Application for Planning Approval

Land Use Planning and Approvals Act 1993

APPLICATION NO.

DA2024/093

LOCATION OF AFFECTED AREA

15 LUKAARLIA DRIVE, BRIDGEWATER

DESCRIPTION OF DEVELOPMENT PROPOSAL

WAREHOUSE (MANUFACTURING AND PROCESSING)

A COPY OF THE DEVELOPMENT APPLICATION MAY BE VIEWED AT www.brighton.tas.gov.au AND AT THE COUNCIL OFFICES, 1 TIVOLI ROAD, OLD BEACH, BETWEEN 8:15 A.M. AND 4:45 P.M, MONDAY TO FRIDAY OR VIA THE QR CODE BELOW. ANY PERSON MAY MAKE WRITTEN REPRESENTATIONS IN ACCORDANCE WITH S.57(5) OF THE LAND USE PLANNING AND APPROVALS ACT 1993 CONCERNING THIS APPLICATION UNTIL 4:45 P.M. ON **16/09/2024**. ADDRESSED TO THE GENERAL MANAGER AT 1 TIVOLI ROAD, OLD BEACH, 7017 OR BY EMAIL AT development@brighton.tas.gov.au. REPRESENTATIONS SHOULD INCLUDE A DAYTIME TELEPHONE NUMBER TO ALLOW COUNCIL OFFICERS TO DISCUSS, IF NECESSARY, ANY MATTERS RAISED.

JAMES DRYBURGH
General Manager

SCAN ME

Brighton going places

DEVELOPMENT APPLICATION DRAWINGS
PROPOSED WAREHOUSE
LOT 1 LUKAARLIA DRIVE
BRIDGEWATER TAS 7030

A001	INDEX & LOCALITY PLAN	D	20/06/2024
A002	EXISTING SITE PLAN	D	20/06/2024
A003	PROPOSED SITE PLAN	D	20/06/2024
A004	PROPOSED GROUND FLOOR PLAN	D	20/06/2024
A005	ELEVATION / SECTION 01	D	20/06/2024
A006	ELEVATION / SECTION 02	D	20/06/2024
A007	ELEVATION / SECTION 03	D	20/06/2024

LOCALITY PLAN
N.T.S.

SITE INFORMATION

TITLE INFORMATION	CT: 186550/1
PROPERTY IDENTIFICATION	9621638
DESIGN WIND VELOCITY Vh,s	NX - XX M/S
DESIGN WINDOW VELOCITY VH, U	NX - XX M/S
SOIL CLASSIFICATION	CLASS _
CLIMATE ZONE	7
BAL RATING	_
ALPINE AREA	N/A
CORROSION ENVIROMENT (INTERNAL AND EXTERNAL)	CX
OTHER HAZARDS	N/A

REV	ISSUE	DATE	APPROVAL
D	PLANNING APPROVAL - REMOVAL OF STAGE 2	20/06/2024	
C	PLANNING APPROVAL	24/04/2024	
B	PRELIMINARY - CLIENT REVIEW	27/02/2024	
A	PRELIMINARY	15/12/2023	

DRAWN:	TH
CHECKED:	MG
DESIGN:	TH
CHECKED:	MG
VERIFIED:	--

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CONSULTING ENGINEERS
Lower Ground
199 Macquarie Street
Hobart TAS 7000
03 6234 8666
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www.aldanmark.com.au

PROJECT: PROPOSED WAREHOUSE

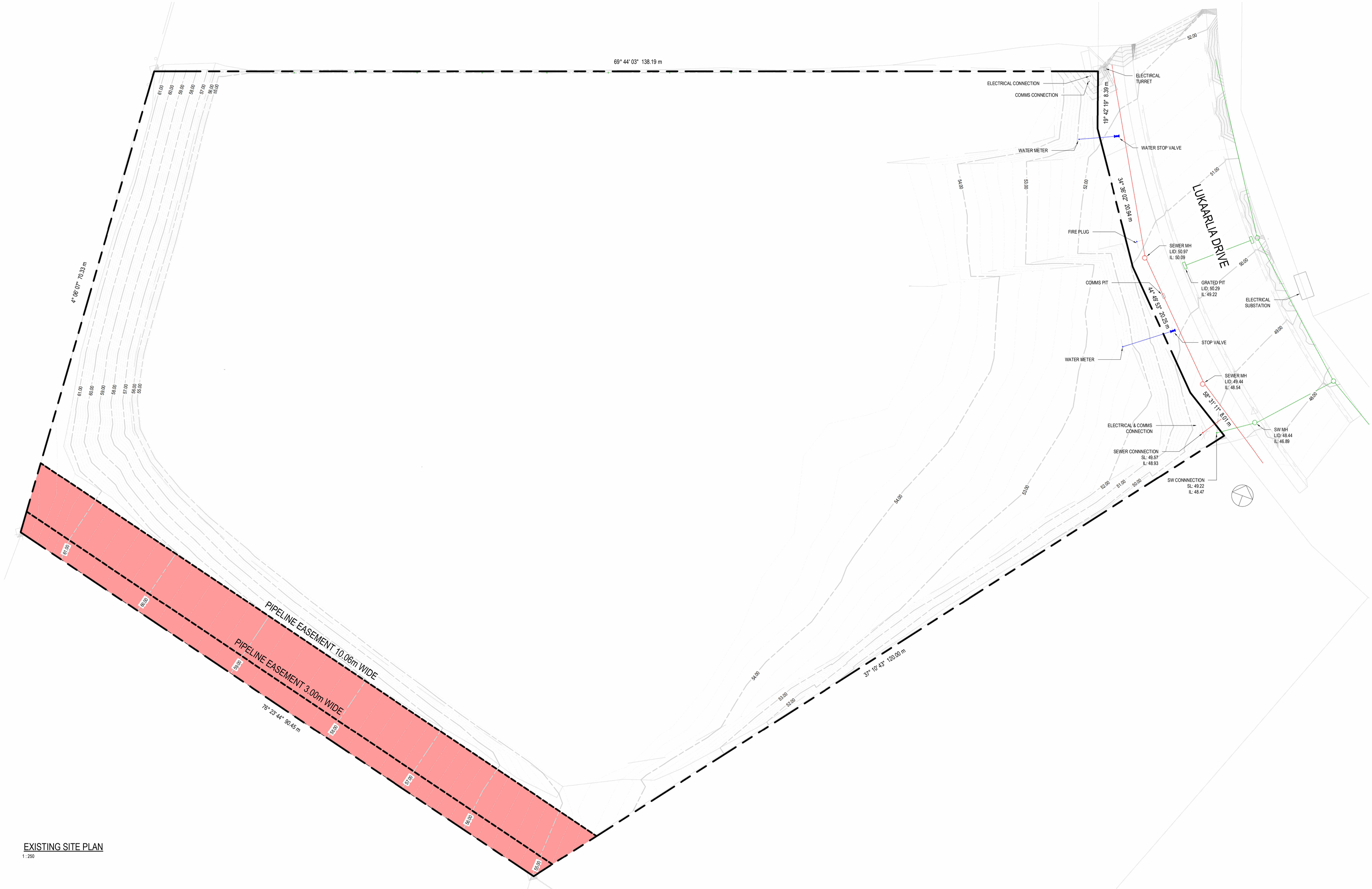
ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER TAS 7030

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: INDEX & LOCALITY PLAN

SCALE: 1 : 100 | TOTAL SHEETS: 7 | SIZE: A1

PROJECT No: 23E99-98 | SHEET: A001 | REV: D



EXISTING SITE PLAN
1 : 250

REV	ISSUE	DATE	APPROVAL	
			DRAWN:	TH
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PROJECT: PROPOSED WAREHOUSE

ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER TAS 7030

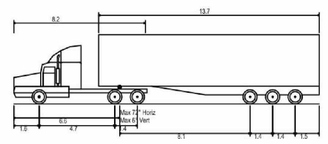
CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: EXISTING SITE PLAN

SCALE: 1 : 250 | TOTAL SHEETS: 7 | SIZE: A1

PROJECT No: 23E99-98 | SHEET: A002 | REV: D

SITE PLAN
1 : 250



AV - Articulated Vehicle

Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.301m
Min Body Ground Clearance	0.418m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

MAX. DESIGN VEHICLE LEGEND

KEY

- PAVED CONCRETE — REFER TO CIVIL DOCUMENTATION (FUTURE)
- PROPOSED LANDSCAPING AREA — REFER TO SHEET - A1.04 FOR DETAILS
- EASEMENT — REFER TO PLAN FOR TYPE & WIDTH
- BOUNDARY SETBACK — AS PER CLARENCE INTERIM PLANNING SCHEME

PARKING

24 PARKING SPACES PROVIDED INCLUDING
1 ACCESSIBLE PARKING SPACE

EXTERNAL LIGHTING (CLAUSE 24.3.3 BRIGHTON INTERIM PLANNING SCHEME 2015)

ALL EXTERNAL LIGHTING TO BE TURNED OFF BETWEEN 10.00 pm & 6.00am (EXC. SECURITY LIGHTING).
SECURITY LIGHTING TO BE BAFFLED TO ENSURE NO EMISSION OF LIGHT OUTSIDE THE ZONE.

REFER TO PROPOSED SITE LIGHTING PLAN FOR EXTERNAL LIGHTING DETAILS

NOISE (CLAUSE 24.3.2 BRIGHTON INTERIM PLANNING SCHEME 2015)

NOISE EMISSIONS MEASURED AT THE RESIDENTIAL ZONE BOUNDARY NOT TO EXCEED:
- 55dB(A) (LAeq) BETWEEN 7.00am TO 7.00pm.
- 5dB(A) ABOVE BACKGROUND (LA90) LEVEL OR 40dB(A) (LAeq), WHICHEVER IS THE LOWER, BETWEEN 7.00am TO 7.00pm.
- 65dB(A) (LAmax) AT ANY TIME.

ALL BUILDINGS TO BE CONSTRUCTED USING PRECAST CONCRETE TO REDUCE TENANCY NOISE EMITTANCE.

PLANNING (BRIGHTON INTERIM PLANNING SCHEME 2015)

LAND TITLE
FOLIO: 186550
VOLUME: 1

SETBACKS
FRONT: 10 m
SIDE: 3 m
REAR: 3 m

AREA
NEW BUILDING FOOTPRINT: 2,495 m²
EXG. SITE: 14,306 m²
SITE COVERAGE %: 17.5 %

LANDSCAPING LEGEND

(A) CLUMPINGS OF *Anigozanthos Flavidus* - KANGAROO PAW WITH EUCALYPT BARK MULCH TO ROADSIDE AREA

(A) CLUMPINGS OF *Festuca Glauca* - BLUE FESCUE WITH EUCALYPT BARK MULCH TO ROADSIDE AREA

(B) *Eucalypt forrestiana* - FUCHSIA GUM TO 5m HIGH x 3m SPREAD AS SHOWN TO ROADSIDE GARDEN AREA

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PROJECT: PROPOSED WAREHOUSE

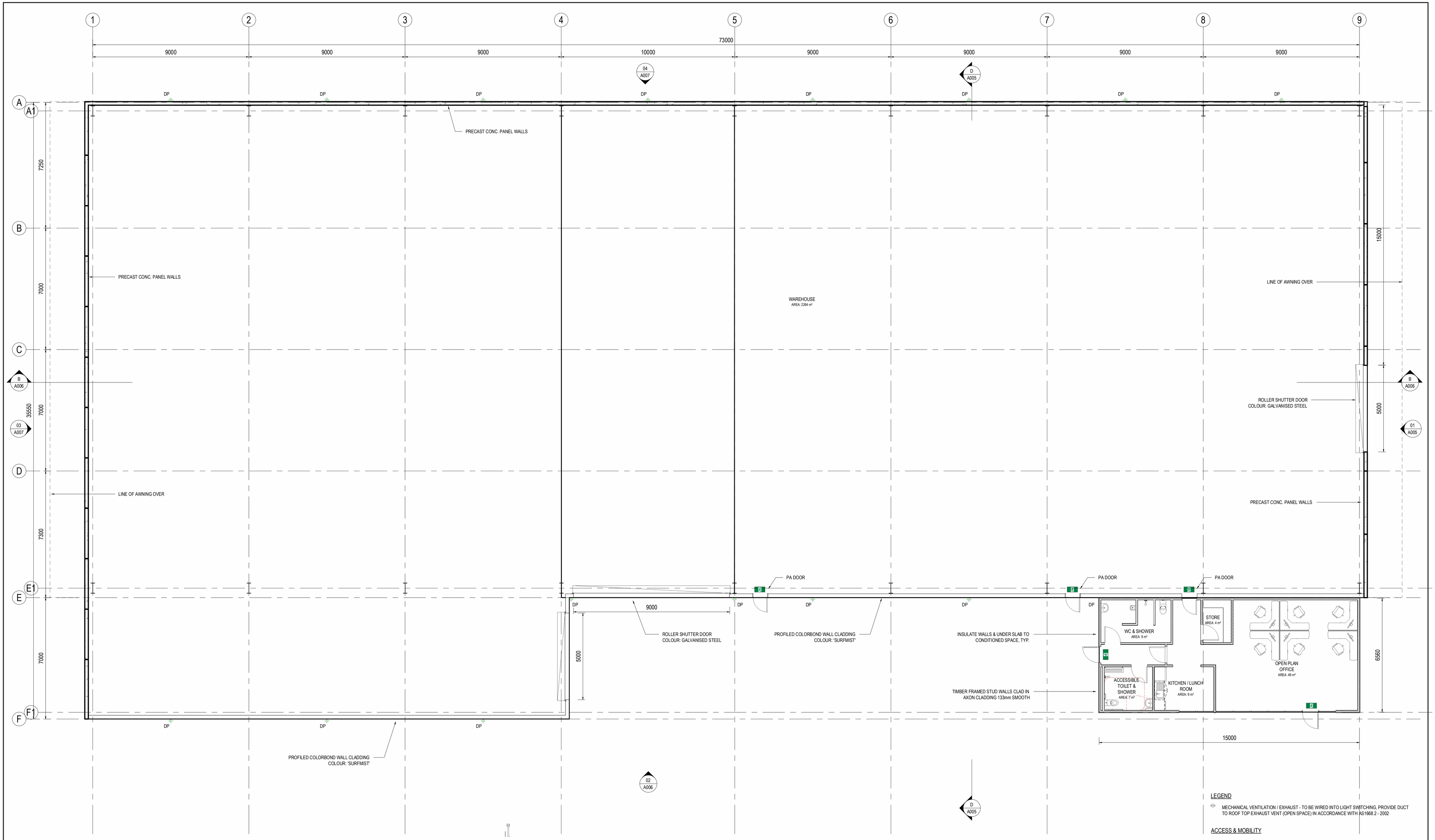
ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER TAS 7030

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: PROPOSED SITE PLAN

SCALE: As indicated | TOTAL SHEETS: 7 | SIZE: A1

PROJECT No: 23E99-98 | SHEET: A003 | REV: D



GROUND FLOOR PLAN

1 : 100

LEGEND

MECHANICAL VENTILATION / EXHAUST - TO BE WIRED INTO LIGHT SWITCHING, PROVIDE DUCT TO ROOF TOP EXHAUST VENT (OPEN SPACE) IN ACCORDANCE WITH AS1668.2 - 2002

ACCESS & MOBILITY

BUILDER / CONTRACTOR TO REFER TO DESIGN FOR ACCESS & MOBILITY PART 1: GENERAL REQUIREMENTS FOR ACCESS - NEW BUILDING WORK (AS1428.1) FOR GREATER DETAIL WHEN INSTALLING FITTINGS.

ENERGY EFFICIENCY

PROVIDE - R2.0 INSULATION BATTS TO ALL WALL OF OFFICE / LUNCH ROOM AREA
- R4.0 INSULATION BATTS TO OFFICE / LUNCH CEILING SPACE
- 50mm XPS INSULATION LAYER & WATERPROOF MEMBRANE UNDER CONC. SLAB

DGU - DOUBLE GLAZING ONLY TO CONDITIONED SPACE
SGU - SINGLE GLAZING TO ALL WAREHOUSE SPACE

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PROJECT: PROPOSED WAREHOUSE

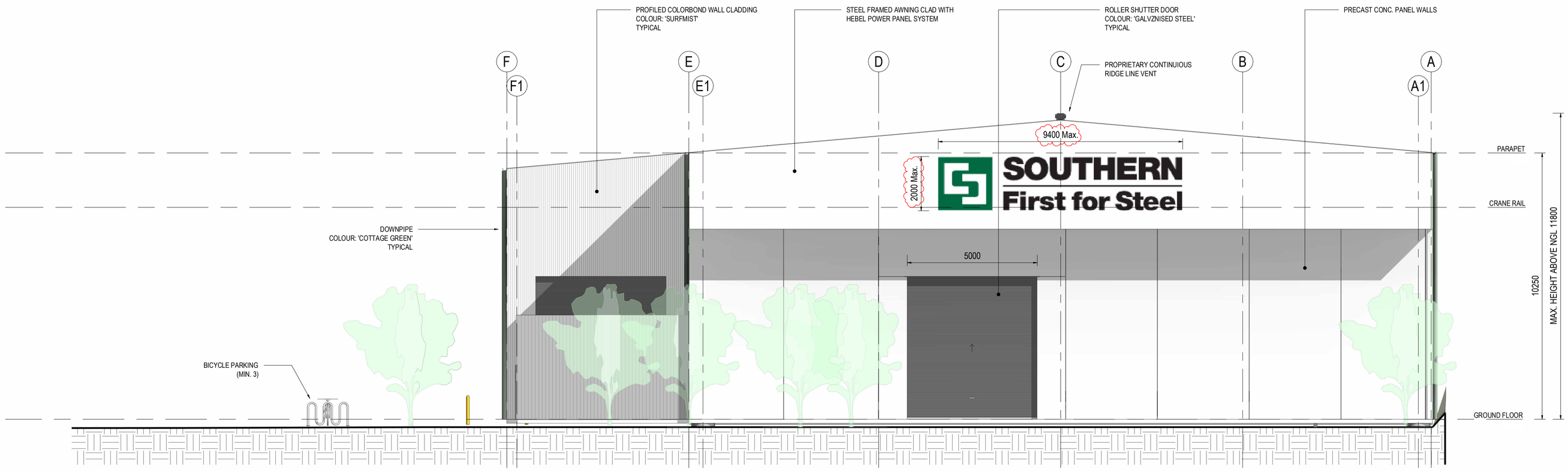
0 1 2 3 4 5 6 7 8 9 10m

ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER TAS 7030

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: PROPOSED GROUND FLOOR PLAN

SCALE:	1 : 100	TOTAL SHEETS:	7	SIZE:	A1
PROJECT No:	23E99-98	SHEET:	A004	REV:	D



01 A004 ELEVATION 01
1 : 100

SIGNAGE (C1.6.1 / P1.1 - DESIGN AND SITING OF SIGNS)

1. APPLICABLE ZONE:
THE PROPOSED SIGN IS LOCATED WITHIN A ZONE DESIGNATED FOR THIS TYPE OF SIGN AS OUTLINED IN TABLE C1.6. THIS COMPLIANCE ENSURES THAT THE SIGN IS PERMISSIBLE IN THE INTENDED LOCATION.

2. SIZE AND DIMENSIONS:
THE SIGN'S SIZE AND DIMENSIONS HAVE BEEN CAREFULLY CHOSEN TO ENSURE COMPATIBILITY WITH THE SURROUNDING STREETSCAPE AND LANDSCAPE. THE SIGN IS PROPORTIONATE TO ITS INTENDED LOCATION, AVOIDING ANY OVERPOWERING PRESENCE IN THE AREA.

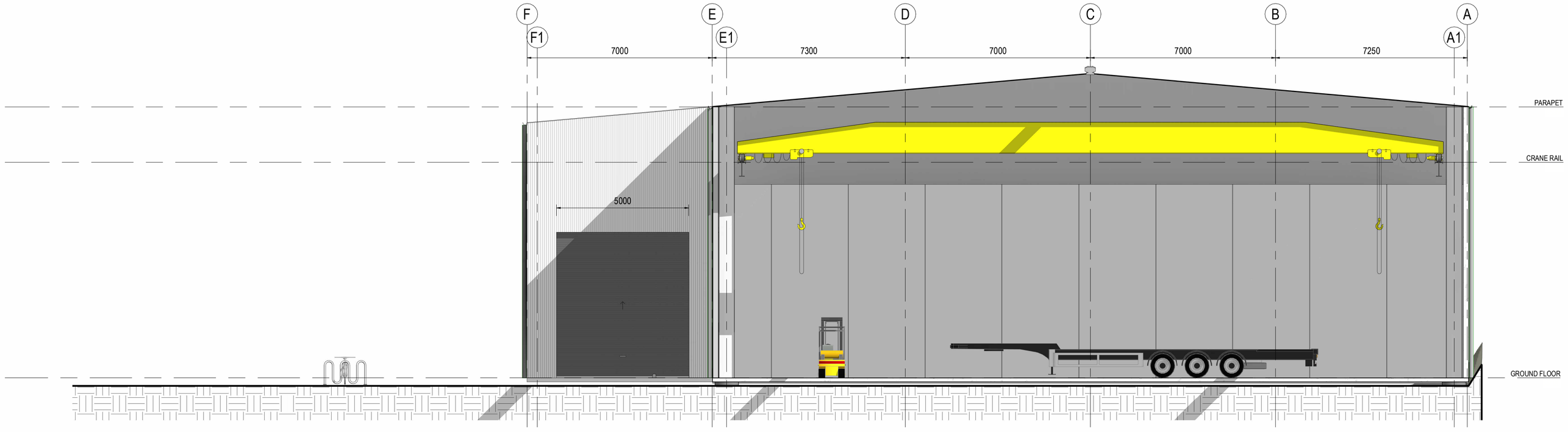
3. BUILDING SCALE:
THE SIGN IS DESIGNED TO MATCH THE SCALE OF THE BUILDING UPON WHICH IT WILL BE INSTALLED. ITS SIZE AND DESIGN ELEMENTS COMPLEMENT THE ARCHITECTURAL FEATURES OF THE BUILDING, MAINTAINING VISUAL HARMONY AND AESTHETIC APPEAL.

4. AMENITY OF SURROUNDING PROPERTIES:
THE SIGN HAS BEEN DESIGNED TO ENHANCE, RATHER THAN DETRACT FROM, THE VISUAL AMENITY OF SURROUNDING PROPERTIES. IT INCORPORATES DESIGN ELEMENTS AND COLORS THAT ARE IN KEEPING WITH THE COMPANY BRANDING AND COMPLIMENT THE SELECTED DESIGN MATERIALS OF THE BUILDING, ENSURING IT DOES NOT NEGATIVELY IMPACT NEIGHBORING PROPERTIES.

5. REPETITION OF MESSAGES OR INFORMATION:
THE CONTENT OF THE SIGN MINIMIZES VISUAL CLUTTER AND ENSURES THAT THE SIGN DELIVERS ITS MESSAGE EFFECTIVELY WITHOUT REDUNDANCY.

6. NUMBER AND DENSITY OF SIGNS:
THIS IS THE ONLY BRANDING SIGN PLANNED ON THE SITE AND WIIL BE WALL MOUNTED. CURRENTLY NO ADJACENT PROPERTIES EXIST HOWEVER AS PRECINCT REVIEW HAS BEEN CONDUCTED AND THE PROPOSED SIGN IS IN LINE WITH OTHER DEVELOPMENTS. THE NEW SIGN HAS BEEN DESIGNED AND POSITIONED TO AVOID CONTRIBUTING TO SIGN DENSITY OR OVERCROWDING, ENSURING A BALANCED AND VISUALLY APPEALING STREETSCAPE.

7. IMPACT ON SAFETY AND EFFICIENCY:
THE SIGN PLACEMENT AND DESIGN HAVE BEEN EVALUATED TO ENSURE THEY DO NOT INTERFERE WITH THE SAFE AND EFFICIENT MOVEMENT OF VEHICLES AND PEDESTRIANS. THE SIGN'S LOCATION DOES NOT OBSTRUCT SIGHTLINES, TRAFFIC SIGNALS, OR PEDESTRIAN PATHWAYS, THEREBY MAINTAINING SAFETY AND ACCESSIBILITY FOR ALL USERS.



D A004 SECTION D
1 : 100

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PROJECT: PROPOSED WAREHOUSE

0 1 2 3 4 5 6 7 8 9 10m

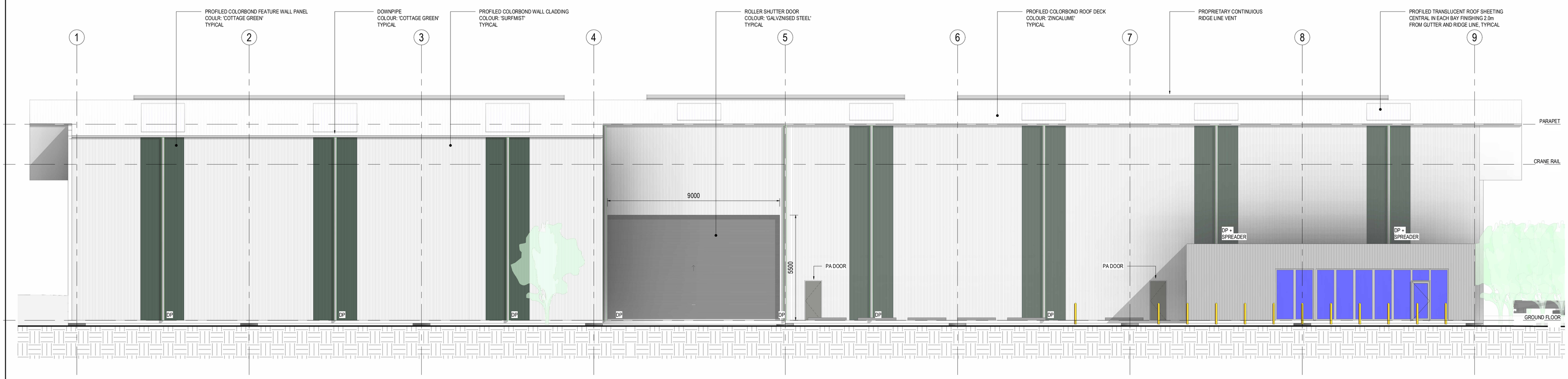
ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER TAS 7030

CLIENT: SOUTHERN STEEL PROPERTIES

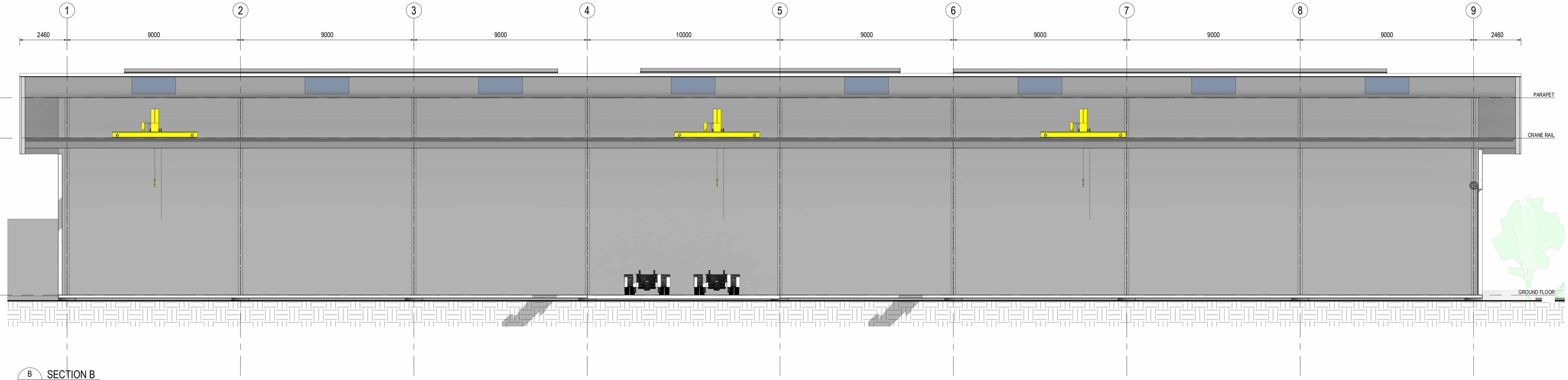
SHEET: ELEVATION / SECTION 01

SCALE: 1 : 100 | TOTAL SHEETS: 7 | SIZE: A1

PROJECT No: 23E99-98 | SHEET: A005 | REV: D



02 A004 ELEVATION 02
1 : 100



B A004 SECTION B
1 : 100

REV	ISSUE	DATE	APPROVAL	
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PROJECT: PROPOSED WAREHOUSE

0 1 2 3 4 5 6 7 8 9 10m

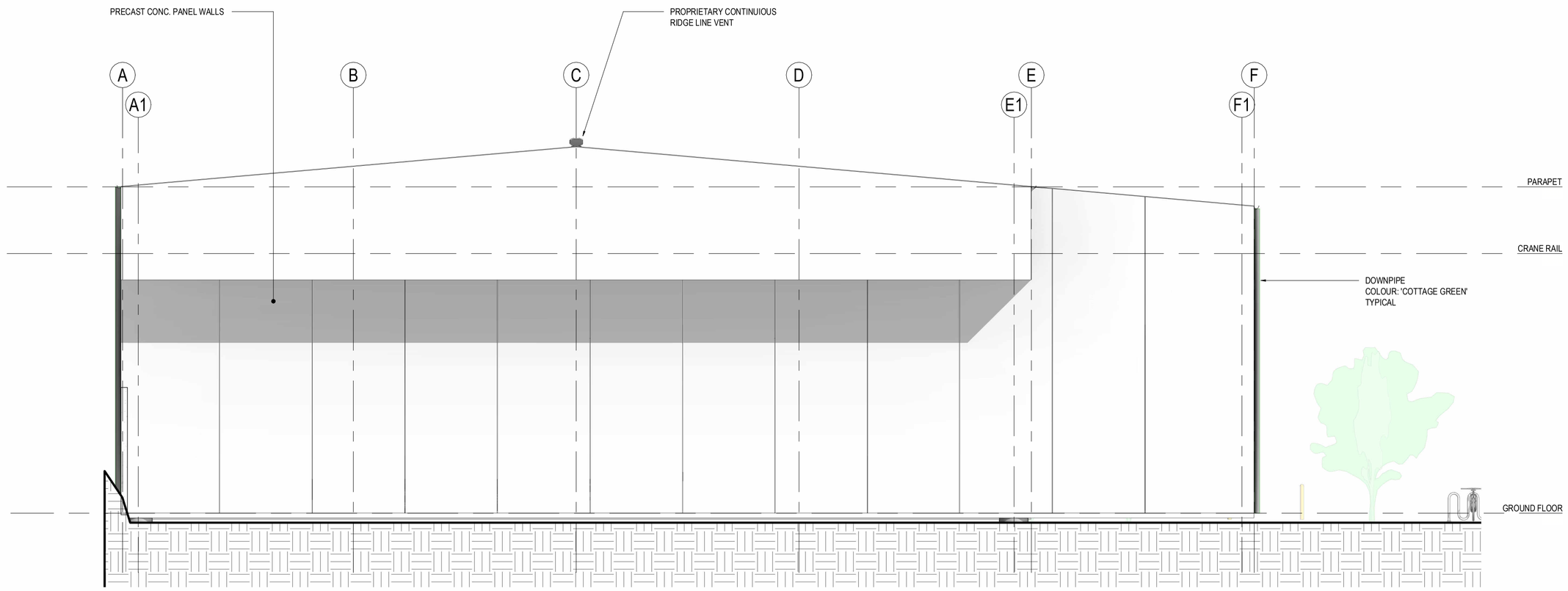
ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER TAS 7030

