Co-operative Bulk Handling Ltd
ABN 29 256 604 947
Level 6, 240 St Georges Terrace
Perth WA 6000 Australia
GPO Box L886
Perth WA 6842 Australia
Telephone
+61 8 9237 9600
Grower Service Centre
1800 199 083
cbh.com.au

21 September 2026

Alan Leeson
Chief Executive Officer
Shire of Kulin
Via email: shire@kulin.wa.gov.au

Dear Alan,

LOT 302 ON DEPOSITED PLAN 32191 – PROPOSED GRAIN HANDLING & STORAGE FACILITY.

CBH is seeking development approval from the Shire of Kulin for two open storage bulkheads adjacent to its existing grain processing facility located at Lot 302 on Deposited Plan 32191, Kulin.

As you would be aware, CBH received a record harvest in FY25/26 and the existing network at the time was not able to cope with the increased storage demand. To accommodate this storage shortfall CBH added ~1.7 million tonnes of low specification storage to the network. CBH intends to convert this temporary low specification storage to permanent through the development application process.

At a Council Meeting on 17th September 2025, the Shire of Kulin approved a request by CBH for a temporary works exemption for two open storage bulkheads (TBH02 & TBH03) and associated vehicular access and drainage works adjacent to its Pingaring facility. This temporary works exemption will expire on 18th November 2026 being 12 months following construction of the bulkheads.

The recent FY25/26 harvest was the largest on record with 24.2 million tonnes received across the network and there was considerable feedback about the growing crop size taking into consideration the innovative practices of growers and accelerated conversion of hectares from sheep to cropping.

As such we are currently in the process of preparing for a storage shortfall for the FY26/27 harvest and preparing for larger crops sooner than originally contemplated. To address this increased demand, it is proposed to retain the open storage bulkheads (TBH02 & TBH03) the subject of the temporary works exemption that has a lower specification than permanent bulkhead storage such as a gravel or dirt basecourse serviced with Drive Over Grids (DOGs).

The subject application is proposed in accordance with Clause 68 of Schedule 2 (Deemed Provisions) of the Planning and Development (Local Planning Schemes) Regulations 2015 and the provisions of the Shire of Kulin Local Planning Scheme No. 2.

The two main items of consideration for an application of this type are traffic generation and stormwater management.

Stormwater Management

A Stormwater Management Plan has been provided in support of this application for development approval. The Stormwater Drainage Report describes how the objectives for the stormwater drainage have been met for a 20% AEP or 5 Year ARI.

- Stormwater outflows have been limited to predevelopment flows.
- Culverts & trapezoidal drains are sized to provide 150mm freeboard to the adjacent pavements.
- The velocities were less than 2 m/s.
- An area outside the site were identified to be subject to flooding.

Traffic Management

A Traffic Impact Statement has been provided in support of this application for development approval and concludes the following:

- CBH estimate that the proposed storage increase will result in a decrease of 323 total truck movements, or 7 daily truck movements during the 45-day harvest period, as Harvest Essential Moves will no longer be required. Whilst truck volumes will increase in some sections of the road network due to movements between the two sites, these are minimal and at worst 1x movement in the peak hour.

- The estimated traffic generation can be accommodated within the capacity of the adjacent road network.

- The crash history does not suggest any inherent safety issues in the existing road network that would be materially worsened by the proposal.

- The existing sealed and carriageway widths of the surrounding road are above the minimum road width for their relative RAV categories.

- The available sight distances at all intersections/accesses meet the minimum requirements.

- Based on MRWA's intersection configuration warrant assessment tool warrants the following:
  - CBH Access/Luke Price Street – BAR (Basic Right Turn) / BAL (Basic Left Turn)
  - CBH Site Exit/Commonwealth Road – SR (Simple Right Turn) /SL (Simple Left Turn)
  - North Lake Grace-Karlgarin Rd/Commonwealth Road – BAR/BAL
  - New Site Entry /N Lake Grace-Karlgarin Rd – SR/BAL
  - New Site Exit /N Lake Grace-Karlgarin Rd – SR/SL
  - Luke Price Street/N Lake Grace-Karlgarin Rd – BAR/BAL

- Given that the intersections are generally being used in the same manner as they are currently and/or there is only a small increase in traffic for certain movements, no modifications are recommended, except for the CBH Exit onto Commonwealth Road where it is recommended that the pavement be sealed to provide an obvious travel path and protect the existing sealed pavement from damage and deposition of gravel.

- The swept path analysis indicates that:
  - The designated movements using RAV 7 vehicles can be completed within the existing intersection extents at the existing CBH Site Access/Luke Price Street intersection, CBH site exit/Commonwealth Road intersection, North Lake Grace-Karlgarin Rd/Commonwealth Rd intersection and the Luke Price Street/N Lake Grace-Karlgarin Rd. However, the movements do not allow for lane-correct movements, or for two opposing vehicles to pass each other within the intersection. In accordance with MRWA's Standard RAV Route Assessment Guidelines, this is acceptable given that there is adequate sight distance in all directions.
  - The designated movements using RAV 7 vehicles can be completed within the existing intersection geometry at the proposed site entry and exit intersection on North Lake Grace-Karlgarin Road.

CBH understands the Shire of Kulin would prefer CBH take egress from the existing facility onto N Lake Grace – Karlgarin Road in lieu of the existing arrangement via Commonwealth Road. Egress onto N Lake Grace- Karlgarin Road from the existing facility removes the ability for the future expansion of the Pingaring facility. The reason CBH did not develop at the existing site to support the FY25/26 record harvest was due to the permit requirements for the clearing of native vegetation.

The CBH Master Plan for the existing facility has future storage bulkheads, accessways and drainage infrastructure in the location the Shire of Kulin would prefer CBH relocate its site egress to. Site egress onto N Lake Grace- Karlgarin Road will require the removal of native vegetation. CBH does not undertake the clearing of native vegetation lightly due to the onerous and costly environmental clearing permits and will always seek to design around native vegetation where possible.

Further the low spec storage the subject of this development application is only to support future peak seasons. In a low or average season there is every possibility that this storage will not be utilised.

The recovery of expenses for road damage and repairs caused by heavy traffic is governed by the Road Traffic (Administration) Act 2008 which is independent of the development application process. It is our preference that a road condition report be conditioned as part of any development approval and any future road damage that does occur can be assessed against that report.

Conclusion

The proposed retention of the two open storage bulkheads (TBH02 & TBH03) is aligned with the planning framework and is not considered to result in any new amenity impacts to the surrounding area. CBH respectfully requests the Application for Development Approval is considered by the Shire of Kulin expeditiously given the straightforward nature of the application, the bulkheads have already been constructed with no known amenity impacts as well as its general compliance with the Shire's planning framework.

I look forward to hearing from you and if there is any further information that I can provide to assist with Council's consideration of my application, please do not hesitate to contact me on 08 9216 6061 or timothy.roberts@cbh.com.au

Yours Sincerely,



Timothy Roberts
Lead – Planning & Approvals

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
2221	**360**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 302 ON DEPOSITED PLAN 32191

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

CO-OPERATIVE BULK HANDLING LIMITED OF LEVEL 6 240 ST GEORGES TERRACE PERTH WA 6000
(T Q667393) REGISTERED 21/11/2025

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

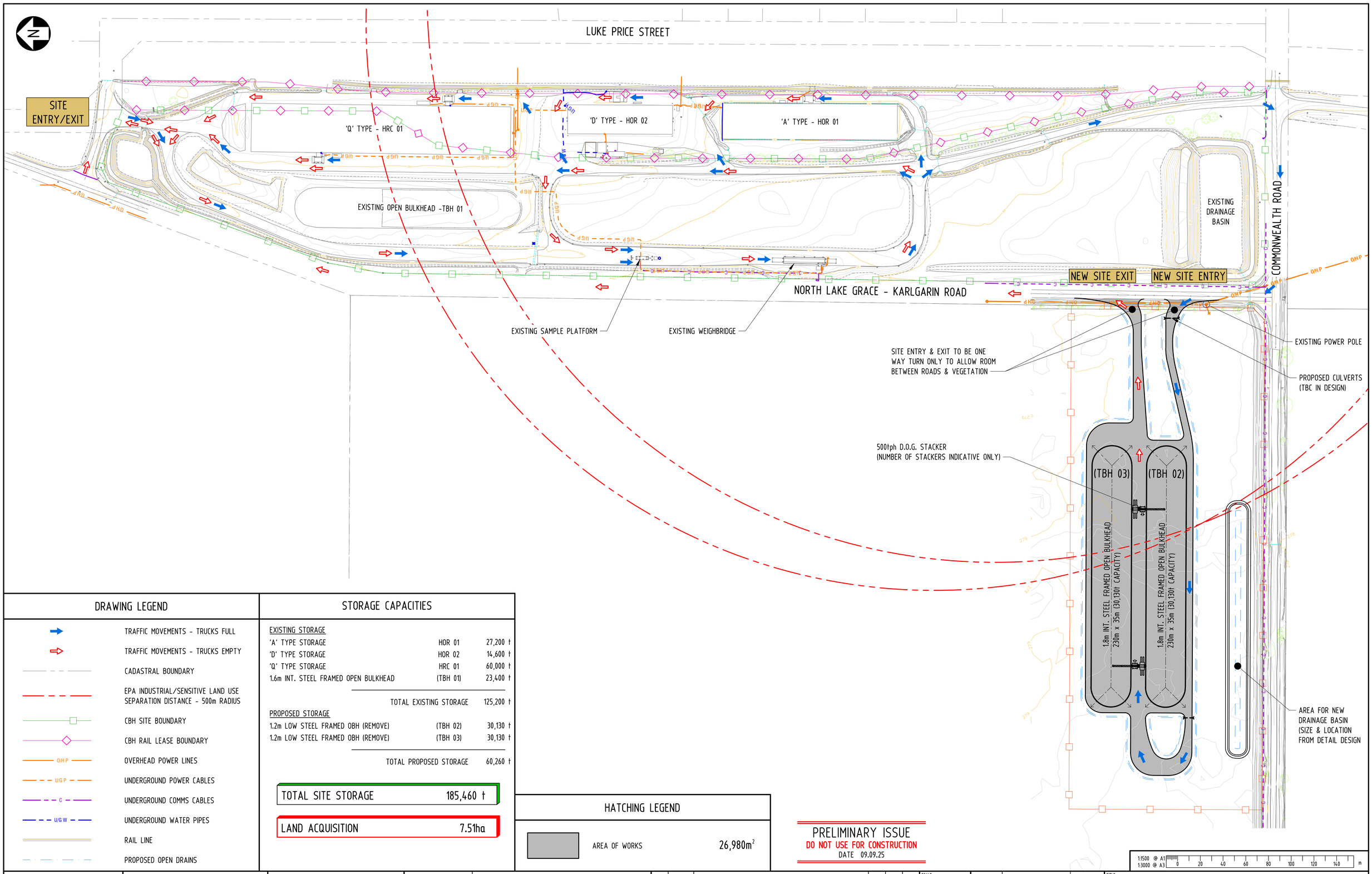
STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP32191
PREVIOUS TITLE:	1739-300
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY:	SHIRE OF KULIN

LANDGATE COPY OF ORIGINAL NOT TO SCALE 21/09/2026 05:02 PM Request number: 70420078

Landgate
www.landgate.wa.gov.au



DRAWING LEGEND

- TRAFFIC MOVEMENTS - TRUCKS FULL
- TRAFFIC MOVEMENTS - TRUCKS EMPTY
- CADASTRAL BOUNDARY
- EPA INDUSTRIAL/SENSITIVE LAND USE SEPARATION DISTANCE - 500m RADIUS
- CBH SITE BOUNDARY
- CBH RAIL LEASE BOUNDARY
- O/H P — OVERHEAD POWER LINES
- U/G P — UNDERGROUND POWER CABLES
- C — UNDERGROUND COMMS CABLES
- U/G W — UNDERGROUND WATER PIPES
- RAIL LINE
- PROPOSED OPEN DRAINS

STORAGE CAPACITIES

EXISTING STORAGE		
'A' TYPE STORAGE	HOR 01	27,200 t
'D' TYPE STORAGE	HOR 02	14,600 t
'Q' TYPE STORAGE	HRC 01	60,000 t
1.6m INT. STEEL FRAMED OPEN BULKHEAD	(TBH 01)	23,400 t
TOTAL EXISTING STORAGE		125,200 t
PROPOSED STORAGE		
1.2m LOW STEEL FRAMED OBH (REMOVE)	(TBH 02)	30,130 t
1.2m LOW STEEL FRAMED OBH (REMOVE)	(TBH 03)	30,130 t
TOTAL PROPOSED STORAGE		60,260 t

TOTAL SITE STORAGE 185,460 t

LAND ACQUISITION 7.51ha

HATCHING LEGEND

AREA OF WORKS 26,980m²

PRELIMINARY ISSUE
DO NOT USE FOR CONSTRUCTION
DATE 09.09.25

1:1500 @ A1
1:3000 @ A3
0 20 40 60 80 100 120 140 m

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ABN 29 256 604 947

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PERTH W.A. 6000
PH (08) 9237 9600
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REF DRAWING No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	BY	CHK'D	APP'D
-	-	A	09.09.25	ISSUED AS CHECK PRINT AND FOR REVIEW	JB		

SCALE	1:1500	
SHEET	A1	
PROJECT		
CO-ORDINATE SYSTEM	KONDININ94	
DRAWN	J. Bullingham	09.09.25
CHECKED		
DESIGNED		
DESIGN APPR		
PROJECT APPR		

TITLE
PINGARING
2025 PEAK PLANNING
2 x ADDITIONAL OPEN BULKHEADS
CONCEPTUAL LAYOUT No. 5

DRG No 574-ENG-CI-DCO-0005 | SHEET 1 OF 1 | REV. A

INSTALLATION NOTES:

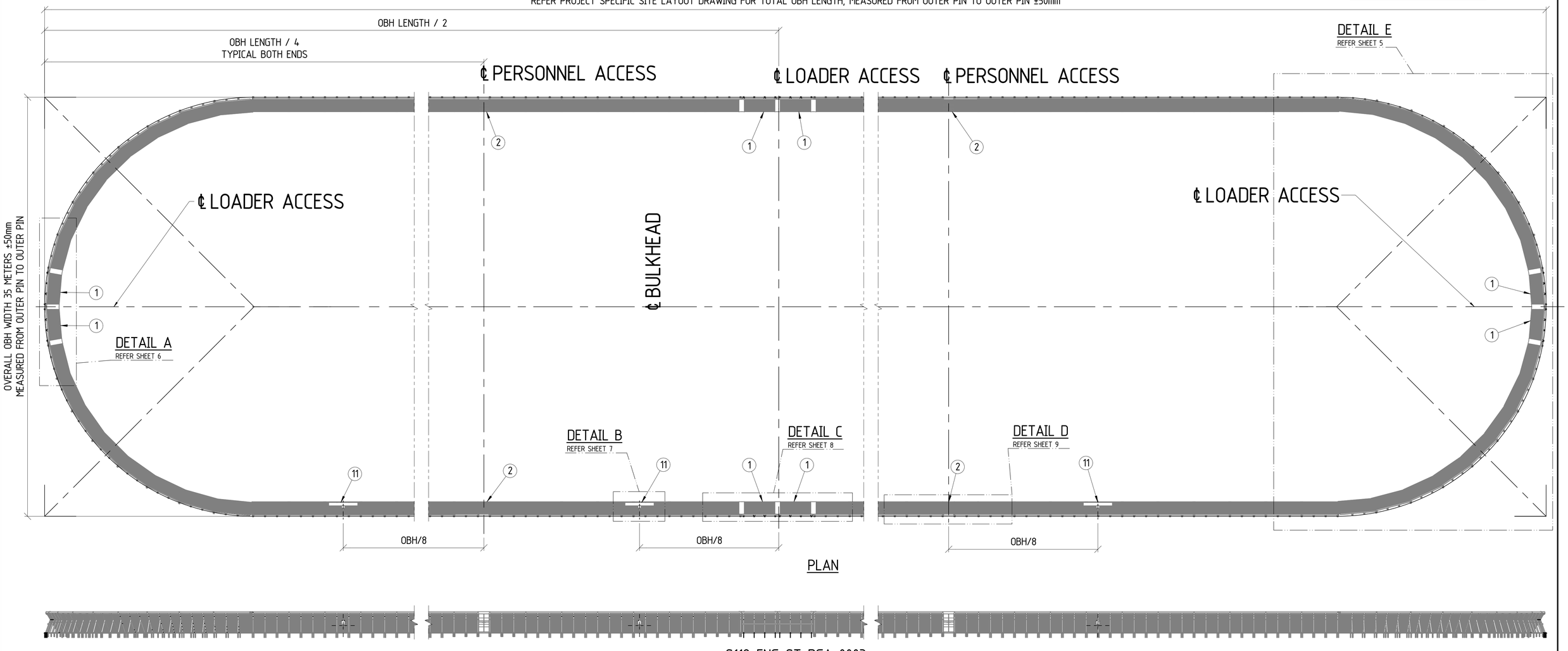
1. OBH LENGTH AND WIDTH DIMENSIONS ARE SPECIFIED FROM REAR PIN TO THE OPPOSITE REAR PIN. REFER PROJECT SPECIFIC SITE LAYOUT DRAWING FOR DIMENSIONS.
2. TOLERANCE FOR OVERALL OBH WIDTH AND LENGTH ARE +/- 50MM. TOLERANCE FOR FRAME SPACING +/- 10mm.
3. NOTE DIFFERENT ANCHORING DETAILS FOR DOOR/GATES AND FRAMES EITHER SIDE OF BULKHEAD OPENINGS. REFER ANCHORING DETAILS ON SHEETS 2 AND 3.
4. NOTE ADDITIONAL Z-CAPPING, WOOD AND CLADDING TRIMMING REQUIRED AT GATE JOINS. REFER SHEETS 6 AND 8 FOR DETAILS.
5. TYPICAL CLADDING OVERLAP IS 200mm, CENTERERED OVER THE CENTERLINE OF THE STRUT, FOR ALL JOINS EXCEPT AT GATE AND DOOR JOINS. REFER SHEETS 6 - 9.
6. ALL Z-CAPPING MUST BE ALIGNED AS ACCURATELY AS POSSIBLE. ANY MISALIGNMENT IN Z-CAPPING WILL TEAR THE OBH TARP. REFER NOTES ON SHEETS 6, 8 AND 9 FOR TOLERANCES.
7. FOUR PERSONNEL ACCESS DOORS TO BE INSTALLED AS SHOWN. TWO INSTALLED EACH SIDE AT MIDPOINTS BETWEEN END OF OBH AND CENTRE BULKHEAD OPENING.
8. THREE FUMIGATION T-PIECES TO BE INSTALLED ON SAME SIDE AS ELECTRICAL CONNECTION. REFER SHEETS 1 AND 7 FOR INSTALLATION DETAILS. REFER CBH DRAWING S119-ENG-ME-DER-0001 FOR VENDOR DRAWING OF T-PIECE.
9. DRAWING DEPICTS TYPICAL OBH SIZE OF 35M WIDE BY 300M LONG AND ASSOCIATED STANDARDISED REQUIRED QUANTITIES OF FUMIGATION TEES, PERSONAL ACCESS DOORS AND FRONT END LOADER ACCESS GATES. SITE SPECIFIC OBH REQUIREMENTS SHALL BE CONFIRMED WITH THE NOMINATED CBH REPRESENTATIVE PRIOR TO CONSTRUCTION.
10. BULKHEAD CONTENTS ARE INTENDED TO BE FUMIGATED IN A SEALED ENVIRONMENT BY USE OF WALL CANVICON AND OVER STACK TARPS - THE CONTRACTOR SHALL MINIMISE ANY MEANS WHICH COULD DETRIMENTALLY AFFECT THE SEALING CAPABILITY, SUCH AS SHARP EDGES THAT COULD CUT TARP.

PARTS LIST (PER UNIT)

ITEM No	DESCRIPTION	WIDTH	LENGTH	QTY	CBH OR SUPPLIER PART No	PROCESS	SAP Code	MASS Kg	TO DETAIL
1	FRONT END LOADER ACCESS GATE			REFER NOTE	S119-ENG-ST-ASY-0034	FIELD FIT	N/A	184.4	Yes
2	PERSONNEL ACCESS DOOR			REFER NOTE	S119-ENG-ST-ASY-0017	FITTING	N/A	17.1	Yes
3	STRAIGHT PIN STRUT ASSEMBLY			REFER NOTE	S119-ENG-ST-ASY-0004	FITTING	N/A	36.4	Yes
4	SPIRAL PIN STRUT ASSEMBLY			REFER NOTE	S119-ENG-ST-ASY-0005	FITTING	N/A	36.2	Yes
5	CUSTOM ORB ZINC ALUME 0.42mm BMT 550 MPa MIN. (YIELD)	762	3200	REFER NOTE	S119-ENG-ST-PRT-0010	FITTING	DREQ	1.3	No
6	DIA 20 STRAIGHT PIN ANCHOR		420	REFER NOTE	S-014-A0000	FIELD KIT	DREQ	1.1	Yes
7	SPIRAL PIN ANCHOR		300	REFER NOTE	S119-ENG-ST-DER-0052	FITTING	DREQ	0.8	Yes
8	Z CAPPING 1.6PL PGI	300	3000	REFER NOTE	S119-ENG-ST-PRT-0011	FAB SHEET	108015	11.4	Yes
9	TIMBER SAWN KARRI STRUC3 75mmx50mmx3m	75	3000	REFER NOTE	S119-ENG-ST-PRT-0014	FITTING	108594	6.2	No
10	TARP CLAMP 6PL	130	257	REFER NOTE	S119-ENG-ST-PRT-0012	FAB PROFILE	107901	1.6	Yes
11	FUMIGATION TEE PIECE			REFER NOTE	S119-ENG-ME-DER-0001	FITTING	N/A		Yes
12	RUBBER STRIP 450mm WIDE, 8mm THICK	450	2050	REFER NOTE	S119-ENG-ST-PRT-0048	FIELD KIT	DREQ	6.9	No
13	M10 x 120 GALV BOLT GR8.8 (50mm THREAD Min.)			REFER NOTE		FIELD KIT	DREQ	0.1	No
14	M10 GALV. NUT			REFER NOTE		FIELD KIT	DREQ	0.0	No
15	M10 GALV FW			REFER NOTE		FIELD KIT	DREQ	0.0	No
16	METAL TEK SCREW, HEX HEAD, 14g-20x22mm, CLASS 4, WITH SEAL			REFER NOTE		FIELD KIT	DREQ	0.0	No
17	METAL TEK SCREW, HEX HEAD, 14g-20x45mm, CLASS 4, WITH SEAL			REFER NOTE		FIELD KIT	DREQ		No
18	NOVALAST LTM 151			REFER NOTE		FIELD KIT	DREQ		No
19	BOSTIK SEAL AND FLEX 1			REFER NOTE		FIELD KIT	DREQ		No

** QTY NOTE: TO CALCULATE EXACT ORDER QUANTITYS, REFER TO THE 'CBH OBH PROCUREMENT CALCULATOR'-S119-ENG-ST-CAL-0001

REFER PROJECT SPECIFIC SITE LAYOUT DRAWING FOR TOTAL OBH LENGTH, MEASURED FROM OUTER PIN TO OUTER PIN ±50mm



PLAN

S119-ENG-ST-DGA-0003

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PERTH W.A 6000
PH (08) 9237 9600 FAX (08) 9322 3942

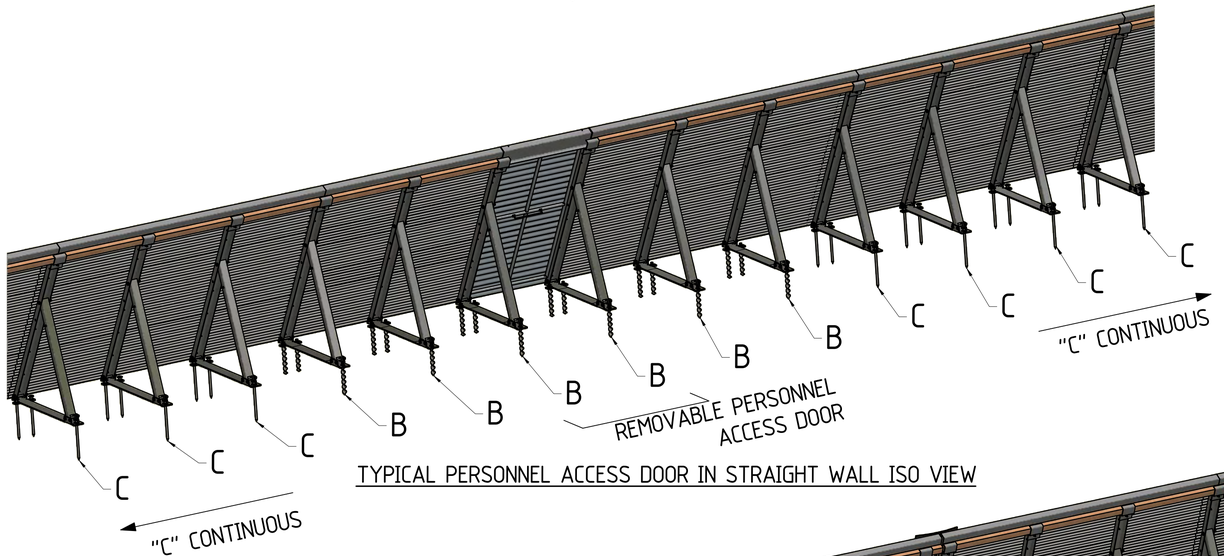
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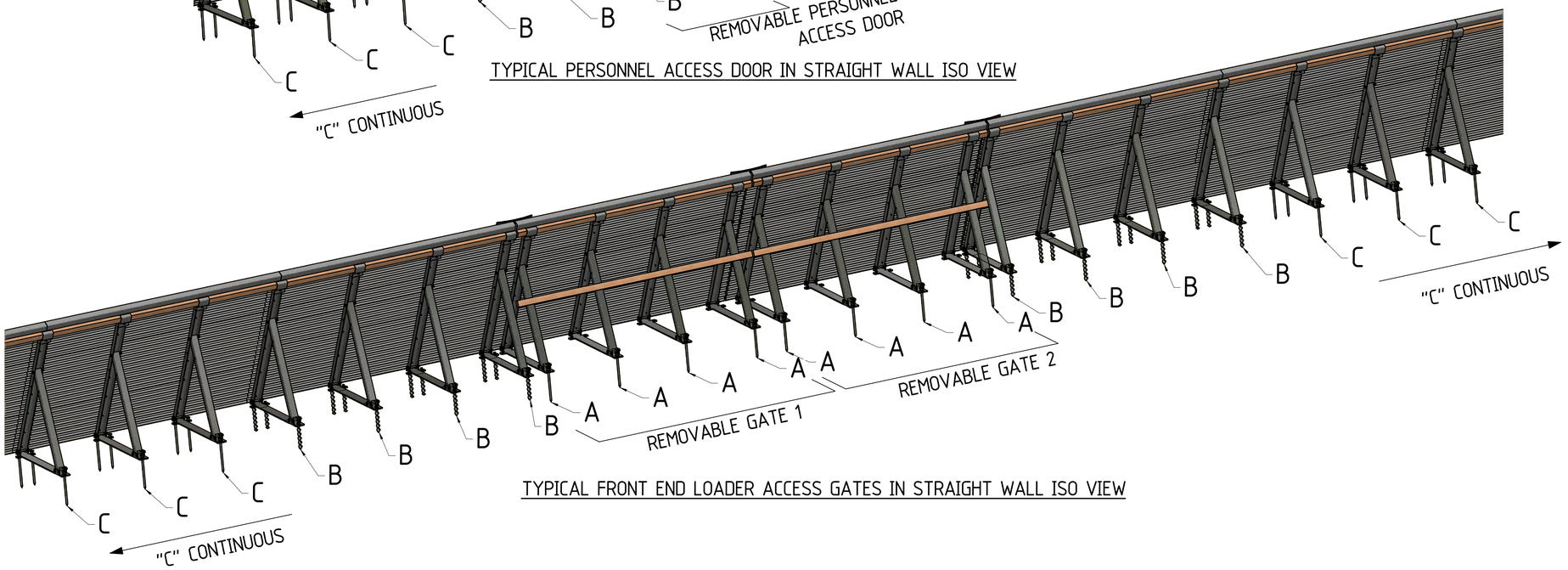
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CHECKED	LS	10/06/2020
ENGINEER	BC	11/06/2020
APPROVED	NH	11/06/2020

DRAWING TITLE
1.8m OPEN BULK HEAD
GENERAL ARRANGEMENT
OVERALL LAYOUT

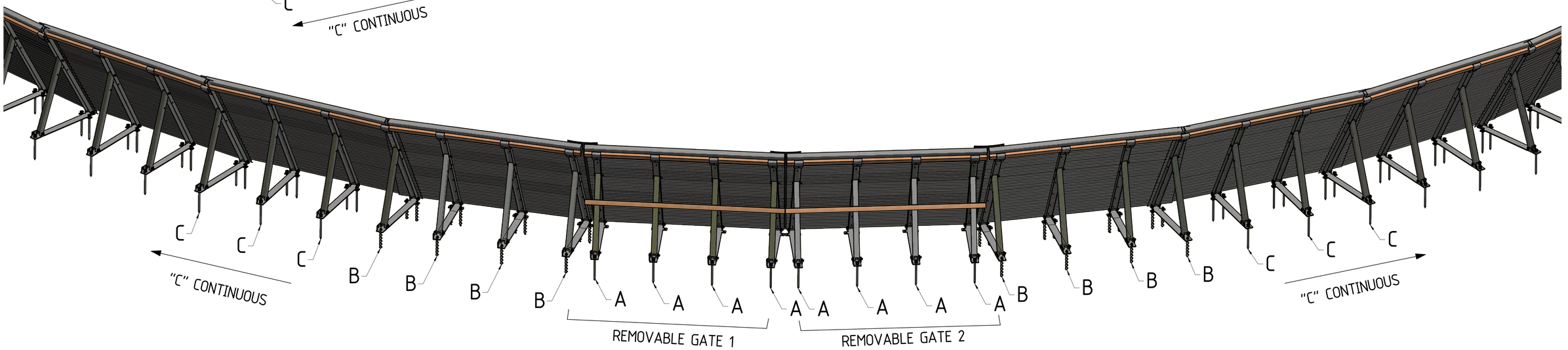
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PROJECT: STANDARD
DRAWING No: S119-ENG-ST-DGA-0003
SHEET: 1 OF 9
REV: 0



TYPICAL PERSONNEL ACCESS DOOR IN STRAIGHT WALL ISO VIEW



TYPICAL FRONT END LOADER ACCESS GATES IN STRAIGHT WALL ISO VIEW



TYPICAL FRONT END LOADER ACCESS GATES IN CURVED WALL ISO VIEW

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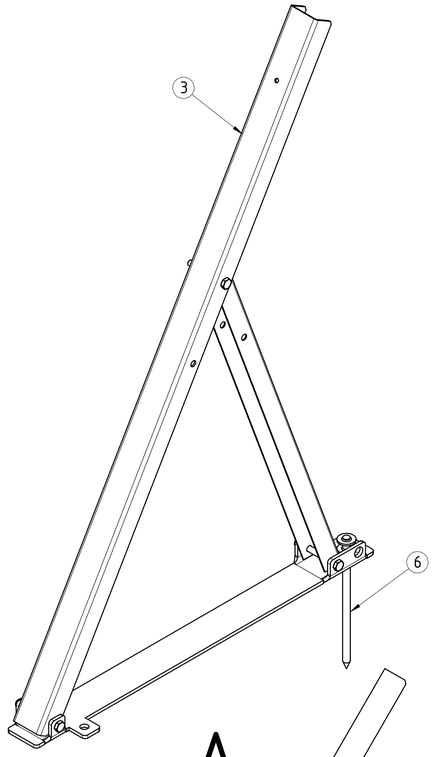
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DRAWN	SCR	10/06/2020
CHECKED	LS	10/06/2020
ENGINEER	BC	11/06/2020
APPROVED	NH	11/06/2020

DRAWING TITLE
1.8m OPEN BULK HEAD
GENERAL ARRANGEMENT
ANCHORINGS LAYOUT

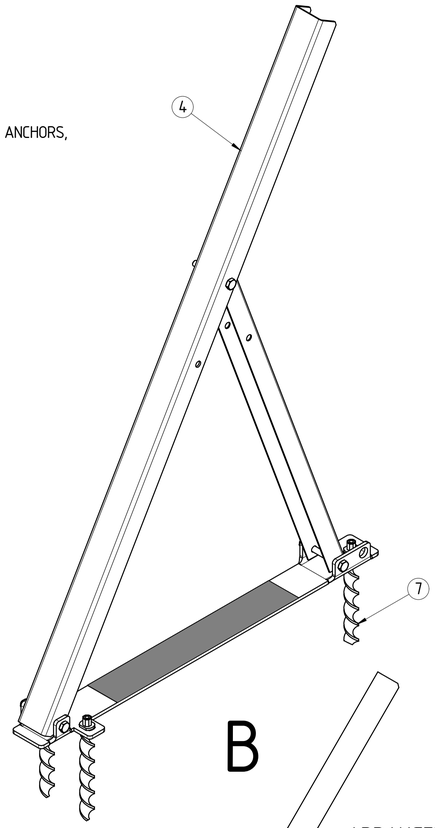
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PROJECT: STANDARD
DRAWING No: S119-ENG-ST-DGA-0003
SHEET: 2 OF 9
REV: 0



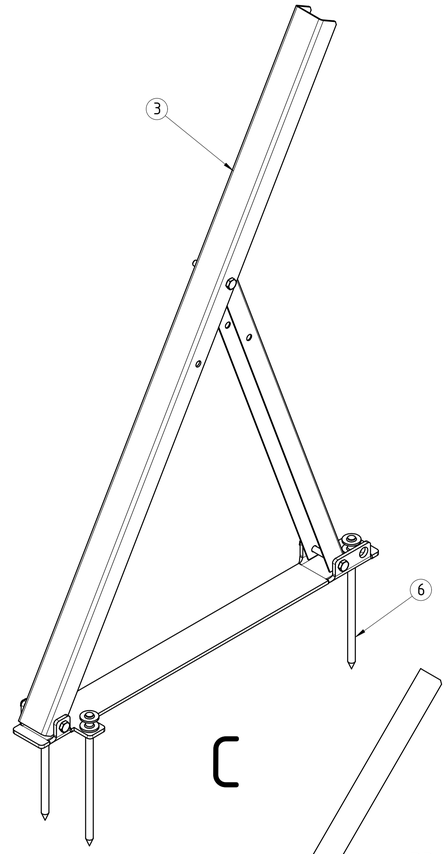
A

NOTES:

REMOVAL TOOL REQUIRED FOR SPIRAFIX ANCHORS,
M22 SPANNER/SOCKET,
HANDLE LENGTH TO SUIT CONDITIONS.



