



THE SOUTH AFRICAN NATIONAL ROADS AGENCY LIMITED

CONTRACT NO. X.003-022-2018/1-C6

FOR

AD-HOC STRUCTURAL AND DRAINAGE SERVICES IN THE SOUTHERN REGION – EMERGENCY
BRIDGE REPAIR WORKS (REPAIR OF BRIDGES ALONG THE N2 SECTIONS 16)

DRAWINGS FOR STRUCTURES

N2 SECTION 16

AUGUST 2023

VOLUME 5
BOOK 1 OF 1

ISSUED BY:

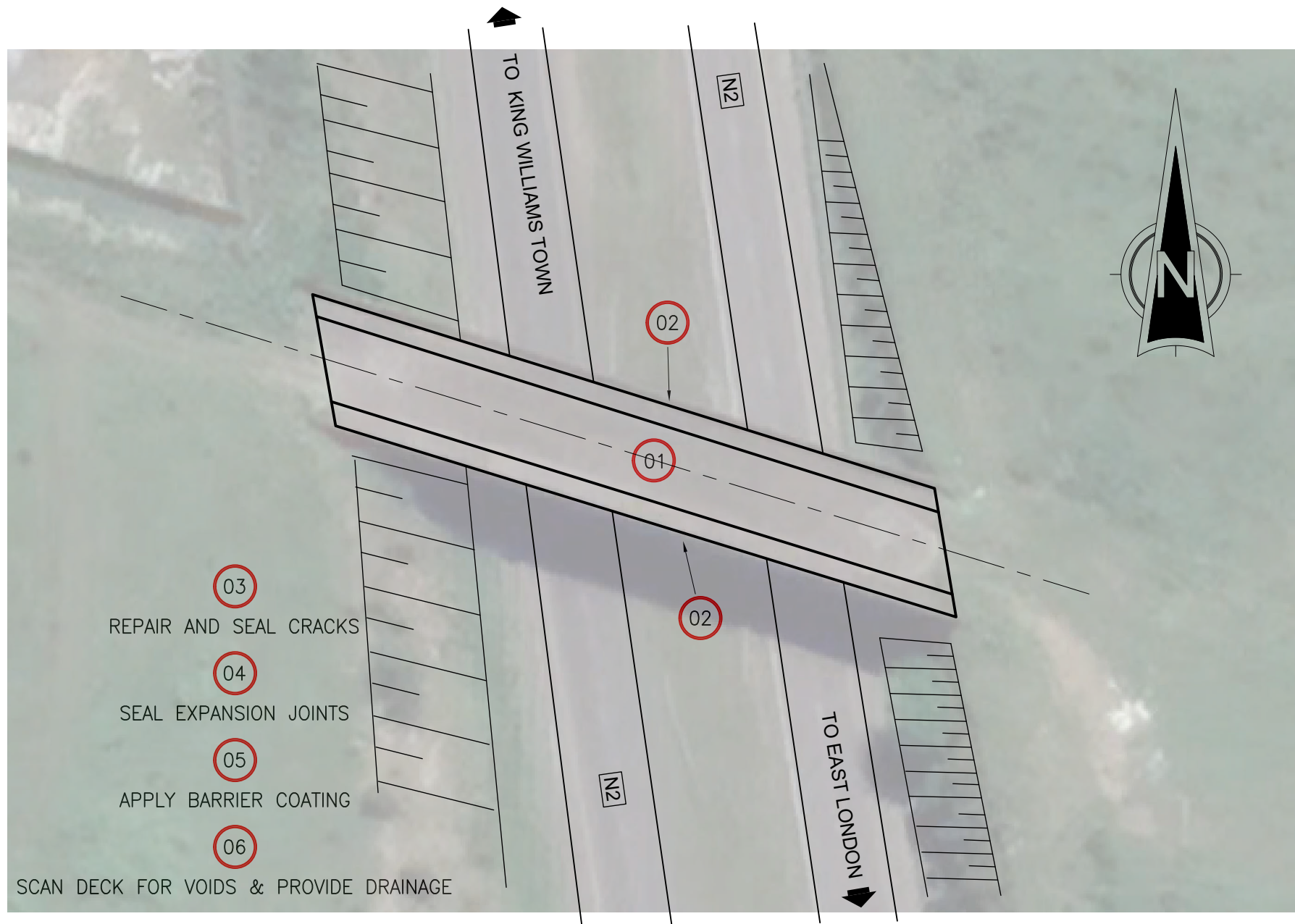
CHIEF EXECUTIVE OFFICER
THE SOUTH AFRICAN NATIONAL ROADS AGENCY
SOUTHERN REGION
20 SHOREWARD DRIVE
BAYWEST
PORT ELIZABETH

DRAWING INDEX: STRUCTURES

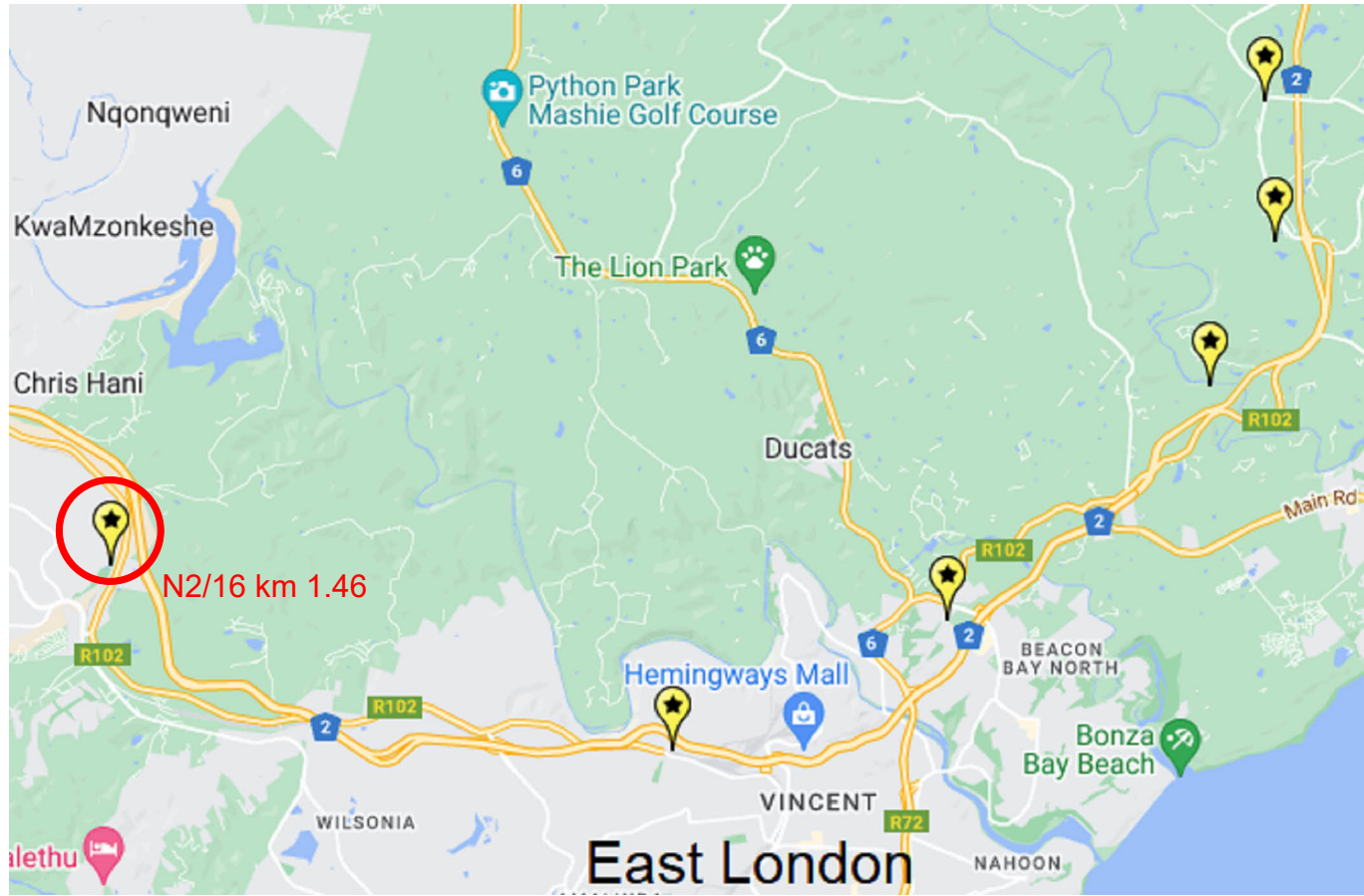
VOLUME 5 BOOK 1 OF 1

SANRAL Doc. No.	Drawing No.	Drawing Description
	201931- N2- C6 - INDEX	
#	201931- N2- 16- 01 - 00	Layout and Details: Bridge B1244 @ km 1.46
#	201931- N2- 16- 01 - 01	Accommodation of Traffic: Bridge B1244 @ km 1.46
#	201931- N2- 16- 12 - 00	Layout and Details: Bridge B1252 @ km 12.29
#	201931- N2- 16- 12 - 01	Details: Bridge B1252 @ km 12.29
#	201931- N2- 16- 12 - 02	Accommodation of Traffic: Bridge B1252 @ km 12.29
#	201931- N2- 16- 18 - 00	Layout and Details: Bridge B4084 @ km 17.70
#	201931- N2- 16- 18 - 01	Details: Bridge B4084 @ km 17.70
#	201931- N2- 16- 18 - 02	Accommodation of Traffic: Bridge B4084 @ km 17.70
#	201931- N2- 16- 23 - 00	Layout and Details: Bridge B1264 @ km 23.40
#	201931- N2- 16- 23 - 01	Details: Bridge B1264 @ km 23.40
#	201931- N2- 16- 23 - 02	Accommodation of Traffic: Bridge B1264 @ km 23.40
#	201931- N2- 16- 26 - 00	Layout and Details: Bridge B910 @ km 26.46
#	201931- N2- 16- 26 - 01	Details: Bridge B910 @ km 26.46
#	201931- N2- 16- 26 - 02	Accommodation of Traffic: Bridge B910 @ km 26.46
#	201931- N2- 16- 28 - 00	Layout and Details: Bridge B1265 @ km 28.70
#	201931- N2- 16- 28 - 01	Accommodation of Traffic: Bridge B1265 @ km 28.70
#	201931- N2- 16- 80 - 00	Layout and Details: Bridge B149 @ km 80.22
#	201931- N2- 16- 80 - 01	Details: Bridge B149 @ km 80.22
#	201931- N2- 16- 80 - 02	Accommodation of Traffic: Bridge B149 @ km 80.22

		CONSTRUCTION RECORD		DESIGNED BY		CONSULTANT APPROVAL		HEAD OFFICE		SOUTHERN REGION		ACCEPTANCE		PROJECT DESCRIPTION		PROJECT NUMBER		X.003-022-2018/1-C6	
		WORKS CONTRACT ENGINEER		NAME		NAME		48 Tambotie Avenue		20 Shoreward Drive		THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATSOEVER CAUSE OR HOWEVER ARISING		AD-HOC STRUCTURAL AND DRAINAGE SERVICES IN THE SOUTHERN REGION – EMERGENCY BRIDGE REPAIR WORKS		DRAWING LOCATION DATA		START	
		Name		Prof. Reg. No.		Prof. Reg. No.		Vai de Grace		Baywest				ROUTE		N2		N2	
		Date		CHECKED BY		NAME		Pretoria		Port Elizabeth				SECTION		16		16	
				NAME		NAME		0184		6025				DRAWING TYPE		INDEX			
		SANRAL PROJECT MANAGER		Prof. Reg. No.		Prof. Reg. No.		PO Box 415		P.O. Box 27230				BRIDGE/STRUCTURE No.		N/A			
		Name		Date		Date		Pretoria 0001		Greenacres				CONSULTANT DRAWING No.		201931-N2-C6-INDEX		VER	
		Prof. Reg. No.		DRAWN BY		Date		South Africa		6057				SANRAL DOCUMENT #		#####		VA	
		Date		NAME				Tel: (012) 844 8000		Tel: (041) 398 3200				SCALE :		AS SHOWN		SHEET 1 OF 1	
VA		FOR TENDER								Fax: (041) 398 3222									
No.		DATE		REVISION		CONSULT. ENG.													

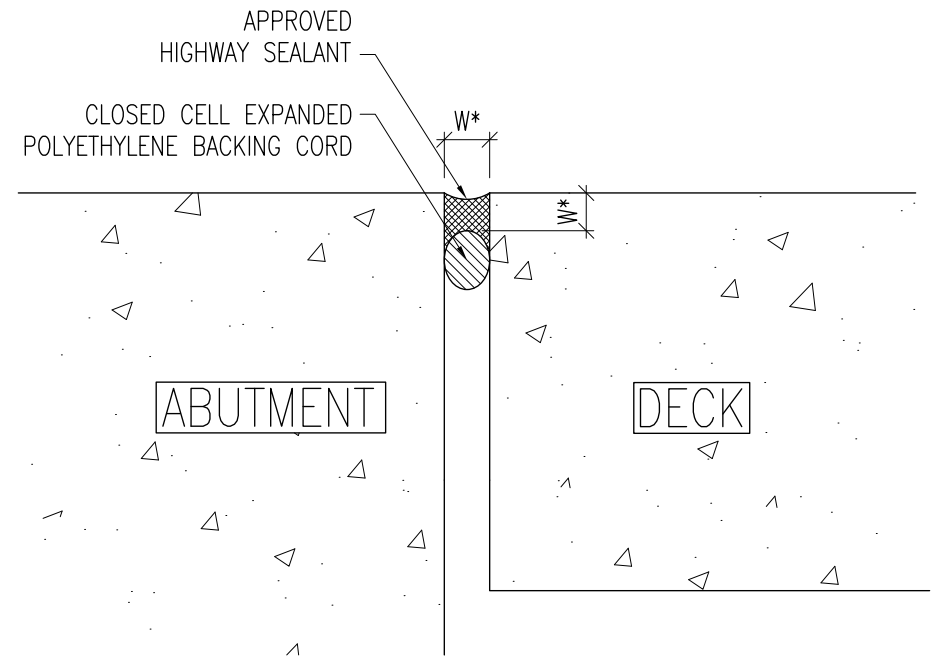


PLAN ON BRIDGE B1244 – (N2/16 @ km 1.46)
NTS



LOCALITY

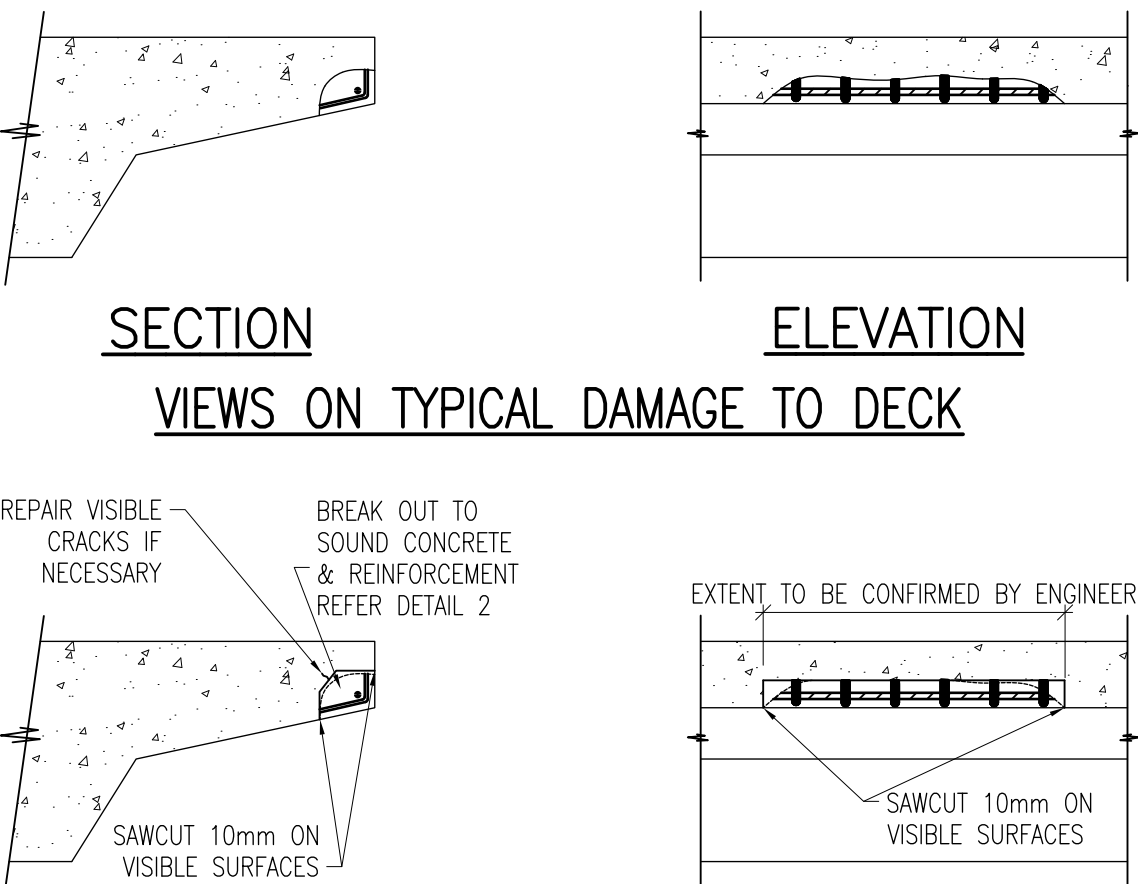
ITEM	DESCRIPTION
01	CLEAN DECK AND REMOVE VEGETATION.
02	REPAIR LOCAL SPALLS ALONG DECK EDGE AND PARAPETS.
03	REPAIR AND SEAL CRACKS TO DECK AND ABUTMENTS.
04	SEAL EXPANSION JOINTS.
05	APPLY APPROVED CEMENTITIOUS BARRIER COATING, IF SIGNS OF ASR ARE FOUND, TREAT WITH SILANE.
06	SCAN DECK WITH GROUND PENETRATING RADAR (GPR) TO DETERMINE THE PRESENCE & LOCATION OF DECK VOIDS & PROVIDE DRAINAGE TO VOIDS IF PRESENT.



NOTE:
* DIMENSION "W" TO BE DETERMINED ON SITE.

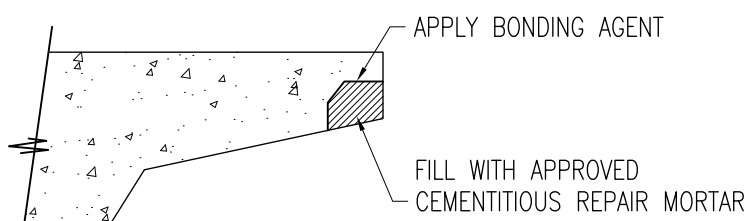
SECTION

TYPICAL DETAIL – CONCRETE REPAIR



SECTION
VIEWS ON TYPICAL DAMAGE TO DECK

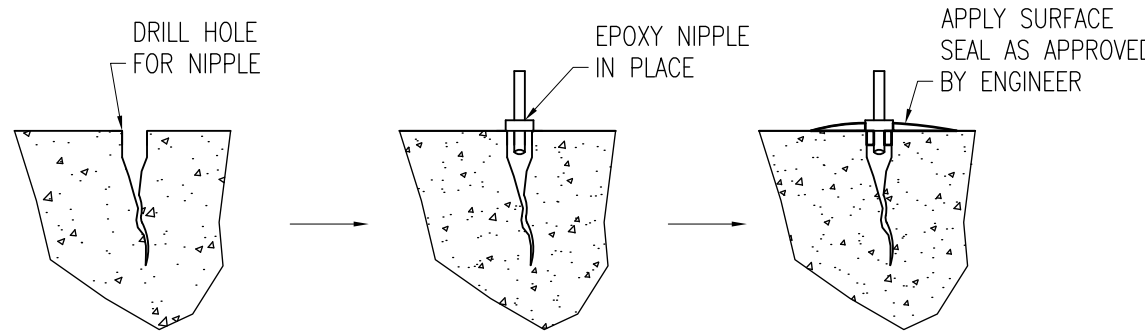
SECTION
EXTENT OF REMOVAL OF DAMAGED CONCRETE



SECTION
PATCHING OF DAMAGE

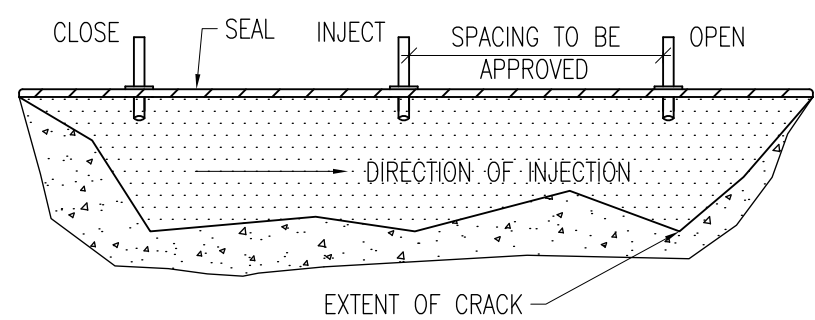
TYPICAL DETAIL – CRACK REPAIR (>0.5mm)

NOTE:
1) INSTALL INJECTION NIPPLES – POSITIONS AS APPROVED BY ENGINEER



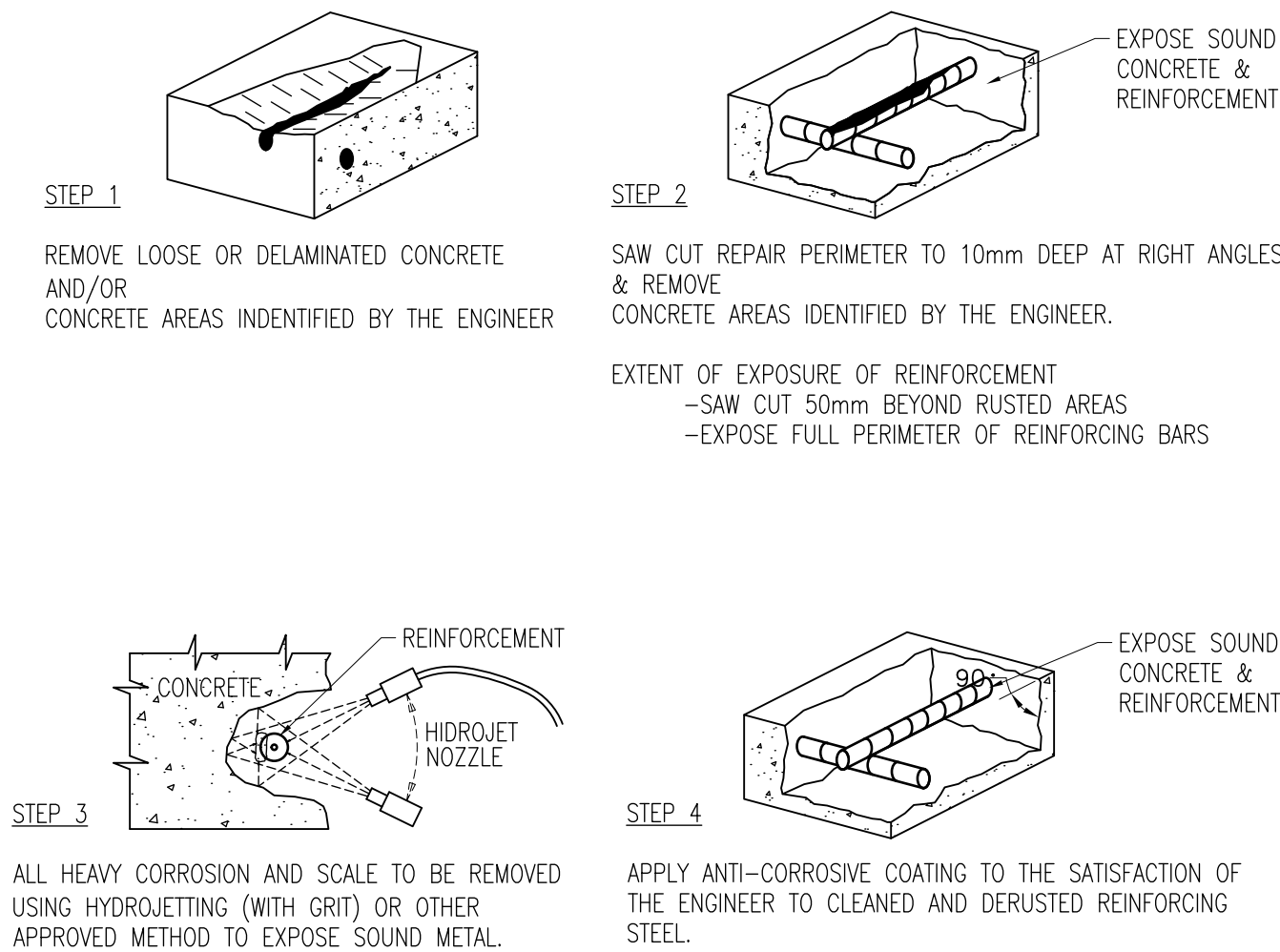
PREPARATION OF CRACK

NOTE:
1) START AT ONE END OF CRACK WITH INJECTION.
2) START INJECTING AT LOWEST POINT.
3) INJECT UNTIL CONSTANT FLOW OF EPOXY IS VISIBLE AT THE NEXT NIPPLE.
4) CLOSE CURRENT NIPPLE AND PROCEED TO NEXT NIPPLE.
5) WHEN COMPLETE, GRIND OFF NIPPLES AND SURFACE EPOXY SEAL.