CLIENT: SOUTHERN STEEL PROPERTIES

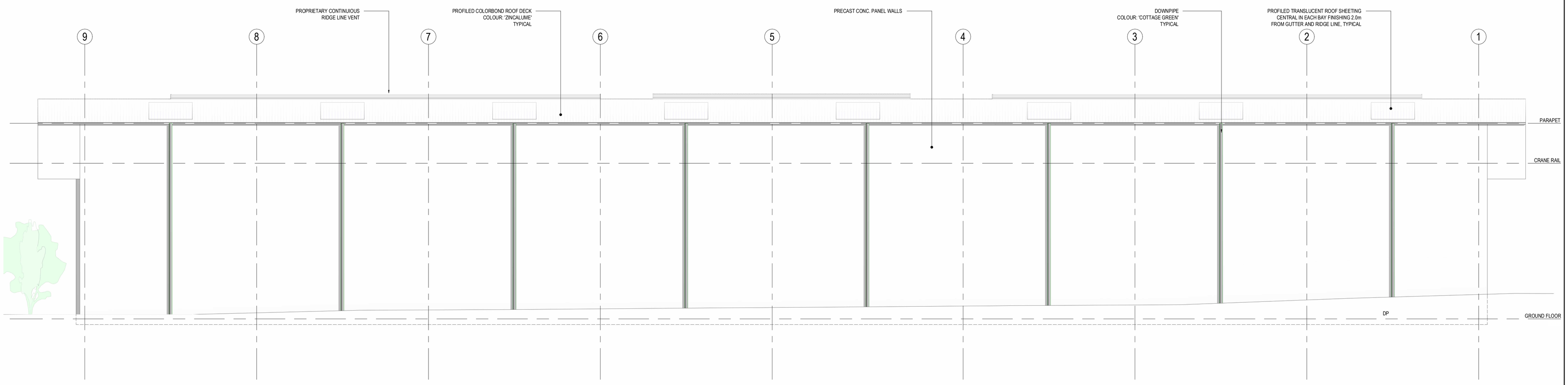
SHEET: ELEVATION / SECTION 02

SCALE: 1 : 100 | TOTAL SHEETS: 7 | SIZE: A1

PROJECT No: 23E99-98 | SHEET: A006 | REV: D



03 A004 ELEVATION 03
1 : 100



04 A004 ELEVATION 04
1 : 100

REV	ISSUE	DATE	APPROVAL	
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PROJECT: PROPOSED WAREHOUSE

0 1 2 3 4 5 6 7 8 9 10m

ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER TAS 7030

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: ELEVATION / SECTION 03

SCALE: 1 : 100 | TOTAL SHEETS: 7 | SIZE: A1

PROJECT No: 23E99-98 | SHEET: A007 | REV: D

CIVIL DRAWINGS
SOUTHERN STEEL WAREHOUSE
LOT 1 LUKAARLIA DRIVE
BRIDGEWATER

C001	COVER	C	1/08/2024
C002	ENGINEERING NOTES	C	1/08/2024
C101	SITE PLAN	C	1/08/2024
C102	STORMWATER PLAN	C	1/08/2024
C103	DRIVEWAY AND STORMWATER PLAN - SHEET 1	C	1/08/2024
C104	DRIVEWAY AND STORMWATER PLAN - SHEET 2	C	1/08/2024
C105	DRIVEWAY AND STORMWATER PLAN - SHEET 3	C	1/08/2024
C106	DRIVEWAY AND STORMWATER PLAN - SHEET 4	C	1/08/2024
C107	DRIVEWAY AND STORMWATER PLAN - SHEET 5	C	1/08/2024
C108	SEWER AND WATER PLAN	C	1/08/2024
C109	JOINTING PLAN	C	1/08/2024
C110	TURNPATH PLAN - SHEET 1	C	1/08/2024
C111	TURNPATH PLAN - SHEET 2	C	1/08/2024
C201	LONG SECTIONS	C	1/08/2024
C301	STORMWATER LONG SECTIONS	C	1/08/2024
C302	STORMWATER LONG SECTIONS	C	1/08/2024
C303	STORMWATER LONG SECTIONS	C	1/08/2024
C401	CONSTRUCTION DETAILS	C	1/08/2024

REV	ISSUE	DATE	APPROVAL	
			DRAWN:	MN
			CHECKED:	NM
C	PRELIMINARY - NOT FOR CONSTRUCTION - RFI RESPONSE	1/08/2024	DESIGN:	MN
B	PRELIMINARY - NOT FOR CONSTRUCTION	22/04/2024	CHECKED:	MG
A	PRELIMINARY - NOT FOR CONSTRUCTION	15/12/2023	VERIFIED:	MG

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PROJECT: SOUTHERN STEEL WAREHOUSE

ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: COVER

SCALE:

TOTAL SHEETS: 18

SIZE: A1

PROJECT No: 23 E 99 - 98

SHEET: C001

REV: C

GENERAL NOTES:

1. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE ARCHITECTURAL, HYDRAULIC AND STRUCTURAL DRAWINGS AND SPECIFICATIONS. STANDARDS REFERENCED ARE TO BE THE MOST CURRENT VERSION.
2. THESE DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION UNLESS ENDORSED 'FOR CONSTRUCTION' AND AUTHORISED FOR ISSUE ACCORDINGLY.
3. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH IPWEA/LGAT STANDARD DRAWINGS AND SPECIFICATIONS, AUSTRALIAN STANDARDS, (WSAA SEWERAGE CODE OF AUSTRALIA & WATER SUPPLY CODE OF AUSTRALIA) AND TO THE SATISFACTION OF COUNCIL'S DEVELOPMENT ENGINEER.
4. IPWEA/LGAT STANDARD DRAWINGS TO BE READ IN CONJUNCTION WITH COUNCIL EXCLUSION SHEETS TSD-E01-v1 & TSD-E02-v1.
5. ALL WORKS ARE TO BE MAINTAINED IN A SAFE CONDITION.
6. CONFIRM ALL LEVELS ON SITE PRIOR TO THE COMMENCEMENT OF WORKS
7. CONTRACTOR TO OBTAIN APPROVALS, SERVICE CLEARANCES AND COORDINATE WORK WITH ALL RELEVANT AUTHORITIES PRIOR TO COMMENCEMENT.
8. A "START OF WORKS NOTICE" MUST BE OBTAINED FROM COUNCIL PRIOR TO ANY WORKS COMMENCING.
9. SURVEY DATA UNDERTAKEN AND PROVIDED BY PDA SURVEYORS.
10. ARCHITECTURAL UNIT AND SITE LAYOUT UNDERTAKEN AND PROVIDED BY ALDANMARK.
11. FLOOR LEVELS SET BY ARCHITECT. DRIVEWAY GRADING BASED ON THESE

WORKPLACE HEALTH & SAFETY NOTES:

BEFORE THE CONTRACTOR COMMENCES WORK THE CONTRACTOR SHALL UNDERTAKE A SITE SPECIFIC PROJECT PRE-START HAZARD ANALYSIS / JOB SAFETY ANALYSIS (JSA) WHICH SHALL IDENTIFY IN DOCUMENTED FORM;

- THE TYPE OF WORK.
- HAZARDS AND RISKS TO HEALTH AND SAFETY.
- THE CONTROLS TO BE APPLIED IN ORDER ELIMINATE OR MINIMIZE THE RISK POSED BY THE IDENTIFIED HAZARDS.
- THE MANNER IN WHICH THE RISK CONTROL MEASURES ARE TO BE IMPLEMENTED.

THESE ARE TO BE SUBMITTED TO THE SUPERINTENDENT AND/OR OTHER RELEVANT WORKPLACE SAFETY OFFICERS.

FOR THIS PROJECT; POSSIBLE HAZARDS INCLUDE (BUT ARE NOT LIMITED TO):

- EXCAVATION OF ANY TYPE & DEPTHS
- CONTAMINATED SOILS
- CONSTRUCTION IN GROUND WITH HIGH WATER TABLE
- FELLING / LOPPING &/OR REMOVAL OF EXISTING TREES/VEGETATION
- UNDERGROUND STRUCTURES (MANHOLES / SUMPS / ETC)
- CONFINED SPACES
- OVERHEAD POWER LINES
- UNDERGROUND STORMWATER, WATER AND SEWER PIPES
- TELECOMMUNICATION CABLES - BOTH UNDERGROUND & OVERHEAD
- ELECTRICAL/POWER CABLES - BOTH UNDERGROUND & OVERHEAD
- WORKING AT HEIGHTS
- WORKING WITH ASBESTOS CONTAINING MATERIALS
- TRAFFIC MANAGEMENT

EARTHWORKS & DRIVEWAY NOTES:

1. ALL EARTHWORKS SHALL BE IN ACCORDANCE WITH AS3798 "GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS".
2. ALL VEGETATION AND TOPSOIL SHALL BE STRIPPED AND GRUBBED IN THE AREA OF PROPOSED WORKS.
3. NEW OR MODIFIED DRIVEWAY CROSSINGS SHALL BE IN ACCORDANCE WITH IPWEA STANDARD DRAWING TSD-R09-v2 AND MUST BE INSPECTED AND APPROVED BY COUNCIL.
4. EXCAVATED AND IMPORTED MATERIAL USED AS FILL IS TO BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
5. FILL MATERIAL SHALL BE WELL GRADED AND FREE OF BOULDERS OR COBBLES EXCEEDING 150mm IN DIAMETER UNLESS APPROVED TO BE OTHERWISE.
6. FILL REQUIRED TO SUPPORT DRIVEWAYS INCLUDING FILL IN EMBANKMENTS THAT SUPPORT DRIVEWAYS SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
   - TOP SOIL AND ORGANIC MATTER SHALL BE STRIPPED TO A MINIMUM OF 100mm.
   - THE SUB GRADE SHALL HAVE A MINIMUM BEARING CAPACITY OF 100 kPa.
   - FILL IN EMBANKMENTS SHALL BE KEYED 150mm INTO NATURAL GROUND.
   - THE FILL SHALL BE COMPACTED IN HORIZONTAL LAYERS OF NOT MORE THAN 200mm.
   - EACH LAYER SHALL BE COMPACTED TO A MINIMUM DENSITY RATIO OF 95% STD, IT IS THE BUILDERS RESPONSIBILITY TO ENSURE THAT THIS IS ACHIEVED.
7. WHERE THE ABOVE REQUIREMENTS CANNOT BE ACHIEVED THE ENGINEER SHALL BE CONSULTED AND THE FORMATION SHALL BE PROOF ROLLED (UNDER SUPERVISION OF THE ENGINEER) TO CONFIRM AN APPROVED BASE.
8. CONCRETE PAVEMENTS SHALL BE CURED FOR A MINIMUM OF 3 DAYS USING A CURRENT BEST PRACTICE METHOD.
9. SAWN CONTROL JOINTS SHALL BE CONSTRUCTED AS SOON AS POSSIBLE WITHOUT RAVELLING THE JOINT, GENERALLY THIS SHALL BE WITHIN 24 HOURS.
10. BATTERS SHALL BE SET TO A SAFE ANGLE OF REPOSE IN ACCORDANCE WITH THE BCA VOL 2 AS INDICATED BELOW:

SOIL TYPE (* REFER BCA 3.2.4)		EMBANKMENT SLOPES H:L	
		COMPACTED FILL	CUT
STABLE ROCK (A*)		2:3	8:1
SAND (A*)		1:2	1:2
SILT (P*)		1:4	1:4
CLAY	FIRM CLAY	1:2	1:1
	SOFT CLAY	NOT SUITABLE	2:3
SOFT SOILS (P)		NOT SUITABLE	NOT SUITABLE

NOTE: WHERE SITE CONDITIONS ARE UNSUITABLE FOR A BATTERED BANK CONSULT THE ENGINEER FOR A SUITABLE RETAINING WALL DESIGN. EMBANKMENTS THAT ARE TO BE LEFT EXPOSED MUST BE STABILISED BY VEGETATION OR SIMILAR WORKS TO PREVENT SOIL EROSION.

DRAINAGE AND SERVICES NOTES:

1. ALL WORKS ASSOCIATED WITH PUBLIC STORMWATER INFRASTRUCTURE IS TO BE CARRIED OUT IN ACCORDANCE WITH IPWEA (TAS) LGAT STANDARD DRAWINGS AND SPECIFICATION AND TO THE SATISFACTION OF COUNCIL.
2. ALL WORKS ASSOCIATED WITH PUBLIC SEWER AND WATER ARE TO BE CARRIED OUT IN ACCORDANCE WITH THE WATER SUPPLY CODE OF AUSTRALIA WSA 03 -2011-3.1 VERSION 3.1 MRWA EDITION V2.0 AND SEWERAGE CODE OF AUSTRALIA MELBOURNE RETAIL WATER AGENCIES CODE WSA 02--2014-3.1 MRWA VERSION 2 AND TASWATER'S SUPPLEMENTS TO THESE CODES AND TO THE SATISFACTION OF TASWATER.
3. ALL CONNECTIONS TO EXISTING MAINS TO BE CARRIED OUT BY THE REGULATING AUTHORITY AT COST TO BUILDER UNLESS APPROVED OTHERWISE.
4. HYDRAULIC LAYOUT TO BE COORDINATED WITH OTHER SERVICES. HYDRAULIC LAYOUT AS SHOWN IS NOTIONAL, LAYOUT TO BE CONFIRMED ON SITE.
5. ALL EXISTING SERVICES TO BE LOCATED ON SITE PRIOR TO THE COMMENCEMENT OF WORKS.
6. GENERAL MATERIALS, INSTALLATION & TESTING SHALL COMPLY WITH AS3500 AND THE NCC VOLUME 3 (PCA)
7. INSTALL ALL SUB-SOIL DRAINS TO THE REQUIREMENTS OF AS3500, PART 3.1.3 OF THE NCC 2019 - VOLUME 2 AND PART FP2 OF THE NCC 2019 - VOLUME 3.
8. PAVEMENT AND HARDSTAND AREAS SHALL FALL AT A MINIMUM OF 1% (1:100) TOWARD AN APPROVED DISCHARGE POINT.
9. ALL PIPE WORK UNDER TRAFFICABLE AREAS, INCLUDING DRIVEWAYS, IS TO BE BACKFILLED WITH COMPACTED FCR.
10. DRAINAGE PIPES TO BE MIN. uPVC CLASS SN4, PIPES UNDER TRAFFICABLE AREAS TO BE SN8 U.N.O.
11. MINIMUM GRADES FOR PRIVATE DRAINAGE PIPES SHALL BE 1% FOR STORMWATER AND 1.67% FOR SEWER U.N.O.
12. MINIMUM COVER FOR PRIVATE DRAINAGE PIPES SHALL BE 300mm FOR STORMWATER AND 500mm FOR SEWER U.N.O.
13. TASWATER SEWER MAINS TO BE MINIMUM DWV CLASS SN8 DN150 RRJ WITH MINIMUM CLASS SN10 DN100 PROPERTY CONNECTIONS.
14. STORMWATER MAINS TO BE MINIMUM DWV CLASS SN8 DN225 RRJ OR APPROVED EQUIVALENT UNLESS NOTED OTHERWISE.
15. WATER PIPES TO BE MIN. DN20 POLY PN16 AND FITTINGS TO BE MIN. CLASS 16 U.N.O.
16. WATER CONNECTIONS SHALL BE PROVIDED WITH METERAGE AND BACKFLOW PREVENTION AS PER TASWATER STANDARD DRAWING TWS-W-0002.
17. ALL PIPEWORK TO BE INSPECTED BY COUNCIL PRIOR TO BACKFILL.
18. PIT DIMENSIONS SHOWN HAVE BEEN DESIGNED BY PIT CAPACITY TABLES. THESE PITS MAY NEED TO BE INCREASED IN MINIMUM INTERNAL SIZE DUE TO THE DEPTH AS PER AS3500.3 AS PER TABLE BELOW WHICH IS THE CONTRACTORS RESPONSIBILITY TO ENSURE COMPLIANCE TO AS3500:

DEPTH TO INVERT OF OUTLET	MINIMUM INTERNAL DIMENSIONS mm	
	WIDTH	LENGTH
≤600	450	450
>600 ≤900	600	600
>900 ≤1200	600	900
>1200	900	900

REV	ISSUE	DATE	APPROVAL	
			DRAWN:	MN
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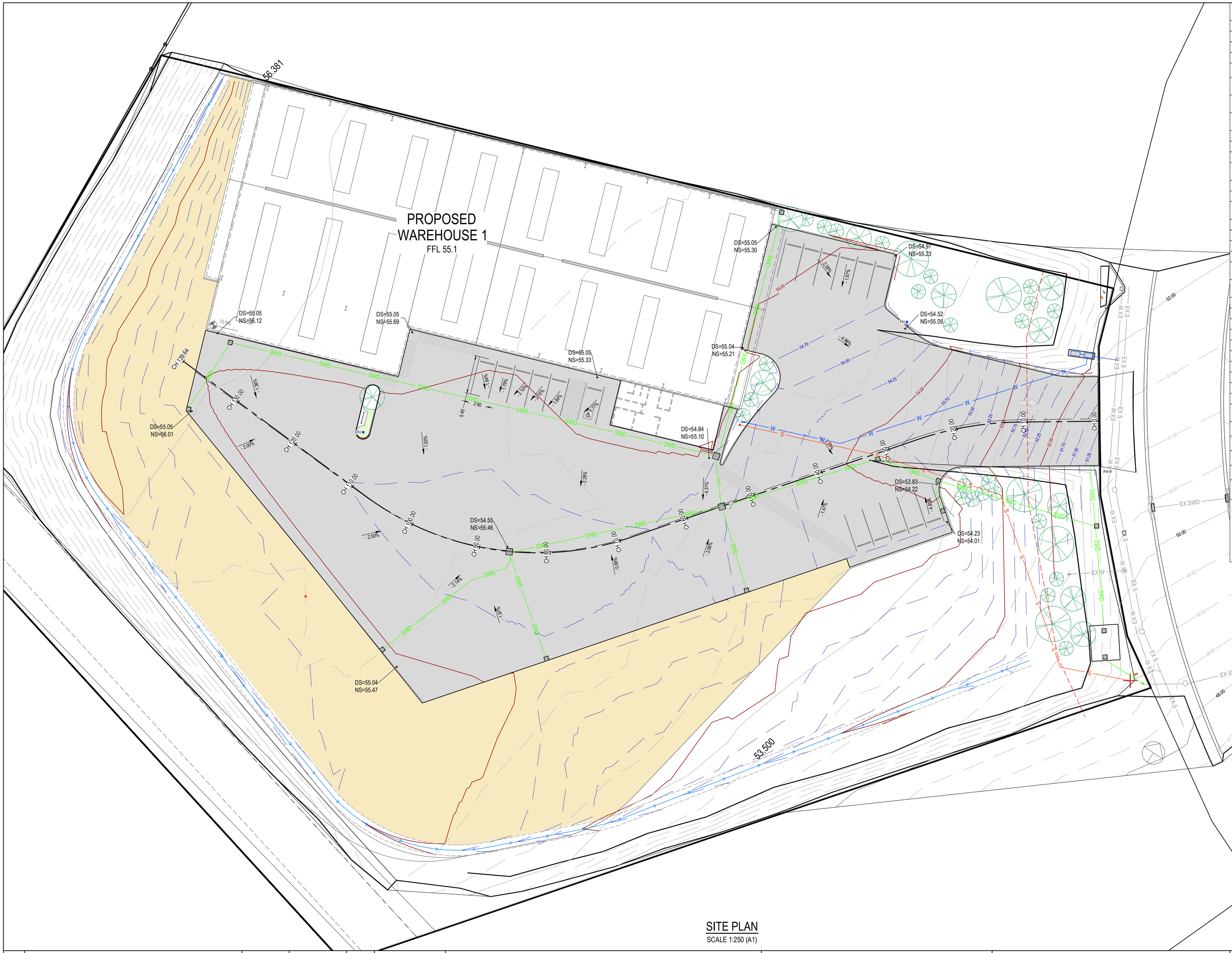
PROJECT: SOUTHERN STEEL WAREHOUSE
ADDRESS: LOT 1 LUKAARLIA DRIVE BRIDGEWATER
CLIENT: SOUTHERN STEEL PROPERTIES
SHEET: ENGINEERING NOTES
SCALE:
TOTAL SHEETS: 18
SIZE: A1
PROJECT No: 23 E 99 - 98
SHEET: C002
REV: C



STORMWATER LEGEND

SWD	PVC STORMWATER DN150 SN8 U.N.O.
SSD	SLOTTED PVC AG DRAIN
	TABLE DRAIN
EX SWD	EXISTING STORMWATER
	STORMWATER MANHOLE
	SIDE ENTRY PIT TYPE 3, AS PER TSD-SW09-v3
	SIDE ENTRY PIT TYPE 5, AS PER TSD-SW12-v3
	SIDE ENTRY PIT TYPE 6, AS PER TSD-SW16-v3
	INSPECTION OPENING
	GRATED PIT
	GRATED TRENCH WITH PIT

SEWER LEGEND

S	uPVC SEWER DN100 SN6 U.N.O.
EX S	EXISTING SEWER
	SEWER MAINTENANCE HOLE 1050Ø AS PER MRWA-S-307
	MAINTENANCE SHAFT
	SEWER FIXTURE
IO	INSPECTION OPENING
IOS	INSPECTION OPENING TO SURFACE
ORG	OVERFLOW RELIEF GULLY (DN100) WITH TAP OVER

SITE & EXISTING SERVICES LEGEND

26.0	DESIGN SURFACE CONTOUR (MAJ/MIN)
26.0	EXISTING SURFACE CONTOUR (MAJ/MIN)
	BOUNDARY
	EASEMENT
	EXISTING FENCE
OH	EXISTING OVERHEAD POWER
E	EXISTING UNDERGROUND POWER
OP	EXISTING TELSTRA
FOC	EXISTING NBN
G	EXISTING GAS

PAVEMENT LEGEND

	ASPHALT
	CONCRETE DRIVEWAY
	CONCRETE FOOTPATH
	GRAVEL

NOTES

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SITE PLAN

SCALE 1:250 (A1)

REV	ISSUE	DATE	APPROVAL	
			DRAWN:	MN
			CHECKED:	NM
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0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

PROJECT: SOUTHERN STEEL WAREHOUSE

ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: SITE PLAN

SCALE: 1:250 | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C101 | REV: C

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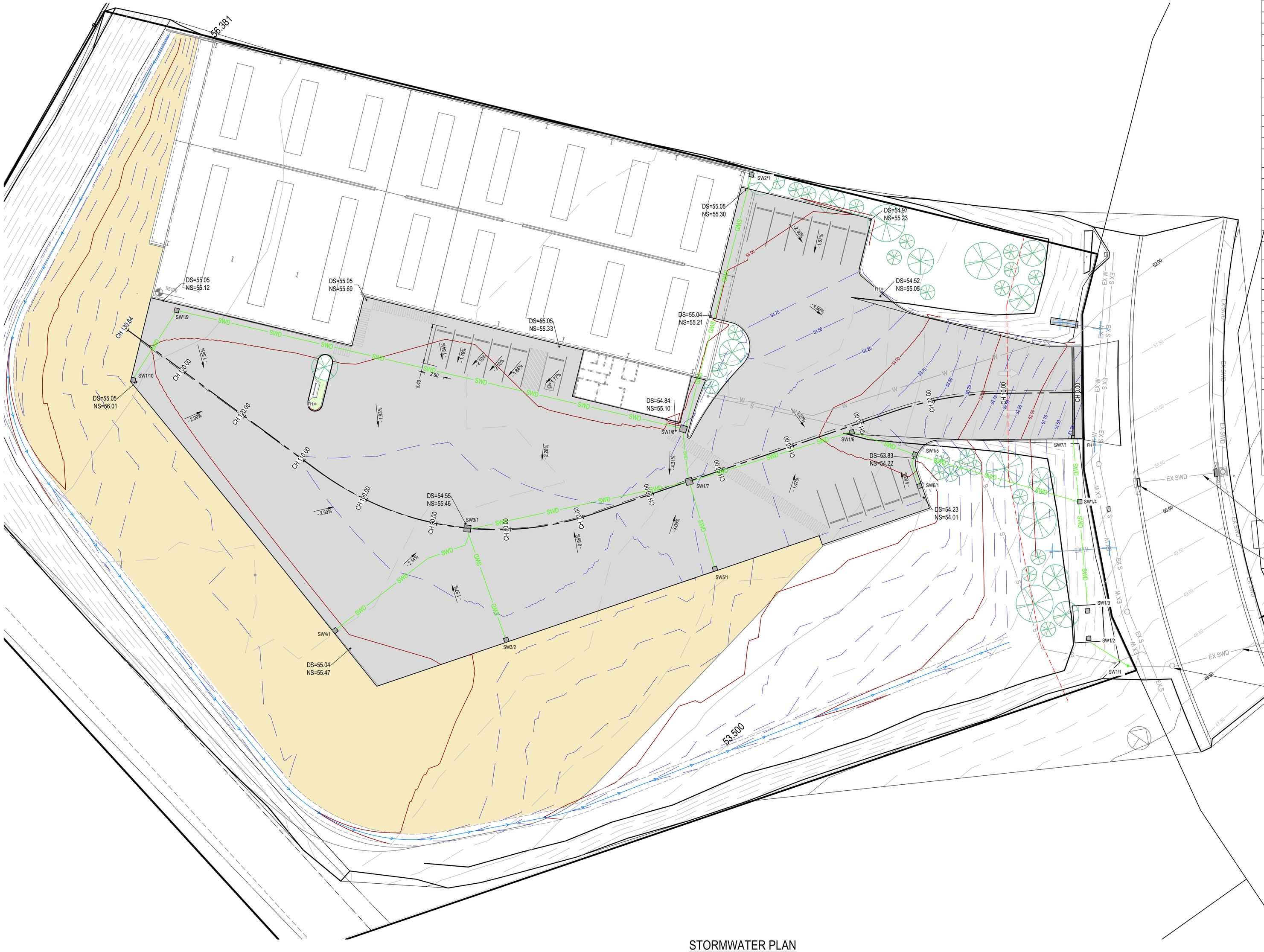

STORMWATER LEGEND

SWD	PVC STORMWATER DN150 SN8 U.N.O.
SSD	SLOTTED PVC AG DRAIN
	TABLE DRAIN
EX SWD	EXISTING STORMWATER
	STORMWATER MANHOLE
	SIDE ENTRY PIT TYPE 3, AS PER TSD-SW09-v3
	SIDE ENTRY PIT TYPE 5, AS PER TSD-SW12-v3
	SIDE ENTRY PIT TYPE 6, AS PER TSD-SW16-v3
	INSPECTION OPENING
	GRATED PIT
	GRATED TRENCH WITH PIT

SEWER LEGEND

S	uPVC SEWER DN100 SN6 U.N.O.
EX S	EXISTING SEWER
	SEWER MAINTENANCE HOLE 1050Ø AS PER MRWA-S-307
	MAINTENANCE SHAFT
IO	INSPECTION OPENING
IOS	INSPECTION OPENING TO SURFACE
ORG	OVERFLOW RELIEF GULLY (DN100) WITH TAP OVER

SITE & EXISTING SERVICES LEGEND

26.0	DESIGN SURFACE CONTOUR (MAJ/MIN)
26.0	EXISTING SURFACE CONTOUR (MAJ/MIN)
	BOUNDARY
	EASEMENT
	EXISTING FENCE
OH	EXISTING OVERHEAD POWER
E	EXISTING UNDERGROUND POWER
OP	EXISTING TELSTRA
FOC	EXISTING NBN
G	EXISTING GAS

NOTES

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STORMWATER PLAN

SCALE 1:250 (A1)

REV	ISSUE	DATE	APPROVAL
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0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

PROJECT: SOUTHERN STEEL WAREHOUSE

ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: STORMWATER PLAN

SCALE: 1:250 | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C102 | REV: C

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DRIVEWAY AND STORMWATER PLAN - SHEET 1

SCALE 1:100 (A1)

STORMWATER LEGEND

SWD	PVC STORMWATER DN150 SN8 U.N.O.
SSD	SLOTTED PVC AG DRAIN
	TABLE DRAIN
EX SWD	EXISTING STORMWATER
	STORMWATER MANHOLE
	SIDE ENTRY PIT TYPE 3, AS PER TSD-SW09-v3
	SIDE ENTRY PIT TYPE 5, AS PER TSD-SW12-v3
	SIDE ENTRY PIT TYPE 6, AS PER TSD-SW16-v3
	INSPECTION OPENING
	GRATED PIT
	GRATED TRENCH WITH PIT

SEWER LEGEND

S	uPVC SEWER DN100 SN6 U.N.O.
EX S	EXISTING SEWER
	SEWER MAINTENANCE HOLE 1050Ø AS PER MRWA-S-307
	MAINTENANCE SHAFT
IO	INSPECTION OPENING
IOS	INSPECTION OPENING TO SURFACE
ORG	OVERFLOW RELIEF GULLY (DN100) WITH TAP OVER

SITE & EXISTING SERVICES LEGEND

26.0	DESIGN SURFACE CONTOUR (MAJ/MIN)
26.0	EXISTING SURFACE CONTOUR (MAJ/MIN)
	BOUNDARY
	EASEMENT
	EXISTING FENCE
OH	EXISTING OVERHEAD POWER
E	EXISTING UNDERGROUND POWER
OP	EXISTING TELSTRA
FOC	EXISTING NBN
G	EXISTING GAS

NOTES

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PROJECT: SOUTHERN STEEL WAREHOUSE

0 1 2 3 4 5 6 7 8 9 10m

ADDRESS: LOT 1 LUKAARLIA DRIVE BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: DRIVEWAY AND STORMWATER PLAN - SHEET 1

SCALE: 1:100 | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C103 | REV: C

DRIVEWAY AND STORMWATER PLAN - SHEET 2

SCALE 1:100 (A1)

STORMWATER LEGEND

SWD	PVC STORMWATER DN150 SN8 U.N.O.
SSD	SLOTTED PVC AG DRAIN
	TABLE DRAIN
EX SWD	EXISTING STORMWATER
	STORMWATER MANHOLE
	SIDE ENTRY PIT TYPE 3, AS PER TSD-SW09-v3
	SIDE ENTRY PIT TYPE 5, AS PER TSD-SW12-v3
	SIDE ENTRY PIT TYPE 6, AS PER TSD-SW16-v3
	INSPECTION OPENING
	GRATED PIT
	GRATED TRENCH WITH PIT