B



C

ARRANGEMENT 'A' NOTES:

- PURPOSE: ARRANGEMENT 'A' IS USED IN THE FRONT END LOADER ACCESS GATE ASSEMBLY (S119-ENG-ST-ASY-0034). ONLY 1 STRAIGHT PIN ANCHOR IS TO BE INSTALLED AS THE DOOR IS TO BE REMOVABLE.
- STRUT TYPE: STRAIGHT PIN STRUT
- PIN TYPE: STRAIGHT PIN ANCHOR
- PIN QUANTITY: 1

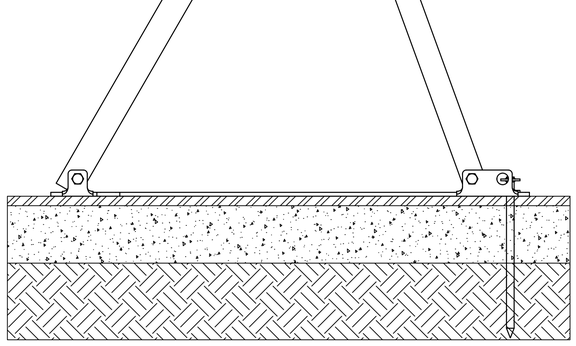
ARRANGEMENT 'B' NOTES:

- PURPOSE: ARRANGEMENT 'B' IS USED 4 STRUTS EITHER SIDE OF THE FRONT END LOADER ACCESS GATES AND 3 STRUTS EITHER SIDE OF PERSONNEL ACCESS DOORS, AS WHEN THE GATES/DOORS ARE REMOVED THE SURROUNDING STRUTS EXPERIENCE HIGHER WIND LOADS.
- STRUT TYPE: SPIRAL PIN STRUT
- PIN TYPE: SPIRAL PIN ANCHOR
- PIN QUANTITY: 3

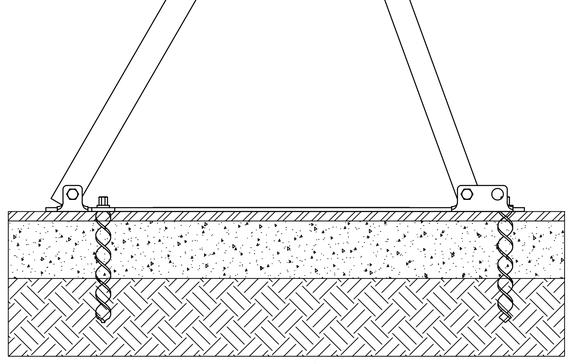
ARRANGEMENT 'C' NOTES:

PURPOSE: ARRANGEMENT 'C' IS USED IN ALL LOCATIONS, OTHER THAN WHERE ARRANGEMENT 'A' AND 'B' ARE USED

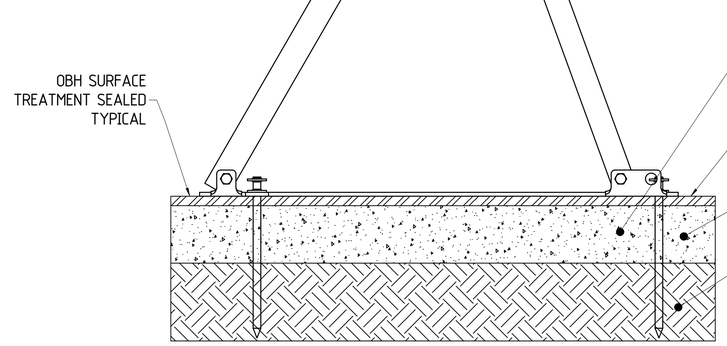
- STRUT TYPE: STRAIGHT PIN STRUT
- PIN TYPE: STRAIGHT PIN ANCHOR
- PIN QUANTITY: 3



A



B



C

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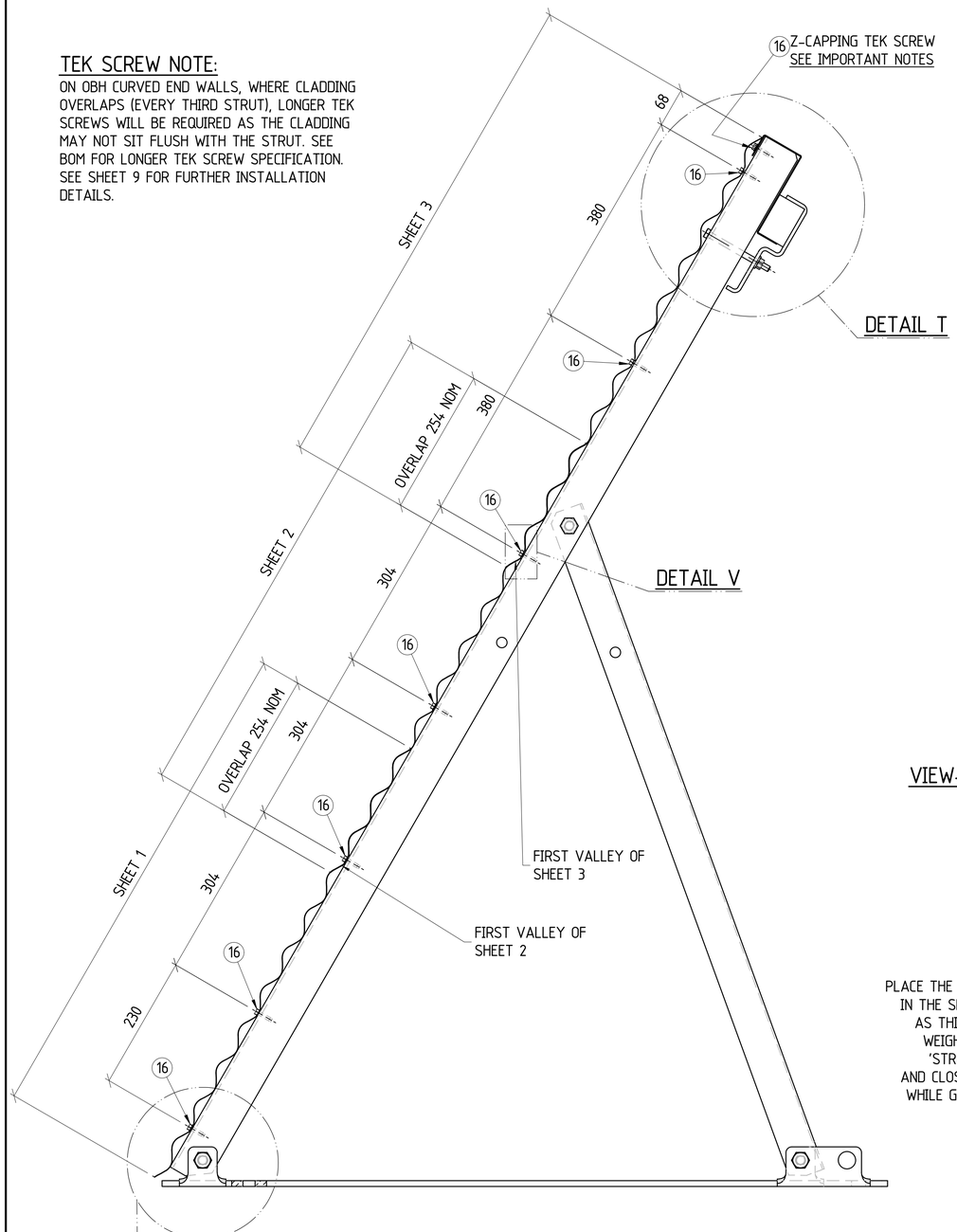
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CHECKED	LS	10/06/2020
ENGINEER	BC	11/06/2020
APPROVED	NH	11/06/2020

DRAWING TITLE
1.8m OPEN BULK HEAD
GENERAL ARRANGEMENT
TYPICAL ANCHORINGS

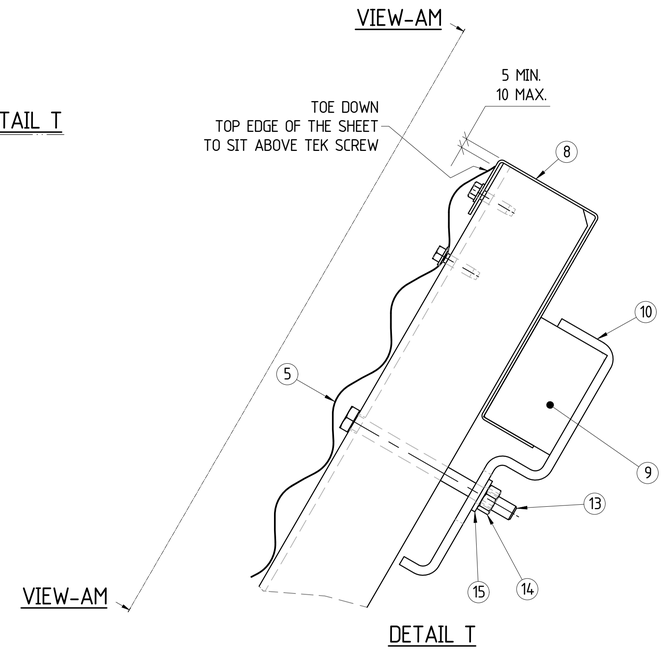
SITE: VARIOUS
SIZE: A1
PROJECT: STANDARD
DRAWING No: S119-ENG-ST-DGA-0003
SHEET: 3 OF 9
REV.: 0

TEK SCREW NOTE:

ON OBH CURVED END WALLS, WHERE CLADDING OVERLAPS (EVERY THIRD STRUT), LONGER TEK SCREWS WILL BE REQUIRED AS THE CLADDING MAY NOT SIT FLUSH WITH THE STRUT. SEE BOM FOR LONGER TEK SCREW SPECIFICATION. SEE SHEET 9 FOR FURTHER INSTALLATION DETAILS.



TYPICAL ARRANGEMENT

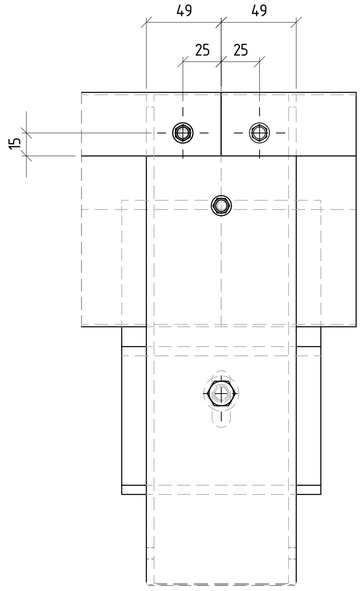


DETAIL T

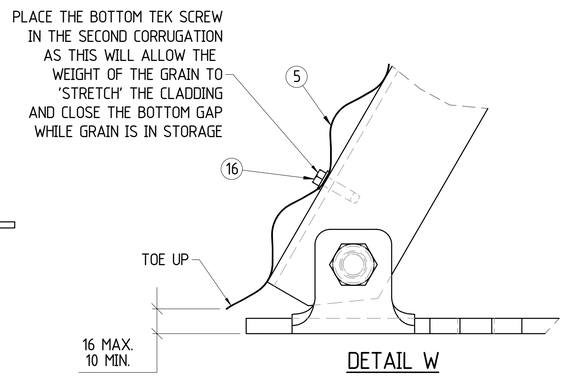
IMPORTANT NOTE:

TYPICAL ALL JOINTS, EXCEPT DOOR/GATE JOINS:

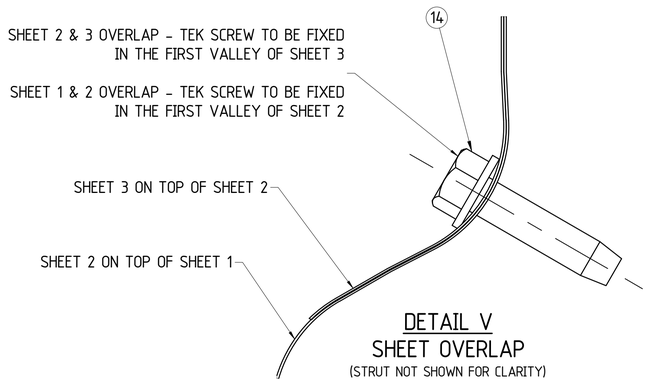
- 'Z' CAPPING SHALL BUTT JOIN TO THE CENTRE LINE OF THE STRUT.
- ALL Z CAPPING MUST BE ALIGNED AS ACCURATELY AS POSSIBLE. ANY MIS-ALIGNMENT IN THE 'Z' CAPPING WILL CREATE SHARP EDGES, WHICH MAY DAMAGE THE OBH TARP. MAXIMUM 'Z' CAPPING MISALIGNMENT TO BE 2mm IN ALL DIRECTIONS.
- WHERE 'Z' CAPPING BUTT JOINS OVER A STRUT, FIX 'Z' CAP WITH 2 x TEK SCREWS, ONE IN EACH 'Z' CAP (SHOWN BELOW)
- WHERE 'Z' CAPPING PASSES OVER A STRUT, FIX 'Z' CAP WITH 1 x TEK SCREW, INLINE WITH THE CENTRE OF THE STRUT.



VIEW-AM
(CLADDING NOT SHOWN FOR CLARITY)



DETAIL W



DETAIL V
SHEET OVERLAP
(STRUT NOT SHOWN FOR CLARITY)

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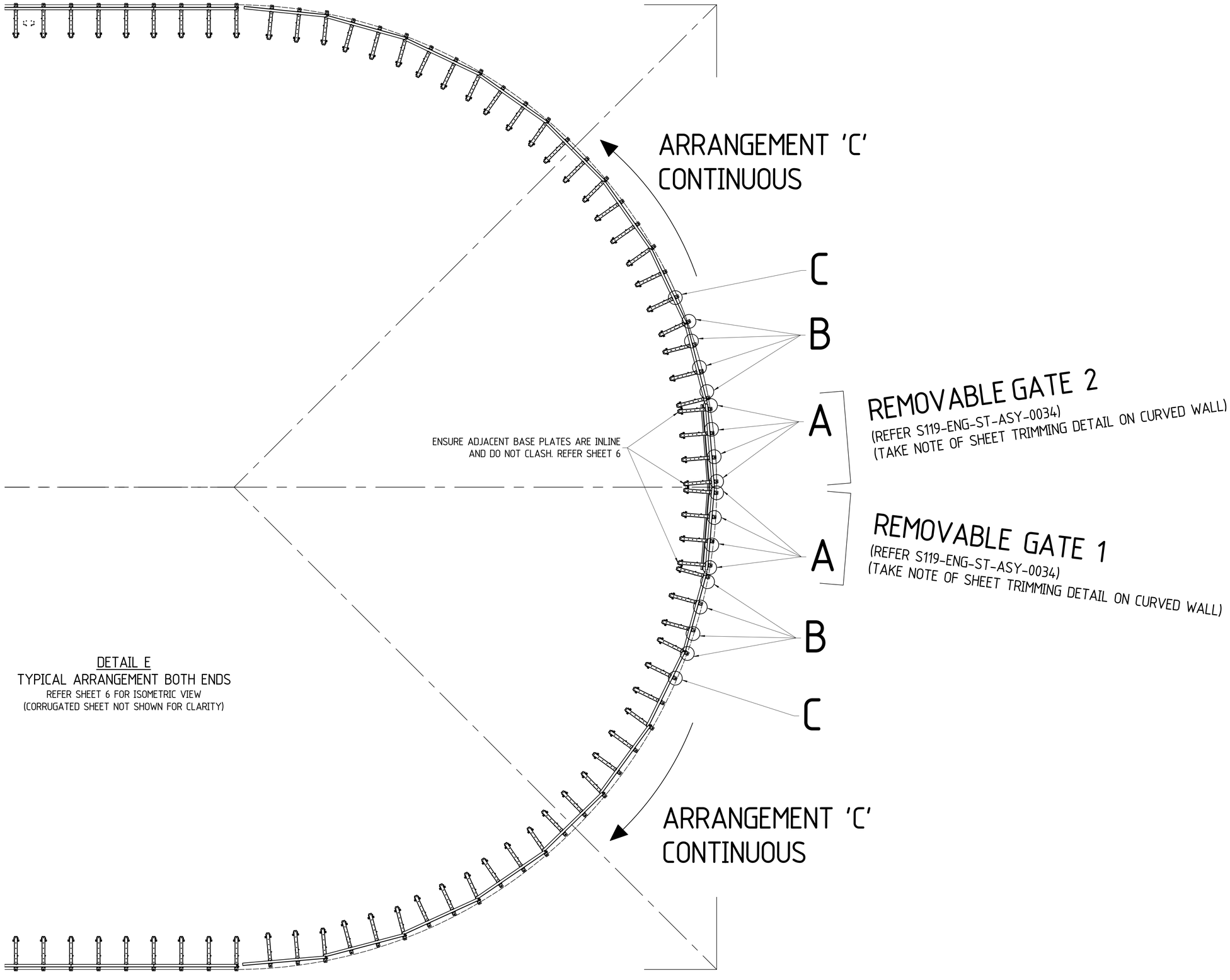
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DRAWING TITLE
1.8m OPEN BULK HEAD
GENERAL ARRANGEMENT
TYPICAL WALL ASSEMBLY

SITE: VARIOUS
SIZE: A1
PROJECT: STANDARD
DRAWING No: S119-ENG-ST-DGA-0003
SHEET: 4 OF 9
REV.: 0



DETAIL E
TYPICAL ARRANGEMENT BOTH ENDS
REFER SHEET 6 FOR ISOMETRIC VIEW
(CORRUGATED SHEET NOT SHOWN FOR CLARITY)

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1.8m OPEN BULK HEAD
GENERAL ARRANGEMENT
TYPICAL CURVED END WALL LAYOUT

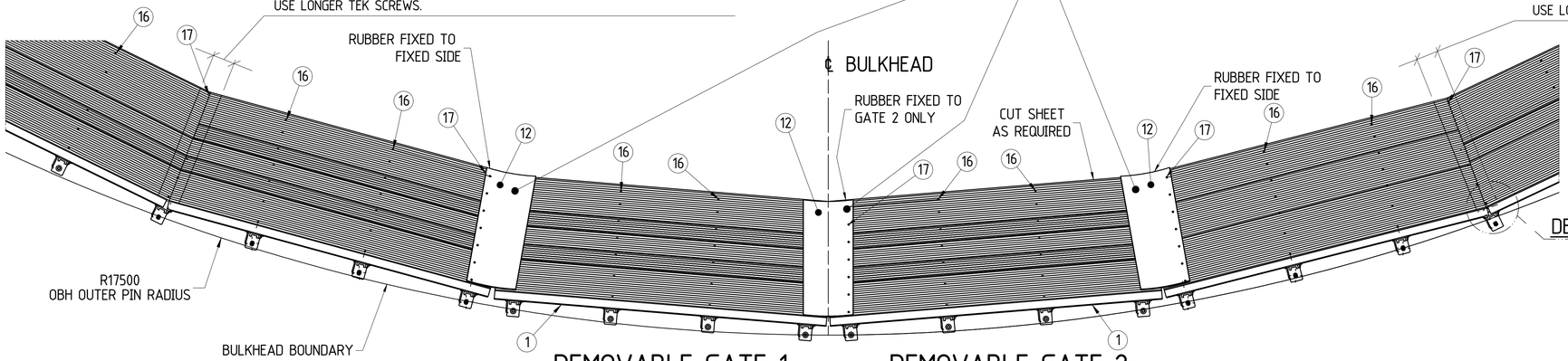
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PROJECT: STANDARD
DRAWING No: S119-ENG-ST-DGA-0003
SHEET: 5 OF 9
REV.: 0

TYPICAL RUBBER FIXINGS, BOTH ENDS

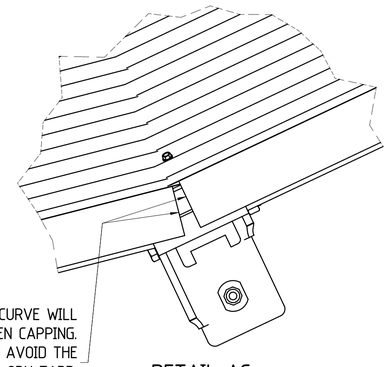
- ATTACH CONVEYOR BELT OVER JOINTS (SEE BOM FOR BELT DETAILS)
- FIX RUBBER USING 45MM LONG TEK SCREWS, USING 7 TEK SCREWS PER RUBBER STRIP

■ 200 CLADDING OVERLAP, CENTERED OVER THE CENTRELINE OF THE STRUT TYPICAL ALL CLADDING, EXCEPT OBH GATE/DOOR JOINS
■ ON CURVED ENDS, WHERE CLADDING OVERLAPS, USE LONGER TEK SCREWS.

■ 200 CLADDING OVERLAP, CENTERED OVER THE CENTRELINE OF THE STRUT TYPICAL ALL CLADDING, EXCEPT OBH GATE/DOOR JOINS
■ ON CURVED ENDS, WHERE CLADDING OVERLAPS, USE LONGER TEK SCREWS.



DETAIL AC



FITTING THE Z-CAPPING TO A CURVE WILL CREATE A GAP BETWEEN CAPPING. MINIMISE GAP AS MUCH AS POSSIBLE TO AVOID THE SHARP EDGES RIPPING THE OBH TARP. VERTICAL AND HORIZONRAL MISALIGNMENT SHOULD BE A MAXIMUM OF 2MM.

DETAIL AC

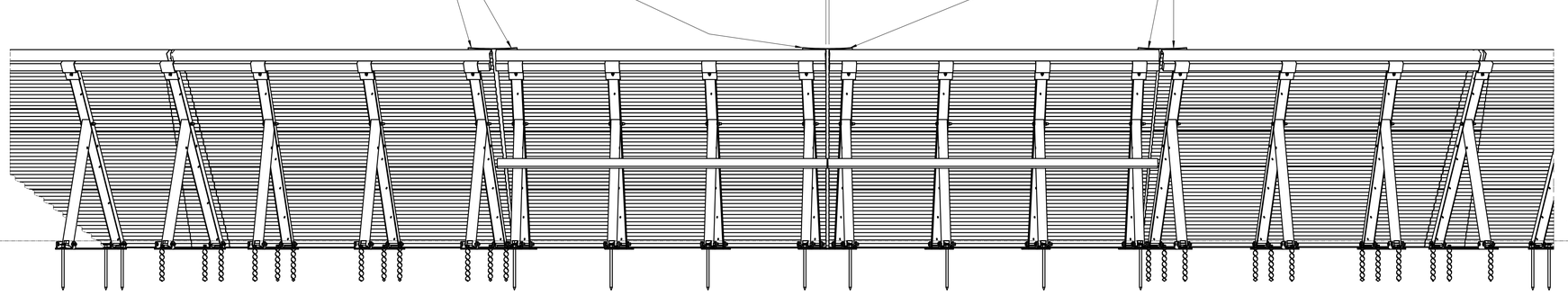
DETAIL A

FRONT END LOADER ACCESS GATES IN CURVED WALL
TYPICAL BOTH ENDS

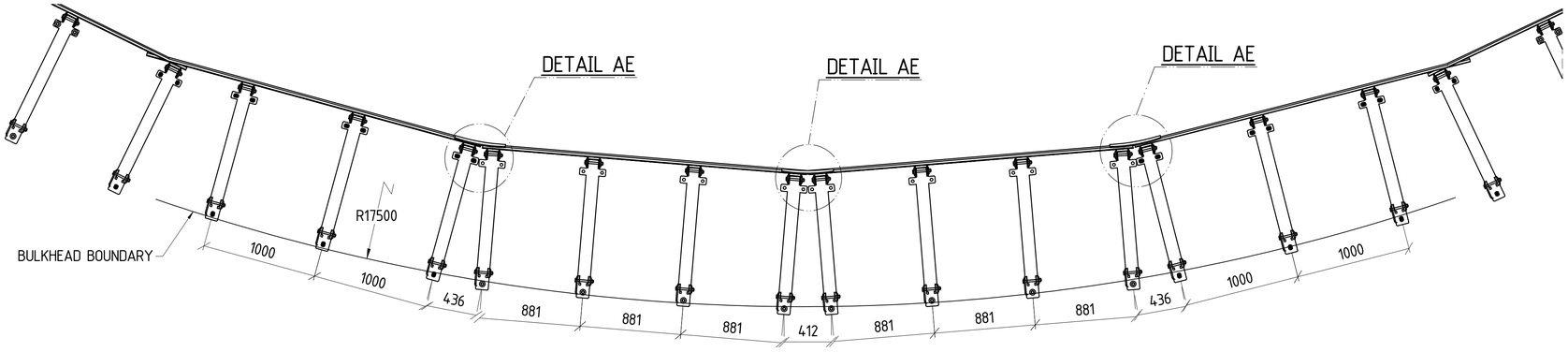
CLADDING, Z-CAPPING AND WOOD, ALL TRIMMED TO SUIT ON BOTH SIDES TO CREATE A BUTT JOIN BETWEEN THE FIXED WALL AND THE REMOVABLE GATE. REFER S119-ENG-ST-ASY-0003 FOR CLADDING TRIMMING DETAIL. MAX ALLOWABLE GAP BETWEEN BUTT JOINTS IS 20mm - TYPICAL ALL GATES

CLADDING, Z-CAPPING AND WOOD, ALL TRIMMED TO SUIT ON BOTH SIDES TO CREATE A BUTT JOIN BETWEEN THE FIXED WALL AND THE REMOVABLE GATE. REFER S119-ENG-ST-ASY-0003 FOR CLADDING TRIMMING DETAIL. MAX ALLOWABLE GAP BETWEEN BUTT JOINTS IS 20mm - TYPICAL ALL GATES

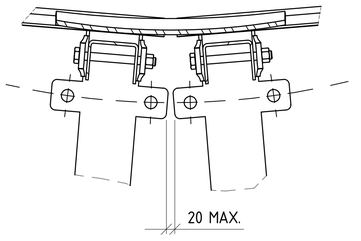
20 MAX. GAP
TYPICAL ALL ACCESS WAYS



ELEVATION



SECTION B
FRAMES FOOT PRINT



DETAIL AE
TYPICAL STRUT FOOT ALIGNMENT AT GATE JOINS
(PINS NOT SHOWN FOR CLARITY)

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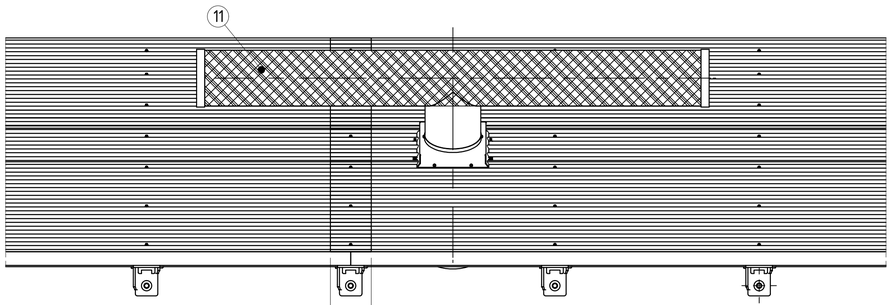
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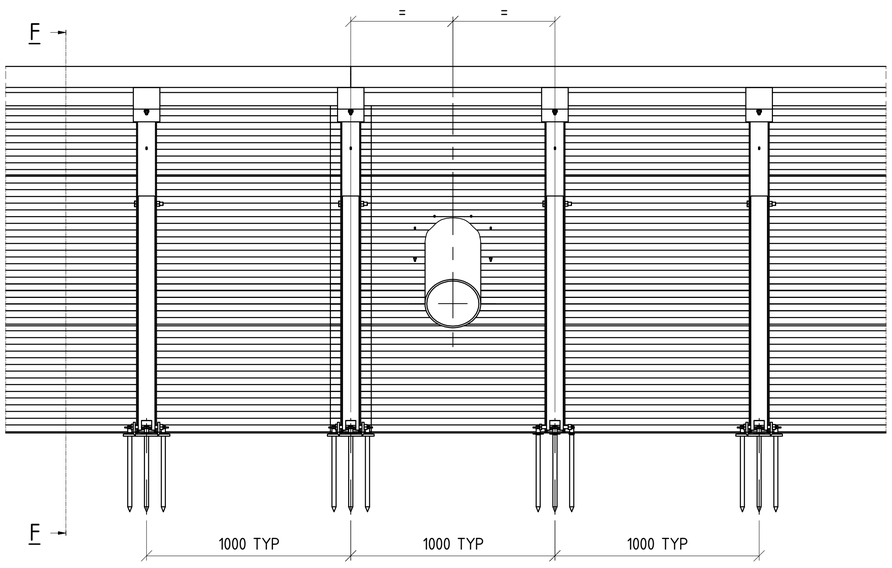
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DRAWING TITLE
1.8m OPEN BULK HEAD
GENERAL ARRANGEMENT
CURVED OBH OPENING DETAIL

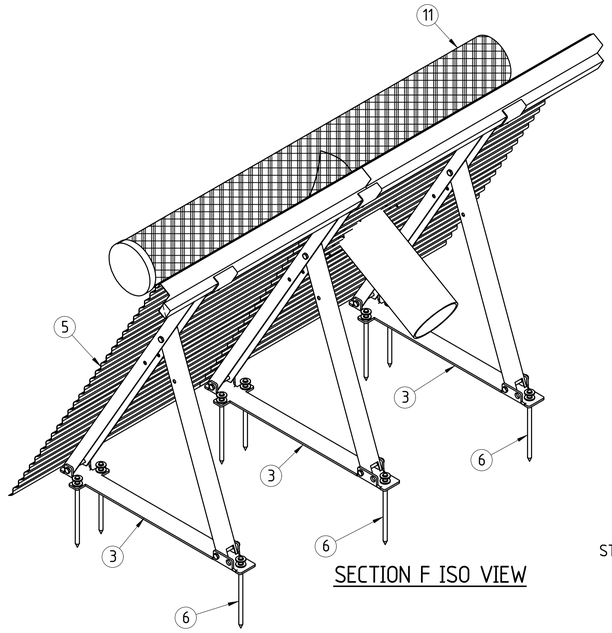
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SHEET: 6 OF 9
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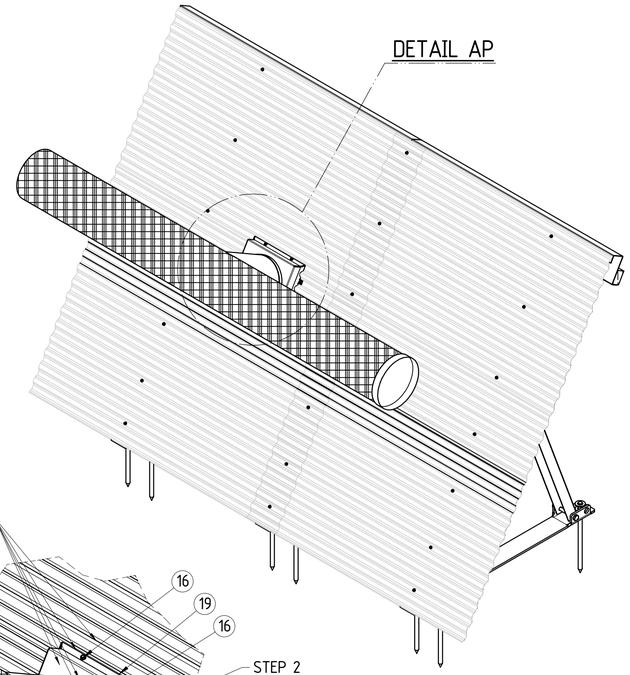
DETAIL B
'T' PIECE INSTALLATION DETAIL

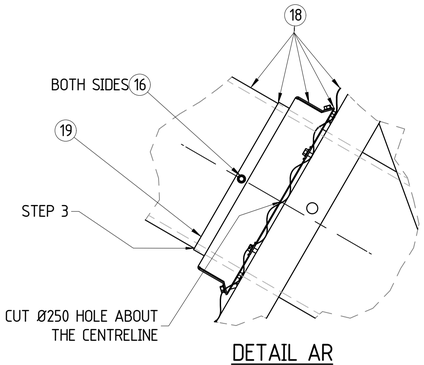


ELEVAION

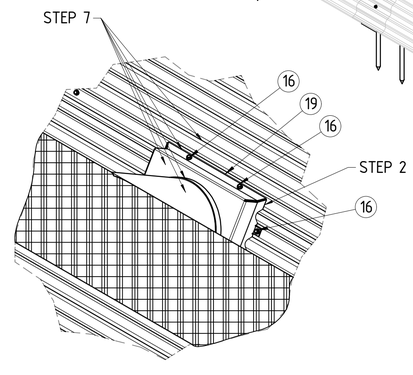


SECTION F ISO VIEW

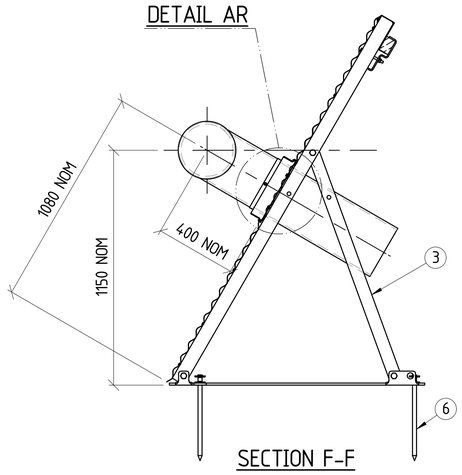




DETAIL AR



DETAIL AP



SECTION F-F

BACKGROUND:

- THE 'T' PIECE IS USED TO PUMP HAZARDOUS FUMIGANT INTO THE STORAGE AFTER IT IS FULLY SEALED. CARE MUST BE TAKEN WHEN INSTALLING THE 'T' PIECE AND APPLYING THE SEALANTS TO ENSURE THE SEAL IS APPLIED TO A HIGH QUALITY.