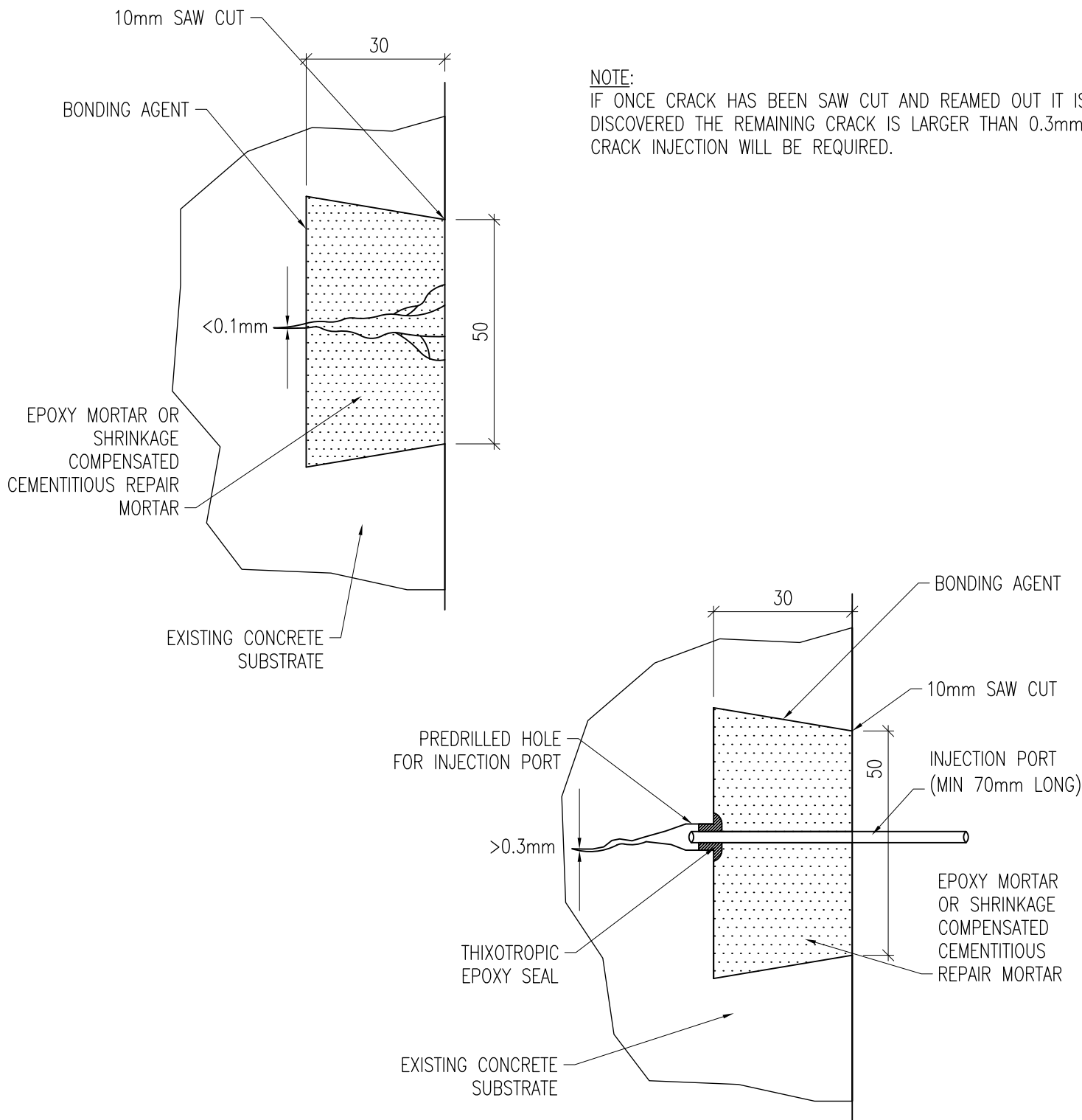
INJECTION OF CRACK

TYPICAL DETAIL – TREATMENT OF REINFORCEMENT



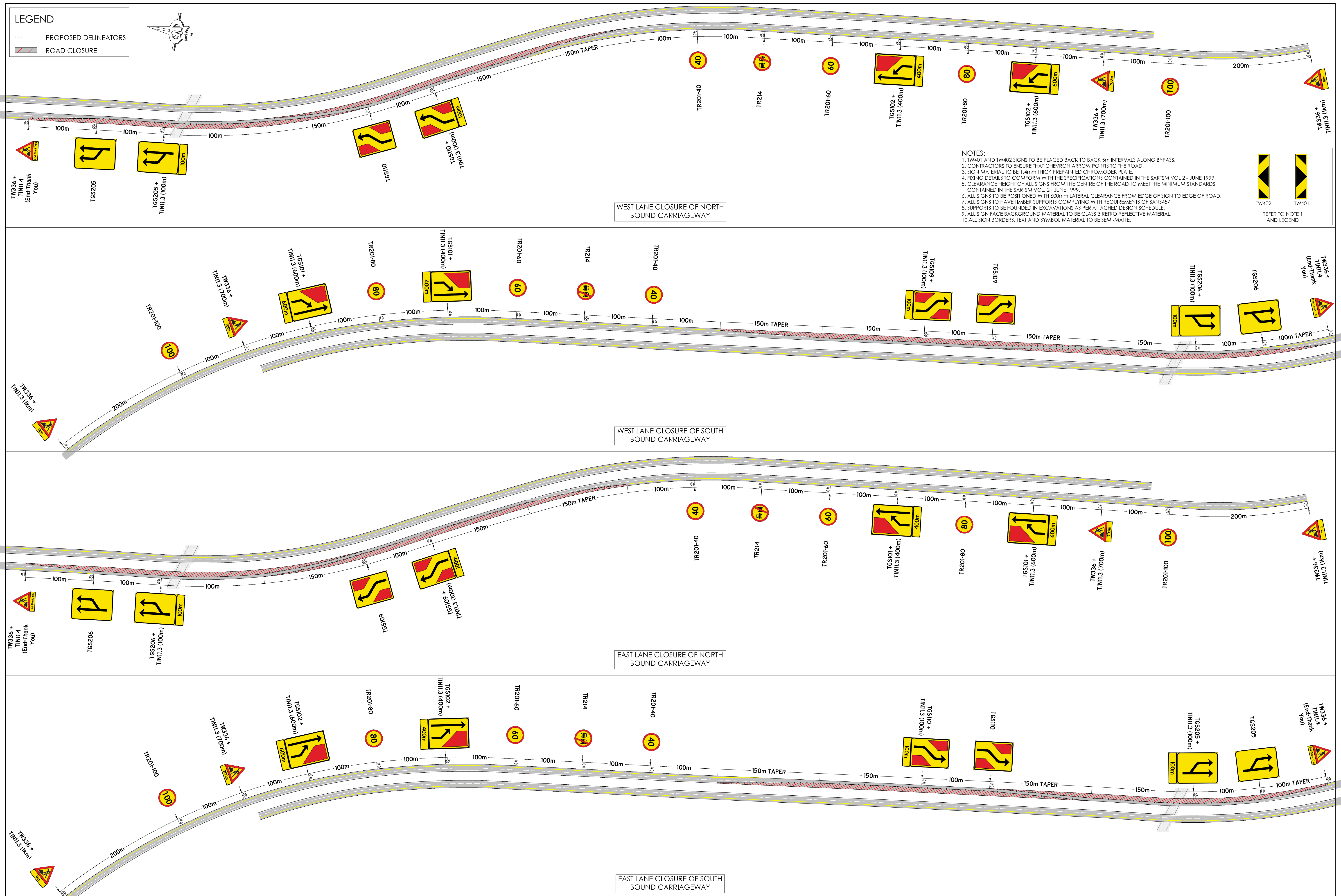
NOTE:
IF SECONDARY REINFORCING STEEL HAS LOST MORE THAN 15% OF DIAMETER OR IF MAIN REINFORCING STEEL HAS LOST MORE THAN 5% OF DIAMETER, STRUCTURAL ENGINEER TO ADVISE ON THE ADDITION OF SUPPLEMENTAL REINFORCEMENT.

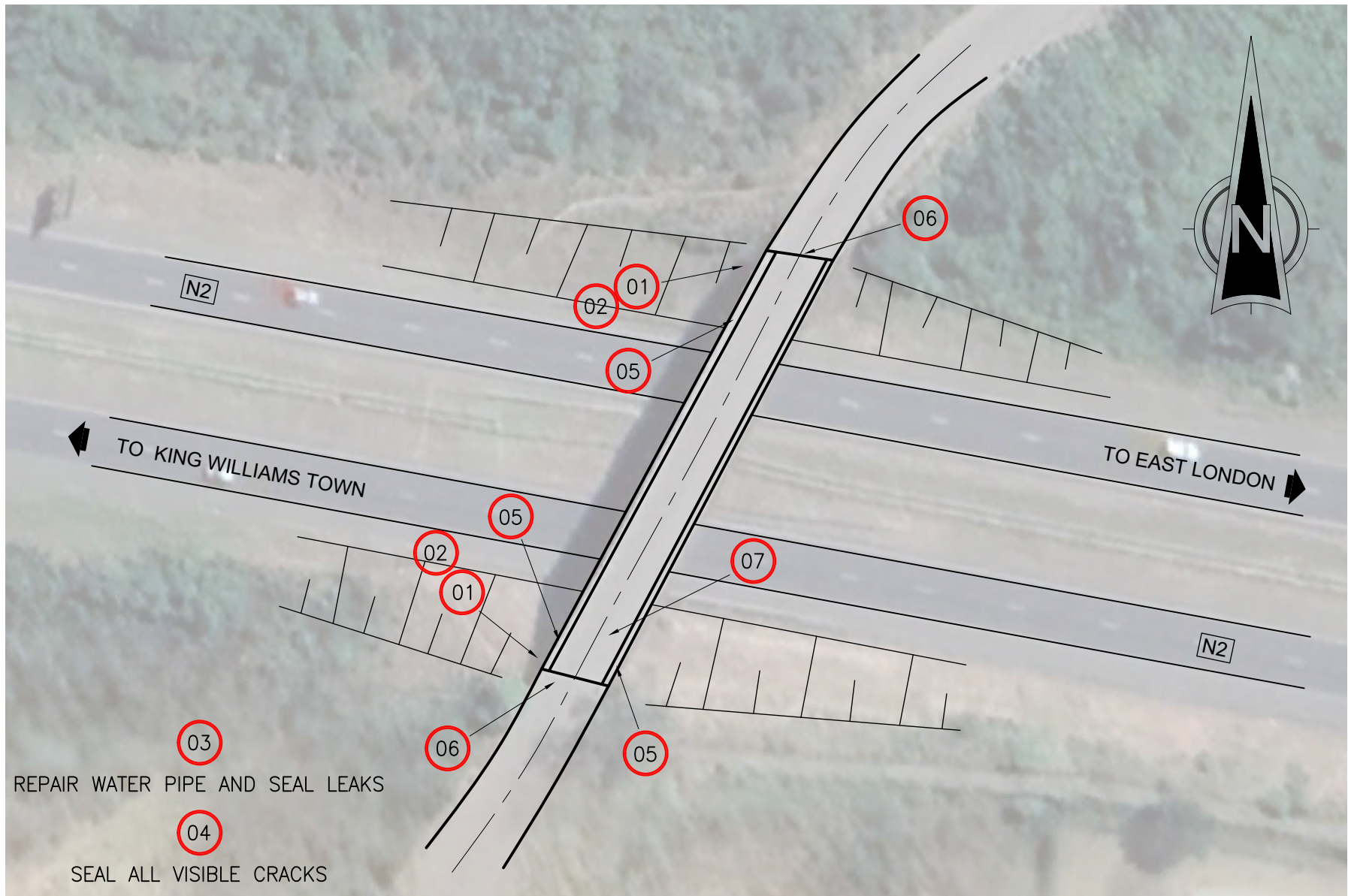
TYPICAL DETAIL – LARGE CRACK REPAIR



NOTE:
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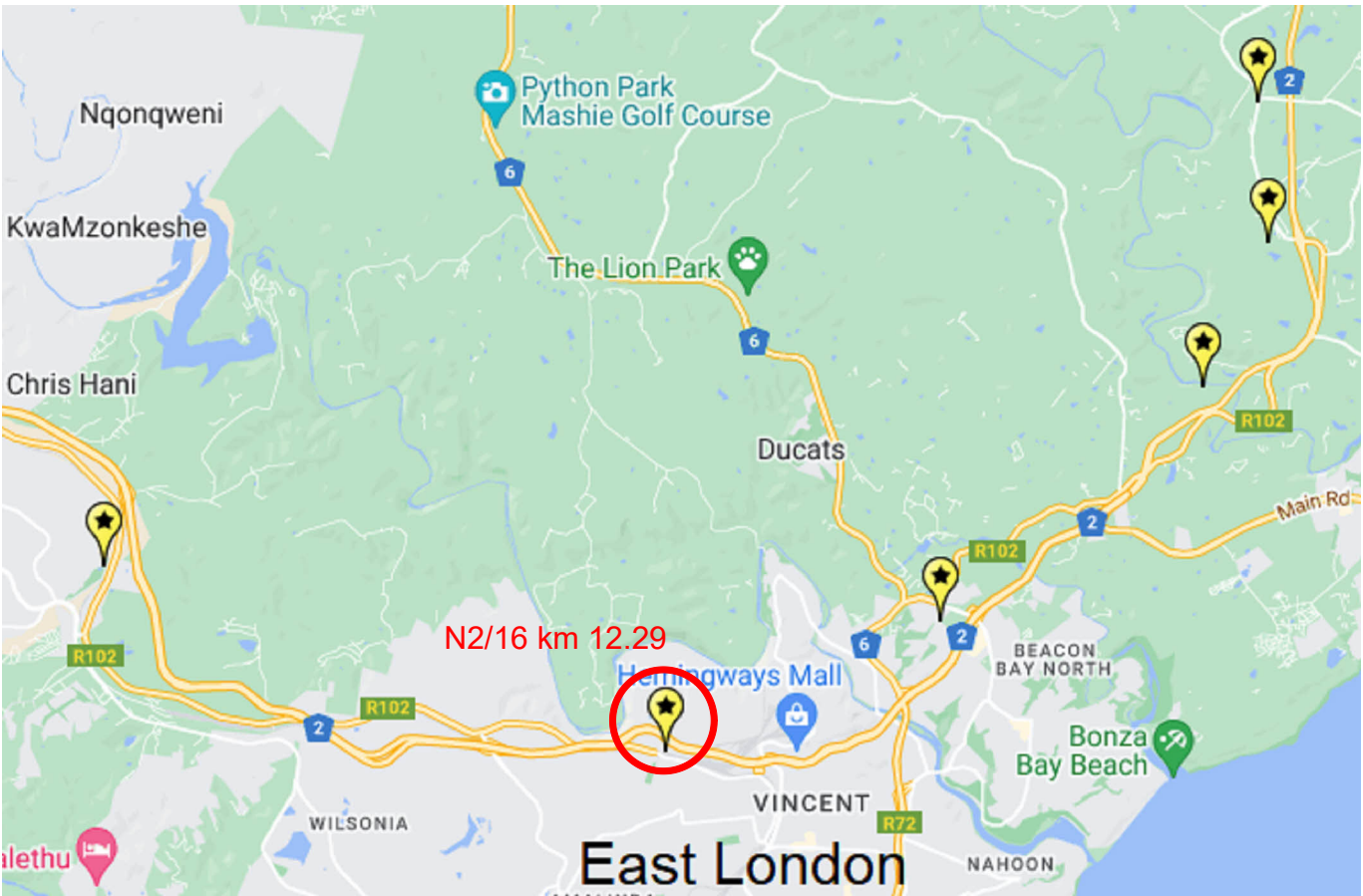
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			Name		Prof. Reg. No.		Date		Pretoria		Baywest				ROUTE		N2		N2	
			Date		CHECKED BY				0184		Port Elizabeth				SECTION		16		16	
			SANRAL PROJECT MANAGER		NAME		Name		PO Box 415		P.O. Box 27230				DRAWING km DISTANCE		KM 1.46		KM 1.46	
			Name		Prof. Reg. No.		Date		Pretoria 0001		Greenacres				DRAWING TYPE		STRUCTURES - BRIDGES			
			Date		DRAWN BY				South Africa		6057				BRIDGE/STRUCTURE No.		B1244			
									Tel: (012) 844 8000		Tel: (041) 398 3200				CONSULTANT DRAWING No.		201931-N2-16-01-00		VER	
											Fax: (041) 398 3222				SCALE :		AS SHOWN		SHEET 1 OF 1	
																	SANRAL DOCUMENT #		#####	
																			VA	

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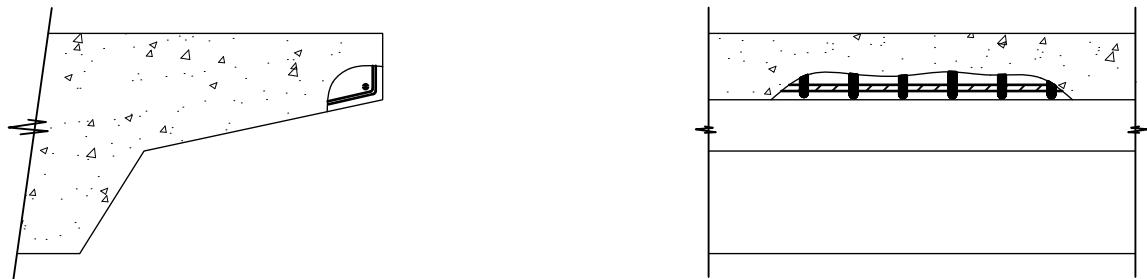
PLAN ON BRIDGE B1252 – (N2/16 @ km 12.29)
NTS

ITEM	DESCRIPTION
01	JACK UP BRIDGE AND REPLACE ELASTOMERIC BEARINGS
02	REFURBISH OR REPLACE DIRECTIONAL GUIDES
03	REPAIR WATER PIPE & SEAL WATER LEAKS, PRESSURE CLEAN ABUTMENTS AFTER
04	SEAL ALL VISIBLE CRACKS
05	REPAIR DAMAGED SIDEWALKS
06	REPLACE EXPANSION JOINTS
07	REPAIR LOCAL DAMAGE TO ROAD SURFACE