SEWER LEGEND

S	uPVC SEWER DN100 SN6 U.N.O.
EX S	EXISTING SEWER
	SEWER MAINTENANCE HOLE 1050Ø AS PER MRWA-S-307
	MAINTENANCE SHAFT
IO	INSPECTION OPENING
IOS	INSPECTION OPENING TO SURFACE
ORG	OVERFLOW RELIEF GULLY (DN100) WITH TAP OVER

SITE & EXISTING SERVICES LEGEND

26.0	DESIGN SURFACE CONTOUR (MAJ/MIN)
26.0	EXISTING SURFACE CONTOUR (MAJ/MIN)
	BOUNDARY
	EASEMENT
//	EXISTING FENCE
OH	EXISTING OVERHEAD POWER
E	EXISTING UNDERGROUND POWER
OP	EXISTING TELSTRA
FOC	EXISTING NBN
G	EXISTING GAS

NOTES

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www.aldanmark.com.au

PROJECT: SOUTHERN STEEL WAREHOUSE

ADDRESS: LOT 1 LUKAARLIA DRIVE BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: DRIVEWAY AND STORMWATER PLAN - SHEET 2

SCALE: 1:100 | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C104 | REV: C

STORMWATER LEGEND

SWD	PVC STORMWATER DN150 SN8 U.N.O.
SSD	SLOTTED PVC AG DRAIN
	TABLE DRAIN
EX SWD	EXISTING STORMWATER
	STORMWATER MANHOLE
	SIDE ENTRY PIT TYPE 3, AS PER TSD-SW09-v3
	SIDE ENTRY PIT TYPE 5, AS PER TSD-SW12-v3
	SIDE ENTRY PIT TYPE 6, AS PER TSD-SW16-v3
	INSPECTION OPENING
	GRATED PIT
	GRATED TRENCH WITH PIT

SEWER LEGEND

S	uPVC SEWER DN100 SN6 U.N.O.
EX S	EXISTING SEWER
	SEWER MAINTENANCE HOLE 1050Ø AS PER MRWA-S-307
	MAINTENANCE SHAFT
IO	INSPECTION OPENING
IOS	INSPECTION OPENING TO SURFACE
ORG	OVERFLOW RELIEF GULLY (DN100) WITH TAP OVER

SITE & EXISTING SERVICES LEGEND

26.0	DESIGN SURFACE CONTOUR (MAJ/MIN)
26.0	EXISTING SURFACE CONTOUR (MAJ/MIN)
	BOUNDARY
	EASEMENT
	EXISTING FENCE
OH	EXISTING OVERHEAD POWER
E	EXISTING UNDERGROUND POWER
OP	EXISTING TELSTRA
FOC	EXISTING NBN
G	EXISTING GAS

NOTES

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DRIVEWAY AND STORMWATER PLAN - SHEET 3

SCALE 1:100 (A1)

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PROJECT: SOUTHERN STEEL WAREHOUSE

0 1 2 3 4 5 6 7 8 9 10m

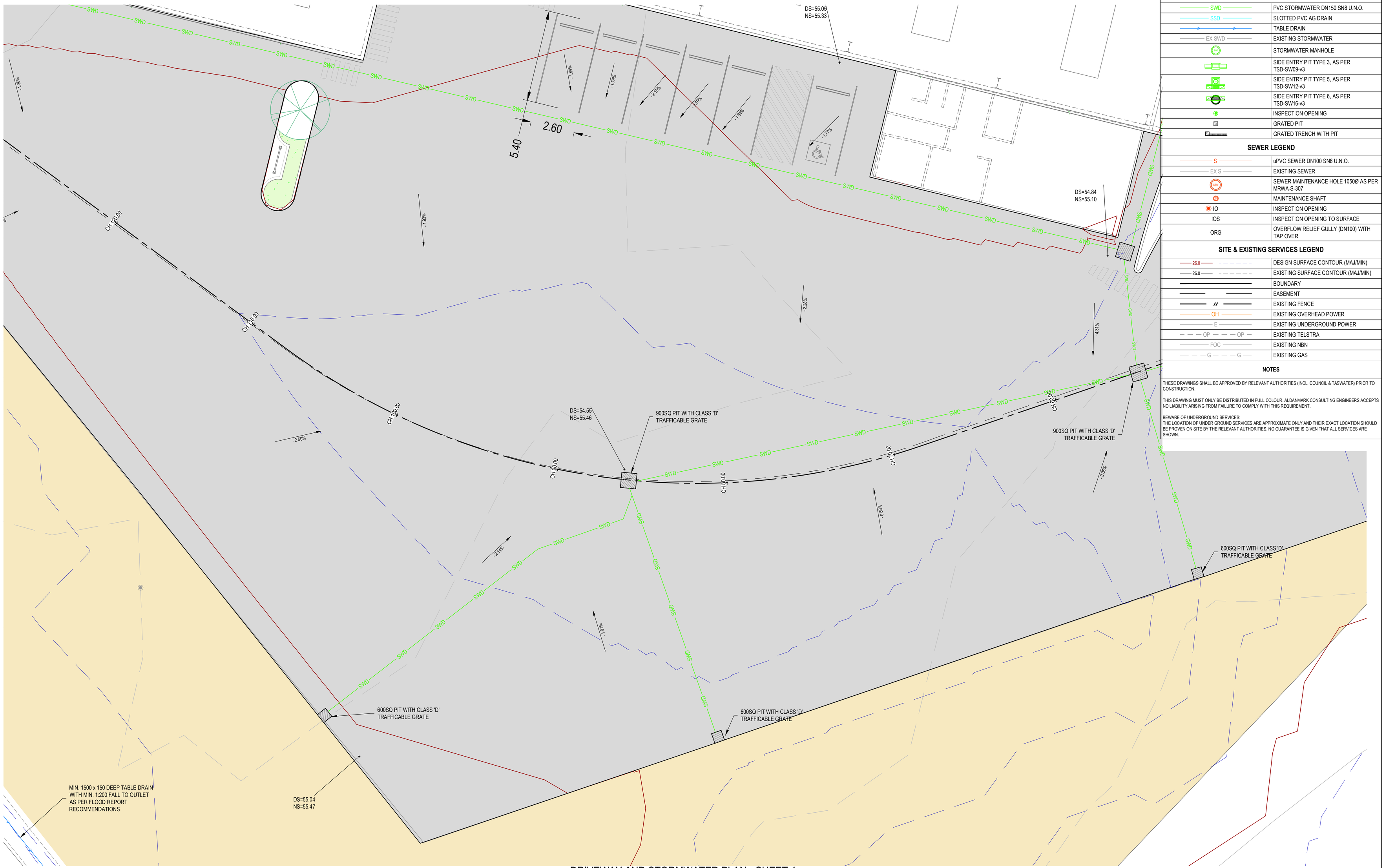
ADDRESS: LOT 1 LUKAARLIA DRIVE BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: DRIVEWAY AND STORMWATER PLAN - SHEET 3

SCALE: 1:100 | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C105 | REV: C



STORMWATER LEGEND

SWD	PVC STORMWATER DN150 SN8 U.N.O.
SSD	SLOTTED PVC AG DRAIN
	TABLE DRAIN
EX SWD	EXISTING STORMWATER
	STORMWATER MANHOLE
	SIDE ENTRY PIT TYPE 3, AS PER TSD-SW09-v3
	SIDE ENTRY PIT TYPE 5, AS PER TSD-SW12-v3
	SIDE ENTRY PIT TYPE 6, AS PER TSD-SW16-v3
	INSPECTION OPENING
	GRATED PIT
	GRATED TRENCH WITH PIT

SEWER LEGEND

S	uPVC SEWER DN100 SN6 U.N.O.
EX S	EXISTING SEWER
	SEWER MAINTENANCE HOLE 1050Ø AS PER MRWA-S-307
	MAINTENANCE SHAFT
IO	INSPECTION OPENING
IOS	INSPECTION OPENING TO SURFACE
ORG	OVERFLOW RELIEF GULLY (DN100) WITH TAP OVER

SITE & EXISTING SERVICES LEGEND

26.0	DESIGN SURFACE CONTOUR (MAJ/MIN)
26.0	EXISTING SURFACE CONTOUR (MAJ/MIN)
	BOUNDARY
	EASEMENT
	EXISTING FENCE
OH	EXISTING OVERHEAD POWER
E	EXISTING UNDERGROUND POWER
OP	EXISTING TELSTRA
FOC	EXISTING NBN
G	EXISTING GAS

NOTES

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DRIVEWAY AND STORMWATER PLAN - SHEET 4

SCALE 1:100 (A1)

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0 1 2 3 4 5 6 7 8 9 10m

PROJECT: SOUTHERN STEEL WAREHOUSE

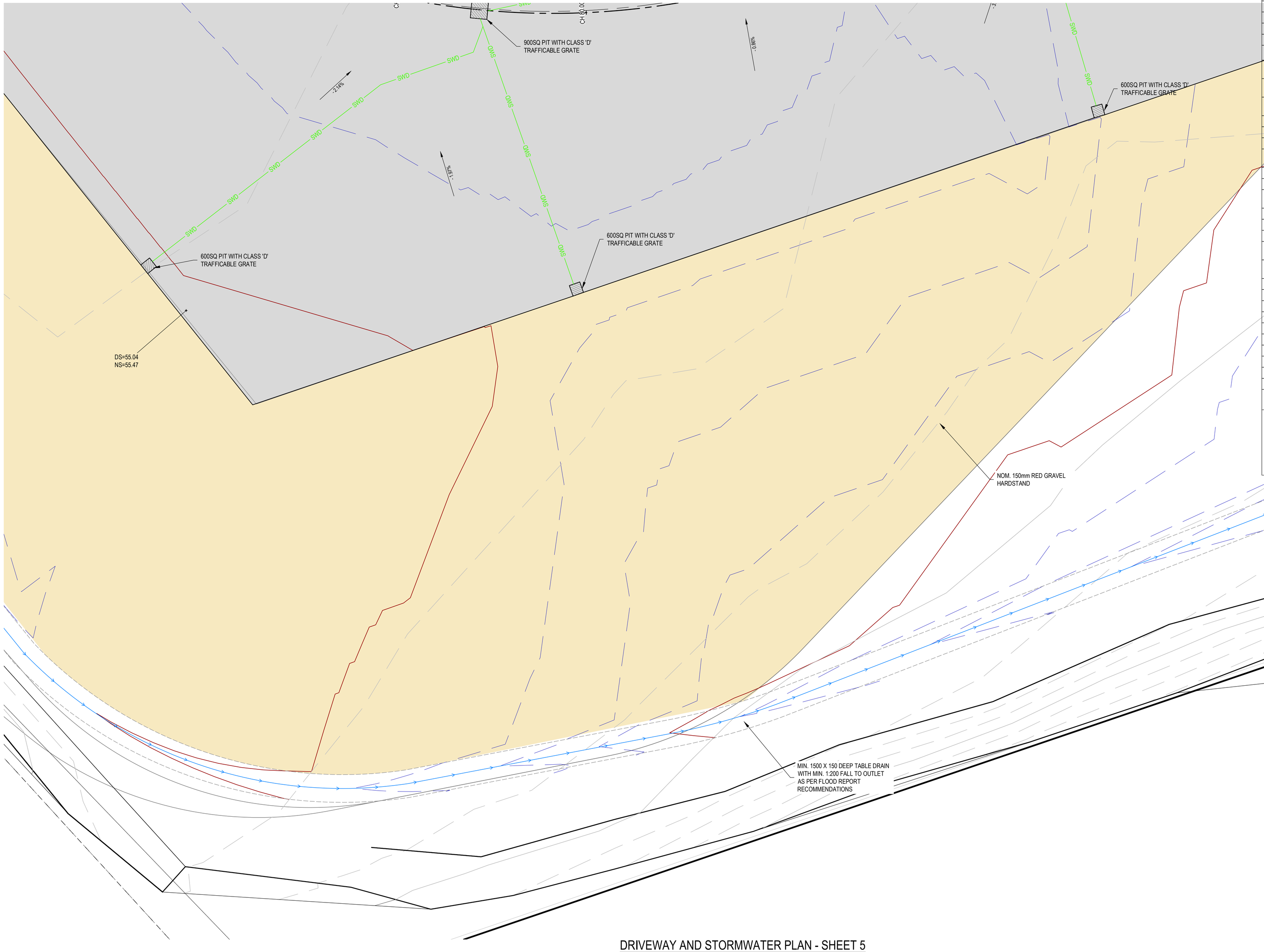
ADDRESS: LOT 1 LUKAARLIA DRIVE BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: DRIVEWAY AND STORMWATER PLAN - SHEET 4

SCALE: 1:100 | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C106 | REV: C



STORMWATER LEGEND

SWD	PVC STORMWATER DN150 SN8 U.N.O.
SSD	SLOTTED PVC AG DRAIN
	TABLE DRAIN
EX SWD	EXISTING STORMWATER
	STORMWATER MANHOLE
	SIDE ENTRY PIT TYPE 3, AS PER TSD-SW09-v3
	SIDE ENTRY PIT TYPE 5, AS PER TSD-SW12-v3
	SIDE ENTRY PIT TYPE 6, AS PER TSD-SW16-v3
	INSPECTION OPENING
	GRATED PIT
	GRATED TRENCH WITH PIT

SEWER LEGEND

S	uPVC SEWER DN100 SN6 U.N.O.
EX S	EXISTING SEWER
	SEWER MAINTENANCE HOLE 1050Ø AS PER MRWA-S-307
	MAINTENANCE SHAFT
IO	INSPECTION OPENING
IOS	INSPECTION OPENING TO SURFACE
ORG	OVERFLOW RELIEF GULLY (DN100) WITH TAP OVER

SITE & EXISTING SERVICES LEGEND

26.0	DESIGN SURFACE CONTOUR (MAJ/MIN)
26.0	EXISTING SURFACE CONTOUR (MAJ/MIN)
	BOUNDARY
	EASEMENT
	EXISTING FENCE
OH	EXISTING OVERHEAD POWER
E	EXISTING UNDERGROUND POWER
OP	EXISTING TELSTRA
FOC	EXISTING NBN
G	EXISTING GAS

NOTES

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DRIVEWAY AND STORMWATER PLAN - SHEET 5

SCALE 1:100 (A1)

DIAL BEFORE YOU DIG www.1100.com.au

REV	ISSUE	DATE	APPROVAL	
			DRAWN:	MN
			CHECKED:	NM
C	PRELIMINARY - NOT FOR CONSTRUCTION - RFI RESPONSE	1/08/2024	DESIGN:	MN
B	PRELIMINARY - NOT FOR CONSTRUCTION	22/04/2024	CHECKED:	MG
A	PRELIMINARY - NOT FOR CONSTRUCTION	15/12/2023	VERIFIED:	MG

ALDANMARK CONSULTING ENGINEERS
Lower Ground
199 Macquarie Street
Hobart TAS 7000
03 6234 8666
mail@aldanmark.com.au
www.aldanmark.com.au

PROJECT: SOUTHERN STEEL WAREHOUSE

0 1 2 3 4 5 6 7 8 9 10m

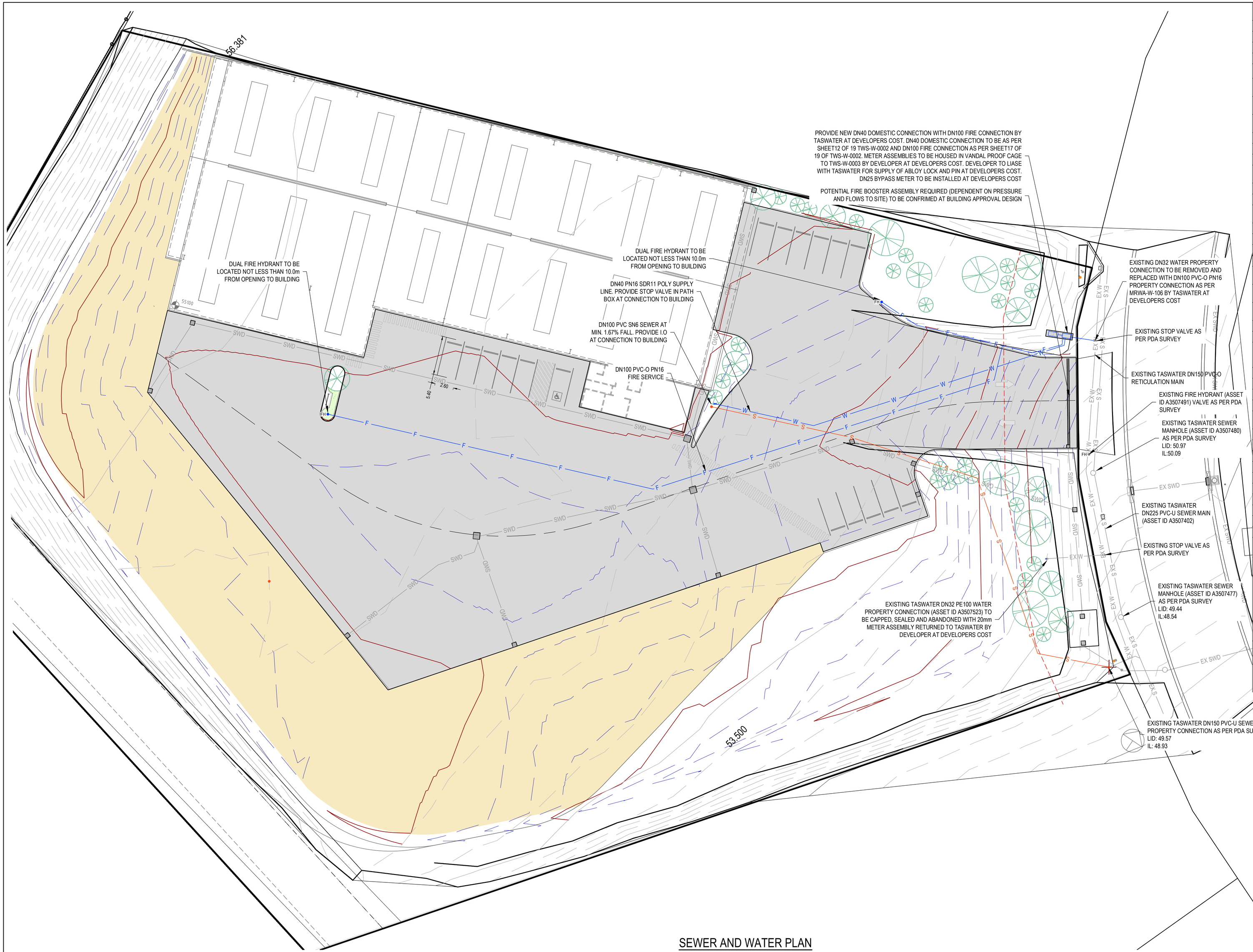
ADDRESS: LOT 1 LUKAARLIA DRIVE BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: DRIVEWAY AND STORMWATER PLAN - SHEET 5

SCALE: 1:100 | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C107 | REV: C



SEWER AND WATER PLAN

SCALE 1:250 (A1)

STORMWATER LEGEND

SWD	PVC STORMWATER DN150 SN8 U.N.O.
SSD	SLOTTED PVC AG DRAIN
	TABLE DRAIN
EX SWD	EXISTING STORMWATER
	STORMWATER MANHOLE
	SIDE ENTRY PIT TYPE 3, AS PER TSD-SW09-v3
	SIDE ENTRY PIT TYPE 5, AS PER TSD-SW12-v3
	SIDE ENTRY PIT TYPE 6, AS PER TSD-SW16-v3
	INSPECTION OPENING
	GRATED PIT
	GRATED TRENCH WITH PIT

SEWER LEGEND

S	uPVC SEWER DN100 SN6 U.N.O.
EX S	EXISTING SEWER
	SEWER MAINTENANCE HOLE 1050Ø AS PER MRWA-S-307
	MAINTENANCE SHAFT
	SEWER FIXTURE
IO	INSPECTION OPENING
IOS	INSPECTION OPENING TO SURFACE
ORG	OVERFLOW RELIEF GULLY (DN100) WITH TAP OVER

WATER SERVICES LEGEND

W	DN150 O-PVC PN16 WATER MAIN OR APPROVED EQUIVALENT UNO
W	HDPE WATER
EX W	EXISTING WATER MAIN
W	25OD POLY (20ID) CONNECTION WITH 20mm WATER METER INCL. OF BACKFLOW PREVENTION AS PER TWS-W-0002
W	DN100 CONDUIT TO ROAD CROSSING
	CHECK VALVE
SV	WATER VALVE
FH	HYDRANT

SITE & EXISTING SERVICES LEGEND

26.0	DESIGN SURFACE CONTOUR (MAJ/MIN)
26.0	EXISTING SURFACE CONTOUR (MAJ/MIN)
	BOUNDARY
	EASEMENT
	EXISTING FENCE
OH	EXISTING OVERHEAD POWER
E	EXISTING UNDERGROUND POWER
OP	EXISTING TELSTRA
FOC	EXISTING NBN
G	EXISTING GAS

NOTES

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WATER & SEWER NOTES

ALL WORKS ARE TO BE IN ACCORDANCE WITH THE WATER SUPPLY CODE OF AUSTRALIA WSA 03 - 2011-3.1 VERSION 3.1 MRWA EDITION V2.0 AND SEWERAGE CODE OF AUSTRALIA MELBOURNE RETAIL WATER AGENCIES CODE WSA 02 - 2014-3.1 MRWA VERSION 2 AND TASWATER'S SUPPLEMENTS TO THESE CODES

WATER METER ASSEMBLY TO BE HOUSED IN VANDAL PROOF CAGE AS PER TWS-W-0003. DEVELOPER TO LIAISE WITH TASWATER FOR SUPPLY OF ABLOY LOCK AND PIN AT DEVELOPERS COST

DIAL BEFORE YOU DIG www.1100.com.au

REV	ISSUE	DATE	APPROVAL	
			DRAWN:	MN
			CHECKED:	NM
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0 1 2 3 4 5 6 7 8 9 10m

PROJECT: SOUTHERN STEEL WAREHOUSE

ADDRESS: LOT 1 LUKAARLIA DRIVE BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: SEWER AND WATER PLAN

SCALE: 1:250 | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C108 | REV: C

JOINTING LEGEND

SC SC	SAWCUT JOINT
EJ EJ	EXPANSION JOINT
I	ISOLATION JOINT
CJ CJ	CONSTRUCTION JOINT
	REINFORCEMENT BAR

NOTES

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JOINTING PLAN

SCALE 1:250 (A1)

REV	ISSUE	DATE	APPROVAL	
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			CHECKED:	NM
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0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

PROJECT: SOUTHERN STEEL WAREHOUSE

ADDRESS: LOT 1 LUKAARLIA DRIVE BRIDGEWATER

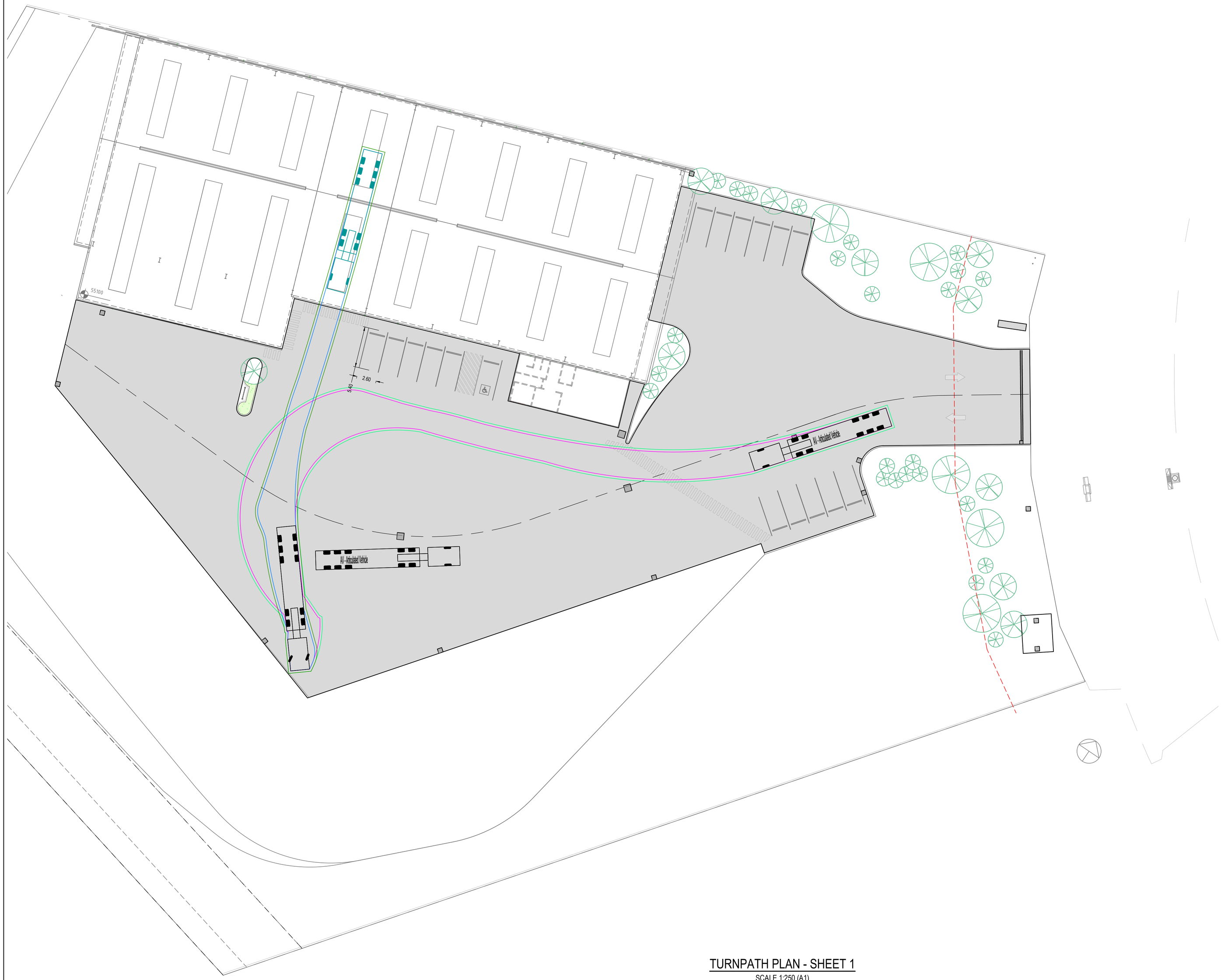
CLIENT: SOUTHERN STEEL PROPERTIES

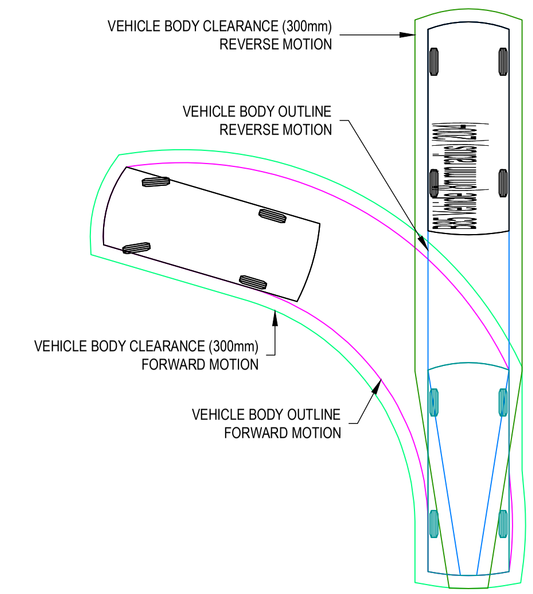
SHEET: JOINTING PLAN

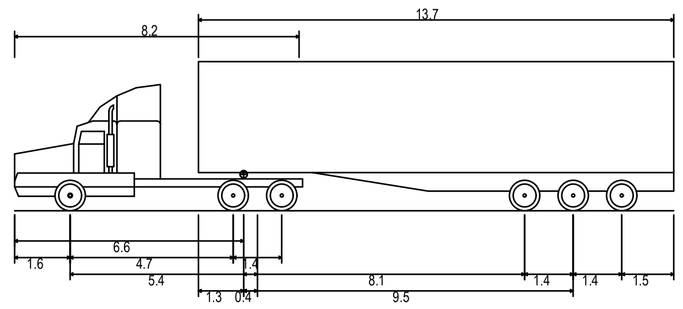
SCALE: 1:250 | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C109 | REV: C

DIAL BEFORE YOU DIG www.1100.com.au







AV - Articulated Vehicle

Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.301m
Min Body Ground Clearance	0.418m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

VEHICLE TURNPATH - LEGEND

SCALE 1:100 (A1)
FROM AUTOCAD CIVIL 3D VEHICLE TRACKING SOFTWARE

TURNPATH PLAN - SHEET 1

SCALE 1:250 (A1)

DIAL BEFORE YOU DIG www.1100.com.au

REV	ISSUE	DATE	APPROVAL	
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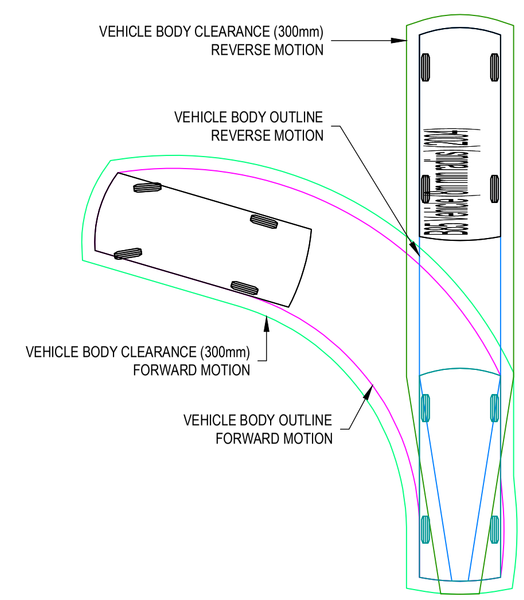
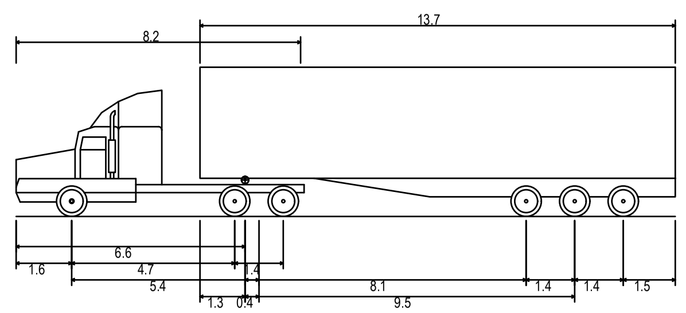
0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

PROJECT: SOUTHERN STEEL WAREHOUSE
ADDRESS: LOT 1 LUKAARLIA DRIVE BRIDGEWATER
CLIENT: SOUTHERN STEEL PROPERTIES
SHEET: TURNPATH PLAN - SHEET 1
SCALE: 1:250
TOTAL SHEETS: 18
SIZE: A1
PROJECT No: 23 E 99 - 98
SHEET: C110
REV: C