USE THE FOLLOWING QUANTITY'S PER 1 'T'PIECE

- 1 X 600ML SAUSAGE OF BOSTIK SEAL AND FLEX 1
- 1L OF NOVALAST LTM 151

PROCEDURE:

- STEP 1: PREPARE AND CLEAN SURFACES WHERE SEALANTS ARE TO BE APPLIED AS PER MANUFACTURERS SPECIFICATIONS.
- STEP 2: INITIAL COLLAR INSTALL; APPLY A THICK (5-10MM) BEAD OF 'BOSTIK SEAL N FLEX 1' TO ALL EDGES OF THE T-PIECE MOUNTING COLLAR WHICH WILL CONTACT THE CORRUGATED CLADDING. TEK SCREW T-PIECE MOUNT (WITH BOSTIC SEALANT APPLIED) TO THE CLADDING USING 8 TEK SCREWS, EVENLY SPACED AROUND THE T-PIECE MOUNTING COLLAR.
- STEP 3: INSERT T-PIECE INTO THE T-PIECE MOUNTING COLLAR. SECURE THE T-PIECE AT THE LOCATION SHOWN, USING 2 X TEK SCREWS, THROUGH THE MOUNTING COLLAR RING. APPLY A THICK (5-10MM) BEAD OF 'BOSTIK SEAL N FLEX 1' AROUND THE JOIN AND AROUND ANY GAPS, INCLUDING AROUND THE TEK SCREWS. ALSO APPLY A THICK BEAD TO FILL THE GAP BETWEEN THE CLADDING AND THE T-PIECE, ON THE OUTSIDE OF THE BULKHEAD.
- STEP 4: LET SEALANT DRY AS PER MANUFACTURER'S DIRECTIONS.
- STEP 5: APPLY A SECOND THICK (5-10MM) BEAD OF 'BOSTIC SEAL N FLEX 1' AROUND ALL JOINS BETWEEN THE T-PIECE MOUNTING COLLAR, THE T-PIECE AND THE CLADDING.
- STEP 6: LET SEALANT DRY AS PER MANUFACTURER'S DIRECTIONS.
- STEP 7: PAINT THE ENTIRE T-PIECE MOUNTING COLLAR AND 150MM OF CLADDING AROUND THE COLLAR. ALSO PAINT 150MM OF THE T-PIECE, PAST THE COLLAR RING JOIN. PAINT WITH 'NOVALAST 151 LTM'
- STEP 8: LET SEALANT DRY AS PER MANUFACTURER'S DIRECTIONS.

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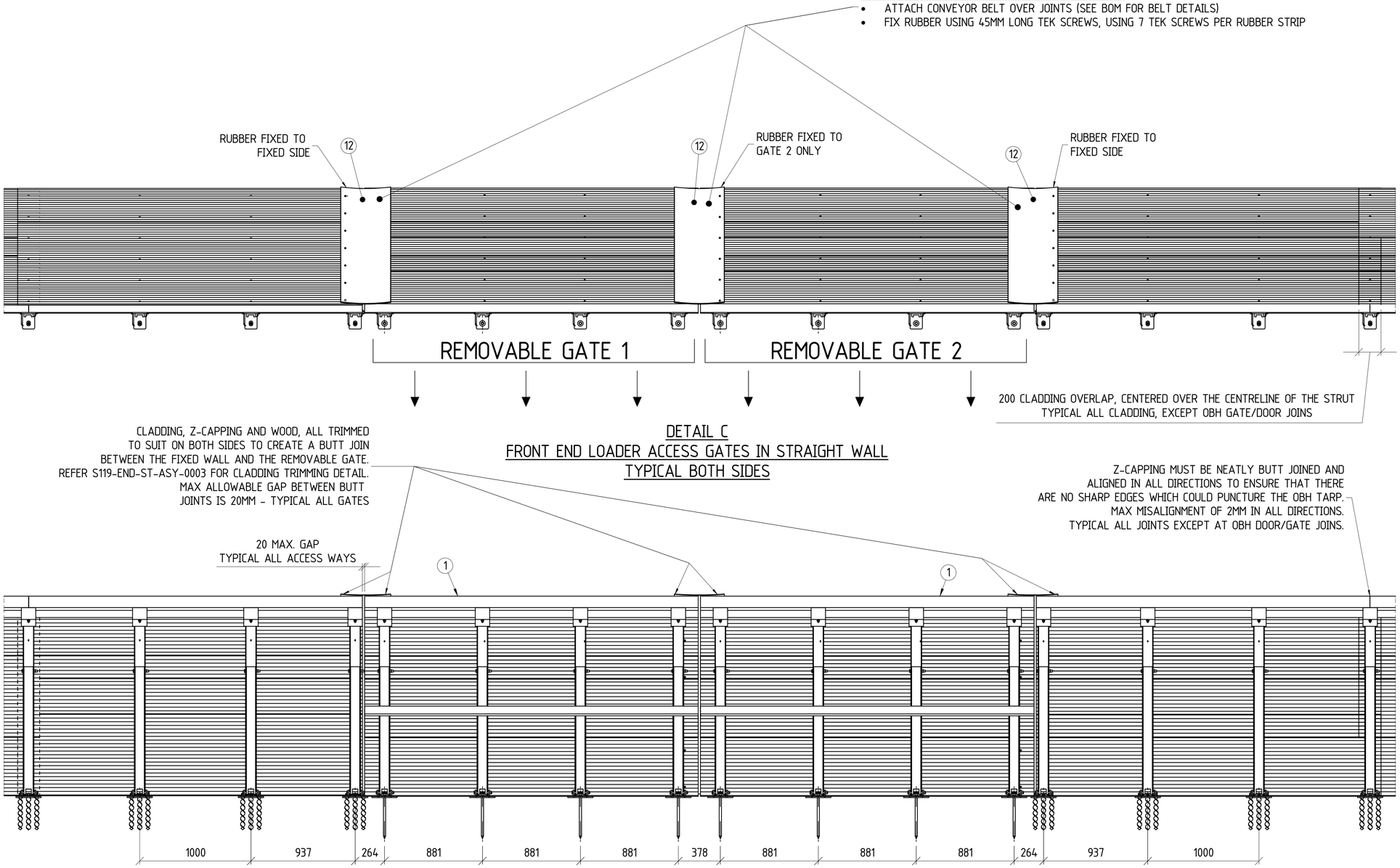
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DRAWING TITLE
1.8m OPEN BULK HEAD
GENERAL ARRANGEMENT
'T' PIECE DETAIL

SITE: VARIOUS
SIZE: A1
PROJECT: STANDARD
DRAWING No: S119-ENG-ST-DGA-0003
SHEET: 7 OF 9
REV: 0

TYPICAL RUBBER FIXINGS, BOTH ENDS

- ATTACH CONVEYOR BELT OVER JOINTS (SEE BOM FOR BELT DETAILS)
- FIX RUBBER USING 45MM LONG TEK SCREWS, USING 7 TEK SCREWS PER RUBBER STRIP



DETAIL C
FRONT END LOADER ACCESS GATES IN STRAIGHT WALL
TYPICAL BOTH SIDES

ELEVATION

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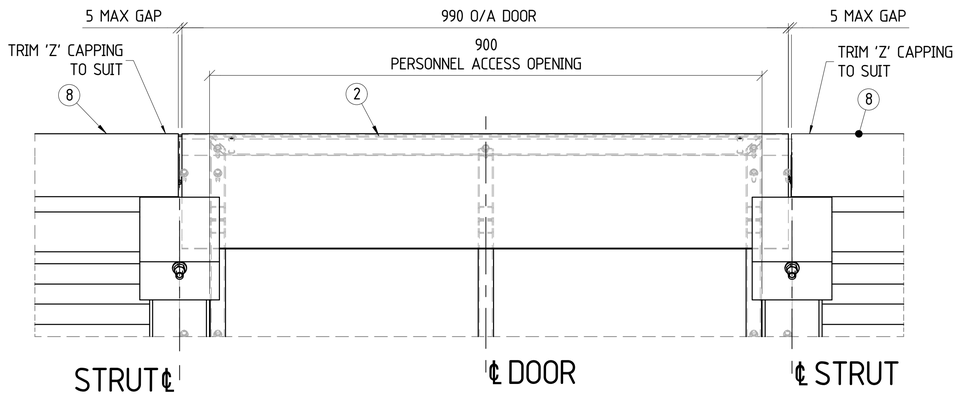
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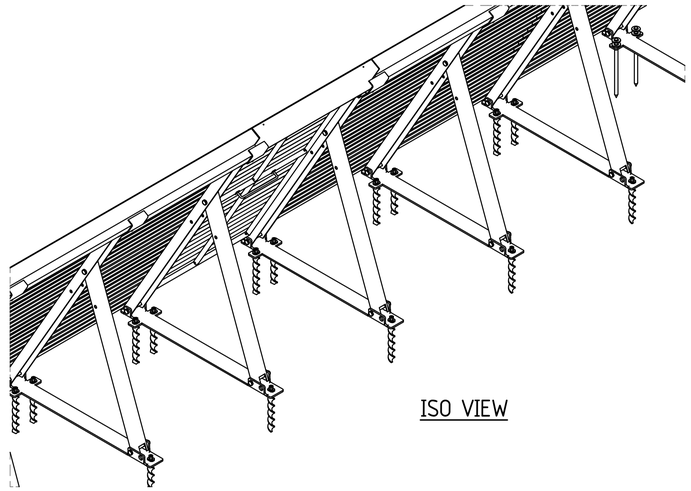
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DRAWING TITLE
1.8m OPEN BULK HEAD
GENERAL ARRANGEMENT
STRAIGHT OBH OPENING DETAIL

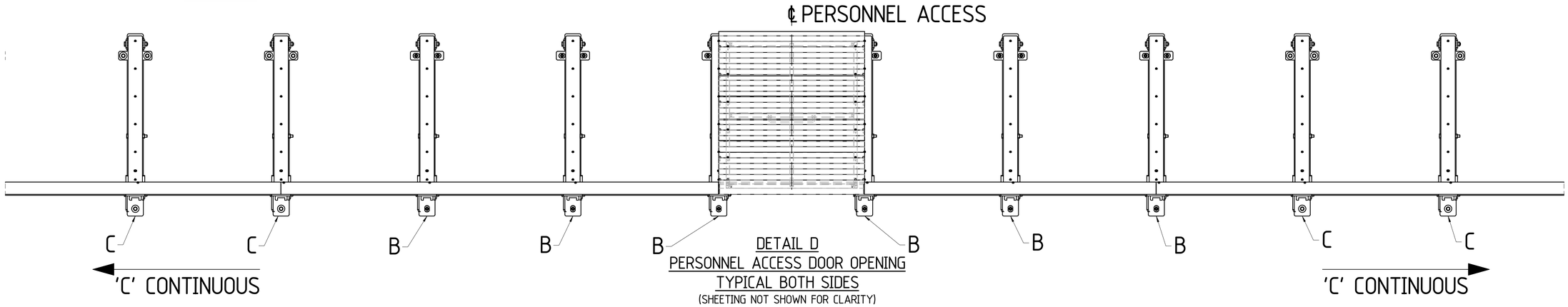
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REV: 0



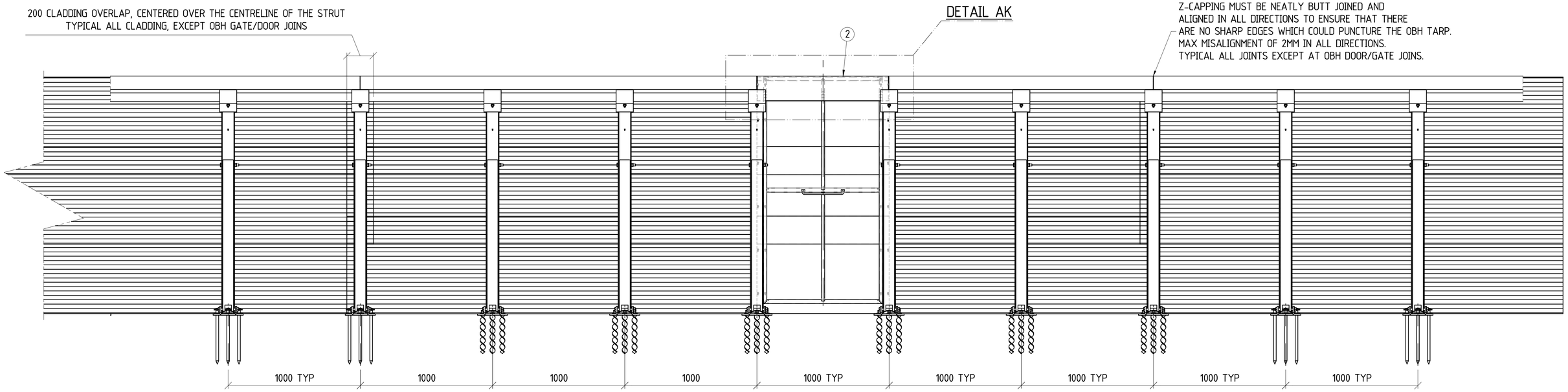
DETAIL AK



ISO VIEW



DETAIL D
PERSONNEL ACCESS DOOR OPENING
TYPICAL BOTH SIDES
(SHEETING NOT SHOWN FOR CLARITY)



ELEVATION

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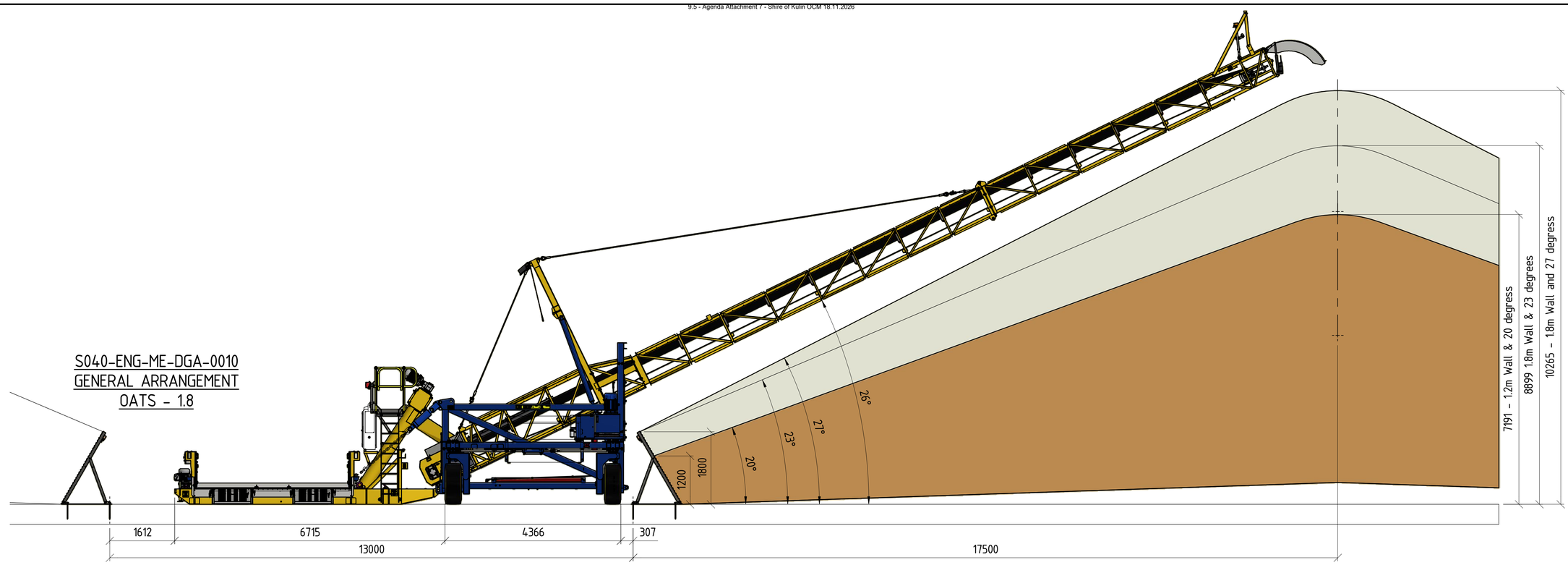
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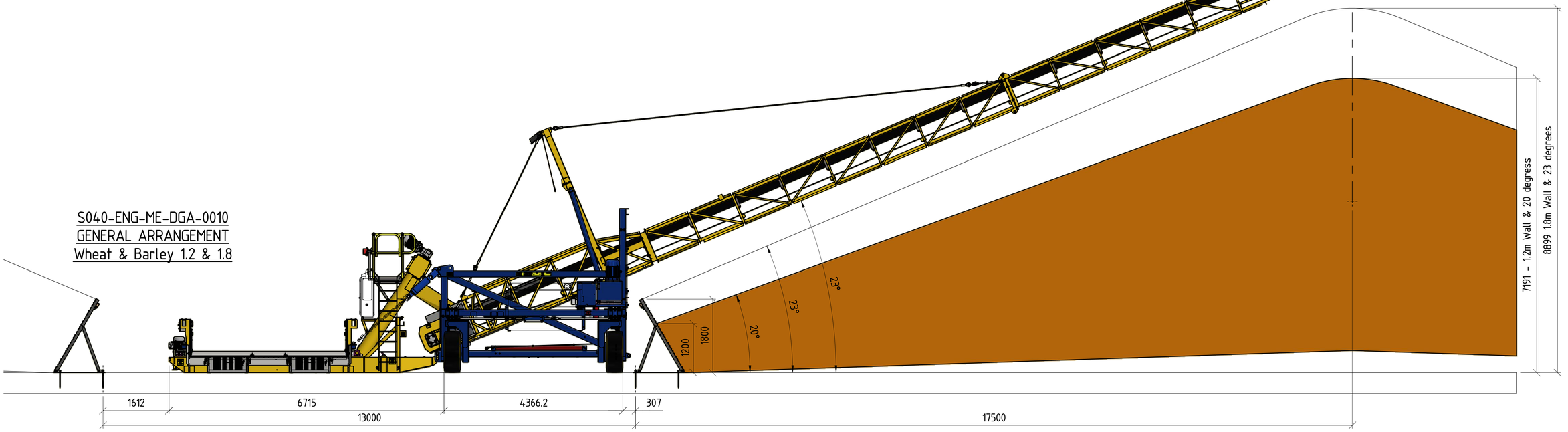
DRAWING TITLE
1.8m OPEN BULK HEAD
GENERAL ARRANGEMENT
PERSONELL ACCESS DOOR DETAIL

SITE: VARIOUS
SIZE: A1
PROJECT: STANDARD
DRAWING No: S119-ENG-ST-DGA-0003
SHEET: 9 OF 9
REV.: 0

S040-ENG-ME-DGA-0010
GENERAL ARRANGEMENT
OATS - 1.8



S040-ENG-ME-DGA-0010
GENERAL ARRANGEMENT
Wheat & Barley 1.2 & 1.8



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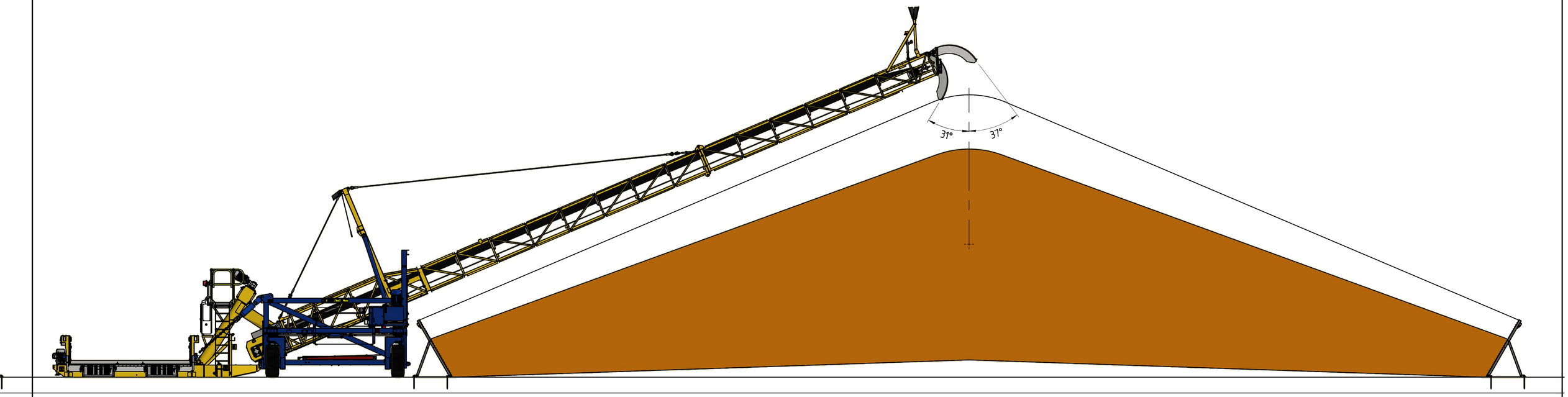
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DRAWN	DD 30/08/2018	
CHECKED	30/12/1899	
ENGINEER	30/12/1899	
APPROVED	30/12/1899	

DRAWING TITLE
DOG STACKER BULKKHEAD ARRANGEMENT
GENERAL ARRANGEMENT

SITE: VARIOUS
SIZE: A1
PROJECT: LAYOUT
DRAWING No: S040-ENG-ME-DGA-0010
SHEET: 1 OF 2
REV.: 0



S040-ENG-ME-DGA-0010
GENERAL ARRANGEMENT

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APPROVED		30/12/1899

DRAWING TITLE
DOG STACKER BULKKHEAD ARRANGEMENT
GENERAL ARRANGEMENT

SITE: VARIOUS
SIZE: A1
PROJECT: LAYOUT
DRAWING No: S040-ENG-ME-DGA-0010
SHEET: 2 OF 2
REV.: 0

Project Number & Title:	Stormwater Drainage Report
Contractor:	MAD3 PTY LTD

Document Information

CBH Document Number	Contractor Document Number	Document Name
574-R0563-CI-RPT-0001	30264-CI-RPT-0001	Stormwater Drainage Report

Revision History

CBH Rev No	Contractor Rev No.	Description	Date	Approved By (Contractor)	Approved By (CBH)
A	A	Initial Report	21.08.2025	Michael Ferritto	
B	B	New Variation	22.09.2025	Michael Ferritto	

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1. EXECUTIVE SUMMARY

CBH are conducting detailed design for an emergency bulkhead expansion at their Pingaring facility to cater for future harvest demands, referred to herein as 'the site'.

The Stormwater Drainage Report (SDR) has been prepared to support the design and provide guidance to both CBH and contractors on their obligations to minimise the potential impacts of development.

This SDR provides details on how the emergency bulkhead expansion will meet the water management criteria detailed in the CBH Technical Specification 10A. This document outlines the calculations and descriptions related to surface water management necessary for meeting the design criteria. It aims to ensure that the proposed stormwater infrastructure can accommodate flows from storm events with an Annual Exceedance Probability (AEP) of up to 20%. This 20% AEP is equivalent to a 5-Year Average Recurrence Interval (ARI). The drainage channels, culverts, and drains generally provide at least 150mm freeboard to the bottom of adjacent permanent pavements.

2. INTRODUCTION

2.1. Background

MAD3 Engineering has been appointed by CBH as the Engineering consultant for the emergency expansion at the CBH Pingaring facility. The proposed expansion is to construct two additional Open Bulkhead (OBH) storage, ancillary pavements, and drainage infrastructure to convey stormwater flows to a new basin.

2.2. Objectives

The objective of this Stormwater Design Report (SDR) is to ensure that the proposed stormwater infrastructure can accommodate storm events with an Annual Exceedance Probability (AEP) of up to 20%. The stormwater discharge will be conveyed in open drains and culverts towards a basin, while maintaining a 150mm freeboard to the bottom of the pavement layers. This SDR provides details on how stormwater will be managed.

2.3. Locality

The site is located at Pingaring, a small town in the Wheatbelt region of Western Australia, about 270 kilometres east of Perth and approximately 180 kilometres from the coast. The facility features one open bulkhead (OBH), three grain sheds, weigh bridges, ancillary pavements, a railway loading facility, various stormwater detention basins, and two proposed OBHs as depicted in **Figure 1**.

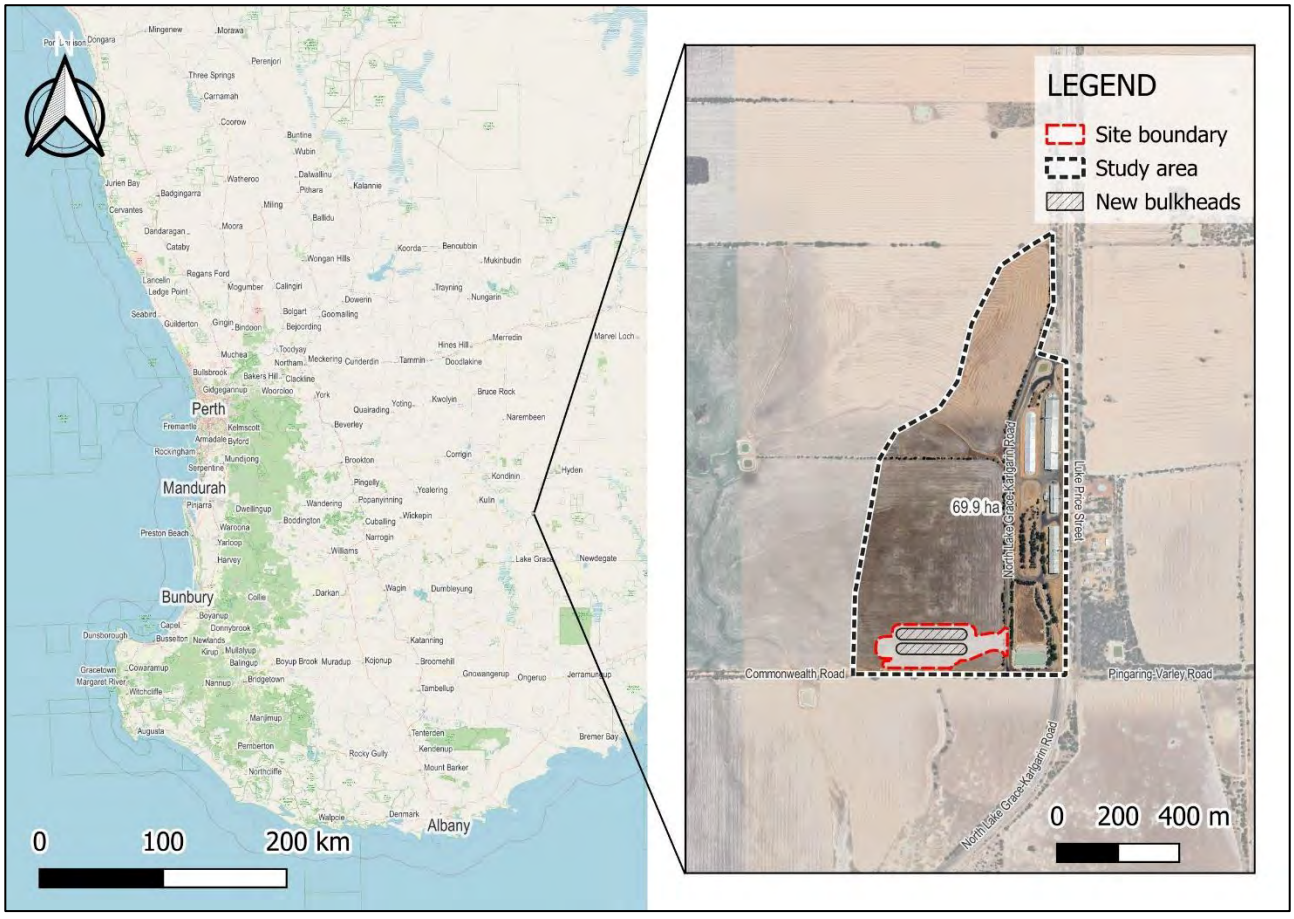


Figure 1 : Locality Plan

3. PRIMARY MODELLING DATA

3.1. Study area

The study area was defined by identifying the catchment draining towards the site, which is approximately 69.9 hectares, as illustrated in **Figure 2**. The existing and proposed stormwater infrastructure in the study area, represented in different colours for clarity, is depicted in **Figure 3**.

