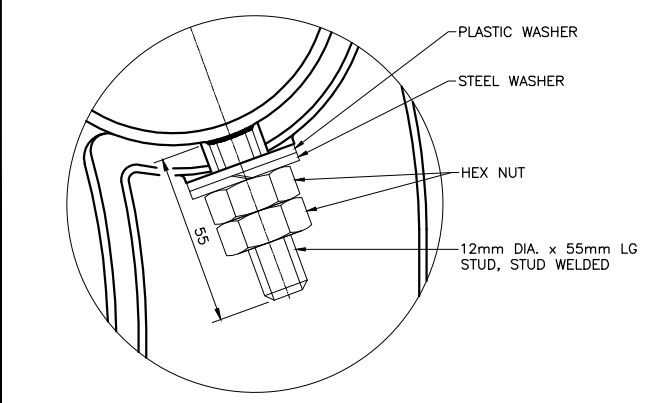
- NOTES FOR ALUMINUM RAIL OPTION:**
- ALUMINUM RAIL SHALL BE 6061 ALLOY T-6 HEAT TREATED.
 - STAINLESS STEEL BOLTS, WASHERS AND NUTS SHALL BE TYPE 304 ACCORDING TO ASTM A314.

TYPICAL CROSS SECTION ALUMINUM RAIL OPTION

TYPICAL CROSS SECTION STEEL RAIL OPTION

BACK VIEW

POST DETAILS



DETAIL FULL-THREADED WELDED STUD (FOR ALTERNATIVE SEE E)

DETAIL BLIND BOLT

RAIL PROFILE

DETAIL EXTRUDED ALUMINUM RAIL

SPLICE PROFILE

	MAXIMUM
POST* SPACING FOR STEEL RAIL	3500mm
POST* SPACING FOR ALUMINUM RAIL	2500mm

* POSTS MAY BE STEEL OR ALUMINUM

LEGEND:
SST - STAINLESS STEEL

STANDARD DRAWING SEPT, 2016	MODIFIED SS110-21
RAILING FOR BARRIER/PARAPET WALL	

CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP_SONIA\DWG\4427-00-1-STR-B10-DWG-515B.DWG
 MODIFIED: 1/4/2018 3:12:34 PM BY: PANG, SONIA
 DATE PLOTTED: 1/9/2018 3:36:31 PM BY: PANG, SONIA

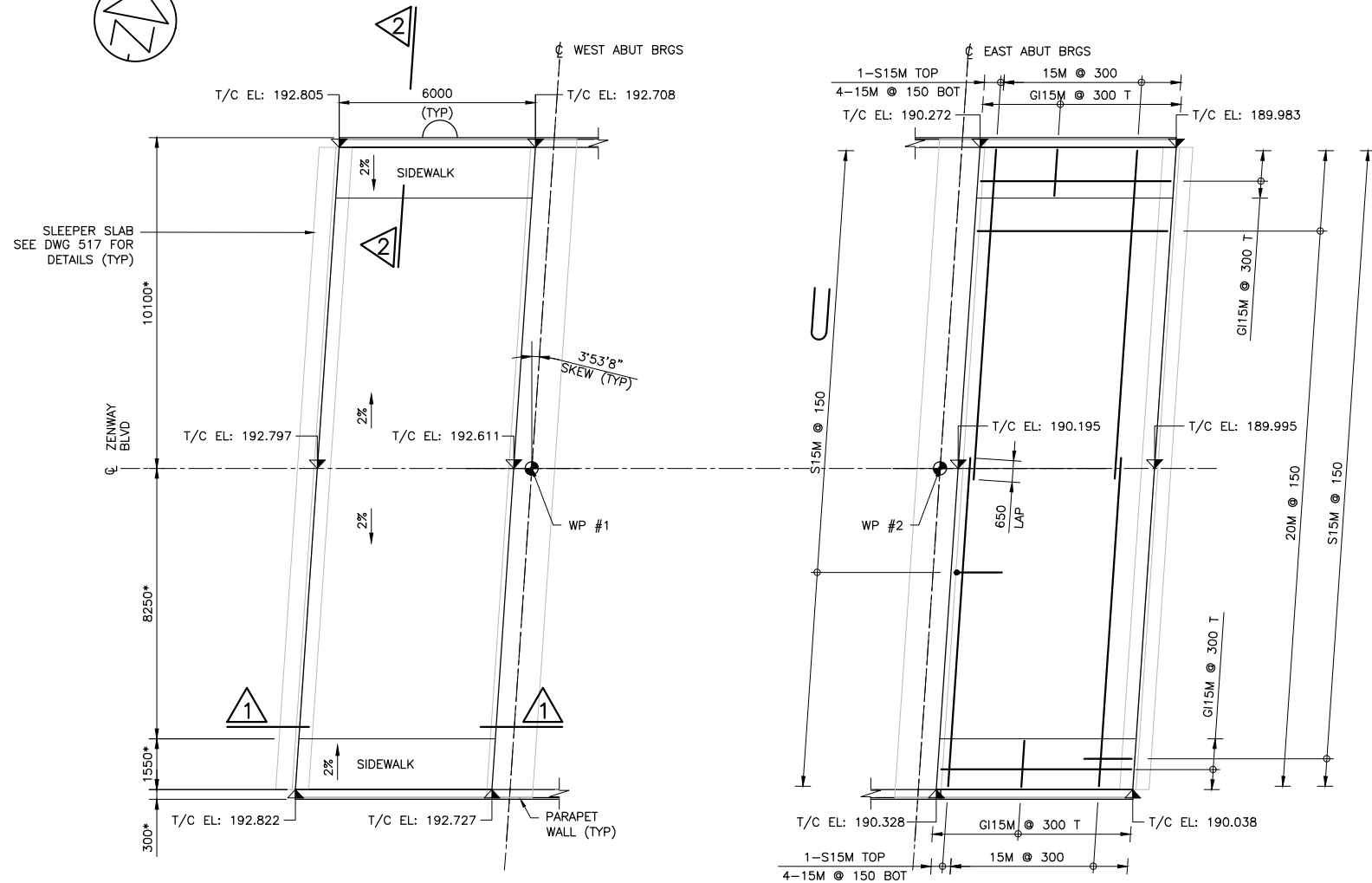
DATE	REVISIONS	BY	CHK	LEAD	PROJ. MGR.
18/03/16	90% SUBMISSION TO CA				
18/01/12	90% SUBMISSION TO CA				

SCALE :
AS NOTED

DESIGNED	HOSSEIN AZMI
DRAWN	JOSHUA ROSE
CHECKED	ZHONG LIU
APPROVED LEAD ENGR.	TATIANA QJALA
APPROVED PROJ. MANAGER	

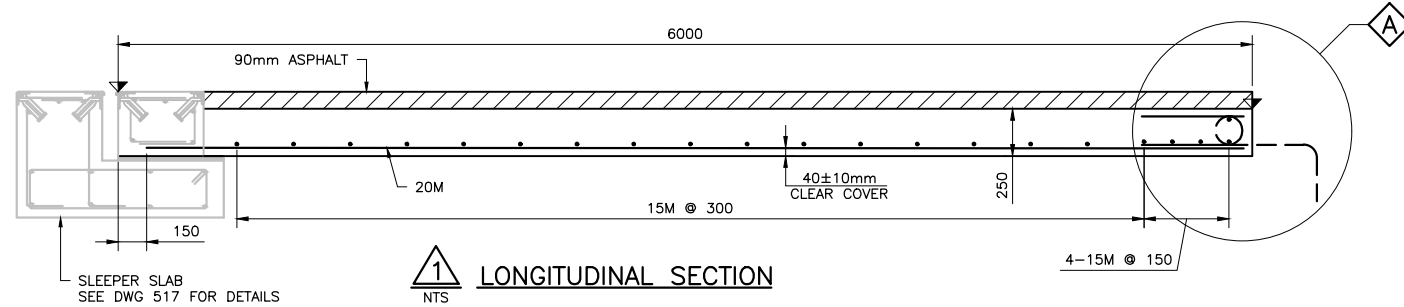


HWY 427 EXPANSION							
HWY 427							
AT ZENWAY BLVD UNDERPASS							
RAILING FOR BARRIER/PARAPET WALL							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE TYPE	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	515	B

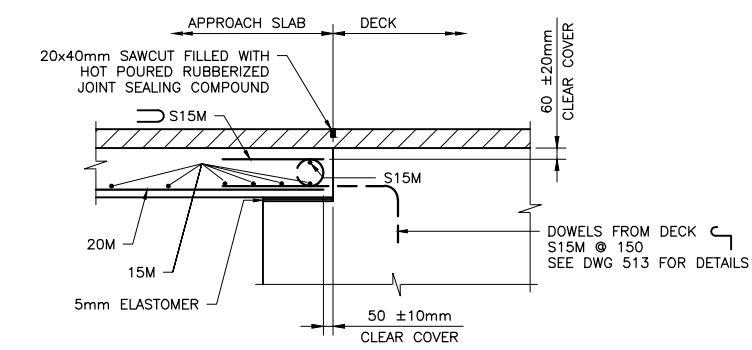


PLAN

1:100
 REINFORCING SHOWN FOR EAST APPROACH SLAB
 REINFORCING FOR WEST APPROACH SLAB SIMILAR
 *DIMENSIONS MEASURED PERPENDICULAR TO CONTROL LINE



1 LONGITUDINAL SECTION



A FOR BRIDGES WITHOUT EXPANSION JOINTS

NOTES:

- CLEAR COVER TO REINFORCING STEEL 70 ±20 mm EXCEPT AS NOTES.
- STAINLESS STEEL BARS SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPa. REINFORCING STEEL SHALL BE GRADE 400W.
- WATERPROOFING AT JOINT BETWEEN BRIDGE AND APPROACH SLAB TO BE IN ACCORDANCE WITH OPSD 3370.100.
- WATERPROOFING FOR BRIDGES WITHOUT EXPANSION JOINTS (RIGID FRAMES AND INTEGRAL ABUTMENTS) TO BE IN ACCORDANCE WITH OPSD 3370.101.
- BAR'S MARKED WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
- SLEEPER SLABS ARE REQUIRED. REFER TO DWG 517 FOR DETAILS

LIST OF ABBREVIATIONS:

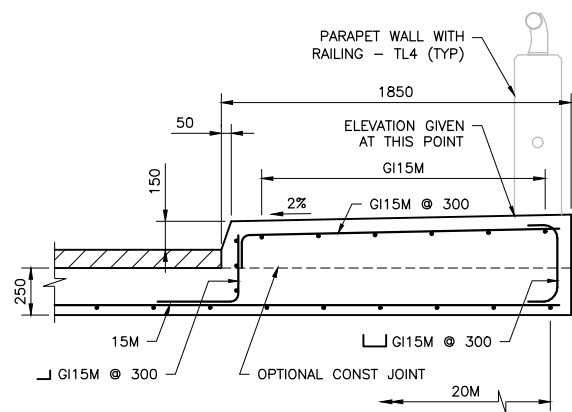
T/C TOP OF CONCRETE
 WP WORKING POINT

APPLICABLE STANDARD DRAWINGS:

- OPSD 3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
 OPSD 3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS

LEGEND:

▽ ELEVATIONS GIVEN AT THESE POINTS



2 SECTION WITH SIDEWALK

STANDARD DRAWING		MODIFIED	
MARCH 2016		SS116-1	
6000 mm APPROACH SLAB			

CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\JENNIFER.MEDEMA\DWG\443\427-00-1-STR-B10-DWG-516AS.DWG
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 DATE PLOTTED: 1/11/2018 3:54:10 PM BY: MEDEMA, JENNIFER

DATE	REVISIONS	BY	CHK	LEAD	PROJ
18/03/16	90% SUBMISSION TO CA				
18/01/12	90% SUBMISSION TO CA				

SCALE :
 AS NOTED

DESIGNED	HADI AGHASSANI		
DRAWN	JOSHUA ROSE		
CHECKED	ZHONG LIU		
APPROVED LEAD ENR.	TATIANA QJALA		
APPROVED PROJ. MANGER			
	NAME (PRINT)	INIT.	DATE