AV - Articulated Vehicle

Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.301m
Min Body Ground Clearance	0.418m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

VEHICLE TURNPATH - LEGEND

SCALE 1:100 (A1)
FROM AUTOCAD CIVIL 3D VEHICLE TRACKING SOFTWARE

TURNPATH PLAN - SHEET 2

SCALE 1:250 (A1)

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REV	ISSUE	DATE	APPROVAL	
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			CHECKED:	NM
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0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

PROJECT: SOUTHERN STEEL WAREHOUSE

ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: TURNPATH PLAN - SHEET 2

SCALE: 1:250 | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C111 | REV: C

NOTES

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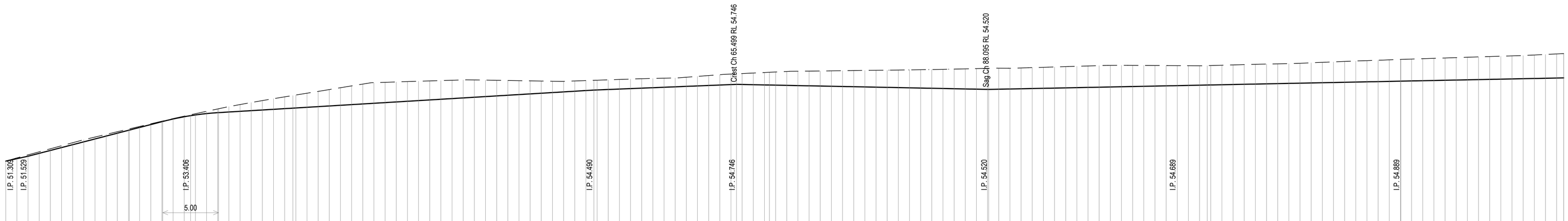

R.L. 47.00

CHAINAGE	CUT (-) FILL (+)	DESIGN CENTRE LINE	EXISTING SURFACE
0.00	+0.00	51.309	51.31
1.00	-0.03	51.419	51.45
2.00	-0.06	51.529	51.59
3.00	-0.07	51.658	51.73
4.00	-0.07	51.787	51.86
5.00	-0.08	51.915	52.00
6.00	-0.09	52.044	52.13
7.00	-0.10	52.173	52.27
8.00	-0.09	52.302	52.39
9.00	-0.08	52.431	52.51
10.00	-0.06	52.560	52.62
11.00	-0.05	52.688	52.74
11.08	-0.05	52.699	52.75
12.00	-0.04	52.817	52.86
13.00	-0.03	52.946	52.98
14.00	-0.03	53.075	53.10
14.07	-0.03	53.084	53.11
15.00	-0.02	53.195	53.22
16.00	-0.02	53.296	53.32
16.67	-0.02	53.344	53.39
17.00	-0.05	53.376	53.43
18.00	-0.10	53.437	53.54
19.00	-0.16	53.479	53.64
19.07	-0.17	53.481	53.65
20.00	-0.24	53.509	53.75
21.00	-0.30	53.539	53.84
22.00	-0.36	53.569	53.93
23.00	-0.42	53.599	54.02
24.00	-0.47	53.629	54.10
25.00	-0.53	53.659	54.19
25.73	-0.57	53.681	54.25
26.00	-0.58	53.689	54.27
27.00	-0.63	53.719	54.35
28.00	-0.68	53.749	54.43
29.00	-0.73	53.779	54.51
30.00	-0.79	53.809	54.60
31.00	-0.84	53.839	54.68
32.00	-0.89	53.869	54.76
33.00	-0.92	53.899	54.82
34.00	-0.91	53.929	54.84
35.00	-0.89	53.959	54.85
36.00	-0.88	53.989	54.87
37.00	-0.87	54.019	54.89
38.00	-0.85	54.049	54.90
39.00	-0.83	54.079	54.91
40.00	-0.82	54.109	54.93
41.00	-0.80	54.139	54.94
42.00	-0.77	54.169	54.94
43.00	-0.74	54.199	54.94
44.00	-0.70	54.229	54.93
45.00	-0.66	54.259	54.92
46.00	-0.62	54.289	54.91
47.00	-0.58	54.319	54.90
48.00	-0.54	54.349	54.89
49.00	-0.51	54.379	54.89
50.00	-0.47	54.409	54.88
51.00	-0.46	54.439	54.90
52.00	-0.44	54.469	54.91
52.71	-0.44	54.490	54.93
53.00	-0.43	54.496	54.93
54.00	-0.43	54.516	54.95
55.00	-0.42	54.536	54.97
56.00	-0.42	54.556	54.98
57.00	-0.41	54.576	55.00
58.00	-0.40	54.596	55.01
59.00	-0.39	54.616	55.02
60.00	-0.39	54.636	55.03
61.00	-0.40	54.656	55.06
62.00	-0.42	54.676	55.10
63.00	-0.44	54.696	55.14
64.00	-0.46	54.716	55.18
65.00	-0.47	54.736	55.21
65.50	-0.47	54.746	55.22
66.00	-0.49	54.741	55.23
67.00	-0.52	54.731	55.25
68.00	-0.56	54.721	55.28
68.44	-0.57	54.716	55.29
69.00	-0.59	54.711	55.30
70.00	-0.62	54.701	55.32
71.00	-0.64	54.691	55.33
72.00	-0.66	54.681	55.34
73.00	-0.67	54.671	55.34
74.00	-0.69	54.661	55.35
75.00	-0.71	54.651	55.36
76.00	-0.72	54.641	55.36
77.00	-0.74	54.631	55.37
78.00	-0.76	54.621	55.38
79.00	-0.77	54.611	55.38
80.00	-0.79	54.601	55.39
81.00	-0.80	54.591	55.39
82.00	-0.82	54.581	55.40
83.00	-0.84	54.571	55.41
84.00	-0.86	54.561	55.42
85.00	-0.88	54.551	55.43
86.00	-0.90	54.541	55.44
87.00	-0.92	54.531	55.45
88.00	-0.94	54.521	55.46
88.10	-0.94	54.520	55.46
89.00	-0.94	54.529	55.47
90.00	-0.93	54.539	55.47
91.00	-0.93	54.549	55.48
92.00	-0.94	54.559	55.50
93.00	-0.94	54.569	55.51
94.00	-0.94	54.579	55.52
95.00	-0.95	54.589	55.54
96.00	-0.95	54.599	55.55
97.00	-0.96	54.609	55.57
98.00	-0.96	54.619	55.58
99.00	-0.97	54.629	55.60
100.00	-0.96	54.639	55.60
101.00	-0.95	54.649	55.60
102.00	-0.93	54.659	55.59
103.00	-0.92	54.669	55.59
104.00	-0.91	54.679	55.59
105.00	-0.89	54.689	55.58
106.00	-0.88	54.699	55.58
107.00	-0.87	54.709	55.58
107.69	-0.86	54.716	55.58
108.00	-0.87	54.719	55.59
109.00	-0.87	54.729	55.60
110.00	-0.88	54.739	55.62
111.00	-0.88	54.749	55.63
112.00	-0.88	54.759	55.64
113.00	-0.89	54.769	55.66
114.00	-0.88	54.779	55.66
115.00	-0.88	54.789	55.67
116.00	-0.89	54.799	55.69
117.00	-0.90	54.809	55.71
118.00	-0.91	54.819	55.73
119.00	-0.92	54.829	55.75
120.00	-0.93	54.839	55.77
121.00	-0.94	54.849	55.79
122.00	-0.95	54.859	55.81
123.00	-0.96	54.869	55.83
124.00	-0.96	54.879	55.84
125.00	-0.97	54.889	55.86
125.04	-0.97	54.889	55.86
126.00	-0.98	54.899	55.88
127.00	-0.98	54.909	55.89
128.00	-1.00	54.919	55.91
129.00	-1.00	54.929	55.93
130.00	-1.00	54.939	55.94
131.00	-1.01	54.949	55.96
132.00	-1.02	54.959	55.98
133.00	-1.02	54.969	55.99
134.00	-1.03	54.979	56.01
135.00	-1.03	54.989	56.02
136.00	-1.04	54.999	56.04
137.00	-1.05	55.009	56.06
138.00	-1.06	55.019	56.08
139.00	-1.08	55.029	56.11
139.63	-1.08	55.035	56.12
139.64	-1.08		

From 0.000m To 139.640m Scales: H 1:200 V 1:100

SECTIONS 01

SCALE 1:100 (A1)

REV	ISSUE	DATE	APPROVAL
			DRAWN: MN
			CHECKED: NM
C	PRELIMINARY - NOT FOR CONSTRUCTION - RFI RESPONSE	1/08/2024	DESIGN: MN
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PROJECT: SOUTHERN STEEL WAREHOUSE

0 2 4 6 8 10m
0 1 2 3 4 5m
H1:200
V1:100

ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: LONG SECTIONS

SCALE: AS INDICATED | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C201 | REV: C

NOTES

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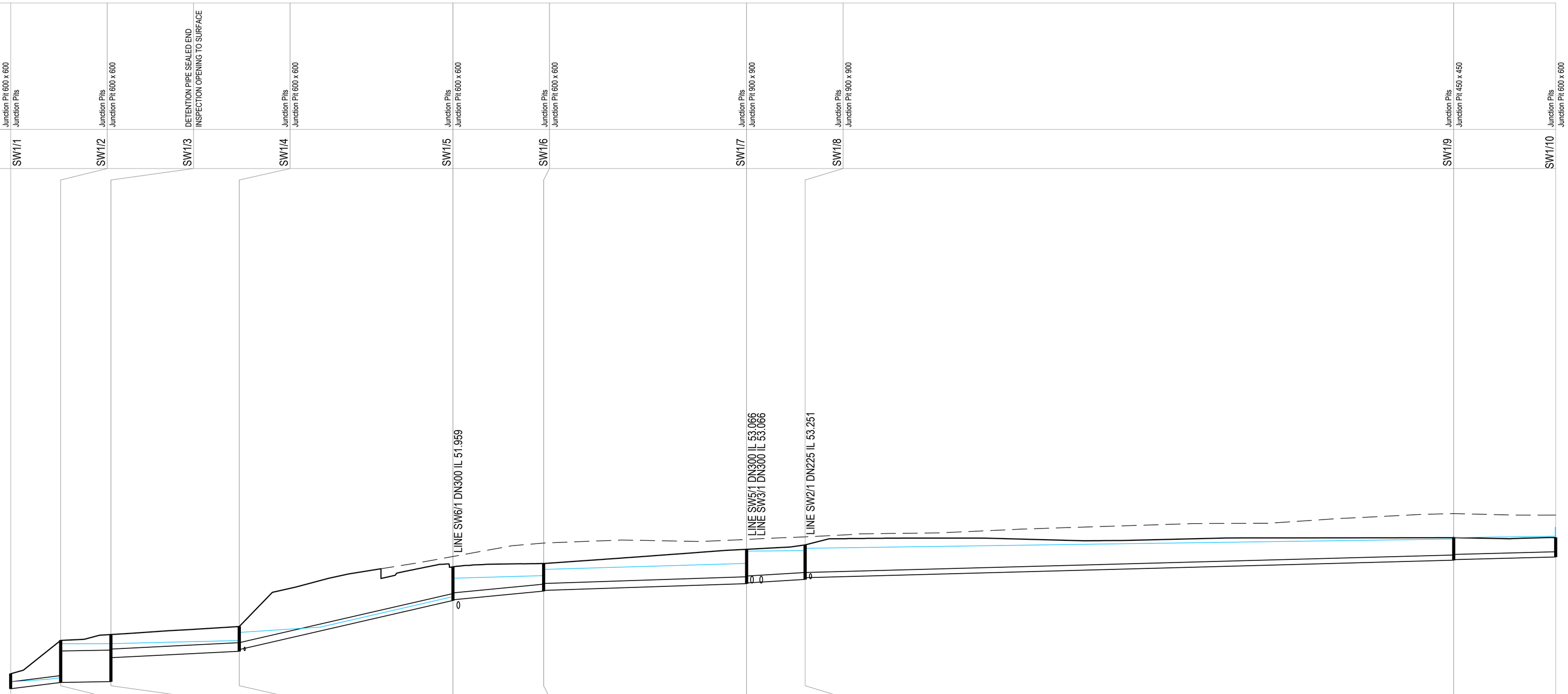

DATUM RL 47.60

STRUCTURE DESCRIPTION	Junction Pit 600 x 600	Junction Pits	Junction Pits	Junction Pit 600 x 600	DETENTION PIPE SEALED END INSPECTION OPENING TO SURFACE	Junction Pits	Junction Pit 600 x 600	Junction Pits	Junction Pit 600 x 600	Junction Pits	Junction Pit 600 x 600	Junction Pits	Junction Pit 900 x 900	Junction Pits	Junction Pit 900 x 900	Junction Pits	Junction Pit 450 x 450	Junction Pits	Junction Pit 600 x 600
STRUCTURE NAME	SW1/1		SW1/2		SW1/3		SW1/4		SW1/5		SW1/6		SW1/7		SW1/8		SW1/9		SW1/10
PIPE SIZE / MATRIAL	DN300 StormPRO		DN1350 Default		DN375 StormPRO		DN300 StormPRO		DN300 StormPRO		DN300 StormPRO		DN300 StormPRO		DN225 StormPRO				DN225 StormPRO
GRADE %	5.00%		0.70%		2.01%		9.19%		3.84%		1.33%		2.43%		1.08%				1.04%
PIPE VELOCITY	3.68 m/s		0.18 m/s		2.38 m/s		3.56 m/s		2.28 m/s		2.33 m/s		1.21 m/s		1.29 m/s				1.31 m/s
PIPE HGL CAPACITY	356 L/s		5990 L/s		389 L/s		492 L/s		309 L/s		174 L/s		241 L/s		73 L/s				72 L/s
DESIGN FLOW	260 L/s		261 L/s		262 L/s		252 L/s		161 L/s		164 L/s		86 L/s		52 L/s				52 L/s
DEPTH TO INVERT	0.65	1.83	2.05	1.01	1.08	1.00	1.46	1.43	1.20	1.17	1.49	1.46	1.50	1.43	0.98	0.95			0.84
INVERT LEVEL	48.470	48.742	48.780	49.820	50.100	50.174	52.309	52.339	52.718	52.748	53.041	53.071	53.226	53.300	54.061	54.086			54.201
FINISHED SURFACE	49.12	50.57	50.83		51.18		53.77		53.92		54.53		54.73		55.04				55.05
EXISTING SURFACE	49.12	50.57	50.83		51.18		54.22		54.81		54.96		55.08		56.09				56.02
CHAINAGE	0.00	5.44	10.90		24.85		48.07		57.93		79.99		86.35		156.84				167.92
	5.44m		5.46m		13.95m		23.22m		9.86m		22.06m		6.36m		70.49m				11.09m

DRAINAGE LONG. SECTION FOR LINE SW1

SCALES: HORIZONTAL 1:250 VERTICAL 1:100

REV	ISSUE	DATE	APPROVAL	
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A	PRELIMINARY - NOT FOR CONSTRUCTION	15/12/2023	VERIFIED:	MG

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PROJECT: SOUTHERN STEEL WAREHOUSE

ADDRESS: LOT 1 LUKAARLIA DRIVE BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: STORMWATER LONG SECTIONS

SCALE: AS INDICATED | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C301 | REV: C

STRUCTURE DESCRIPTION	Junction Pit 900 x 900 Junction Pits	Junction Pits Junction Pit 600 x 600
STRUCTURE NAME	SW1/8	SW2/1
	LINE SW1/9 DN225 IL 53.361	
DATUM RL 52.50		
PIPE SIZE / MATRIAL	DN225 StormPRO	
GRADE %	2.28%	
PIPE VELOCITY	1.00 m/s	
PIPE HGL CAPACITY	110 L/s	
DESIGN FLOW	40 L/s	
DEPTH TO INVERT	1.37	0.87
INVERT LEVEL	53.361	54.192
FINISHED SURFACE	54.73	55.06
EXISTING SURFACE	55.08	55.33
CHAINAGE	0.00	36.40
	36.40m	

DRAINAGE LONG. SECTION FOR LINE SW2
SCALES: HORIZONTAL 1:250 VERTICAL 1:100

	Junction Pit 900 x 900	Junction Pits Junction Pit 900 x 900	Junction Pits Junction Pit 600 x 600
STRUCTURE NAME	SW1/7	SW3/1	SW3/2
	LINE SW5/1 DN300 IL 53.184 LINE SW1/8 DN300 IL 53.184	LINE SW4/1 DN300 IL 53.617	
DATUM RL 52.30			
PIPE SIZE / MATRIAL	DN300 StormPRO		DN300 StormPRO
GRADE %	1.34%		1.63%
PIPE VELOCITY	1.22 m/s		0.00 m/s
PIPE HGL CAPACITY	175 L/s		194 L/s
DESIGN FLOW	86 L/s		0 L/s
DEPTH TO INVERT	1.35	0.95	0.92 0.92
INVERT LEVEL	53.184	53.592	53.617 53.875
FINISHED SURFACE	54.53	54.54	54.80
EXISTING SURFACE	54.96	55.44	55.13
CHAINAGE	0.00	30.57	46.43
	30.57m		15.86m

DRAINAGE LONG. SECTION FOR LINE SW3
SCALES: HORIZONTAL 1:250 VERTICAL 1:100

	Junction Pit 900 x 900	Junction Pits Junction Pit 600 x 600
STRUCTURE NAME	SW3/1	SW4/1
	LINE SW3/2 DN300 IL 53.617	
DATUM RL 52.80		
PIPE SIZE / MATRIAL	DN300 StormPRO	
GRADE %	1.00%	
PIPE VELOCITY	0.00 m/s	
PIPE HGL CAPACITY	149 L/s	
DESIGN FLOW	0 L/s	
DEPTH TO INVERT		1.19
INVERT LEVEL	53.617	53.842
FINISHED SURFACE	54.54	55.03
EXISTING SURFACE	55.44	55.50
CHAINAGE	0.00	22.48
	22.48m	

DRAINAGE LONG. SECTION FOR LINE SW4
SCALES: HORIZONTAL 1:250 VERTICAL 1:100

	Junction Pit 900 x 900	Junction Pits 1050 MANHOLE
STRUCTURE NAME	SW1/7	SW5/1
	LINE SW3/1 DN300 IL 53.184 LINE SW1/8 DN300 IL 53.184	
DATUM RL 52.30		
PIPE SIZE / MATRIAL	DN300 StormPRO	
GRADE %	1.99%	
PIPE VELOCITY	0.00 m/s	
PIPE HGL CAPACITY	217 L/s	
DESIGN FLOW	0 L/s	
DEPTH TO INVERT	1.35	0.92
INVERT LEVEL	53.184	53.429
FINISHED SURFACE	54.53	54.35
EXISTING SURFACE	54.96	54.58
CHAINAGE	0.00	12.30
	12.30m	

DRAINAGE LONG. SECTION FOR LINE SW5
SCALES: HORIZONTAL 1:250 VERTICAL 1:100

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A	PRELIMINARY - NOT FOR CONSTRUCTION	15/12/2023	VERIFIED:	MG

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PROJECT: SOUTHERN STEEL WAREHOUSE

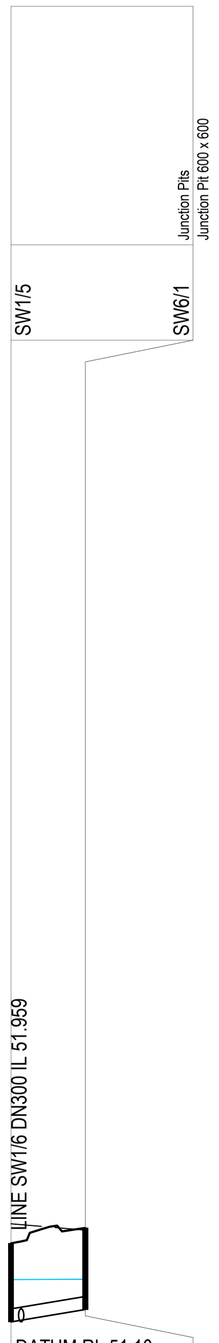
ADDRESS: LOT 1 LUKAARLIA DRIVE BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: STORMWATER LONG SECTIONS

SCALE: AS INDICATED | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C302 | REV: C



DATUM RL 51.10	
DN300 StormPRO	
6.68%	
0.89 m/s	
415 L/s	
63 L/s	
1.81	1.88
51.959	52.245
53.77	54.13
54.22	54.08
0.00	4.28
4.28m	

DRAINAGE LONG. SECTION FOR LINE SW6
SCALES: HORIZONTAL 1:250 VERTICAL 1:100

DATUM RL 49.30		
PIPE SIZE / MATRIAL	DN150 StormPRO	
GRADE %	2.40%	
PIPE VELOCITY	0.76 m/s	
PIPE HGL CAPACITY	37 L/s	
DESIGN FLOW	13 L/s	
DEPTH TO INVERT	0.98	0.77
INVERT LEVEL	50.199	50.411
FINISHED SURFACE	51.18	51.18
EXISTING SURFACE	51.18	51.19
CHAINAGE	0.00	8.83
8.83m		

DRAINAGE LONG. SECTION FOR LINE SW7
SCALES: HORIZONTAL 1:250 VERTICAL 1:100

REV	ISSUE	DATE	APPROVAL	
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PROJECT: SOUTHERN STEEL PROPERTIES
ADDRESS: LOT 10 / 11 ASHBURTON ESTATE BRIDGEWATER
CLIENT:
SHEET: STORMWATER LONG SECTIONS
SCALE: AS INDICATED
TOTAL SHEETS: 16
SIZE: A14
PROJECT No: 23 E 99 - 98
SHEET: C303
REV: A

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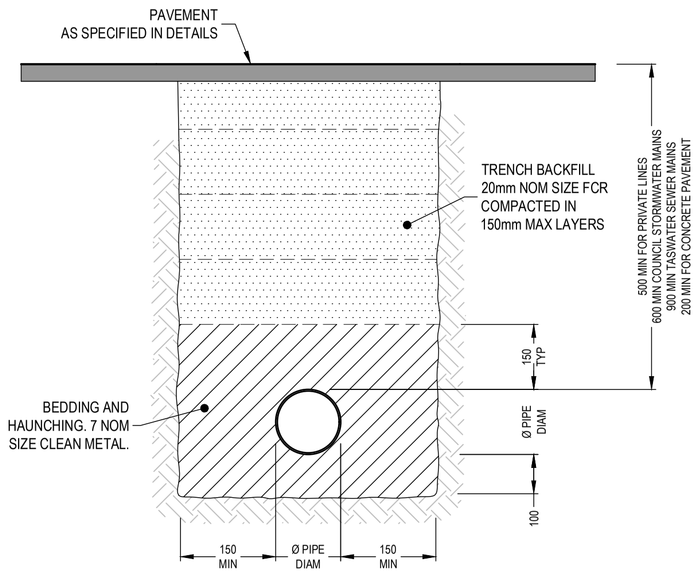
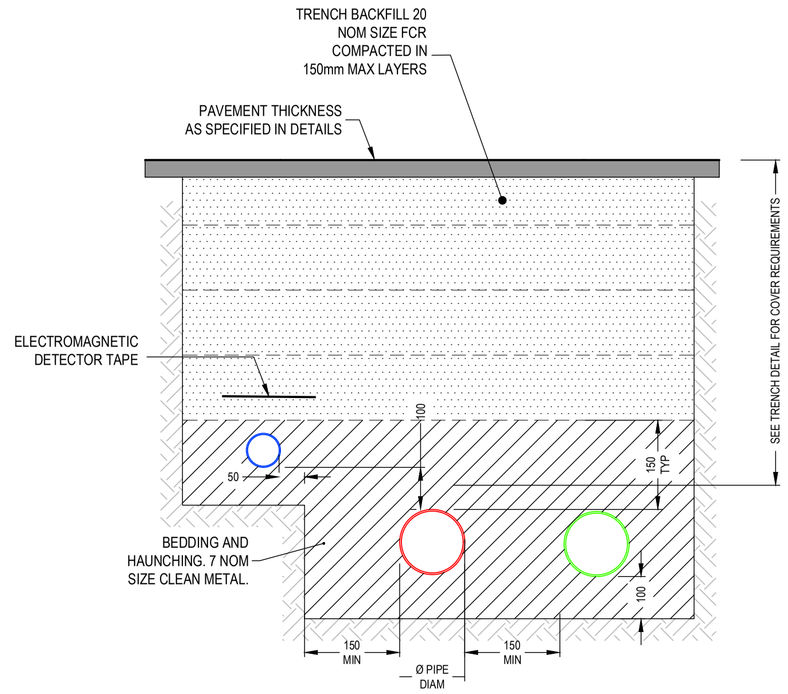
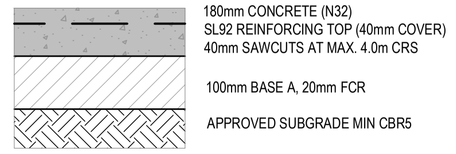


TYPICAL CROSS SECTION - TRAFFICABLE
SCALE 1:10 (A1)

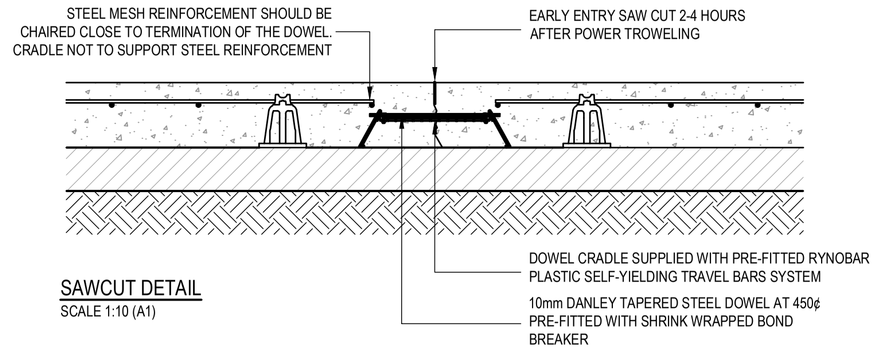


SHARED SERVICE TRENCH DETAIL - TRAFFICABLE
SCALE 1:10 (A1)

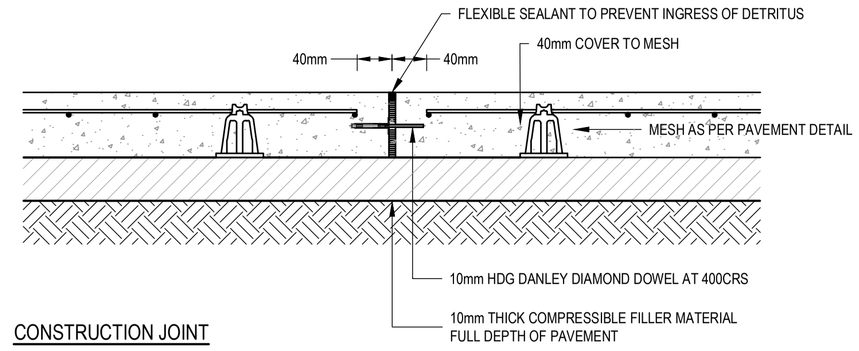


NOTE: CONCRETE PAVEMENT NOT DESIGNED FOR SPECIAL SURFACE FINISHES SUCH AS EXPOSED AGGREGATE.

CONCRETE PAVEMENT DETAIL



SAWCUT DETAIL
SCALE 1:10 (A1)



CONSTRUCTION JOINT
SCALE 1:10 (A1)

CONSTRUCTION DETAILS
AS INDICATED

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PROJECT: SOUTHERN STEEL WAREHOUSE

0 1 2 3 4 5 6 7 8 9 10m

ADDRESS: LOT 1 LUKAARLIA DRIVE
BRIDGEWATER

CLIENT: SOUTHERN STEEL PROPERTIES

SHEET: CONSTRUCTION DETAILS

SCALE: AS INDICATED | TOTAL SHEETS: 18 | SIZE: A1

PROJECT No: 23 E 99 - 98 | SHEET: C401 | REV: C

Prepared for
Southern Steel Properties

15 Lukaarlia Drive
Bridgewater

FLOOD HAZARD REPORT

FE_24052
19 July 2024

flüssig Engineers

L4/ 116 BATHURST ST
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Document Information

Title	*Client*	*Document Number*	*Project Manager*
15 Lukaarlia Drive, Bridgewater, Flood Hazard Report	**Southern Steel Properties**	FE_24052	Max W. Möller *Principal Hydraulic Engineer*

Document Initial Revision

REVISION 00	Staff Name	Signature	Date
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Authorised by	Max W. Moller ***Principal Hydraulic Engineer***		19/07/2024

Rev No.	Description	Prepared by	Authorised by	Date

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1. Introduction

Flüssig Engineers has been engaged by **Southern Steel Properties** to undertake a site-specific Flood Hazard Report for the development at 15 Lukaarlia Drive, Bridgewater in the **Brighton Council** municipality. The purpose of this report is to determine the flood characteristics on the existing and post-development hazard scenarios for the 1% AEP plus climate change, for the purpose of development.

1.1 Development

The proposed development consists of a proposed warehouse, concrete handstand and gravel handstand. The proposed warehouse will cover approximately 2495 m^2 of the 14,306 m^2 lot. The concrete hardstand will cover 3,930 m^2, while the gravel hardstand will cover 2,985 m^2 of the lot. The site is currently vacant. This development triggers the inundation code as the development falls within Brighton Council, flood prone area.

1.2 Objectives and Scope

This report is to assess the proposed development at 15 Lukaarlia Drive, Bridgewater under C12.0 Flood Prone Areas Hazard Code of the Tasmanian Planning Scheme 2021- Brighton (TPS 2021). The objectives of this study are:

- Provide an assessment of the site's flood characteristics under the combined 1% AEP plus climate change (CC) scenario.
- Provide comparison of flooding for post-development against acceptable solution and performance criteria.
- Provide flood mitigation recommendations for a potential future development, where appropriate.

1.3 Limitations

This study is limited to the objectives of the engagement by the clients, the availability and reliability of data, and including the following:

- The flood model is limited to a 1% AEP + CC worst case temporal design storm.
- All parameters have been derived from best practice manuals and available relevant studies (if applicable) in the area.
- All provided data by the client or government bodies for the purpose of this study is deemed fit for purpose and has not been checked for accuracy.
- The study is to determine the effects of the new development on flooding behaviour and should not be used as a full flood study outside the specified area without further assessment.

1.4 Relevant Planning Scheme Requirements

This report addresses the Tasmanian Planning Scheme codes C12.5.1 and C12.6.1 of the Flood Prone Areas Hazard Code of which the objective is to ensure that risk from riverine, watercourse or inland flooding is appropriately managed and takes into account the use of the buildings.

Table 1. TPS Planning Scheme Requirements

Planning Scheme Code	Objective
C12.5.1 Uses within a flood prone area	That a habitable building can achieve and maintain a tolerable risk from flood
C12.6.1 Building and works within a flood prone area	(a) building and works within a flood-prone hazard area can achieve and maintain a tolerable risk from flood; and
	(b) buildings and works do not increase the risk from flood to adjacent land and public infrastructure.