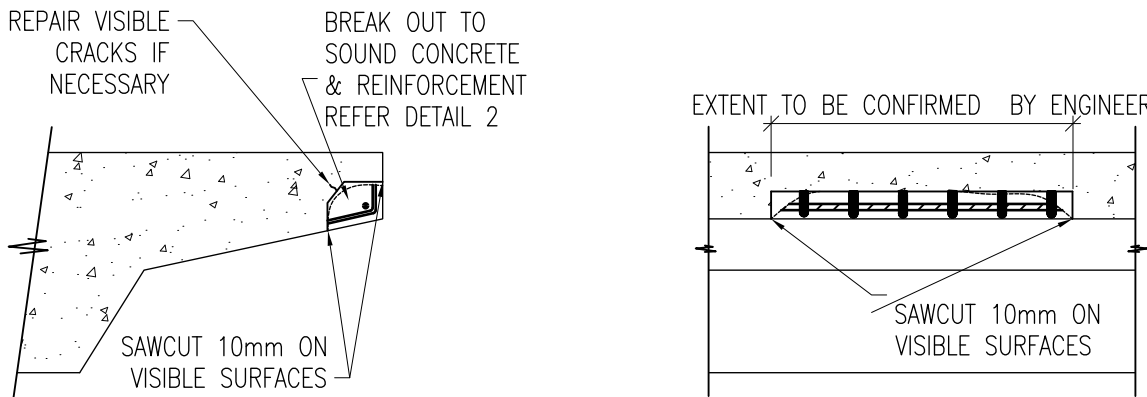


LOCALITY

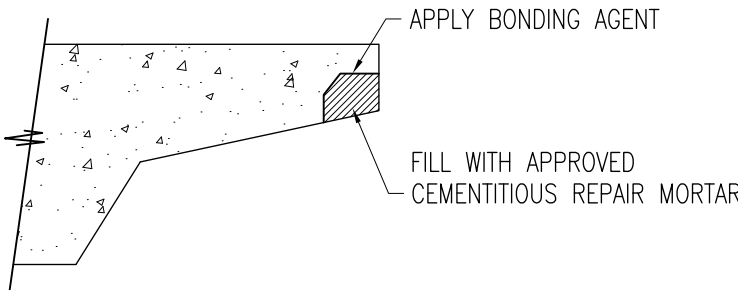
TYPICAL DETAIL – CONCRETE REPAIR



SECTION
ELEVATION
VIEWS ON TYPICAL DAMAGE TO DECK

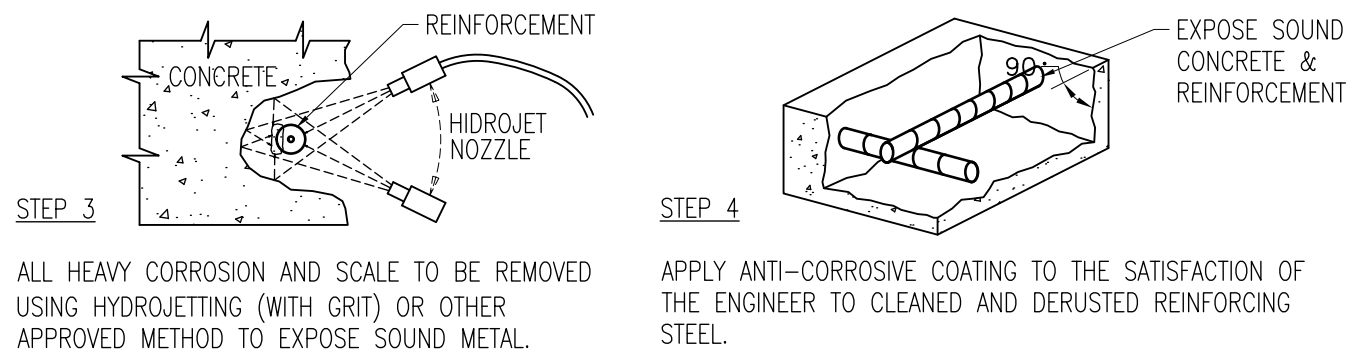
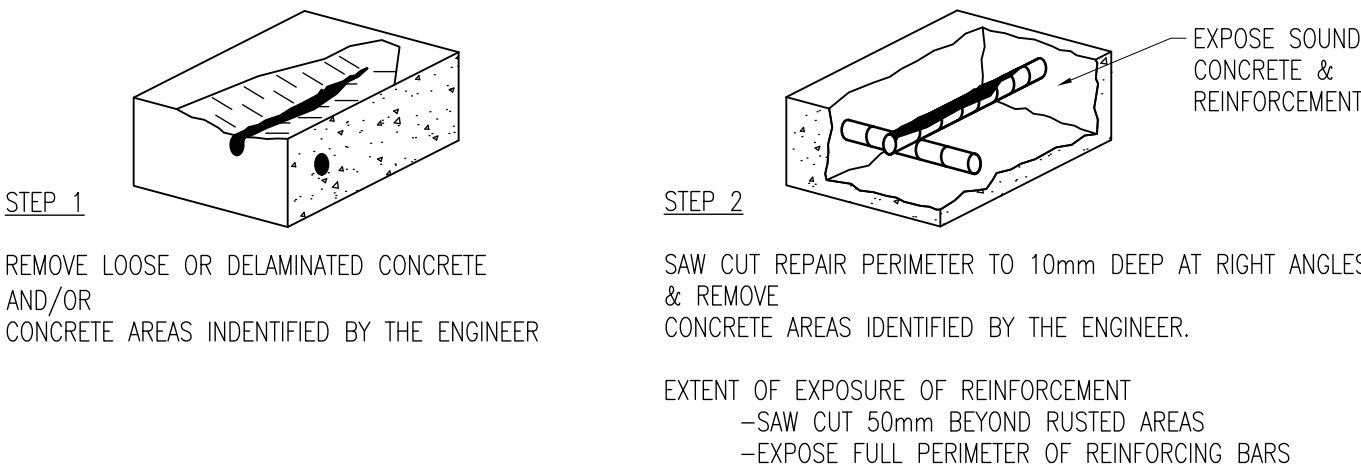


SECTION
ELEVATION
EXTENT OF REMOVAL OF DAMAGED CONCRETE



SECTION
PATCHING OF DAMAGE

TYPICAL DETAIL – TREATMENT OF REINFORCEMENT



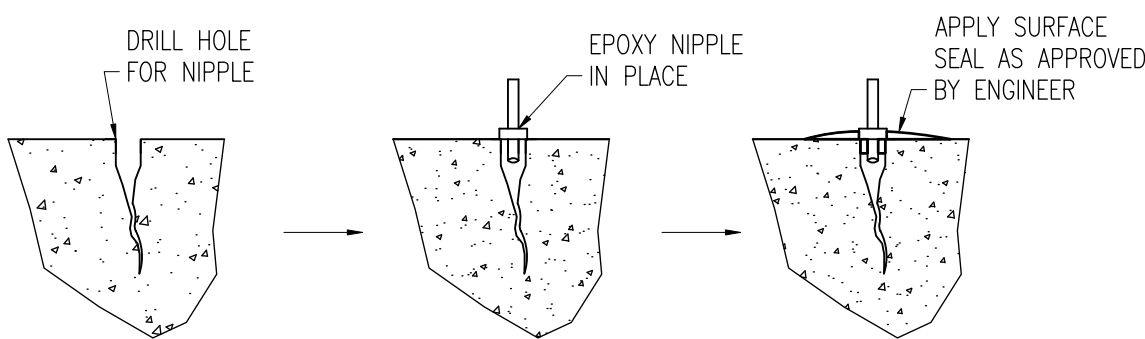
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			Name : Prof. Reg. No. : Date :		Prof. Reg. No. : CHECKED BY		Name : Prof. Reg. No. : Date :		P.O. Box 415 Pretoria 0001 South Africa		P.O. Box 27230 Greenacres 6057		for CEO: SA NATIONAL ROADS AGENCY LTD.		DRAWING TITLE		ROUTE		N2	
			SANRAL PROJECT MANAGER		NAME		NAME		0184 PO Box 415 Pretoria 0001 South Africa		Tel: (012) 844 8000				N2 SECTION 16 km 12.29 BRIDGE REPAIRS - LAYOUT AND DETAILS		SECTION		16	
			Name : Prof. Reg. No. : Date :		Prof. Reg. No. : DRAWN BY		Name : Prof. Reg. No. : Date :		Tel: (012) 844 8000		Tel: (041) 398 3200 Fax: (041) 398 3222						DRAWING km DISTANCE		KM 12.29	
																	DRAWING TYPE		STRUCTURES - BRIDGES	
																	BRIDGE/STRUCTURE No.		B1252	
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																	SANRAL DOCUMENT #		#####	
																	SCALE :		AS SHOWN	
																	SHEET		1 OF 1	
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																			VA	

TYPICAL DETAIL – CRACK REPAIR (>0.5mm)

NOTE:

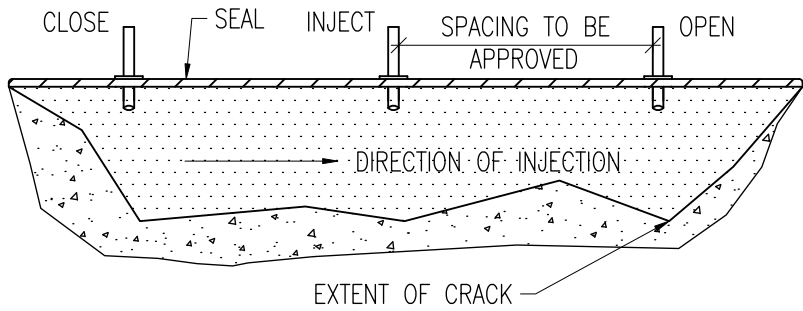
- 1) INSTALL INJECTION NIPPLES – POSITIONS AS APPROVED BY ENGINEER



PREPARATION OF CRACK

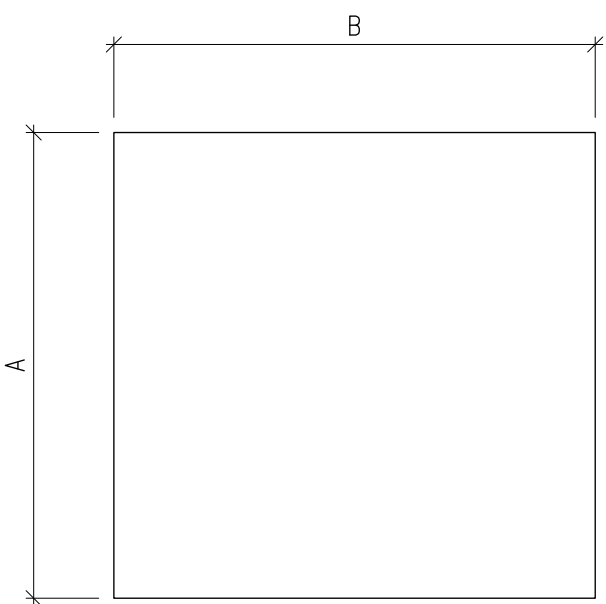
NOTE:

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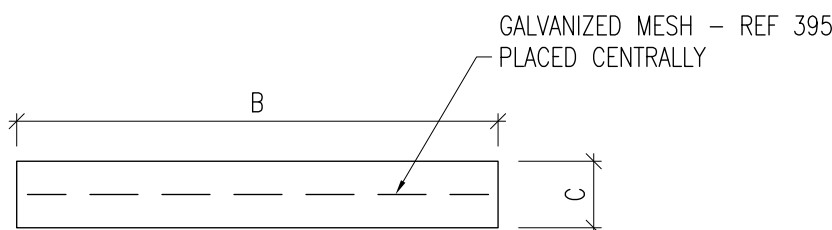


INJECTION OF CRACK

PRECAST PANEL DETAILS



PLAN

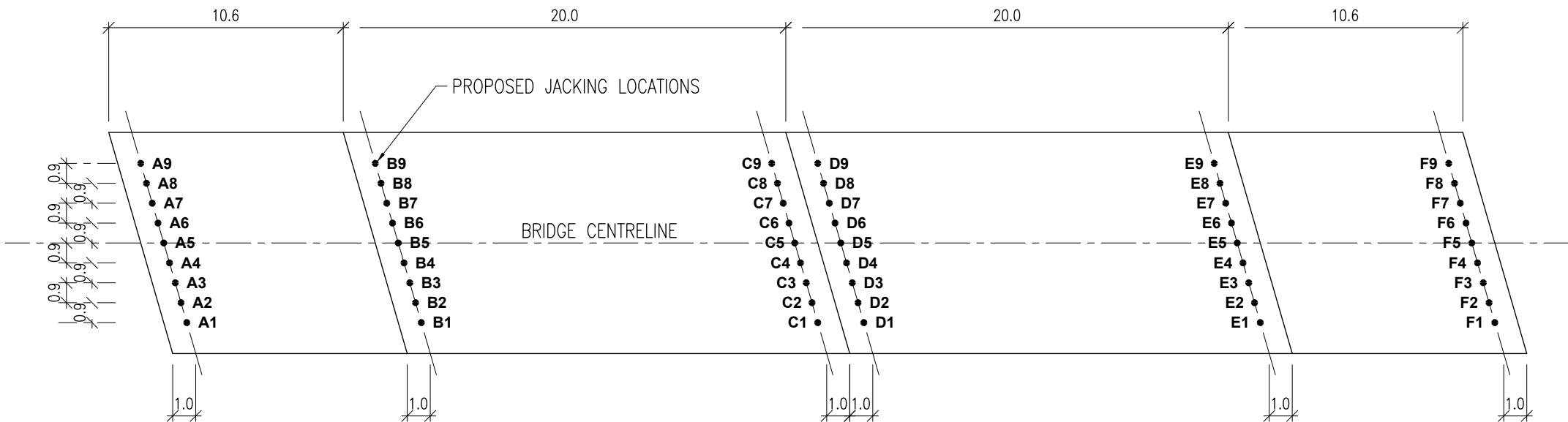


SECTION

NOTES:

1. REMOVE ALL PRECAST SIDEWALK PANELS
2. UNCOVER WATER PIPES TO IDENTIFY DAMAGED AREAS AND FIX ALL LEAKS
3. IDENTIFY ALL DAMAGED PANELS AND CONFIRM DIMENSIONS.
4. PLACE SAND FILL AROUND PIPES AND REPLACE PANELS

LIFTING AND BEARING REPLACEMENT



Location	A1/F9	A2/F8	A3/F7	A4/F6	A5/F5	A6/F4	A7/F3	A8/F2	A9/F1
DL	122	80	74	71	70	69	69	74	122
NA _{max}	57	82	85	86	81	86	85	83	61
60% of NA _{max}	35	50	51	52	49	52	51	50	37
EST JACKING FORCE	157	130	125	123	119	121	120	124	159
Location	B1/E9	B2/E8	B3/E7	B4/E6	B5/E5	B6/E4	B7/E3	B8/E2	B9/E1
DL	401	302	288	283	283	285	291	306	413
NA _{max}	153	154	155	151	138	150	154	153	158
60% of NA _{max}	92	93	93	91	83	90	93	92	95
EST JACKING FORCE	493	395	381	374	366	375	384	398	508
Location	C1/D9	C2/D8	C3/D7	C4/D6	C5/D5	C6/D4	C7/D3	C8/D2	C9/D1
DL	299	203	189	184	180	176	173	170	214
NA _{max}	197	172	165	157	147	156	162	167	186
60% of NA _{max}	119	104	99	95	89	94	98	101	112
EST JACKING FORCE	418	307	288	279	269	270	271	271	326

INDICATIVE JACKING VALUES (kN)

BEARING SCHEDULE							
POSITION	No OFF	VERTICAL LOADS			MAX HORIZONTAL LOAD (kN)	MAX HORIZONTAL DISPLACEMENT (kN)	
		DEAD LOADS (kN)	MAX. LOAD (kN)	MIN. LOAD (kN)		LONGITUDINAL (mm)	TRANSVERSE (mm)
ABUTMENT A & E							
A1- A9 & E1 - E9	18	87	151	28	5	3.5	1
PIER B & D							
B1 - B9 & D1-D9	18	443	631	302	5	3.5	1
PIER C							
C1 - C9	9	536	744	139	5	3.5	1

NOTES

1. THE PROPOSED METHODOLOGY SHOULD ONLY BE TAKEN AS A GUIDE. THE CONTRACTOR SHALL AVOID HIMSELF OF THE CONDITIONS ON SITE. THE CONTRACTOR SHALL SUBMIT A DETAILED METHOD STATEMENT INCLUDING DETAILS OF TEMPORARY WORKS, DESIGNED BY A SUITABLY QUALIFIED COMPETENT PERSON.
2. THE INDICATIVE JACKING FORCES ARE BASED ON MEASUREMENTS ON SITE AND ACTUAL VALUES MAY DIFFER. TRAFFIC WILL BE USING THE BRIDGE DURING JACKING. THE SPEED OF THE TRAFFIC SHALL BE REDUCED AND IT SHALL BE ENSURED THAT NO CONGESTION OCCURS DURING JACKING. THE JACKING FORCE MAY HAVE TO ACCOMMODATE UP TO 60% OF FULL NA LOADING.

PROPOSED BEARING PLACEMENT METHODOLOGY

STAGE 1

- 1.1. REMOVE EXISTING EXPANSION JOINTS IN HALF WIDTHS
1.2. ENSURE THAT THE JOINT BETWEEN THE DECK AND THE BALLAST WALL IS CLEAN AND ALLOWS FREE MOVEMENT OF THE DECK

STAGE 2

- 2.1. RAISE THE DECK AT ALL SUPPORT LOCATIONS SIMULTANEOUSLY.
2.2. IT IS FORESEEN THAT THE JACKS WILL BE PLACED ON TEMPORARY SUPPORTS FOUNDED ON THE EXISTING BRIDGE FOUNDATIONS.
2.3. LIMIT THE SPEED OF TRAFFIC TO BELOW 60km/h AND LIMIT THE NUMBER OF VEHICLES USING THE BRIDGE AT ANY ONE TIME TO ENSURE NO CONGESTION DURING JACKING AND RAISE THE DECK SUFFICIENTLY TO REMOVE THE EXISTING BEARINGS.
2.4. SUPPORT THE DECK ON TEMPORARY BEARINGS AT THE REQUIRED LEVEL.
2.5. PROVIDE TEMPORARY ASPHALT RAMP TO ALLOW TRAFFIC TO USE THE BRIDGE AT REDUCED SPEED.
2.6. CLOSE THE SHOULDERS OF THE BRIDGE TO ONLY ALLOW TWO LANES OF TRAFFIC BEFORE OPENING THE ROAD.
2.7. REPEAT STEPS 2.1 TO 2.6 FOR THE REMAINING ABUTMENTS

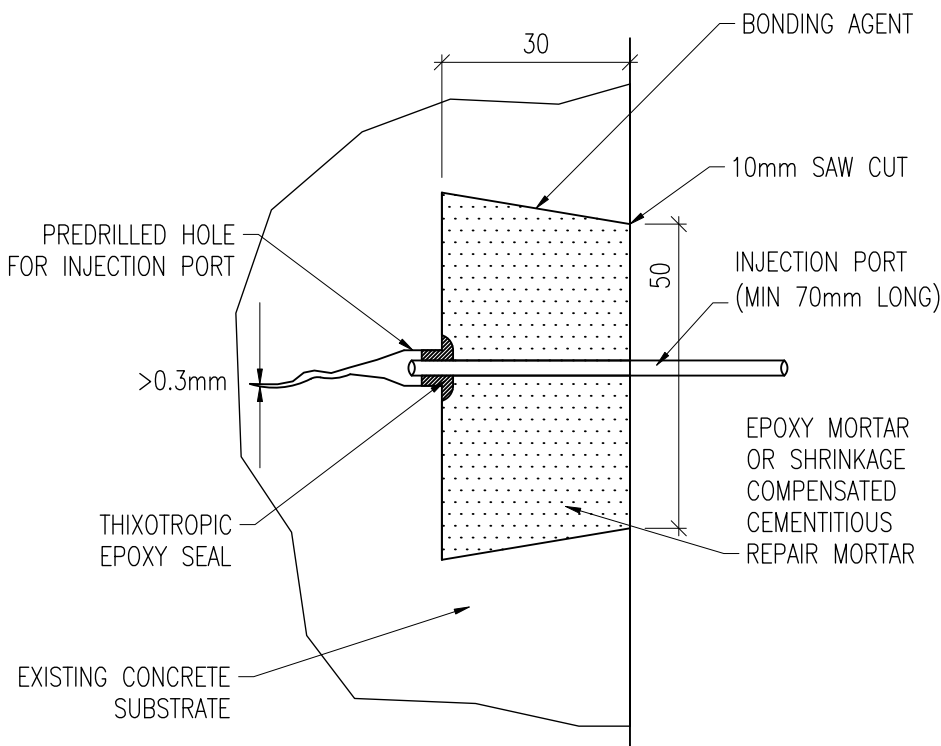
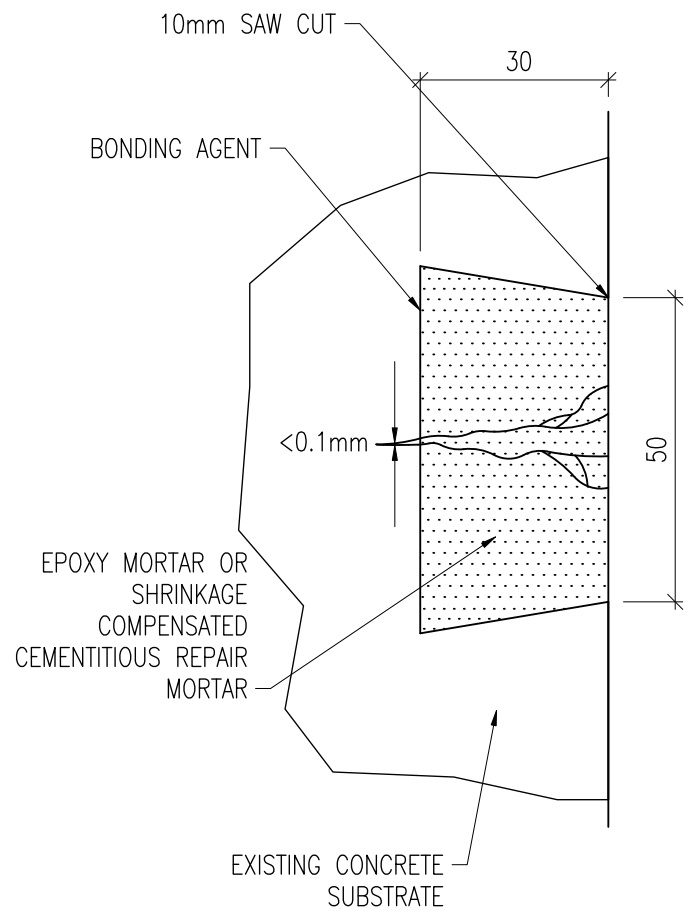
STAGE 3

- 3.1. WHILE THE BRIDGE IS SUPPORTED ON TEMPORARY SUPPORTS, THE EXISTING BEARINGS CAN BE REMOVED.
3.2. THE BEARING SEATINGS SHALL THEN BE PREPARED FOR REPLACEMENT BEARINGS. PLEASE NOTE THAT THE PLINTHS MAY HAVE TO BE DEMOLISHED TO CREATE ROOM FOR THE NEW BEARINGS.
3.3. THE TOP LEVEL OF THE NEW BEARINGS SHALL BE WITHIN 1mm OF THE EXISTING BEARINGS.
3.4. AFTER THE NEW BEARINGS ARE IN PLACE, A THIN LAYER OF EPOXY MORTAR SHALL BE PLACED ON TOP OF THE BEARING, BEFORE THE DECK IS LOWERED DURING ANOTHER ROAD CLOSURE FOR A CHOSEN ABUTMENT. THE DECK SHALL BE LOWERED UNTIL THE EPOXY MORTAR IS SQUEEZED OUT ALL AROUND. THE DECK SHALL THEN BE SUPPORTED AT THIS LEVEL UNTIL THE MORTAR HAS GAINED SUFFICIENT STRENGTH. THIS IS TO ACCOMMODATE SURFACE IRREGULARITIES AND ENSURE EQUAL LOAD DISTRIBUTION.
3.6. REMOVE TEMPORARY ASPHALT RAMPS AND OPEN BRIDGE TO TRAFFIC

TYPICAL DETAIL – LARGE CRACK REPAIR

NOTE:

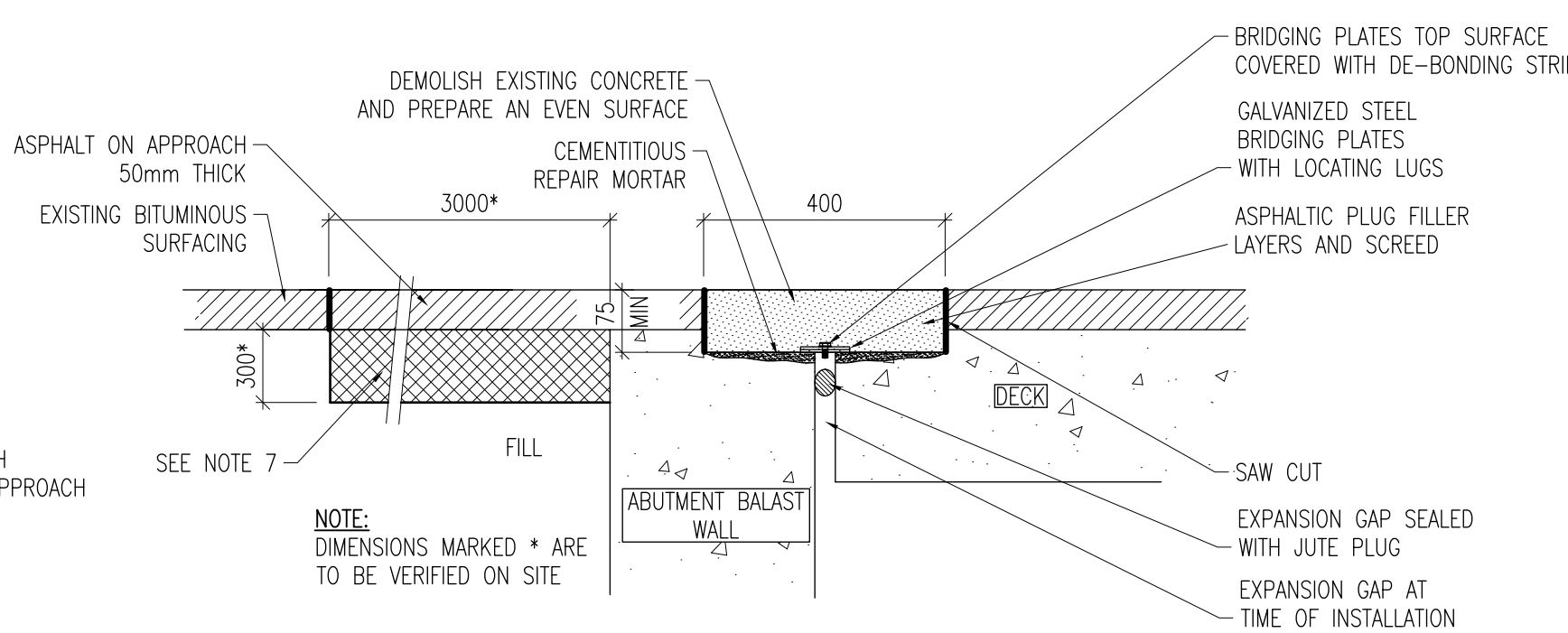
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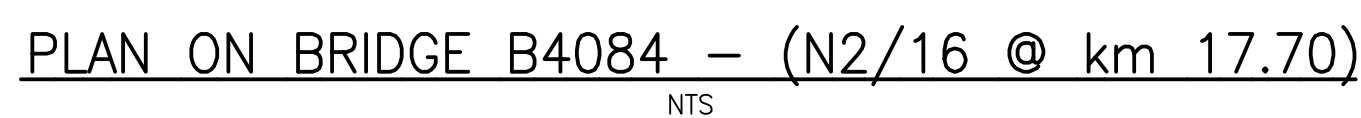
TYPICAL DETAIL – ASPHALTIC PLUG JOINT AT ABUTMENTS

EXPANSION JOINT NOTES:

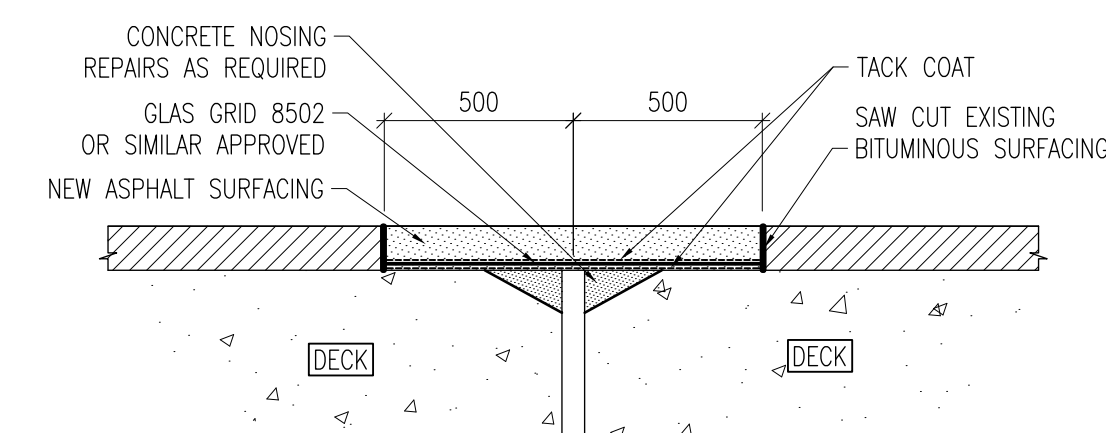
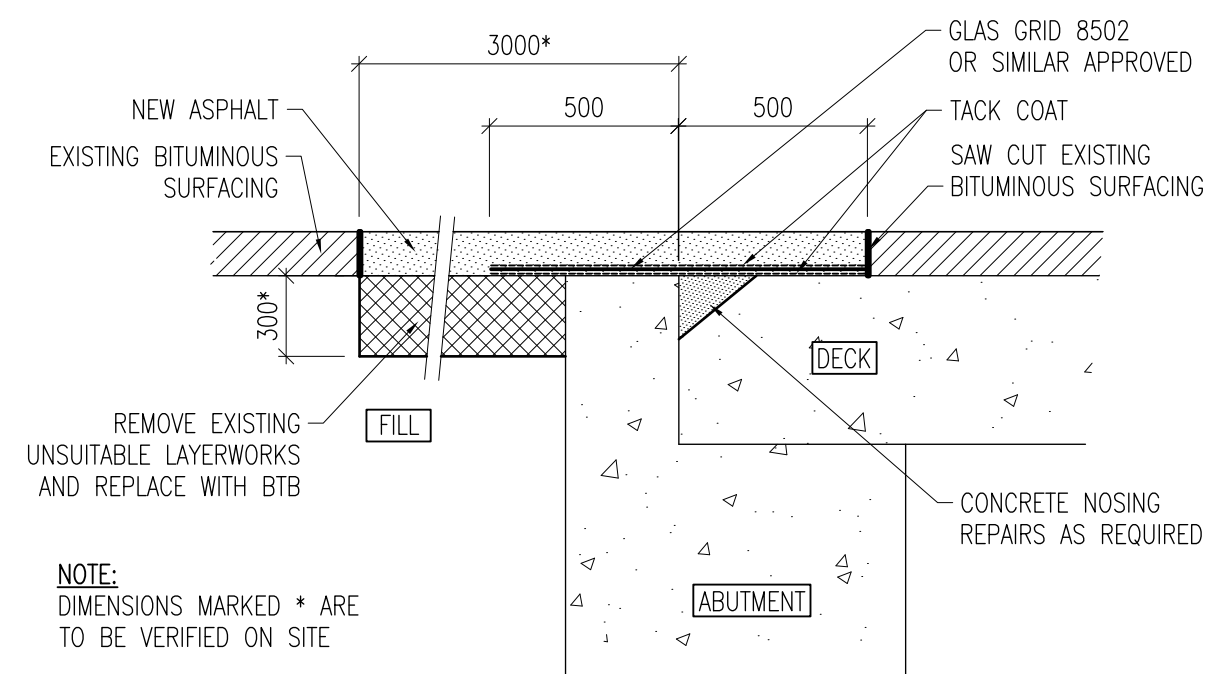
1. EXPANSION JOINT TO BE 400x75 ASPHALTIC PLUG JOINTS
2. INSTALLATION TO BE DONE UNDER TRAFFIC CONDITIONS
3. THESE JOINTS SHALL BE INSTALLED BY SPECIALISTS OR UNDER THE SUPERVISION OF THE MANUFACTURER.
4. THE JOINTS MUST BE AGREEMENT SA APPROVED WITH IDENTIFICATION DETAILS
5. SEAL PARAPET JOINTS IN LINE WITH ASPHALTIC PLUG JOINTS WITH AN APPROVED SILICON SEALANT
6. REMOVAL OF UNSUITABLE PAVEMENT LAYERS AND REPLACE WITH BTB COMPACTED IN LAYERS AT DAMAGED ROAD SURFACE ON APPROACH



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			Name		Prof. Reg. No.		Prof. Reg. No.		Pretoria		Port Elizabeth						ROUTE		N2	
			Date		Name		Name		0184		P.O. Box 27230						SECTION		16	
			SANRAL PROJECT MANAGER		Prof. Reg. No.		Prof. Reg. No.		Greenacres		6057						DRAWING km DISTANCE		KM 12.29	
			Name		Name		Name		6057								DRAWING TYPE		STRUCTURES - BRIDGES	
			Prof. Reg. No.		Prof. Reg. No.		Prof. Reg. No.		6057								BRIDGE/STRUCTURE No.		B1252	
			Date		Date		Date		6057								CONSULTANT DRAWING No.		201931-N2-16-12-01	
			Name		Name		Name		6057								SANRAL DOCUMENT #		#####	
			Prof. Reg. No.		Prof. Reg. No.		Prof. Reg. No.		6057										VER	
			Date		Date		Date		6057										VA	
VA			FOR TENDER		CONSULT. ENG.												SCALE :		AS SHOWN	
No.			DATE		REVISION												SHEET		1 OF 1	



ITEM	DESCRIPTION
01	REPAIR ROAD SURFACING
02	REPLACE BRIDGE EXPANSION JOINTS
03	SEAL ALL VISIBLE CRACKS
04	REPAIR LOCAL SPALLS
05	REMOVE METAL HANDRAIL AND REPLACE WITH PRECAST CONCRETE PARAPETS
06	COAT DECK AND PARAPETS WITH APPROVED BARRIER COATING
07	CLEAN ABUTMENTS WITH HIGH PRESSURE WATER JETTING AND TREAT WITH APPROVED BARRIER COATING. IF SIGNS OF ASR ARE FOUND, TREAT WITH SILANE

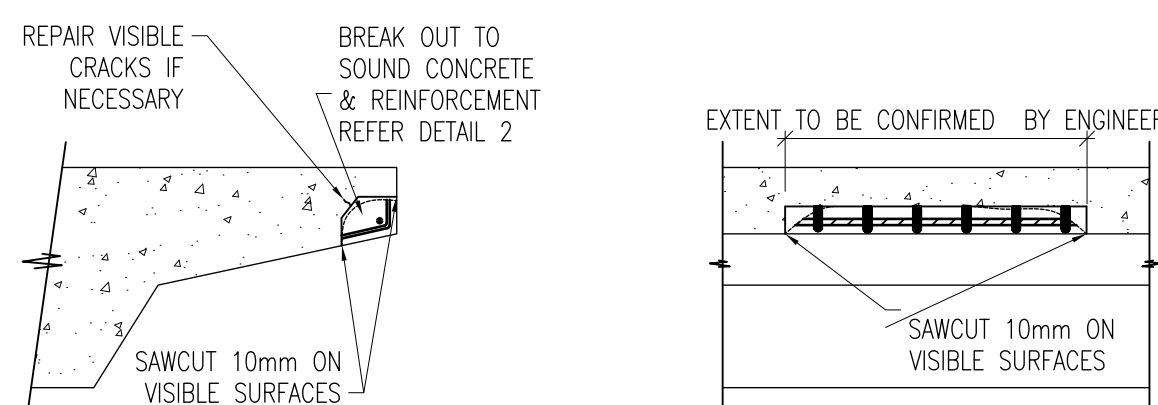


SECTION

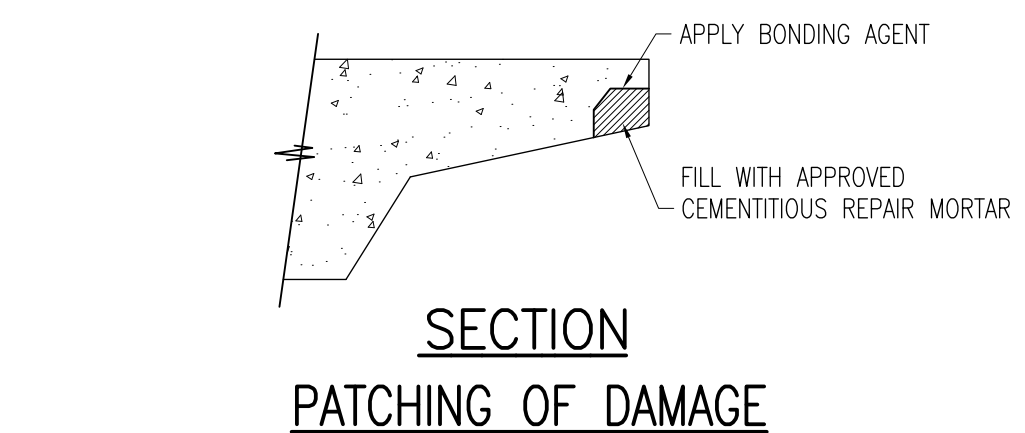
ELEVATION

VIEWS ON TYPICAL DAMAGE TO DECK

<u>SECTION</u>	<u>ELEVATION</u>
<u>VIEWS ON TYPICAL DAMAGE TO DECK</u>	



<u>SECTION</u>	<u>ELEVATION</u>
EXTENT OF REMOVAL OF DAMAGED CONCRETE	



NOTE:
1) INSTALL INJECTION NIPPLES – POSITIONS AS APPROVED BY ENGINEER

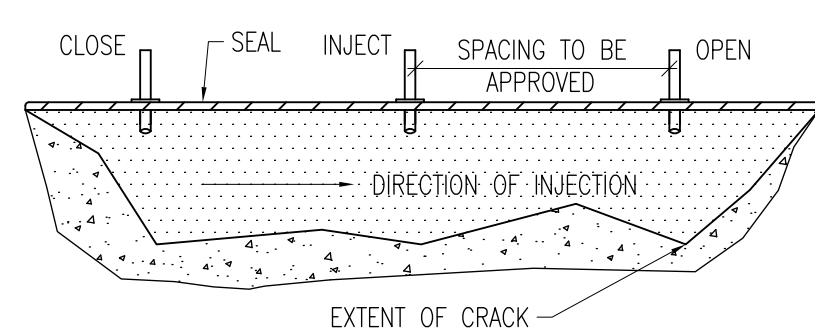
DRILL HOLE FOR NIPPLE

EPOXY NIPPLE IN PLACE

APPLY SURFACE SEAL AS APPROVED BY ENGINEER

PREPARATION OF CRACK

- NOTE:
- 1) START AT ONE END OF CRACK WITH INJECTION.
 - 2) START INJECTING AT LOWEST POINT.
 - 3) INJECT UNTIL CONSTANT FLOW OF EPOXY IS VISIBLE AT THE NEXT NIPPLE.
 - 4) CLOSE CURRENT NIPPLE AND PROCEED TO NEXT NIPPLE.
 - 4) WHEN COMPLETE, GRIND OFF NIPPLES AND SURFACE EPOXY SEAL.



INJECTION OF CRACK

STEP 1

REMOVE LOOSE OR DELAMINATED CONCRETE AND/OR CONCRETE AREAS IDENTIFIED BY THE ENGINEER

STEP 2

SAW CUT REPAIR PERIMETER TO 10mm DEEP AT RIGHT ANGLES & REMOVE CONCRETE AREAS IDENTIFIED BY THE ENGINEER.

EXPOSE SOUND CONCRETE & REINFORCEMENT

STEP 3

ALL HEAVY CORROSION AND SCALE TO BE REMOVED
USING HYDROJETTING (WITH GRIT) OR OTHER
APPROVED METHOD TO EXPOSE SOUND METAL.

STEP 4

APPLY ANTI-CORROSIVE COATING TO THE SATISFACTION OF THE ENGINEER TO CLEANED AND DERUSTED REINFORCING STEEL.

NOTE:
IF SECONDARY REINFORCING STEEL HAS LOST MORE THAN 15% OF DIAMETER OR IF MAIN REINFORCING STEEL HAS LOST MORE THAN 5% OF DIAMETER, STRUCTURAL ENGINEER TO ADVISE ON THE ADDITION OF SUPPLEMENTAL REINFORCEMENT.

The diagram consists of two cross-sectional views of a concrete repair process.

Top Diagram (Saw Cut Method):

- A vertical crack is shown in an **EXISTING CONCRETE SUBSTRATE**.
- A **10mm SAW CUT** is made along the crack, with a width of **30** units.
- A **BONDING AGENT** is applied to the exposed crack surfaces.
- The crack is filled with **EPOXY MORTAR OR SHRINKAGE COMPENSATED CEMENTITIOUS REPAIR MORTAR**.
- The depth of the repair is indicated as **<0.1mm**.
- The vertical extent of the repair area is marked as **50** units.

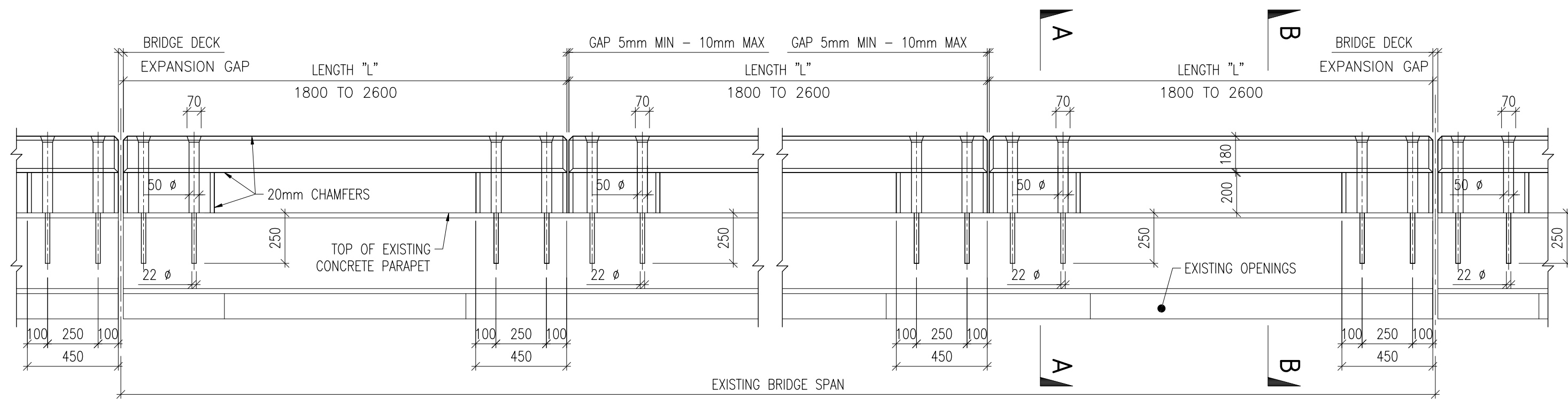
Bottom Diagram (Predrilled Hole Method):

- A vertical crack is shown in an **EXISTING CONCRETE SUBSTRATE**.
- A **PREDRILLED HOLE FOR INJECTION PORT** is made, with a diameter of **>0.3mm**.
- A **BONDING AGENT** is applied to the crack surfaces.
- A **10mm SAW CUT** is made along the crack, with a width of **30** units.
- The crack is filled with **EPOXY MORTAR OR SHRINKAGE COMPENSATED CEMENTITIOUS REPAIR MORTAR**.
- The depth of the repair is indicated as **>0.3mm**.
- The vertical extent of the repair area is marked as **50** units.
- An **INJECTION PORT (MIN 70mm LONG)** is shown inserted into the predrilled hole.
- A **THIXOTROPIC EPOXY SEAL** is applied to the injection port.

NOTE:
IF ONCE CRACK HAS BEEN SAW CUT AND REAMED OUT IT IS DISCOVERED THE REMAINING CRACK IS LARGER THAN 0.3mm CRACK INJECTION WILL BE REQUIRED.

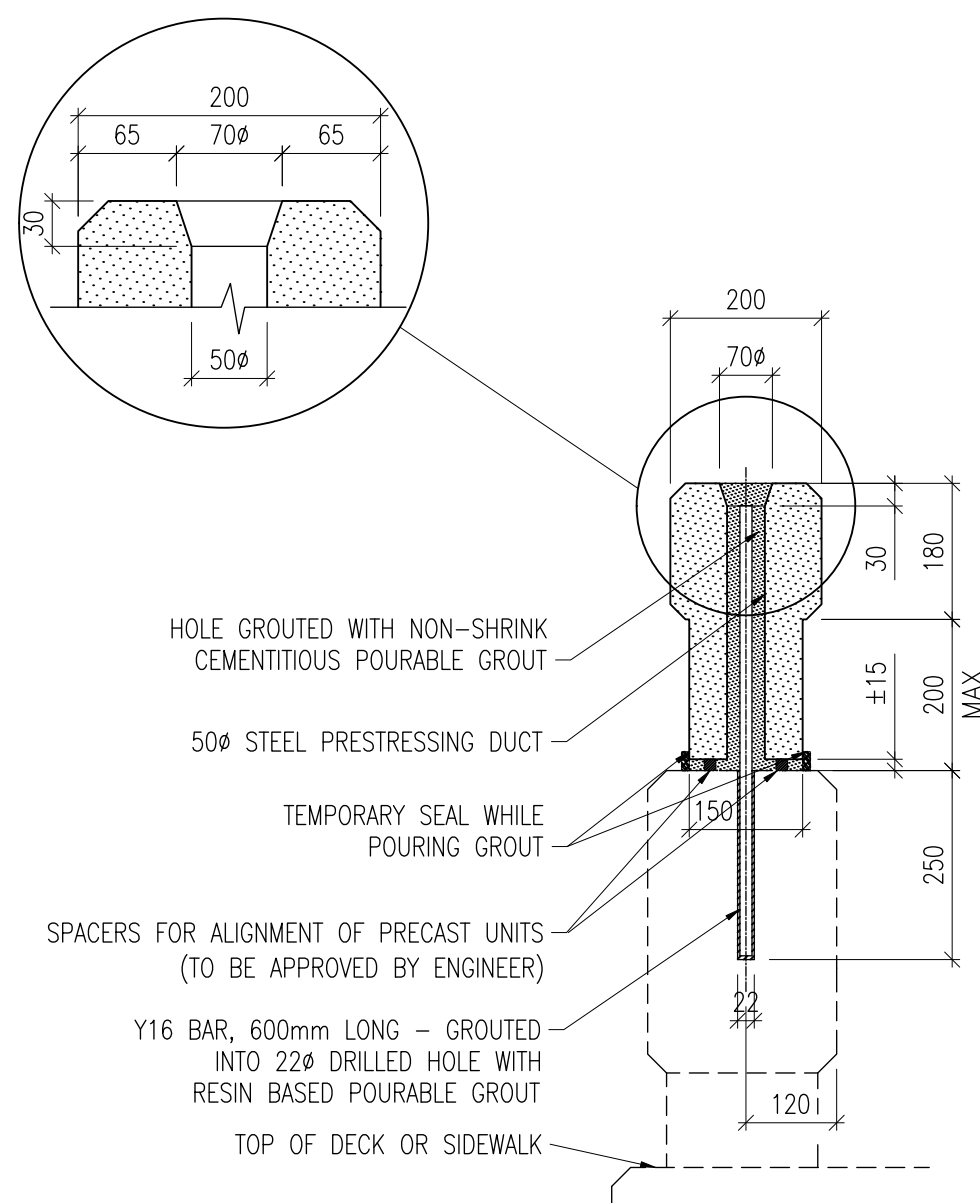
NOTE:
IF ONCE CRACK HAS BEEN SAW CUT AND REAMED OUT IT IS
DISCOVERED THE REMAINING CRACK IS LARGER THAN 0.3mm,
CRACK INJECTION WILL BE REQUIRED.