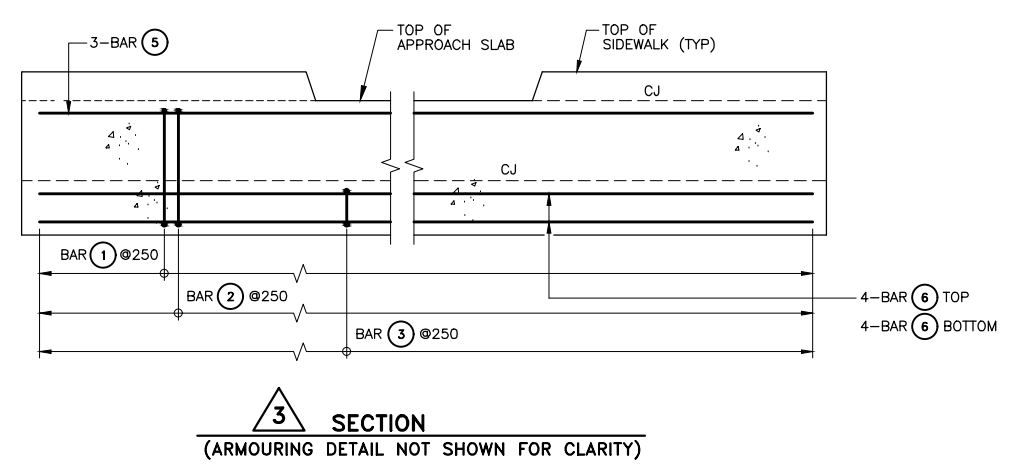
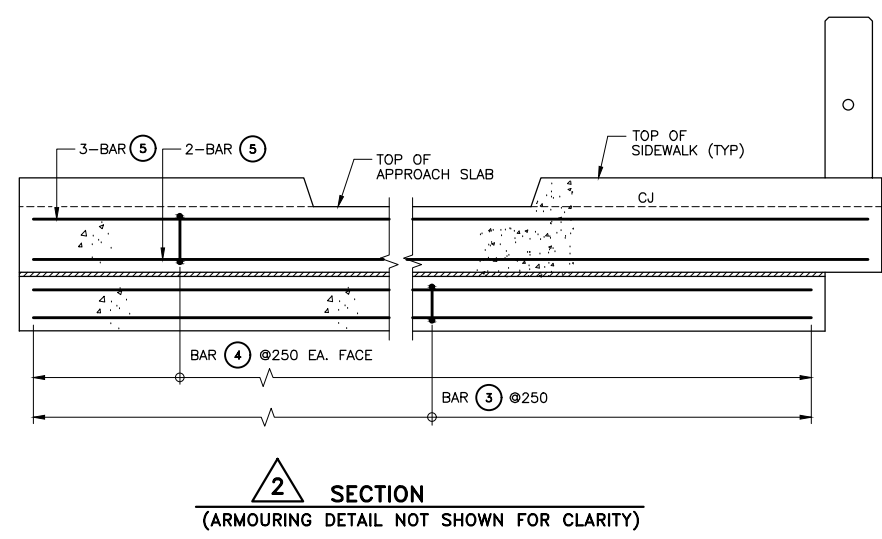
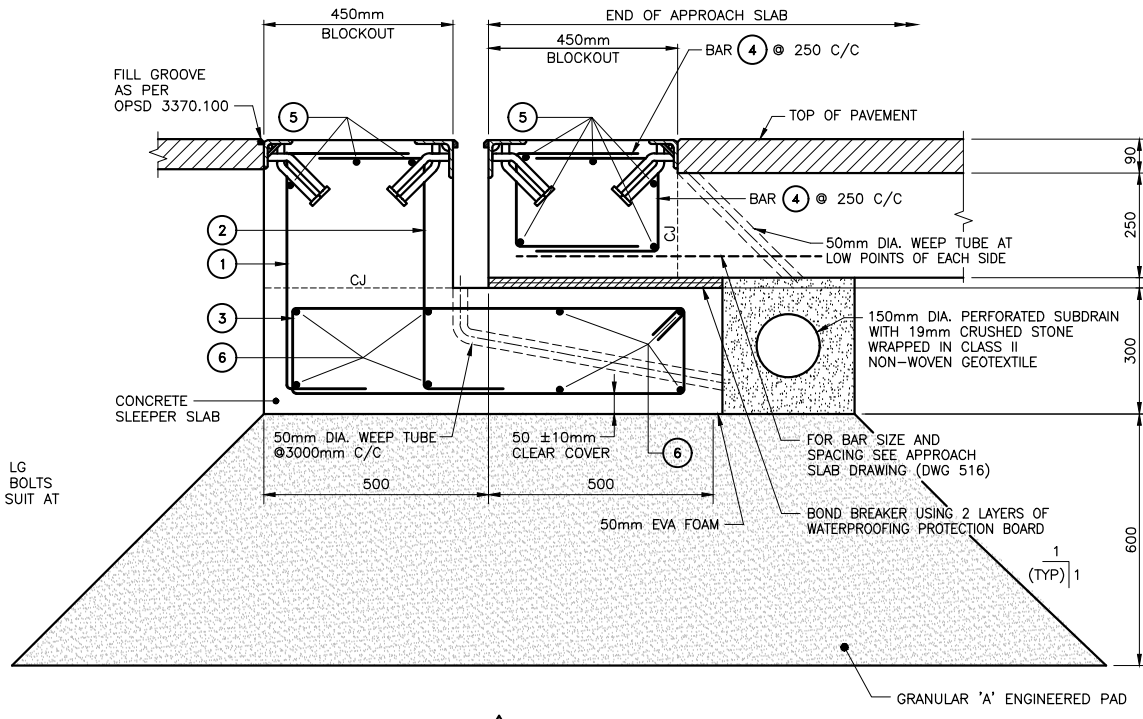
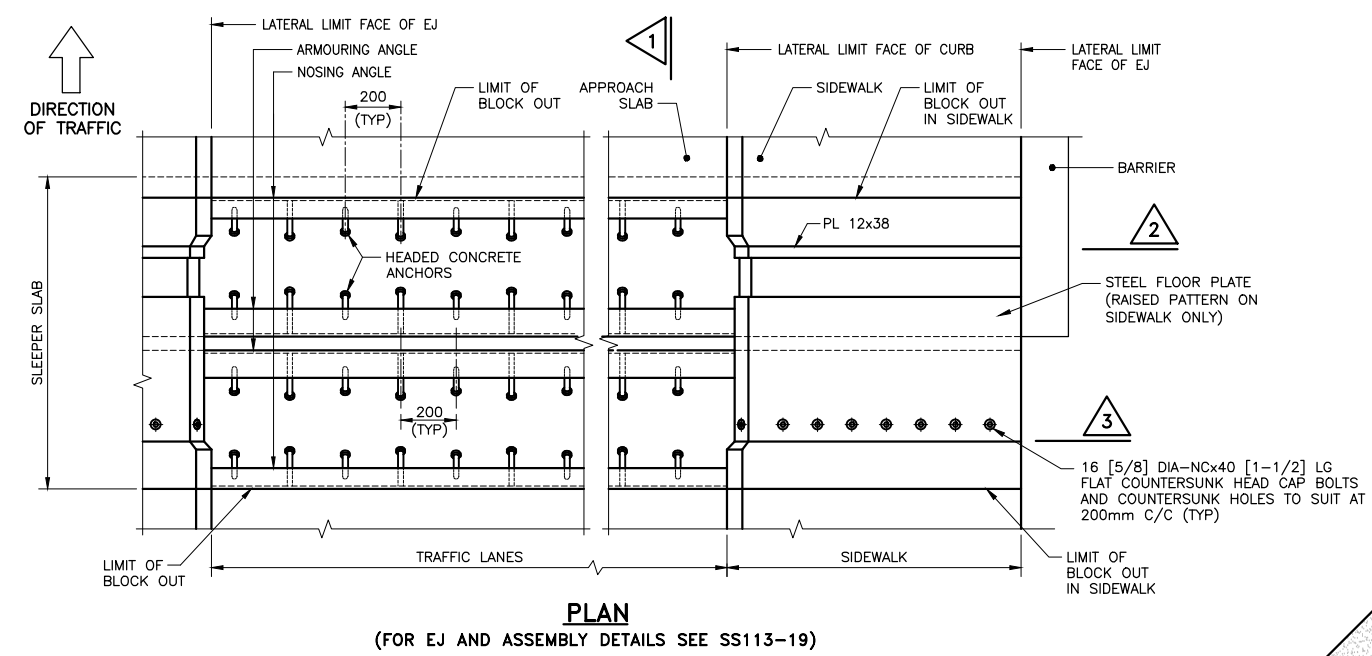


TITLE							
HWY 427 EXPANSION							
HWY 427							
AT ZENWAY BLVD UNDERPASS							
6000MM APPROACH SLAB							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE TYPE	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	516	B

- NOTES:**
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING SS113-19
 2. CLASS OF CONCRETE TO BE 30 MPa.
 3. REINFORCEMENT STEEL SHALL BE GRADE 400W. STAINLESS STEEL SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPa. BARS MARKED WITH PREFIX DENOTES STAINLESS STEEL BARS.
 4. COVER TO REINFORCING STEEL 70 ±20mm EXCEPT AS NOTED.
 5. FOR SKEWED STRUCTURE, WORKING DRAWING SHALL BE DETAILED TO SUIT GEOMETRY OF STRUCTURE.

LEGEND:
 [] - DENOTES FASTENER SIZE IN INCHES
 EJ - DENOTES EXPANSION JOINT

BAR MARK	SIZE	SHAPE
1	S15M	
2	S15M	
3	15M	
4	S15M	
5	S15M	STRAIGHT
6	15M	STRAIGHT



STANDARD DRAWING SEPTEMBER 2016	MODIFIED SS113-37
EXPANSION JOINT AND SLEEPER SLAB FOR INTEGRAL AND SEMI-INTEGRAL ABUTMENT BRIDGES (10mm < MOVEMENT <= 40mm)	

CAD FILE LOCATION AND NAME: C:\PROJECTWISE\WSP-CA\WSP_SONIA.PANG\DMSC4443\H427-DO-1-STR-B10-DWG-517.DWG
 MODIFIED: 1/4/2018 3:14:20 PM BY: PANGS
 DATE PLOTTED: 1/5/2018 3:58:49 PM BY: PANG, SONIA

DATE	REVISIONS	BY	CHK	LEAD	PROJ
B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

SCALE :
AS NOTED

DESIGNED	HADI AGHASSANI		
DRAWN	JOSHUA ROSE		
CHECKED	ZHONG LIU		
APPROVED LEAD ENGR.	TATIANA GJALA		
APPROVED PROJ. MANAGER			
	NAME (PRINT)	INIT.	DATE



HWY 427 EXPANSION						
HWY 427						
AT ZENWAY BLVD UNDERPASS						
EXPANSION JOINT AND SLEEPER SLAB						
(10MM < MOVEMENT <= 40MM)						
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER
H427-D	N	1	STR	B10	DWG	517

NOTES:

- THIS DRAWING SHOWS EXPANSION JOINT AND SLEEPER SLAB AT THE END OF APPROACH SLAB OF INTEGRAL AND SEMI-INTEGRAL ABUTMENT BRIDGES WITH A MOVEMENT BETWEEN 10 AND 40mm.
- EXPANSION JOINT TO BE SUPPLIED BY MANUFACTURERS LISTED IN DSM 9.40.27 FOR THE SUPPLY OF TYPE 'C' STRIP SEAL EXPANSION JOINT.
- EXPANSION JOINT ASSEMBLY CONSTRUCTION AND MATERIAL SHALL BE ACCORDING TO OPSS 920 AND OPSS 1210, AND AS SPECIFIED IN THE CONTRACT DOCUMENTS.
- JOINT ASSEMBLY SHALL BE COMPLETELY SHOP ASSEMBLED (EXCEPT FOR SEALS) AND PRESET TO DIMENSION 'J' FOR 15°C AND ADJUSTED IN THE FIELD TO SUIT INSTALLATION TEMPERATURE.
- JOINT ASSEMBLY INSTALLATION TEMPERATURE SHALL BE TAKEN AS MEAN SHADE AIR TEMPERATURE AT STRUCTURE PRIOR TO JOINT INSTALLATION AS FOLLOWS:
 - FOR CONCRETE STRUCTURES - 48 HOURS
 - FOR STEEL STRUCTURES - 24 HOURS
- FIELD SPLICES IN JOINT ASSEMBLY ARE ONLY PERMITTED AT STAGED CONSTRUCTION, AND/OR AS SHOWN ON THE CONTRACT DRAWINGS.
- IF THE JOINT ARMOURING FOR A SKEW STRUCTURE IS SPLICED AT A CROWN, THE SPLICE SHALL BE DETAILED PARALLEL TO THE CENTRELINE OF THE TRAFFIC LANE.
- SETTING ANGLES SHALL BE FLAME CUT ACCORDING TO OPSS 920, BUT IN NO CASE PRIOR TO CONCRETE REACHING INITIAL SET.
- AFTER CURING OF THE CONCRETE HAS BEEN COMPLETED, THE SETTING DEVICES MAY BE REMOVED. THE VOIDS UNDER THE ARMOURING ANGLE AND NOSING ANGLE SHALL THEN BE PRESSURE INJECTED.
- PREFORMED SEALS SHALL HAVE MINIMUM THICKNESS OF 5mm OR AS PER DSM.
- ALL STEEL RETAINER SURFACES COMING IN CONTACT WITH PREFORMED SEAL SHALL BE CLEANED PRIOR TO INSTALLATION OF THE SEAL.
- PREFORMED SEALS SHALL BE INSTALLED AFTER JOINT ASSEMBLY HAS BEEN CAST, STYROFOAM OR FILLER BETWEEN APPROACH SLAB AND SLEEPER SLAB REMOVED, AND EXPANSION GAP CLEARED OF ANY DEBRIS.
- PROTECT INJECTION HOSE AND FITTINGS ADJACENT TO FIELD SPLICE DURING WELDING AND REMOVE PROTECTION PRIOR TO PLACING OF CONCRETE IN BLOCKOUT.
- ALL JOINT ANCHORAGES SHALL BE DETAILED ON WORKING DRAWINGS PERPENDICULAR TO THE EXPANSION JOINT ON BOTH THE APPROACH SLAB SIDE AND THE SLEEPER SLAB SIDE EXCEPT STRUCTURE SKEWED FROM OVER 15° AND UP TO 45° SHALL HAVE ANCHORAGES DETAILED 30° OFFSET FROM THE PERPENDICULAR TO THE EXPANSION JOINT ON THE APPROACH SLAB SIDE.

LEGEND:

- [] - DENOTES FASTENER SIZE IN INCHES
- EJ - DENOTES EXPANSION JOINT

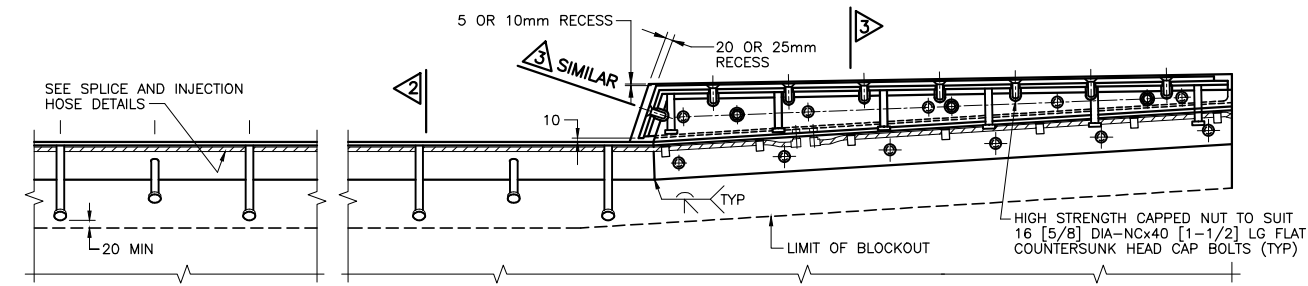
ADDITIONAL NOTES FOR BOLTS:

- 19 [3/4] DIAMETER BOLTS SHALL BE IN ACCORDANCE WITH WITH ASTM A325. ALL BOLTS USED IN 25 DIA. x 50 LONG SLOTTED HOLES SHALL BE INSTALLED WITH OVERSIZE WASHERS.
- 16 [5/8] DIAMETER FLAT COUNTERSUNK HEAD CAP BOLTS SHALL BE IN ACCORDANCE WITH ASTM F835.
- ALL BOLTS SHALL BE INSTALLED USING MOLY50 LUBRICANT.
- ALL BOLTS SHALL BE TENSIONED USING THE TURN-OF-NUT TIGHTENING METHOD IN ACCORDANCE WITH CAN/CSA S6-14.

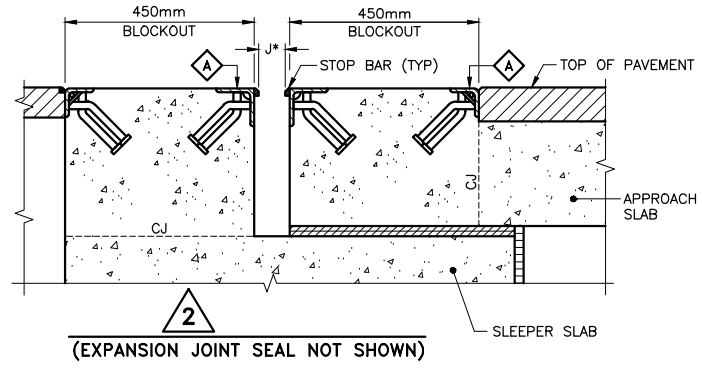
TABLE OF DESIGN REQUIREMENTS (TO BE FULLY COMPLETED BY DESIGNER)

EXP. JOINT LOCATION	MTO GAP ** RATING (mm)		DESIGN *** MOVEMENT	* "J" AT INSTALLATION TEMPERATURE (C) (mm)							
	MIN	MAX		-5°	0°	5°	10°	15°	20°	25°	30°
WEST	40	100	39	58	56	54	52	50	48	46	44
EAST	40	100	39	58	56	54	52	50	48	46	44

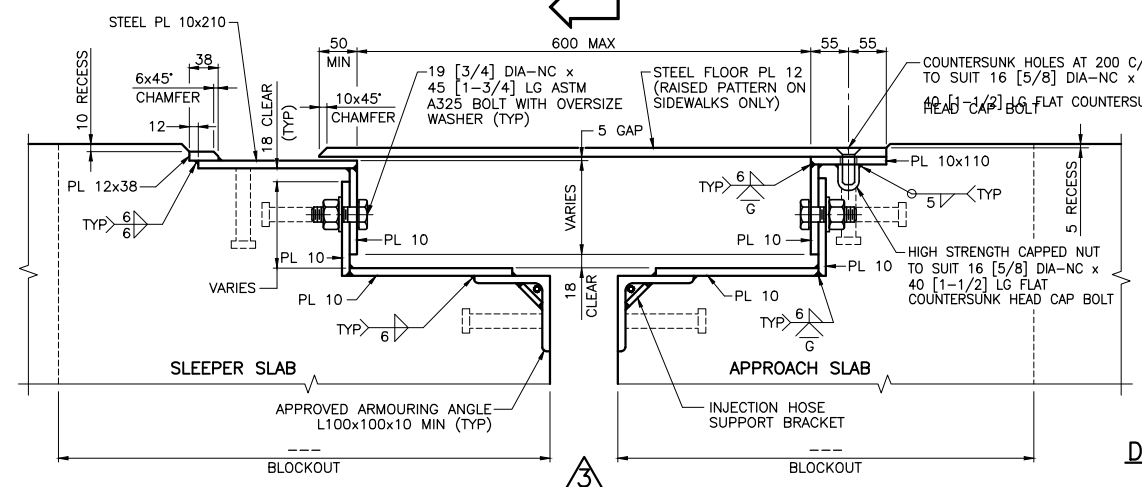
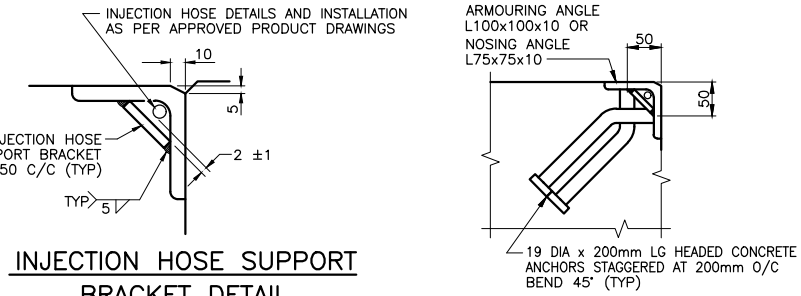
- * DIMENSION 'J' MEASURED PERPENDICULAR TO CENTRELINE OF EXPANSION JOINT. WHERE MIN. AND MAX. FOR JOINT SUPPLIED DIFFER FROM THOSE SHOWN IN TABLE, 'J' DIMENSIONS SHALL BE REVISED BY CONTRACTOR AND SHOWN ON SHOP DRAWINGS. FOR STAGED CONSTRUCTION ON STRUCTURES OTHER THAN POST-TENSIONED, THE CONTRACTOR SHALL USE THE FIRST STAGE OBSERVED 'J' GAP TO INSTALL THE SECOND STAGE.
- ** MTO GAP, MEASURED BETWEEN PROJECTING FACES OF STEEL CLAMPING BAR, IS TAKEN FROM DSM 9.40.27, TYPE "C".
- *** CALCULATED TOTAL MOVEMENT AT SLS OCCURRING AFTER TIME OF JOINT INSTALLATION. (MEASURED PARALLEL TO CENTRELINE OF STRUCTURE)