Specific details of this code and how this report addresses these requirements is shown in Table 8 and Table 9

2. Model Build

2.1 Overview of Catchment

The contributing catchment for 15 Lukaarlia Drive, Bridgewater is approximately 58 ha stretching from the peak located approximately 600 m north of the end of Cobbs Hill Road to the development site with an average slope of 8 %.

The land use of the catchment is Landscape Conservation, Rural and General Industrial with the specific site being listed as General industrial. Figure 1 below outlines the approximate contributing catchment for the site at 15 Lukaarlia Drive, Bridgewater.

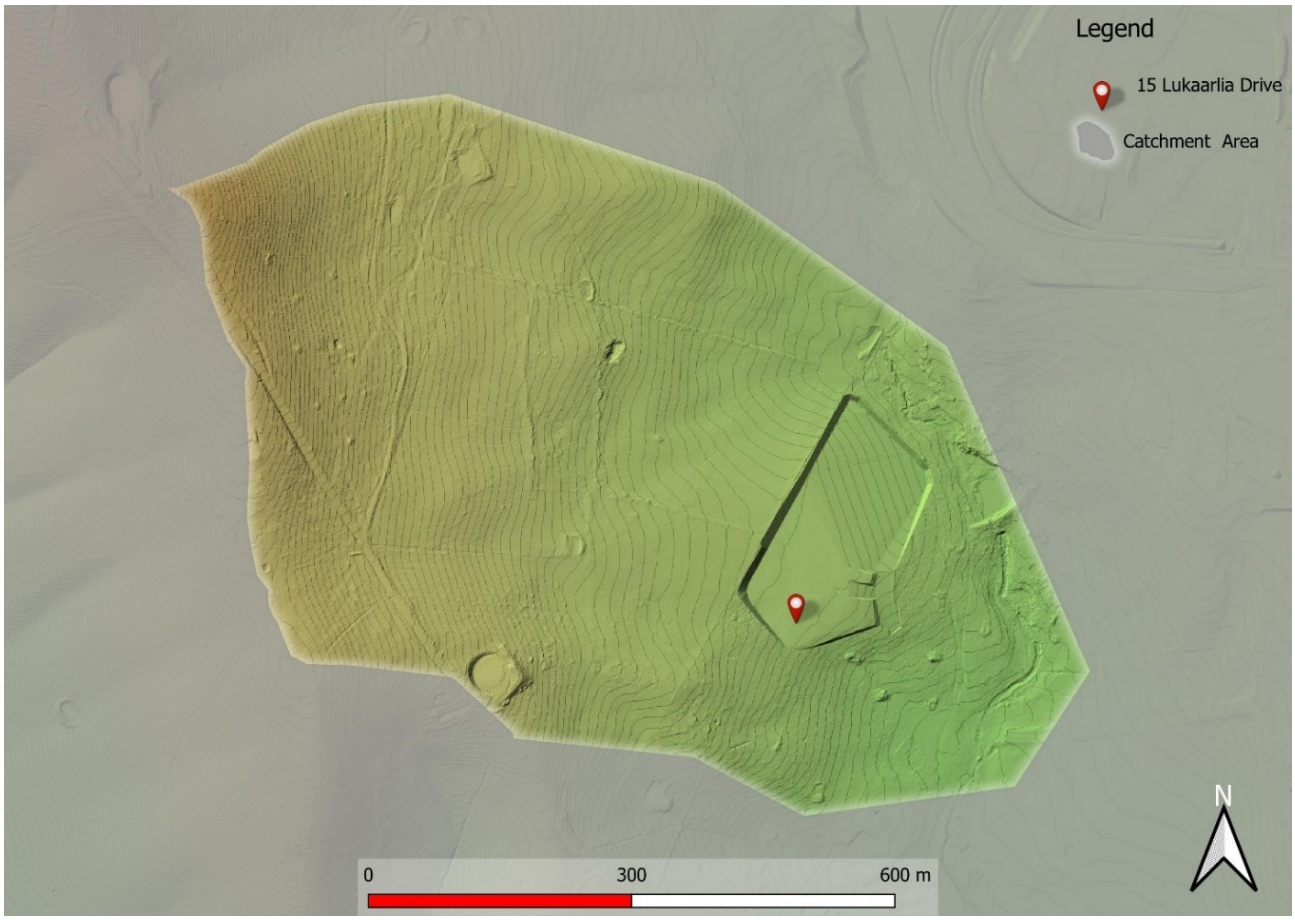

Figure 1. Contributing Catchment, 15 Lukaarlia Drive, Bridgewater

2.2 Hydrology

Table 2 states the adopted hydrological parameters for the RAFTS catchment, as per best practice guidelines.

Table 2. Parameters for RAFTS catchment

Catchment Area (ha)	Initial Loss Perv/imp (mm)	Continuing Loss Perv/imp (mm/hr)	Manning's N pervious	Manning's N impervious	Non-linearity factor
58	26/1	4.3/0.0	0.045	0.02	-0.285

2.2.1 Design Rainfall Events

Figure 2 shows the box and whisker output of the model run. The model shows that the 1% AEP 10-minute storm temporal pattern 5 was the worst-case median storm. Therefore, this storm event was used within the hydraulic model. This particular storm event was selected as the worst-case scenario for further integration into the hydraulic model. The utilisation of this specific storm pattern ensures a comprehensive assessment of the system's response under conditions representing a high level of hydrological stress, thereby enhancing the model's ability to simulate and address extreme weather scenarios.

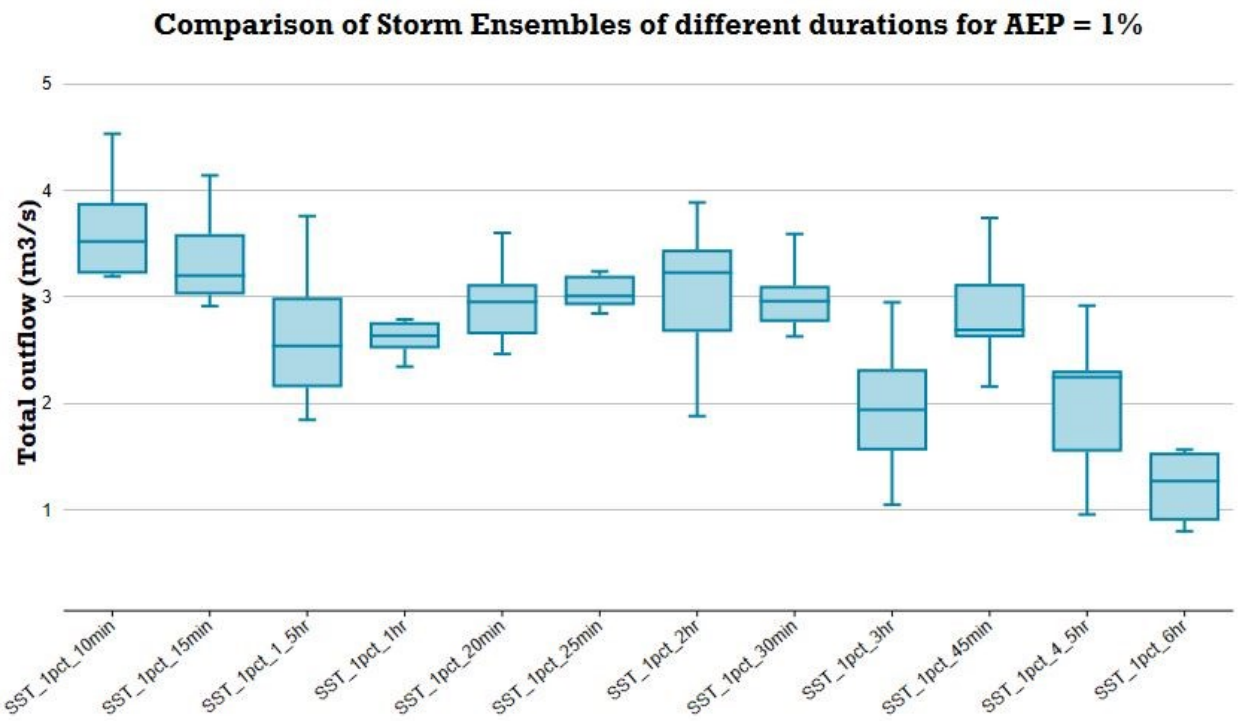

Figure 2. 1% AEP Flood Event Model, Box and Whisker Plot

2.2.2 Climate Change

As per ARR 2019 Guidelines, for an increase in rainfall due to climate change at 2100, it is recommended the use of RCP 8.5. However, ARR 2019 recommends that this figure be used in lieu of more local data being available.

The base scenario of the Climate Futures Tasmania (2010) study was revised following the ARR 2019 Australasia Climate Change study (undertaken by the University of Tasmania), resulting in the original increase in rainfall being reduced to 14.6% in cooler climates (Southern Tasmania). Table 3 shows the ARR 8.5 increased that has been adopted by Brighton Council and therefore used within the model.

Table 3. Climate Change Increases

Catchment	CFT increase @ 2100	ARR 8.5 increase @ 2100
South East Tasmania	14.6%	16.3%

2.2.3 Calibration/Validation

This catchment has no stream gauge to calibrate the model against a real-world storm event. Similarly, there is little historical information available, and limited available past flood analysis undertaken to validate against the flows obtained in the model. A Regional Flood Frequency Estimation model (RFFE) has been used to calibrate our rain on grid rainfall estimation. The RFFE values are listed in Table 4.

Table 4. Regional Flood Frequency Estimation model (RFFE) v/s Flussig Result.

AEP (%)	Lower Confidence Limit (5%) (m^3/s)	Upper Confidence Limit (95%) (m^3/s)	Discharge (m^3/s)	Flussig Discharge (m^3/s)
50	0.230	1.11	0.500	0.58
20	0.420	2.02	0.930	1.09
10	0.510	3.23	1.29	1.48
5	0.560	5.02	1.71	1.95
2	0.610	8.47	2.45	2.86
1	0.630	12.2	3.01	3.48

Input Data	
Date/Time	**2024-07-09 15:40**
Catchment Name	**Catchment1**
Latitude (Outlet)	**-42.745**
Longitude (Outlet)	**147.239**
Latitude (Centroid)	**-42.686**
Longitude (Centroid)	**147.167**
Catchment Area (km^2)	**0.56**
Distance to Nearest Gauged Catchment (km)	**23.43**
50% AEP 6 Hour Rainfall Intensity (mm/h)	**4.150245**
2% AEP 6 Hour Rainfall Intensity (mm/h)	**8.761337**
Rainfall Intensity Source (User/Auto)	**Auto**
Region	**Tasmania**
Region Version	**RFFE Model 2016 v1**
Region Source (User/Auto)	**Auto**
Shape Factor	**4.46***
Interpolation Method	**Natural Neighbour**
Bias Correction Value	**0.213**

2.3 Hydraulics

A 1D-2D hydraulic model was created to determine the flood level through the target area.

2.3.1 Survey

The 2D surface model was taken from a combination of Greater Hobart LIDAR DEM 2013 to create a 1m cell size DEM. For the purposes of this report, 1m cells are enough to capture accurate flow paths. The DEM with hill shading can be seen below (Figure 3).

The site excavation has been incorporated into the revised Digital Elevation Model (DEM) for both the pre and post-development scenario. This mesh has been fused with the ELVIS DEM to establish the ground conditions for existing and post development conditions.

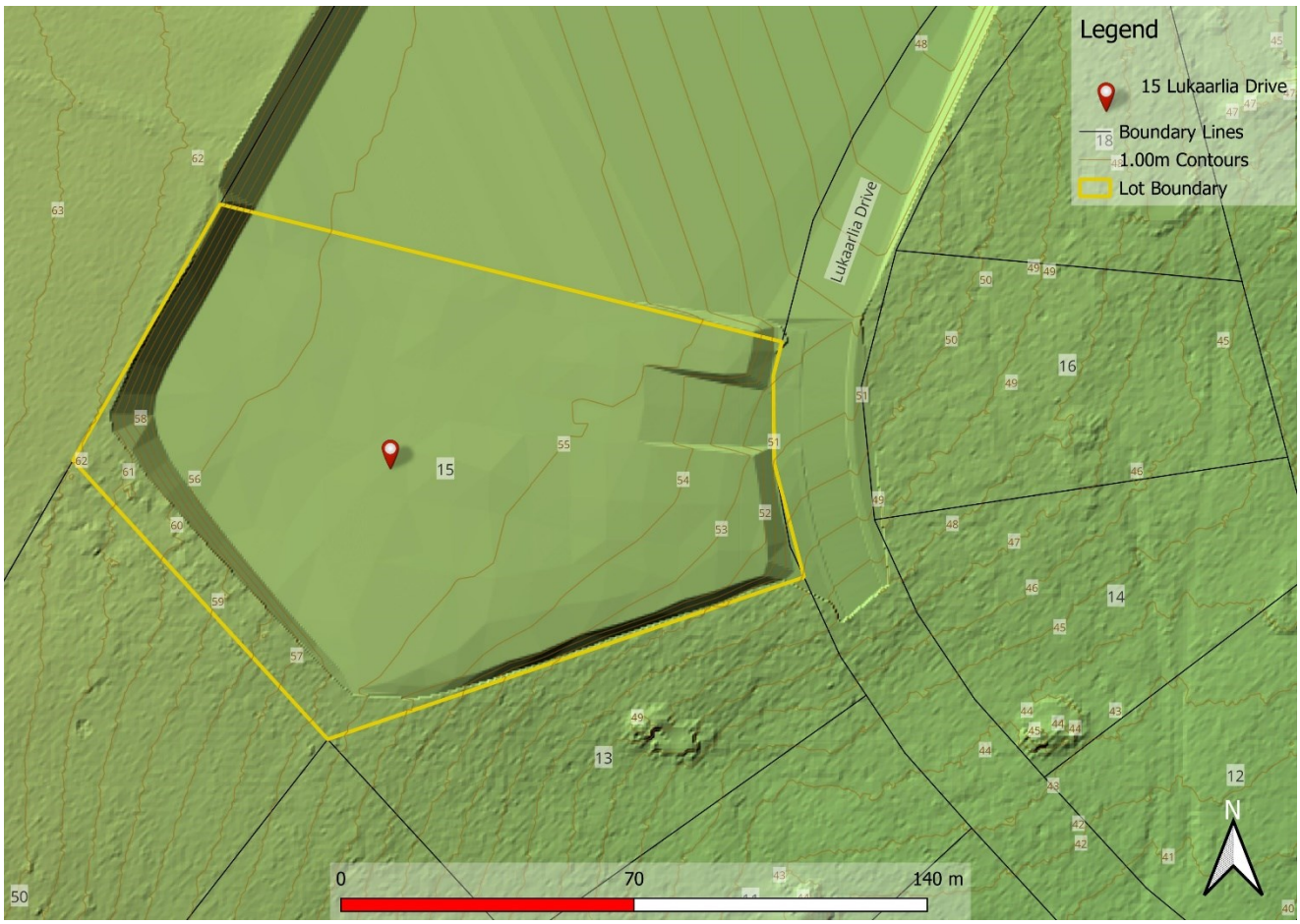

Figure 3. 1m DEM (Hill shade) of Lot Area

2.3.2 Key Stormwater Assets including pipes and pits

Pipes and pits were modelled as 1D underground network within the catchment model included identified culverts and discharge outlets. All upstream stormwater infrastructure was included within the model to provide insight into the capacity of the stormwater system. Where data was missing, this was inferred from surrounding data and where invert levels were missing, a 600 mm cover was applied.

2.3.3 Roads

Roads often form the basis for overland flow in high frequency events, however the kerb and channel are not always picked up by DEM surface. To correct for the drainage lines, mesh polygons were used to delineate road corridors with the roads being incorporated a z-line along the gutter to ensure the kerb invert is represent in the mesh.

In our Digital Elevation Model (DEM), a "z-line" refers to a line representing a constant elevation or contour line. These lines connect the existing kerb points of equal elevation on the terrain surface, allowing for visualisation of the terrain's shape and elevation changes.

2.3.4 Buildings

Specifically, residential houses and commercial buildings were integrated into the DEM by elevating the corresponding grid cells representing these structures by a standardised height of 0.3 meters above the natural ground surface. Subsequently, the re-sampled grids were utilised to establish the Infoworks ICM model, thus forming a foundational framework for the subsequent analysis and simulation of flood dynamics.

This method allows for flow through the building if the flood levels/ pressure become great enough. The aim is to mimic flow through passageways such as doors, windows, and hallways.

2.3.5 Boundary Conditions

Infoworks ICM operates as a single-use software, streamlining the hydrology and hydraulic modelling processes within a unified framework. This unique feature eliminates the necessity for separate inflow boundary conditions, as the hydrology model seamlessly integrates with the hydraulic model through a 1D or 2D link.

The rain on grid model originated from Cobbs Hill to the west with the extents stretching further downstream of the site up to the Midland Highway.

2.3.6 Structures

In the process of crafting a two-dimensional grid to depict the ground surface of the floodplain, we initiated by re-sampling high-resolution LiDAR data to generate a digital elevation model (DEM) through the utilisation of GIS software.

Within this procedure, the attention was directed towards identifying and incorporating pertinent features such as residential structures, commercial buildings, walls, and roadways. Ensuring the comprehensive inclusion of these features within the re-sampled DEM was of utmost importance.

2.3.7 Roughness (Manning's n)

The model grid's roughness and equivalent Manning's n values were derived from land use data. Table 5 shows Manning's values used in the model. Values for this layer were derived from the ARR 2019 Guidelines. These parameters have proven effective in previous flood mapping projects undertaken in Tasmania.

Table 5. Manning's Coefficients (ARR 2019)

Land type	Roughness, Manning's N	Equivalent Manning's 'n' (1/Roughness)
Built up areas	8	0.125
Open space	28	0.025
Waterways	33	0.029
Roads	55	0.013
Houses/ Buildings Roof	56	0.010

2.3.8 Walls

All significant fences and retaining structures were included as 2D linear wall structures within the 2D model. Fences were modelled 300 mm above the ground level.

2.4 Development Runoff

Stormwater runoff from the development site has been assessed under pre- and post-development models to determine the potential impact the development at 15 Lukaarlia Drive, Bridgewater has on the immediate local flows. As per planning guidelines it is a requirement that this does not have a negative impact from pre to post development. Site Characteristics for the pre- and post-development model are summarised in Table 6.

Table 6. Site Characteristics

	Pre-Development		Post-Development	
Land Use	**Area (m²)**	**% of total**	**Area (m²)**	**% of total**
Total Impervious	0	0	9,410	66
Total Pervious	14,306	100	4,896	34

3. Model Results

The result of 1% AEP + CC were run through the pre-development and post-development model scenarios to compare the changes to flooding onsite and to surrounding properties.

3.1 Pre-development Scenario

It can be seen from the pre-development model runs (Figure 4), that there is a shallow overland flood path flowing from the south western lot boundary with depths of < 0.06 m. The maximum depth in the pre-development scenario within the lot is 0.17 m in the western corner of the lot.

3.2 Post-Development Scenario

Figure 5 shows the effect that the inclusion of the proposed warehouse and the hardstand has on the overland flood flow.

To divert and channelise the overland flow path, a 1.5 m wide, 0.15 m deep open drain is recommended to be constructed along the western and southern edge of the gravel hardstand area. This mitigation option proves to be effective in alleviating the effects of the overland flow path on the proposed warehouse.

With the proposed open drain included in the post-development flood model, there is a slight increase of 0.01 m in depth to 0.07 m at the cross-sectional result line on the southern lot boundary. Within the lot, the maximum depths observed are under 0.22 m. These depths are observed in a localised area within the western section of the lot and are due to combined effects of the depth of the proposed drain along with the site cut that has been undertaken.

There are depths up to 0.05 m observed at the back of the proposed warehouse facing the northern lot boundary. However, these depths are minimal and has no impact since the proposed warehouse has no entrances from that side.

It can be deemed that the proposed warehouse including its access is free from inundation.

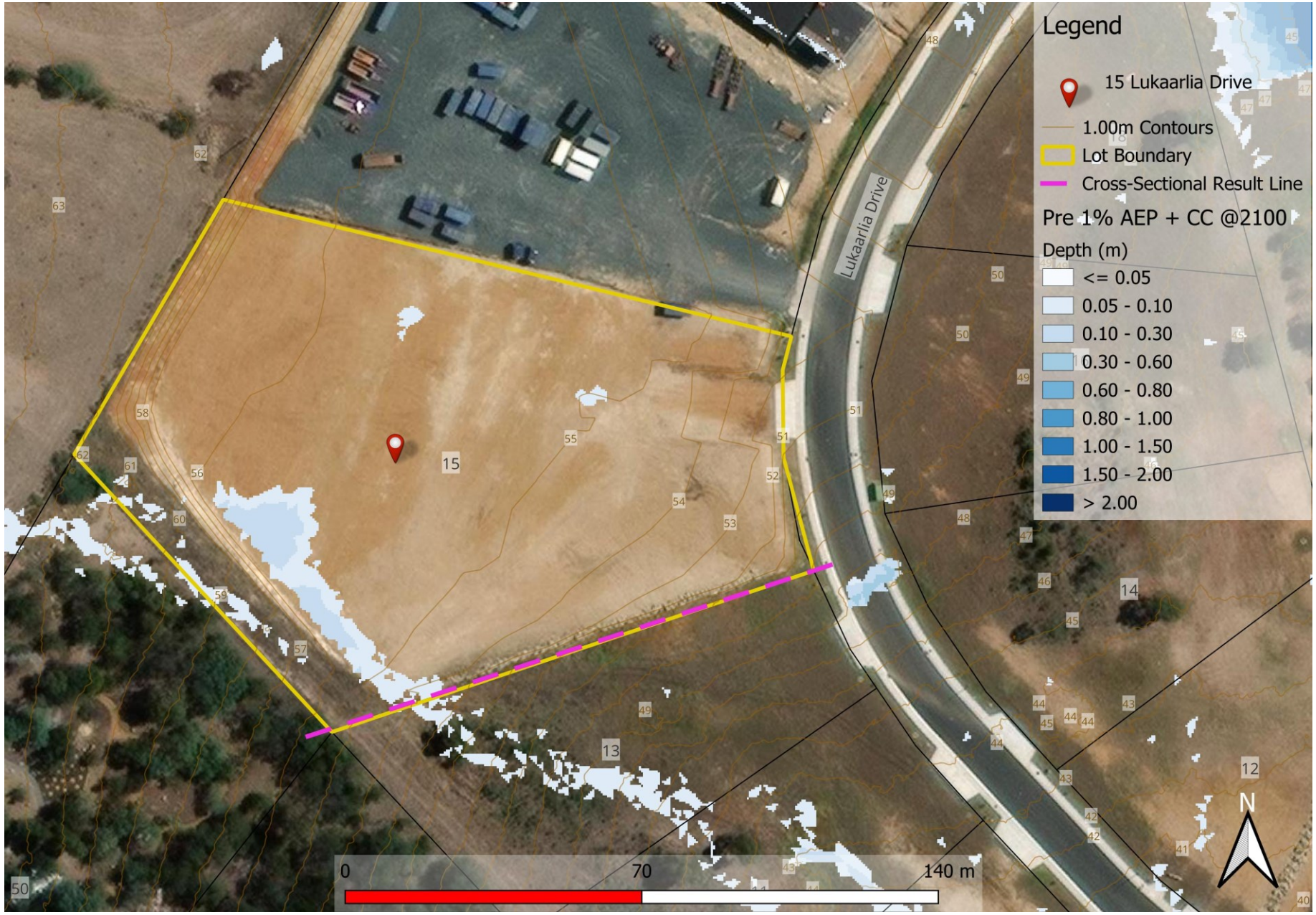

Figure 4. Pre-Development 1% AEP + CC Depth

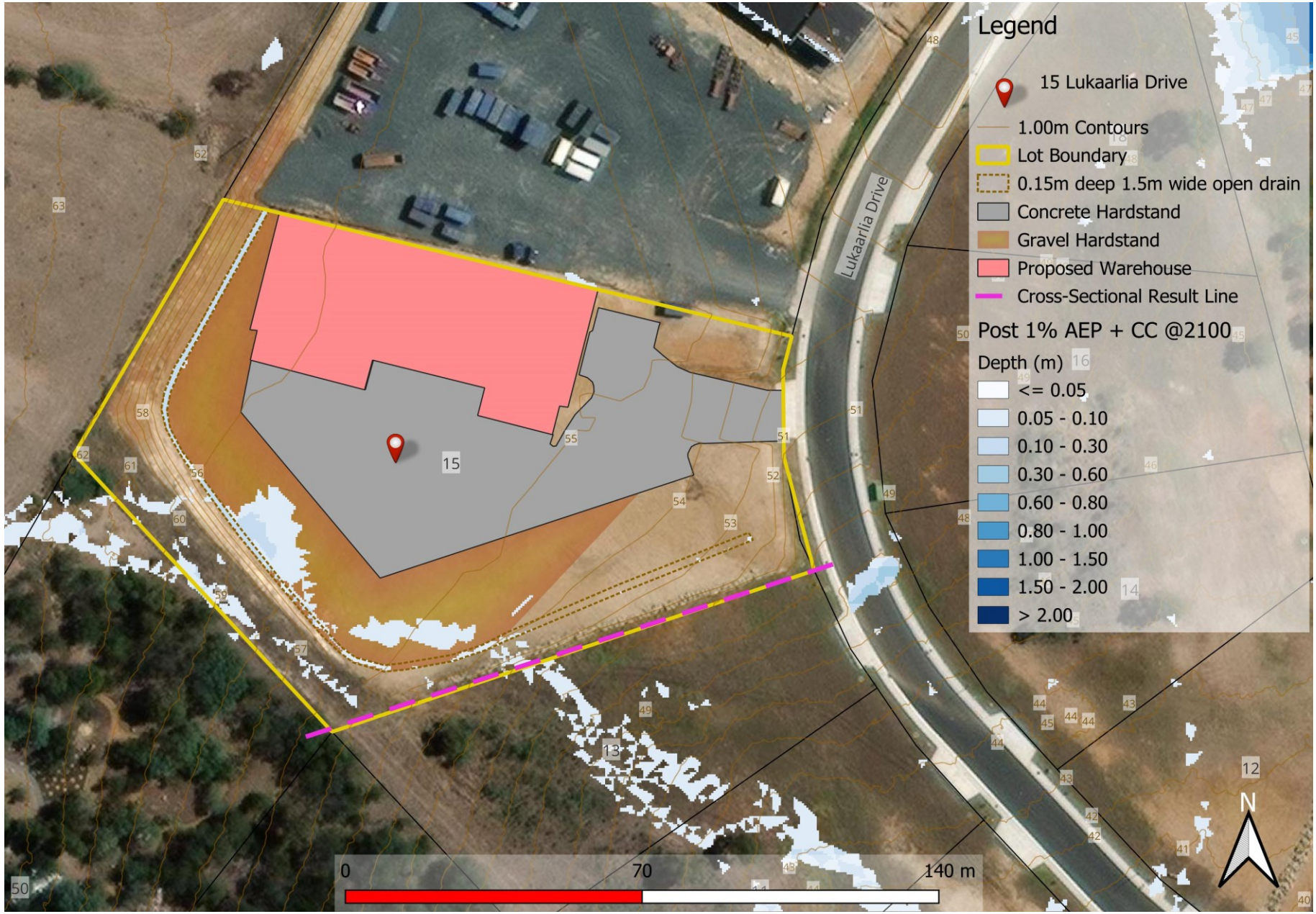

Figure 5. Post-Development 1% AEP + CC including Depth

3.3 Displacement of Overland Flow on Third Party Property

Post-development flows in Figure 5 show that when compared against pre-development in Figure 4, there is only negligible increase in flood depths on adjacent properties to the south of the development lot, with the overland flow continuing towards the natural overland flow path to the southern boundary of the lot. However, this lot to the south is already affected by this overland flood path, and any observed increase in flood depths is only minimal and does not contribute to any increase in flood hazard. The negligible increase in flood depth on the northern wall of the proposed warehouse is also minor in impact having no detrimental effect on the neighbouring lot to the north.

Therefore, it can be stated that the development does not have any measurable effect on third party property.

3.4 Development Effects on Flooding

The proposed warehouse is within the natural overland flow path. However, with the recommended mitigation measures, the proposed warehouse has no adverse effect on flooding during a 1% AEP storm event, both within the lot and on surrounding areas. Velocities and depths in the post-development scenario are within the lowest hazard band, and therefore the post development models show that there is no increase to the risk rating on surrounding properties or infrastructure.

3.5 Development Effects on Stormwater Discharge

Figure 6 below shows the discharge hydrograph from the property boundary for the overland flow through the development area. The graph was captured in the model for both pre- and post-development runs and combined in graph format to demonstrate the change in net discharge. It demonstrates the discharge increasing by 0.02 m^3/s from 0.60 m^3/s to 0.62 m^3/s from the pre-development to post-development scenarios, while velocity shows a minor increase of 0.05 m/s from 0.71 m/s to 0.76 m/s.

As both the discharge and velocity in the pre-development scenario is relatively low, the slight increases are more likely due to model sensitivity and has no real impact on discharge from the lot following development. It is therefore deemed that the post development model does not increase net discharge.

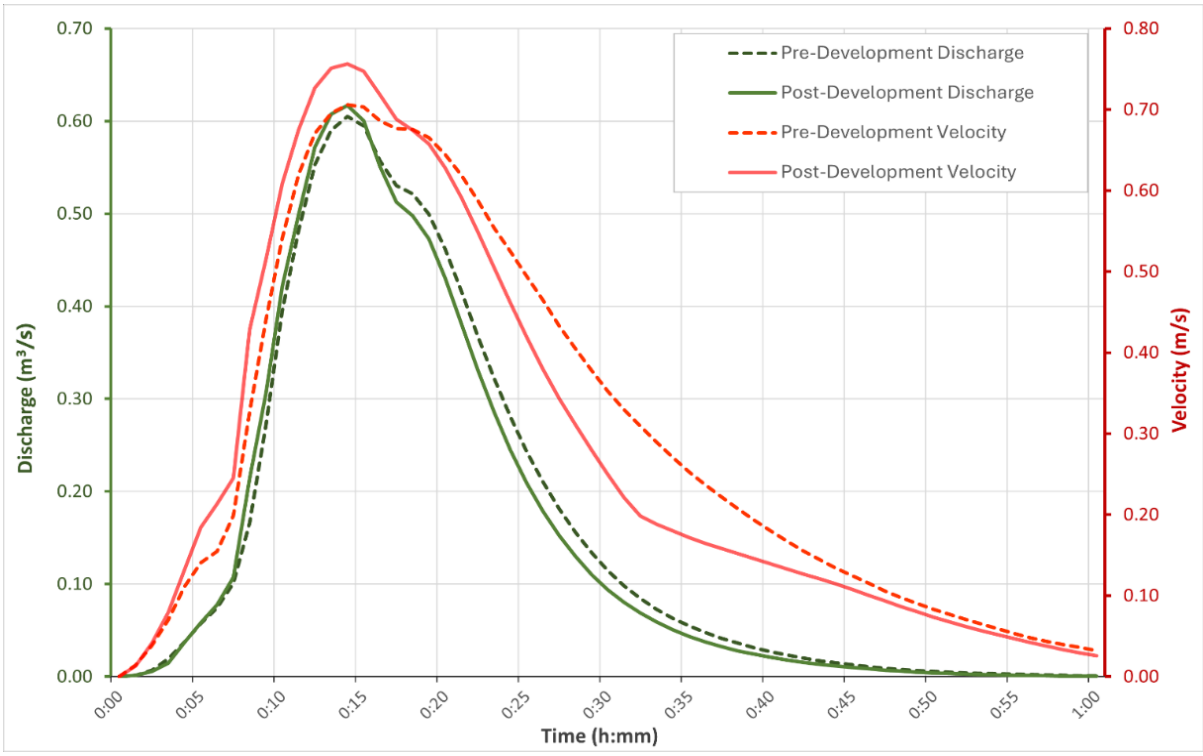

Figure 6. Pre and Post development net discharge and velocity 1% AEP + CC

3.6 New Habitable Building

To meet the performance criteria of the Building Regulations S.54, the construction of a new habitable building is required to have a habitable floor level > 300 mm above the 1% AEP + CC flood level. The new development at 15 Lukaarlia Drive, Bridgewater must meet this regulation in respect to the habitable office areas. (The floor level >1% AEP + CC flood level + 300mm does not apply for non-habitable areas).