				CONSTRUCTION RECORD		DESIGNED BY		CONSULTANT APPROVAL		HEAD OFFICE		SOUTHERN REGION		ACCEPTANCE		PROJECT DESCRIPTION				PROJECT NUMBER		X.003-022-2018/1-C6			
				WORKS CONTRACT ENGINEER		NAME				48 Tambotie Avenue Val de Grace Pretoria 0184		20 Shoreward Drive Baywest Port Elizabeth 6026		THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATSOEVER CAUSE OR HOWEVER ARISING		AD-HOC STRUCTURAL AND DRAINAGE SERVICES IN THE SOUTHERN REGION – EMERGENCY BRIDGE REPAIR WORKS				DRAWING LOCATION DATA		START		END	
				Name : Prof. Reg. No. : Date :		CHECKED BY				P.O. Box 415 Pretoria 0001 South Africa		P.O. Box 27230 Greenacres 6057				DRAWING TITLE				ROUTE		N2		N2	
				SANRAL PROJECT MANAGER		NAME										N2 SECTION 16 km 17.70				SECTION		16		16	
				Name : Prof. Reg. No. : Date :		DRAWN BY										BRIDGE REPAIRS - LAYOUT AND DETAILS				DRAWING km DISTANCE		KM 17.70		KM 17.70	
				Name : Prof. Reg. No. : Date :																DRAWING TYPE		STRUCTURES - BRIDGES			
				Name : Prof. Reg. No. : Date :																BRIDGE/STRUCTURE No.		B4084			
				Name : Prof. Reg. No. : Date :																CONSULTANT DRAWING No.		201931-N2-16-18-00			
				Name : Prof. Reg. No. : Date :																SANRAL DOCUMENT #		#####		VER	
				Name : Prof. Reg. No. : Date :																SCALE :		AS SHOWN		SHEET 1 OF 1	
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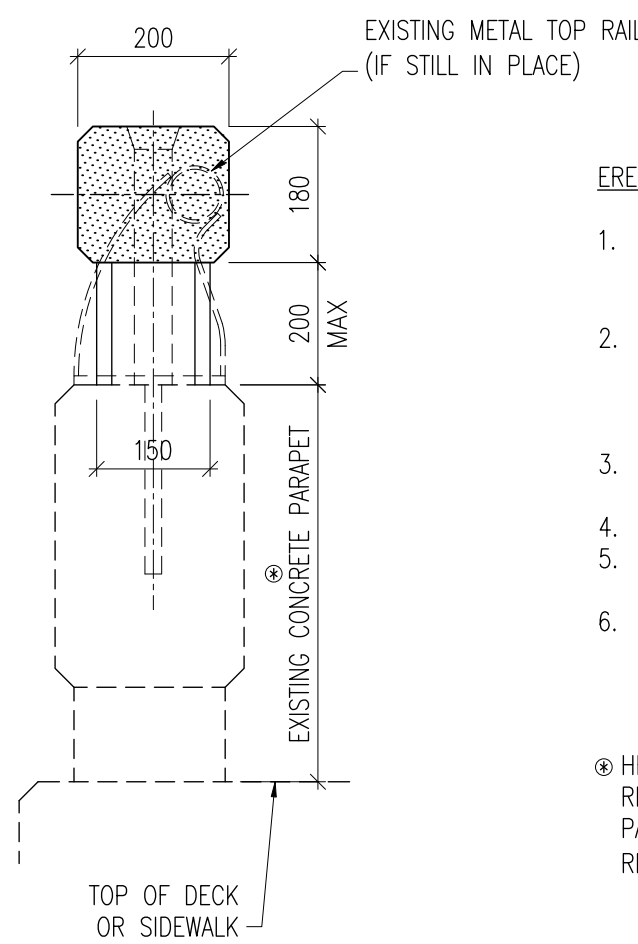
PARAPET REPAIR – TYPICAL ELEVATION

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SECTION A-A

1:10

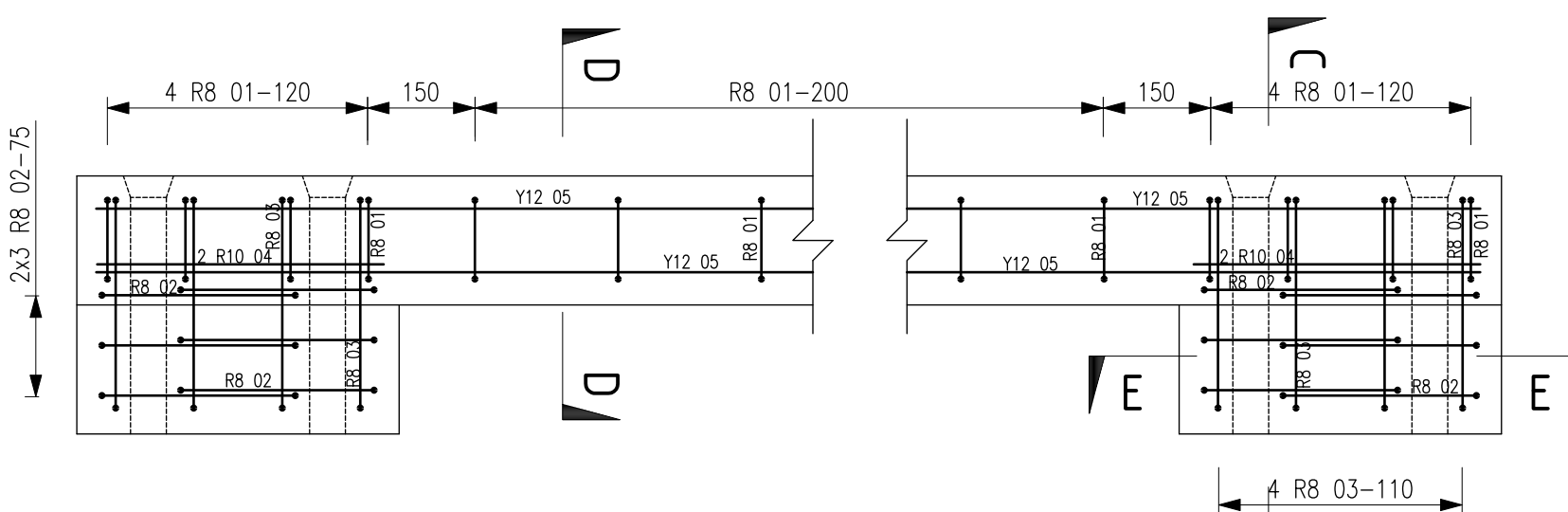


SECTION B-B

1:10

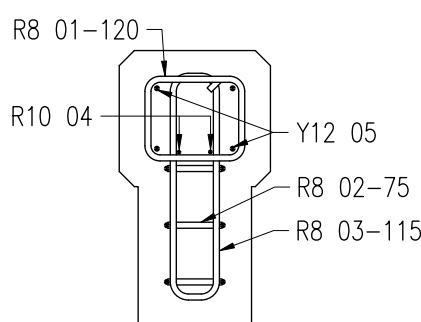
ERECTION PROCEDURE

1. REMOVE ANY EXISTING BRACKETS & PATCH BOLT HOLES (REFER REPAIR PRODUCTS LIST)
 2. DRILL 22mm ϕ HOLES INTO EXISTING PARAPET AS PER DETAIL, IF HOLES ARE CORED, HOLES TO BE SCABBLED TO ENSURE GROUT ADHESION.
 3. CLEAN GROUT CONTACT SURFACES AS PER PRODUCT SPECIFICATIONS.
 4. PLACE AND GROUT Y16 DOWEL BARS
 5. PLACE PRECAST UNITS AND ENSURE ALIGNMENT
 6. GROUT HOLES IN PRECAST UNITS & GAP BETWEEN UNITS AND EXISTING PARAPETS WITH CEMENTITIOUS POURABLE GROUT.
- ⊙ HEIGHT TO BE CHECKED TO COMPLY WITH HEIGHT REQUIREMENT FOR CLASS 1 BALUSTRADE TO TMH7 PARTS 1 & 2, 1981 AS AMENDED 1988. REFER TO CLAUSE 3.5.1.2, Fb' = 15kN, FIG. 5



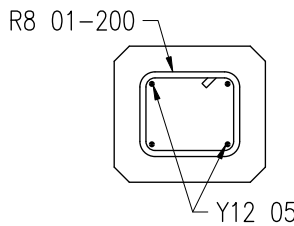
TYPICAL ELEVATION OF PRECAST UNIT (SHOWING REINFORCEMENT)

NTS



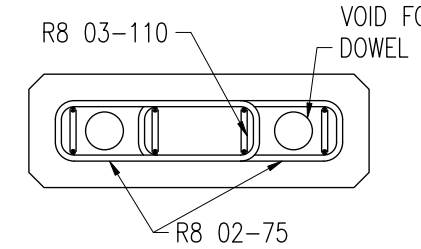
SECTION C-C

NTS



SECTION D-D

NTS



SECTION E-E

NTS

NOTES

1. GENERAL:
 - 1.1 PARAPET DESIGNED ACCORDING TO TMH7, PARTS 1 & 2, 1981 AS AMENDED 1988* REFER TO CLAUSE 3.5.1.2, Fb' = 15kN, FIG. 5
 - 1.2 THE REQUIRED LENGTH OF PARAPET, LAYOUT AND THE REQUIRED UNIT QUANTITIES & LENGTHS SHALL BE DETERMINED ON SITE.
2. MATERIAL AND FINISHES:

THE MATERIAL AND WORK SHALL COMPLY WITH THE RELEVANT CLAUSES OF SERIES 6000 AND 7000 OF THE STANDARD SPECIFICATIONS, THE PROJECT SPECIFICATIONS AND SHALL INCLUDE THE FOLLOWING.

 - 2.1 CHARACTERISTIC STRENGTH OF MATERIALS:

DESCRIPTION	CHARACTERISTIC STRENGTH (MPa)	YOUNG'S MODULUS (GPa)
MILD STEEL BARS	250	200
HIGH TENSILE STEEL	450	200
 - 2.1.1 REINFORCEMENT:

DESCRIPTION	CHARACTERISTIC STRENGTH (MPa)	CONCRETE CLASS (MPa/mm)	YOUNG'S MODULUS (GPa)
TOP RAIL	W50	50/13	28
 - 2.1.2 CONCRETE:

DESCRIPTION	CHARACTERISTIC STRENGTH (MPa)	CONCRETE CLASS (MPa/mm)	YOUNG'S MODULUS (GPa)
TOP RAIL	W50	50/13	28
 - 2.2 SURFACE FINISHES: CLASS F3 – STEEL SHUTTER FINISH
CLASS U3 – STEEL TROWEL FINISH
 - 2.3 MINIMUM CONCRETE COVER : 40mm (TOP RAIL)
: 30mm (COLUMNS)
 - 2.4 MINIMUM LAP LENGTH = 43 DIA.
 - 2.5 ALL EXPOSED SHARP CORNERS SHALL BE CHAMFERED 20mm x 20mm
3. MANUFACTURE :
 - 3.1 THE PRECAST PARAPET UNITS SHALL CONFORM TO ALL DETAILS, INCLUDING DIMENSIONAL TOLERANCES SHOWN ON DETAIL DRAWINGS.
 - 3.2 THE FOLLOWING IDENTIFICATION MARKING SHALL APPEAR ON END OF EACH UNIT:
 - a) THE MOULD NUMBER, TYPE OF UNIT AND BRIDGE NUMBER (WHERE APPLICABLE)
 - b) THE DATE OF CASTING
 4. TOLERANCES :

THE SHUTTER SHALL BE MANUFACTURED TO TOLERANCES THAT WILL ENSURE THAT UNITS AFTER CASTING COMPLY WITH THE FOLLOWING TOLERANCES:

 - 4.1 DIMENSIONS:

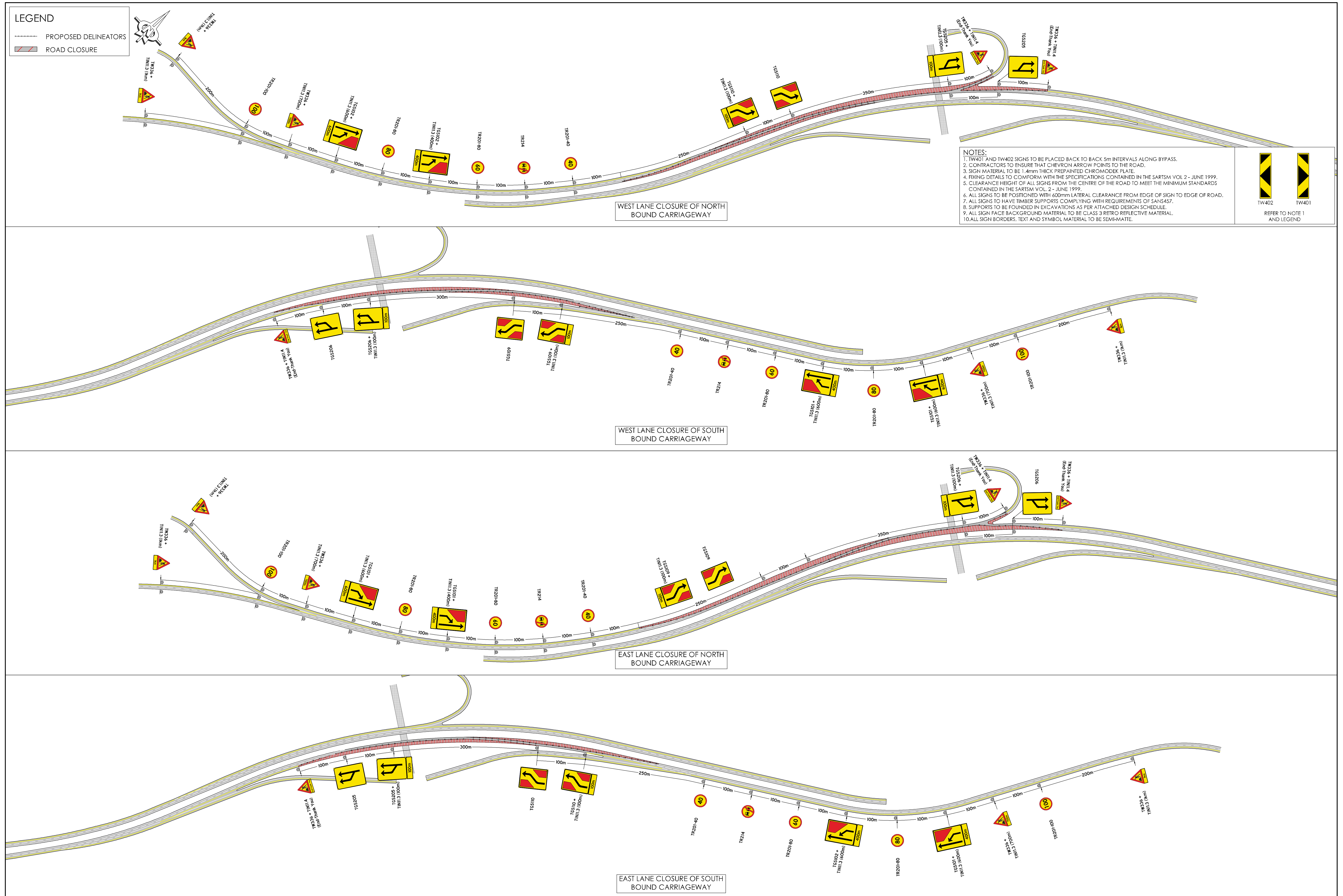
TRANSVERSAL	: +5mm – 0mm
LONGITUDINAL	: +0mm – 5mm
 - 4.2 SURFACE IRREGULARITIES AND WARP MEASURED BY MEANS OF A STRAIGHT EDGE:

TRANSVERSE	: –2mm
LONGITUDINAL	: –3mm OVER LENGTH OF UNIT
 - 4.3 SQUARENESS OF ENDS:

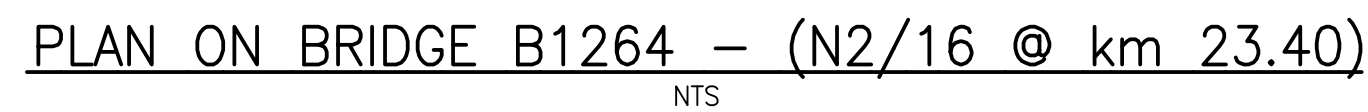
NO DIMENSIONS SHALL DEViate BY MORE THAN 3mm FROM THE THEORETICAL SQUARE PLANE CORRESPONDING TO THE FURTHEST PROJECTING CONCRETE.
 - 4.4.1 DIMENSION FROM SETTING OUT LINE TO FRONT FACES:

10mm OUTWARDS, 0mm INWARDS
 - 4.4.2 STEPS IN CONCRETE FRONT FACES AT ABUTTING UNITS : 3mm
 - 4.4.3 DEVIATION FROM LINE AND LEVEL MEASURED OVER ANY 5 UNITS : 5mm
 5. ERECTION OF PARAPET UNITS
 - 5.1 GENERAL:
 - 5.1.1 NON-SHRINK CEMENTITIOUS GROUT AND EPOXY GROUT AS APPROVED BY THE ENGINEER.
 - 5.1.2 DURABILITY OF CONCRETE WITHIN 5km OF COAST NEEDS SPECIAL ATTENTION.
 - 5.1.3 NO UNIT SHALL BE TRANSPORTED OR ERECTED BEFORE IT HAS ATTAINED A CHARACTERISTIC CONCRETE STRENGTH OF 20MPa.
 - 5.1.4 IN ORDER TO ACHIEVE GOOD ALIGNMENT WITH A UNIFORM APPEARANCE THE FOLLOWING PROCEDURE IS RECOMMENDED FOR EACH INDIVIDUAL BRIDGE:
 - a) ONLY UNITS OF MATCHING COLOUR FINISH FROM ONE MOULD TO BE USED IN A PARTICULAR PARAPET.
 - b) LINING UP OF THE PARAPET UNITS SHALL BE COMPLETED OVER THE FULL LENGTH OF THE BRIDGE PRIOR TO GROUTING.
 - 5.1.5 THE PREPARATION OF THE CONCRETE SURFACES PRIOR TO THE PLACING AND GROUTING IN OF THE UNITS AND THE GROUTING OPERATION SHALL BE AS SPECIFIED IN CLAUSE 6408(b) OF THE STANDARD SPECIFICATIONS AND SHALL INCLUDE THE RECOMMENDATION OF THE GROUT MANUFACTURER.

CONSTRUCTION RECORD WORKS CONTRACT ENGINEER Name : Prof. Reg. No. : Date : SANRAL PROJECT MANAGER Name : Prof. Reg. No. : Date :			DESIGNED BY NAME : Prof. Reg. No. : CHECKED BY NAME : Prof. Reg. No. : DRAWN BY NAME :			CONSULTANT APPROVAL Name : Date :			HEAD OFFICE 48 Tambotie Avenue Val de Grace Pretoria 0184 PO Box 415 Pretoria 0001 South Africa Tel: (012) 844 8000			SOUTHERN REGION 20 Shoreward Drive Baywest Port Elizabeth 6025 P.O. Box 27230 Greenacres 6057 Tel: (041) 398 3200 Fax: (041) 398 3222			ACCEPTANCE THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATSOEVER CAUSE OR HOWEVER ARISING for CEO: SA NATIONAL ROADS AGENCY LTD. Date:			PROJECT DESCRIPTION AD-HOC STRUCTURAL AND DRAINAGE SERVICES IN THE SOUTHERN REGION – EMERGENCY BRIDGE REPAIR WORKS DRAWING TITLE N2 SECTION 16 km 17.70 BRIDGE REPAIRS - PARAPET DETAILS SCALE : AS SHOWN			PROJECT NUMBER X.003-022-2018/1-C6 DRAWING LOCATION DATA ROUTE SECTION DRAWING km DISTANCE DRAWING TYPE BRIDGE/STRUCTURE No. CONSULTANT DRAWING No. SANRAL DOCUMENT #			START N2 16 KM 17.70 STRUCTURES - BRIDGES B4084 201931-N2-16-18-01 #####			END N2 16 KM 17.70 VER VA		
FOR TENDER No. DATE REVISION CONSULT. ENG.			FOR TENDER ONLY																										



				CONSTRUCTION RECORD		DESIGNED BY		CONSULTANT APPROVAL		HEAD OFFICE		SOUTHERN REGION		ACCEPTANCE		PROJECT DESCRIPTION				PROJECT NUMBER		X.003-022-2018/1-C6					
				WORKS CONTRACT ENGINEER						NAME		48 Tambotie Avenue Val de Grace Pretoria		20 Shoreward Drive Baywest Port Elizabeth		THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATSOEVER CAUSE OR HOWEVER ARISING		AD-HOC STRUCTURAL AND DRAINAGE CONSULTING ENGINEERING AND SUPERVISION SERVICES				DRAWING LOCATION DATA		START		END	
				Name : Prof. Reg. No. : Date :		CHECKED BY				Prof. Reg. No. : Date :		P.O. Box 27230 Greenacres 6057						ROUTE				N2		N2			
				SABRAL PROJECT MANAGER						NAME		Tel: (012) 844 8000		Tel: (041) 398 3200				SECTION				16		16			
				Name : Prof. Reg. No. : Date :		DRAWN BY				Name : Prof. Reg. No. : Date :		BUILDING SOUTH AFRICA THROUGH BETTER ROADS		Tel: (041) 398 3222		for CEO: SA NATIONAL ROADS AGENCY LTD.		DRAWING TITLE				DRAWING km DISTANCE		KM 17.70		KM 17.70	
				SABRAL PROJECT MANAGER						Name : Prof. Reg. No. : Date :								N2 SECTION 16 KM 17.70				DRAWING TYPE		STRUCTURES - BRIDGES			
				Name : Prof. Reg. No. : Date :						Name : Prof. Reg. No. : Date :								BRIDGE REPAIRS - ACCOMMODATION OF TRAFFIC DETAILS				BRIDGE/STRUCTURE No.		B4084			
				Name : Prof. Reg. No. : Date :						Name : Prof. Reg. No. : Date :								SCALE : 1:3500				SHEET 1 OF 1		CONSULTANT DRAWING No.		201931-N2-16-18-02	
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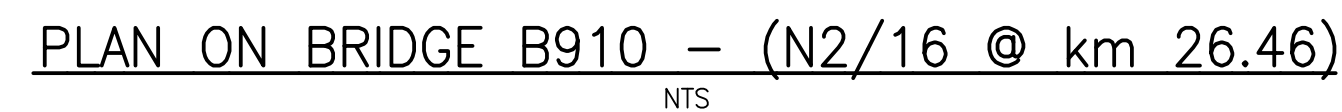


ITEM	DESCRIPTION
01	REPAIR AND SEAL CRACKS IN ABUTMENTS AND PARAPETS
02	REMOVE VEGETATION FROM TOP OF PIERS
03	REPLACE EXISTING EXPANSION JOINTS WITH ASPHALTIC PLUG TYPE JOINTS
04	REPLACE EXISTING EXPANSION JOINTS AT APPROACH SLAB ENDS WITH BURIED TYPE JOINTS
05	REMOVE VEGETATION AND DEBRIS FROM WATERWAY
06	REPAIR/REPLACE DAMAGED PARAPET BY REMOVING COMPLETE EXISTING TOP RAIL OF DAMAGED PARAPET AND REPLACE WITH PRECAST TOP RAIL
07	SCAN DECK WITH GROUND PENETRATING RADAR (GPR) TO DETERMINE THE PRESENCE AND LOCATION OF DECK VOIDS AND PROVIDE DRAINAGE TO VOIDS IF PRESENT
08	COAT EXPOSED CONCRETE SURFACES WITH AN APPROVED BARRIER COATING.