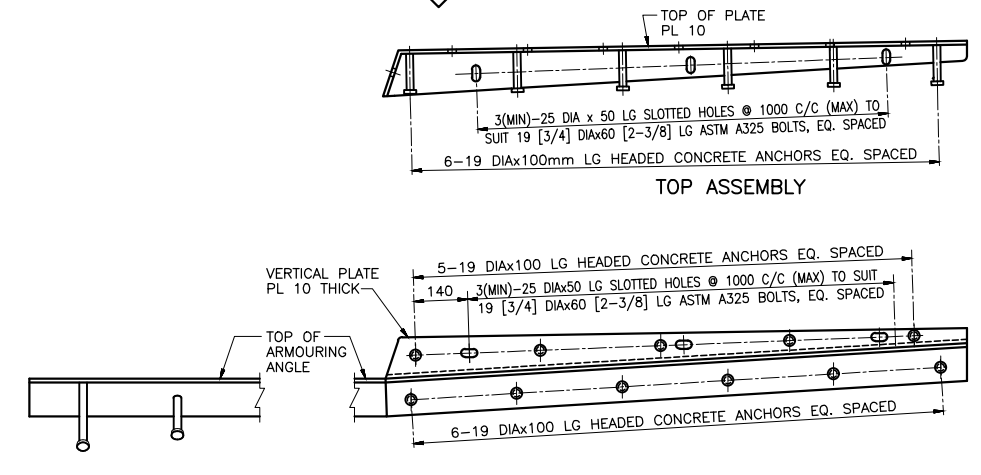
SECTION AT EXPANSION JOINT



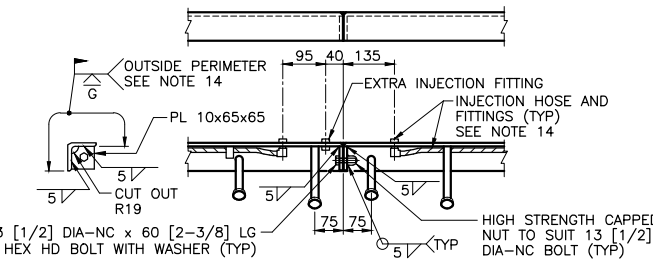
INJECTION HOSE SUPPORT BRACKET DETAIL



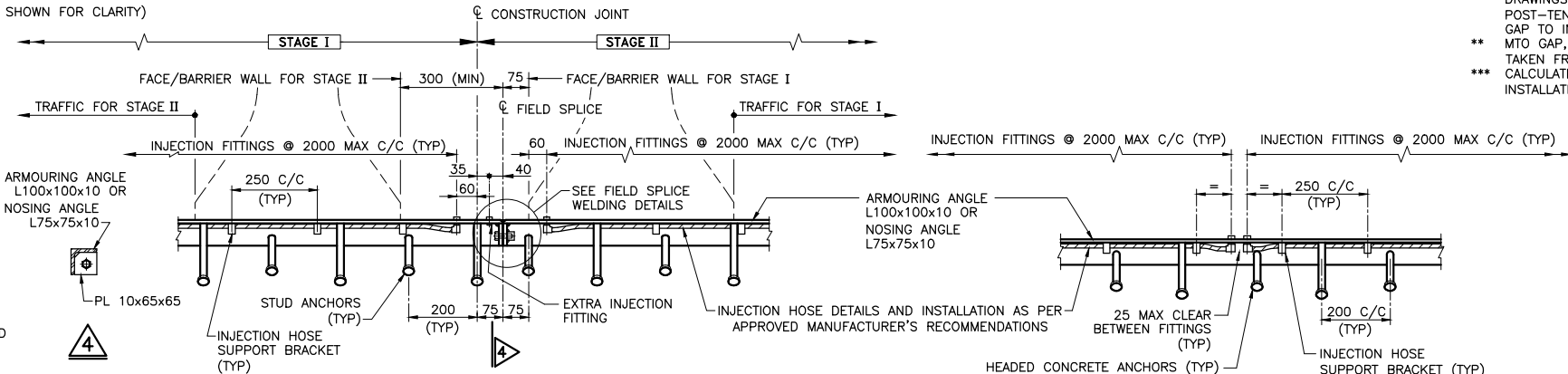
DETAIL OF ARMOURING WITHOUT SIDEWALK



DETAIL OF ARMOURING AT SIDEWALK



ARMOURING AND NOSING ANGLES FIELD SPLICE DETAIL



FIELD SPLICE DETAILS AT STAGED CONSTRUCTION FOR ARMOURING AND NOSING ANGLES

DETAILS OF HEADED CONCRETE ANCHORS AND INJECTION HOSE FOR ARMOURING AND NOSING ANGLES

STANDARD DRAWING SEPTEMBER 2016	MODIFIED SS113-19
STRIP SEAL EXPANSION JOINT FOR SLEEPER SLAB	

CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP_SONIA_PANG\DMSC4443\H427-DO-1-STR-B10-DWG-518.DWG
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 DATE PLOTTED: 1/5/2018 3:40:29 PM BY: PANG, SONIA

DATE	REVISIONS	BY	CHK	LEAD	PROJ. MGR.
B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

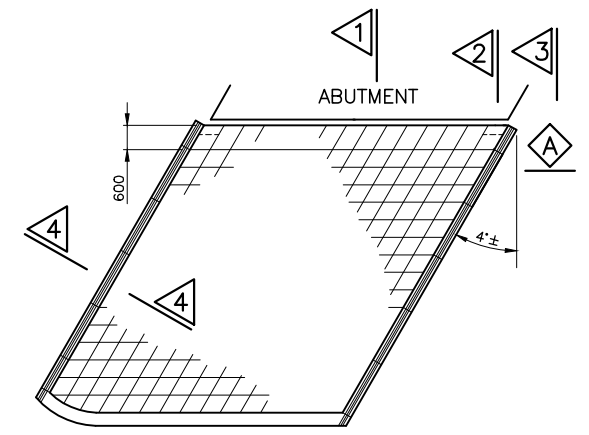
SCALE :
AS NOTED

DESIGNED	HADI AGHASSAN
DRAWN	SCOTT CLAYTON
CHECKED	ZHONG LIU
APPROVED LEAD ENGR.	TATIYANA GJALA
APPROVED PROJ. MANAGER	

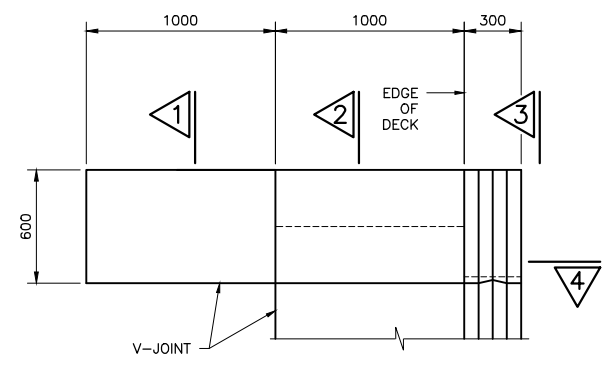


TITLE						
HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS STRIP SEAL EXPANSION JOINT FOR SLEEPER SLAB (10mm < MOVEMENT <= 40mm)						
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER
H427-D	N	1A	STR	B11A	DWG	518
						REVISION NUMBER
						B

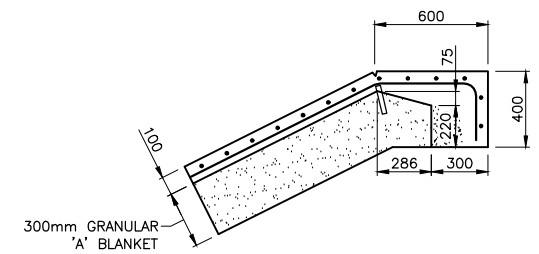
- NOTES:**
1. SECTIONS AND DETAILS TYPICAL FOR ALL LAYOUTS.
 2. ELEVATIONS, COORDINATED, CURVE AND ALIGNMENT DATA ARE IN METRES.



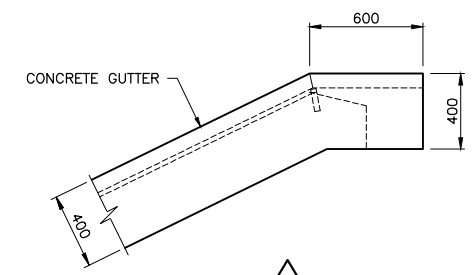
SLOPE PAVING LAYOUTS



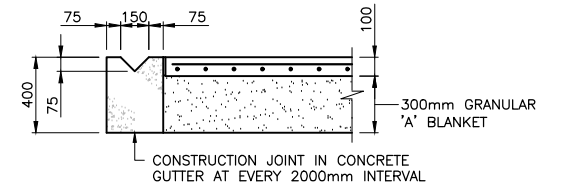
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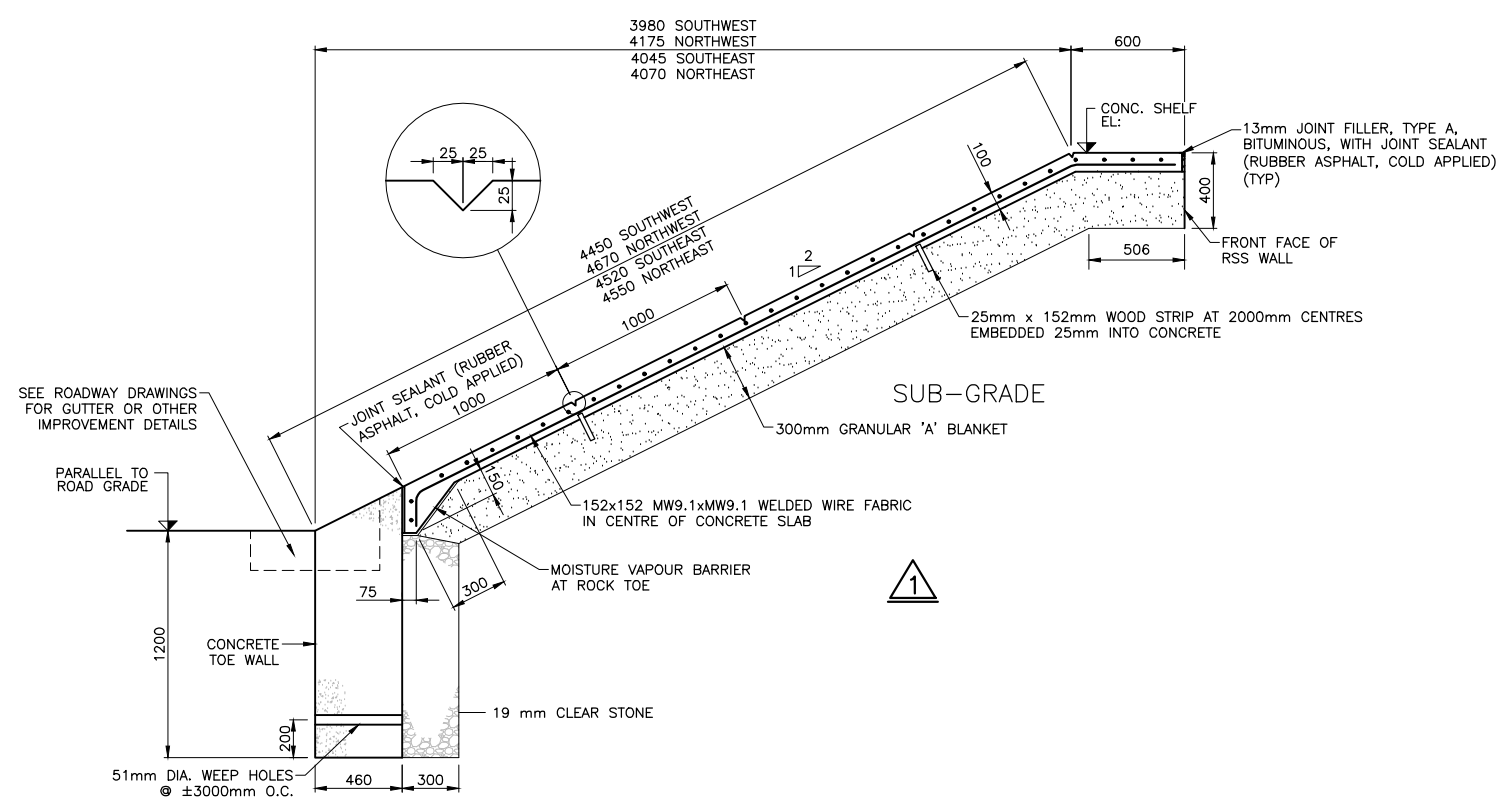
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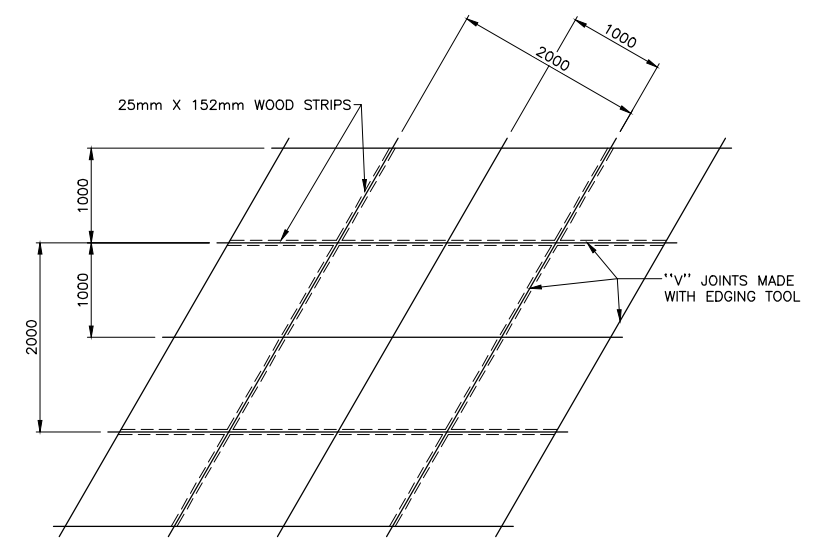
3



4



1



WOOD FRAME AND "V" JOINT LAYOUT

STANDARD DRAWING DECEMBER 2003		MODIFIED SS116-10
DETAILS OF CONCRETE SLOPE PAVING		

CAD FILE LOCATION AND NAME: C:\PROJECTWISE\WSP-CA\WSP_SONIA.PANG\DN504443\H427-00-1-STR-B10-DWG-519SP.DWG
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 DATE PLOTTED: 1/9/2018 3:42:32 PM BY: PANG, SONIA

DATE	REVISIONS	BY	CHK	LEAD	PROJ. MAN.
18/03/16	90% SUBMISSION TO CA				
18/01/12	90% SUBMISSION TO CA				

SCALE :

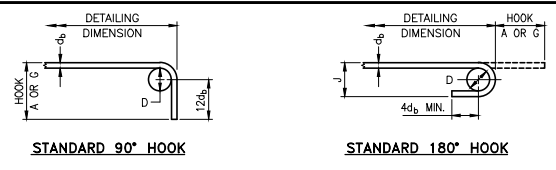
AS NOTED

DESIGNED	HADI AGHAWASSAN		
DRAWN	JOSHUA ROSE		
CHECKED	ZHONG LIU		
APPROVED LEAD ENGR.	TATIANA GJALA		
APPROVED PROJ. MANAGER			
	NAME (PRINT)	INIT.	DATE



HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS DETAILS OF CONCRETE SLOPE PAVING							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	519	B

CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP-SONIA.PANG\DMSC4443\H427-00-1-STR-B10-DWG-520.DWG
 MODIFIED: 1/9/2018 3:07:02 PM BY: PANGS
 DATE PLOTTED: 1/10/2018 2:44:05 PM BY: PANG, SONIA



MINIMUM BENDING PIN DIAMETER, D, mm

BAR SIZE	STEEL GRADE	
	400R ⁽²⁾	400W
10M	70	60
15M	100	90
20M	120	100
25M	150	150
30M	250	200
35M	300	250
45M	450 ⁽¹⁾	400
55M	600 ⁽¹⁾	550

(1) Special fabrication is required for bends exceeding 90° for bars of these sizes and grade.
 (2) For stainless steel, with $F_y = 500$, use the same D as for 400R.