As the proposed warehouse, its entrances and office area are free from inundation, this performance criteria do not apply.

3.7 Model Summary

Table 7. Pre-development and post-development at the cross-sectional line

	Pre-development	Post-development	Net Change
Depth (m)	0.06	0.07	+0.01
Velocity (m/s)	0.71	0.76	+0.05
Discharge (m^3/s)	0.60	0.62	+0.02

4. Flood Hazard

Under existing conditions prior to development, the proposed location of the building is subject to be inundated to < 0.06 m flood depth and < 0.71 m/s velocity. This places the hazard rating as adopted by Australian Flood Resilience and Design Handbook as a maximum H1 – *Generally safe for people, vehicles and buildings* as shown in Appendix A – Hazard maps.

The post-development scenario sees the depth at the lot boundary slightly increasing to 0.07 m from the pre-development level and the velocity showing a minor increase of 0.05 m/s which has no effect on the hazard rating that remains within the lowest hazard band of H1 for majority of the lot.

As this study does not extend to the public access roads we cannot comment on the accessibility to the site, only within the site. Therefore, this report would advise that occupants and visitors remain inside in the event of a flood unless instructed by emergency services. A summary of the hazard ratings is shown in Figure 7.

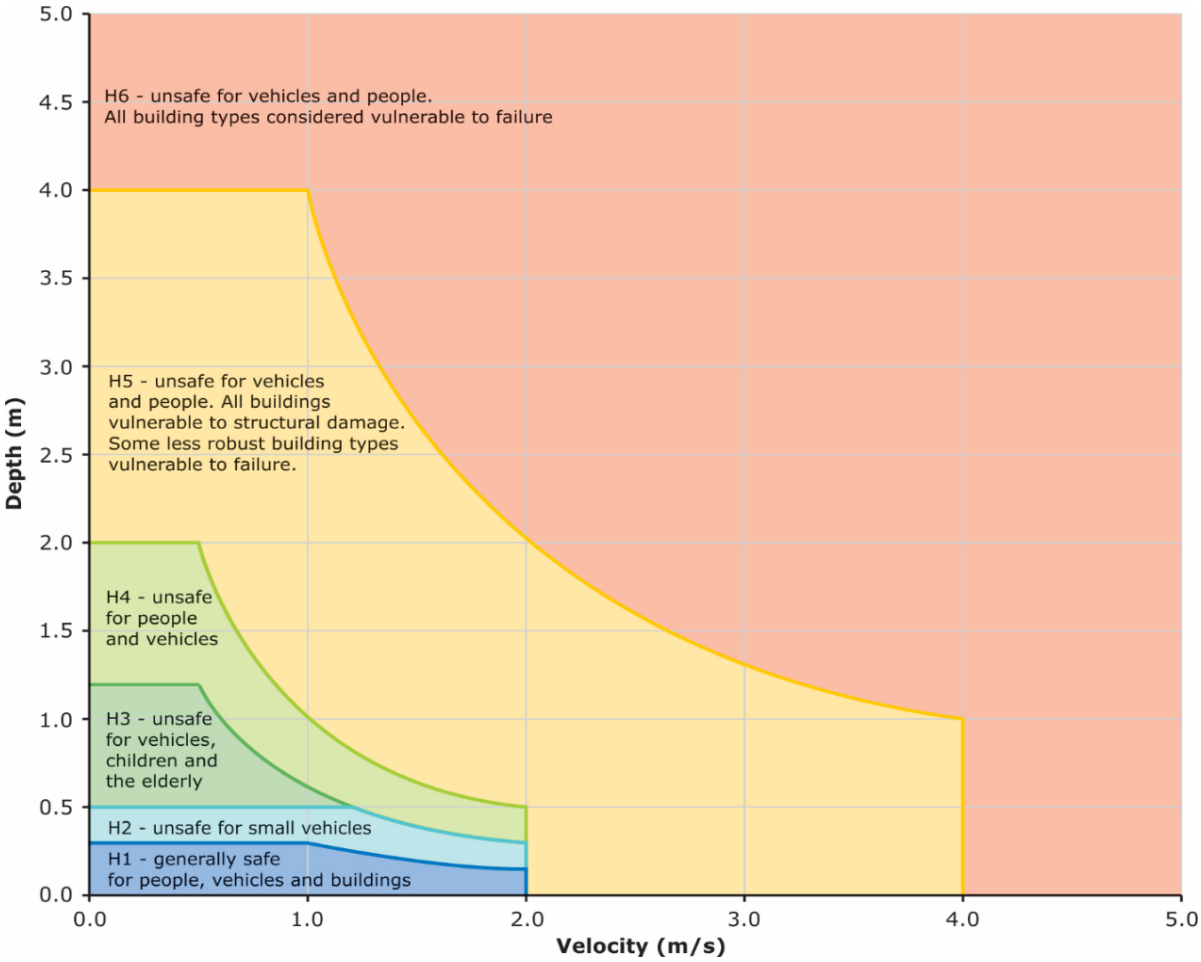

Figure 7. Hazard Categories Australian Disaster and Resilience Handbook

4.1 Tolerable Risk

The lot at 15 Lukaarlia Drive, Bridgewater is susceptible to a shallow, slow-moving flood plain flow, with the majority of the immediate surrounding region classified low (H1) hazard rating in the 1% AEP + climate change event. The hazard remains at H1 in the post development scenario which means that it will not pose any risk to occupants or structures during a 1% AEP storm event.

Even at minor velocity and depths during a storm event, erosion and debris movement nevertheless pose a threat. If the recommendations in this report are implemented, the proposed structure, which is intended to be a class 7b structure with a 50-year asset life (BCA2022), can achieve a tolerable risk of flooding over its asset life.

Table 8. Tasmanian Planning Scheme – Brighton summary C12.5.1

C12.5.1 Uses within a flood prone hazard area			
Objectives: That a habitable building can achieve and maintain a tolerable risk from flood			
Performance Criteria			
P1.1		**P1.1**	
A change of use that, converts a non-habitable building to a habitable building, or a use involving a new habitable room within an existing building, within a flood-prone hazard area must have a tolerable risk, having regard to:		Response from flood report	
(a)	the location of the building;	(a)	Proposed warehouse and hardstand areas in a lot that lays within a shallow, slow-moving flood inundation area. Warehouse entrances, office and designated parking spaces are situated in an area away from inundated areas.
(b)	the advice in a flood hazard report;	(b)	Assuming recommendations of this report are implemented, no additional flood protection measures required for the life expectancy of the building.
(c)	any advice from a state authority, regulated entity or a council;	(c)	N/A
P1.2		**P1.2**	
A flood hazard report also demonstrates that:		Response from flood report	
(a)	any increase in the level of risk from flood does not require any specific hazard reduction or protection measures;	(a)	No increase in level of risk from pre-development scenario.
(b)	the use can achieve and maintain a tolerable risk from a 1% annual exceedance probability flood event for the intended life of the use without requiring any flood protection measures	(b)	Maximum hazard rating at the proposed development is H1 in both the pre-development and post-development scenarios.

Table 9. Tasmanian Planning Scheme – Brighton summary C12.6.1

C12.6.1 Building and works within a flood prone area			
Objective: (a) building and works within a flood-prone hazard area can achieve and maintain a tolerable risk from flood; and, (b) buildings and works do not increase the risk from flood to adjacent land and public infrastructure.			
Performance Criteria			
P1.1		**P1.1**	
Buildings and works within a flood-prone hazard area must achieve and maintain a tolerable risk from a flood, having regard to:		Response from flood report	
(a)	the type, form, scale and intended duration of the development;	(a)	Proposed warehouse, office and hardstand areas.
(b)	whether any increase in the level of risk from flood requires any specific hazard reduction or protection measures;	(b)	Assuming recommendations of this report are implemented, no additional flood protection measures required for the life expectancy of a habitable building.
(c)	any advice from a State authority, regulated entity or a council; and	(c)	N/A
(d)	the advice contained in a flood hazard report.	(d)	Flood report and recommendations provided within.
Performance Criteria			
P1.2		**P1.2**	
A flood hazard report also demonstrates that the building and works:		Response from Flood Report	
(a)	do not cause or contribute to flood on the site, on adjacent land or public infrastructure; and	(a)	No significant increase to flow and velocity from proposed development.
(b)	can achieve and maintain a tolerable risk from a 1% annual exceedance probability flood event for the intended life of the use without requiring any flood protection measures.	(b)	Assuming recommendations of this report the proposed site and development can achieve a tolerable risk to the 1% AEP storm event for the life expectancy of the building.

5. Conclusion

The Flood Hazard Report for 15 Lukaarlia Drive, Bridgewater development site has reviewed the potential development flood scenario.

The following conclusions were derived in this report:

1. A comparison of the post-development peak flows for the 1% AEP at 2100 were undertaken against C12.0 of the Tasmanian Planning Scheme – Brighton Flood Prone Areas code.
2. A slight increase of 0.01 m in depth at the property boundary at the cross-sectional result line.
3. Peak discharge sees a small increase of 0.02 m^3/s from both pre-development to post-development riverine flood scenario.
4. Velocity shows a slight increase of 0.05 m/s between pre- and post-development riverine flood scenarios.
5. Hazard from flooding within the lot remain at the majority category of H1 for both pre and post development riverine scenarios, including on neighbouring properties.

6. Recommendations

Flüssig Engineers therefore recommends the following engineering design be adopted for the development and future use to ensure the works meets the Inundation Code:

1. A 1.5 m wide, 0.15 m deep open drain to be constructed along the edge of the gravel hardstand area as shown in Figure 5.
2. All hardstand areas surrounding the proposed warehouse must be graded (minimum 2%) away from the building and equipped with adequate internal drainage to manage surface water effectively.
3. Any change in external building layout or addition of other solid structures will require further flood assessment.
4. The proposed warehouse must be designed to resist flood forces including debris for the given flood conditions.
5. All future proposed structures within the flood extent not shown within this report will require a separate design and report addressing their impacts.

Under the requirements of this Flood Hazard Report, the proposed development will meet current acceptable solutions and performance criteria under the Tasmanian Planning Scheme 2021- Brighton.

7. Limitations

Flüssig Engineers were engaged by **Southern Steel Properties** on behalf of the developer, for the purpose of a site-specific Flood Hazard Report for 15 Lukaarlia Drive, Bridgewater as per C12.0 of the Tasmanian Planning Scheme – Brighton 2021. This study is deemed suitable for purpose at the time of undertaking the study. If the conditions of the site should change, the report will need to be reviewed against all changes.

This report is to be used in full and may not be used in part to support any other objective other than what has been outlined within, unless specific written approval to do otherwise is granted by Flüssig Engineers.

Flüssig Engineers accepts no responsibility for the accuracy of third-party documents supplied for the purpose of this Flood Hazard Report.

8. References

- Australian Disaster Resilience Guideline 7-3: Technical flood risk management guideline: Flood hazard, 2014, Australian Institute for Disaster Resilience CC BY-NC
- Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors), 2019, Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia
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- T.A. Remenyi, N. Earl, P.T. Love, D.A. Rollins, R.M.B. Harris, 2020, Climate Change Information for Decision Making –Climate Futures Programme, Discipline of Geography & Spatial Sciences, University of Tasmania.

Appendices

Appendix A Flood Study Maps

PRE 1% AEP + CC @2100

Legend

- 15 Lukaarlia Drive
- 1.00m Contours
- Boundary Lines
- Lot Boundary

Pre 1% AEP + CC @2100

Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.60
- 0.60 - 0.80
- 0.80 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 30 60 m

meters

N

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- 16-07-2024 - Flussig Engineers

Map CRS: GDA94 / MGA zone 55

EPSG:28355

PRE 1% AEP + CC @2100

Legend

15 Lukaarlia Drive

Boundary Lines

Lot Boundary

Pre 1% AEP + CC @2100

Velocity (m/s)

- <= 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 30 60 m

meters

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EPSG:28355

PRE 1% AEP + CC @2100

Legend

- 15 Lukaarlia Drive
- Boundary Lines
- Lot Boundary

Pre 1% AEP + CC @2100

Hazard

- H1
- H2
- H3
- H4
- H5
- H6

0 30 60 m

meters

N

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POST 1% AEP + CC @2100

Legend

- 15 Lukaarlia Drive
- Boundary Lines
- Lot Boundary
- Gravel Hardstand
- Proposed Warehouse
- 0.15m deep 1.5m wide open drain
- Concrete Hardstand

Post 1% AEP + CC @2100

Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.60
- 0.60 - 0.80
- 0.80 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 30 60 m

meters

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- Concrete Hardstand

Post 1% AEP + CC @2100

Velocity (m/s)

- <= 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 30 60 m

meters

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POST 1% AEP + CC @2100

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- Boundary Lines
- Lot Boundary
- Gravel Hardstand
- Proposed Warehouse
- 0.15m deep 1.5m wide open drain
- Concrete Hardstand

Post 1% AEP + CC @2100

Hazard

- H1
- H2
- H3
- H4
- H5
- H6

0 30 60 m

meters

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WAREHOUSE AT 15 LUKAARLIA DRIVE, BRIDGEWATER

TRAFFIC IMPACT ASSESSMENT

Hubble Traffic

July 2024

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1. Introduction

Aldanmark Consulting Engineers engaged Hubble Traffic to prepare an independent Traffic Impact Assessment, to consider the traffic impacts from the provision of a new warehouse at 15 Lukaarlia Drive, Bridgewater.

A development application was submitted to Brighton Council (DA2024/00093), who have requested for an independent Traffic Impact Assessment addressing C2.0 Parking & Sustainable Transport Code and C3.0 Road and Railway Assets Code of the Tasmanian Planning Scheme.

This assessment has considered the functional requirements of the proposed business; the size and position of the lot, the current surrounding road network, the need to cater for articulated vehicle deliveries, and the need to provide adequate on-site staff parking, while providing safe and efficient access.

This report has been prepared to satisfy the requirements of Austroads, Guide to Traffic Management Part 12: Traffic Impacts of Developments, 2019, and referred to the following information and resources:

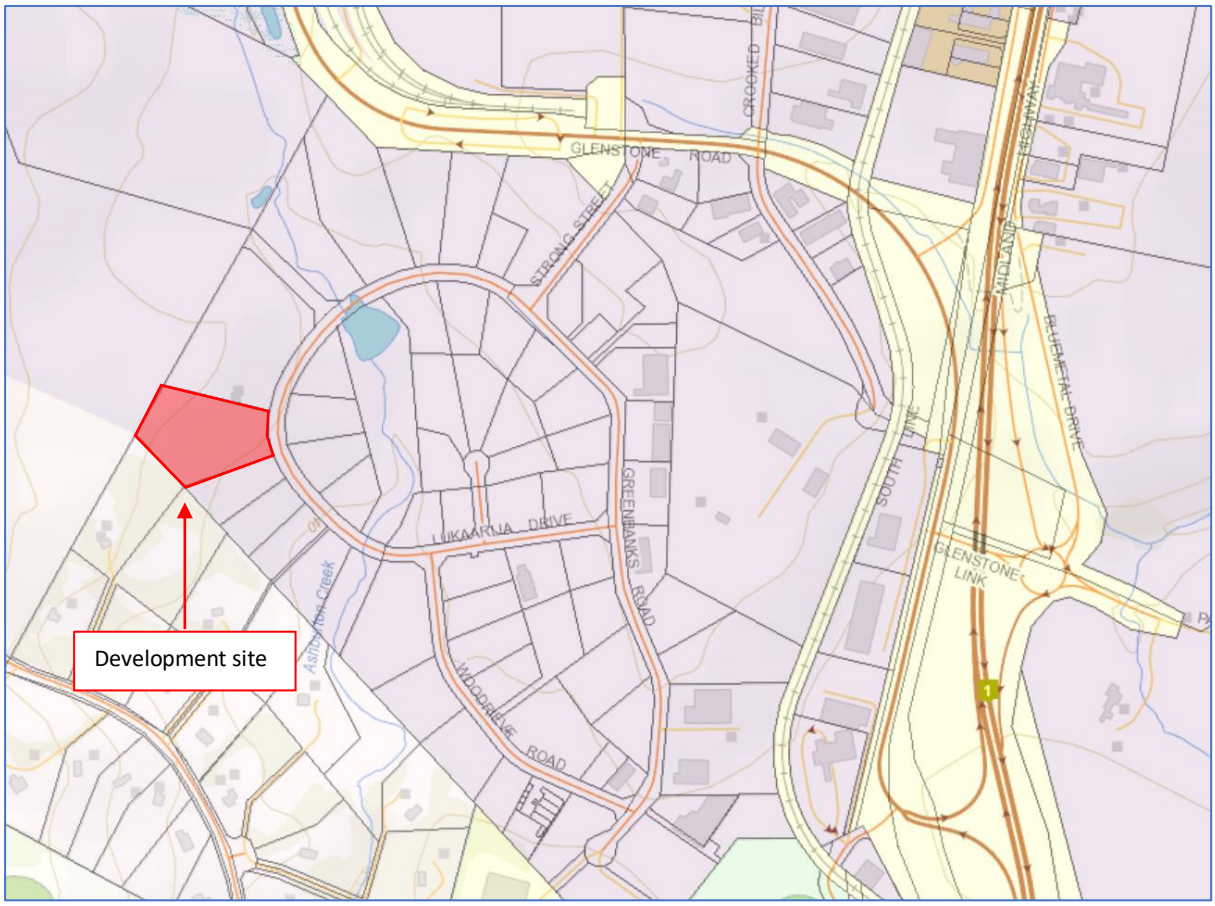
- Tasmanian Planning Scheme, (Brighton Council)
- Road Traffic Authority NSW (RTA) Guide to Traffic Generating Developments
- Australian Standards AS2890 parts 1, 2 and 6
- Austroads series of Traffic Management and Road Design
  - Part 4: Intersection and crossings, General
  - Part 4a: Unsignalised and Signalised Intersections
  - Part 12: Traffic Impacts of Development
- Department of State Growth
- Autoturn Online vehicle turning software
- LIST – Land Information System Tasmania Database

2. Site Description

Located at 15 Lukaarlia Drive, Bridgewater, the development site is a large parcel of vacant land with an existing concrete crossover onto Lukaarlia Drive, which is cleared of any significant trees and vegetation. The site is located within a new subdivision, in an established industrial area.

According to LIST Land Information System Tasmania Database, the site is located within a general industrial zone. The entire industrial zone is serviced by Glenstone Road, which connects back onto the Midland Highway, with the surrounding roads built to cater for industrial traffic.

Diagram 2.0 – Extract from LIST Database



3. Development proposal

The development proposal is for the construction of a warehouse, suitable for manufacturing and processing use. The warehouse will have a floor area of 2,264 square metres, supported with 53 square metres of office floor area, plus staff amenity facilities (kitchen and toilets). Large roller doors will be provided, allowing for loading and unloading to occur internally.

In total the development will be supported with 17 on-site car parking spaces.

The existing concrete crossover with Lukaarlia Drive will be retained. The driveway servicing the building will have a concrete surface and will be supported with an appropriate stormwater drain system.

Diagram 3.0 – Proposed development layout

4. Trip generation by this development

A trip in this report is defined as a one way vehicular movement from one point to another excluding the return journey. Therefore, a return trip to and from a land use is counted as two trips.

To determine the number of trips likely to be generated by this development, reference has been taken from the RTA Guide to Traffic Generating Developments, section 3.10.2 Warehouses.

The guide indicates peak traffic generation for warehouse land use is generally determined by three key factors; employee density, travel mode, and peak period travel distribution.

- The business is expected to employ a maximum of seven staff members, and with the location being remote from public transport, the employees are expected to travel by private vehicle, and are expected to generate up to seven trips in the morning and evening peak periods.
- Delivery of raw materials and finished products are expected to occur a maximum of four times per day, with a worst-case scenario of deliveries occurring once per day during the morning and evening peak periods.
- Visitors are expected to arrive on-site, with this assessment assuming a worst-case scenario of five visitors on-site per day, however, it is expected that they will occur intermittently and outside of the peak periods.

The above assumptions are considered to represent a higher trip generation rate, than what is likely to occur.

Table 4.0 – Trip generation of the new use

Trip generator	Number per weekday	Number of trips during the morning peak	Number of trips during the evening peak	Number of trips between peaks	Total weekday trips
Staff	7	7	7	10	24
Deliveries	4	2	2	4	8
Visitors	5	0	0	10	10
Total		**9**	**9**	**24**	**42**

Table 4.0 provides an estimate on the likely number of trips this development could generate during a working weekday. The above analysis identifies that up to nine trips are likely to occur during the morning and evening peaks, and up to 24 trips likely to occur between the peak periods.

Overall, this warehouse will be a low traffic generator, potentially generating 42 daily trips, with nine of these trips occurring in the peak hours.

5. Existing industrial road network

Lukaarlia Drive in the surrounding road network would operate as an access road for the industrial businesses, with all motorists arriving and leaving the development site using Strong Street, to connect to the nearest arterial roads, Glenstone Road and Midland Highway.

5.1. Lukaarlia Drive characteristics

Lukaarlia Drive extends westerly from the junction with Strong Street and Greenbanks Road, forming a loop road to connect back onto Greenbanks Road. The road has a sweeping curve alignment, with a long continuous sweeping curve from the junction, situated within rolling terrain.

Adjacent to the development site, the road has been constructed to an urban standard, with a 10.5 metre wide bitumen surface, concrete kerb and channel, concrete footpaths along both sides and street lighting.

There is no posted speed limit, with the default 50 km/h urban speed limit applying.

Photograph 5.1 – Lukaarlia Drive standard

5.2. Surrounding road junctions

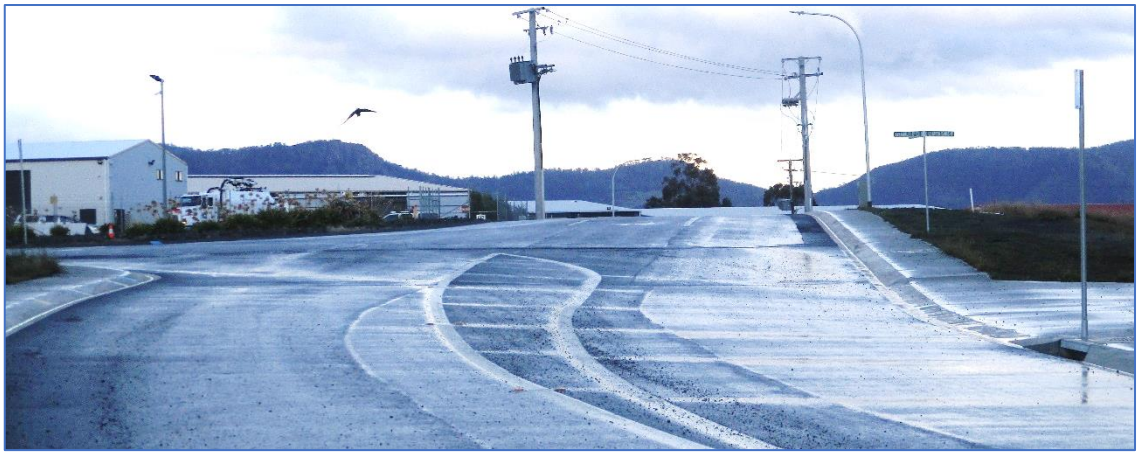
To access the nearest arterial roads being Glenstone Road and Midland Highway, all traffic generated by the development must travel through two junctions, Strong Street and Glenstone Road junction, and Strong Street, Greenbanks Road and Lukaarlia Drive junction.

Glenstone Road connects to the Midland Highway and is part of the State Road network. The road is a purpose built industrial road, to accommodate the largest commercial and industrial vehicles, arriving and leaving the Brighton Industrial Hub.

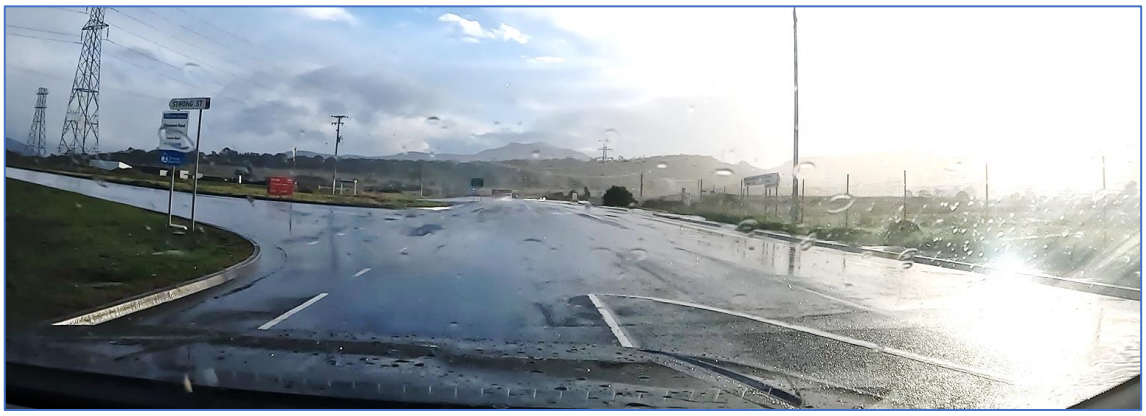
Strong Street connects Glenstone Road with Lukaarlia Drive, with positive traffic control at both junctions in the form of dedicated right turn lanes, give way signs, delineation through appropriate road markings, and street lighting.

The geometrical layout of the junctions is of a high standard, to accommodate the swept paths of large industrial and commercial heavy vehicles. At both junctions there is adequate sight distance for motorists to operate in a safe and efficient manner.

Photograph 5.2A – Strong Street, Greenbanks Road and Lukaarlia Drive junction



Photograph 5.2B – Glenstone Road and Strong Street junction



5.3. Traffic flow on the surrounding industrial road network

In evaluating the traffic impact from the development, it is important to understand the current traffic flow on the surrounding road network. Recent manual traffic surveys were undertaken at the following locations:

- Glenstone Road and Strong Street junction, and
- Strong Street, Greenbanks Road and Lukaarlia Drive junction.

The surveys revealed that the surrounding industrial road network is lightly trafficked, with less than 150 two-way vehicles captured using Greenbanks Road and Lukaarlia Drive. While both Strong Street and Glenstone Road have higher peak hour traffic flows, the two-way flows are less than 300 vehicles, as shown in table 5.3.

The vehicle fuel station on the corner of Glenstone Road and Strong Street junction, generated a reasonably high number of vehicle movements at the junction.

The survey found approximately 40 to 50 percent of the vehicle movements were generated by commercial and industrial vehicles, although these large vehicles require a longer time to clear the junction, no operational issues were observed.

Table 5.3 – Summary of traffic flows on the surrounding road network

Junction	Road	Peak hour two-way flows	
		Morning	Evening
Glenstone Rd and Strong St	Glenstone Rd west of junction	142	138
	Glenstone Rd east of junction	262	222
	Strong Street	200	176
Strong St, Greenbanks Rd and Lukaarlia Dr	Strong Street	94	144
	Greenbanks Road	86	118
	Lukaarlia Drive	12	26

5.4. Road safety of surrounding road network

The Department of State Growth maintains a database of reported road crashes, a check of this database found no crashes reported on Lukaarlia Drive.

6. Impact from traffic generated by this development

As determined in section 4 of this report, the development site is estimated to generate up to 42 daily trips, with nine of these movements likely to occur during the morning and evening peak periods.

Level of Service (LOS) is a quantifiable assessment of the factors that contribute to the traffic performance, which includes traffic density, gaps in traffic streams, expected delays, and queues. The RTA Guide provides performance criteria for urban traffic lanes (diagram 6.1) and junctions (diagram 6.2), with five levels from A to E.

LOS A provides the highest level of traffic performance, where motorists are not expected to incur traffic delays or queues, with ample gaps in the traffic stream for vehicles to turn freely and safely without disrupting other users. For busy arterial urban roads LOS D within the weekday peak hour periods are acceptable.

6.1. Lane capacity and level of service for Strong Street and Glenstone Road users

In evaluating the impact of additional vehicles on Strong Street, Lukaarlia Drive, and Glenstone Road users, it is important to understand LOS motorists are currently receiving, which is done by comparing the peak hour traffic flow with diagram 6.1 from the RTA Guide, for urban environments.

From the manual traffic surveys, the surrounding roads are operating at the highest level of traffic efficiency, LOS A. This means that the traffic flow is free flowing, motorists have freedom to select their own operating speed, and there should be sufficient gaps in the traffic stream to enable vehicles to enter and leave, without causing adverse impacts.

Diagram 6.1 – Extract from the RTA Guide

Table 4.4
Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

The additional peak hour trips have been assigned to the surrounding road network, with the table below comparing the current directional traffic flow and level of performance, against the traffic flow and level of performance when the development is operating.

Table 6.1 demonstrates the increase in vehicular trips is not expected to cause adverse traffic impact on the surrounding road network, as level of service will not deteriorate, with all traffic lanes to continue to operate at LOS A.

Table 6.1 – Comparison of traffic performance on the surrounding roads

	Strong Street				Glenstone Road				Lukaarlia Drive			
	Morning		Evening		Morning		Evening		Morning		Evening	
	NB	SB	NB	SB	EB	WB	EB	WB	EB	WB	EB	WB
Existing flows	90	110	110	66	146	116	120	102	6	1	26	1
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
With development	91	118	118	67	149	122	127	104	6	10	35	1
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A

6.2. Traffic efficiency at the surrounding road junctions

The simplest method to determine the traffic performance at a junction is to use SIDRA Intersection traffic modelling software, which uses gap acceptance theory to determine the average delay, queue lengths, and degree of saturation, which are all measures of traffic congestion and level of service. The RTA Guide provides five levels of service for junctions and roundabouts as shown in the table below.