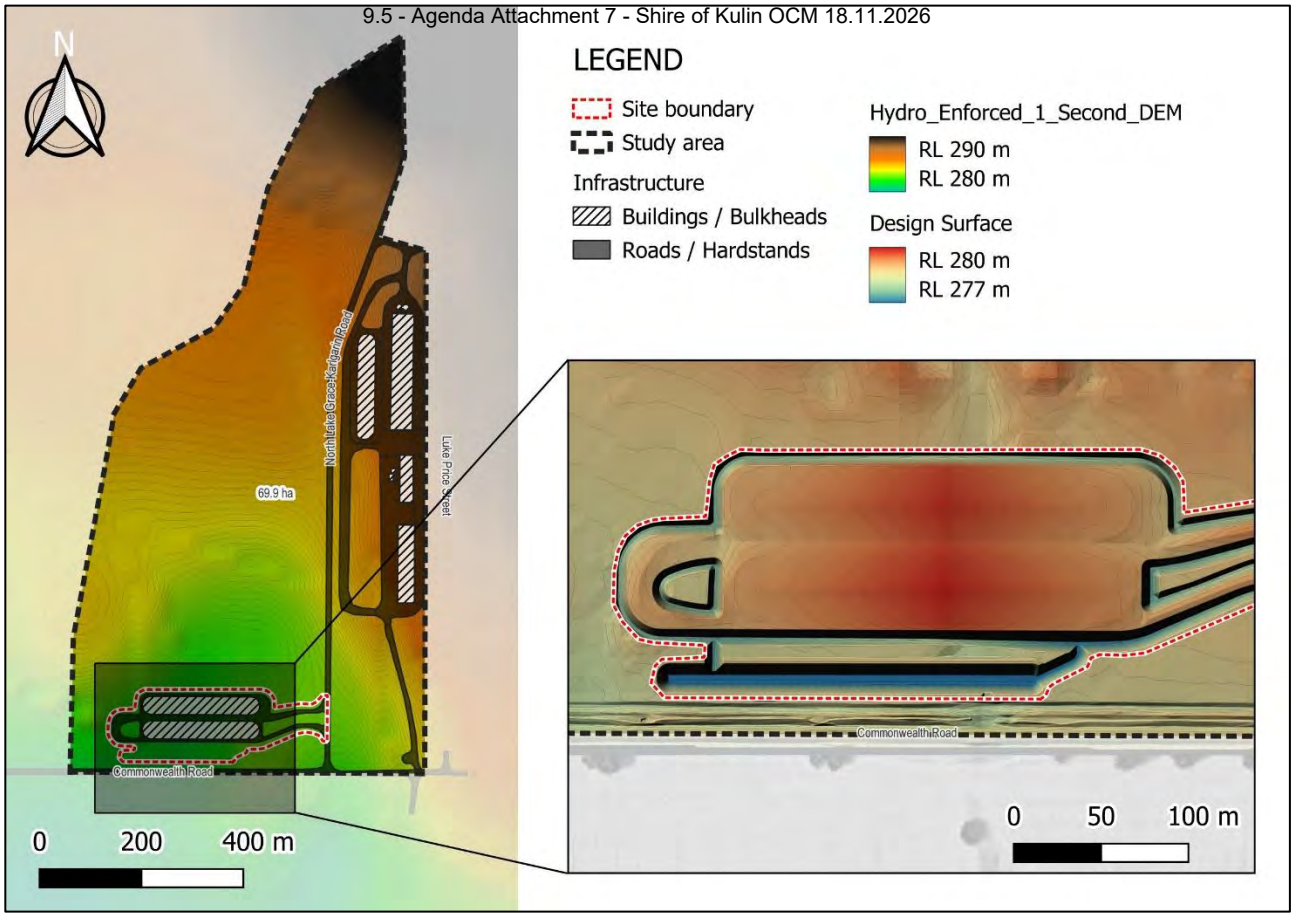


Figure 2 : Study Area

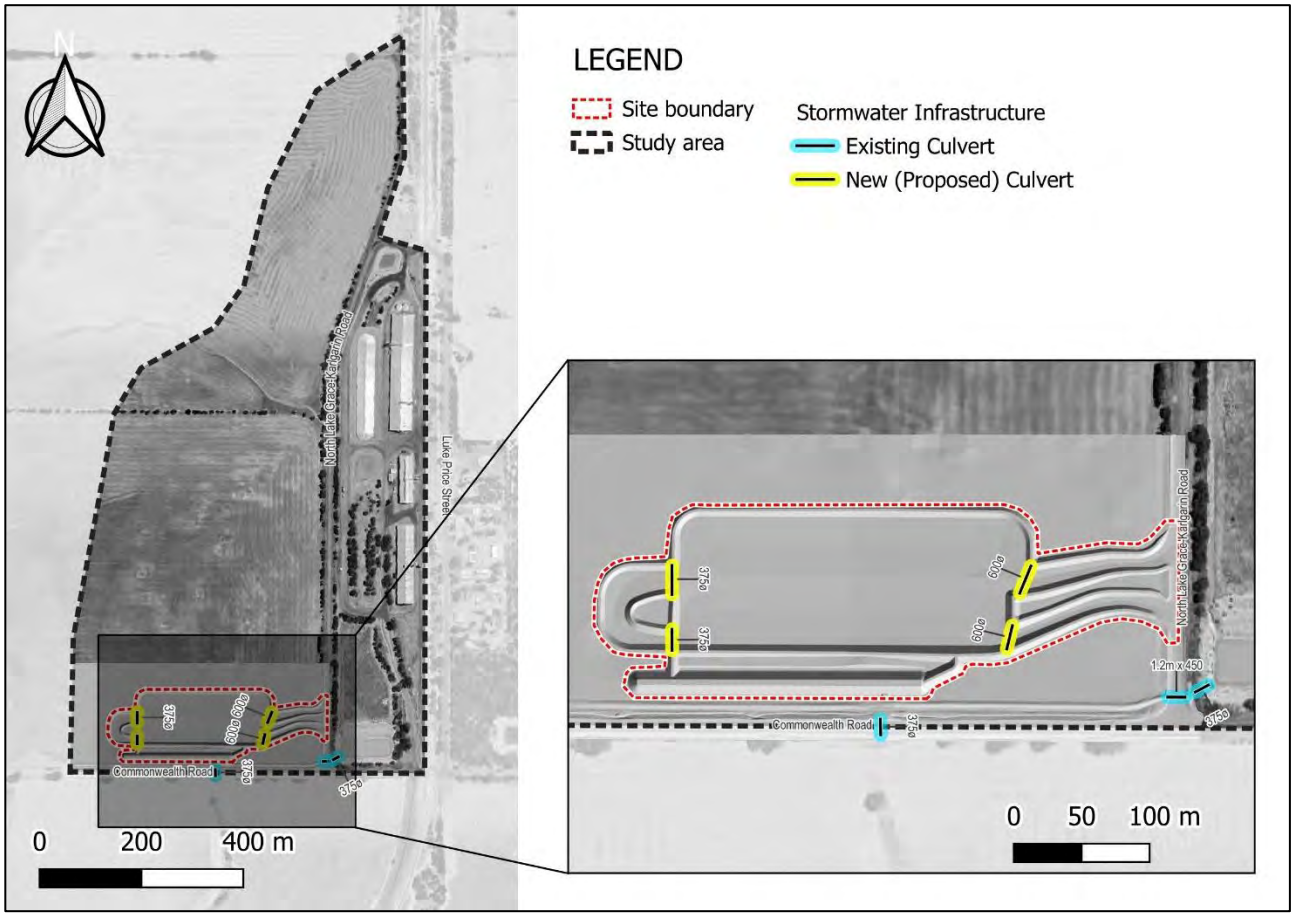


Figure 3 : Stormwater Infrastructure

3.2. Climate Change

Climate Change (CC) was applied to the design rainfall and the storm losses, assuming a very high Shared Socioeconomic Pathway (SSP 5-8.5) until 2030.

3.3. Design Rainfall

The design rainfall used for this investigation was obtained from the Australian Government Bureau of Meteorology (BoM). The design rainfall, adjusted for CC, is summarised in **Table 1**.

Table 1 : Design Rainfall adjusted for CC (SSP 5-8.5 2030) at 32.7625S and 118.6125E

Duration (min)	Rainfall Factor	Design Rainfall (mm)						
		Annual Exceedance Probability (%)						
		63.2	50	20	10	5	2	1
1	1.2	1.58	1.84	2.69	3.35	4.06	5.11	6.00
2	1.2	2.75	3.14	4.50	5.52	6.59	8.15	9.41
3	1.2	3.68	4.22	6.08	7.48	8.96	11.12	12.84
4	1.2	4.45	5.12	7.43	9.17	11.03	13.80	16.08
5	1.2	5.10	5.88	8.57	10.62	12.84	16.08	18.72
10	1.2	7.34	8.50	12.60	15.72	19.08	24.00	28.32
15	1.2	8.78	10.18	15.00	18.84	22.92	28.92	34.08
20	1.2	9.88	11.44	16.80	21.00	25.56	32.28	38.04
25	1.2	10.76	12.48	18.36	22.80	27.72	34.92	41.04
30	1.2	11.52	13.32	19.56	24.24	29.40	36.96	43.44
45	1.2	13.32	15.36	22.32	27.72	33.48	41.88	48.96
60	1.2	14.76	17.04	24.60	30.36	36.48	45.60	53.04
90	1.18	16.76	19.23	27.61	33.98	40.71	50.62	58.76
120	1.17	18.37	21.06	30.19	37.09	44.34	54.87	63.77
180	1.16	21.00	24.01	34.45	42.22	50.46	62.41	72.50
270	1.14	23.83	27.25	38.99	47.88	57.23	71.14	82.76
360	1.13	25.99	29.72	42.71	52.55	63.05	78.54	91.64
540	1.13	29.61	33.90	48.93	60.46	72.89	91.53	107.46
720	1.12	31.92	36.62	52.98	65.86	79.74	100.69	118.72
1080	1.11	35.08	40.29	58.72	73.37	89.69	114.33	136.53
1440	1.11	37.41	42.96	62.83	78.81	96.79	124.32	148.74

3.4. Storm losses

The storm losses were based on the Horton Loss model since no initial and continuing losses were available from the BoM. The assumed parameter values are summarised in **Table 2**.

Table 2 : Horton storm loss parameter values

Description	Description	Initial Loss (mm/hour)	Final Loss (mm/hour)	Decay Rate	AMC Condition
Pervious Areas	C - Slow infiltration	125	6	2	3
Ponds	D – Very slow (clays)	75	3	2	3

4. STORMWATER MANAGEMENT STRATEGY

4.1. Development Overview

As part of the expansion of the site, it is proposed to have the following drainage devices:

- Trapezoidal and Vee drains and culverts are designed to convey 20% AEP while providing 150 mm minimum freeboard to the bottom of pavements.
- Erosion protection at headwall outlets will be installed where velocities are estimated to be greater than 2m/s.
- Rock check dams in drains where velocities are likely to scour.

4.2. Hydraulic Modelling

Our modelling approach was based on a distributed hydraulic model, also known as a Rain-on-Grid (RoG) model, which is a two-dimensional (2D) hydraulic model. We used the TUFLOW software program with 12d Model as the Graphical User Interface (GUI) to conduct the modelling. An ensemble approach was followed using the ARR's Southern and Southwestern Flatlands temporal patterns. To ascertain the rain event that would require the greatest peak flow and greatest volume of detention, a range of storm durations (10, 15, 20, 25, 30, 45, 60, 90, 120, and 180 min) was simulated before identifying the critical duration. A total of 100 storm events were simulated to determine the worst case for the 20% AEP event. The simulations were conducted within the study area to evaluate the open drains, culverts, basins, and outlet structures' ability to convey a 20% AEP through the site.

4.3. Modelling Assumptions

The study area was modelled by identifying surface areas with different surface roughness using Google Earth, as depicted in **Figure 4**. The surface roughness, associated with the Manning n value, was assumed based on the industry standard values as summarised in **Table 3**.

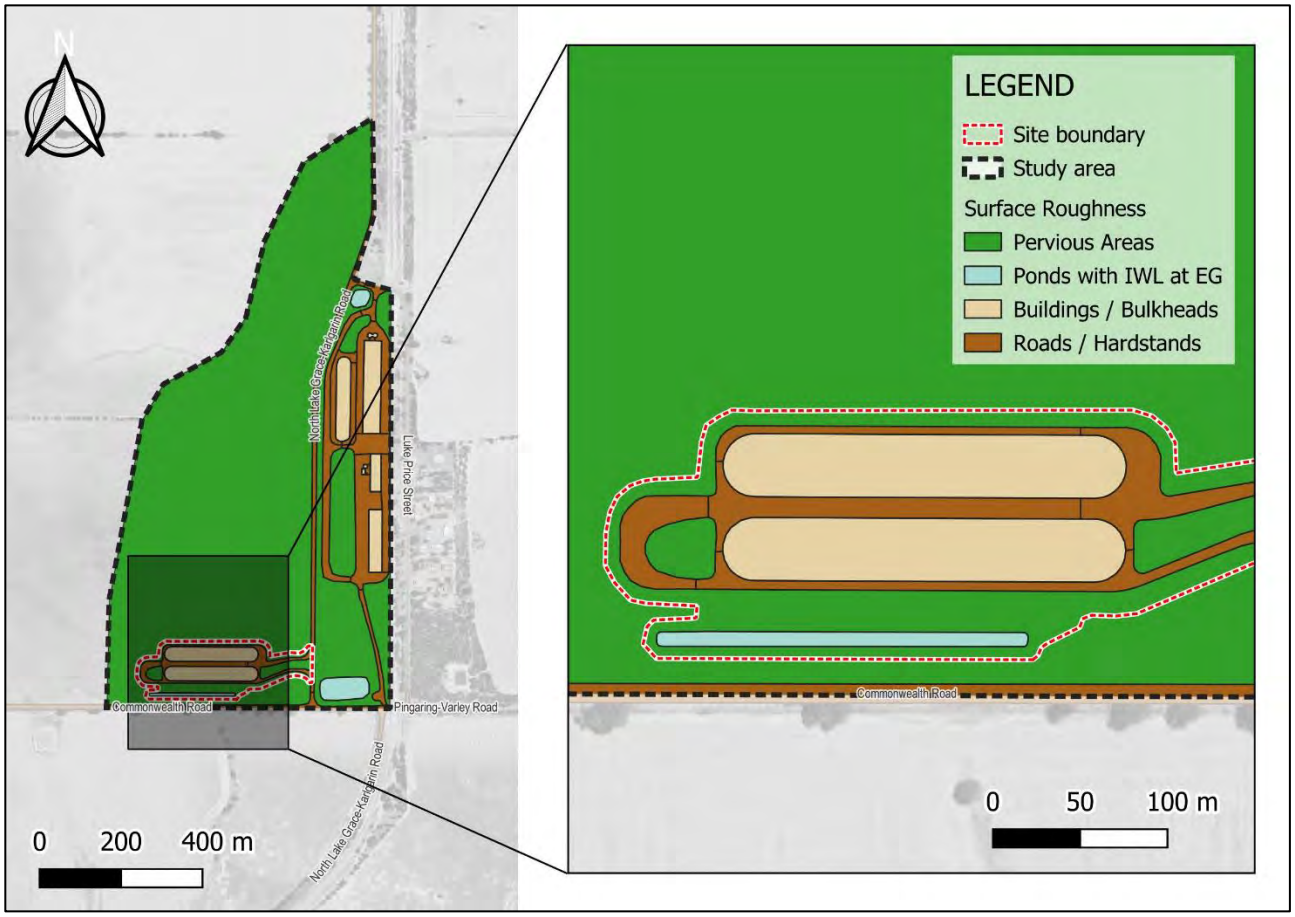


Figure 4 : Material roughness

Table 3 : Assumed surface roughness and storm losses for the study area

Description	Manning, n
Pervious areas	0.040
Roads / Hardstand	0.020
Buildings / Bulkheads	0.100
Ponds with IWL at EG	0.040

4.4. Modelling Results

Following the RoG modelling of the study area with TUFLOW (12d), by utilising the primary modelling data described in the preceding sections, the size of the culverts for a 20% AEP was ascertained. The modelling results are described separately in the following sections.

4.4.1. Critical Storm Duration

The identification of the critical storm duration entailed the assessment of the ensemble modelling results to determine the mean result following the ARR. Thereafter, the mean results of the variety of durations were compared to identify the maximum, which is the critical duration, and the result of this assessment is depicted in **Figure 5**.

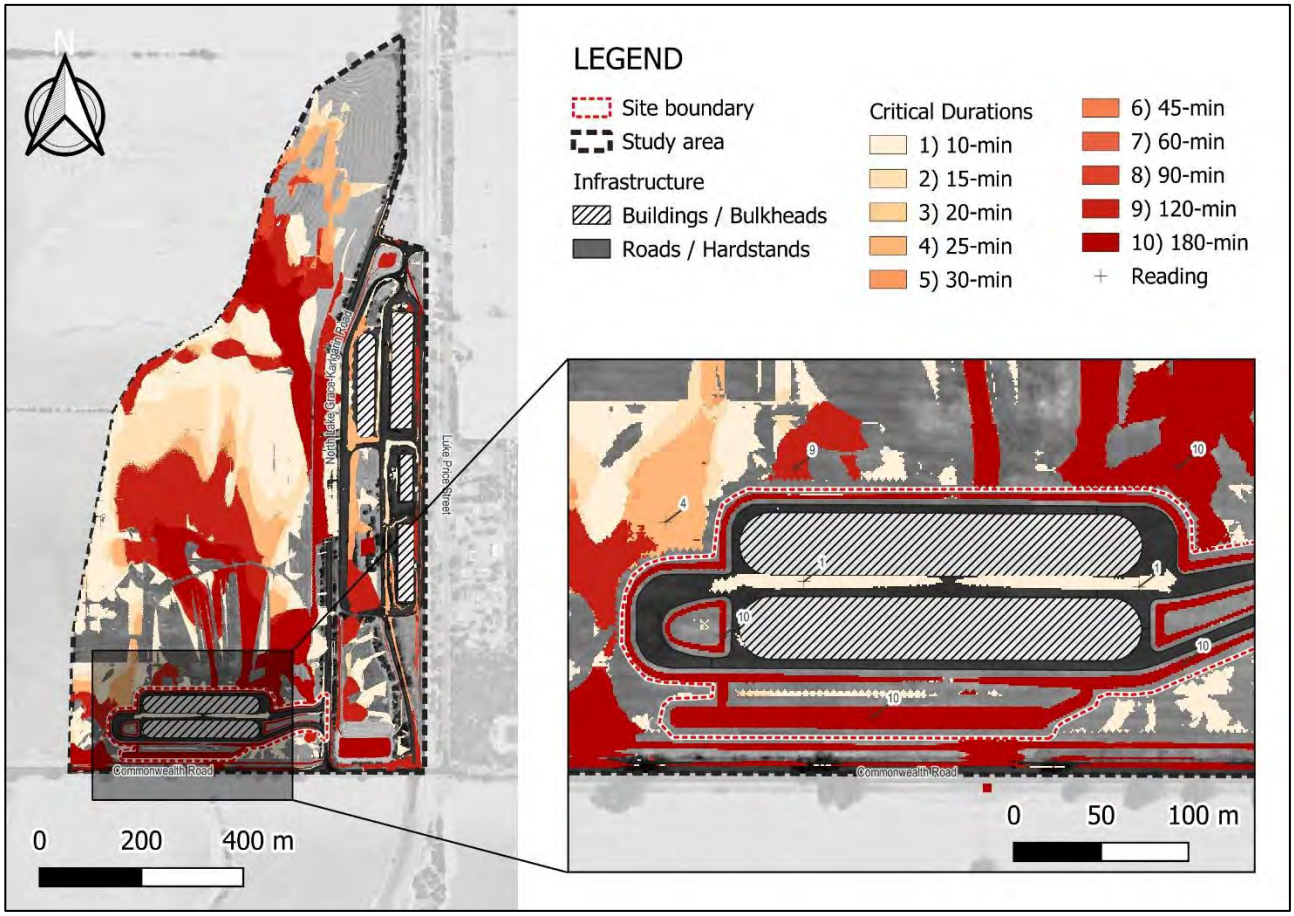


Figure 5 : Critical durations for the 20% AEP event

4.4.2. Flood Inundation

The maximum flow depth results for the 20% AEP event (Including CC) are depicted in **Figure 6**. This map shows the water depth of 5 mm or deeper. The maximum flow depths were 1.6 m in the basin and 0.5 to 1.0 m in the drain. More detailed information is provided in the drawings, attached as Appendix 1.

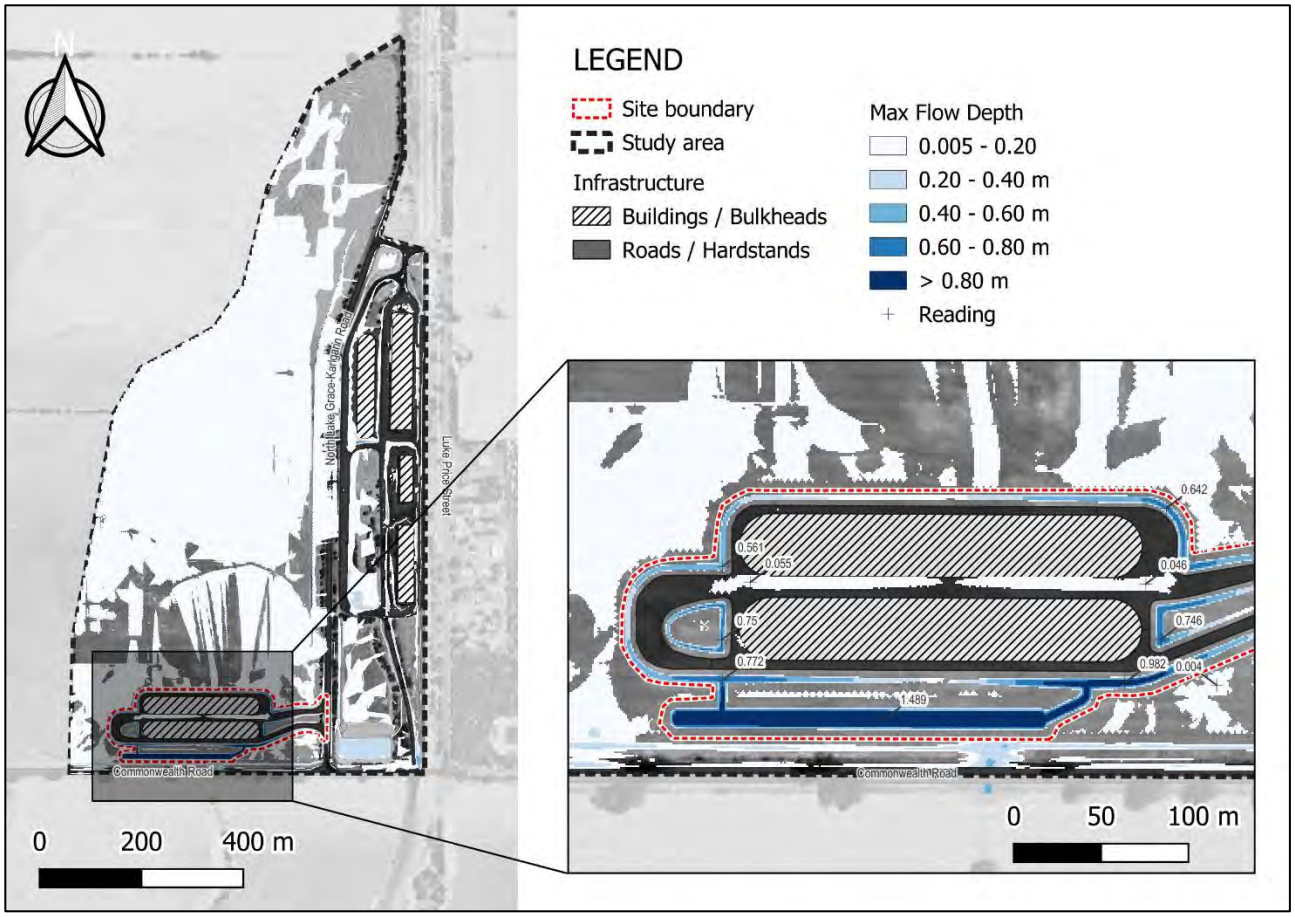


Figure 6 : Maximum flow depth results for the 20% AEP event (Including CC)

4.4.1.Water Surface Elevation

The maximum water surface elevations are depicted in **Figure 8**, which indicates a constant elevation of RL 278.26 m in the drains and the basin with very few differences. This shows that, in addition to the basin, the drains also assist in providing storage volume. More detailed information is provided in the drawings, attached as Appendix 1.

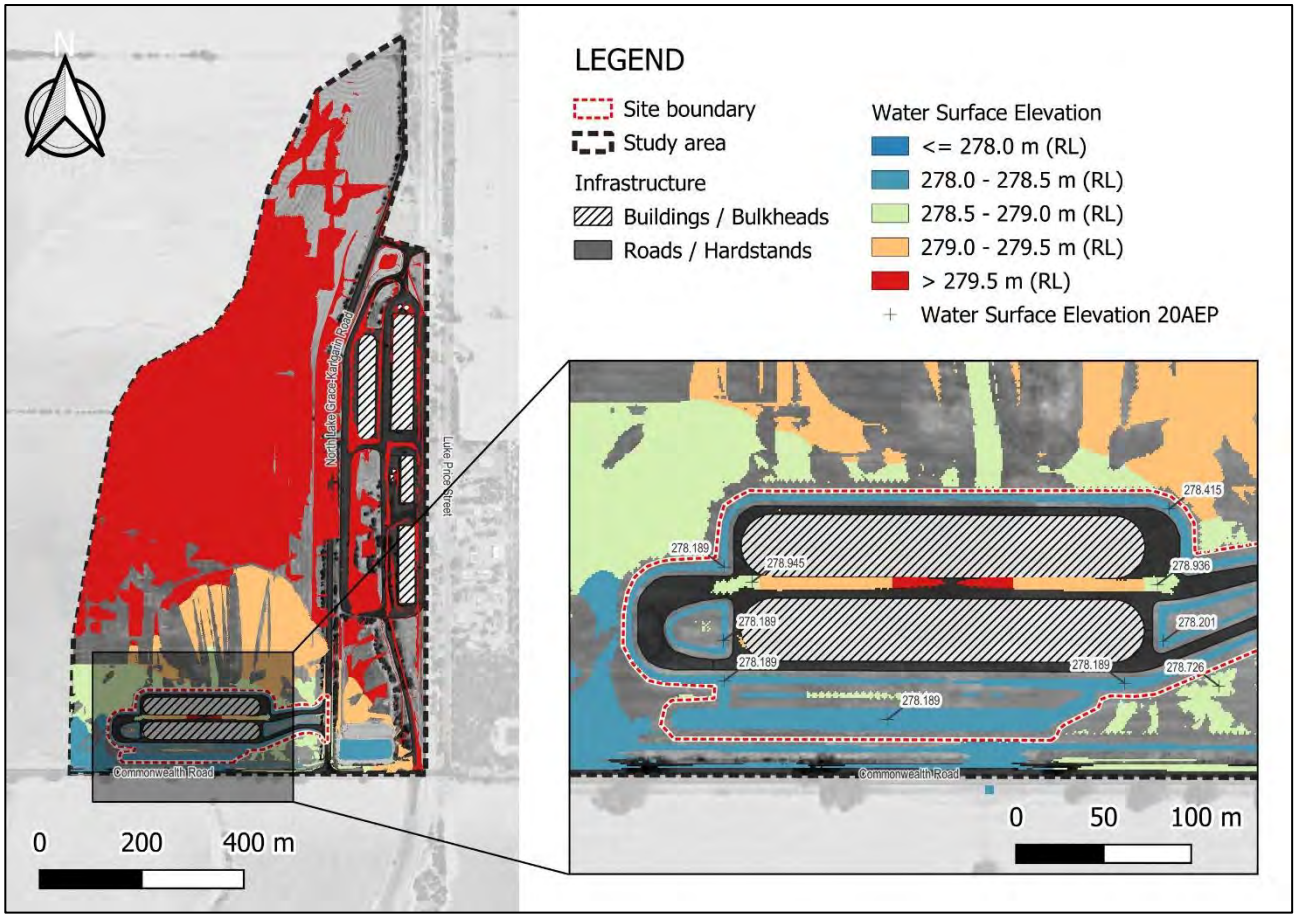


Figure 7 : Maximum water surface elevation results for the 20% AEP event (Including CC)

4.4.2. Flow Velocity

The maximum flow velocity, inclusive of depths of less than 5 mm, is depicted in **Figure 8**, which indicates a maximum velocity of 0.3 to 0.6 m/s in the drains. More detailed information is provided in the drawings, attached as Appendix 1.

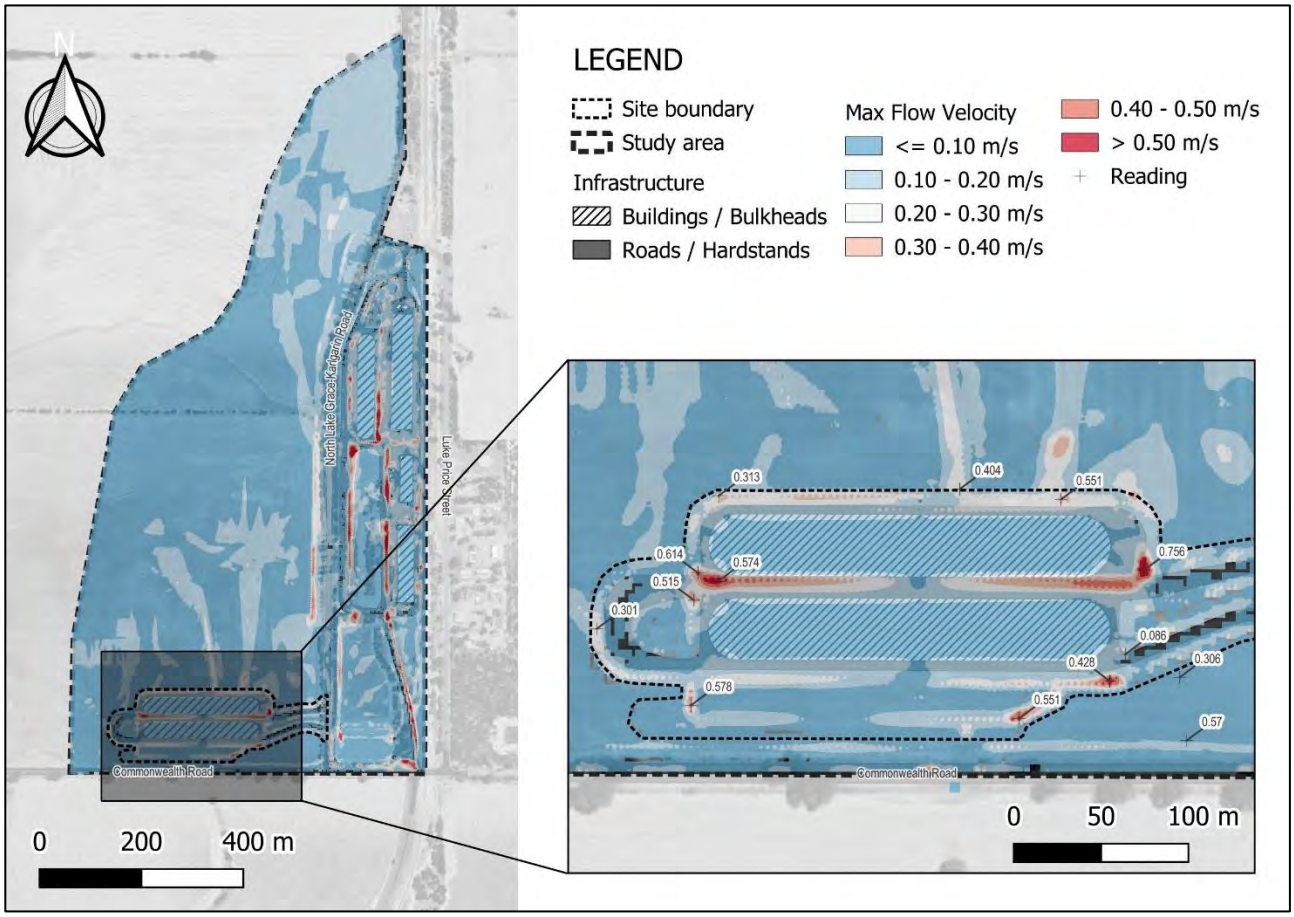


Figure 8 : Flow velocity results for the 20% AEP event (Including CC)

4.4.3. Culverts

The culverts were evaluated to have sufficient capacity to handle a 20% AEP while maintaining a minimum freeboard of 150mm below adjacent pavements. Detailed drawings and the hydraulic assessment report of the culverts are attached in Appendix 1. At the North Lake Grace-Karlgarin Road intersections, surface water has been directed into the existing open drains in lieu of installing culverts. This design decision was based on the limited longitudinal grade available along the road reserve, which does not provide sufficient fall to achieve self-cleansing velocities. In addition, the reduced cover depth at the proposed locations would not have met minimum requirements for culvert installation. Directing flows to the open drain network therefore provides a more reliable and maintainable drainage solution under the site constraints.