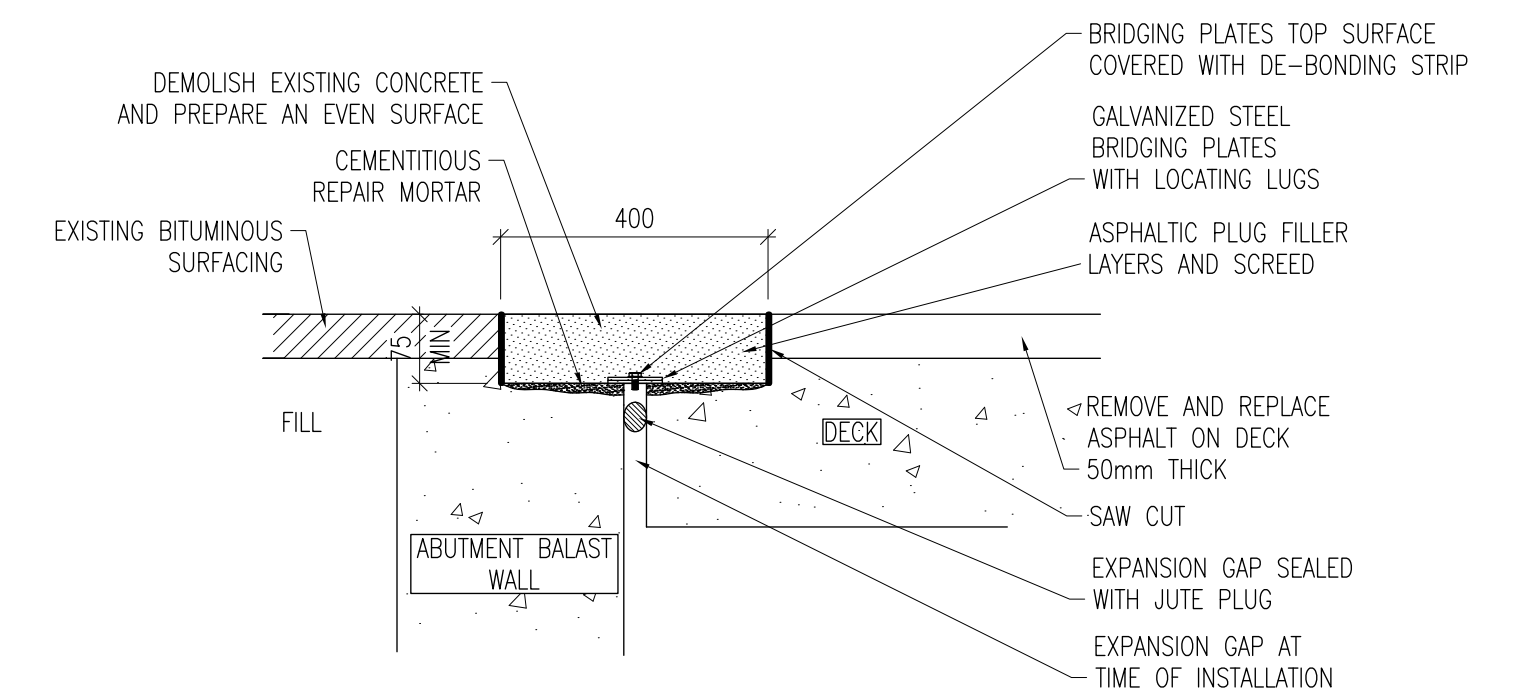
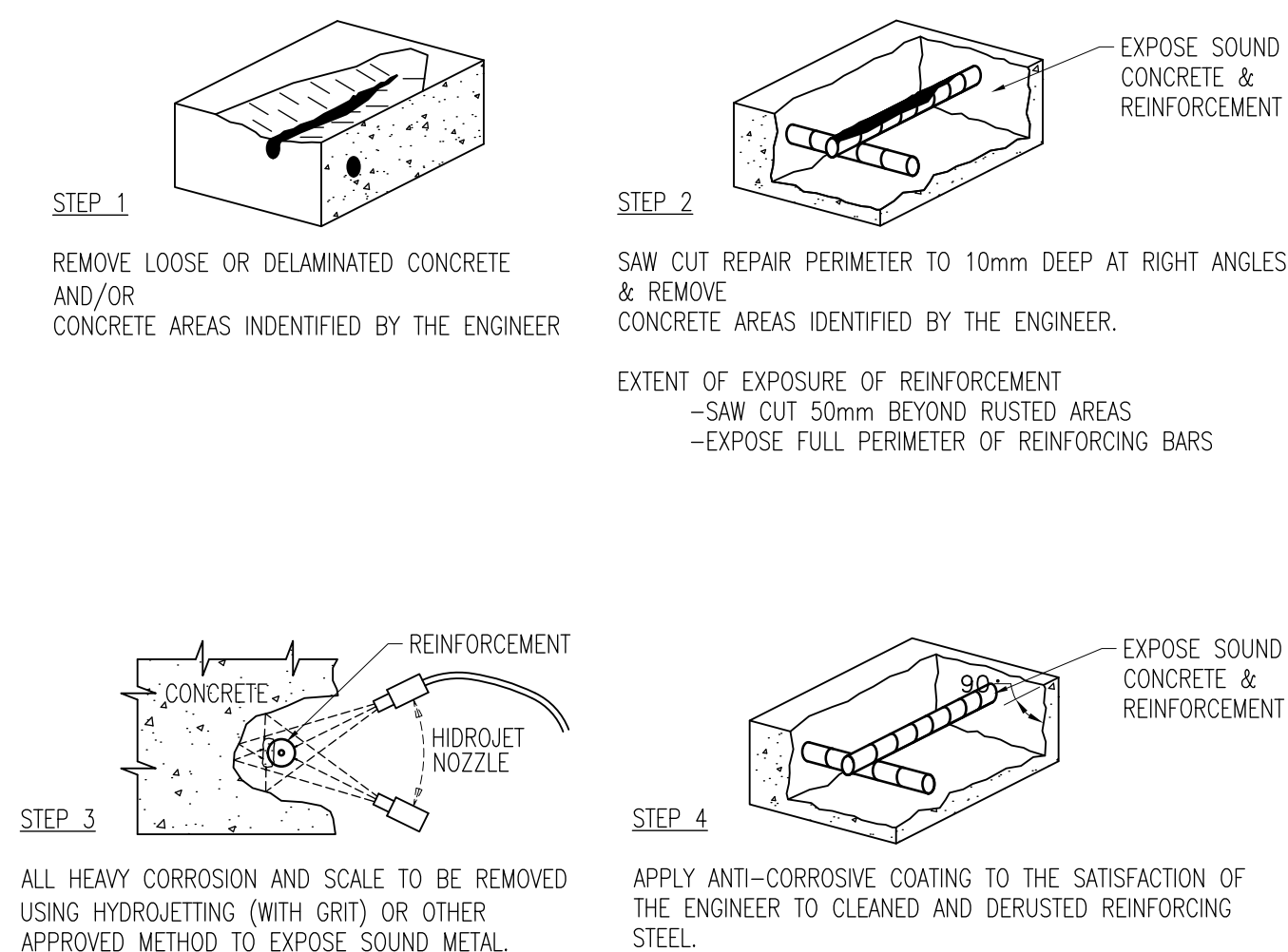
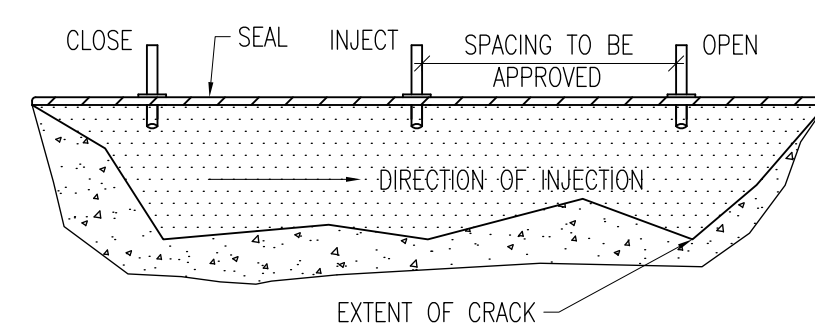
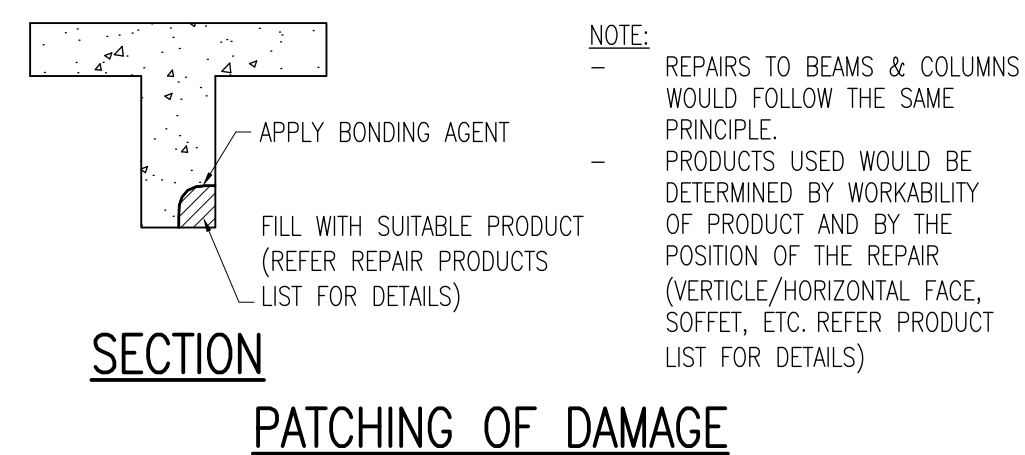


				CONSTRUCTION RECORD				DESIGNED BY				CONSULTANT APPROVAL				HEAD OFFICE				SOUTHERN REGION				ACCEPTANCE				PROJECT DESCRIPTION				PROJECT NUMBER				X.003-022-018/1-C6															
				WORKS CONTRACT ENGINEER				NAME								48 Tambotie Avenue Val de Grace Pretoria				20 Shoreward Drive Port Elizabeth				THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATSOEVER CAUSE OR HOWEVER ARISING				AD-HOC STRUCTURAL AND DRAINAGE SERVICES IN THE SOUTHERN REGION – EMERGENCY BRIDGE REPAIR WORKS				DRAWING LOCATION DATA				START				END											
				Name :				Prof. Reg. No. :				CHECKED BY				0184 PO Box 415 Pretoria 0001 South Africa				P.O. Box 27230 Greenscans 6057								ROUTE				N2				N2															
				Date :				Prof. Reg. No. :				NAME								Tel: (012) 844 8000								SECTION				16				16															
				SANRAL PROJECT MANAGER				Prof. Reg. No. :				DRAWN BY								Tel: (041) 398 3200 Date: (041) 398 3222								DRAINING km DISTANCE				KM 13.60				KM 13.60															
VA				FOR TENDER				Name :				NAME								Tel: (041) 398 3200				for CEO: SA NATIONAL ROADS AGENCY LTD.				DRAWING TITLE				DRAWING TYPE				STRUCTURES - BRIDGES															
No.				DATE				REVISION				CONSULT. ENG.																BRIDGE/STRUCTURE No.				B1264																			
								Date :				DATE																CONSULTANT DRAWING No.				201931-N2-16-23-00				VER															
								Name :				NAME																SCALE : AS SHOWN				SHEET				1 OF 1				SANRAL DOCUMENT #				#####				VA			
								Prof. Reg. No. :				NAME																																							

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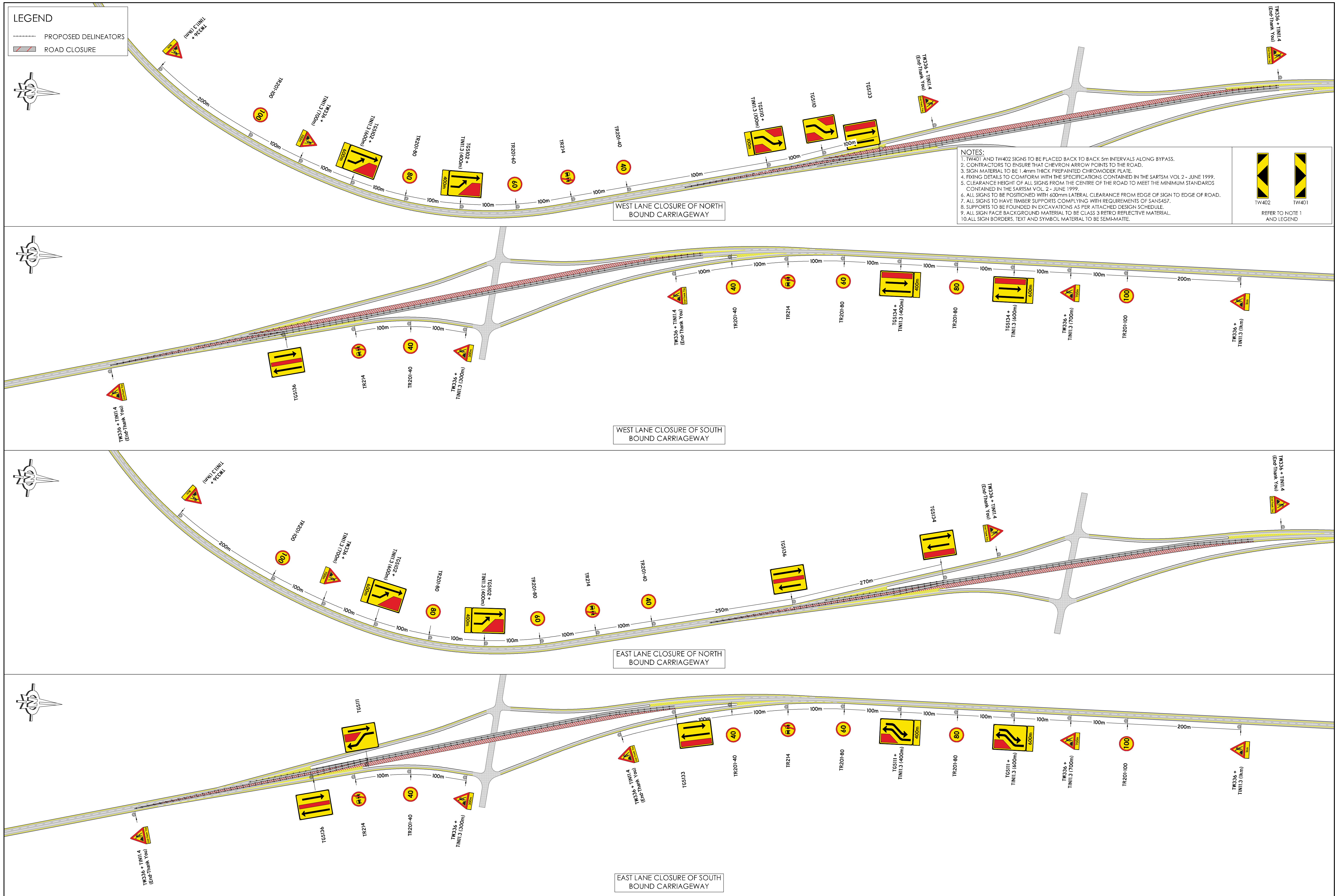



ITEM	DESCRIPTION
01	REPAIR ROAD SURFACING AT APPROACHES
02	REPLACE JOINTS WITH ASPHALTIC PLUG EXPANSION JOINTS
03	CLEAN ABUTMENTS AND PIERS WITH HIGH PRESSURE WATER JETTING
04	SEAL ALL VISIBLE CRACKS AND REPAIR LOCAL SPALLS
05	TREAT ABUTMENTS AND PIERS WITH APPROVED BARRIER COATING. IF SIGNS OF ASR ARE FOUND, TREAT WITH SILANE.
06	CLEAN PARAPETS WITH HIGH PRESSURE WATER JETTING BEFORE REPAIRING SPALLS AND CRACKS
07	COAT PARAPETS WITH APPROVED BARRIER COATING
08	REPAIR IMPACT DAMAGE AND VISIBLE SPALLS
09	FIX GUARDRAILS TO END BLOCKS

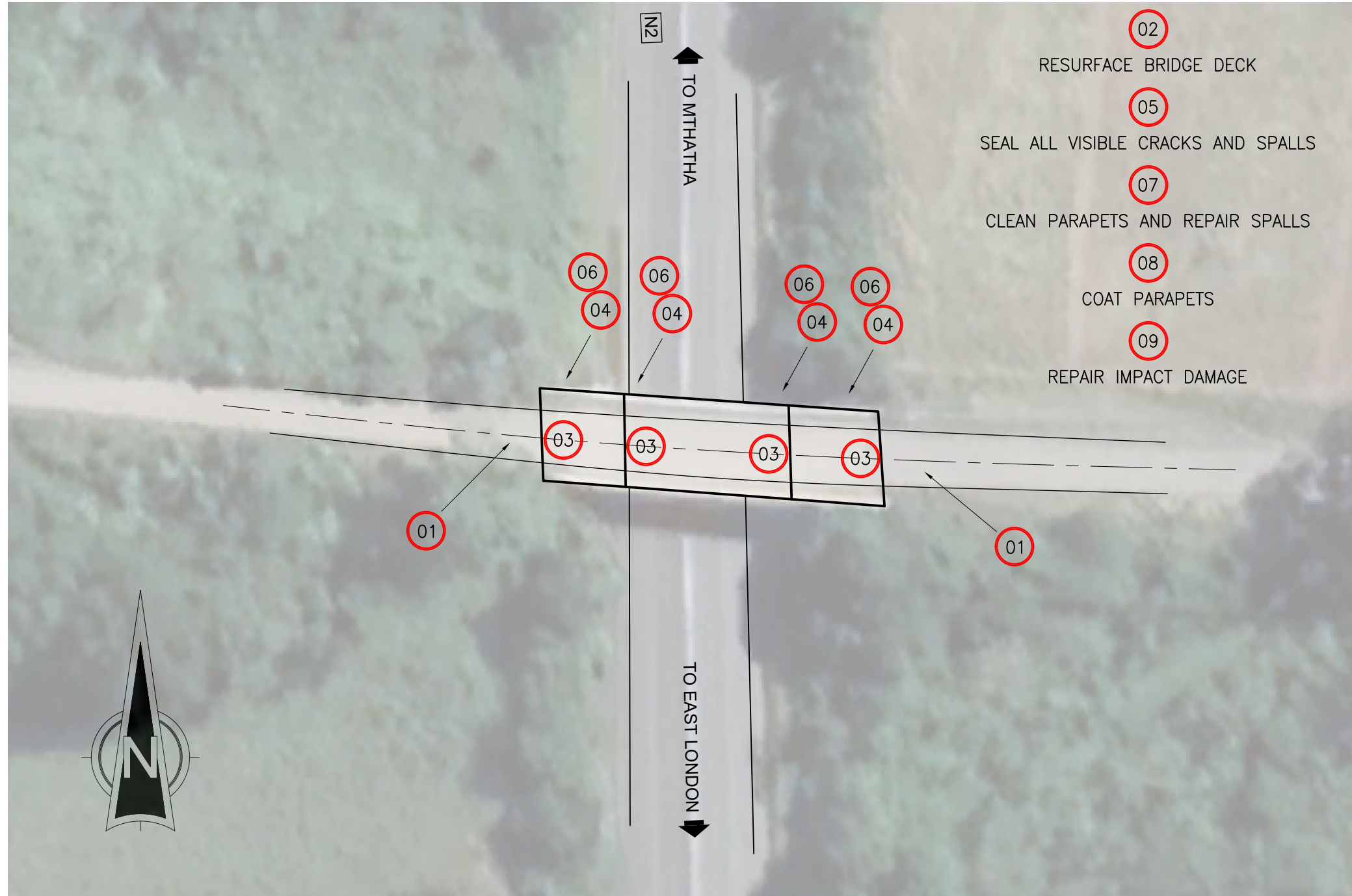


- EXPANSION JOINT NOTES:**
1. EXPANSION JOINT TO BE 400x75 ASPHALTIC PLUG JOINTS
 2. INSTALLATION TO BE DONE UNDER TRAFFIC CONDITIONS
 3. THESE JOINTS SHALL BE INSTALLED BY SPECIALISTS OR UNDER THE SUPERVISION OF THE MANUFACTURER.
 4. THE JOINTS MUST BE AGREEMENT SA APPROVED WITH IDENTIFICATION DETAILS
 5. SEAL PARAPET JOINTS IN LINE WITH ASPHALTIC PLUG JOINTS WITH AN APPROVED SILICON SEALANT

[illegible]