Diagram 6.2 – RTA Guide for level of service at junctions, intersections, and roundabouts

Table 4.2
Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode

Traffic models were developed within the SIDRA software with the recent peak hour traffic flows, to replicate the two surrounding junctions of Strong Street with Glenstone Road, and Strong Street, Greenbanks Road and Lukaarlia Drive.

The additional trips generated by the development was assigned to the traffic models, which allows the change in traffic performance to be quantified, with the comparison data shown in table 6.2. As both junctions are currently lightly trafficked, they operate at the highest traffic performance LOS A, with motorists not incurring any notable delays or traffic queues. The traffic modelling demonstrates that the additional development trips travelling through the junctions will not cause any deterioration in traffic performance, as the junctions will continue to operate at LOS A.

As the industrial area continues to grow and develop, the traffic flows of the surrounding road network are expected to grow over the next 10 years. This incremental traffic growth has been modelled at the two junctions, based on three percent growth per year for the next 10 years. The impact of this traffic growth is shown in table 6.2, and demonstrates the junctions have sufficient spare traffic capacity for incremental growth for the next 10 years, as the junctions are expected to continue to operate at LOS A.

This traffic analysis clearly demonstrates additional peak hour trips generated by this development, are not expected to cause any adverse traffic impact to the traffic performance of the surrounding junctions.

Table 6.2 – Traffic modelling comparison between existing and with development traffic

Junction	Scenario	Period	Total vehicles	DOS	Worst delay	LOS	Max queue
Glenstone Rd with Strong St	Existing	Morning peak	318	0.122	8.1 secs	A	4.9 metres
	With development		328	0.124	8.2 secs	A	5.0 metres
	3% growth		434	0.187	9.2 secs	A	7.8 metres
	Existing	Evening peak	282	0.112	7.5 secs	A	4.6 metres
	With development		294	0.122	7.5 secs	A	5.0 metres
	3% growth		396	0.180	8.3 secs	A	7.6 metres
Strong St with Greenbanks Rd and Lukaarlia Dr	Existing	Morning peak	102	0.037	6.6 secs	A	1.5 metres
	With development		113	0.048	6.6 secs	A	1.9 metres
	3% growth		151	0.063	6.8 secs	A	2.6 metres
	Existing	Evening peak	156	0.064	7.1 secs	A	3.0 metres
	With development		165	0.064	7.2 secs	A	3.0 metres
	3% growth		228	0.089	7.7 secs	A	4.2 metres

Printouts of traffic modelling can be found in Appendix B.

7. Access arrangement to and from the development site

7.1. Existing crossover with Lukaarlia Drive

The existing 14.5 metre wide concrete crossover with Lukaarlia Drive will be retained and is of sufficient width to accommodate two-way traffic movements and heavy vehicle movements into and out of the site.

Autoturn Online vehicle swept path software has been used to verify that an articulated vehicle can turn left into the development and left out of the development, without going over the centre of the road. Diagrams of the swept paths can be found in Appendix C.

Photograph 7.1 – Existing crossover with Lukaarlia Drive

7.2. Sight distance at existing crossover

The existing crossover with Lukaarlia Drive is located on the outside of a sweeping horizontal curve, on top of a slight vertical crest, which provides motorists with excellent sight distance in both directions.

With the development generating commercial vehicles, it is important drivers have Safe Intersection Sight Distance (SISD), which is the highest sight distance parameter. Austroads Guide to Road Design provides guidance on sight distance and specifies SISD for a 50 km/h speed environment is 90 metres, based on a driver reaction time of 1.5 seconds and observation time of three seconds.

On-site measurements of the available sight distance were taken based on the driver leaving the access being 1.05 metres above the access surface, and an approaching vehicle being 1.2 metres high. The available sight distance in both directions exceeds 100 metres.

With the available sight distance exceeding the SISD, vehicles will be able to enter and leave the development site in a safe and efficient manner, without impacting other road users.

Photograph 7.2A – Available sight distance to the left

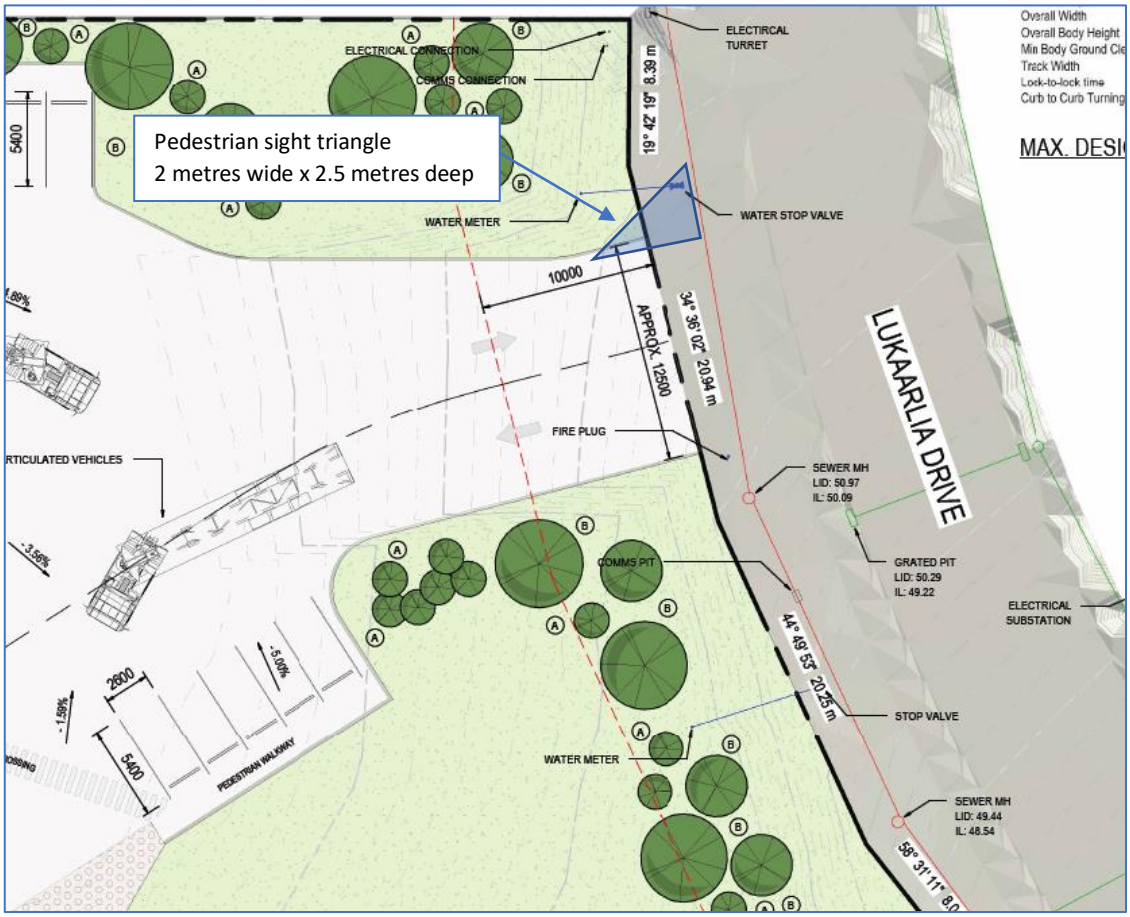
Photograph 7.2B – Available sight distance to the right

7.3. Pedestrian sight distance

It is important for drivers leaving the development site, to have adequate sight lines to pedestrians using the footpath along Lukaarlia Drive. Adequate sight lines between a driver leaving the site and pedestrians using the footpath, will be achieved by not having any physical obstacles in the pedestrian sight triangle.

The diagram below demonstrates the pedestrian sight triangle for a driver leaving the site, as defined in the Standard figure 3.3.

Diagram 7.3 – Pedestrian sight triangle



8. On-site parking and internal road layout

8.1. Number of car parking spaces

Planning scheme table C2.1 prescribes the number of on-site parking spaces required based on the type of land use. The development has two land uses, the warehouse is considered as Manufacturing and Processing use, while the office space is considered as Business and professional services (Office use).

- Manufacturing and Processing use – requires one space per 200 square metres of floor area or two spaces per three employees, whichever is greater.
- Office use – requires one space per 40 square metres of floor area.

Based on the floor areas, the development needs to provide a minimum 12 on-site car parking spaces, to meet the acceptable solution under the planning scheme.

The developer has elected to provide 17 on-site parking spaces, as there is plenty of available space to provide surplus spaces if further development occurs. This number spaces are expected to meet the reasonable demand and eliminate parking overflow.

Table 8.1 – Number of on-site car parking spaces

Activity	Use	Planning scheme requirements	Floor area	Number of parking spaces
Warehouse	Manufacturing and Processing	One space per 200m^2 of floor area or two spaces per three employees, whichever is greater	2,264m^2	11
Office	Business	One space per 40m^2 of floor area.	53m^2	1
Total				**12**

8.2. Design vehicles

The developer has indicated that an Articulated Vehicle (AV) measuring 19 metres in length is the largest vehicle expected on site, with this vehicle entering and leaving the warehouse through large roller doors (3.5 metre clearance height), to undertake unloading and loading activities.

Employees and visitors to the site are expected to generate light vehicle movements, with vehicles measuring less than 5.5 metres in length.

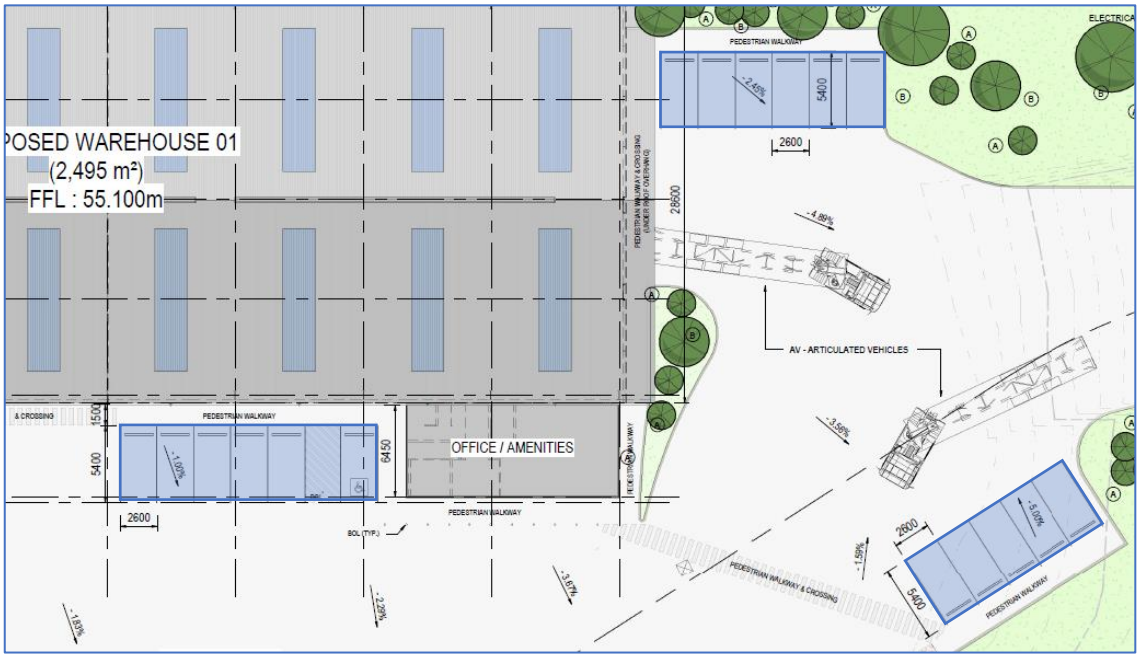
8.3. Layout and dimensions of on-site parking spaces

The design incorporates three parking modules, with one located adjacent to the office building, a second adjacent to the warehouse and third located along the southern part of the driveway.

The car parking spaces have been designed to comply with the planning scheme parking dimensions in table C2.3, where ninety-degree parking spaces will be 2.6 metres wide, 5.4 metres long, and supported with a minimum 6.4 metre manoeuvring area or access aisle. These parking dimensions will ensure a vehicle can enter and leave the spaces in an efficient manner.

The parking spaces will be delineated with pavement markings and supported with wheel stops and designed to be situated on a gradient less than five percent, in both longitudinal and transverse directions.

Diagram 8.3 – Location of on-site parking spaces



8.4. Heavy vehicle movements and delivery area

The warehouse has been designed with large roller doors, allowing for loading and unloading to occur internally. The design allows for the design vehicle to enter the warehouse through the south and exit to the east. Alternatively, to turnaround on-site and reverse into the warehouse, using the roller door to the east.

Autoturn Online vehicle swept path software has been used to demonstrate in diagram 8.4A that an AV can enter, travel through, and leave the warehouse. An in diagram 8.4B than an AV can turn around on-site and reverse into the warehouse, and turnaround within the forecourt, leaving in a forward driving direction.

Diagram 8.4A – Swept path of an AV through warehouse

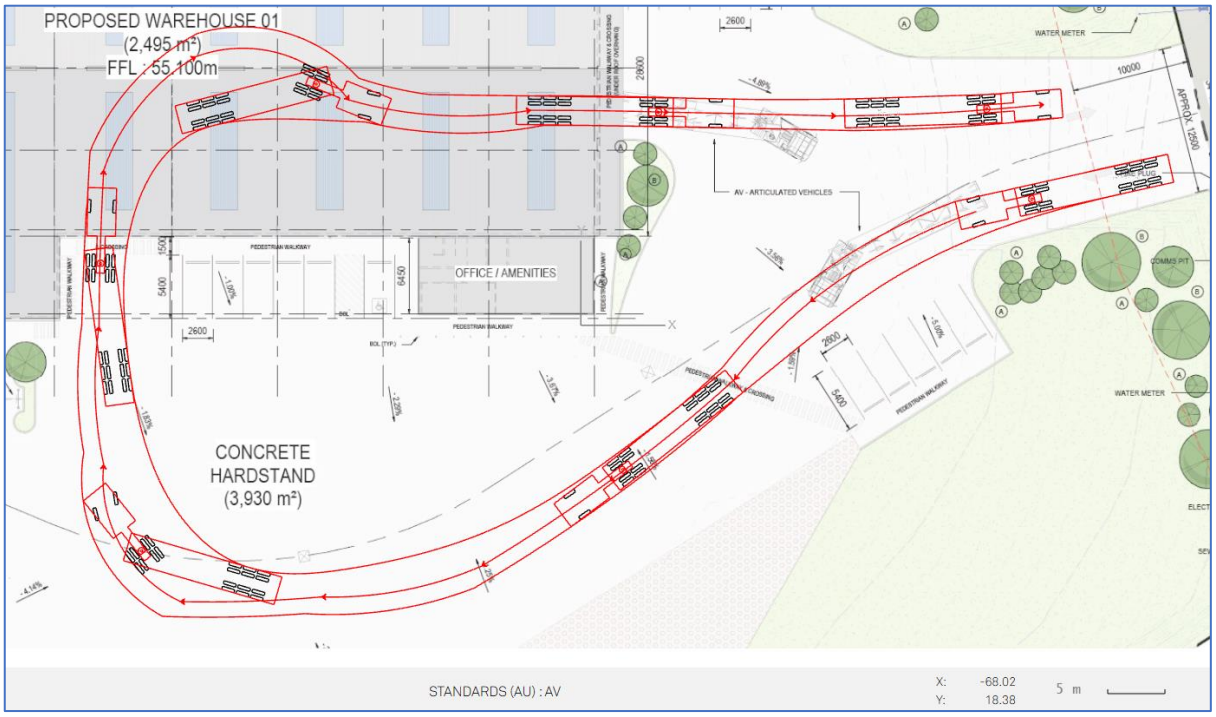
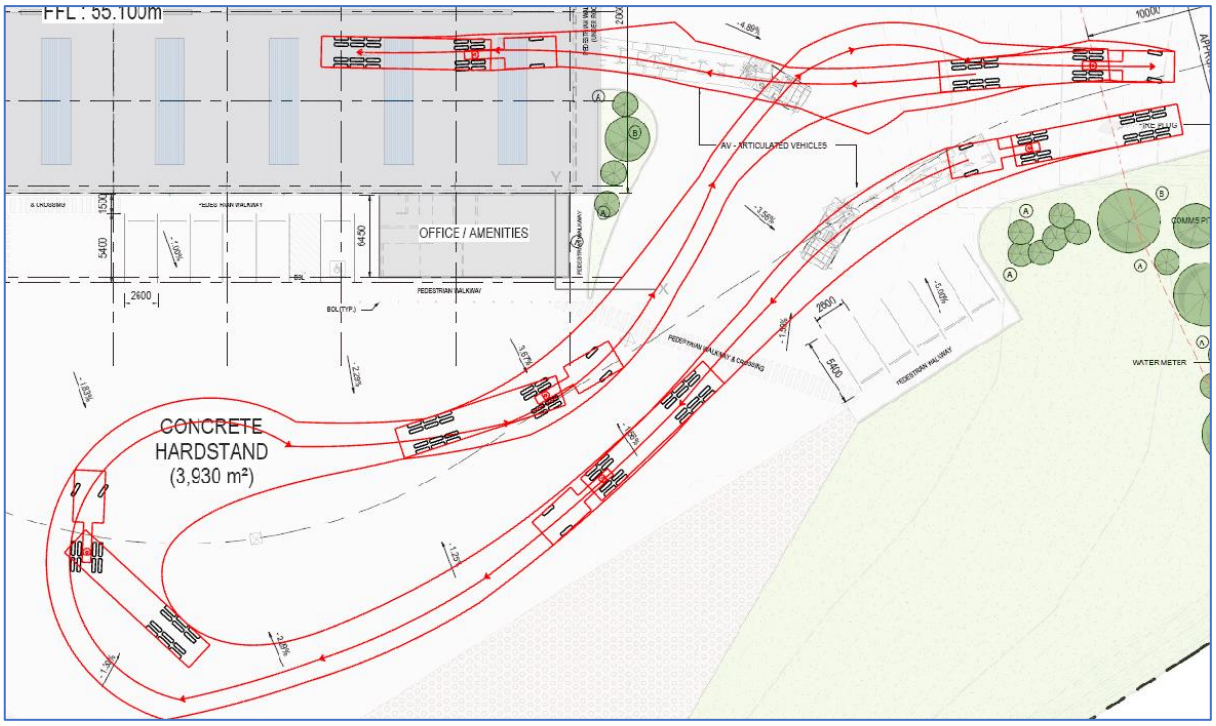


Diagram 8.4B – Swept path of an AV reversing into warehouse



8.5. Internal driveway and stormwater

The internal driveway leading off Lukaarlia Drive will be 12.5 metres wide, to accommodate two-way flow for heavy vehicles, with the driveway to widen into a large forecourt to allow heavy vehicles to turnaround.

The driveway will be constructed with a hard-wearing concrete surface, with a suitable camber to direct surface water to a series of stormwater pits to be located through the middle of the driveway, which will connect to an approved stormwater drain system.

8.6. Internal driveway gradients

With the industrial/commercial use of the site, the driveway has been designed to comply with AS 2890.2:2018 part 2: Off-street commercial vehicle facilities Commercial Standard), which specifies a maximum gradient should be 15.4 percent for an AV design vehicle and change in grade should not exceed 6.25 percent over 10 metres of travel.

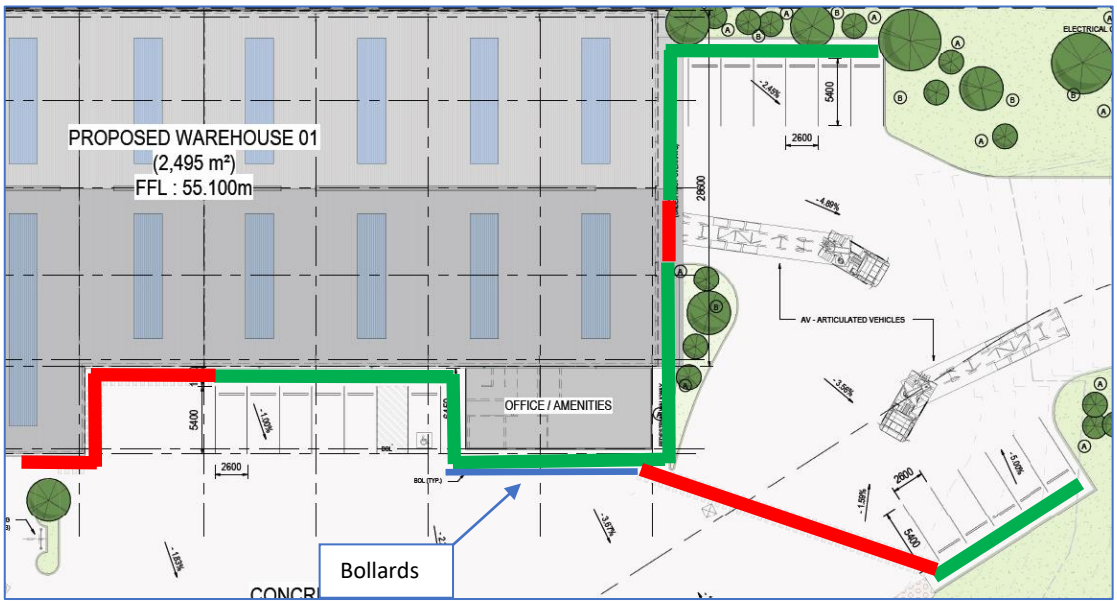
This assessment determined the gradient of the driveway complies with the Commercial Standard, to enable heavy vehicles to enter and leave the site in a safe and efficient manner without impacting other users.

8.7. Internal pedestrian pathway

Suitable internal pathway will be provided within the site, to connect all of the parking spaces with the main building entrances, as shown in diagram 8.7. The pathway will be a minimum one metre wide and constructed with a hard-wearing concrete surface. Where the pathway crosses the internal road, it will be delineated with road markings (red), defining the pathway and pedestrian crossing areas.

Wheel stops will be used to separate the pathway from the parking spaces, while landscaping and bollards will be utilised to separate the pathway from the internal driveway. The proposed safety measures are expected to ensure pedestrians can move around the development site in a safe and convenient manner, meeting the objective of the planning scheme.

Diagram 8.7 – Internal pedestrian pathway



8.8. Other parking requirements

<u>Bicycle parking spaces</u>

Table C2.1 of the planning scheme prescribes the number and class of bicycle parking spaces required, based on the type of land use. Manufacturing and Processing use requires one space per five employees, while Office use requires one space per 500 metres of floor area. Three bicycle parking spaces will be provided, exceeding the planning scheme requirement of one bicycle space.

Motorcycle parking spaces

Table C2.4 of the planning scheme prescribes that there is no requirement to provide motorcycle parking, based on the development site providing 12 on-site car parking spaces.

Accessible parking spaces

One accessible parking space will be provided, which will be located as close as possible to the front entrance of the office and incorporate a shared zone.

9. Planning scheme

9.1. C2.0 Parking and Sustainable Transport Code

C2.5.1 Car parking numbers

A total of 17 on-site car parking spaces will be provided, exceeding the minimum requirement under planning scheme table C2.1 of 12 spaces. This number of spaces is expected to meet the reasonable demand, eliminating parking overflow, and complying with the acceptable solution A1.

C2.5.2 Bicycle parking numbers

The development will provide three bicycle parking spaces, exceeding the required one space under planning scheme table C2.1, and complying with the acceptable solution A1.

C2.5.3 Motorcycle parking numbers

Table C2.4 of the planning scheme prescribes that a use with less than 20 on-site car parking spaces does not require a motorcycle parking space, complying with the acceptable solution A1.

C2.5.4 Loading bays

The development has been designed to cater for commercial vehicles to load and unload internally within the warehouse, complying with the acceptable solution A1.

C2.6. Development standards

C2.6.1 Construction of parking areas.	The car parking spaces and internal driveway, will be constructed with a hard-wearing concrete surface, with appropriate camber to direct surface water to centrally located pits, which is connected to an approved stormwater system. This design complies with the acceptable solution A1.
C2.6.2 Design and layout of parking areas.	All car parking spaces have been designed to comply with the planning scheme table C2.3, where each space will be 2.6 metres wide, 5.4 metres long, with a minimum manoeuvring area of 6.4 metres. The dimensions will ensure all vehicles will be able to enter and leave the development site in a forward-driving direction. The parking spaces shall be located on a gradient of less than five percent, will be delineated with line markings and supported with wheel stops. The width of the driveway will

	exceed the minimum 5.5 metres for two-way traffic movements, complying with table C2.2 of the planning scheme. The roller doors into the warehouse where heavy vehicles are expected, will be 3.5 metres in height, and there will be no other overhead structure restricting headroom clearance less than 2.1 metres. One accessible parking space will be provided as near as practical to the main entrance and incorporate a share zone. Overall, the car parking layout complies with the acceptable solution A1.1, and A1.2, ensuring safe and efficient access.
C2.6.3 Number of accesses for vehicles.	The development will operate with a single vehicular access, using the existing concrete crossover onto Lukaarlia Drive and this complies with the acceptable solution A1.
C2.6.4 Lighting of parking areas within the general business zone and central business zone	The development site will be provided with suitable lighting to ensure vehicles can enter, park, manoeuvre, and leave in a safe manner.
C2.6.5 Pedestrian access.	A delineated internal pedestrian pathway will be provided, connecting all parking spaces to the warehouse and office. The internal pathway will be a minimum of one metre wide, where possible separated from the internal driveway by bollards and landscaping, and from the parking spaces by wheel stops. Where the internal pathway crosses the driveway, it will be delineated with road markings, defining the pathway and pedestrian crossing areas. Overall, pedestrians will be able to move around the development site safely and efficiently, complying with the acceptable solution A1.1 and A1.2 of the planning scheme.
C2.6.6 Loading bays.	The warehouse has been designed with large roller doors, allowing for delivery vehicles to be loaded and unloaded internally, complying with the acceptable solution A1.
C2.6.7 Bicycle parking and storage facilities	Bicycle parking spaces will be designed to comply with the planning scheme and Australian Standard 1158.3.1:2005 and be located within close proximity to the entrance of the warehouse and office, complying with the acceptable solution A1 and A2.
C2.6.8 Siting of parking and turning areas.	Not applicable for a general industrial zone.

9.2. C3.5.1 Traffic generation at a vehicle crossing, level crossing or new junction

The development will increase the use of the existing crossover with Lukaarlia Drive by more than 20 percent and will need to be assessed against the performance criteria P1.

The assessment below demonstrates the warehouse use will be a low traffic generator, and the surrounding road network has sufficient spare traffic capacity to absorb the additional vehicular trips, without impacting other users, safety or traffic efficiency.

Performance criteria	**Assessment**
Vehicular traffic to and from the site must minimise any adverse effects on the safety of a junction, vehicle crossing or level crossing or safety or efficiency of the road or rail network, having regard to:	
a) Any increase in traffic caused by the use;	The development is estimated to generate up to 42 daily trips, with nine of these trips likely to occur during the morning and evening peak periods.
b) The nature of the traffic generated by the use;	A warehouse is being developed within an established industrial area and will generate both light vehicle (less than 5.5 metres) and heavy vehicle movements. Light vehicles will be generated by employees and visitors, while heavy vehicles (including articulated vehicles) will deliver raw materials and collect finished products. These vehicle types are compatible with the existing traffic on the surrounding road network.
c) The nature of the road	Lukaarlia Drive has been purposely constructed to accommodate industrial traffic and is suitable to accommodate the types of vehicles generated by this development. All traffic must enter and leave through two junctions, Strong Street and Glenstone Road, and Strong Street, Greenbanks Road and Lukaarlia Drive, with each junction constructed to a high standard to facilitate safe and efficient traffic movements for the industrial area. Available sight distance at the development access and junctions, exceeds Safe Intersection Sight Distance, ensuring vehicles can enter and leave in a safe manner.
d) The speed limit and traffic flow of the road	There is no posted speed limit, with the urban default 50 km/h speed limit applying. Recent manual surveys found that the surrounding road network is lightly trafficked, with less than 300 two-way vehicles using Glenstone Road, Strong Street, Greenbanks Road and Lukaarlia Drive during the peak periods. Traffic modelling at the junction found motorists are receiving the highest level of traffic performance and efficiency, and the additional traffic generated by the development is not expected to cause any deterioration in traffic performance or have an adverse impact on traffic flow.
e) Any alternative access to a road	There is only one route to the development site, this assessment found this route is suitable to cater for the traffic movements, with the proposed access to the development expected to provide safe and efficient vehicle movements.

f) The need for the use	The land is zoned general industrial, the new manufacturing facility will create new employment within the Brighton municipality.
g) Any traffic impact assessment	A traffic impact assessment found no reason for this development not to proceed.
h) Any advice received from the rail or road authority	Aware of none.

10. Conclusion

From a traffic engineering and road safety perspective, additional traffic generated from this development is not expected to create any adverse safety, amenity, or traffic efficiency problems, as:

- the amount of traffic generated is considered to be low and there if sufficient capacity within the current road network to absorb the extra traffic movements,
- the existing crossover onto Lukaarlia Drive has sufficient Safe Intersection Sight Distance, ensuring safe and efficient vehicle movements, without causing adverse impact to other users or surrounding properties,
- the development will have sufficient parking spaces to meet the expected demand, and
- commercial vehicles will be able to load and unload within the development site, causing no overflow on to the public road network.

This Traffic Impact Assessment found no reason for this development not to proceed.