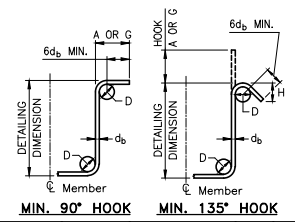
STANDARD HOOK DIMENSIONS

BAR SIZE	90° HOOKS		180° HOOKS			
	A OR G (mm)		A OR G (mm)		J (mm)	
	400R	400W	400R	400W	400R	400W
10M	180	180	140	130	90	80
15M	260	250	180	170	130	120
20M	310	300	220	200	160	140
25M	400	400	280	280	200	200
30M	510	490	400	350	310	260
35M	610	590	480	430	370	320
45M	790	770	680	630	540	490
55M	1030	1010	900	850	710	660

NOTE: All Hook Dimensions are according to the CHBDC-2014.

MINIMUM STIRRUP AND TIE HOOK DIMENSIONS

BAR SIZE	BAR DIAM. d_b (mm)	PIN DIAM. D (mm)	90°		135°
			A OR G (mm)	A OR G (mm)	H (approx.) (mm)
10M	11.3	45	100	100	70
15M	16.0	65	140	140	100
20M	19.5	80	180	175	115
25M	25.2	100	230		



HOOK DIMENSIONS FOR REINFORCING STEEL BARS

Date: Sept. 2016 Rev: _____

SS12-1

DATE	REVISIONS	BY	CHK	LEAD ENG.	PROJ. MAN.
18/03/16	90% SUBMISSION TO CA				
18/01/12	90% SUBMISSION TO CA				

SCALE :

AS NOTED

DESIGNED	HADI AGHAWASSAN
DRAWN	JOSHUA ROSE
CHECKED	ZHONG LIU
APPROVED LEAD ENG.	TATIANA GJALA
APPROVED PROJ. MANAGER	
NAME (PRINT)	INIT. DATE



HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS STANDARD AND MISCELLANEOUS DETAILS							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	520	B

METHOD OF APPLYING THE HILEY FORMULA

The Hiley Formula for:

(a) Double-acting, differential-acting Steam and Diesel Hammers,

$$R = \frac{n e_f E}{S + C/2} \quad \begin{matrix} e_f = 0.6 \text{ to } 0.8 \text{ for steam hammers} \\ e_f = 1.0 \text{ for diesel hammers} \end{matrix}$$

(b) Drop Hammers and single-acting Steam Hammers,

$$R = \frac{n e_f WgH}{S + C/2} \quad \begin{matrix} e_f = 0.75 \text{ for drop hammers} \\ H = \text{height of free fall of mass in metres} \end{matrix}$$

Where R = Ultimate pile resistance in kilonewtons
 S = Measured penetration of pile per hammer blow in millimetres
 C = Measured rebound of pile per hammer blow in millimetres
 E = Rated Energy of hammer blow in joules
 e_f = efficiency based on manufacturer's gross rated energy (typ. 0.6 to 0.8)
 n = efficiency of blow
 e = coefficient of restitution
 g = 9.80665 m/s²
 $n = \frac{W + Pe^2}{W + P}$
 where $e = 0.32$ for steel (or $e = 0.55$. See Note 1 below.)
 $= 0.25$ for timber
 P = Mass of pile + anvil or helmet in kilograms (See Note 2 below)
 W = Mass of ram (piston) in kilograms

NOTE 1:

It is assumed that piles are driven with a pile cushion. Where Steel H-Piles are driven without a cushion, the ultimate pile capacity R should be calculated assuming a coefficient of Restitution $e = 0.55$.

NOTE 2:

Assume mass of anvil = 600 kg unless otherwise noted.

NOTE 3:

The resulting Ultimate Pile Resistance, R , as calculated by Hiley Formula must exceed the Ultimate Geotechnical Resistance given in the Pile Driving Notes on the Contract Drawings.

EXAMPLE FOR DIESEL HAMMERS

Given: Pile HP 310x110, length = 50m
 Mass of anvil = 600 kg
 Pile driven without a cushion
 Hammer is Delmag D22-13
 From the Pile Driving Notes on the Contract Drawings,
 Ultimate Geotechnical Resistance = 3000 kN

Observations: measured penetration = $S = 5$ mm
 measured rebound = $C = 10$ mm

Hiley Formula Calculations

$$P = 50(110) + 600 = 6100 \text{ kg}$$

$$W = 2200 \text{ kg} \quad e = 0.55$$

$$n = \frac{W + Pe^2}{W + P} = \frac{2200 + 6100(0.55)^2}{2200 + 6100} = 0.49$$

$$E = 67,000 \text{ Joules/blow}$$

$$R = \frac{n e_f E}{S + C/2} = \frac{0.49(1.0)(67,000)}{5 + (10/2)} = \underline{3283 \text{ kN}} > 3000 \text{ kN} \quad \text{O.K.}$$

EXAMPLE FOR DROP HAMMERS

Given: Timber Pile: length = 15m, density = 641 kg/m³
 butt dia. = 0.36m, tip dia. = 0.20m
 Mass of Helmet = 300 kg
 Mass of Hammer = 2268 kg = W
 Fall of Hammer = 1.0 metre = H
 $e = 0.25$
 From Pile Driving Notes on Contract Drawings,
 Ultimate Geotechnical Resistance = 750 kN

Observations: measured penetration = $S = 5$ mm
 measured rebound = $C = 20$ mm

Hiley Formula Calculations

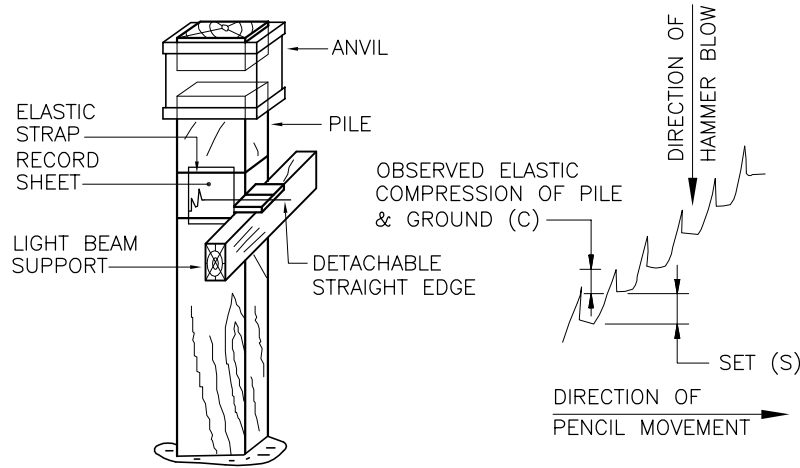
$$P = (15 \times \frac{\pi}{4} (\frac{0.36 + 0.20}{2})^2 \times 641) + 300 = 892 \text{ kg}$$

$$e_f = 0.75$$

$$W = 2268 \text{ kg}$$

$$n = \frac{W + Pe^2}{W + P} = \frac{2268 + 892(0.75)^2}{2268 + 892} = 0.74$$

$$R = \frac{n e_f WgH}{S + C/2} = \frac{0.74(0.75)(2268)(9.806)(1.0)}{5 + (20/2)} = \underline{823 \text{ kN}} > 750 \text{ kN} \quad \text{O.K.}$$



FIELD MEASUREMENT TECHNIQUE DURING PILE DRIVING

NOTES:

1. THIS STANDARD DRAWING IS FOR THE CONTROL OF PILE INSTALLATIONS BY VALIDATING DESIGN ASSUMPTIONS.
2. THE HILEY FORMULA SHALL BE USED TO CONFIRM PILE RESISTANCE FOR FRICTION-TYPE PILES IN NON-COHESIVE SOILS. FOR USE IN COHESIVE SOILS, THE GEOTECHNICAL ENGINEER WILL HAVE TO BE CONSULTED.
3. DURING PILE DRIVING, THE HAMMER HAS TO REBOUND ENOUGH TO MAINTAIN ITS ENERGY PER BLOW. ACCORDINGLY, THE SOIL MUST PROVIDE SUFFICIENT REBOUND FOR THE HILEY FORMULA TO BE EFFECTIVE.
4. IF THE ULTIMATE PILE RESISTANCE, AS CALCULATED BY THE HILEY FORMULA, IS NOT REACHED WHEN REFERENCED TO A PRESCRIBED PILE TIP ELEVATION OR RANGE OF ELEVATIONS, THE ADVICE AND RECOMMENDATIONS OF A GEOTECHNICAL ENGINEER SHALL BE SOUGHT.
5. THE CONTRACTOR SHALL SUBMIT THE PERTINENT HAMMER PROPERTIES, AS REQUIRED BY OPSS 903.
6. THE TABLE OF HAMMERS GIVEN ON THIS STANDARD DRAWING CAN BE USED FOR COMPARING THE SUBMITTED HAMMER PROPERTIES. IT IS APPROXIMATE AND MAY NOT INCLUDE ALL HAMMERS. THE CONTRACTOR SHALL CONTACT THE MANUFACTURER FOR RATED AND ACTUAL HAMMER ENERGIES.
7. WHEN APPLYING THE HILEY FORMULA, THE HAMMER SHALL BE OPERATED AT FULL CAPACITY.

NOTES TO DESIGNER

1. WHEN USING THIS STANDARD THE DESIGNER SHOULD ENSURE THAT THE ULTIMATE GEOTECHNICAL RESISTANCE IS GIVEN ON THE CONTRACT DRAWINGS AS DETAILED IN SECTION 3.3.2/3 OF THE STRUCTURAL MANUAL.
2. THE 'NOTES TO DESIGNER' SHALL BE DELETED FROM THIS DRAWING PRIOR TO ISSUING OF THE CONTRACT.

MODIFIED

STANDARD DRAWING APRIL 2008 **SS103-11**

PILE DRIVING CONTROL

HAMMERS*

TYPE	MASS OF RAM W (Kilograms)	RATED ENERGY E (Joules/blow)
9B3	726	12419
10B3	1361	16948
50C	2268	20337
11B3	2268	26005
D12	1250	30506
B225	1360	39300
LB520	2300	40675
B300	1700	46100
D22	2200	53826
B400	2268	62400
D22-02	2200	67000
D22-13	2200	67000
D30-02	3000	91000
D30-13	3000	91000
B500	3129	107100
D36-02	3600	115000
D36-13	3600	115000

NOTE:

Ram may also be referred to as Piston

* See General Notes 5) and 6).

CAD FILE LOCATION AND NAME: C:\PROJECTS\WSP-CA\WSP-SONIA\PANG\DN504443\H427-001-STR-B10-DWG-521.DWG
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 DATE PLOTTED: 1/5/2018 3:44:20 PM BY: PANG, SONIA

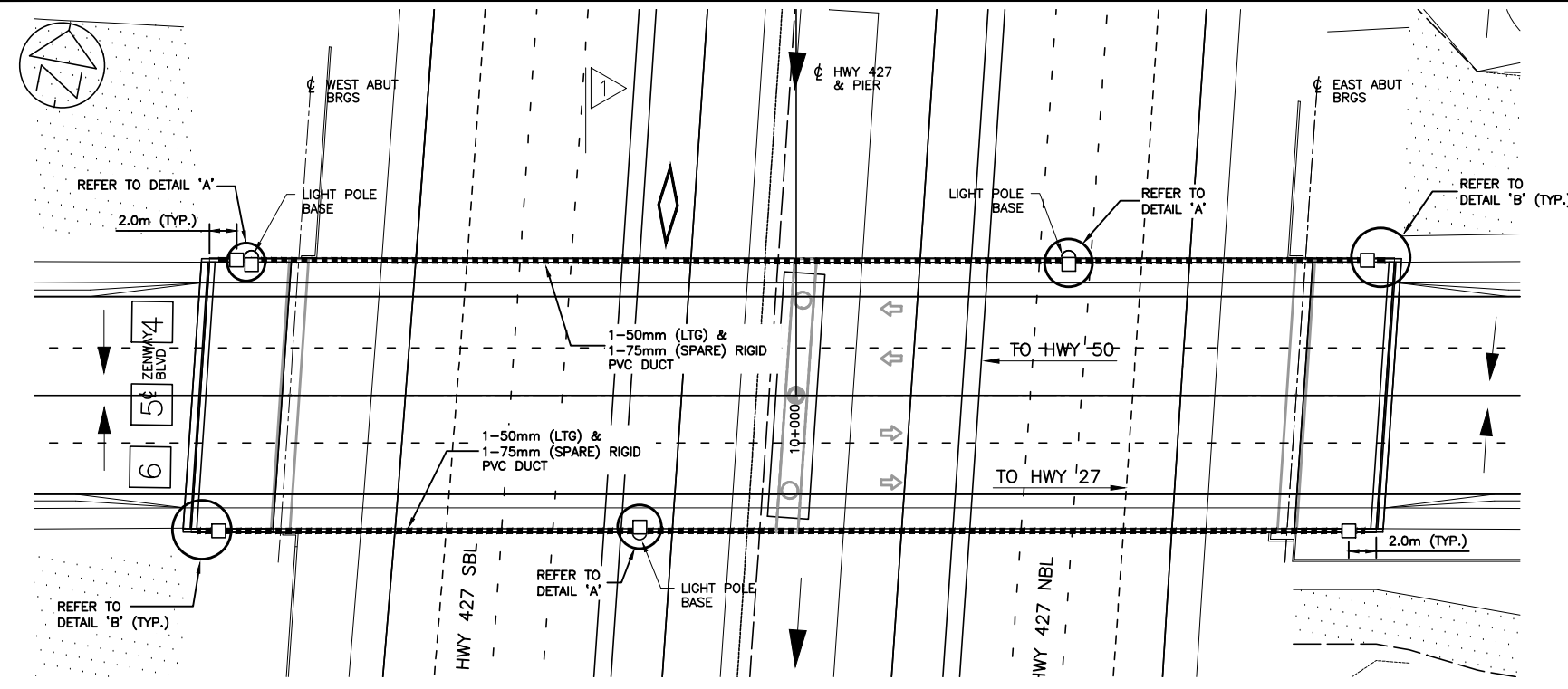
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B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