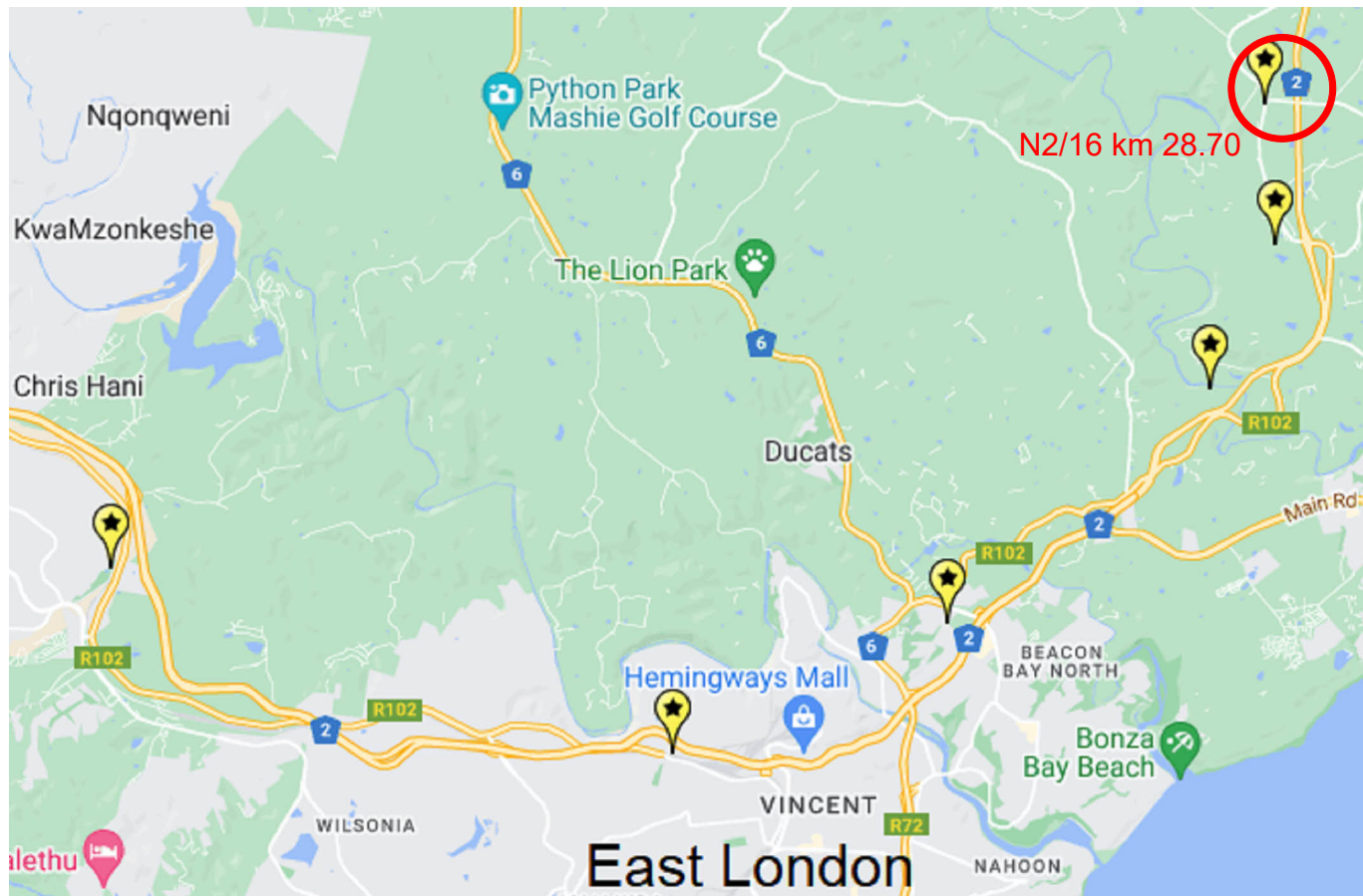


				CONSTRUCTION RECORD WORKS CONTRACT ENGINEER		DESIGNED BY		CONSULTANT APPROVAL		HEAD OFFICE 48 Tambotie Avenue Val de Grace Pretoria 0184 PO Box 415 Pretoria 0001 South Africa Tel: (012) 844 8000		 SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LTD BUILDING SOUTH AFRICA THROUGH BETTER ROADS		SOUTHERN REGION 20 Shoreward Drive Baywest Port Elizabeth 6025 P.O. Box 27230 Greenacres 6057 Tel: (041) 398 3200 Fax: (041) 398 3222		ACCEPTANCE THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATEVER CAUSE OR HOWEVER ARISING For CEO: SA NATIONAL ROADS AGENCY LTD. Date:		PROJECT DESCRIPTION AD-HOC STRUCTURAL AND DRAINAGE CONSULTING ENGINEERING AND SUPERVISION SERVICES				PROJECT NUMBER X.003-022-2018/1-C6	
				Name : Prof. Reg. No. : Date :		NAME Prof. Reg. No. Date		NAME Prof. Reg. No. Date						DRAWING LOCATION DATA		START		END					
						CHECKED BY								ROUTE		N2		N2					
														SECTION		16		16					
				SANRAL PROJECT MANAGER										DRAWING km DISTANCE		KM 26.46		KM 26.46					
						NAME Prof. Reg. No. Date								DRAWING TYPE		STRUCTURES - BRIDGES							
														BRIDGE/STRUCTURE No.		B910							
														CONSULTANT DRAWING No.		201931-N2-16-26-01							
														SANRAL DOCUMENT #		*****				VER			
VA				FOR TENDER																			
No.				DATE		REVISION		CONSULT. ENG.															



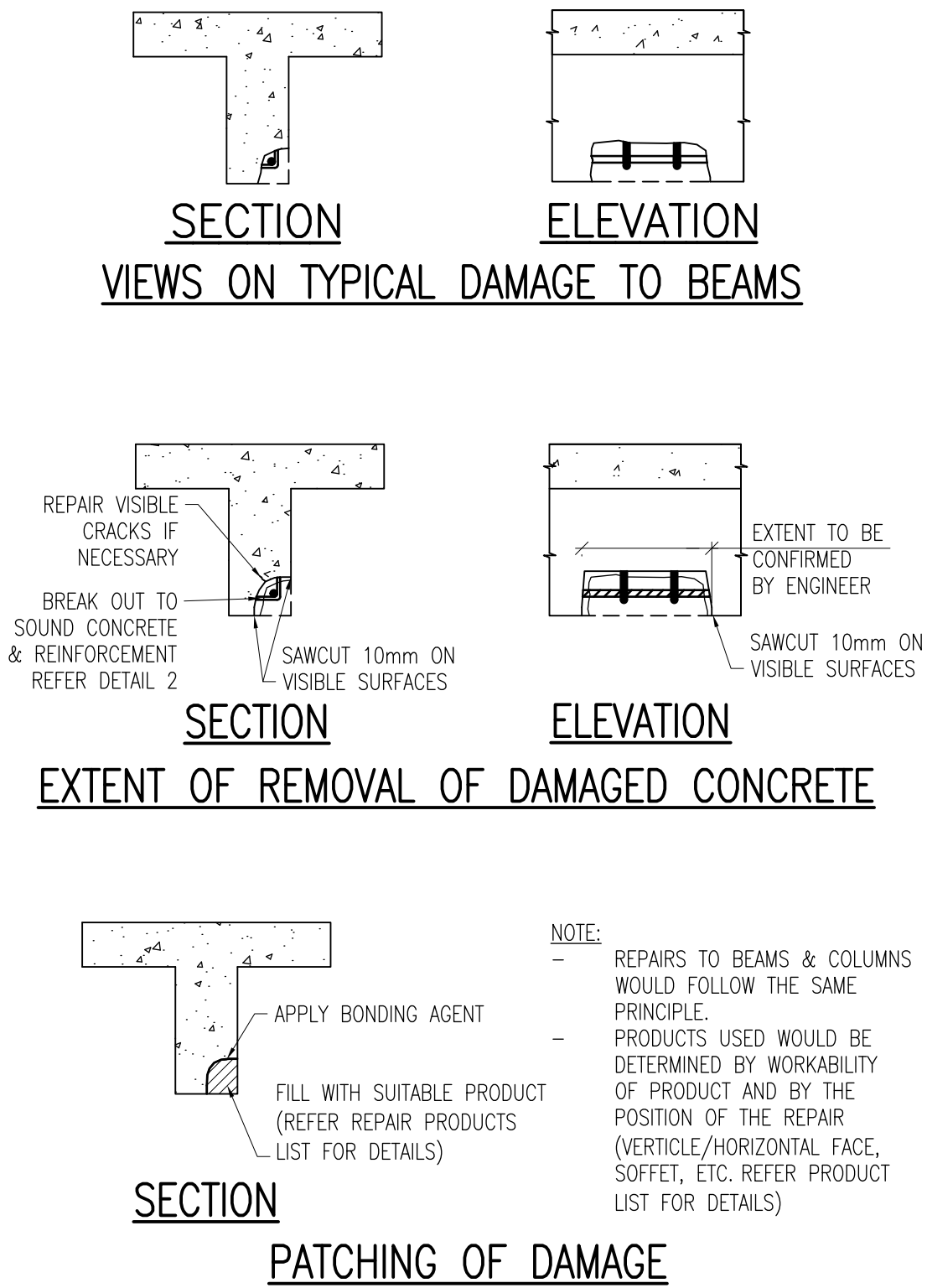
PLAN ON BRIDGE B1265 – (N2/16 @ km 28.70)

ITEM	DESCRIPTION
01	REPAIR ROAD SURFACING AT APPROACHES
02	RESURFACE DECK
03	REPLACE JOINTS WITH ASPHALTIC PLUG EXPANSION JOINTS
04	CLEAN ABUTMENTS AND PIERS WITH HIGH PRESSURE WATER JETTING
05	SEAL ALL VISIBLE CRACKS AND REPAIR LOCAL SPALLS
06	TREAT ABUTMENTS AND PIERS WITH APPROVED BARRIER COATING. IF SIGNS OF ASR ARE FOUND, TREAT WITH SILANE.
07	CLEAN PARAPETS WITH HIGH PRESSURE WATER JETTING BEFORE REPAIRING SPALLS AND CRACKS
08	COAT PARAPETS WITH APPROVED BARRIER COATING
09	REPAIR IMPACT DAMAGE AND VISIBLE SPALLS

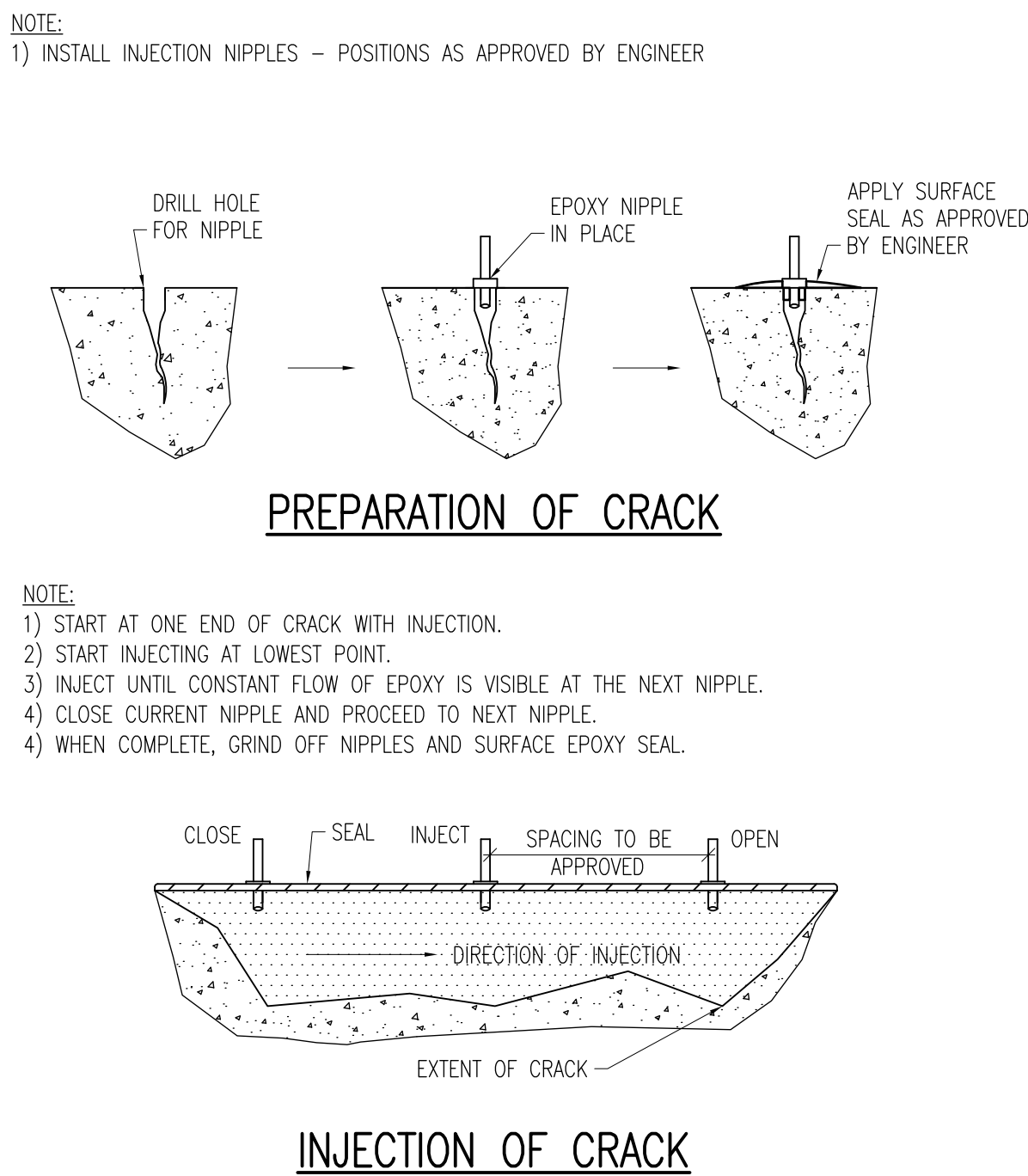


LOCALITY

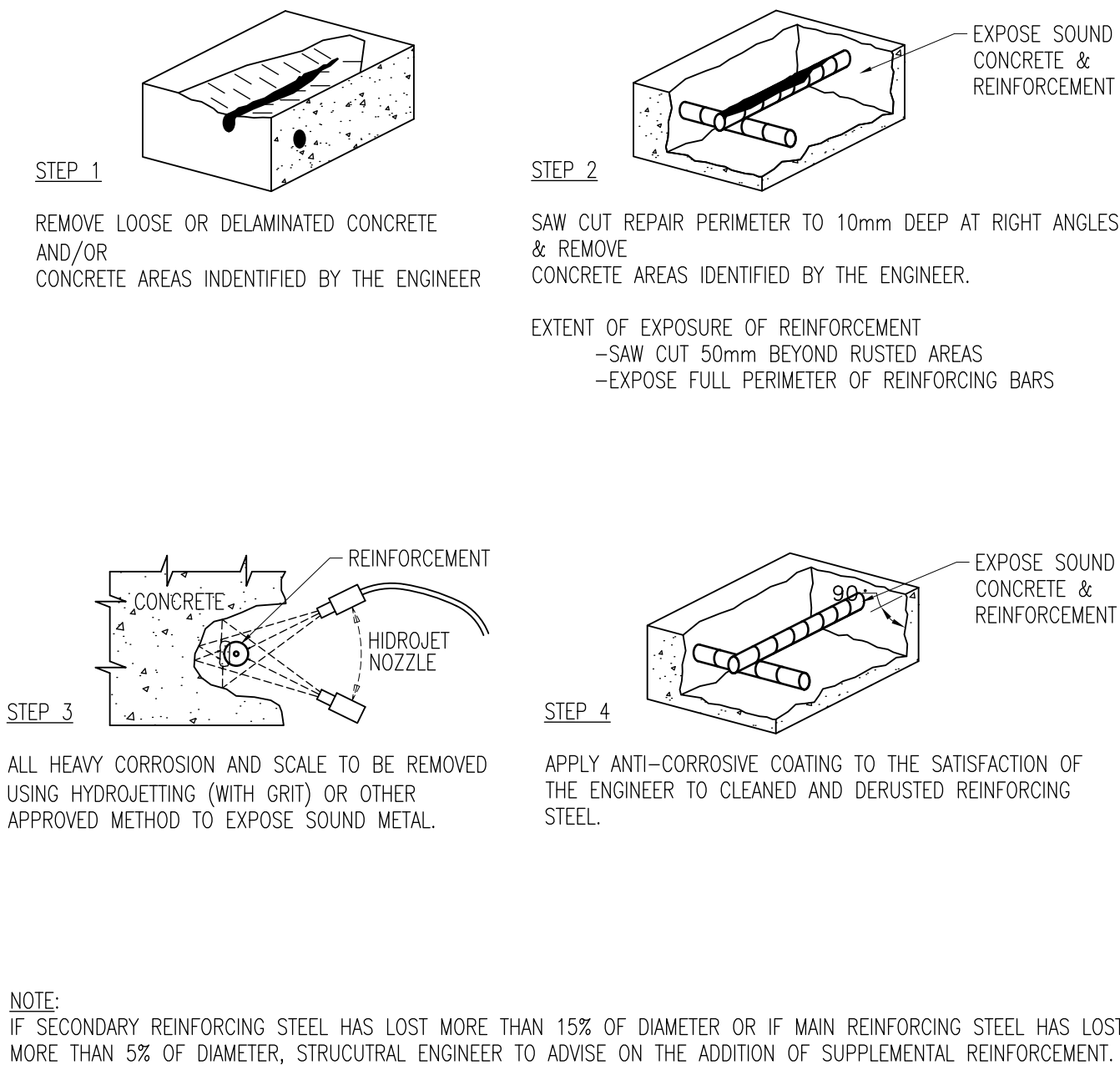
TYPICAL DETAIL – CONCRETE REPAIR



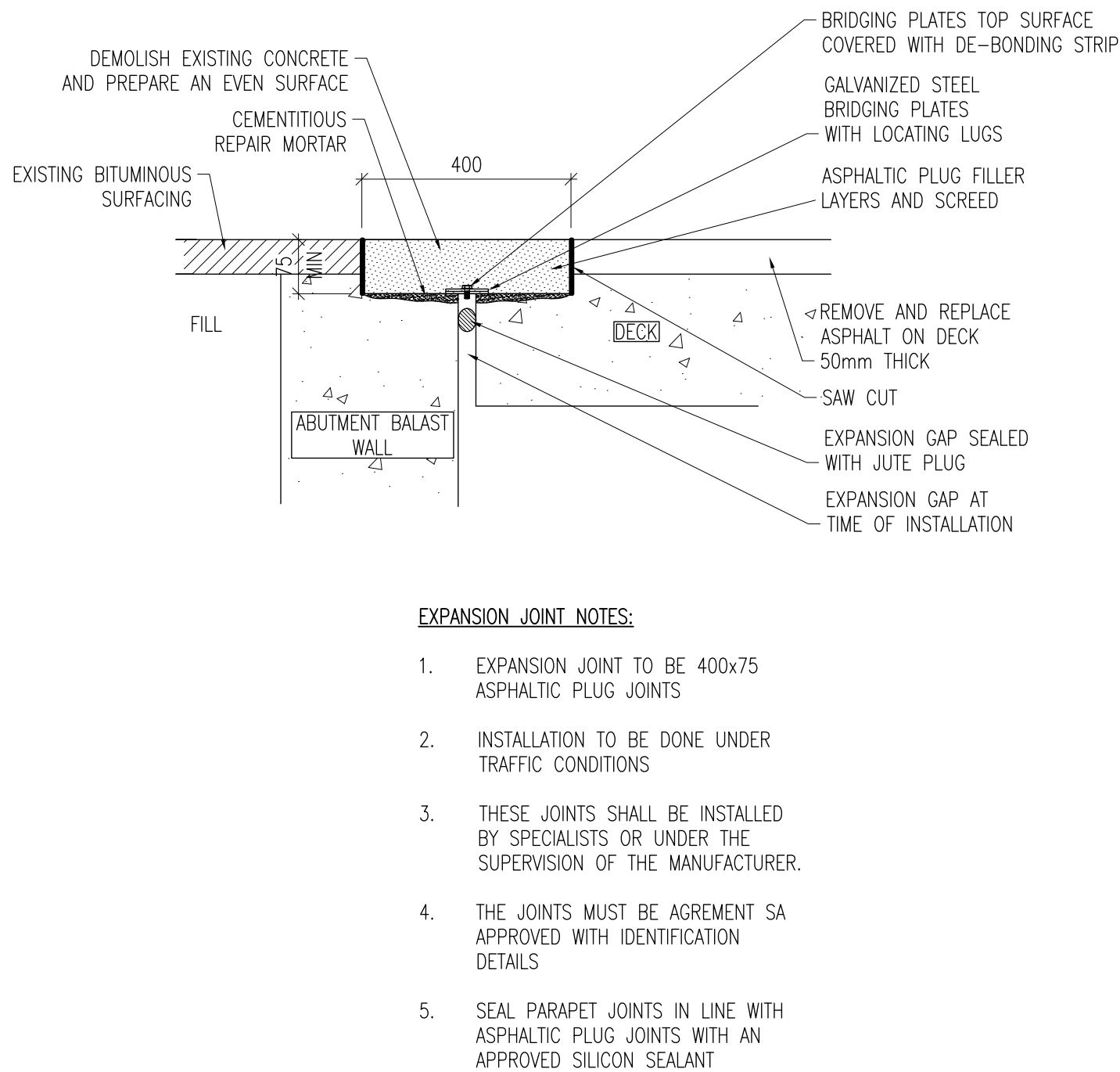
TYPICAL DETAIL – CRACK REPAIR (>0.5mm)