11. Appendix A – Traffic surveys

11.1. Glenstone Road and Strong Street junction

Diagram 11.1A – Morning peak hour traffic movements

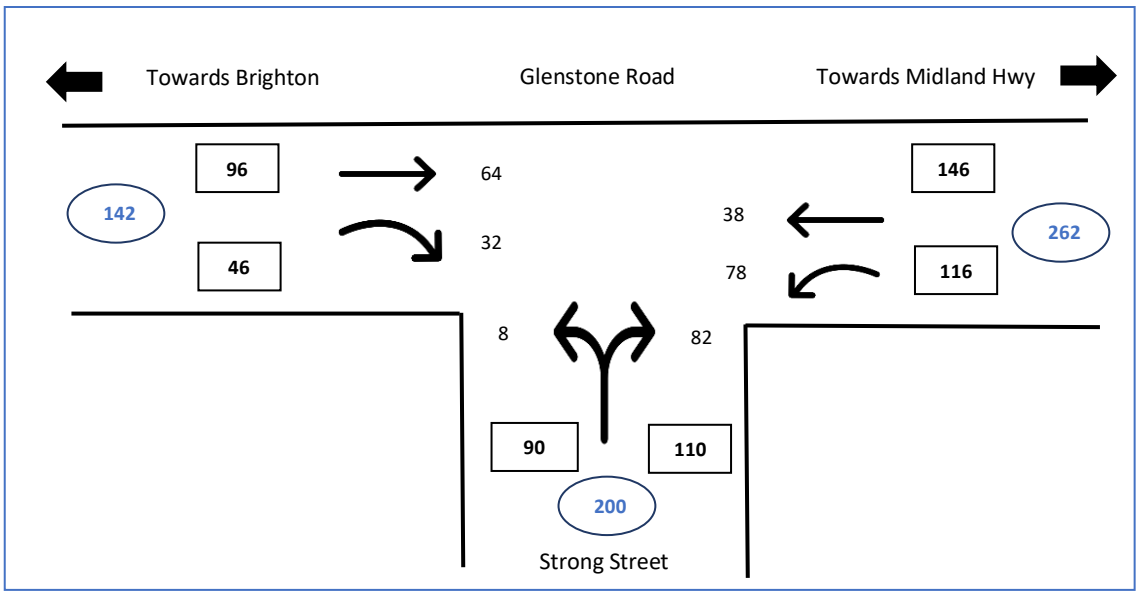
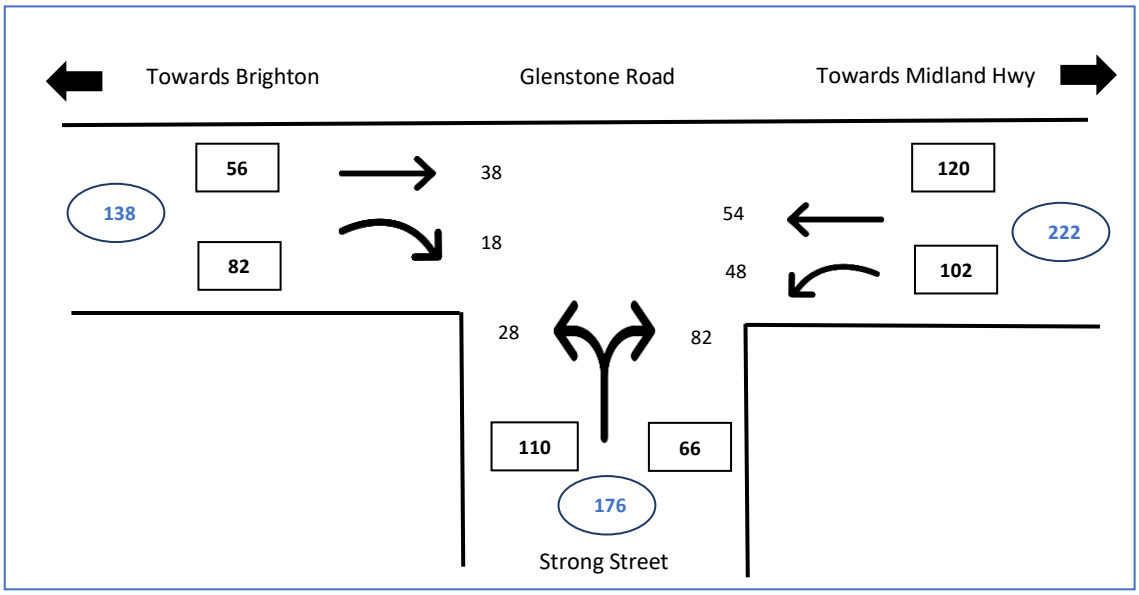


Diagram 11.1B – Evening peak hour traffic movements



11.2. Strong Street, Greenbanks Road and Lukaarlia Drive junction

Diagram 11.2A – Morning peak hour traffic movements

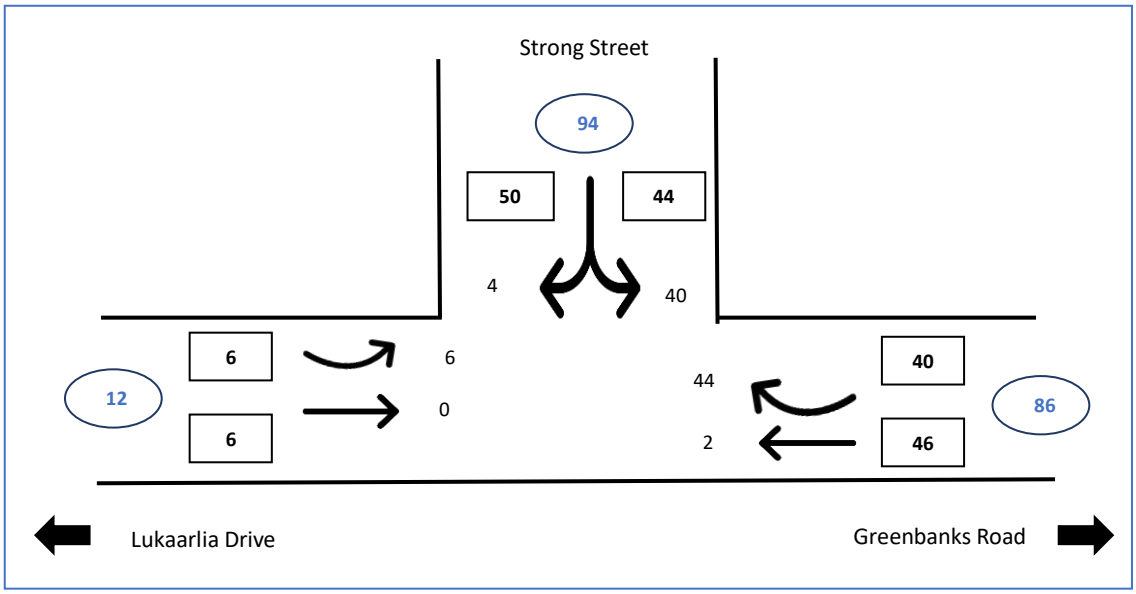
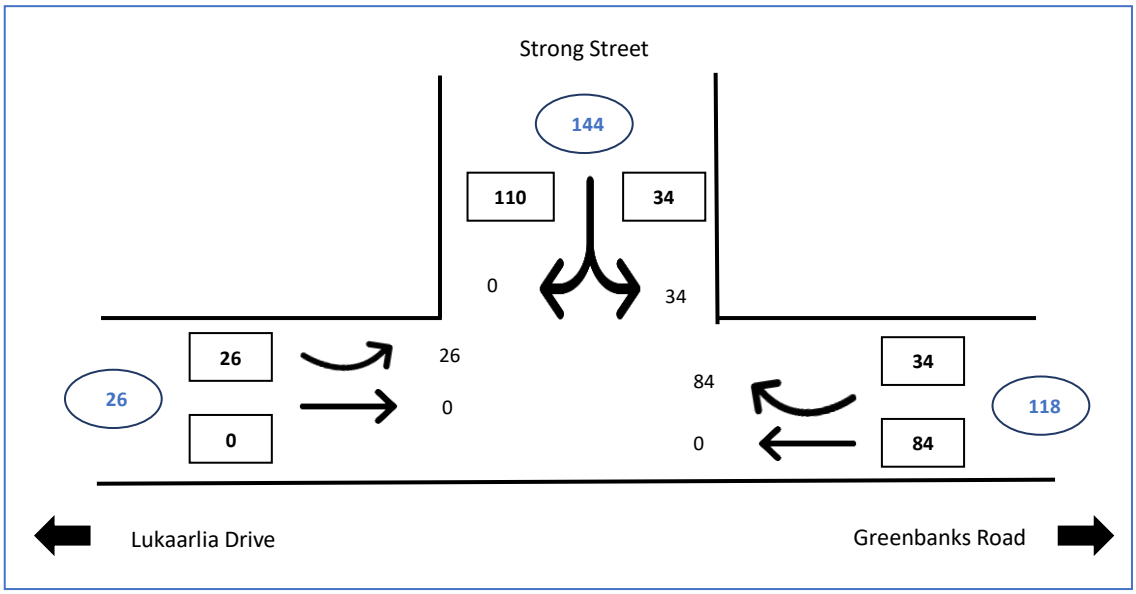


Diagram 11.2B – Evening peak hour traffic movements



12. Appendix B – Traffic modelling

Glenstone Road and Strong Street junction

Morning peak – Existing flows

MOVEMENT SUMMARY

Site: 101 [Glenstone Rd and Strong St - morning existing]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
South: Strong Street								
1	L2	8	50.0	0.007	6.3	LOS A	0.0	0.3
3	R2	86	50.0	0.122	8.1	LOS A	0.5	4.9
Approach		95	50.0	0.122	7.9	LOS A	0.5	4.9
East: Glenstorn Road								
4	L2	82	50.0	0.080	6.1	LOS A	0.0	0.0
5	T1	40	0.0	0.080	0.0	LOS A	0.0	0.0
Approach		122	33.6	0.080	4.1	NA	0.0	0.0
West: Glenstone Rd								
11	T1	67	50.0	0.046	0.0	LOS A	0.0	0.0
12	R2	34	50.0	0.027	6.7	LOS A	0.1	1.2
Approach		101	50.0	0.046	2.3	NA	0.1	1.2
All Vehicles		318	43.7	0.122	4.7	NA	0.5	4.9

Evening peak – Existing flows

MOVEMENT SUMMARY

Site: 101 [Glenstone Rd and Strong St - evening existing]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
South: Strong Street								
1	L2	29	50.0	0.024	6.4	LOS A	0.1	1.0
3	R2	86	50.0	0.112	7.5	LOS A	0.5	4.6
Approach		116	50.0	0.112	7.2	LOS A	0.5	4.6
East: Glenstorn Road								
4	L2	51	50.0	0.066	6.1	LOS A	0.0	0.0
5	T1	57	0.0	0.066	0.0	LOS A	0.0	0.0
Approach		107	23.5	0.066	2.9	NA	0.0	0.0
West: Glenstone Rd								
11	T1	40	50.0	0.027	0.0	LOS A	0.0	0.0
12	R2	19	50.0	0.015	6.6	LOS A	0.1	0.7
Approach		59	50.0	0.027	2.1	NA	0.1	0.7
All Vehicles		282	39.9	0.112	4.5	NA	0.5	4.6

Morning peak - Existing flows with development traffic

MOVEMENT SUMMARY

Site: 101 [Glenstone Rd and Strong St - morning with additional vehicles]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
South: Strong Street								
1	L2	8	50.0	0.007	6.3	LOS A	0.0	0.3
3	R2	87	50.0	0.124	8.2	LOS A	0.5	5.0
Approach		96	50.0	0.124	8.0	LOS A	0.5	5.0
East: Glenstorn Road								
4	L2	89	50.0	0.086	6.1	LOS A	0.0	0.0
5	T1	40	0.0	0.086	0.0	LOS A	0.0	0.0
Approach		129	34.6	0.086	4.2	NA	0.0	0.0
West: Glenstone Rd								
11	T1	67	50.0	0.046	0.0	LOS A	0.0	0.0
12	R2	36	50.0	0.029	6.8	LOS A	0.1	1.3
Approach		103	50.0	0.046	2.4	NA	0.1	1.3
All Vehicles		328	43.9	0.124	4.8	NA	0.5	5.0

Evening peak – Existing flows with development traffic

MOVEMENT SUMMARY

Site: 101 [Glenstone Rd and Strong St - evening with additional vehicles]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
South: Strong Street								
1	L2	33	50.0	0.026	6.4	LOS A	0.1	1.1
3	R2	94	50.0	0.122	7.5	LOS A	0.5	5.0
Approach		126	50.0	0.122	7.2	LOS A	0.5	5.0
East: Glenstorn Road								
4	L2	52	50.0	0.067	6.1	LOS A	0.0	0.0
5	T1	57	0.0	0.067	0.0	LOS A	0.0	0.0
Approach		108	23.8	0.067	2.9	NA	0.0	0.0
West: Glenstone Rd								
11	T1	40	50.0	0.027	0.0	LOS A	0.0	0.0
12	R2	19	50.0	0.015	6.6	LOS A	0.1	0.7
Approach		59	50.0	0.027	2.1	NA	0.1	0.7
All Vehicles		294	40.3	0.122	4.6	NA	0.5	5.0

Morning peak - Existing flows with development traffic and traffic growth of three percent over 10 years

MOVEMENT SUMMARY

Site: 101 [Glenstone Rd and Strong St - morning with developmnet and growth]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
South: Strong Street								
1	L2	13	50.0	0.010	6.3	LOS A	0.0	0.4
3	R2	118	50.0	0.187	9.2	LOS A	0.8	7.8
Approach		131	50.0	0.187	8.9	LOS A	0.8	7.8
East: Glenstorn Road								
4	L2	111	50.0	0.108	6.1	LOS A	0.0	0.0
5	T1	54	0.0	0.108	0.0	LOS A	0.0	0.0
Approach		164	33.7	0.108	4.1	NA	0.0	0.0
West: Glenstone Rd								
11	T1	91	50.0	0.062	0.0	LOS A	0.0	0.0
12	R2	48	50.0	0.042	7.0	LOS A	0.2	1.9
Approach		139	50.0	0.062	2.5	NA	0.2	1.9
All Vehicles		434	43.8	0.187	5.0	NA	0.8	7.8

Evening peak – Existing flows with development traffic and traffic growth of three percent over 10 years

MOVEMENT SUMMARY

Site: 101 [Glenstone Rd and Strong St - evening with development and growth]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
South: Strong Street								
1	L2	44	50.0	0.037	6.5	LOS A	0.1	1.5
3	R2	127	50.0	0.180	8.3	LOS A	0.8	7.6
Approach		172	50.0	0.180	7.8	LOS A	0.8	7.6
East: Glenstorn Road								
4	L2	68	50.0	0.089	6.1	LOS A	0.0	0.0
5	T1	77	0.0	0.089	0.0	LOS A	0.0	0.0
Approach		145	23.6	0.089	2.9	NA	0.0	0.0
West: Glenstone Rd								
11	T1	54	50.0	0.037	0.0	LOS A	0.0	0.0
12	R2	25	50.0	0.021	6.8	LOS A	0.1	0.9
Approach		79	50.0	0.037	2.2	NA	0.1	0.9
All Vehicles		396	40.3	0.180	4.9	NA	0.8	7.6

Strong Street, Greenbanks Road and Lukaarlia Drive junction

Morning peak – Existing flows

MOVEMENT SUMMARY

Site: 101 [Lukaarlia - strong - Greenbanks - Morning existing]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
South: Lukaarlia Drive								
1	L2	6	50.0	0.005	6.1	LOS A	0.0	0.0
2	T1	1	50.0	0.005	0.0	LOS A	0.0	0.0
Approach		7	50.0	0.005	5.2	NA	0.0	0.0
North: Greenbacks Road								
8	T1	2	50.0	0.001	0.0	LOS A	0.0	0.0
9	R2	46	50.0	0.032	6.1	LOS A	0.1	1.5
Approach		48	50.0	0.032	5.8	NA	0.1	1.5
West: Strong Street								
10	L2	42	50.0	0.037	6.1	LOS A	0.1	1.5
12	R2	4	50.0	0.037	6.6	LOS A	0.1	1.5
Approach		46	50.0	0.037	6.2	LOS A	0.1	1.5
All Vehicles		102	50.0	0.037	5.9	NA	0.1	1.5

Evening peak – Existing flows

MOVEMENT SUMMARY

Site: 101 [Lukaarlia - strong - Greenbanks - Evening existing]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
South: Lukaarlia Drive								
1	L2	27	50.0	0.021	6.1	LOS A	0.0	0.0
2	T1	1	50.0	0.021	0.0	LOS A	0.0	0.0
Approach		28	50.0	0.021	5.9	NA	0.0	0.0
North: Greenbacks Road								
8	T1	2	50.0	0.001	0.0	LOS A	0.0	0.0
9	R2	88	50.0	0.064	6.2	LOS A	0.3	3.0
Approach		91	50.0	0.064	6.1	NA	0.3	3.0
West: Strong Street								
10	L2	36	50.0	0.029	6.1	LOS A	0.1	1.2
12	R2	1	50.0	0.029	7.1	LOS A	0.1	1.2
Approach		37	50.0	0.029	6.2	LOS A	0.1	1.2
All Vehicles		156	50.0	0.064	6.1	NA	0.3	3.0

Morning peak - Existing flows with development traffic

MOVEMENT SUMMARY

Site: 101 [Lukaarlia - strong - Greenbanks - Morning with development]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
South: Lukaarlia Drive								
1	L2	7	50.0	0.006	6.1	LOS A	0.0	0.0
2	T1	1	50.0	0.006	0.0	LOS A	0.0	0.0
Approach		8	50.0	0.006	5.4	NA	0.0	0.0
North: Greenbacks Road								
8	T1	2	50.0	0.001	0.0	LOS A	0.0	0.0
9	R2	46	50.0	0.033	6.1	LOS A	0.1	1.5
Approach		48	50.0	0.033	5.8	NA	0.1	1.5
West: Strong Street								
10	L2	42	50.0	0.048	6.1	LOS A	0.2	1.9
12	R2	14	50.0	0.048	6.6	LOS A	0.2	1.9
Approach		56	50.0	0.048	6.2	LOS A	0.2	1.9
All Vehicles		113	50.0	0.048	6.0	NA	0.2	1.9

Evening peak – Existing flows with development traffic

MOVEMENT SUMMARY

Site: 101 [Lukaarlia - strong - Greenbanks - Evening with development]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
South: Lukaarlia Drive								
1	L2	36	50.0	0.027	6.1	LOS A	0.0	0.0
2	T1	1	50.0	0.027	0.0	LOS A	0.0	0.0
Approach		37	50.0	0.027	5.9	NA	0.0	0.0
North: Greenbacks Road								
8	T1	2	50.0	0.001	0.0	LOS A	0.0	0.0
9	R2	88	50.0	0.064	6.3	LOS A	0.3	3.0
Approach		91	50.0	0.064	6.1	NA	0.3	3.0
West: Strong Street								
10	L2	36	50.0	0.030	6.1	LOS A	0.1	1.2
12	R2	2	50.0	0.030	7.2	LOS A	0.1	1.2
Approach		38	50.0	0.030	6.2	LOS A	0.1	1.2
All Vehicles		165	50.0	0.064	6.1	NA	0.3	3.0

Morning peak - Existing flows with development traffic and traffic growth of three percent over 10 years

MOVEMENT SUMMARY

Site: 101 [Lukaarlia - strong - Greenbanks - Morning with development and growth]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
South: Lukaarlia Drive								
1	L2	9	50.0	0.008	6.1	LOS A	0.0	0.0
2	T1	2	50.0	0.008	0.0	LOS A	0.0	0.0
Approach		12	50.0	0.008	5.0	NA	0.0	0.0
North: Greenbacks Road								
8	T1	3	50.0	0.002	0.0	LOS A	0.0	0.0
9	R2	62	50.0	0.044	6.1	LOS A	0.2	2.0
Approach		65	50.0	0.044	5.8	NA	0.2	2.0
West: Strong Street								
10	L2	57	50.0	0.063	6.1	LOS A	0.3	2.6
12	R2	17	50.0	0.063	6.8	LOS A	0.3	2.6
Approach		74	50.0	0.063	6.3	LOS A	0.3	2.6
All Vehicles		151	50.0	0.063	6.0	NA	0.3	2.6

Evening peak – Existing flows with development traffic and traffic growth of three percent over 10 years

MOVEMENT SUMMARY

Site: 101 [Lukaarlia - strong - Greenbanks - Evening with development and growth]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
South: Lukaarlia Drive								
1	L2	53	50.0	0.040	6.1	LOS A	0.0	0.0
2	T1	2	50.0	0.040	0.0	LOS A	0.0	0.0
Approach		55	50.0	0.040	5.9	NA	0.0	0.0
North: Greenbacks Road								
8	T1	3	50.0	0.002	0.0	LOS A	0.0	0.0
9	R2	119	50.0	0.089	6.4	LOS A	0.4	4.2
Approach		122	50.0	0.089	6.2	NA	0.4	4.2
West: Strong Street								
10	L2	48	50.0	0.041	6.1	LOS A	0.2	1.7
12	R2	3	50.0	0.041	7.7	LOS A	0.2	1.7
Approach		52	50.0	0.041	6.2	LOS A	0.2	1.7
All Vehicles		228	50.0	0.089	6.1	NA	0.4	4.2

13. Appendix C – Vehicle swept paths

Diagram 13.0 – Swept path of AV turning into the development site

Diagram 13.1 – Swept path of AV turning out of the development site

ALDANMARK
CONSULTING ENGINEERS

Lower Ground – 199 Macquarie Street
Hobart TAS 7000
(03) 6234 8666
mail@aldanmark.com.au
www.aldanmark.com.au

ENGINEERS ADVICE

240829 ED 23E99-98 COUNCIL STORMWATER RFI

To: Leigh Wighton **Brighton Council** leigh.wighton@brighton.tas.gov.au

Cc:

INSPECTION ☐

INSTRUCTION ☐

MEMO ☐

RFI RESPONSE ☒

SHOP DRAWING APPROVAL ☐

PROJECT:	Southern Steel Properties: Lots 10 & 11 Ashburton Estate, Bridgewater
SUBJECT:	Response to Council Stormwater RFI (29/08/2024)

RELEVANT DOCUMENTS:

- Correspondence from Brighton Council – 15 Lukaarlia Drive_FRAI (DA2024 / 00093) 9th August 2024

COMMENTS:

Response below as requested:

1. *Is your design discharge of 205l/s for the ultimate design or just what is being applied for?*

   205 L/s is for the current proposal. Detention is only required as we can't convey the 205L/s in the DN300 connection. The title allowable permissible discharge is approx. 327L/s (80% impervious)

2. *Do you have a proposed SW treatment system?*

   OceanProtect Proprietary devices will be used to meet the State Stormwater Targets. Did the subdivision allow for WSUD based on future development?

3. *Will the detention and treatment systems be installed for the ultimate development or just what is being applied for now?*

   Detention will be designed for the current proposal; future detention volume will be manifolded to meet the existing DN300 stormwater property connection capacity.

Regards,

Notes:

1. Inspections/instructions conducted by Aldanmark are for structural purposes and are not approvals to proceed and do not override the Building Act 2016 requirement for mandatory notification to the Building Surveyor by the Builder or Superintendent for inspection of works in progress and cannot be used as the sole method of assessment to grant approval to proceed.
2. Inspections/instructions by Aldanmark do not include components of the current National Construction Code that are outside the areas of structural engineering.
3. In cases where building approval is required but has not yet been obtained, this advice must not be used as the basis for performing any works until such approvals are in place.
4. Any advice that results in an alteration to certified documentation must be approved by the Superintendent and Building Surveyor prior to carrying out those works. Such advice assumes a nil cost variation and is based on that expectation. The contractor must obtain approval from the Superintendent prior to commencing any of these works.

ALDANMARK
CONSULTING ENGINEERS

Tom Hazi Dip CivEng Cert IV BldgDes
Associate & Structural Engineering Technician

TH

Tom Hazi <Thazi@aldanmark.com.au>

To: Leigh Wighton; **Cc:** Kelly Min

Caution: This is an external email and may be **malicious**. Please take care when clicking links or opening attachments.

Hi Leigh,

see the below in response regarding our phone discussion,

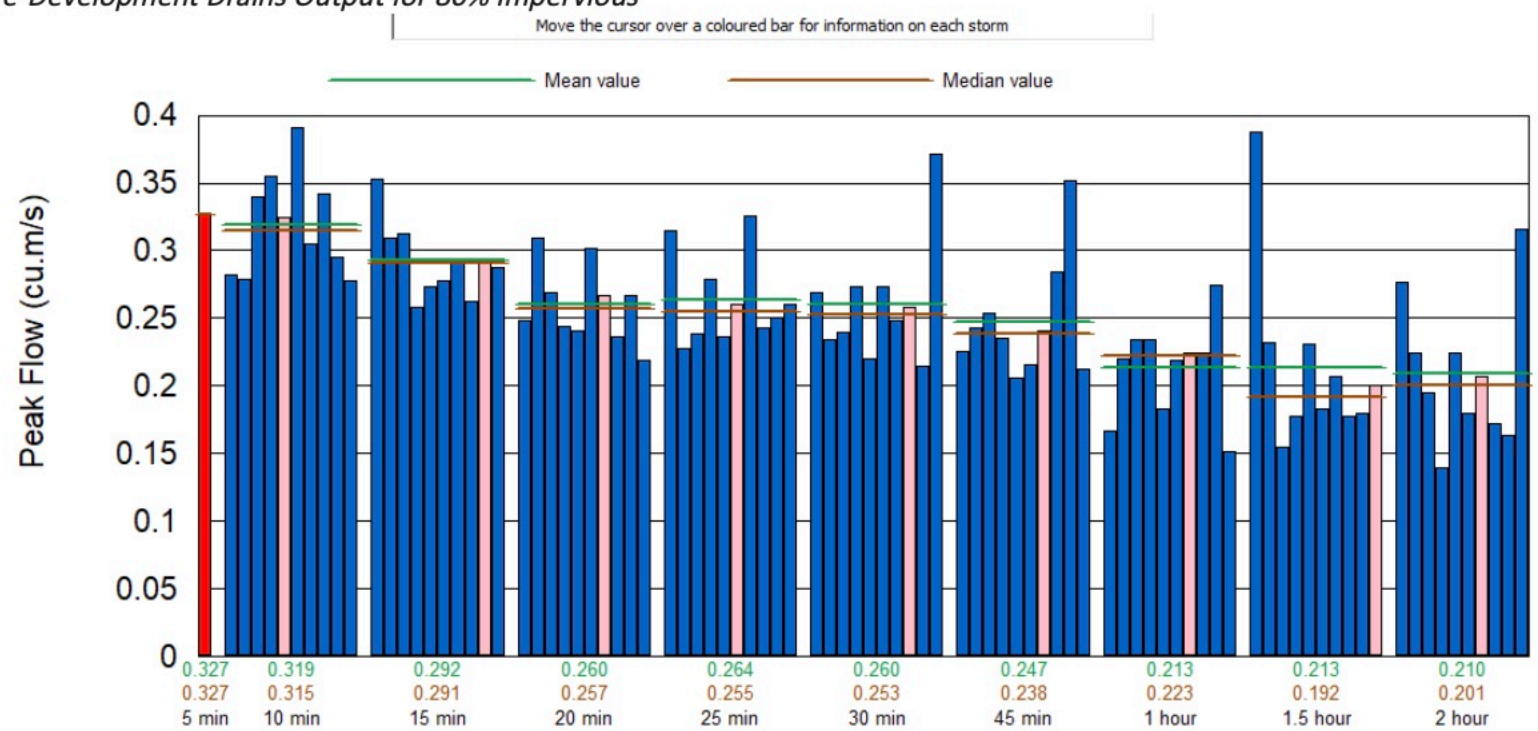
- The proposed development use will be 'Manufacturing and Processing' (as per the TIA document)
- Stormwater Management – Detention will be required (can you please condition this item?)
  stormwater calculations below for reference

  as per Council's advice at the subdivision design principles:

  Advice: The subdivision piped network has been designed to accommodate an 80% impervious area. Providing the property connection (DN300) is adequate, detention may not be required. However, your application must provide this information.

  The permissible site discharge is 327 L/s for 80% impervious across the 1.43Ha during a 2%AEP storm. We're discharging about 205 L/s during a 2% AEP storm.

  Pre-Development Drains Output for 80% Impervious



As the site only has one DN300 stormwater property connection, detention will be required to reduce the internal outflow to allow for a free-flowing discharge to Councils network.

Submission to Planning Authority Notice

Application details

Council Planning Permit No.	DA 2024 / 00093
Council notice date	9/05/2024
TasWater Reference No.	TWDA 2024/00553-BTN
Date of response	06/08/2024
TasWater Contact	Timothy Carr
Phone No.	0419 306 130

Response issued to

Council name	BRIGHTON COUNCIL
Contact details	development@brighton.tas.gov.au

Development details

Address	15 LUKAARLIA DR, BRIDGEWATER
Property ID (PID)	9638588
Description of development	New Warehouse

Schedule of drawings/documents

Prepared by	Drawing/document No.	Revision No.	Issue date
Aldanmark	Proposed Site Plan – A003	D	20/06/2024
Aldanmark	Proposed Ground Floor Plan – A004	D	20/06/2024
Aldanmark	Sewer And Water Plan – C108	C	01/08/2024

Conditions

Pursuant to the *Water and Sewerage Industry Act* 2008 (TAS) Section 56P(1) TasWater imposes the following conditions on the permit for this application:

CONNECTIONS, METERING & BACKFLOW

1. A suitably sized water supply with metered connections and sewerage system and connections to the development must be designed and constructed to TasWater's satisfaction and be in accordance with any other conditions in this permit.

   Advice: *TasWater will not accept direct fire boosting from the network unless it can be demonstrated that the periodic testing of the system will not have a significant negative effect on our network and the minimum service requirements of other customers serviced*

by the network. To this end break tanks may be required with the rate of flow into the break tank controlled so that peak flows to fill the tank do not also cause negative effect on the network.

2. Any removal/supply and installation of water meters and/or the removal of redundant and/or installation of new and modified property service connections must be carried out by TasWater at the developer's cost.

3. Prior to commencing construction of the development, any water connection utilised for construction must have a backflow prevention device and water meter installed, to the satisfaction of TasWater.

DEVELOPER CHARGES

4. Prior to TasWater issuing a Certificate(s) for Certifiable Work (Building) and/or (Plumbing), the applicant or landowner as the case may be, must pay a developer charge totalling $1,757.00 to TasWater for water infrastructure for 1.00 additional Equivalent Tenements, indexed by the Consumer Price Index All groups (Hobart) from the date of this Submission to Planning Authority Notice until the date it is paid to TasWater.
5. Prior to TasWater issuing a Certificate(s) for Certifiable Work (Building) and/or (Plumbing), the applicant or landowner as the case may be, must pay a developer charge totalling $3,514.00 to TasWater for sewerage infrastructure for 2.00 additional Equivalent Tenements, indexed by the Consumer Price Index All groups (Hobart) from the date of this Submission to Planning Authority Notice until the date it is paid to TasWater.

DEVELOPMENT ASSESSMENT FEES

6. The applicant or landowner as the case may be, must pay a development assessment fee of $403.51 to TasWater, as approved by the Economic Regulator and the fees will be indexed, until the date paid to TasWater.

   The payment is required within 30 days of the issue of an invoice by TasWater.

Advice

General

For information on TasWater development standards, please visit
https://www.taswater.com.au/building-and-development/technical-standards
For application forms please visit
https://www.taswater.com.au/building-and-development/development-application-form

Developer Charges

For information on Developer Charges please visit the following webpage -
https://www.taswater.com.au/building-and-development/developer-charges

Service Locations

Please note that the developer is responsible for arranging to locate the existing TasWater infrastructure and clearly showing it on the drawings. Existing TasWater infrastructure may be located by a surveyor and/or a private contractor engaged at the developers cost to locate the infrastructure.

(a) A permit is required to work within TasWater's easements or in the vicinity of its infrastructure. Further information can be obtained from TasWater.

(b) TasWater has listed a number of service providers who can provide asset detection and location services should you require it. Visit https://www.taswater.com.au/building-and-development/service-locations for a list of companies.

(c) Sewer drainage plans or Inspection Openings (IO) for residential properties are available from your local council.

Declaration

The drawings/documents and conditions stated above constitute TasWater's Submission to Planning Authority Notice.