SCALE : AS NOTED

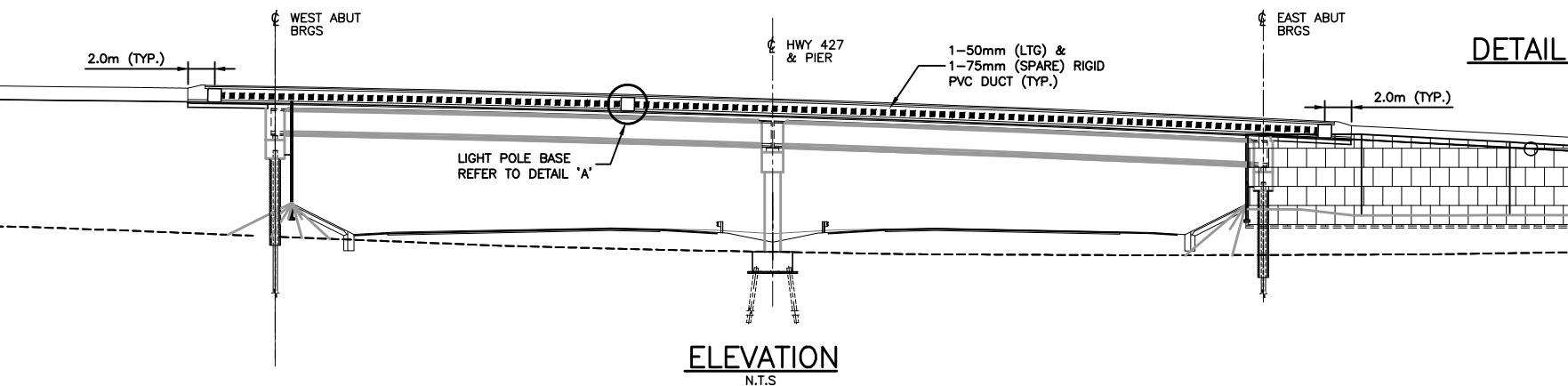
DESIGNED	HOSSEN AZMI
DRAWN	SCOTT CLAYTON
CHECKED	ZHONG LIU
APPROVED LEAD ENG.	TATIANA GJALA
APPROVED PROJ. MANAGER	



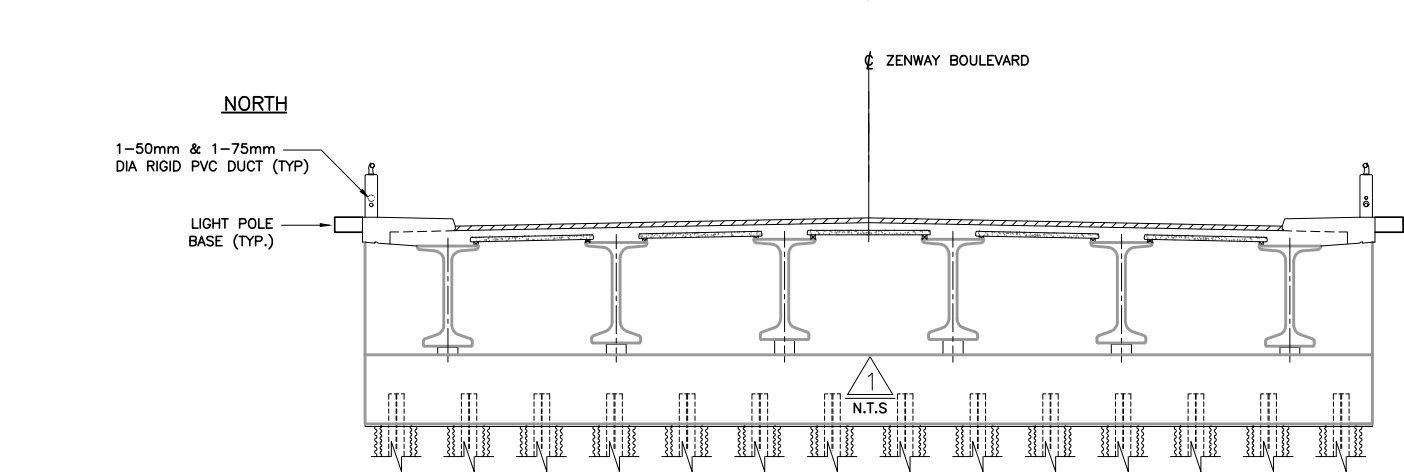
HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS PILE DRIVING CONTROL							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	1	STR	B10	DWG	521	B



PLAN
N.T.S



ELEVATION
N.T.S



NORTH

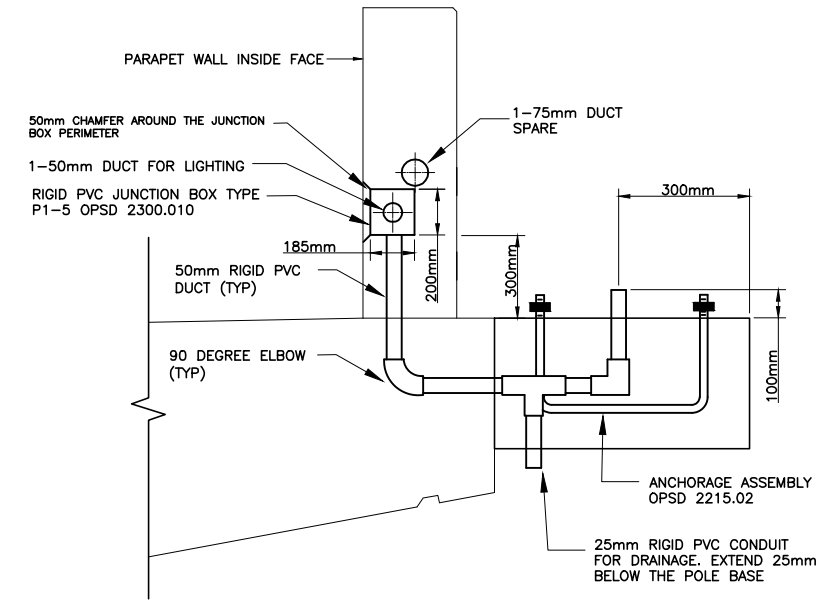
SOUTH

APPLICABLE STANDARD DRAWINGS:

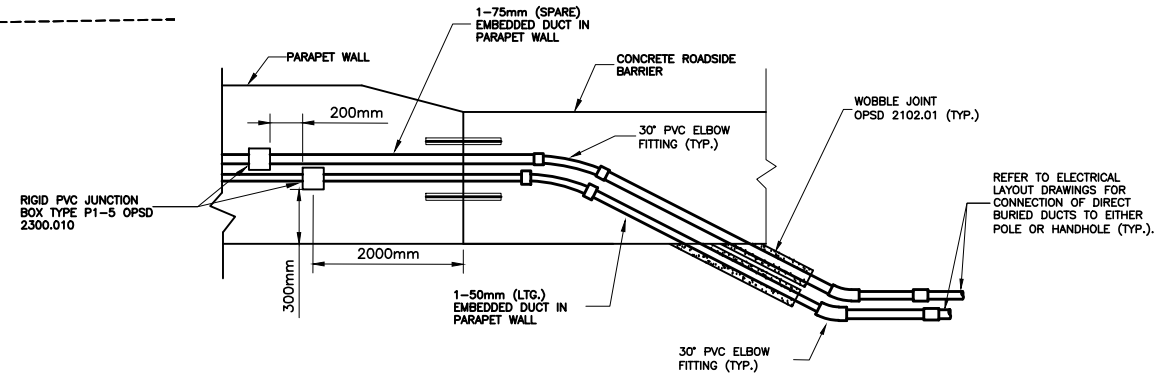
- OPSD 2011.101 - GENERAL SYMBOLS
- OPSD 2011.201 - GENERAL SYMBOLS
- OPSD 2300.010 - RIGID PVC JUNCTION BOX TYPE P1
- OPSD 2102.010 - UNDERGROUND RIGID DUCT CONNECTION AT CONCRETE STRUCTURE
- OPSD 2302.045 - EMBEDDED WORK IN STRUCTURE PARAPET WALL

SUPPLEMENTARY LEGEND:

- RIGID JUNCTION BOX EMBEDDED TYPE P1-5 OPSD 2300.010 C/W GALVANIZED STEEL COVER



DETAIL 'A' - CONNECTION OF EMBEDDED CONDUIT FOR LIGHTING POLE
N.T.S.



DETAIL 'B' - TERMINATION OF EMBEDDED DUCT
N.T.S.

CAD FILE LOCATION AND NAME:
 MODIFIED:
 DATE PLOTTED:
 BY:
 BY:

NO.	DATE	REVISIONS	BY	CHK	LEAD DISC.	PROJ. MAN.
B	18/03/20	90% SUBMISSION TO CA		N.M.	L.L.	M.T.
A	18/01/12	90% SUBMISSION TO CA		N.M.	L.L.	M.T.

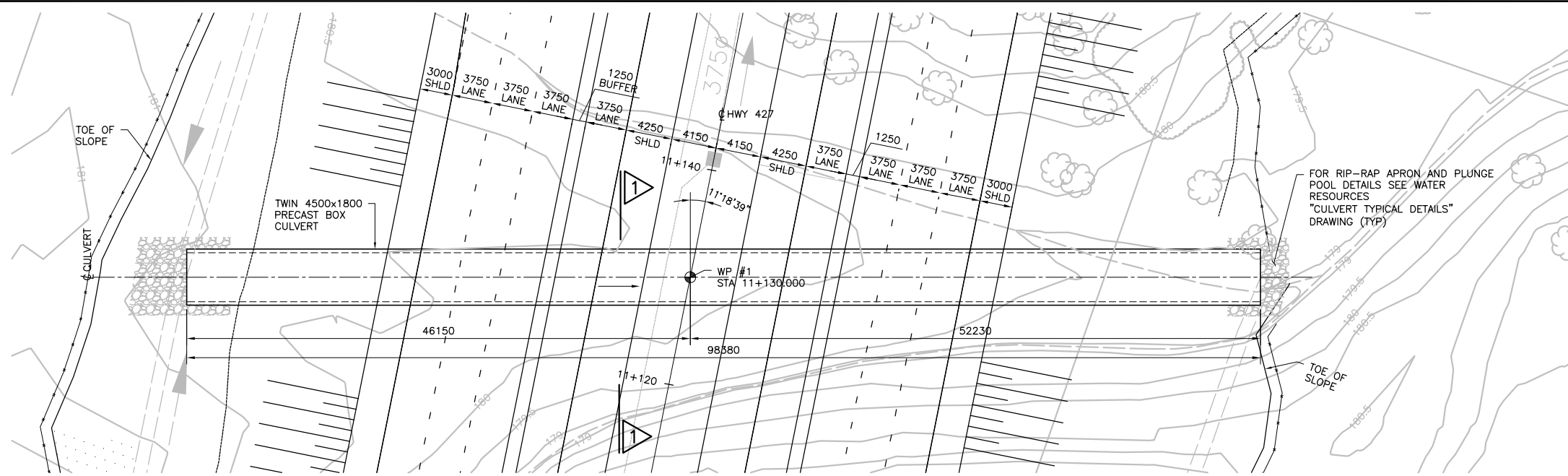
SCALE :

N.T.S

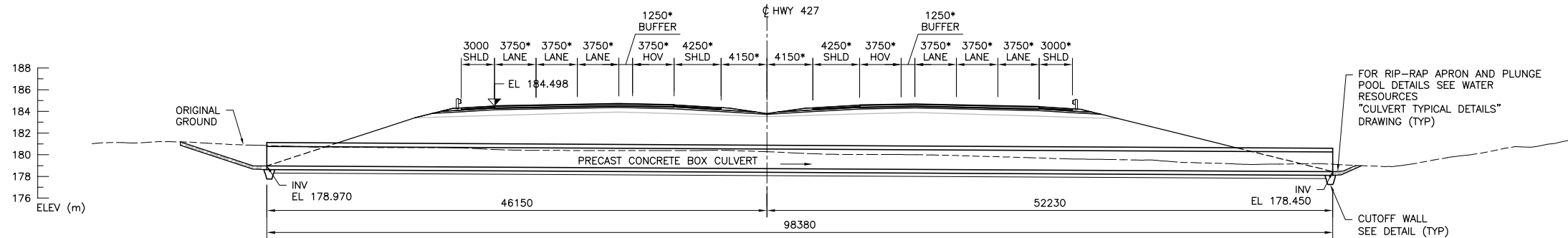
DESIGNED	MANPREET PANSEAR	
DRAWN	JOSH SIMMONS	
CHECKED	LENOX LUE	
APPROVED LEAD ENG.	MARIO TEDESCO	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



TITLE						
HWY 427 EXPANSION HWY 427 AT ZENWAY BLVD UNDERPASS ELECTRICAL EMBEDDED WORK						
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER
H427-D	N	1	STR	B10	DWG	522
						B

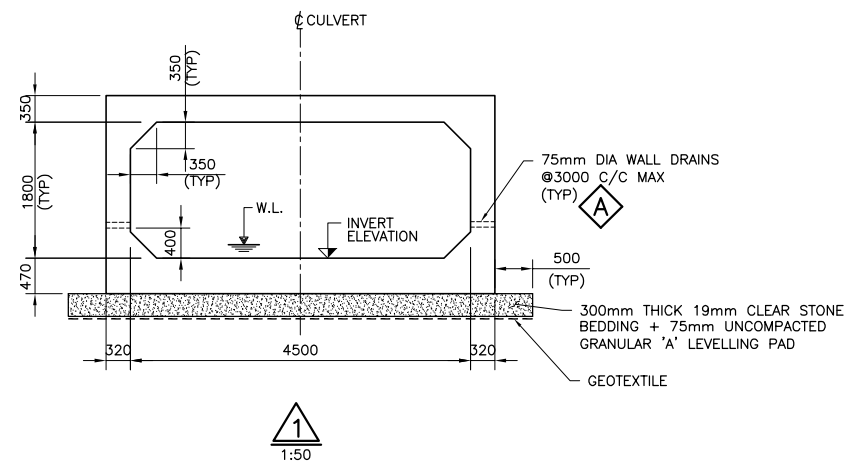


PLAN
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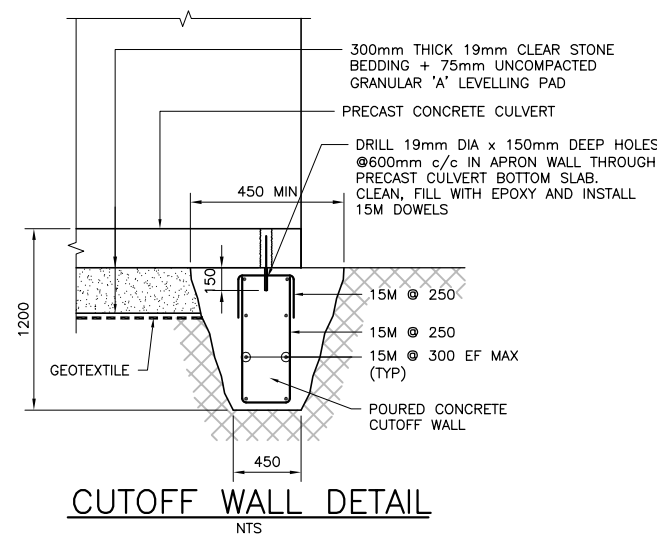


LONGITUDINAL SECTION
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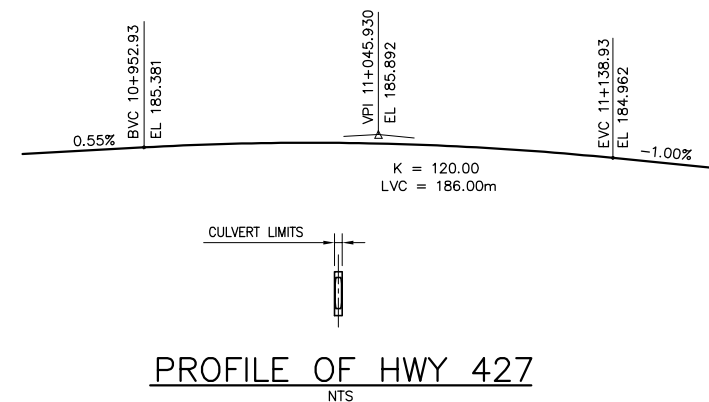
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1
1:50



CUTOFF WALL DETAIL
NTS



PROFILE OF HWY 427
NTS

GENERAL NOTES:

- DESIGN STANDARDS AND CODES:
 - SCHEDULE 15-1 AND SCHEDULE 15-2: PROJECT AGREEMENT
 - DESIGN CODE: CAN/CSA-S6-14
 - MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL MANUAL
 - ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS)
 - MINISTRY OF TRANSPORTATION OF ONTARIO CONCRETE CULVERT DESIGN AND DETAILING MANUAL
- LIVE LOAD: CL-625-ONT.
- CLASS OF CONCRETE
 - PRECAST CONCRETE 35 MPa
 - REMAINDER CONCRETE 30 MPa
- CLEAR COVER TO REINFORCING STEEL
 - CUT OFF WALL 100±25 (CAST AGAINST EARTH)
 - PRECAST CULVERT 50±10
 - REMAINDER 70±20 UNLESS OTHERWISE NOTED
- REINFORCING STEEL
 - REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
 - UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS B.
 - BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM END DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWINGS SS12-1 UNLESS INDICATED OTHERWISE.
- ROADWAY CLASSIFICATION: RFD 120.
- ALL DIMENSIONS ARE IN MILLIMETERS ALL ELEVATIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

CONSTRUCTION NOTES:

- BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH SIDES OF CULVERT KEEPING THE HEIGHT OF BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
- ALL EXPOSED CONCRETE EDGES SHALL HAVE 30x30 mm CHAMFER.
- NO CULVERT SECTIONS SHALL BE PLACED UNTIL THE DEPTH OF EXCAVATION AND THE CHARACTER OF FOUNDATION HAVE BEEN APPROVED BY THE STRUCTURAL VERIFICATION ENGINEER.
- PROVIDE 600mm WIDE STRIP OF GEOTEXTILE OVER ALL HORIZONTAL AND VERTICAL JOINTS BETWEEN CULVERT SEGMENTS.
- APPROPRIATE GROUNDWATER AND SURFACE WATER CONTROL MEASURES SHALL BE PROVIDED.