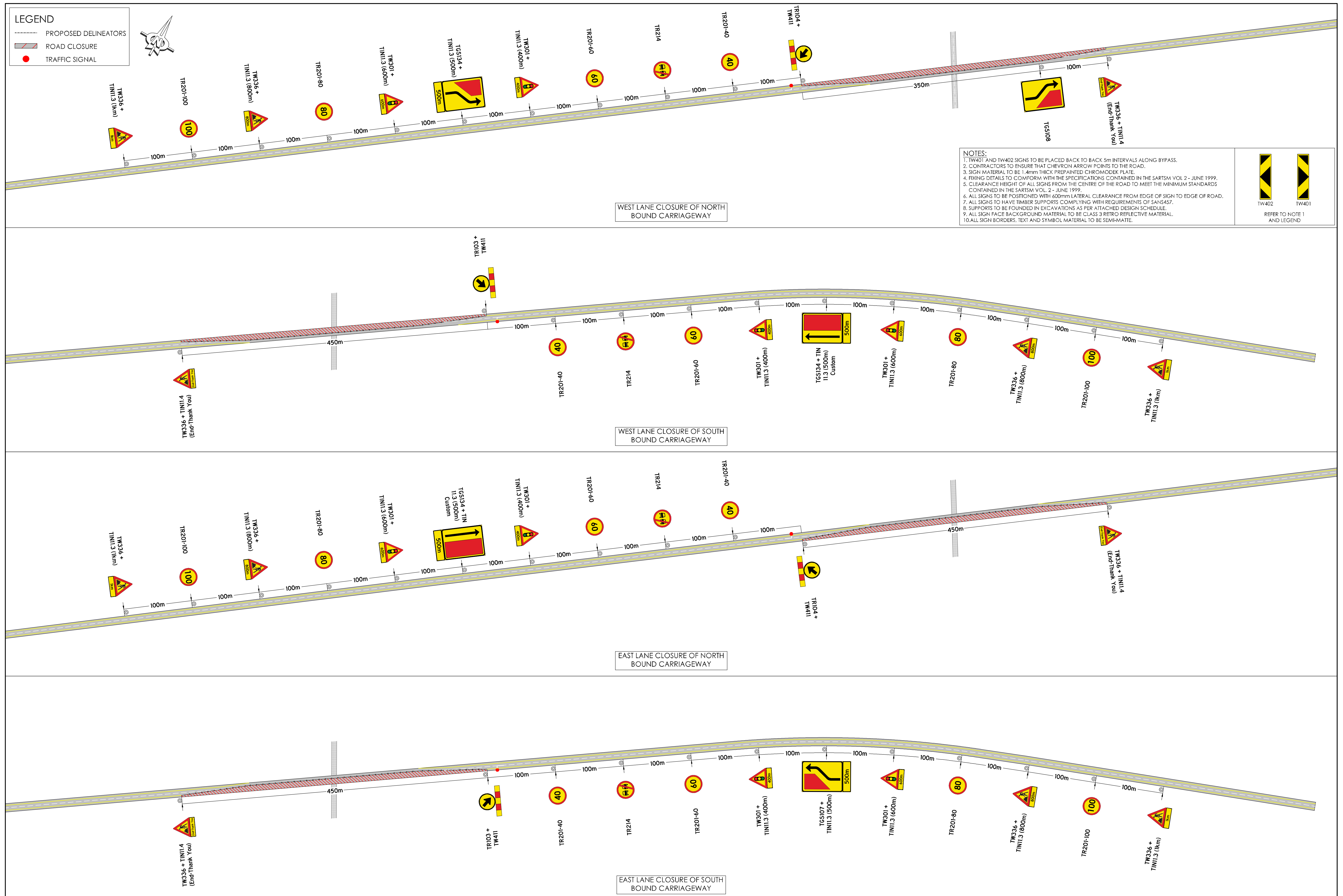
TYPICAL DETAIL – TREATMENT OF REINFORCEMENT

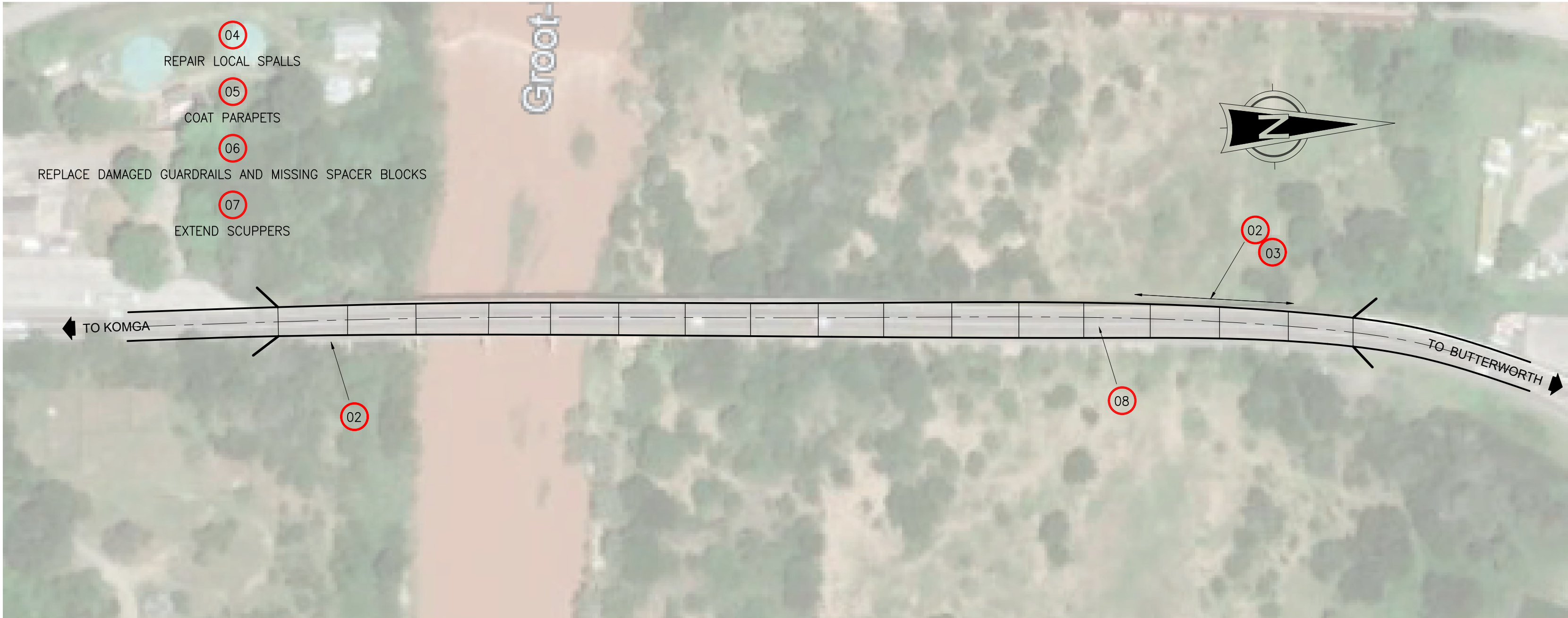


TYPICAL DETAIL – ASPHALTIC PLUG JOINT AT ABUTMENTS



			CONSTRUCTION RECORD		DESIGNED BY		CONSULTANT APPROVAL		HEAD OFFICE		SOUTHERN REGION		ACCEPTANCE		PROJECT DESCRIPTION				PROJECT NUMBER		X.003-022-2018/1-C6			
			WORKS CONTRACT ENGINEER		NAME		THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATSOEVER CAUSE OR HOWEVER ARISING		48 Tambotie Avenue Val de Grace Pretoria 0184 PO Box 415 Pretoria 0001 South Africa Tel: (012) 844 8000		20 Shoreward Drive Baywest Port Elizabeth 6025 P.O. Box 27230 Greenacres 6057 Tel: (041) 398 3200 Fax: (041) 398 3222		for CEO: SA NATIONAL ROADS AGENCY LTD.		AD-HOC STRUCTURAL AND DRAINAGE SERVICES IN THE SOUTHERN REGION – EMERGENCY BRIDGE REPAIR WORKS				DRAWING LOCATION DATA		START		END	
			Name : Prof. Reg. No. : Date :		CHECKED BY				SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LTD						DRAWING TITLE				ROUTE		N2		N2	
			SANRAL PROJECT MANAGER		NAME				BUILDING SOUTH AFRICA THROUGH BETTER ROADS						SECTION				DRAWING km DISTANCE		KM 28.70		KM 28.70	
			Name : Prof. Reg. No. : Date :		Prof. Reg. No. :		DRAWN BY								DRAWING TYPE				BRIDGE/STRUCTURE No.		B1265		STRUCTURES - BRIDGES	
															CONSULTANT DRAWING No.				201931-N2-16-28-00		VER		VA	
															SCALE : AS SHOWN				SHEET		1		OF	
															SANRAL DOCUMENT #				#####					

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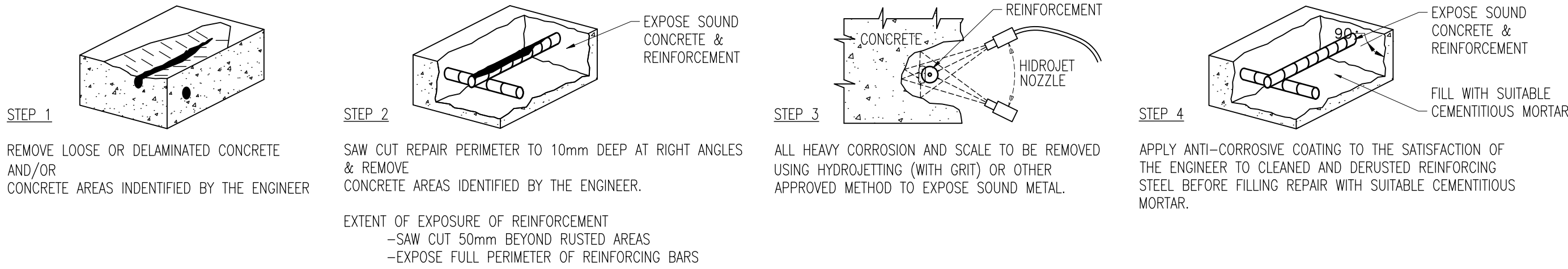
PLAN ON BRIDGE B149 – (N2/16 @ km 80.22)
NTS



LOCALITY

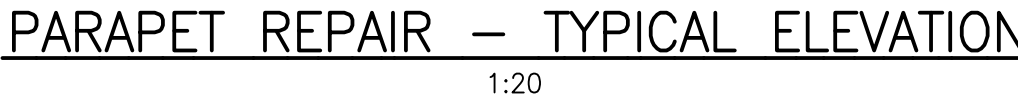
ITEM	DESCRIPTION
01	REMOVE GUARDRAIL OVER ENTIRE LENGTH OF BRIDGE TO ALLOW FOR REPAIRS TO PARAPETS
02	REPLACE ACCIDENT DAMAGED PRECAST CONCRETE BALUSTRADE AND DAMAGED GUARDRAIL.
03	REPAIR DAMAGED CONCRETE TO LOWER PORTION OF PARAPET
04	REPAIR LOCAL SPALLS
05	COAT ENTIRE PARAPET WITH CORROSION INHIBITER AND BARRIER COATING
06	REPLACE DAMAGED GUARDRAILS AND SPACER BLOCKS, RE-ATTACH GUARDRAILS
07	EXTEND SCUPPERS
08	UNDERTAKE LOCAL REPAIRS TO ASPHALT ON BRIDGE

TYPICAL DETAIL CONCRETE REPAIR DETAIL

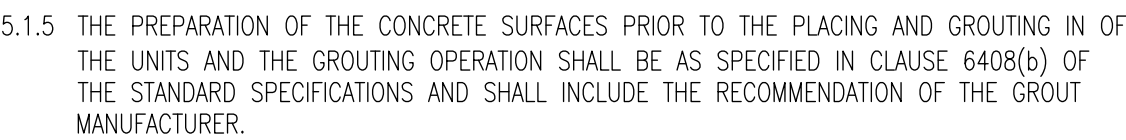
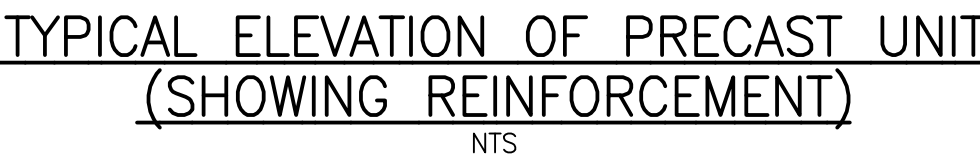



NOTE:
IF SECONDARY REINFORCING STEEL HAS LOST MORE THAN 15% OF DIAMETER OR IF MAIN REINFORCING STEEL HAS LOST MORE THAN 5% OF DIAMETER, STRUCUTRAL ENGINEER TO ADVISE ON THE ADDITION OF SUPPLEMENTAL REINFORCEMENT.

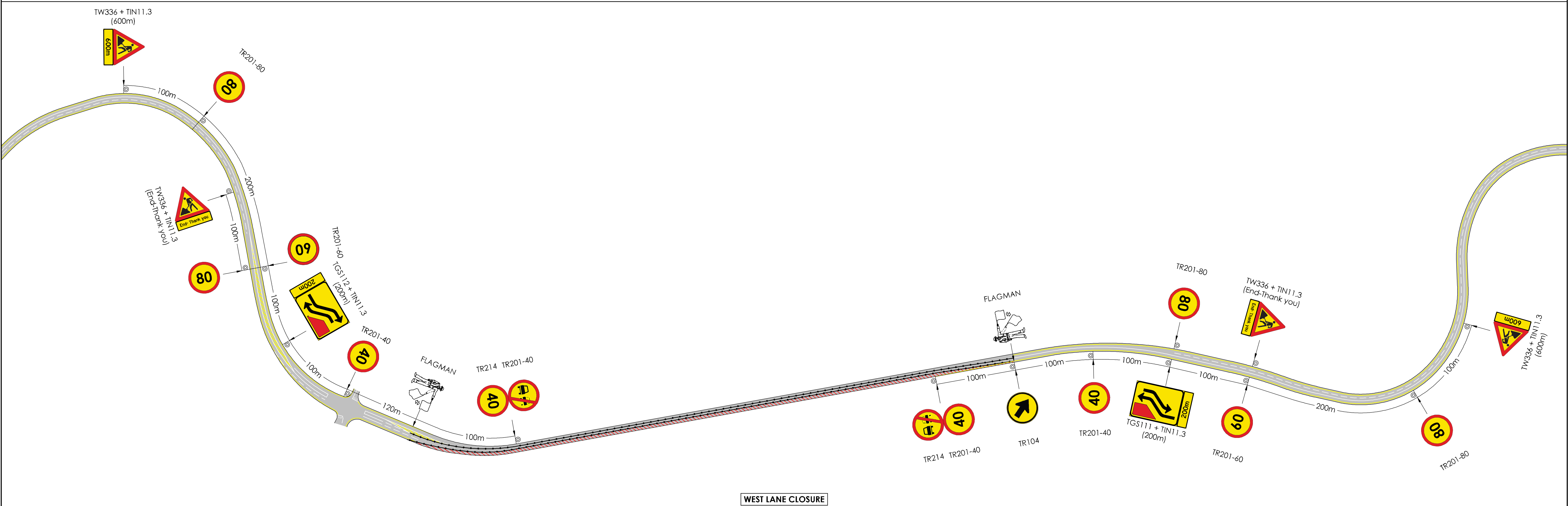
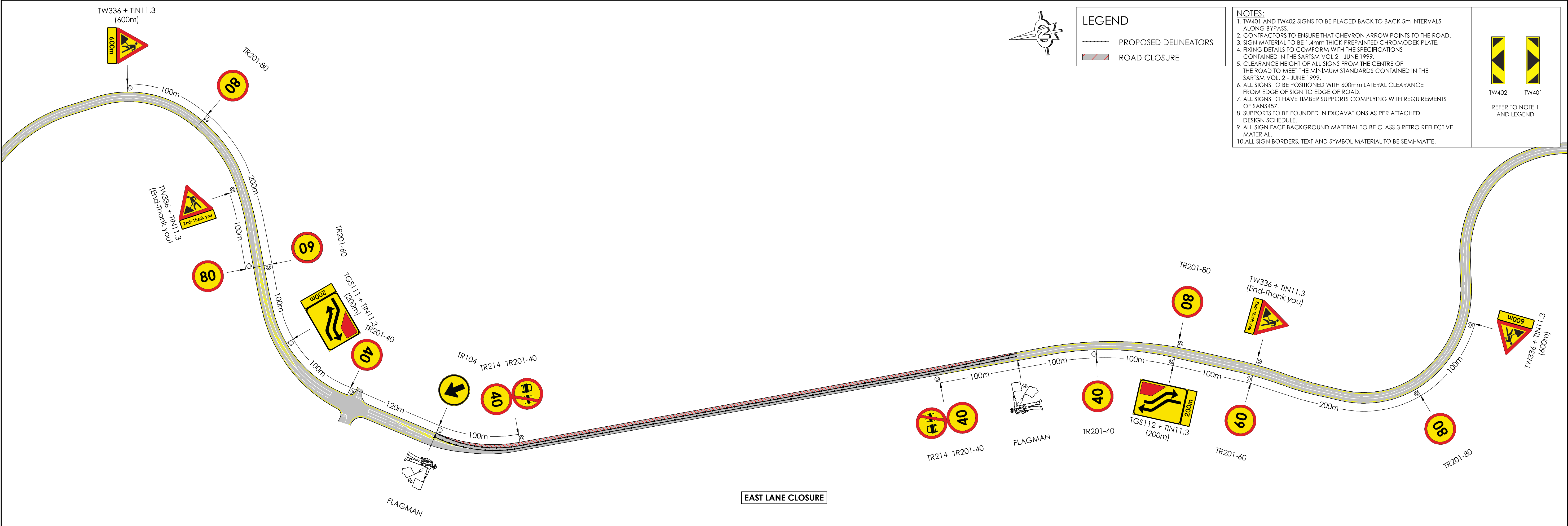
			CONSTRUCTION RECORD		DESIGNED BY		CONSULTANT APPROVAL		HEAD OFFICE		SOUTHERN REGION		ACCEPTANCE		PROJECT DESCRIPTION				PROJECT NUMBER		X.003-022-2018/1-C6			
			WORKS CONTRACT ENGINEER		NAME		Name		48 Tambotie Avenue		20 Shoreward Drive		THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATSOEVER CAUSE OR HOWEVER ARISING		AD-HOC STRUCTURAL AND DRAINAGE SERVICES IN THE SOUTHERN REGION – EMERGENCY BRIDGE REPAIR WORKS				DRAWING LOCATION DATA		START		END	
			Name		Prof. Reg. No.		Prof. Reg. No.		Val de Grace		Baywest				DRAWING TITLE				ROUTE		N2		N2	
			Date		CHECKED BY		Name		Pretoria		Port Elizabeth				N2 SECTION 16 km 80.22				SECTION		16		16	
			SANRAL PROJECT MANAGER		NAME		Prof. Reg. No.		PO Box 415		P.O. Box 27230				BRIDGE REPAIRS - LAYOUT AND DETAILS				DRAWING km DISTANCE		KM 80.220		KM 80.220	
			Name		Prof. Reg. No.		Date		Pretoria 0001		Greenacres								DRAWING TYPE		STRUCTURES - BRIDGES			
			Date		DRAWN BY				South Africa		6057								BRIDGE/STRUCTURE No.		B149			
									Tel: (012) 844 8000		Tel: (041) 398 3200								CONSULTANT DRAWING No.		201931-N2-16-80-00		VER	
											Fax: (041) 398 3222								SANRAL DOCUMENT #		#####		VA	
VA			FOR TENDER																SCALE :		AS SHOWN		SHEET 1 OF 1	
No.			DATE		REVISION		CONSULT. ENG.																	



④ HEIGHT TO BE CHECKED TO COMPLY WITH HEIGHT REQUIREMENT FOR CLASS I BALUSTRADE TO TMH: PARTS 1 & 2, 1981 AS AMENDED 1988. REFER TO CLAUSE 3.5.1.2, $F_b' = 15\text{kN}$, FIG. 5




			CONSTRUCTION RECORD			DESIGNED BY			CONSULTANT APPROVAL			HEAD OFFICE						SOUTHERN REGION			ACCEPTANCE			PROJECT DESCRIPTION			PROJECT NUMBER			X.003-022-2018/1-C6					
			WORKS CONTRACT ENGINEER			NAME						48 Tambotie Avenue						20 Shoreland Drive			THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATSOEVER CAUSE OR HOWEVER ARISING			AD-HOC STRUCTURAL AND DRAINAGE SERVICES IN THE SOUTHERN REGION – EMERGENCY BRIDGE REPAIR WORKS			DRAWING LOCATION DATA			START			END		
			Name			Prof. Reg. No. :			Prof. Reg. No.			Val de Grace			Port Elizabeth			P.O. Box 27230						ROUTE			N2			N2					
			Date			0184			0026			PO Box 415			Greenacres			P.O. Box 27230						SECTION			16			16					
			SANRAL PROJECT MANAGER			NAME			CHECKED BY			Portoria 0001			6057			N2 SECTION 16 km 80.22						DRAWING KM DISTANCE			KM 80.220			KM 80.220					
			Name			Prof. Reg. No. :			NAME			South Africa			6057			B-149						DRAWING TYPE			STRUCTURES - BRIDGES								
			Date			0184			Prof. Reg. No.			Tel: (012) 844 8000			0184			for CEO SA NATIONAL ROADS AGENCY LTD.						BRIDGE/STRUCTURE No.			201931-N2-16-80-01			VER VA					
			FOR TENDER ONLY			Prof. Reg. No. :			Prof. Reg. No.			BUILDING SOUTH AFRICA THROUGH BETTER ROADS			0184			B-149						CONSULTANT DRAWING No.			201931-N2-16-80-01			VER VA					
			REVISION			Date			Prof. Reg. No.			Fax: (041) 398 3222			0184			B-149						SANRAL DOCUMENT #			#####			VER VA					
			CONSULT. ENG.			Date			Prof. Reg. No.						0184			B-149						SCALE :			AS SHOWN			SHEET 1 OF 1			VER VA		



				CONSTRUCTION RECORD				DESIGNED BY				CONSULTANT APPROVAL				HEAD OFFICE				SOUTHERN REGION				ACCEPTANCE				PROJECT DESCRIPTION				PROJECT NUMBER			
				WORKS CONTRACT ENGINEER												48 Tambotie Avenue				20 Shoreward Drive				THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATEVER CAUSE OR HOWEVER ARISING				AD-HOC STRUCTURAL AND DRAINAGE CONSULTING ENGINEERING AND SUPERVISION SERVICES				X.003-022-2018/1			
				Name				NAME				Name				Pretoria				Baywest				DRAWING LOCATION DATA				ROUTE				START			
				Prof. Reg. No. :				Prof. Reg. No.				Prof. Reg. No. :				0184				Port Elizabeth				SECTION				N2				N2			
				Date				CHECKED BY				Date				6025				P.O. Box 27230				DRAWING km DISTANCE				KM 80.220				KM 80.220			
				SANRAL PROJECT MANAGER												Greenacres				6057				DRAWING TYPE				STRUCTURES - BRIDGES				B149			
				Name				NAME				Name				Greenacres				6057				BRIDGE/STRUCTURE No.				CONSULTANT DRAWING No.				201931-N2-16-80-02			
				Prof. Reg. No.				Prof. Reg. No.				Prof. Reg. No. :				Greenacres				6057				SANRAL DOCUMENT #				*****				VER			
				Date				DRAWN BY				Date				Greenacres				6057				SCALE :				1: 2500				SHEET 1 OF 1			
VA				FOR TENDER												Tel: (012) 844 8000				Tel: (041) 398 3200				for CEO: SA NATIONAL ROADS AGENCY LTD.				BRIDGE REPAIRS - ACCOMMODATION OF TRAFFIC DETAILS							
No.				REVISION												Fax: (041) 398 3222																			
DATE				CONSULT. ENG.																															

FOR TENDER ONLY



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SOUTH AFRICAN NATIONAL ROADS AGENCY LTD

**BUILDING SOUTH AFRICA
THROUGH BETTER ROADS**