4.4.4. Open Channels

The trapezoidal and V-drains were evaluated to have sufficient capacity to convey the stormwater during the 20% AEP storm events. The drains generally have a minimum of 0.3% longitudinal fall, maximum 1:3 batter slopes, minimum 0.4m deep to pavement, and have been modelled with a Manning's roughness of 0.040, which would allow for short grass in the channels. The open drain locations are shown on drawings attached in Appendix 1.

It’s noted that after construction the Manning's roughness is likely to be closer to 0.02, which will increase the velocities in the channel, and as vegetation develops, it will reach 0.035 to 0.040. The soil types vary across the site, and the proposed open channels' depths vary, so it’s likely that if velocities aren’t controlled, then the sandier parts of the open channels will scour while the clay areas will be intact.

5. CONCLUSION

The Stormwater Drainage Report describes how the objectives for the stormwater drainage have been met for a 20% AEP or 5 Year ARI.

- Stormwater outflows have been limited to predevelopment flows.
- Culverts and Trapezoidal drains have been sized to provide 150mm freeboard to the adjacent pavements.
- The velocities were less than 2 m/s.
- An area outside the site were identified to be subject to flooding.

APPENDIX 1– HYDROLOGICAL AND HYDRAULIC CALCULATIONS

195 - Agenda Attachment 7 - Path of Kumano - 28/11/2016

12d Dynamic Drainage Results

Modelling Approach: Ensemble Rain-on-Grid

Hydrology method	Infiltration method	AEP (%)	Storm event type
ILSAX 2	Horton	20	Minor

Notes: All flows are the maximum of the median temporal pattern.
Negative flow values indicate reverse flows.
Single link unless indicated in brackets e.g., (2x).
Size is the diameter unless separated by 'x' (width x height).

Group	Node	Next Node	Invert (m)	Grate (m)	Node HGL (m)	Flow (m³/s)	Velocity (m/s)	Length (m)	Slope (%)	Size (mm)
dynamic/10	1-1	1-2	277.440	278.040	277.805	0.160	1.170	19.003	0.631	600
dynamic/15					277.829	0.178	1.170			
dynamic/20					277.840	0.186	1.170			
dynamic/25					277.864	0.204	1.200			
dynamic/30					277.908	0.237	1.250			
dynamic/45					277.939	0.267	1.310			
dynamic/60					278.009	0.328	1.370			
dynamic/90					278.075	0.377	1.500			
dynamic/120					278.145	0.386	1.500			
dynamic/180					278.185	0.414	1.540			
dynamic/10	1-2		277.320	277.920	277.496					
dynamic/15					277.505					
dynamic/20					277.509					
dynamic/25					277.515					
dynamic/30					277.530					
dynamic/45					277.589					
dynamic/60					277.772					
dynamic/90					277.993					
dynamic/120					278.103					
dynamic/180					278.195					
dynamic/10	2-1	2-2	277.630	278.005	277.920	0.070	0.710	21.314	0.563	375
dynamic/15					277.940	0.074	0.730			
dynamic/20					277.950	0.076	0.740			
dynamic/25					277.957	0.080	0.760			
dynamic/30					277.961	0.080	0.770			
dynamic/45					277.948	0.076	0.740			
dynamic/60					277.942	0.079	0.760			
dynamic/90					277.967	0.085	0.760			
dynamic/120					278.103	0.084	0.810			
dynamic/180					278.195	0.091	0.850			
dynamic/10	2-2		277.510	277.885	277.866					
dynamic/15					277.883					
dynamic/20					277.889					
dynamic/25					277.893					
dynamic/30					277.892					
dynamic/45					277.880					
dynamic/60					277.880					
dynamic/90					277.982					
dynamic/120					278.103					
dynamic/180					278.195					
dynamic/10	3-1	3-2	278.400	278.850	278.447	0.017	0.260	12.791	0.745	1200x450
dynamic/15					278.445	0.016	0.270			
dynamic/20					278.441	0.014	0.270			
dynamic/25					278.481	0.038	0.350			
dynamic/30					278.487	0.043	0.370			
dynamic/45					278.497	0.049	0.380			
dynamic/60					278.510	0.059	0.400			
dynamic/90					278.543	0.089	0.460			
dynamic/120					278.566	0.110	0.510			
dynamic/180					278.577	0.122	0.520			
dynamic/10	3-2		278.305	278.755	278.415					
dynamic/15					278.417					
dynamic/20					278.413					
dynamic/25					278.416					
dynamic/30					278.418					
dynamic/45					278.429					
dynamic/60					278.448					
dynamic/90					278.487					
dynamic/120					278.514					
dynamic/180					278.516					

dynamic/10	4-1	4-2	279.079	279.454	279.079	0.000	0.000	11.010	0.319	375
dynamic/15					279.079	0.000	0.000			
dynamic/20					279.079	0.000	0.000			
dynamic/25					279.079	0.000	0.000			
dynamic/30					279.079	0.000	0.000			
dynamic/45					279.079	0.000	0.000			
dynamic/60					279.079	0.000	0.000			
dynamic/90					279.079	0.000	0.000			
dynamic/120					279.079	0.000	0.000			
dynamic/180					279.079	0.000	0.000			
dynamic/10	4-2		279.044	279.419	279.044					
dynamic/15					279.044					
dynamic/20					279.044					
dynamic/25					279.044					
dynamic/30					279.044					
dynamic/45					279.044					
dynamic/60					279.044					
dynamic/90					279.044					
dynamic/120					279.044					
dynamic/180					279.044					
dynamic/10	5-1	5-2	277.670	278.270	278.036	0.161	1.140	20.901	0.574	600
dynamic/15					278.058	0.177	1.150			
dynamic/20					278.068	0.184	1.150			
dynamic/25					278.112	0.217	1.160			
dynamic/30					278.156	0.253	1.190			
dynamic/45					278.180	0.272	1.230			
dynamic/60					278.248	0.335	1.290			
dynamic/90					278.329	0.394	1.420			
dynamic/120					278.384	0.402	1.460			
dynamic/180					278.404	0.429	1.530			
dynamic/10	5-2		277.550	278.150	277.817					
dynamic/15					277.840					
dynamic/20					277.851					
dynamic/25					277.875					
dynamic/30					277.918					
dynamic/45					277.948					
dynamic/60					278.017					
dynamic/90					278.082					
dynamic/120					278.148					
dynamic/180					278.187					
dynamic/10	6-1	6-2	277.510	277.885	277.862	0.097	1.070	15.471	0.646	375
dynamic/15					277.880	0.107	1.110			
dynamic/20					277.885	0.109	1.120			
dynamic/25					277.890	0.111	1.130			
dynamic/30					277.889	0.110	1.140			
dynamic/45					277.877	0.105	1.110			
dynamic/60					277.876	0.105	1.100			
dynamic/90					277.982	0.103	1.100			
dynamic/120					278.103	0.101	1.090			
dynamic/180					278.195	0.097	1.090			
dynamic/10	6-2		277.410	277.785	277.573					
dynamic/15					277.579					
dynamic/20					277.579					
dynamic/25					277.585					
dynamic/30					277.587					
dynamic/45					277.588					
dynamic/60					277.786					
dynamic/90					277.992					
dynamic/120					278.103					
dynamic/180					278.195					
dynamic/10	7-1	7-2	278.000	278.375	278.208	0.014	0.560	11.660	0.000	375
dynamic/15					278.247	0.012	0.480			
dynamic/20					278.271	0.010	0.470			
dynamic/25					278.292	0.010	0.460			
dynamic/30					278.313	0.009	0.450			
dynamic/45					278.353	0.010	0.400			
dynamic/60					278.377	0.010	0.400			
dynamic/90					278.401	0.009	0.360			
dynamic/120					278.417	0.010	0.370			
dynamic/180					278.423	0.010	0.300			
dynamic/10	7-2		278.000	278.375	278.210					
dynamic/15					278.251					
dynamic/20					278.275					

```
dynamic/25                                278.296
dynamic/30                                278.320
dynamic/45                                278.359
dynamic/60                                278.383
dynamic/90                                278.407
dynamic/120                               278.424
dynamic/180                               278.430
```



Traffic Impact Statement

Project:	Pingaring Grain Receival Site Transport Impact Statement
Client:	CBH
Author:	N. Baby
Date:	13th July 2026
Shawmac Document #:	2605002-TIS-003
CBH Document #:	TBC

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1. Introduction

1.1. The Project

It is understood that CBH has undertaken temporary works at its existing Pingaring grain receival site to accommodate excess storage demand. The temporary works involved the construction of two temporary open bulkheads (TBH02/03) on vacant land southwest of existing open bulkheads, as shown in **Figure 1**. An excerpt of the design drawings for the temporary OBH's is shown in **Figure 2.**



Figure 1: Site Location

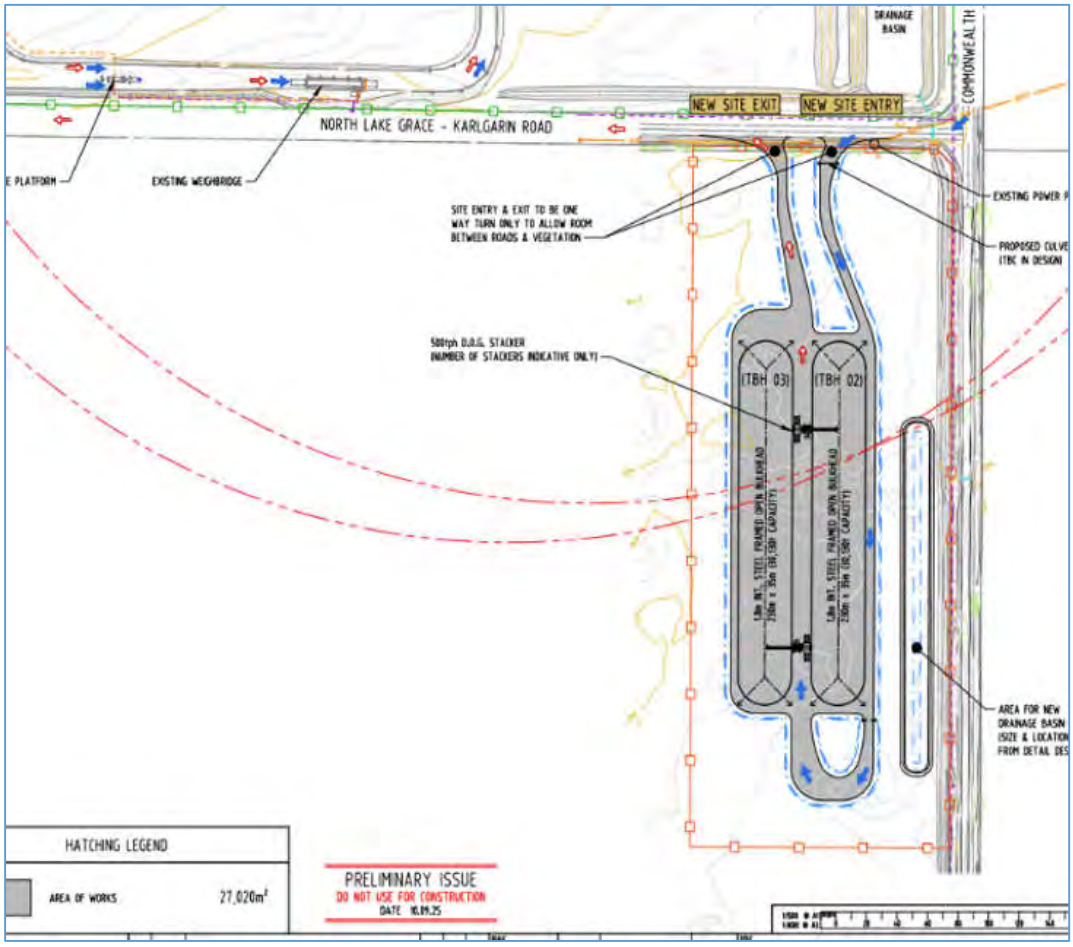


Figure 2: Temporary OBH Design Excerpt

Shawmac has been engaged by CBH to prepare a Transport Impact Statement to support the proposed development at the site.

1.2. Purpose

The TIS has been prepared in accordance with MRWA's requirements and with reference to WAPC's Traffic Impact Assessment Guidelines, and includes:

- Documenting the details of the proposed works.
- Documenting the existing situation including road network, traffic volumes (CBH and background), crash history, RAV network etc.
- Estimate the existing and future traffic generation and trip distribution based on CBH provided site traffic data.
- Assessing the intersections for suitability in terms of:
    - Vehicle swept paths.
    - Sight Distance
    - Intersection configuration assessment
    - Conformance to RAV network requirements
    - Site specific/safety issues

2. Existing Situation

2.1. Road Network

The layout and hierarchy of the existing local road network according to the Main Roads WA *Road Information Mapping System* is shown in **Figure 3**.

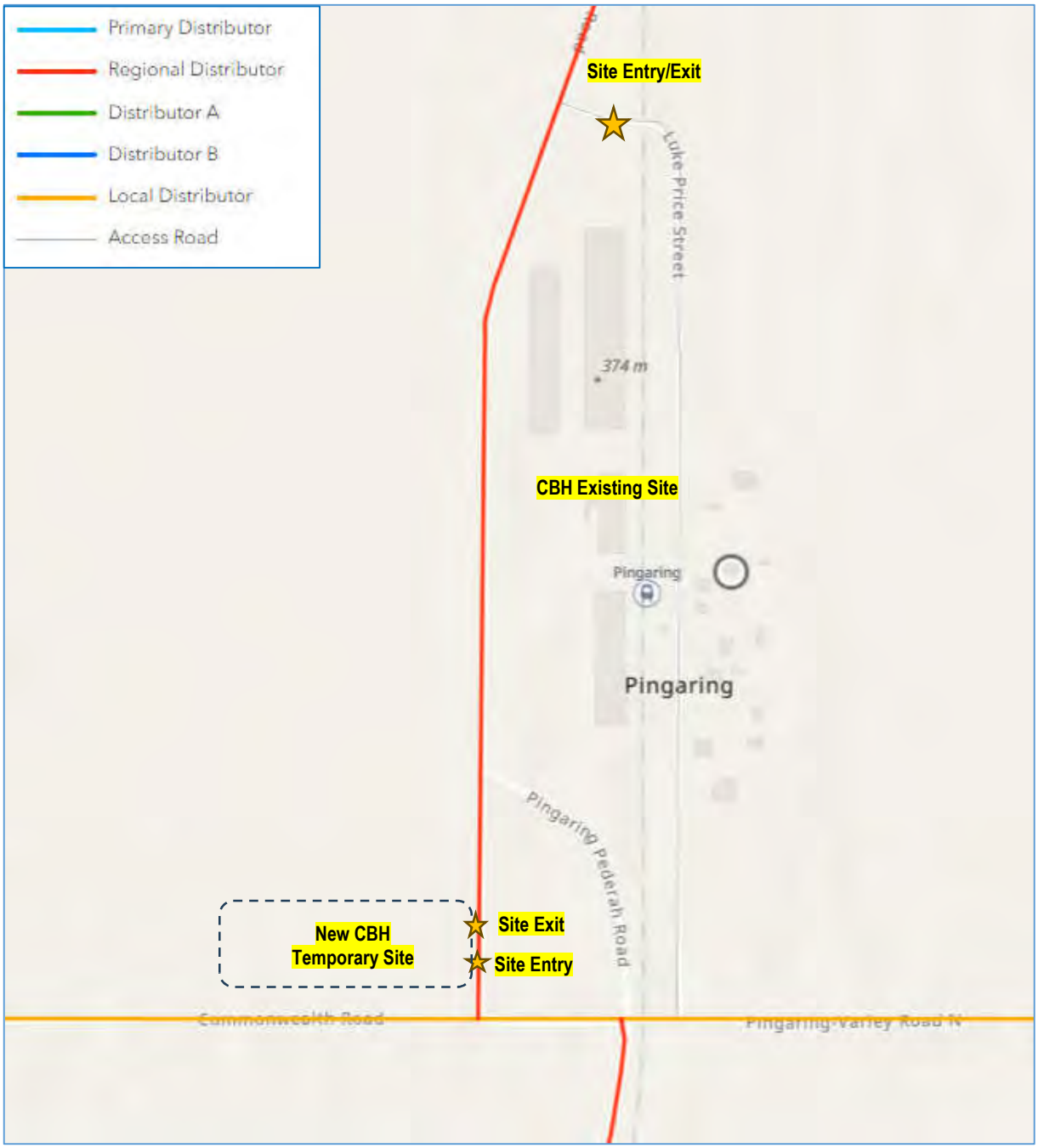


Figure 3: Adjacent Road Network

2.2. Carriageway Width and Cross Section

The configurations of the relevant roads are summarised in **Table 1**.

Table 1: Road Configuration

Road and Location	Road Type	Cross Section	Sealed Pavement Width (Approx.)	Carriageway Width (Approx.)
North Lake Grace-Karlgarin Road	Regional Distributor	Two lane single carriageway	6.5 - 7.2m	8.5 - 10.0m
Luke Price Street	Access Road	Two lane single carriageway	7.0m	10.0m
Commonwealth Road	Local Distributor	Two lane single carriageway	7.5m	9.0m

2.3. Traffic Volumes

The available traffic count data in the vicinity of CBH site for Pingaring Varley Road and Luke Price Street was sourced from MRWA's Traffic Map. The traffic counts sourced for Pingaring Varley Road (West of Luke Price Road) and Luke Price Road (North of Pingaring Varley Road) were recorded in 2020/2021. A compounding 3% annual increase to 2025/2026 has been adopted to reflect current day figures.

There are no count sites for North Lake Grace-Karlgarin Road or Commonwealth Road. It is assumed that the traffic along North Lake Grace-Karlgarin Road and Commonwealth Road will be similar to Pingaring Varley Road. For the purpose of this assessment, the following has conservatively been assumed:

- There is no CBH traffic included in the existing traffic volumes.

The traffic data for the relevant roads are summarised in **Table 2** and **Table 3.**

Refer to **Appendix A – MRWA Traffic Volumes** for detailed traffic data.

Table 2: Daily Traffic Volumes

Road / Direction	Location	Estimated Daily (NB/SB)/(EB/WB) (2025/26)	% HVs	Data Source
North Lake Grace-Karlgarin Road	Temporary CBH Site Entry/Exit	58/52	29.5	Assumed
Commonwealth Road	West of Luke Price Road	58/52	29.5	Assumed
Luke Price Street	North of Pingaring Varley Road	28/22	25.6	MRWA 2020/21

Table 3: Peak Hour Traffic Volumes

Road / Direction	Location	MRWA/Estimated (2025/26)	
		AM Peak	PM Peak
North Lake Grace-Karlgarin Road - NB	Temporary CBH Site Entry/Exit	8	9
North Lake Grace-Karlgarin Road - SB	Temporary CBH Site Entry/Exit	7	8
Commonwealth Road - EB	West of Luke Price Road	8	9
Commonwealth Road - WB	West of Luke Price Road	7	8
Luke Price Street - NB	North of Pingaring Varley Road	3	3
Luke Price Street - SB	North of Pingaring Varley Road	2	3

2.4. RAV Status

As per MRWA HVS network mapping tool:

- North Lake Grace-Karlgarin Road is categorised as Tandem Drive RAV 7.1 / Tri Drive 1.1 with no conditions.
- Commonwealth Road is categorised as Tri Drive 1.1 with no conditions and Tandem Drive RAV 7.1 with the following condition:
    - The operator must notify the road manager via email of their planned transport task, including estimated tonnages and loaded vehicle movements. The operator must copy Main Roads Heavy Vehicle Services (hvsrouteassessments@mainroads.wa.gov.au) into the email.
    - Headlights to be switched on at all times
    - No operation on unsealed road segment when visibly wet, without road owner's approval.
    - No access to & from Gorge Rock - Lake Grace Rd
- Luke Price Street is categorised as Tandem Drive RAV 7.1 / Tri Drive 1.1 with no conditions.

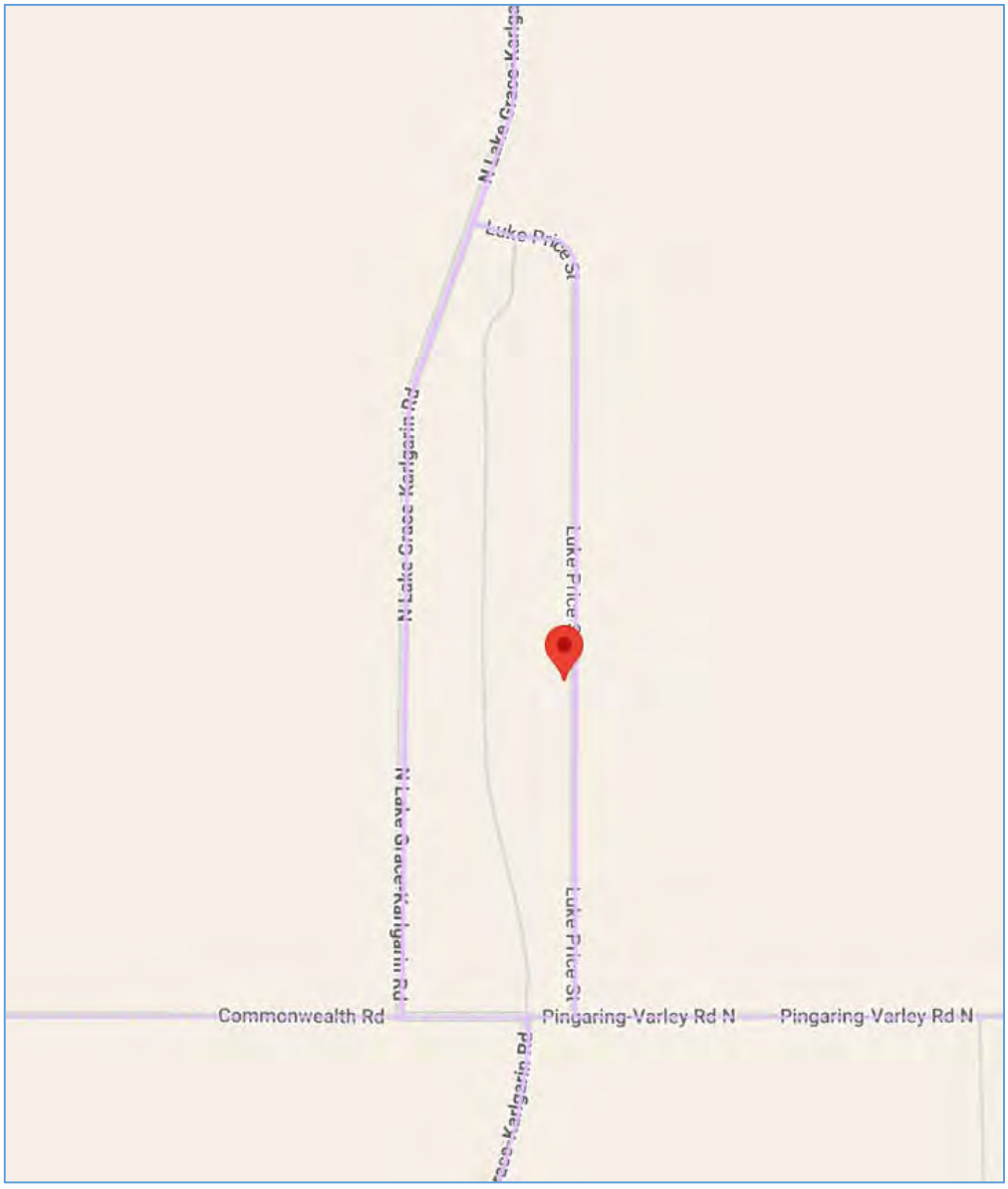


Figure 4 and **Figure 5** show the Tandem Drive and Tri Drive RAV networks in the vicinity of the site, respectively.



Figure 4: Tandem Drive RAV Network



Figure 5: Tri Drive RAV Network

2.5. Speed Limit

The speed limit of the adjacent road network is shown below in **Figure 6**.

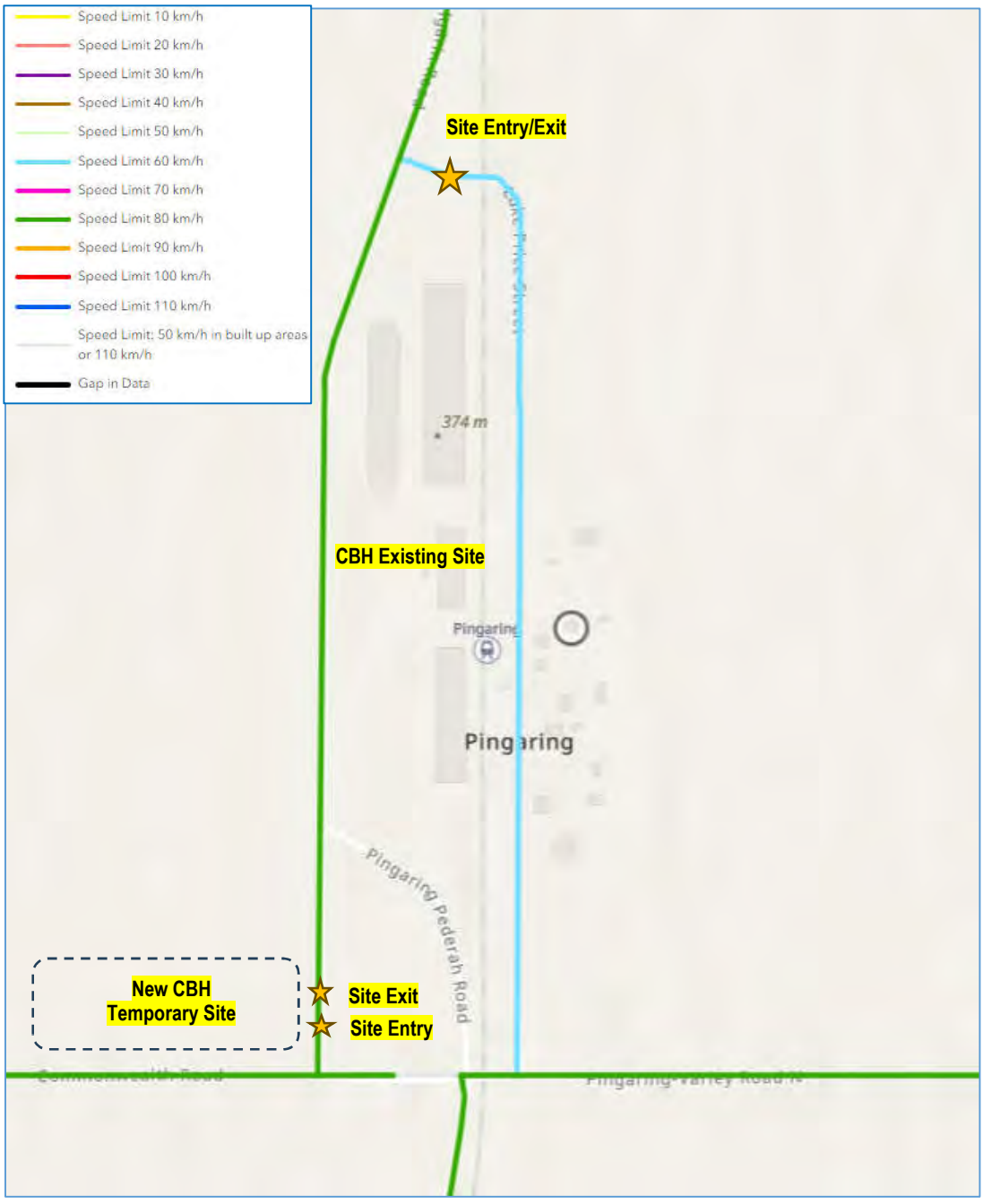


Figure 6: Speed Zoning

2.6. Crash History

Crash data for the relevant roads in the vicinity of Pingaring CBH site were sourced from MRWA Crash Analysis Reporting System (CARS) for the 5-year period ending 31/12/2025. The report indicated that there were no crashes recorded in the vicinity of site during this period.

2.7. Changes to Surrounding Transport Networks

There are no known changes to the adjacent road network that have potential to affect this assessment.

3. Transport Logistics

3.1. Current CBH Traffic Data

CBH have provided the following data associated with the Pingaring Receival site:

- Peak season receivals (from local growers) – 128,611t
- Average carryover (grain remaining from previous harvest) – 9,656t
- CBH Road Movements in (receival from up-country sites, within harvest but outside the harvest peak) – 2,939t
- Total site task – 141,206t
- Available capacity after recent expansion – 182,060t
- Available capacity prior to expansion – 121,800t.
- Average in-loading truck payload - 57t

3.2. Site Expansion

The site expansion was undertaken to increase the grain storage capacity at the Pingaring site. The previous nameplate storage capacity was 121,800t and after expansion, the capacity is now 182,060t.

If local production exceeds the capacity of the Pingaring receival site, CBH must out-turn grain simultaneously (Harvest Essential Moves) to continue to offer a service to growers, and by doing so, increase the traffic on surrounding roads during the peak harvest period. The storage expansion allowed CBH to eliminate the volume of Harvest Essential Moves (HEMs) with the intention of reducing trucks on road during the harvest and instead holding the grain on site to out-turn over the remaining 9 months of the year when the road network is less busy.

The distribution of CBH traffic is unchanged as the receival task is driven by local production regardless of the outcome of the site development.

Table 4 provides a comparison between the record harvest peak truck movements, which would be required with and without the construction of the storage expansion. As shown, the storage expansion eliminated 323 truck movements (7 per day) which would otherwise have been required during the harvest period.

Table 4: Historical Record Harvest Truck Movements

	Unit of Measurement	Before Expansion (2)	After Expansion (2)
Record Site Task[1]	Tonnes	141,206	141,206
Available Site Capacity	Tonnes	121,800	182,060
Road Harvest Essential Moves (HEMs)	Tonnes	19,406	-
Road HEMs	Tonnes	19,406	-
HEMs Per Harvest	Trucks	323	-
HEMs Per Day	Trucks	7	-

1) For the purposes of this assessment the record site task has been adopted and therefore should not be interpreted as the average.
2) Figures may not sum due to rounding.

3.3. Proposed Haulage Vehicle

It is proposed to continue to use RAV 7 trucks up to 36.5m long for haulage of grain. Refer to **Figure 7** for a typical configuration of RAV 7 vehicles. In addition, CBH also noted that while this site is rated for RAV7, smaller RAV vehicles are also used.

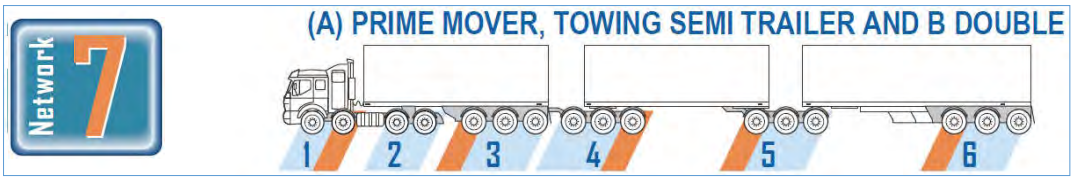


Figure 7: Typical Tandem Drive RAV 7 Trucks

3.4. Receival Period and Operating Hours

CBH have indicated that on average the harvest receival period will last approximately three months, generally October through to December. During this period, it is known that delivery patterns peak for around 45 days with 80% of the crop delivered in this time. Generally, receival sites will operate 7 days a week for 12 hours per day during the harvest period.