FOUNDATION NOTES:

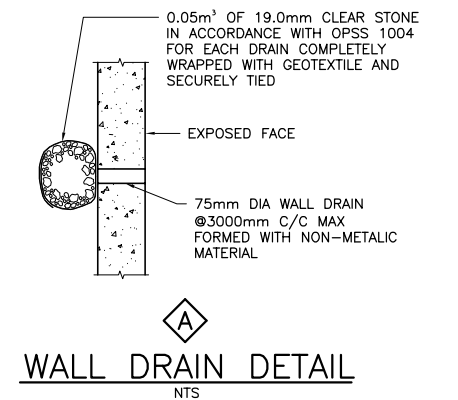
- FACTORED BEARING RESISTANCE
 - SLS = 200 kPa (25mm SETTLEMENT)
 - ULS = 300 kPa

APPLICABLE STANDARD DRAWINGS:

OPSD 0803.010 BACKFILL AND COVER FOR CONCRETE CULVERTS

LIST OF ABBREVIATIONS:

PVI POINT OF VERTICAL INTERSECTION
WP WORKING POINT



WALL DRAIN DETAIL
NTS

CAD FILE LOCATION AND NAME: C:\projects\hwy427\DWG-8000A.dwg
 MODIFIED: 3/20/2018 1:43:02 PM BY: PANGF
 DATE PLOTTED: 3/20/2018 2:28:22 PM BY:

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18/01/12	90% SUBMISSION TO CA				

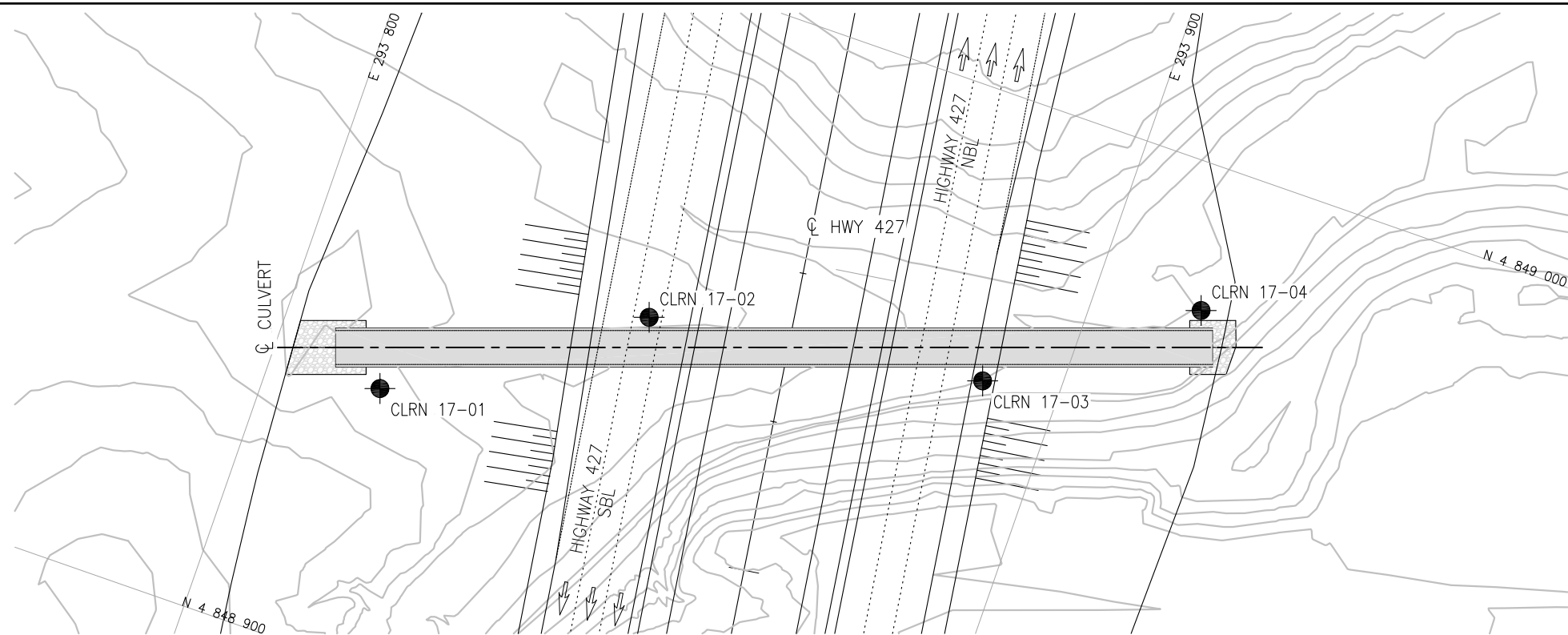
SCALE :

AS NOTED

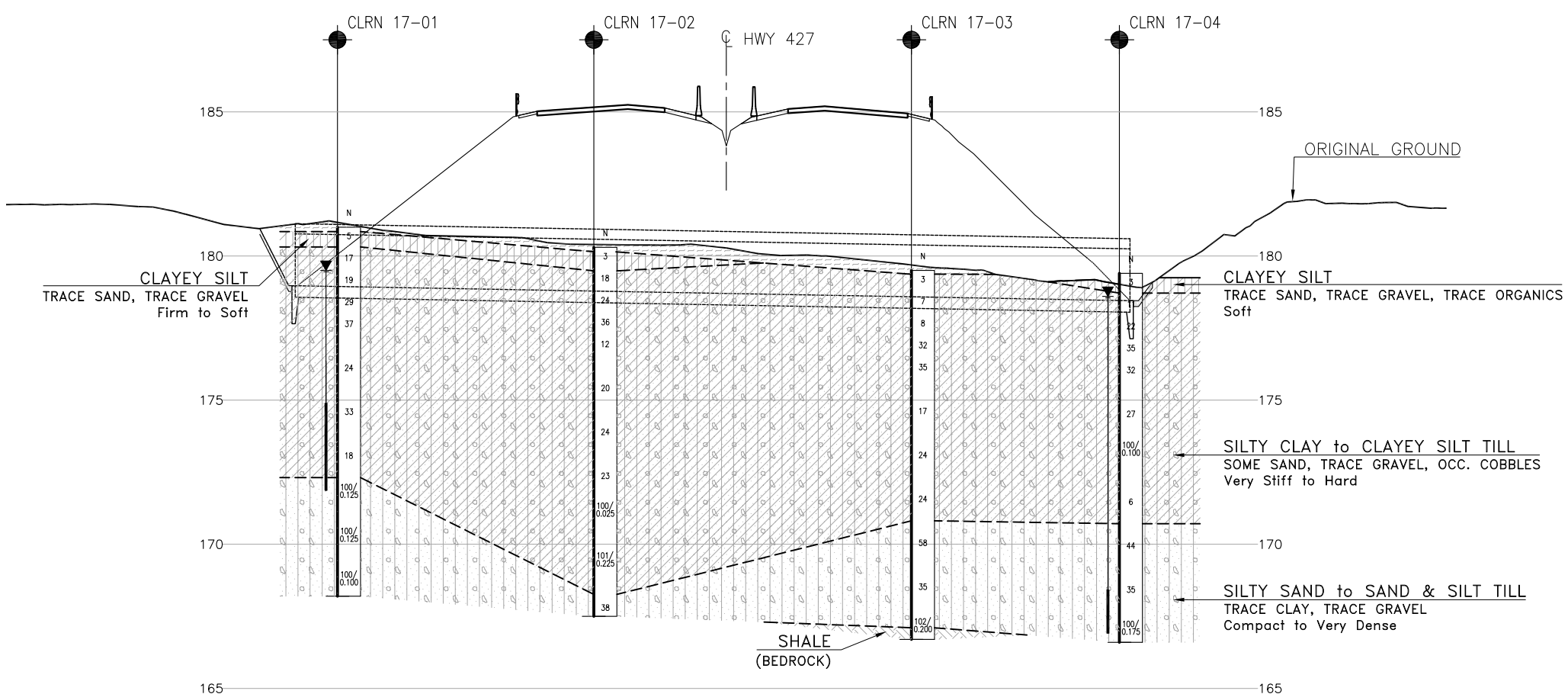
DESIGNED	NIMA MAHMOUDI	
DRAWN	ELENA TSENER	
CHECKED	TATIANA OJALA	
APPROVED LEAD ENG.	TATIANA OJALA	
APPROVED PROJ. MANAGER		
NAME (PRINT)	INIT.	DATE



HWY 427 EXPANSION BOX CULVERT STA 11+130.000 U022 (RAIN-1)						
GENERAL ARRANGEMENT						
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER
H427-D	N	1	STR	S51	DWG	800
						B



PLAN



SECTION ALONG CULVERT

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

	Borehole
	Borehole and Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
CLRN 17-01	181.0	4 848 935.7	293 815.0
CLRN 17-02	180.3	4 848 956.3	293 845.5
CLRN 17-03	179.5	4 848 962.9	293 889.9
CLRN 17-04	179.4	4 848 981.2	293 914.1

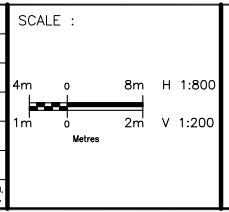
-NOTES-

- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOGRES No.

FILENAME: H:\Drafting\19000\19484\TES-12307-Culvert (11+130).dwg
 PLOTDATE: 3/20/2018 9:52 AM

NO.	DATE	REVISIONS	BY	CHK	LEAD. ENG.	PROJ. MGR.
B	18/03/16	90% SUBMISSION TO CA	AN	KS	JL	JL
A	18/01/12	90% SUBMISSION TO CA	AN	KS	JL	JL



DESIGNED	A. PIASCK	AP	18/03/16
DRAWN	A. NOOR	AN	18/03/16
CHECKED	K. SHI	KS	18/03/16
APPROVED LEAD ENGINEER	J. LEE	JL	18/03/16
APPROVED PROJ. MANAGER	J. LEE	JL	18/03/16
NAME (PRINT)		INT.	DATE

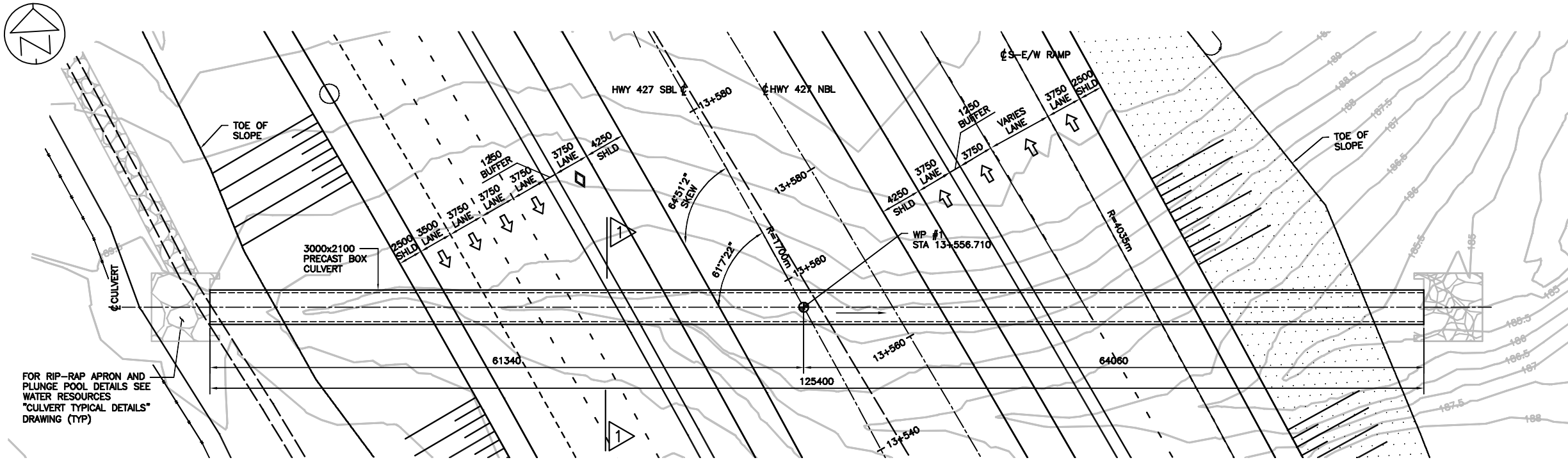


TITLE

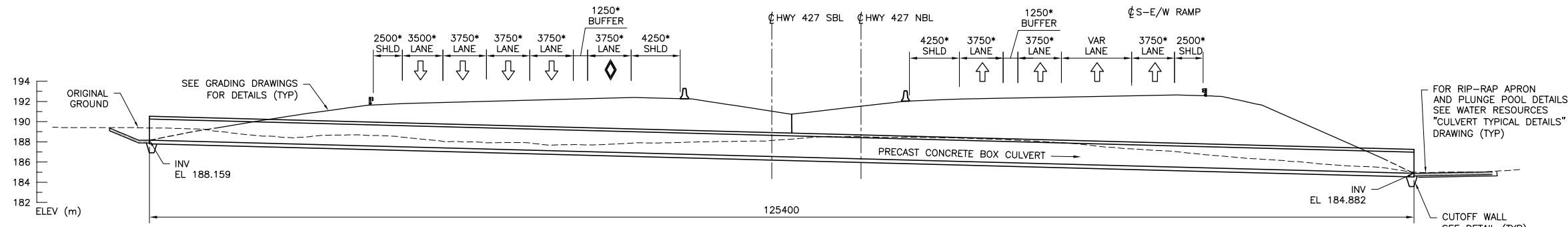
**HWY 427 EXPANSION
BOX CULVERT STA 11+130
U022 (RAIN-1)**