3.5. Haulage Route and Truck Movements – Harvest Period

As per the current traffic data provided by CBH, directional movements for the harvest receivals (from local growers) are shown in **Figure 8**. For clarity, only receival movements are shown, out-bound (empty) trucks are assumed to return to their origin after delivery.

The directional movements for the harvest receivals are as follows:

- Growers from the north (64%) will access the existing site via North Lake Grace–Karlgarin Road, turning left onto Luke Price Street to enter the site.
- Growers from the west (1%) will access the site via Commonwealth Road, then turn left onto North Lake Grace–Karlgarin Road, followed by a left turn onto Luke Price Street to enter the site.
- Growers from the south (15%) will travel via North Lake Grace–Karlgarin Road, turn left onto Commonwealth Road, then right back onto North Lake Grace–Karlgarin Road, and finally left onto Luke Price Street to access the site.
- Growers located west of the site (19%) may also access the site via Pingaring–Varley Road, turning right onto Luke Price Street and travelling in a northerly direction to enter the site.

All trucks will initially arrive at the existing site to undergo sampling and weigh-in. Following this, trucks will be directed to their designated storage areas, either within the existing site or the temporary site. Trucks delivering to the temporary site will be required to return to the existing site for weigh-out after unloading, before exiting the site and returning directly to their origin.



Figure 8 : CBH Directional Split

As noted in **Section 3.4**, grain is not received consistently throughout the harvest period and data from CBH suggest that generally 80% of grain is received within 45 days.

For the purposes of assessing the peak period impacts, the following assumptions have been made:

- 80% of total grain tonnes are received within and evenly distributed over 45 days.
- Truck deliveries occur over a 12-hour period, and 10% of all daily volumes are received within a peak hour.

- All HEMs occur during the 45-day peak period.

Based on the existing average season receival of 128,611t, plus 2,939t road moves from other sites, in total Pingaring site will generate:

- 2,308 truck movements during the harvest.
- 1,805 truck movements during the 45-day peak period. (note road moves from other sites occur outside the peak).
- 40 movements per day during the 45-day peak.
- 4 movements during a peak hour of the 45-day peak.

Out of this, CBH has confirmed that the new Temporary site will receive a 45-day peak receival of 28,063t, and will generate:

- 492 truck movements during the 45-day peak period.
- 11 movements per day during the 45-day peak.
- 1 movement during a peak hour of the 45-day peak.

Therefore, the existing CBH site will receive 45-day peak receival of 74,826t, and will generate:

- 1313 truck movements during the 45-day peak period.
- 29 movements per day during the 45-day peak.
- 3 movement during a peak hour of the 45-day peak.

Figure 9 and **Figure 10** show the previous (before expansion) and existing (after expansion) traffic generation for the harvest period, respectively.

The changes in traffic volumes and movements from the existing operations during the 45-day harvest peak are summarised as follows (note figures are rounded to the nearest whole number):

- CBH Access/Luke Price Street:
    - A reduction of 7 left out daily movements from CBH Access to Luke Price Street (HEMs)
    - An increase in 11x right in daily movements from Luke Price Street to CBH access (new site movements to weigh out)
- CBH Exit/Commonwealth Road
    - An increase in 11x right turn daily movements from CBH exit to Commonwealth Road (new site movements after weigh-in).
- Commonwealth Road between CBH site exit and North Lake Grace-Karlgarin Rd
    - An increase in 11x daily movements (new site movements after weigh-in).
- North Lake Grace-Karlgarin Rd/Commonwealth Rd

- An increase in 11x right turn daily movements from Commonwealth Road to North Lake Grace-Karlgarin Rd (new site movements after weigh-in).

- New Site Entry-Exit/N Lake Grace-Karlgarin Rd
  - An increase in 11x left in daily movements from North Lake Grace-Karlgarin Rd to new site entry.
  - An increase in 11x left out daily movements from new site exit to North Lake Grace-Karlgarin Rd.
- N Lake Grace-Karlgarin Rd between new site exit and Luke Price Street:
  - An increase in 11x daily movements (new site movements to weigh out).
- Luke Price Street/N Lake Grace-Karlgarin Rd
  - A reduction of 7 right out daily movements from Luke Price Street to N Lake Grace-Karlgarin Rd (HEMs).
  - An increase in 11x right in daily movements from N Lake Grace-Karlgarin Rd to Luke Price Street (new site movements to weigh out).

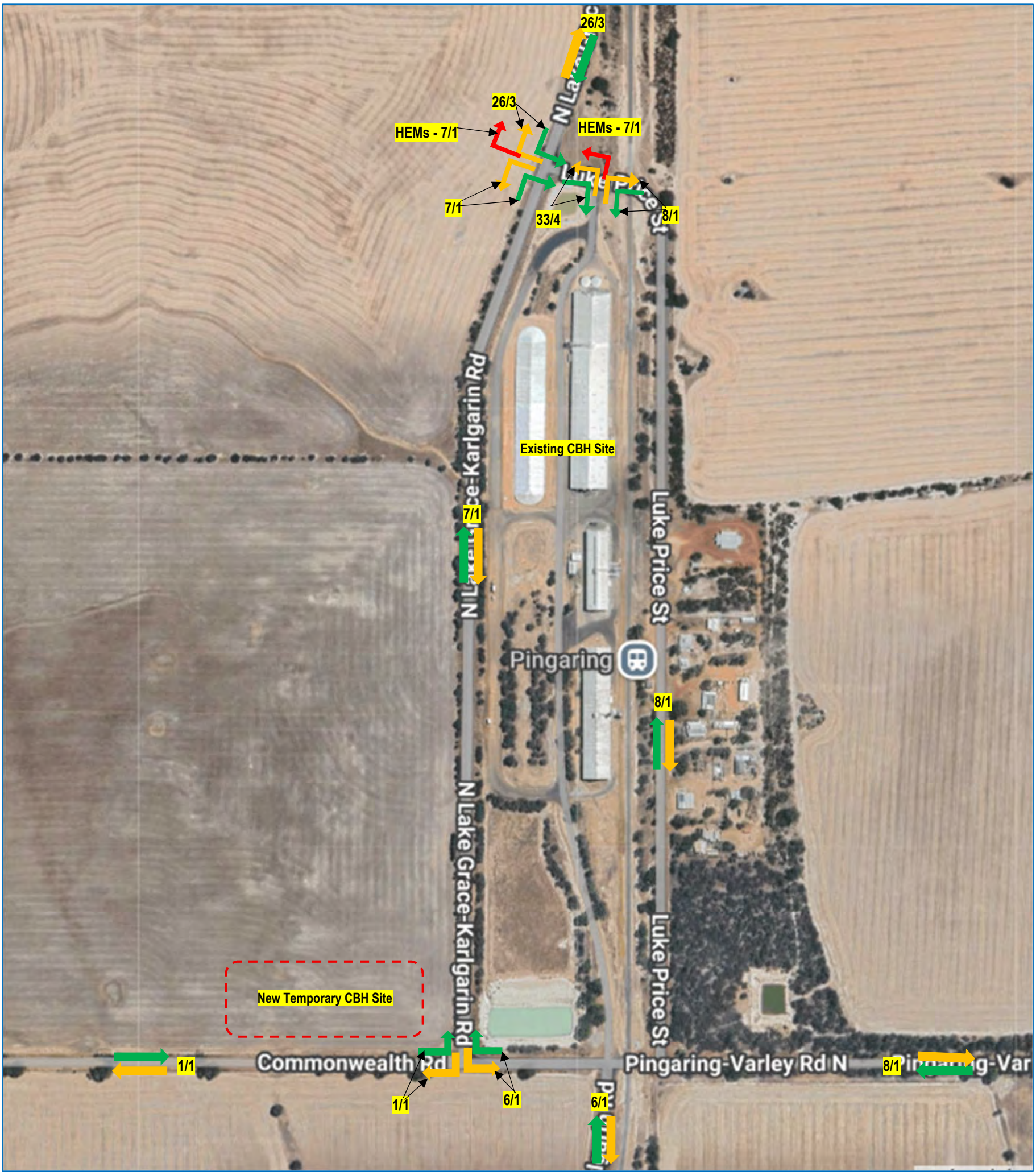


Figure 9: Previous (Before Expansion) Traffic Distribution (Daily Volume/Peak Hour Volume)

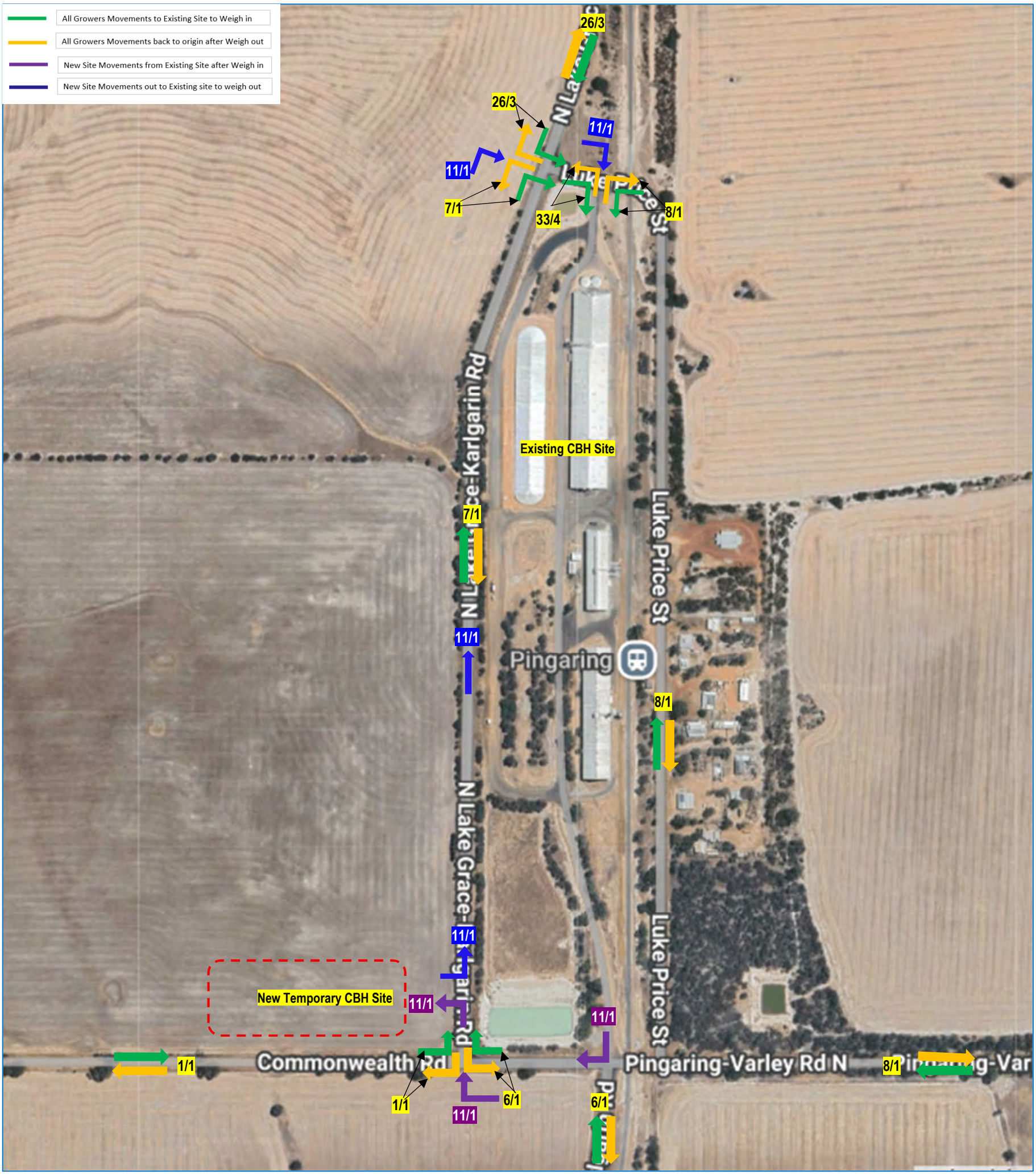


Figure 10: Existing (After Expansion) Traffic Distribution (Daily Volume/Peak Hour Volume)

3.6. Out of Harvest Period

Outside of the harvest period, out-loading movements will be undertaken to move grain from Pingaring to Port for export, in the northbound direction towards Kwinana Port. Most of the out-loading will occur via road, a small amount (15%) is out-loaded via rail.

Table 5 provides a comparison between the out of harvest truck movements, which would be required prior to and after the construction of the site expansion.

Table 5: Out of Harvest Truck Movements

	Unit of Measurement	Before Expansion (1)	After Expansion (1)
Total Out-loading Task (rail + trucks)	Tonnes	112,144	131,550
Total Out-loading task - rail	Tonnes	16,638	16,638
Total Out-loading task - trucks	Tonnes	95,506	114,913
Days to out-load site on road	Days	48	57
Trucks Per Day	Trucks	33	33

1) Figures may not sum due to rounding.

The out-loading task will be performed over the remaining 9 months of the year. Whilst the total out-loading task increases by an equivalent amount to the reduction in HEMs, the same volume of grain is out-turned outside of the peak traffic period and at lower intensity. It is noted that the additional capacity on site does not increase traffic intensity or trucks per day, as the daily out-loading capacity remains at approximately 2,000t/day. Instead, by holding grain during harvest, the out-loading will be done at an intensity of 33 trucks per day during the less busy non-harvest period for a 9-day period compared to the case if the expansion was not built.

The estimated out of harvest period out-loading movements are approximately 33 movements a day (with the expansion), which is considerably less than the 40 peak harvest period in-loading traffic generation, and the 7 HEMs per day that would otherwise need to occur during the harvest. As a result, the out of harvest period out-loading movements will have significantly less impact to the road network than the peak harvest period traffic generation.

4. Traffic Impact Assessment

4.1. Assessment Years

The development is assessed based on 2026 network condition.

4.2. Impact on Roads

4.2.1. Traffic Volumes

According to the WAPC *Transport Impact Assessment Guidelines*, an increase below 10 peak hour vehicles is considered to have a low impact and is generally deemed acceptable without requiring detailed capacity analysis. As discussed previously, the proposal with result in an increase in movements through some sections of the road network, well below this threshold, and overall will result in a net reduction in movements due to the elimination of HEMs.

It is also noted that during the remainder of the year (remaining 9 months outside of harvest), the site will generate a much lower volume of traffic.

4.2.2. Road Minimum Widths

The road widths of the surrounding roads were checked against the Rural Road Minimum Width in accordance with Appendix A of the MRWA RAV assessment guideline. The comparison is shown below in **Table 6**.

Table 6: Rural Road Minimum Width

Road	Location	Existing AADT (No CBH)	Proposed AADT (Peak)	Speed (RAV) (km/hr)	RAV Status	Existing/Required Minimum Seal (m)	Existing/Required Carriageway Width* (m)
North Lake Grace-Karlgarin Road	Temporary CBH Site Entry/Exit	110	146	80	RAV 7	6.5 / 3.5	8.5 / 8.0
Commonwealth Road	West of Luke Price Road	110	135	80	RAV 7	7.0 / 3.5	10.0 / 8.0
Luke Price Street	North of Pingaring Varley Road	50	66	60	RAV 7	7.5 / 3.5	9.0 / 8.0

As shown above, the existing road sealed widths comply with the minimum requirements.

4.2.3. Road Safety

The crash history of the adjacent road network (as previously outlined in **Section 2.6**) does not suggest any particular safety issues.

The crash history of the adjacent road network does not suggest any inherent safety issues in the existing road network that would be materially worsened by the proposal which only has a minor increase in traffic generation through some sections of the road network and a net reduction in traffic volumes overall.

4.3. Intersections

4.3.1. Safe Intersection Sight Distance

The Safe Intersection Sight Distance (SISD) is the minimum distance which should be provided on the major road at any intersection. SISD provides sufficient distance for a driver of a vehicle on the major road to observe a vehicle on a minor road approach moving into a collision situation (e.g., in the worst case, stalling across the traffic lanes) and to decelerate to a stop before reaching the collision point.

The SISD is assessed based on the following parameters:

- An observation time of 3 seconds as per Austroads Part 3;
- A reaction time of 2.5 seconds;
- Deceleration coefficients for the purpose of SISD calculations are 0.36 for light vehicles and 0.28 for heavy vehicles (Road Train Type 1 / RAV 7 equivalent);
- Driver eye height is 2.4m for trucks and 1.1m for cars;
- Object height of 1.25m; and
- Sight distance offset 3-5m from edge of proposed holding line.

A comparison of available and required SISD are summarised in **Table 7**.

Table 7: SISD Calculations

Location	Direction	Vehicle Type	Design Speed (km/h)	Coefficient of Deceleration	Decision Time (s)	Decision Time (s)	Longitudinal Grade (%)*	Required SISD (m)	Available SISD (m)
CBH Access/Luke Price Street	EB	Trucks	70	0.28	3.0+2.5	5.5	0	176	85
		Cars	70	0.36	3.0+2.5	5.5	0	161	85
	WB	Trucks	70	0.28	3.0+2.5	5.5	0	176	85
		Cars	70	0.36	3.0+2.5	5.5	0	161	85
CBH Access/Luke Price Street	EB	Trucks	40	0.28	3.0+2.5	5.5	0	84	85
		Cars	40	0.36	3.0+2.5	5.5	0	79	88
	WB	Trucks	40	0.28	3.0+2.5	5.5	0	84	85
		Cars	40	0.36	3.0+2.5	5.5	0	79	85
CBH Site Exit/Commonwealth Road	EB	Trucks	90	0.28	3.0+2.5	5.5	0.5	249	+260
		Cars	90	0.36	3.0+2.5	5.5	0.5	225	+260
	WB	Trucks	90	0.28	3.0+2.5	5.5	-1.2	256	+260
		Cars	90	0.36	3.0+2.5	5.5	-1.2	229	+260
New Site Exit/N Lake Grace-Karlgarin Rd	NB	Trucks	90	0.28	3.0+2.5	5.5	0	251	92
		Cars	90	0.36	3.0+2.5	5.5	0	226	92
	NB	Trucks	40	0.28	3.0+2.5	5.5	0	84	92
		Cars	40	0.36	3.0+2.5	5.5	0	79	92
	SB	Trucks	90	0.28	3.0+2.5	5.5	0	251	+260
		Cars	90	0.36	3.0+2.5	5.5	0	226	+260
Luke Price Street/N Lake Grace-Karlgarin Rd	NB	Trucks	90	0.28	3.0+2.5	5.5	1.1	247	+260
		Cars	90	0.36	3.0+2.5	5.5	1.1	223	+260
	SB	Trucks	90	0.28	3.0+2.5	5.5	1.5	246	220
		Cars	90	0.36	3.0+2.5	5.5	1.5	223	220
	SB	Trucks	80	0.28	3.0+2.5	5.5	1.5	208	220
		Cars	80	0.36	3.0+2.5	5.5	1.5	189	220

*Positive for through traffic travelling uphill and negative for through traffic travelling downhill. Grades are conservative estimates based on google earth.

As shown, the SISD at the CBH Access / Luke Price Street is not sufficient to achieve the minimum requirement for 70km/h for both directions. However, due to the curve geometry of Luke Street Road (with radii of approximately 23 m to the west and 43 m to the east) and the proximity of the rail crossing, vehicles are expected to travel at a speed of 40km/h. As shown in **Figure 11**, the available SISD is adequate to achieve the minimum requirement for 40km/h in accordance with the Austroads Guide to Road Design Part 4A towards both directions, provided that the area through which the sight line currently extends outside the road reserve remains clear of obstructions. The line-of-sight photos at the intersections are shown **Figure 12** and **Figure 13.**

As shown in **Figure 14**, the SISD on existing CBH Site Exit / Commonwealth Road is sufficient for both directions to achieve the minimum requirements in accordance with the Austroads Guide to Road Design Part 4A. The line-

of-sight photos at the intersections are shown **Figure 15** and **Figure 16.**

As shown in **Figure 17**, the SISD on North Lake Grace-Karlgarin Road / Commonwealth Road is sufficient for both directions to achieve the minimum requirements in accordance with the Austroads Guide to Road Design Part 4A. The line-of-sight photos at the intersections are shown **Figure 18** and **Figure 19**.

As shown, the SISD at the New Site Exit / North Lake Grace-Karlgarin Road is sufficient to achieve the minimum requirement for 90km/h for south bound direction but is not sufficient for northbound direction. However, due to the turning curve radius of North Lake Grace-Karlgarin Road onto Commonwealth Road, vehicles are expected to travel at a speed of 40km/h. As shown in **Figure 20**, the available SISD is adequate to achieve the minimum requirement for 40km/h in accordance with the Austroads Guide to Road Design Part 4A towards northbound direction. The line-of-sight photos at the intersections are shown **Figure 21** and **Figure 22.**

As shown, the SISD at the Luke Price Street / North Lake Grace-Karlgarin Road is sufficient to achieve the minimum requirement for 90km/h for north bound direction and for cars in southbound direction but are slightly deficient for southbound direction for trucks. However, based on the curve of radius 234m at SLK 1.22 of North Lake Grace-Karlgarin Road, in accordance with MRWA Horizontal Curve Table the maximum allowed design speed is 80km/h. As shown in **Figure 23**, the available SISD is adequate to achieve the minimum requirement for 80km/h for trucks in accordance with the Austroads Guide to Road Design Part 4A towards southbound direction. The line-of-sight photos at the intersections are shown **Figure 24** and **Figure 25.**



Figure 11:Sight Distance Checks – Existing Site Access/Luke Price Street Intersection



Figure 12: Existing Site Access/Luke Price Street Intersection - Looking West



Figure 13: Existing Site Access/Luke Price Street Intersection - Looking East



Figure 14:Sight Distance Checks – CBH Site Exit/Commonwealth Road



Figure 15: CBH Site Exit/Commonwealth Road - Looking West



Figure 16: CBH Site Exit/Commonwealth Road - Looking East



Figure 17: Sight Distance Checks – North Lake Grace-Karlgarin Road/Commonwealth Road Intersection



Figure 18: North Lake Grace-Karlgarin Road/Commonwealth Road Intersection - Looking East



Figure 19:North Lake Grace-Karlgarin Road/Commonwealth Road Intersection - Looking West



Figure 20:Sight Distance Checks – New Site exit/North Lake Grace-Karlgarin Road Intersection



Figure 21:New Site exit/North Lake Grace-Karlgarin Road Intersection - Looking South



Figure 22:New Site exit/North Lake Grace-Karlgarin Road Intersection - Looking North



Figure 23:Sight Distance Checks – Luke Price Street/North Lake Grace-Karlgarin Road Intersection



Figure 24: Luke Price Street/North Lake Grace-Karlgarin Road Intersection- Looking South



Figure 25:Luke Price Street/North Lake Grace-Karlgarin Road Intersection- Looking North

4.3.2. Approach Sight Distances

The Approach Sight Distance (ASD) is required to ensure that drivers of trucks and light vehicles approaching the Major Road intersection from the Minor Road at the 85th percentile operating speed are able to see the intersection and stop at the holding line.

The ASD is assessed based on the following parameters:

- A reaction time of 2.5 seconds for light vehicles and heavy vehicles;
- Deceleration coefficients for the purpose of SISD calculations are 0.36 for light vehicles and 0.28 for heavy vehicles (Type 1 Road Train / RAV 7 equivalent); and
- Driver eye height is 2.4m for trucks and 1.1m for cars.
- Object height is 0.0m.

The required and available ASD at the intersection has been determined from Austroads Part 4A Equation 2 are summarised in **Table 8**.

Table 8: Approach Sight Distance

Location	Vehicle Type	Design Speed (km/h)	Coefficient of Deceleration	Reaction Time (s)	Longitudinal Grade (%) *	Required ASD (m)	Available ASD (m)
Luke Price Street/N Lake Grace-Karlgarin Rd	Trucks	70	0.28	2.5	0	118	121
	Cars	70	0.36	2.5	0	102	121
Existing CBH Site Exit /Commonwealth Road	Trucks	30	0.28	2.5	0	33	150
	Cars	30	0.36	2.5	0	31	150
N Lake Grace-Karlgarin Rd/Commonwealth Road	Trucks	90	0.28	2.5	0	176	+200
	Cars	90	0.36	2.5	0	151	+200

*Positive for traffic travelling uphill and negative for through traffic travelling downhill.

As shown, the ASDs for the intersections are acceptable.

The measurement of ASD for the Luke Price Street/N Lake Grace-Karlgarin Rd Intersection is shown in **Figure 26** and the line of sight is shown in **Figure 27**.

The measurement of ASD for the Existing CBH Site Exit /Commonwealth Road Intersection is shown in **Figure 28,** and the line of sight is shown in **Figure 29.**

The measurement of ASD for the N Lake Grace-Karlgarin Rd/Commonwealth Road intersection is shown in **Figure 30,** and the line of sight is shown in **Figure 31**.



Figure 26: Approach Sight Distance Measurement Luke Price Street to N Lake Grace-Karlgarin Rd



Figure 27 : N Lake Grace-Karlgarin Rd Looking from Luke Price Street

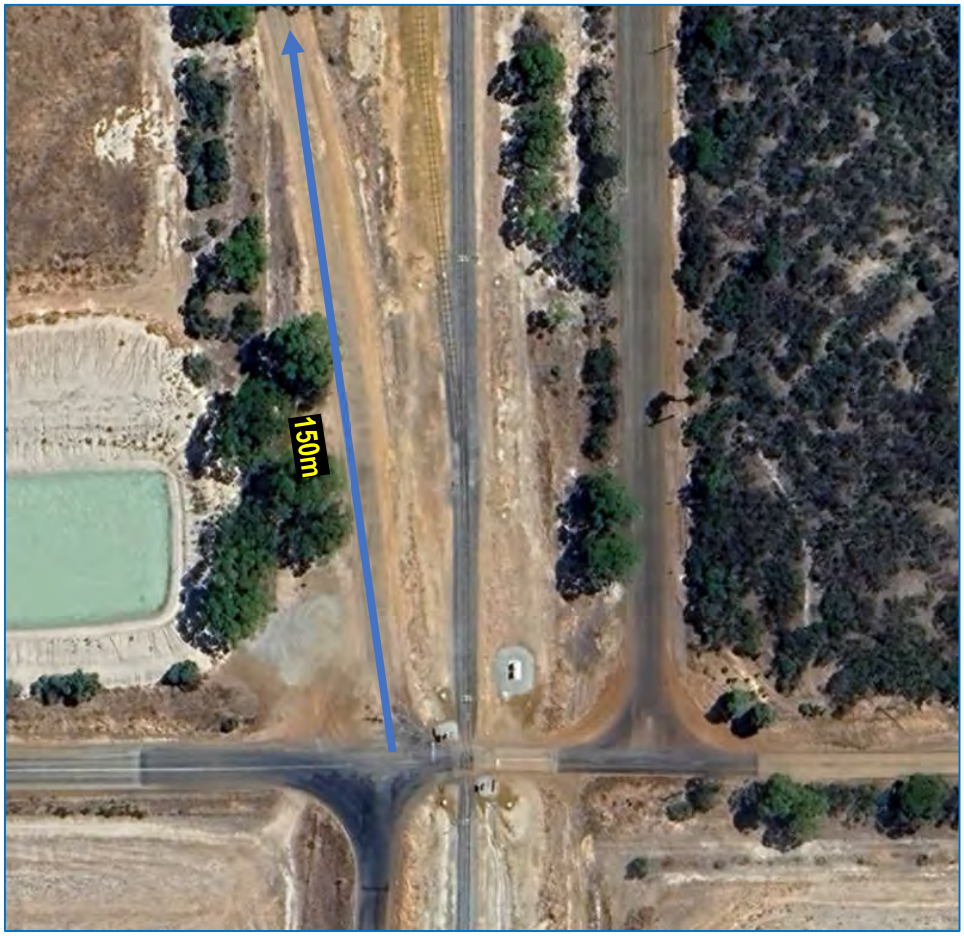


Figure 28: Approach Sight Distance Measurement CBH Site Exit to Commonwealth Road



Figure 29: CBH Site Exit Looking from Commonwealth Road



Figure 30: Approach Sight Distance Measurement N Lake Grace-Karlgarin Rd to Commonwealth Road



Figure 31 : N Lake Grace-Karlgarin Rd Looking from Commonwealth Road

4.3.3. Intersection Volumes

For the purposes of assessing the warrants for auxiliary lanes, the peak hour volumes at the intersection under assessment are shown from **Figure 32** to **Figure 36** (Refer to **Section 3.5** for detailed traffic estimation)