BOREHOLE LOCATIONS AND SOIL STRATA

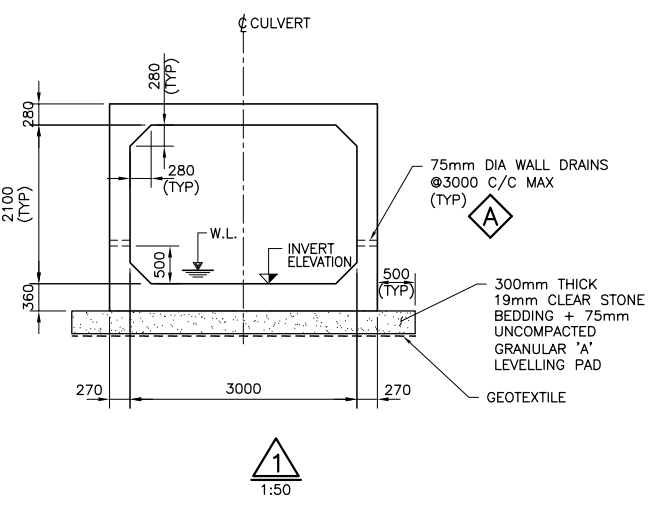
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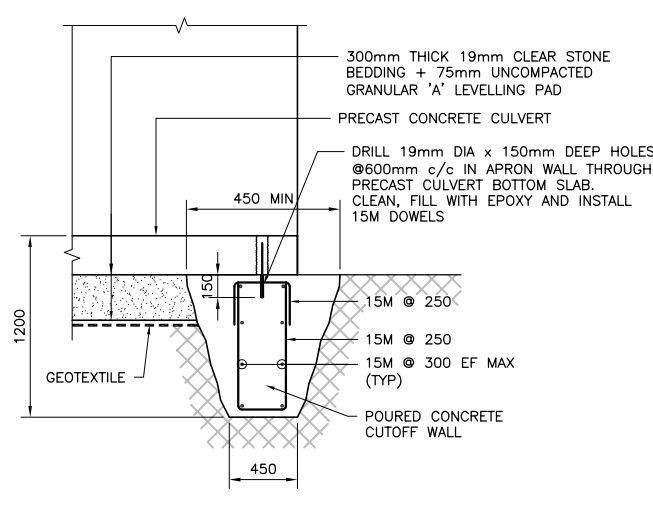
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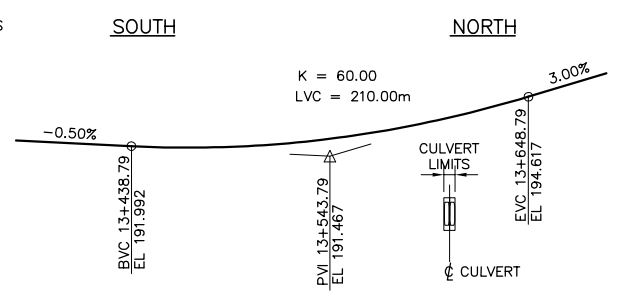
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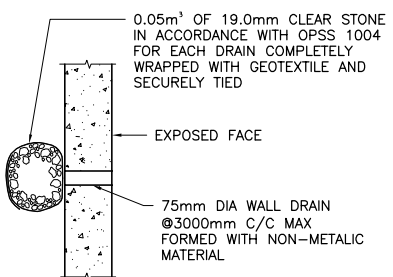
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CUTOFF WALL DETAIL
NTS



PROFILE OF HWY 427
NTS



WALL DRAIN DETAIL
NTS

- GENERAL NOTES:**
- DESIGN STANDARDS AND CODES:
 - SCHEDULE 15-1 AND SCHEDULE 15-2: PROJECT AGREEMENT
 - DESIGN CODE: CAN/CSA-S6-14
 - MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL MANUAL
 - ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS)
 - MINISTRY OF TRANSPORTATION OF ONTARIO CONCRETE CULVERT DESIGN AND DETAILING MANUAL
 - LIVE LOAD: CL-625-ONT.
 - CLASS OF CONCRETE
 - PRECAST CONCRETE 35 MPa
 - REMAINDER CONCRETE 30 MPa
 - CLEAR COVER TO REINFORCING STEEL
 - CUT OFF WALL 100±25 (CAST AGAINST EARTH)
 - PRECAST CULVERT 50±10
 - REMAINDER 70±20 UNLESS OTHERWISE NOTED
 - REINFORCING STEEL
 - REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
 - UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS B.
 - BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM END DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWINGS SS12-1 UNLESS INDICATED OTHERWISE.
 - ROADWAY CLASSIFICATION: RFD 120.
 - ALL DIMENSIONS ARE IN MILLIMETERS, ALL ELEVATIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

- CONSTRUCTION NOTES:**
- BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH SIDES OF CULVERT KEEPING THE HEIGHT OF BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
 - ALL EXPOSED CONCRETE EDGES SHALL HAVE 30x30 mm CHAMFER.
 - NO CULVERT SECTIONS SHALL BE PLACED UNTIL THE DEPTH OF EXCAVATION AND THE CHARACTER OF FOUNDATION HAVE BEEN APPROVED BY THE QUALITY VERIFICATION ENGINEER.
 - PROVIDE 600mm WIDE STRIP OF GEOTEXTILE OVER ALL HORIZONTAL AND VERTICAL JOINTS BETWEEN CULVERT SEGMENTS.
 - APPROPRIATE GROUNDWATER AND SURFACE WATER CONTROL MEASURES SHALL BE PROVIDED.

- FOUNDATION NOTES:**
- FACTORED BEARING RESISTANCE
 - SLS = 200 kPa (25mm SETTLEMENT)
 - ULS = 300 kPa

- APPLICABLE STANDARD DRAWINGS:**
- OPSD 803.010 BACKFILL AND COVER FOR CONCRETE CULVERTS
 - OPSD 3101.150 WALLS, ABUTMENT, BACKFILL, MINIMUM GRANULAR REQUIREMENT
 - OPSD 3941.200 FIGURES IN CONCRETE SITE NUMBER AND DATE LAYOUT
 - OPSD 3950.100 JOINTS, CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE

- LIST OF ABBREVIATIONS:**
- PVI POINT OF VERTICAL INTERSECTION
 - WP WORKING POINT

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 DATE PLOTTED: 3/20/2018 2:32:33 PM BY:

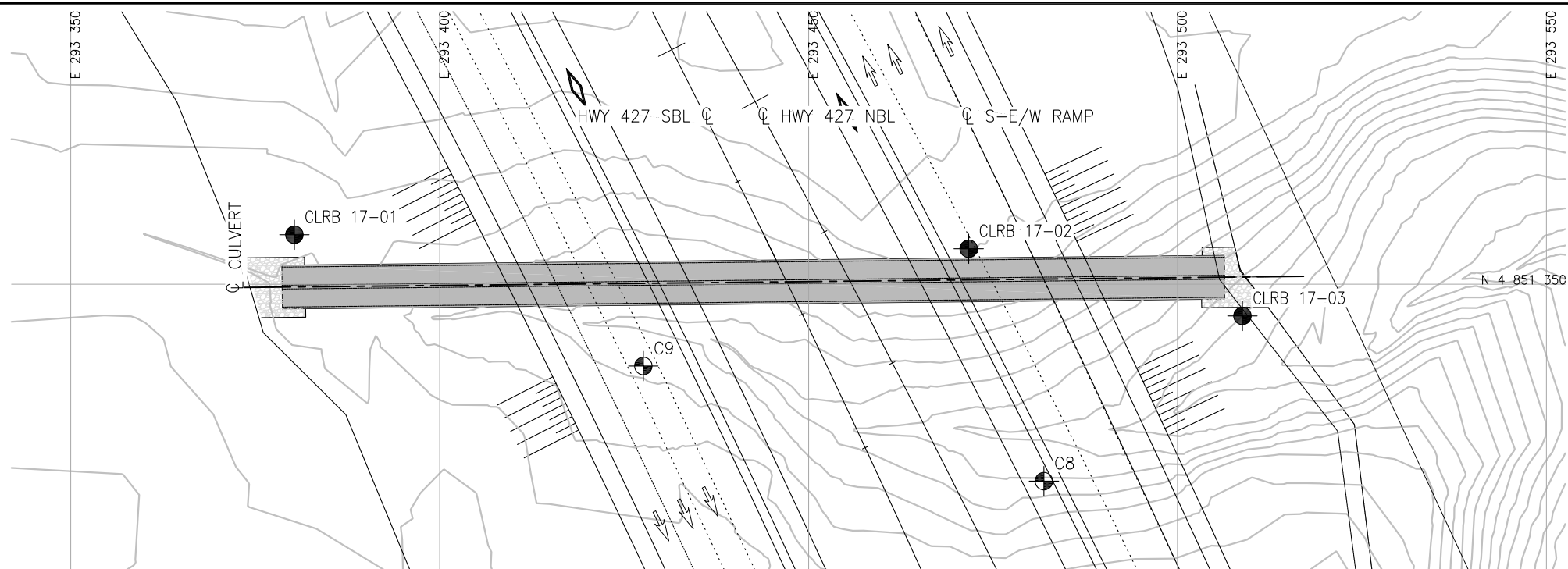
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A 18/01/12	90% SUBMISSION TO CA				

SCALE :
AS NOTED

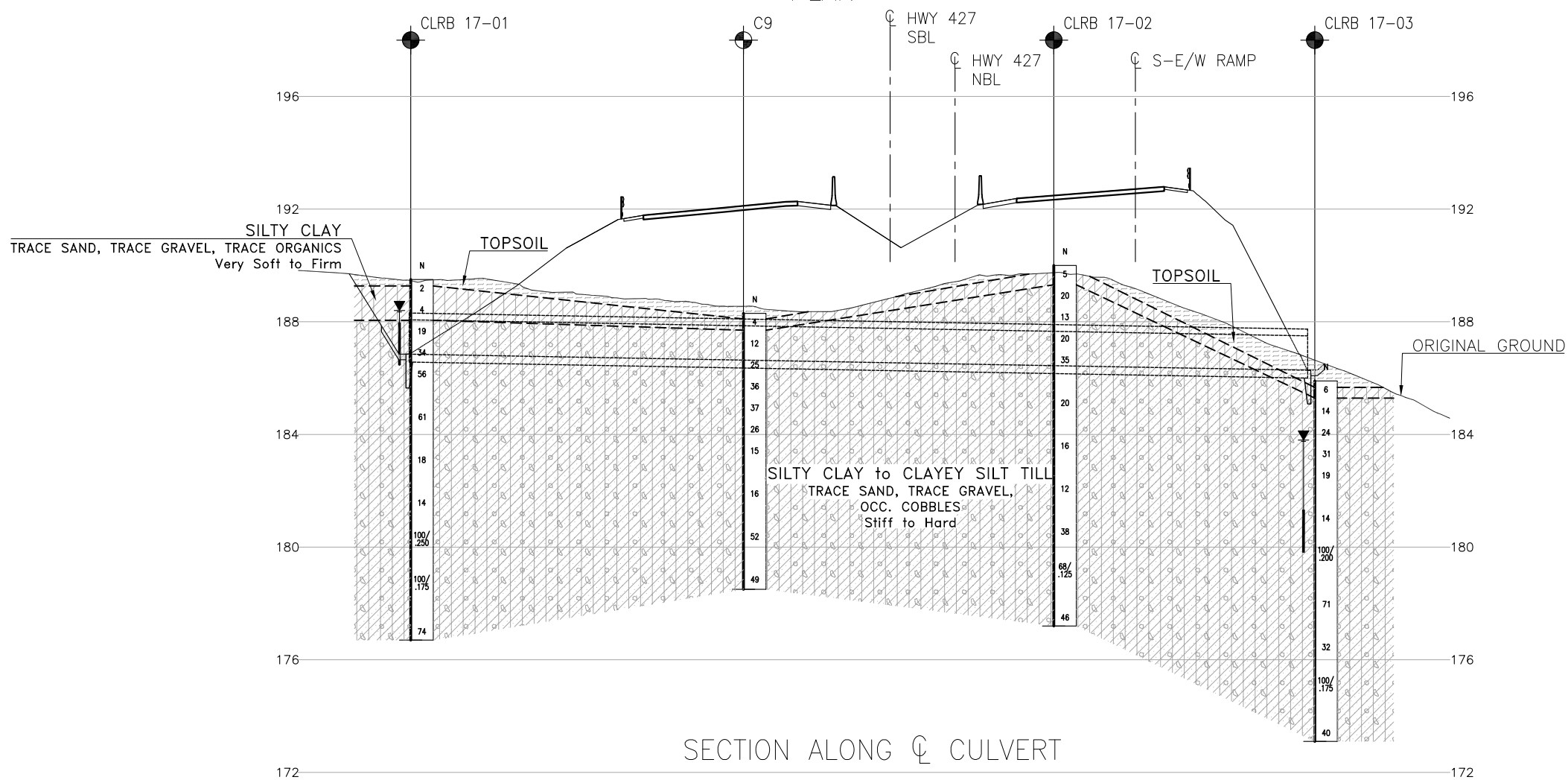
DESIGNED	NMA MAHMOUDI
DRAWN	ELENA TSENER
CHECKED	TATIANA OJALA
APPROVED LEAD ENG.	TATIANA OJALA
APPROVED PROJ. MANAGER	



HWY 427 EXPANSION BOX CULVERT STA 13+556 U046 (ROB-2)							
GENERAL ARRANGEMENT							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	2	STR	S52	DWG	500	B



PLAN



SECTION ALONG CULVERT

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
WP No



KEYPLAN

LEGEND

	Borehole
	Borehole and Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
C8	186.9	4 851 323.3	293 481.9
C9	188.3	4 851 338.9	293 427.6
CLR 17-01	189.5	4 851 356.7	293 380.3
CLR 17-02	190.0	4 851 354.8	293 471.7
CLR 17-03	185.9	4 851 345.7	293 508.8

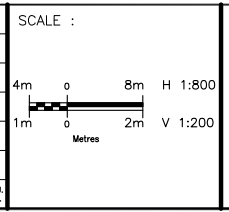
-NOTES-

- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOGRES No.

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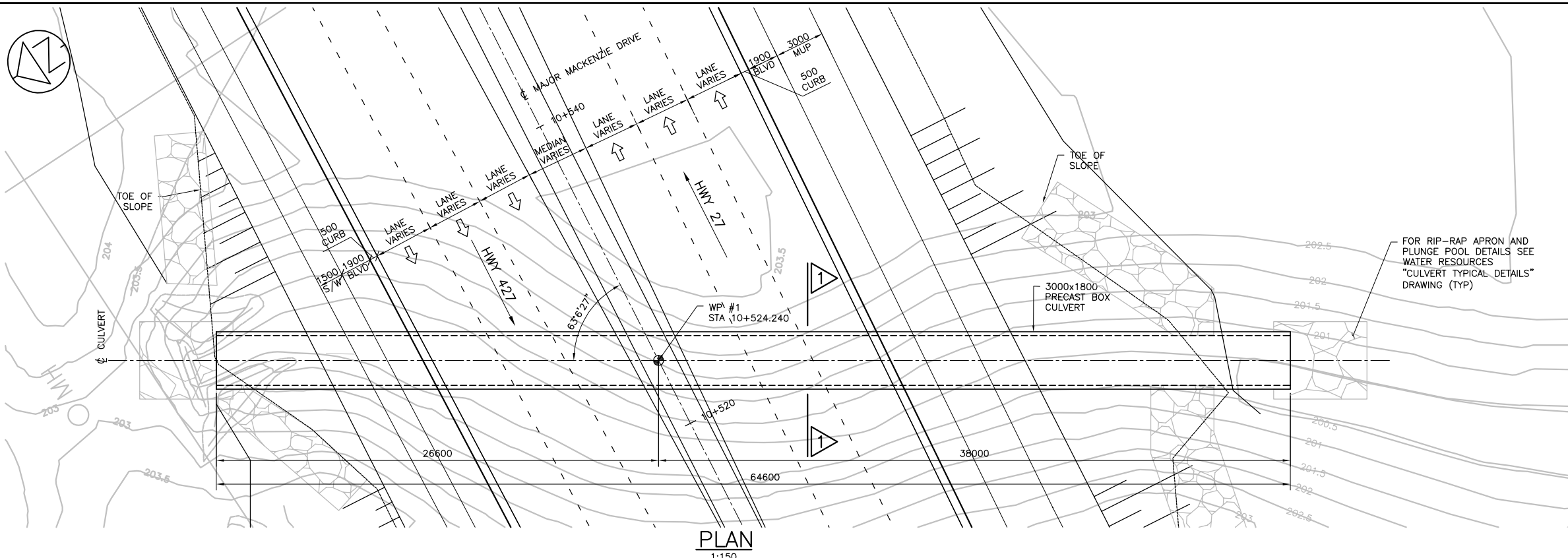
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A	18/01/05	90% SUBMISSION TO CA	AN	KS	JL	JL