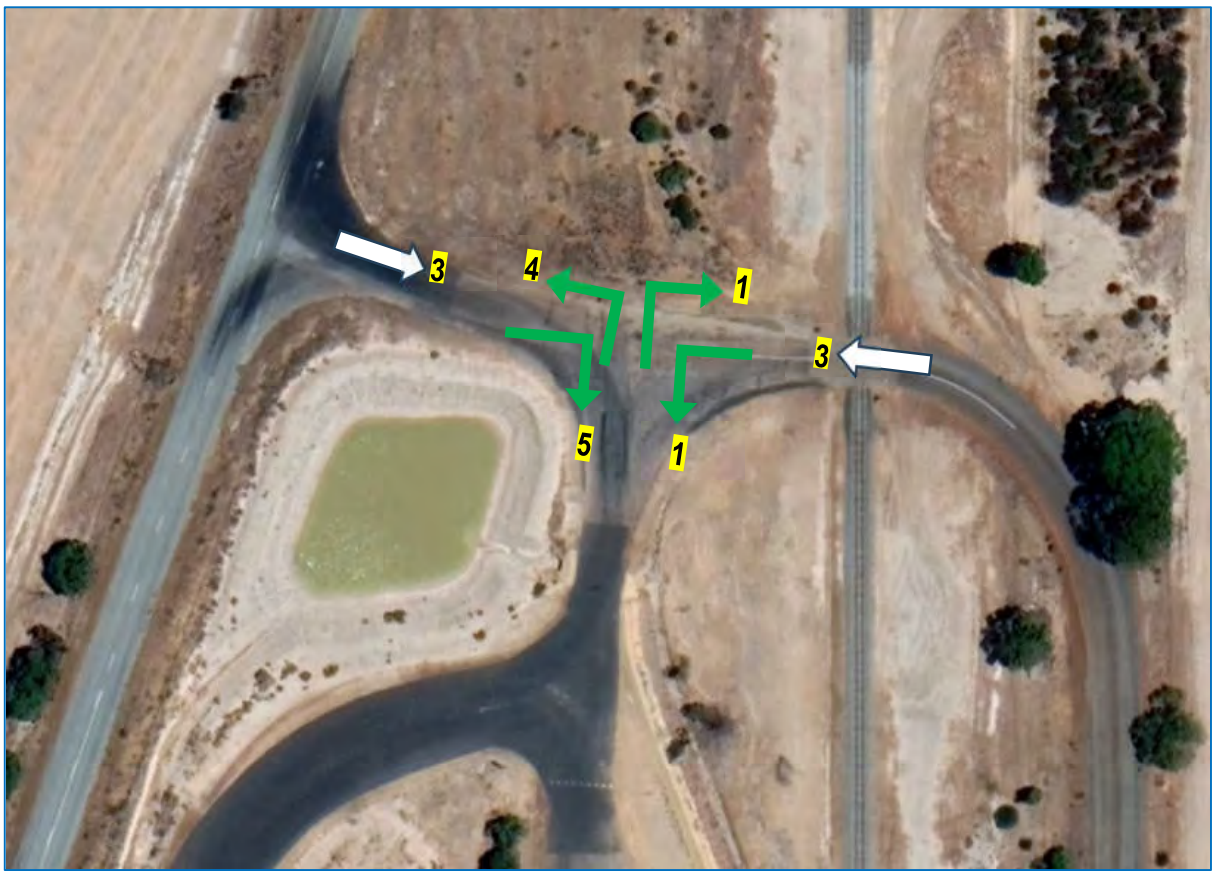


Figure 32: Intersection Volumes CBH Access/Luke Price Street



Figure 33: Intersection Volumes CBH Site Exit/Commonwealth Road



Figure 34: Intersection Volumes N Lake Grace-Karlgarin Rd/Commonwealth Rd



Figure 35: Intersection Volumes New Site Entry Exit/N Lake Grace-Karlgarin Rd

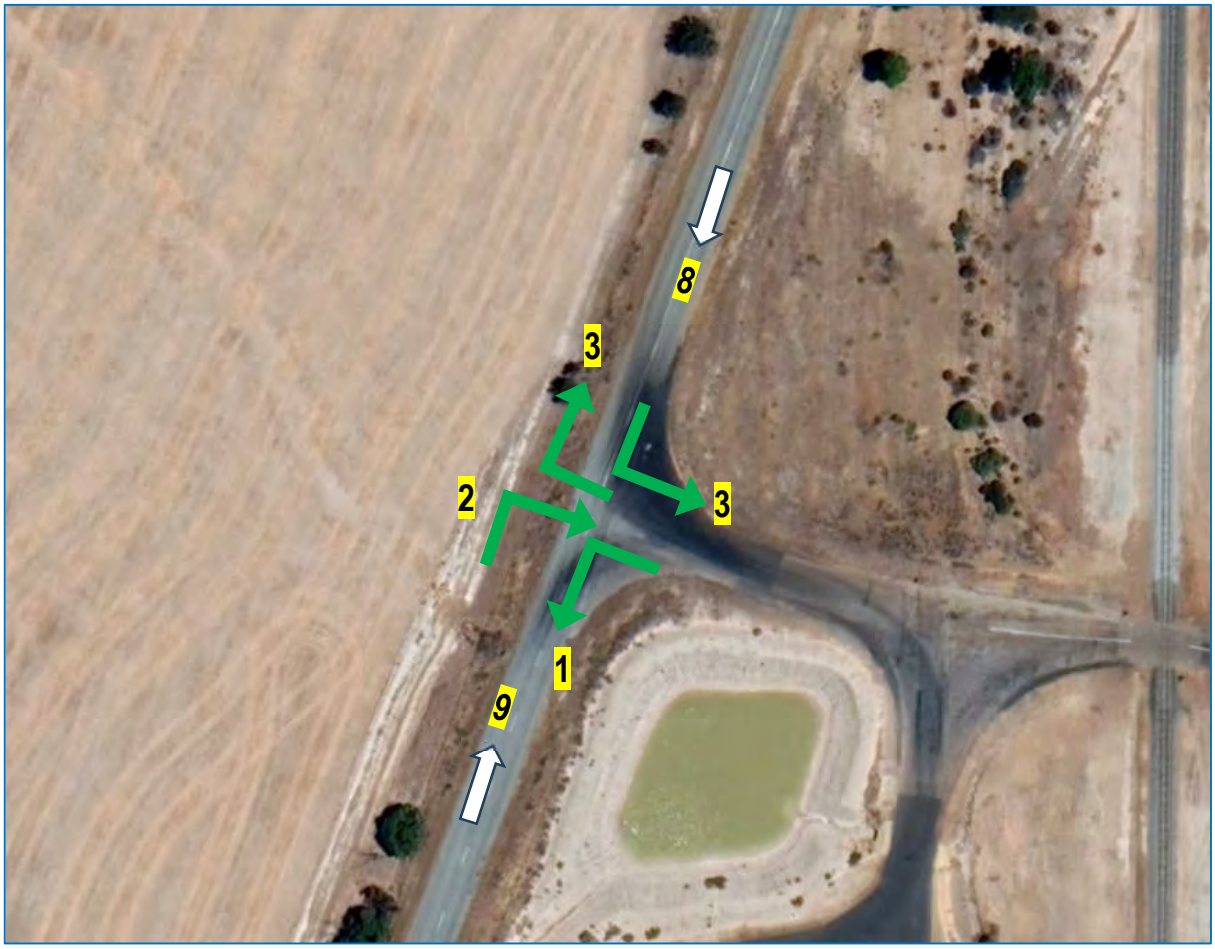
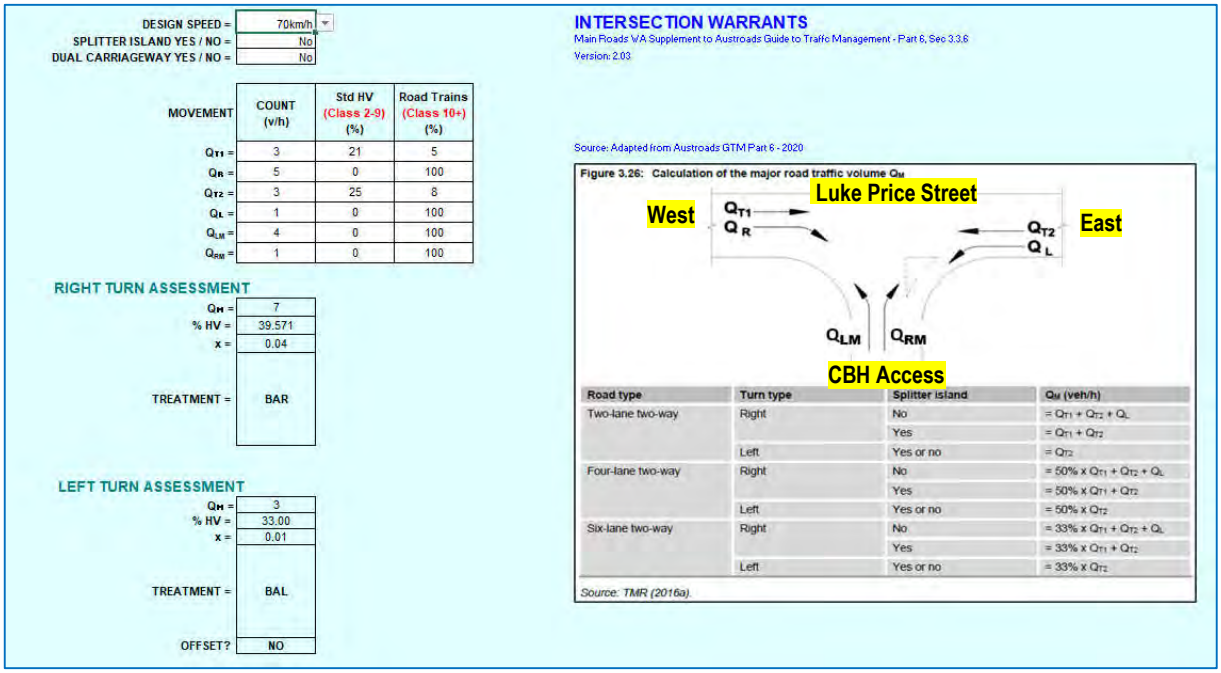


Figure 36:Intersection Volumes Luke Price Street/N Lake Grace-Karlgarin Rd

4.3.4. Auxiliary Lanes

The requirement for turning treatments were calculated using the Intersection Warrants calculator provided in Main Roads WA Supplement to Austroads Guide to Road Design - Part 4 A.8. The results of the assessment are shown from **Figure 37** to **Figure 42.**



DESIGN SPEED = 70km/h
SPLITTER ISLAND YES / NO = No
DUAL CARRIAGEWAY YES / NO = No

MOVEMENT	COUNT (v/h)	Std HV (Class 2-9) (%)	Road Trains (Class 10+) (%)
Q_{T1} =	3	21	5
Q_R =	5	0	100
Q_{T2} =	3	25	8
Q_L =	1	0	100
Q_{LM} =	4	0	100
Q_{RM} =	1	0	100

RIGHT TURN ASSESSMENT

Q_H =	7
% HV =	39.571
x =	0.04
TREATMENT =	BAR

LEFT TURN ASSESSMENT

Q_H =	3
% HV =	33.00
x =	0.01
TREATMENT =	BAL
OFFSET?	NO

INTERSECTION WARRANTS
Main Roads WA Supplement to Austroads Guide to Traffic Management - Part 6, Sec 3.3.6
Version: 2.03

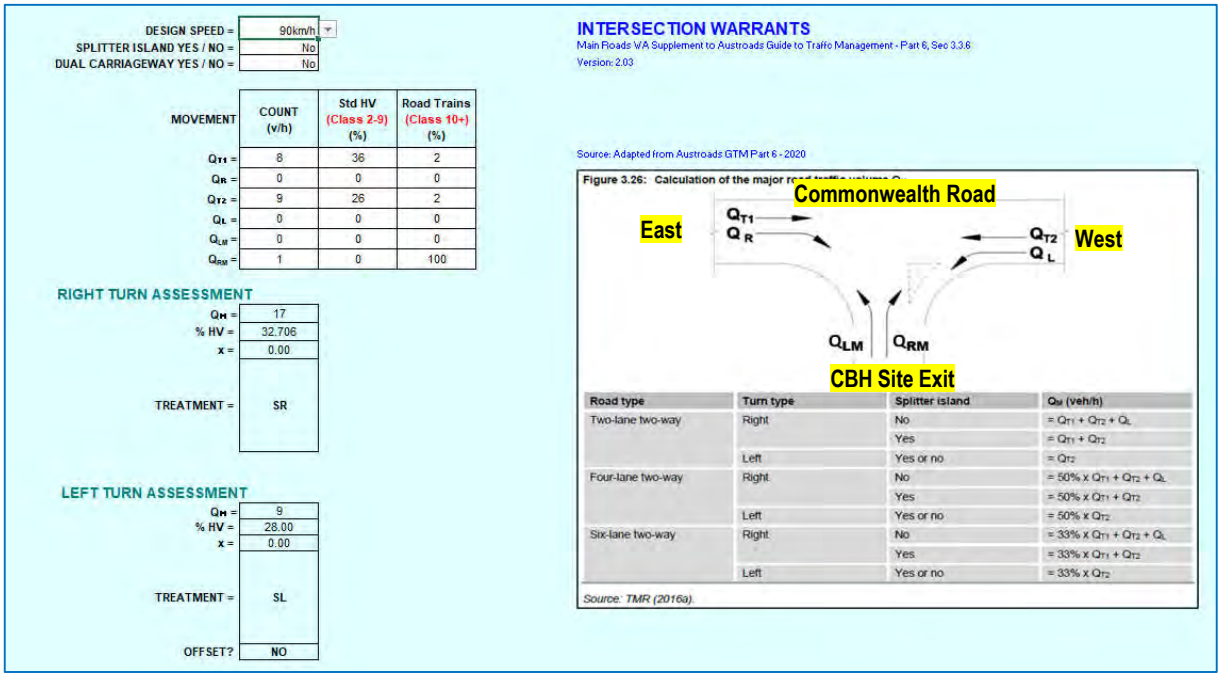
Source: Adapted from Austroads GTM Part 6 - 2020

Figure 3.26: Calculation of the major road traffic volume Q_M

Road type	Turn type	Splitter island	Q_M (veh/h)
Two-lane two-way	Right	No	= $Q_{T1} + Q_{T2} + Q_L$
		Yes	= $Q_{T1} + Q_{T2}$
	Left	Yes or no	= Q_{T2}
Four-lane two-way	Right	No	= 50% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 50% x $Q_{T1} + Q_{T2}$
	Left	Yes or no	= 50% x Q_{T2}
Six-lane two-way	Right	No	= 33% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 33% x $Q_{T1} + Q_{T2}$
	Left	Yes or no	= 33% x Q_{T2}

Source: TMR (2016a).

Figure 37: Intersection Configuration Warrants - CBH Access/Luke Price Street



DESIGN SPEED = 90km/h
SPLITTER ISLAND YES / NO = No
DUAL CARRIAGEWAY YES / NO = No

MOVEMENT	COUNT (v/h)	Std HV (Class 2-9) (%)	Road Trains (Class 10+) (%)
Q_{T1} =	8	36	2
Q_R =	0	0	0
Q_{T2} =	9	26	2
Q_L =	0	0	0
Q_{LM} =	0	0	0
Q_{RM} =	1	0	100

RIGHT TURN ASSESSMENT

Q_H =	17
% HV =	32.706
x =	0.00
TREATMENT =	SR

LEFT TURN ASSESSMENT

Q_H =	9
% HV =	28.00
x =	0.00
TREATMENT =	SL
OFFSET?	NO

INTERSECTION WARRANTS
Main Roads WA Supplement to Austroads Guide to Traffic Management - Part 6, Sec 3.3.6
Version: 2.03

Source: Adapted from Austroads GTM Part 6 - 2020

Figure 3.26: Calculation of the major road traffic volume Q_M

Road type	Turn type	Splitter island	Q_M (veh/h)
Two-lane two-way	Right	No	= $Q_{T1} + Q_{T2} + Q_L$
		Yes	= $Q_{T1} + Q_{T2}$
	Left	Yes or no	= Q_{T2}
Four-lane two-way	Right	No	= 50% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 50% x $Q_{T1} + Q_{T2}$
	Left	Yes or no	= 50% x Q_{T2}
Six-lane two-way	Right	No	= 33% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 33% x $Q_{T1} + Q_{T2}$
	Left	Yes or no	= 33% x Q_{T2}

Source: TMR (2016a).

Figure 38: Intersection Configuration Warrants - CBH Site Exit/Commonwealth Road

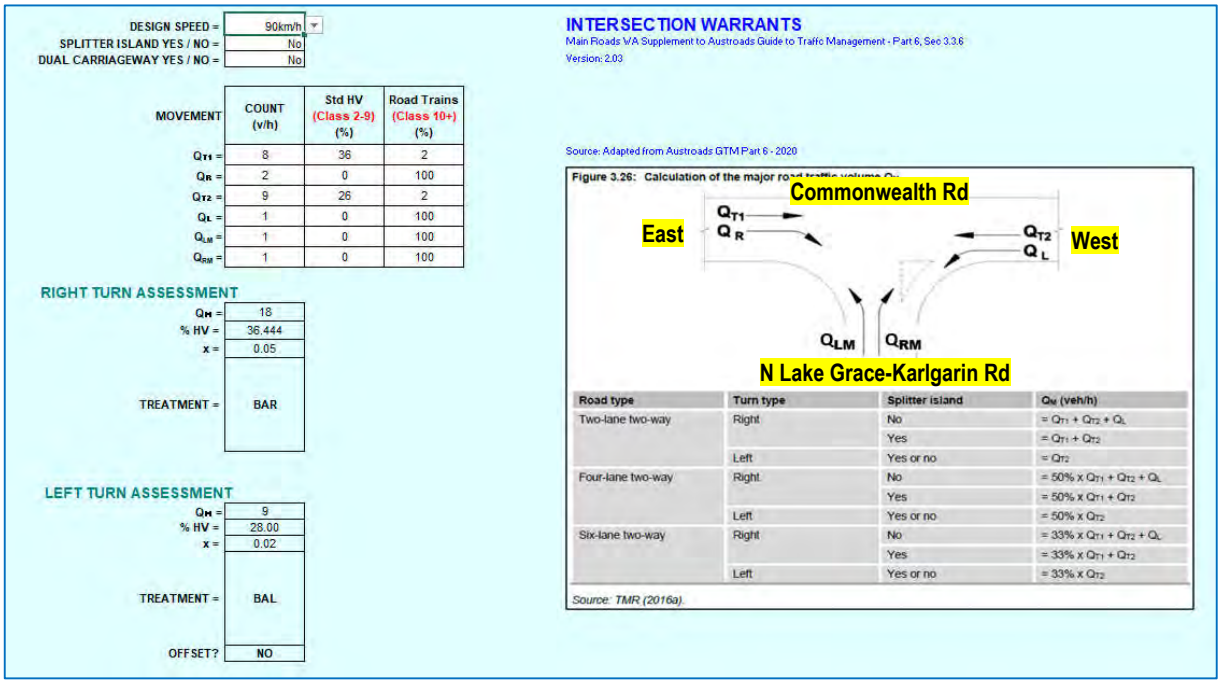


Figure 39: Intersection Configuration Warrants - N Lake Grace-Karlgarin Rd/Commonwealth Rd

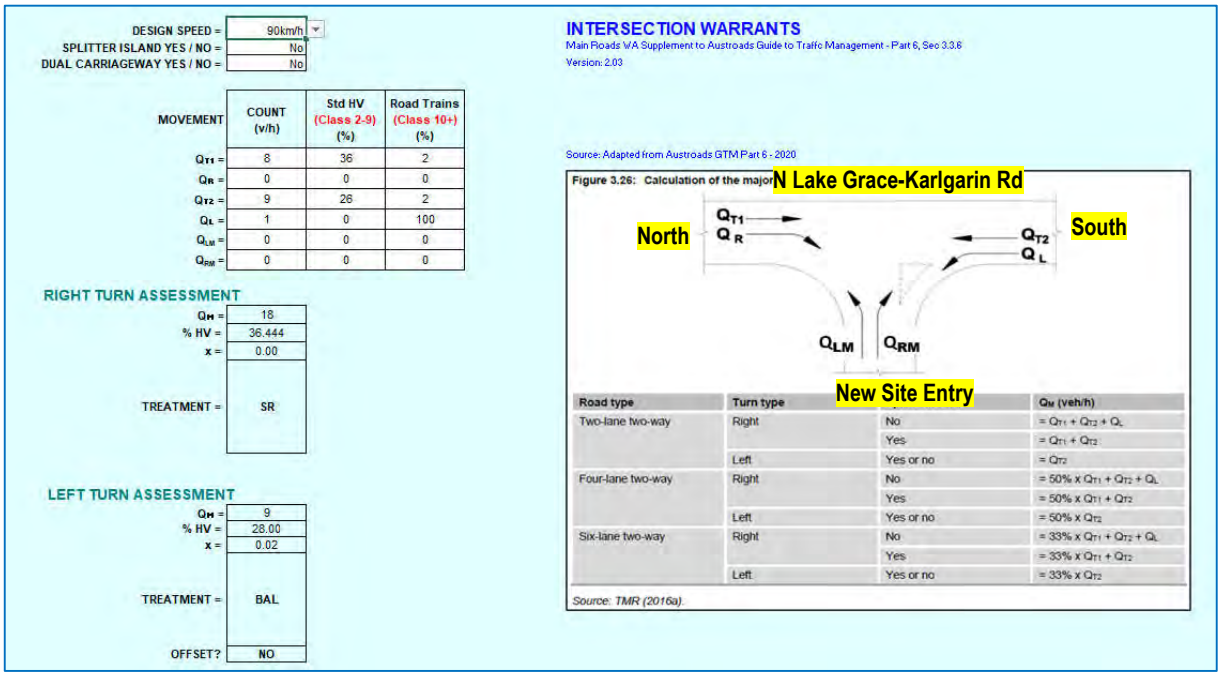


Figure 40: Intersection Configuration Warrants - New Site Entry /N Lake Grace-Karlgarin Rd

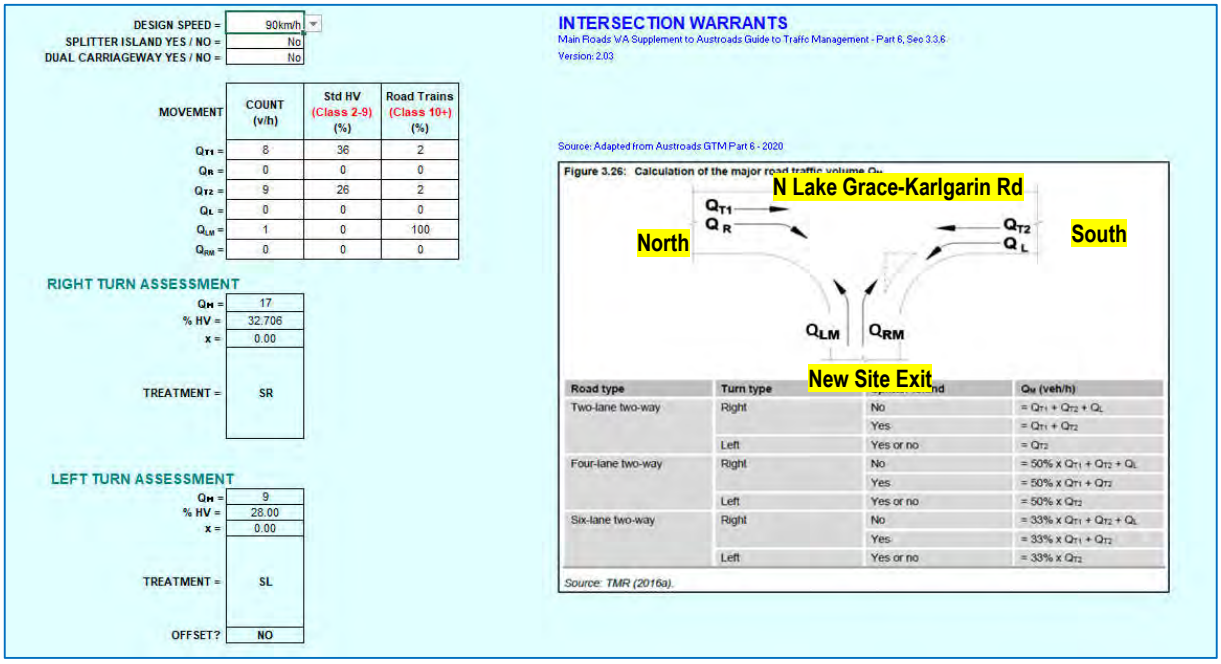


Figure 41: Intersection Configuration Warrants - New Site Exit /N Lake Grace-Karlgarin Rd

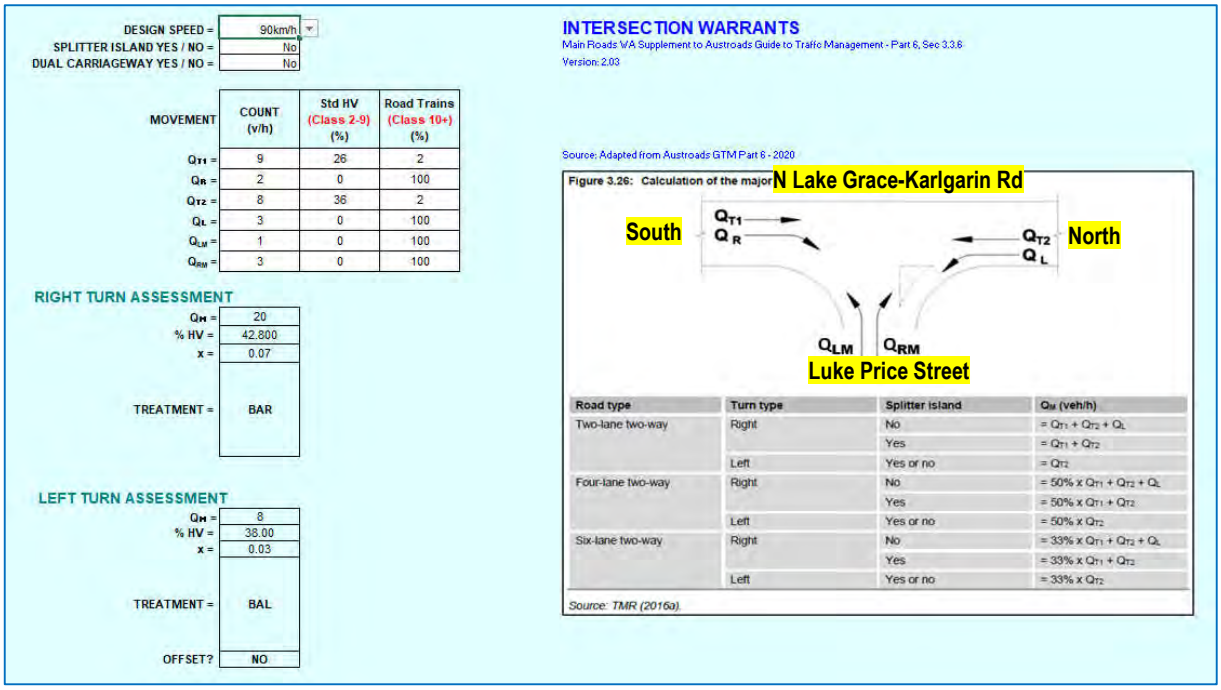


Figure 42: Intersection Configuration Warrants – Luke Price Street/N Lake Grace-Karlgarin Rd

As shown the warranted treatments at the intersections are as follows:

- CBH Access/Luke Price Street – BAR (Basic Right Turn) / BAL (Basic Left Turn). This intersection will see an increase in right turn in movements, and an elimination of the left turn out movements. There are

no changes to the left in movements and right out movements. The intersection is essentially going to operate in the same manner as it does currently, and it no modifications are proposed.

- CBH Site Exit/Commonwealth Road – SR (Simple Right Turn) /SL (Simple Left Turn). This intersection is not formally utilised at present, and there will be a small number of left turn out movements required. The intersection has the required configuration already, however the required movement paths are unclear given the exit faces North Lake Grace-Kalgarin Road. It is recommended that the CBH access leg be sealed ensure the movement paths are obvious, and to avoid damage to and tracking of gravel on the sealed pavement.
- North Lake Grace-Karlgarin Rd/Commonwealth Road – BAR/BAL. This intersection will see a small increase in right turn entry movements but is essentially being used in the same manner as it currently is. Accordingly, no modifications are proposed.
- New Site Entry /N Lake Grace-Karlgarin Rd – SR/BAL. All movements through this intersection are new. There is only one left turn entry movement in the peak hour. As the volumes are minimal, and the geometry is appropriate for the design vehicle (refer **Section 4.3.5**), no further modifications are recommended.
- New Site Exit /N Lake Grace-Karlgarin Rd – SR/SL. All movements through this intersection are new. There is only one left turn exit movement in the peak hour, and the required configuration and geometry is already in place. No further modifications are recommended.
- Luke Price Street/N Lake Grace-Karlgarin Rd – BAR/BAL. This intersection will see a small increase in right turn entry movements, and the removal of a small number of right turn exit movements. The intersection is essentially being used in the same manner as it is currently and no modifications are recommended.

As per MRWA Guideline drawing 202231-0007, a SL/SR treatment does not require a widened sealed shoulder to be installed at the proposed intersections (refer **Figure 43** for extract) but should be designed to accommodate the swept path movements from the design vehicle.

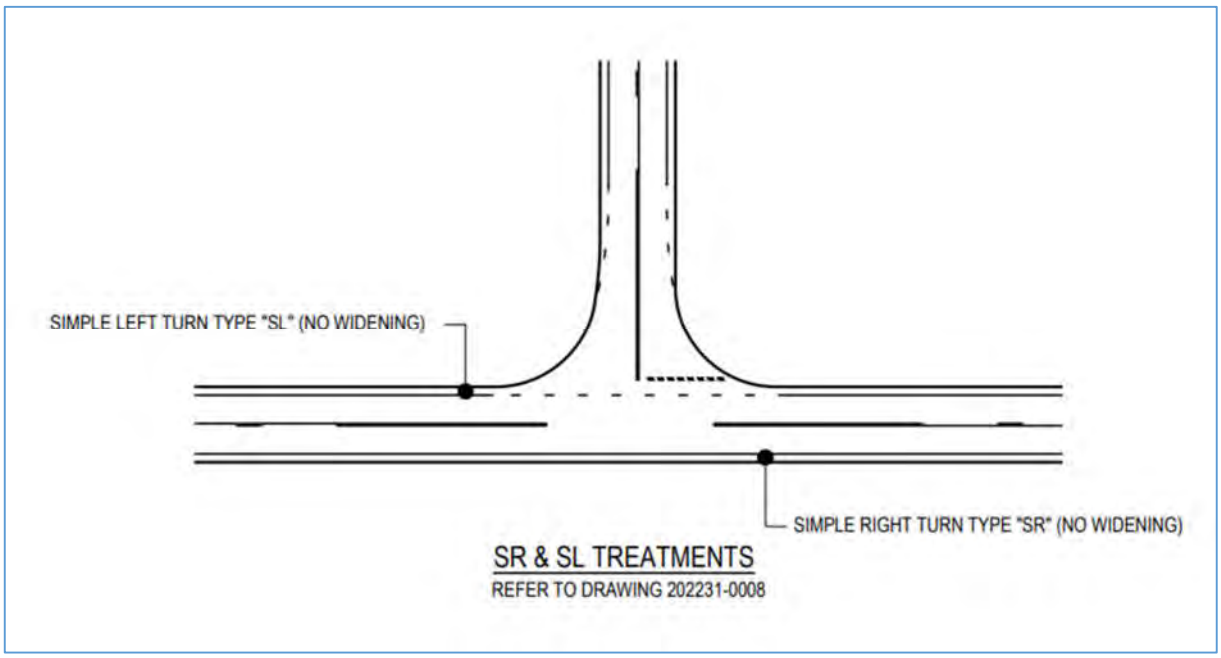


Figure 43: MRWA Guideline Drawing 202231-0007 Extract – SL/SR

As per MRWA Guideline drawing 202231-0007, a BAR/BAL treatment will require widened sealed shoulders and should be designed to accommodate the swept path movements from the design vehicle (refer **Figure 44** for extract).

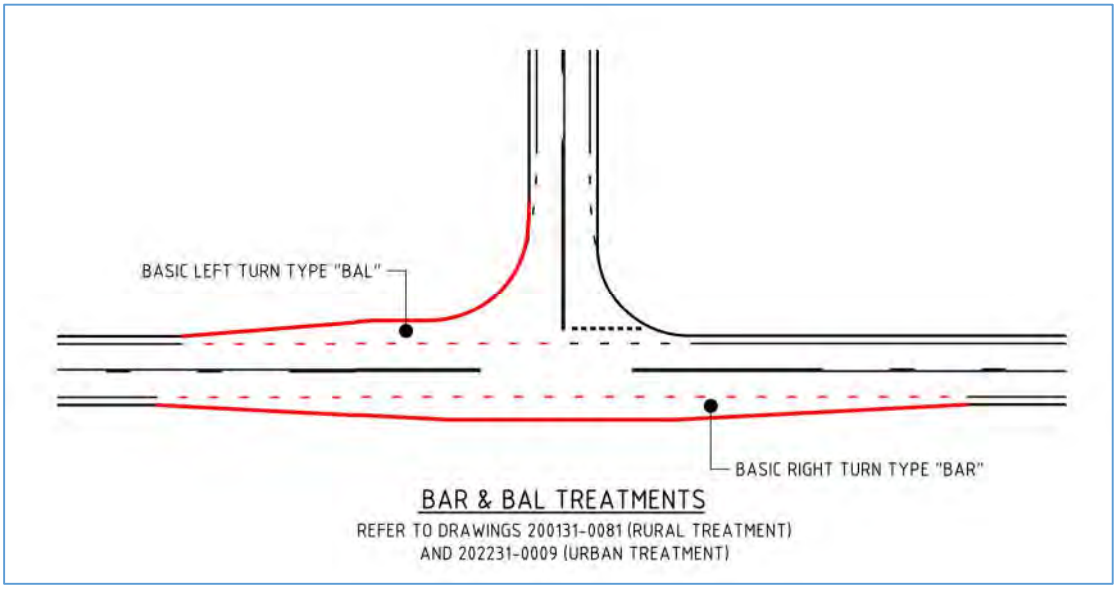


Figure 44: MRWA Guideline Drawing 202231-0007 Extract – BAL/BAR

4.3.5. Swept Path Assessment

A swept path analysis was completed to determine if the existing intersection geometry is sufficient to accommodate the proposed RAV vehicle movements. The analysis has been undertaken in AutoTURN software using the Main Roads WA vehicle template for RAV7 vehicles (20m turning radius) and Google maps imagery.