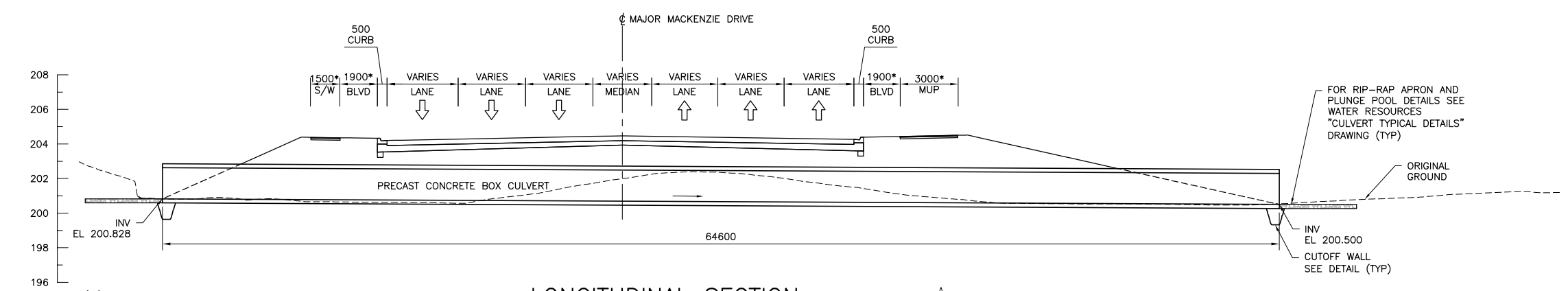
DESIGNED	A. PIASIK	AP	18/03/16
DRAWN	A. NOOR	AN	18/03/16
CHECKED	K. SHI	KS	18/03/16
APPROVED LEAD ENGINEER	J. LEE	JL	18/03/16
APPROVED PROJ. MANAGER	J. LEE	JL	18/03/16
CONSULTANT			
	NAME (PRINT)	INIT.	DATE



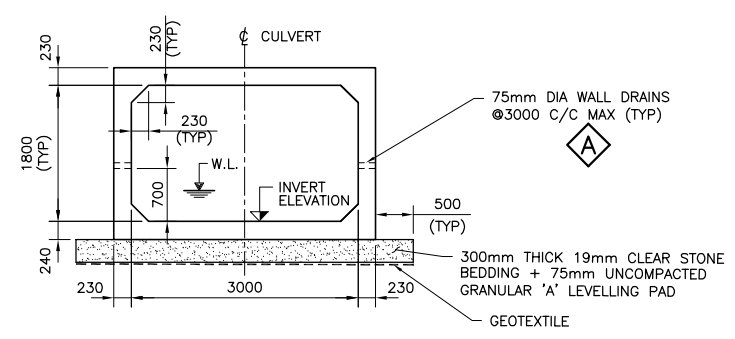
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BOREHOLE LOCATIONS AND SOIL STRATA							
PROJECT ID.	STAGE IDENTIFIER	DESIGN PACKAGE NUMBER	DISCIPLINE	STRUCTURE NUMBER	DOCUMENT TYPE	DRAWING NUMBER	REVISION NUMBER
H427-D	N	2	STR	S52	DWG	501	B



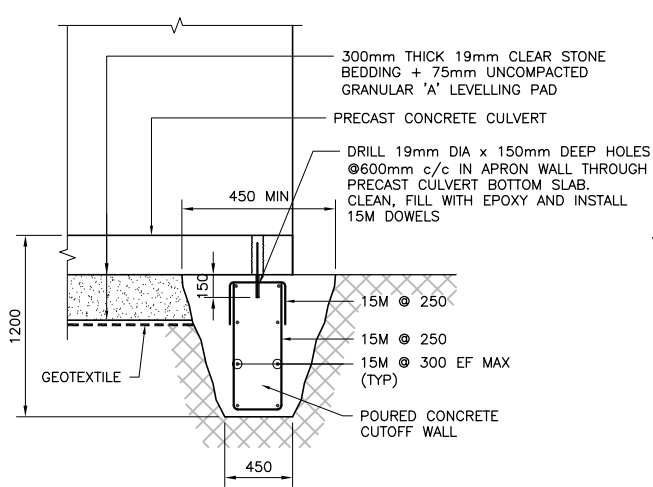
PLAN
1:150



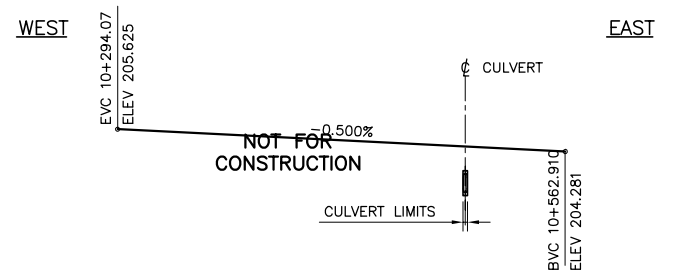
LONGITUDINAL SECTION
1:150
* DIMENSIONS ARE PERPENDICULAR TO CL TRAFFIC LANE



WALL DRAIN DETAIL
NTS



CUTOFF WALL DETAIL
NTS



PROFILE OF MAJOR MACKENZIE DRIVE
NTS

- GENERAL NOTES:**
- DESIGN STANDARDS AND CODES:
 - SCHEDULE 15-1 AND SCHEDULE 15-2: PROJECT AGREEMENT
 - DESIGN CODE: CAN/CSA-S6-14
 - MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL MANUAL
 - ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS)
 - MINISTRY OF TRANSPORTATION OF ONTARIO CONCRETE CULVERT DESIGN AND DETAILING MANUAL
 - LIVE LOAD: CL-625-ONT.
 - CLASS OF CONCRETE

PRECAST CONCRETE	35 MPa
REMAINDER CONCRETE	30 MPa
 - CLEAR COVER TO REINFORCING STEEL

CUT OFF WALL	100±25 (CAST AGAINST EARTH)
PRECAST CULVERT	50±10
REMAINDER	70±20 UNLESS OTHERWISE NOTED
 - REINFORCING STEEL

REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.

UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS B.

BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM END DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWINGS SS12-1 UNLESS INDICATED OTHERWISE.
 - ROADWAY CLASSIFICATION: UAD 60.
 - ALL DIMENSIONS ARE IN MILLIMETERS, ALL ELEVATIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

- CONSTRUCTION NOTES:**
- BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH SIDES OF CULVERT KEEPING THE HEIGHT OF BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
 - ALL EXPOSED CONCRETE EDGES SHALL HAVE 30x30 mm CHAMFER.
 - NO CULVERT SECTIONS SHALL BE PLACED UNTIL THE DEPTH OF EXCAVATION AND THE CHARACTER OF FOUNDATION HAVE BEEN APPROVED BY THE QUALITY VERIFICATION ENGINEER.
 - PROVIDE 600mm WIDE STRIP OF GEOTEXTILE OVER ALL HORIZONTAL AND VERTICAL JOINTS BETWEEN CULVERT SEGMENTS.
 - APPROPRIATE GROUNDWATER AND SURFACE WATER CONTROL MEASURES SHALL BE PROVIDED.

- LIST OF ABBREVIATIONS:**
- MUP MULTI-USE PATH
PVI POINT OF VERTICAL INTERSECTION
WP WORKING POINT

- FOUNDATION NOTES:**
- FACTORED BEARING RESISTANCE

SLS	= 200 kPa (25mm SETTLEMENT)
ULS	= 300 kPa

- APPLICABLE STANDARD DRAWINGS:**
- | | |
|---------------|--|
| OPSD 803.010 | BACKFILL AND COVER FOR CONCRETE CULVERTS |
| OPSD 3101.150 | WALLS, ABUTMENT, BACKFILL, MINIMUM GRANULAR REQUIREMENT |
| OPSD 3941.200 | FIGURES IN CONCRETE SITE NUMBER AND DATE LAYOUT |
| OPSD 3950.100 | JOINTS, CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE |

CAD FILE LOCATION AND NAME: C:\projects\hwy427\hwy427-d0-3-STR-553-DWG-700GA.dwg
 MODIFIED: 3/20/2018 1:52:19 PM BY: PANGF
 DATE PLOTTED: 3/20/2018 2:36:27 PM BY:

DATE	REVISIONS	BY	CHK	LEAD	PROJ
B 18/03/16	90% SUBMISSION TO CA				
A 18/01/12	90% SUBMISSION TO CA				

SCALE :
AS NOTED

DESIGNED	NIMA MAHMOUDI
DRAWN	ELENA TSENIER
CHECKED	TATIANA OJALA
APPROVED LEAD ENG.	TATIANA OJALA
APPROVED PROJ. MANAGER	



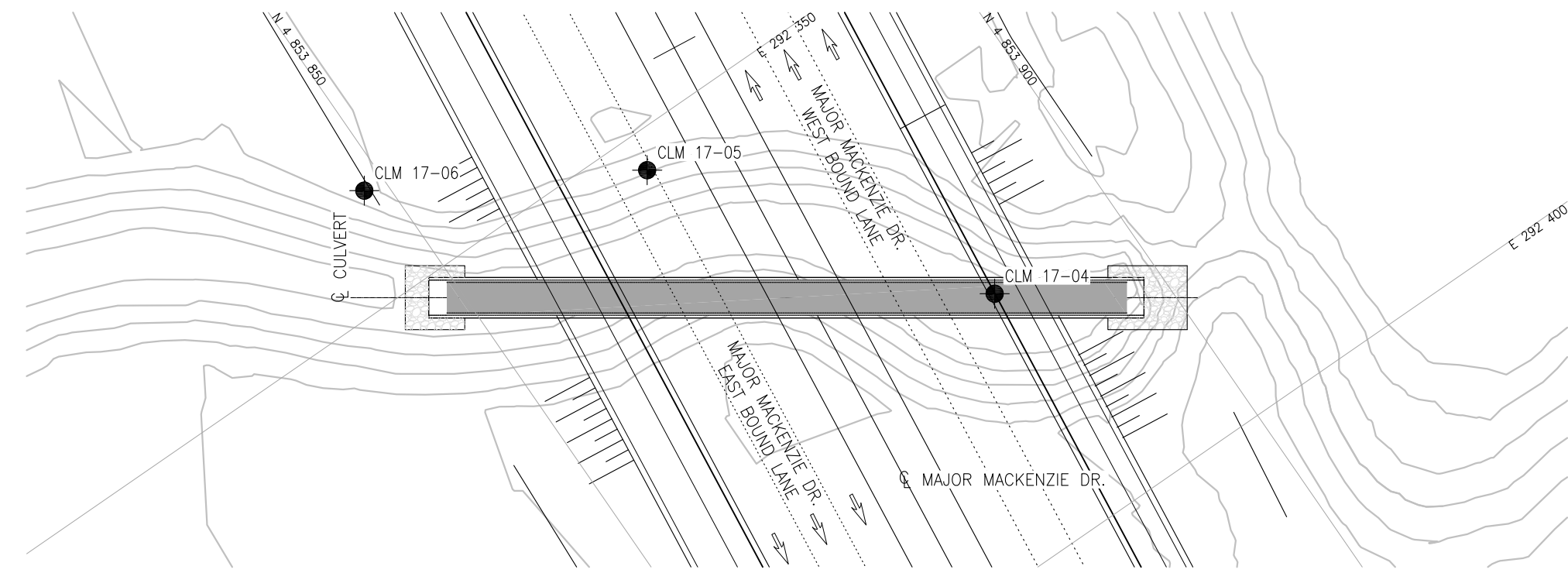
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METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

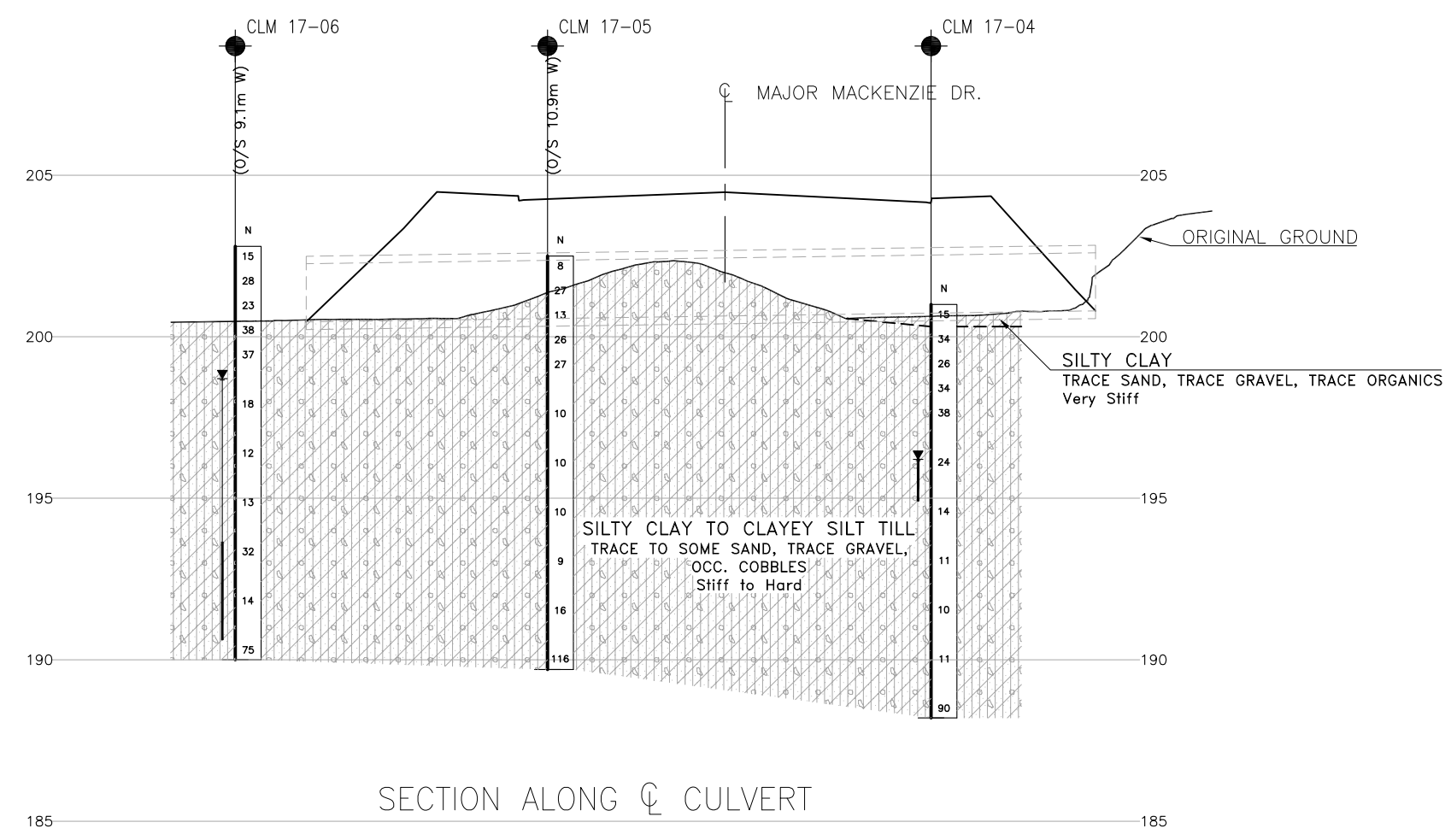
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WP No



KEYPLAN



PLAN



SECTION ALONG CULVERT

LEGEND

	Borehole
	Borehole and Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
CLM 17-04	201.0	4 853 887.4	292 378.7
CLM 17-05	202.5	4 853 869.0	292 353.2
CLM 17-06	202.8	4 853 848.1	292 340.9

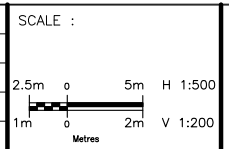
-NOTES-

- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCREs No.

FILENAME: H:\Drafting\19000\19484\YES-12307-Culvert (10+524).dwg
PLOT DATE: 3/20/2018 9:49 AM

NO.	DATE	REVISIONS	BY	CHK	LEAD. ENG.	PROJ. MGR.
B	18/03/16	90% SUBMISSION TO CA	AN	KS	JL	JL
A	18/01/05	90% SUBMISSION TO CA	AN	KS	JL	JL



DESIGNED	A. PIASICK	AP	18/03/16
DRAWN	A. NOOR	AN	18/03/16
CHECKED	K. SHI	KS	18/03/16
APPROVED LEAD ENGINEER	J. LEE	JL	18/03/16
APPROVED PROJ. MANAGER	J. LEE	JL	18/03/16
NAME (PRINT)	INT.	DATE	



TITLE							
HWY 427 EXPANSION BOX CULVERT W017 MAJOR MACKENZIE DRIVE STA 10+524 BOREHOLE LOCATIONS AND SOIL STRATA							
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