Figure 45: RAV 7 Manoeuvring at CBH Access/Luke Price Street



Figure 46: RAV 7 Manoeuvring at CBH Site Exit/Commonwealth Road

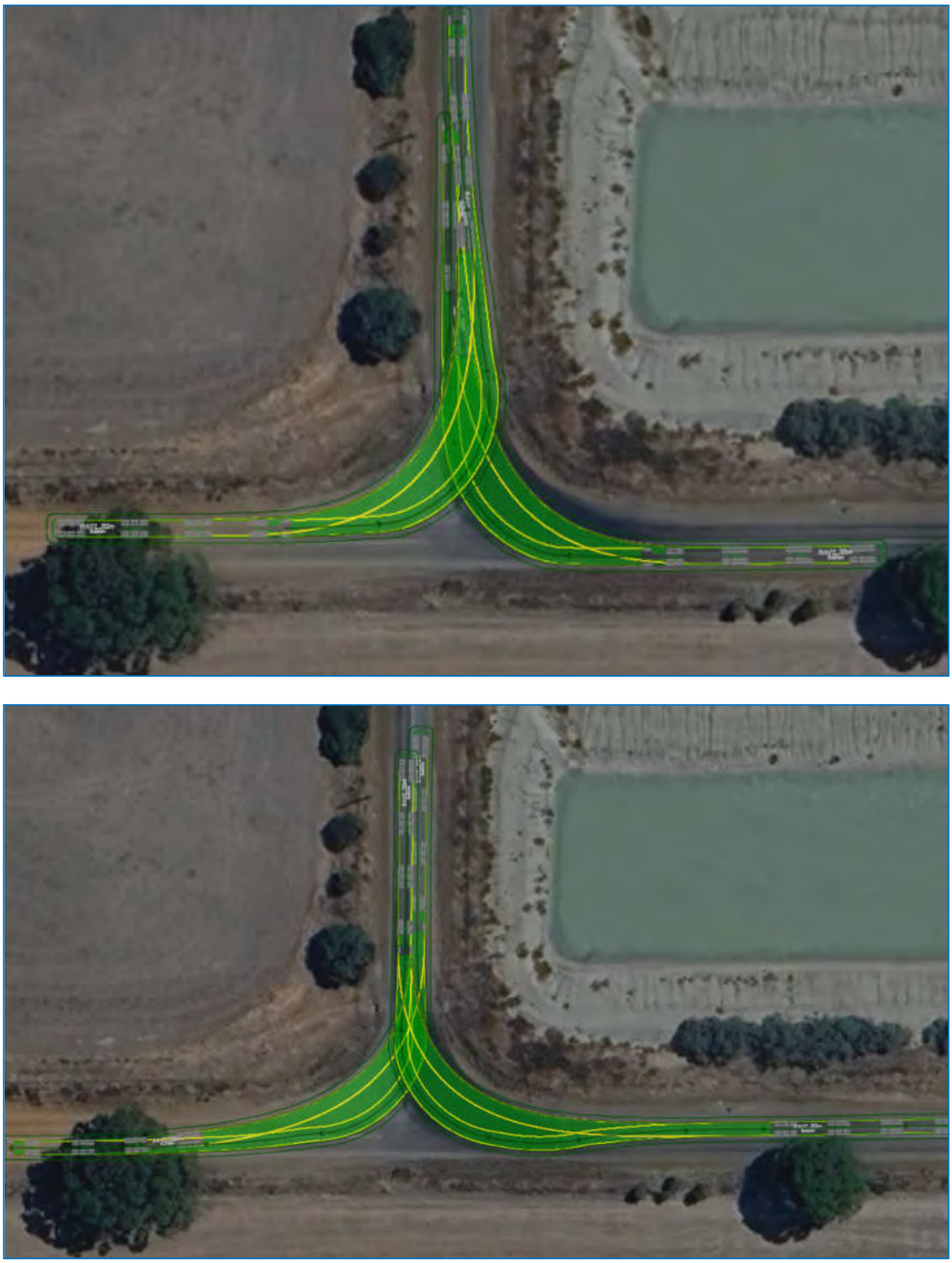


Figure 47: RAV 7 Manoeuvring at N Lake Grace-Karlgarin Rd/Commonwealth Rd



Figure 48:RAV 7 Manoeuvring at New Site Entry Exit /N Lake Grace-Karlgarin Rd



Figure 49: RAV 7 Manoeuvring at Luke Price Street/N Lake Grace-Karlgarin Rd

The analysis indicates that the designated movements using RAV 7 vehicles can be completed within the existing intersection extents at the existing CBH Site Access/Luke Price Street intersection, CBH site exit/Commonwealth Road intersection, North Lake Grace-Karlgarin Rd/Commonwealth Rd intersection and the Luke Price Street/N Lake Grace-Karlgarin Rd. However, the movements do not allow for lane-correct movements, or for two opposing vehicles to pass each other within the intersection. In accordance with MRWA's Standard RAV Route Assessment Guidelines, this is acceptable given that there is adequate sight distance in all directions.

The analysis indicates the designated movements using RAV 7 vehicles can be completed within the existing intersection geometry at the new site entry and exit intersection on North Lake Grace-Karlgarin Road.

5. Conclusions

This Transport Impact Statement has been prepared for the proposed works at Pingaring Site and has concluded the following:

- CBH estimate that the proposed storage increase will result in a decrease of 323 total truck movements, or 7 daily truck movements during the 45-day harvest period, as Harvest Essential Moves will no longer be required. Whilst truck volumes will increase in some sections of the road network due to movements between the two sites, these are minimal and at worst 1x movement in the peak hour.
- The estimated traffic generation can be accommodated within the capacity of the adjacent road network.
- The crash history does not suggest any inherent safety issues in the existing road network that would be materially worsened by the proposal.
- The existing sealed and carriageway widths of the surrounding road are above the minimum road width for their relative RAV categories.
- The available sight distances at all intersections/accesses meet the minimum requirements.
- Based on MRWA's intersection configuration warrant assessment tool warrants the following:
    - CBH Access/Luke Price Street – BAR (Basic Right Turn) / BAL (Basic Left Turn)
    - CBH Site Exit/Commonwealth Road – SR (Simple Right Turn) /SL (Simple Left Turn)
    - North Lake Grace-Karlgarin Rd/Commonwealth Road – BAR/BAL
    - New Site Entry /N Lake Grace-Karlgarin Rd – SR/BAL
    - New Site Exit /N Lake Grace-Karlgarin Rd – SR/SL
    - Luke Price Street/N Lake Grace-Karlgarin Rd – BAR/BAL

  Given that the intersections are generally being used in the same manner as they are currently and/or there is only a small increase in traffic for certain movements, no modifications are recommended, except for the CBH Exit onto Commonwealth Road where it is recommended that the pavement be sealed to provide an obvious travel path and protect the existing sealed pavement from damage and deposition of gravel.
- The swept path analysis indicates that:
    - The designated movements using RAV 7 vehicles can be completed within the existing intersection extents at the existing CBH Site Access/Luke Price Street intersection, CBH site exit/Commonwealth Road intersection, North Lake Grace-Karlgarin Rd/Commonwealth Rd

intersection and the Luke Price Street/N Lake Grace-Karlgarin Rd. However, the movements do not allow for lane-correct movements, or for two opposing vehicles to pass each other within the intersection. In accordance with MRWA's Standard RAV Route Assessment Guidelines, this is acceptable given that there is adequate sight distance in all directions.

- The designated movements using RAV 7 vehicles can be completed within the existing intersection geometry at the proposed site entry and exit intersection on North Lake Grace-Karlgarin Road.

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Monday to Friday

Eastbound

	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	1	0	1	0	0	0	0	0	0	0	0	0	2
07:00	1	0	0	0	0	0	0	0	0	0	0	0	1
08:00	3	1	0	1	1	0	0	0	0	0	1	0	7
09:00	3	0	0	0	0	0	0	0	0	0	0	0	3
10:00	4	0	1	0	0	0	0	0	0	0	0	0	5
11:00	3	0	0	0	1	0	0	0	1	0	0	0	5
12:00	3	0	0	0	0	0	0	0	0	0	0	0	3
13:00	3	0	0	1	1	0	0	0	1	0	0	0	6
14:00	4	0	0	1	0	0	0	0	1	0	0	0	6
15:00	3	1	0	0	0	0	0	0	0	0	0	0	4
16:00	3	0	0	0	0	0	0	0	0	0	0	0	3
17:00	2	0	0	0	0	0	0	0	0	0	0	0	2
18:00	2	0	0	0	0	0	0	0	0	0	0	0	2
19:00	1	0	0	0	0	0	0	0	0	0	0	0	1
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	36	2	2	3	3	0	0	0	3	0	1	0	50

Peak Statistics

AM	TIME	09:45	07:15	06:00	08:00	08:00			10:15	07:30	08:00
	VOL	4	1	1	1	1			1	1	7
PM	TIME	15:30	15:45		13:30	13:30			13:30		13:30
	VOL	4	1		2	1			2		8

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

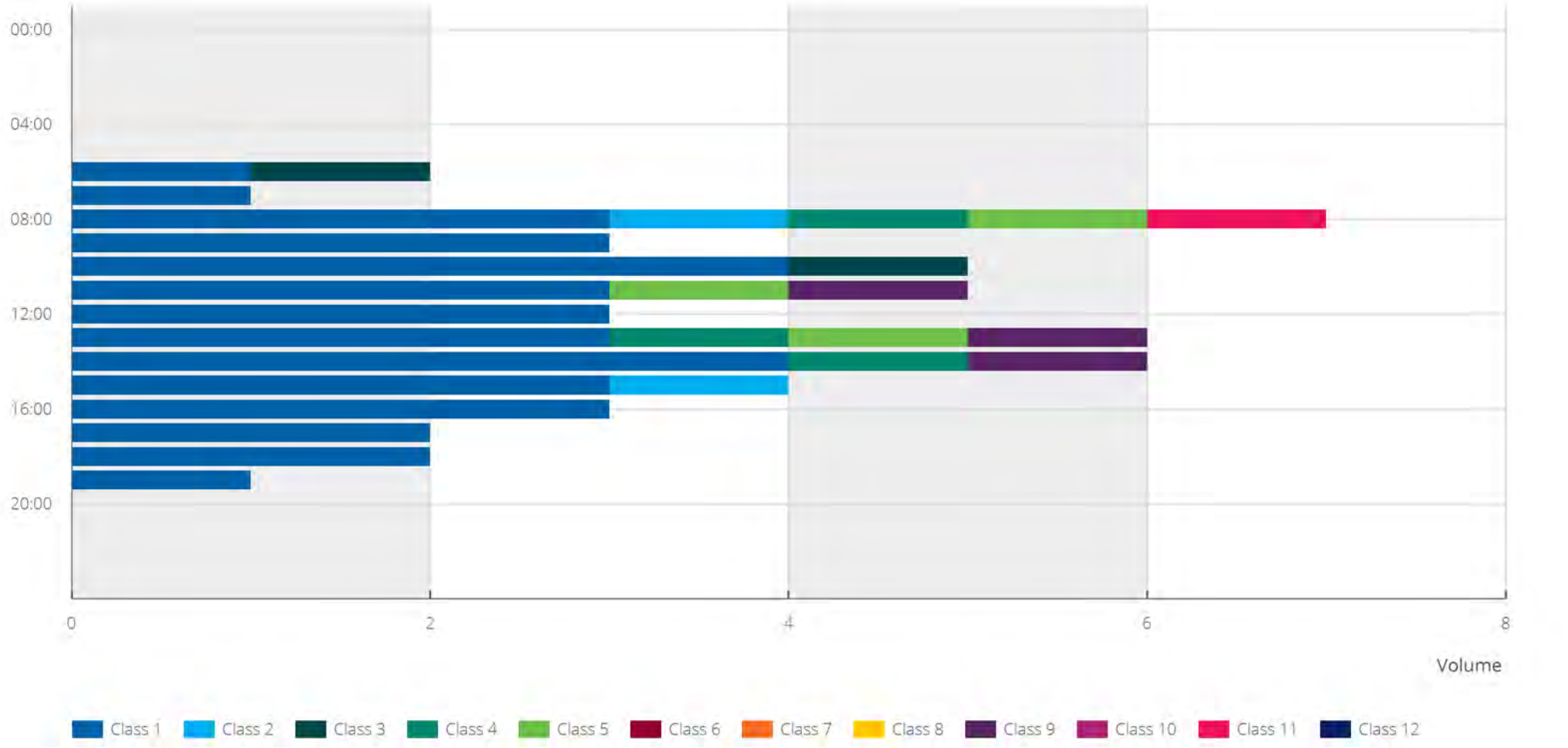
West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Monday to Friday

Eastbound

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Monday to Friday

Westbound

	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	1	0	0	0	1	0	0	0	0	0	0	0	2
07:00	2	0	0	1	0	0	0	0	0	0	0	0	3
08:00	2	0	1	0	0	0	0	0	0	0	0	0	3
09:00	3	0	1	0	0	0	0	0	0	0	0	0	4
10:00	3	0	0	0	0	0	0	0	1	0	0	0	4
11:00	3	0	1	0	0	0	0	0	0	0	0	0	4
12:00	3	0	1	0	0	0	0	0	1	0	0	0	5
13:00	2	0	1	0	0	0	0	0	0	0	0	0	3
14:00	3	0	1	1	0	0	0	0	0	0	0	0	5
15:00	2	0	1	0	1	0	0	0	0	0	0	0	4
16:00	1	1	1	0	0	0	0	0	0	0	0	0	3
17:00	1	0	1	0	0	0	0	0	0	0	0	0	2
18:00	1	0	0	0	0	0	0	0	0	1	0	0	2
19:00	1	0	0	0	0	0	0	0	0	0	0	0	1
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	28	1	9	2	2	0	0	0	2	1	0	0	45

Peak Statistics

AM	TIME	09:15		07:30	06:30	05:30			09:45			11:45
	VOL	4		1	1	1			1			6
PM	TIME	14:45	16:45	14:45	14:45	15:15			12:30	18:15		14:45
	VOL	3	1	2	1	1			1	1		7

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

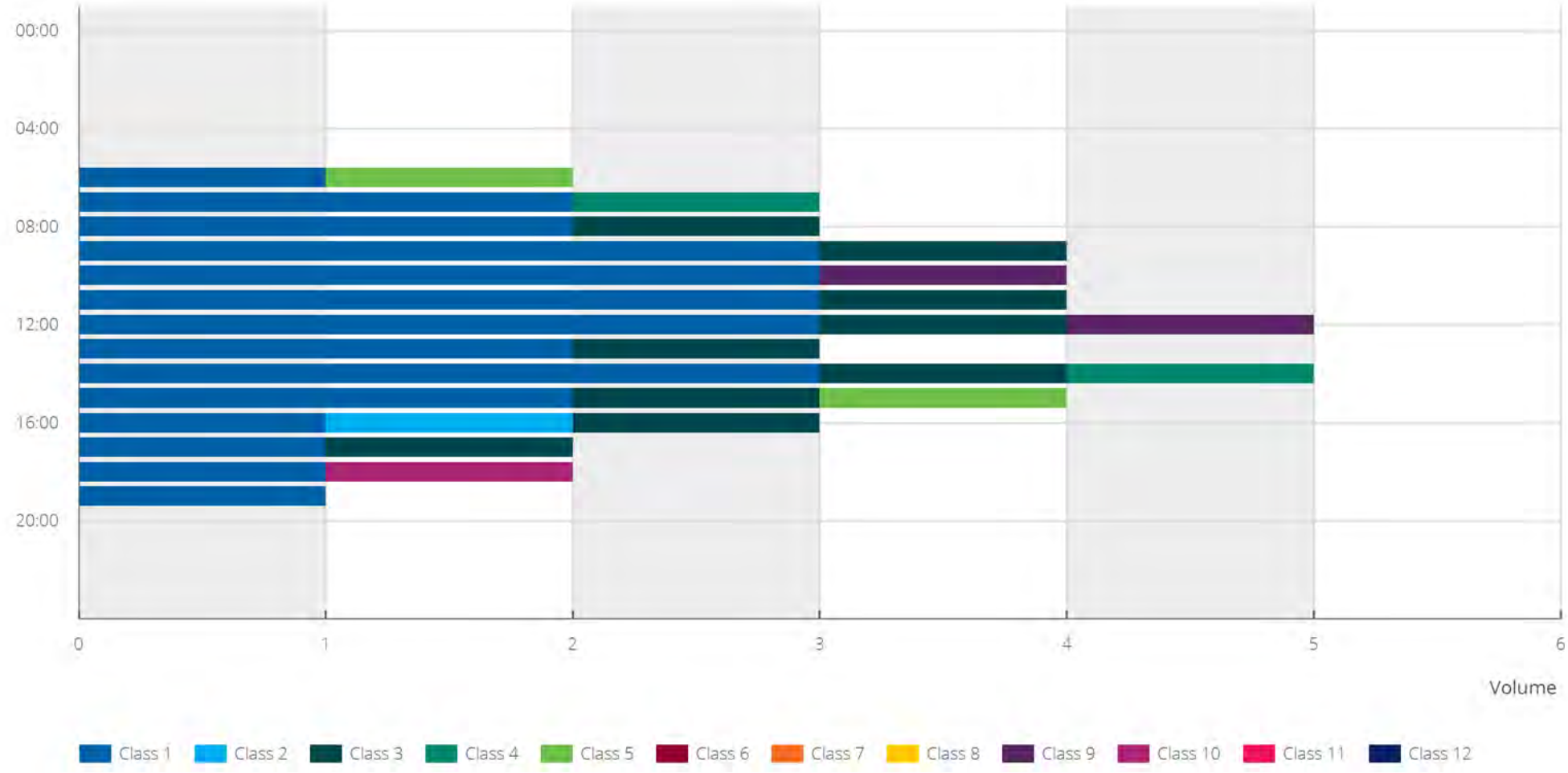
West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Monday to Friday

Westbound

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Monday to Friday

Both Directions

	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	2	0	1	0	1	0	0	0	0	0	0	0	4
07:00	3	0	0	1	0	0	0	0	0	0	0	0	4
08:00	5	1	1	1	1	0	0	0	0	0	1	0	10
09:00	6	0	1	0	0	0	0	0	0	0	0	0	7
10:00	7	0	1	0	0	0	0	0	1	0	0	0	9
11:00	6	0	1	0	1	0	0	0	1	0	0	0	9
12:00	6	0	1	0	0	0	0	0	1	0	0	0	8
13:00	5	0	1	1	1	0	0	0	1	0	0	0	9
14:00	7	0	1	2	0	0	0	0	1	0	0	0	11
15:00	5	1	1	0	1	0	0	0	0	0	0	0	8
16:00	4	1	1	0	0	0	0	0	0	0	0	0	6
17:00	3	0	1	0	0	0	0	0	0	0	0	0	4
18:00	3	0	0	0	0	0	0	0	0	1	0	0	4
19:00	2	0	0	0	0	0	0	0	0	0	0	0	2
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	64	3	11	5	5	0	0	0	5	1	1	0	95

Peak Statistics

AM	TIME	09:15	07:15	10:30	06:30	05:30			10:15	07:30	10:30
	VOL	7	1	2	1	1			2	1	12
PM	TIME	14:45	16:45	14:45	14:00	15:15			13:30	18:15	13:30
	VOL	7	1	2	2	1			2	1	12

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

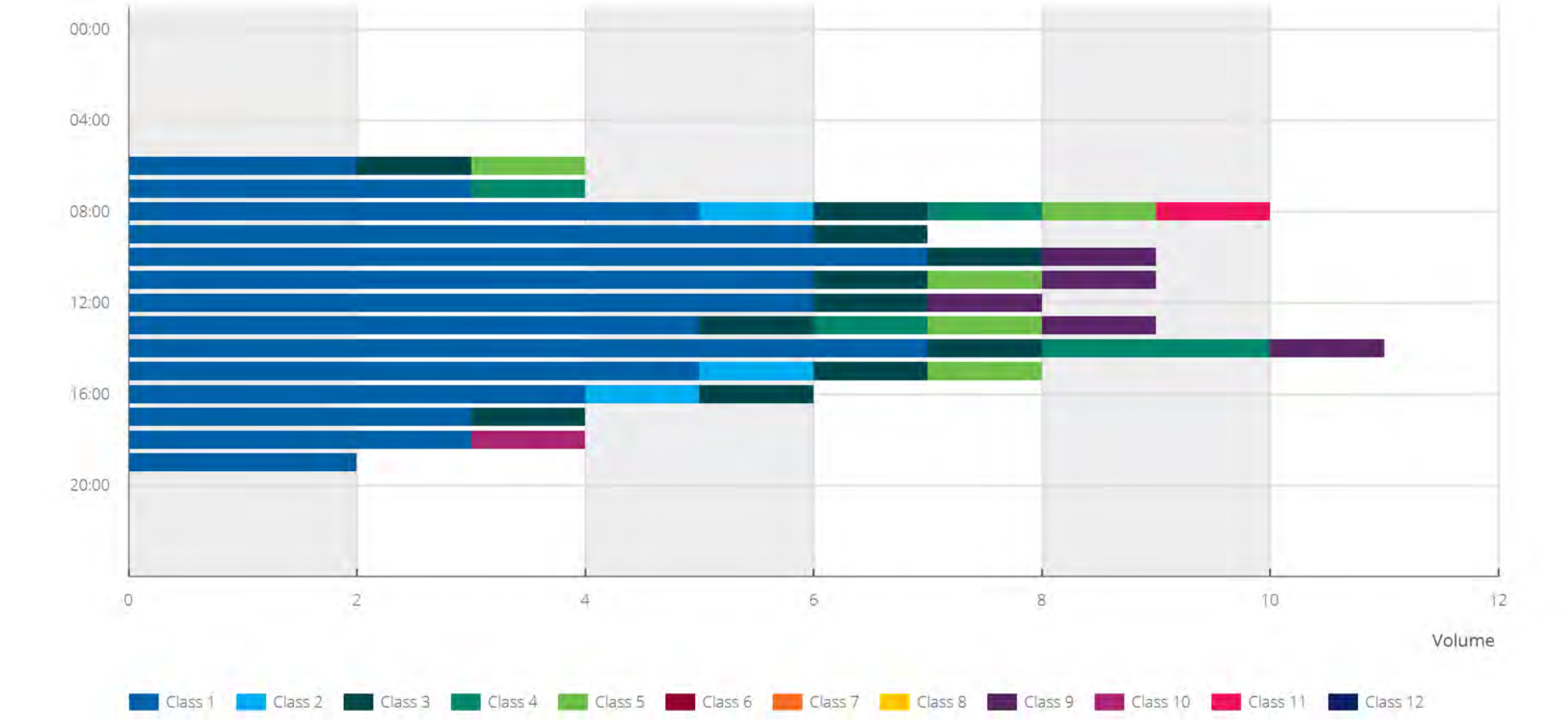
West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Monday to Friday

Both Directions

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Monday to Sunday

Eastbound

Vehicle Type

	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	1	0	1	0	0	0	0	0	0	0	0	0	2
07:00	1	0	0	0	0	0	0	0	0	1	0	0	2
08:00	2	1	0	1	1	0	0	0	1	0	0	0	6
09:00	3	0	0	0	0	0	0	0	0	0	0	0	3
10:00	4	0	1	1	0	0	0	0	0	0	0	0	6
11:00	3	0	0	0	1	0	0	0	1	0	0	0	5
12:00	3	0	0	0	0	0	0	0	0	0	0	0	3
13:00	3	0	0	1	1	0	0	0	1	0	0	0	6
14:00	3	0	0	0	0	0	0	0	0	0	0	0	3
15:00	3	1	0	0	0	0	0	0	0	0	0	0	4
16:00	2	0	0	0	0	0	0	0	0	0	0	0	2
17:00	2	0	0	0	0	0	0	0	0	0	0	0	2
18:00	1	0	0	0	0	0	0	0	0	0	0	0	1
19:00	1	0	0	0	0	0	0	0	0	0	0	0	1
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	32	2	2	3	3	0	0	0	3	1	0	0	46

Peak Statistics

		1	2	3	4	5	6	7	8	9	10	11	12	All
AM	TIME	10:30	08:00	06:00	08:00	08:00				07:45	07:00			10:30
	VOL	5	1	1	1	1				1	1			8
PM	TIME	16:45	15:45		13:30	13:30				13:30				13:30
	VOL	3	1		1	1				1				6

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

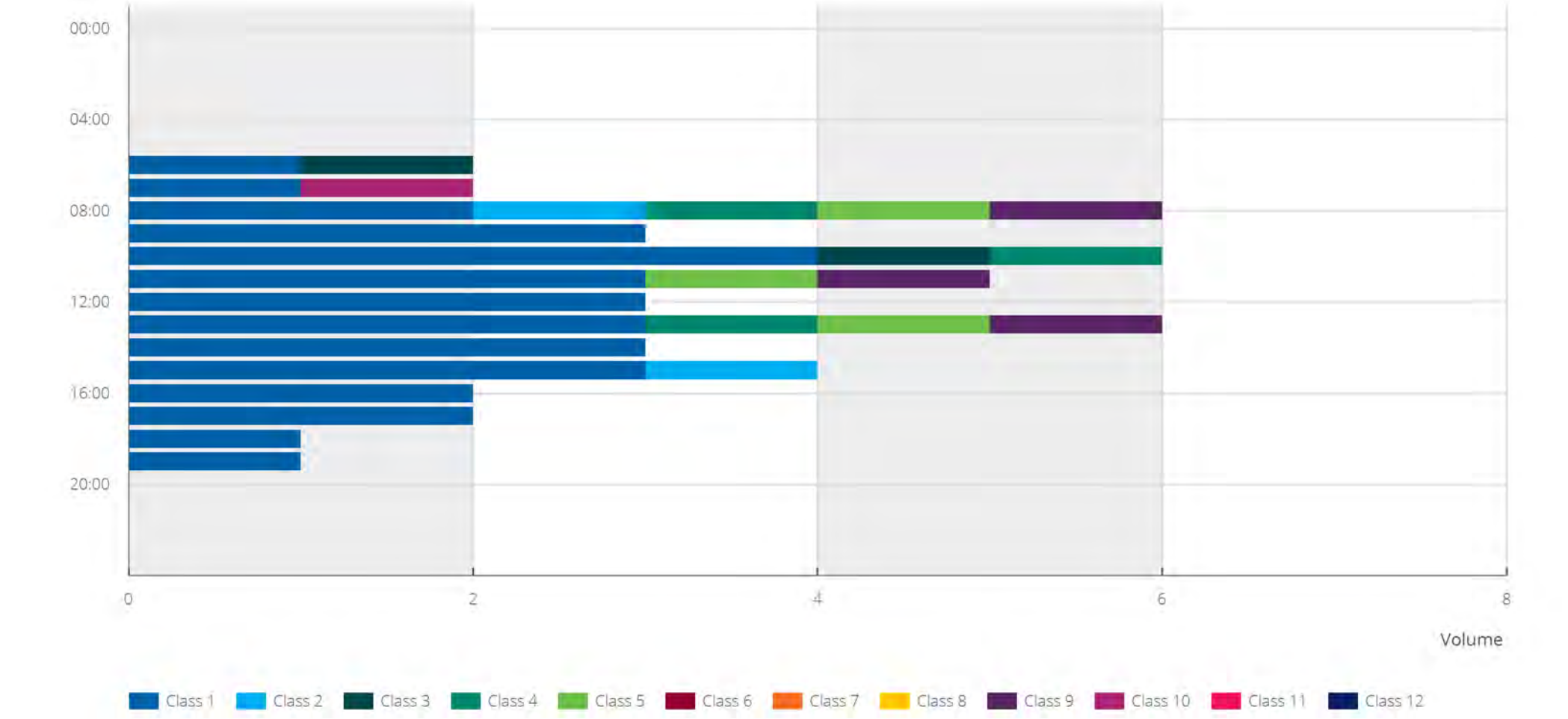
West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Monday to Sunday

Eastbound

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Monday to Sunday

Westbound

	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	1	0	0	0	0	0	0	0	0	0	0	0	1
07:00	2	0	0	1	0	0	0	0	0	0	0	0	3
08:00	2	0	0	0	0	0	0	0	0	0	0	0	2
09:00	3	0	1	0	0	0	0	0	0	0	1	0	5
10:00	2	0	0	0	0	0	0	0	1	0	0	0	3
11:00	3	0	1	0	0	0	0	0	0	0	0	0	4
12:00	2	0	1	0	0	0	0	0	1	0	0	0	4
13:00	2	0	1	0	0	0	0	0	0	0	0	0	3
14:00	2	0	1	1	0	0	0	0	0	0	0	0	4
15:00	2	0	1	0	1	0	0	0	0	0	0	0	4
16:00	1	1	1	0	0	0	0	0	0	0	0	0	3
17:00	1	0	1	0	0	0	0	0	0	0	0	0	2
18:00	1	0	0	0	0	0	0	0	0	0	0	0	1
19:00	1	0	0	0	0	0	0	0	0	0	0	0	1
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	25	1	8	2	1	0	0	0	2	0	1	0	40

Peak Statistics

AM	TIME	09:15		09:00	06:30				09:15	08:30	09:15
	VOL	4		1	1				1	1	7
PM	TIME	14:45	16:45	16:45	14:45	15:15			12:30		14:45
	VOL	3	1	2	1	1			1		7

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

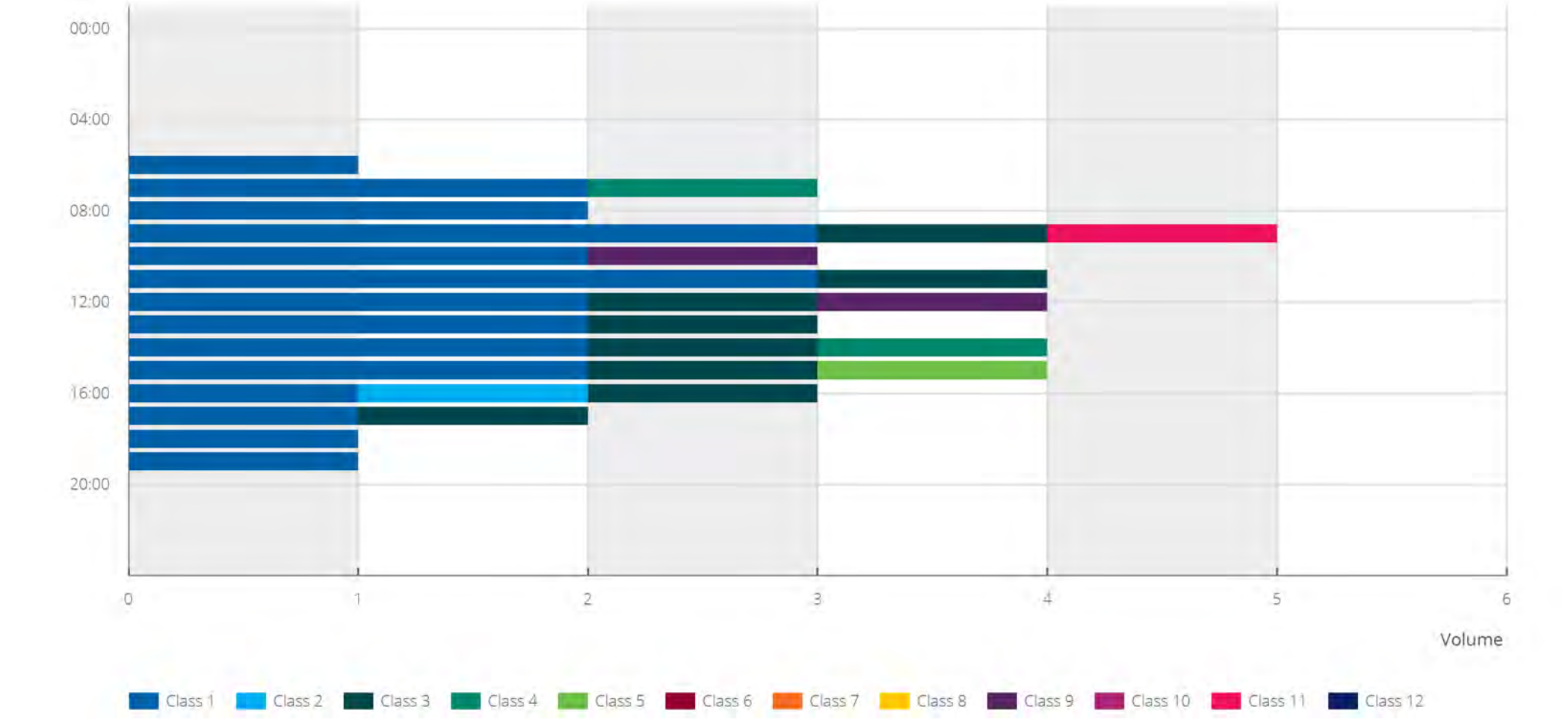
West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Monday to Sunday

Westbound

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Monday to Sunday

Both Directions

Vehicle Type

	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	2	0	1	0	0	0	0	0	0	0	0	0	3
07:00	3	0	0	1	0	0	0	0	0	1	0	0	5
08:00	4	1	0	1	1	0	0	0	1	0	0	0	8
09:00	6	0	1	0	0	0	0	0	0	0	1	0	8
10:00	6	0	1	1	0	0	0	0	1	0	0	0	9
11:00	6	0	1	0	1	0	0	0	1	0	0	0	9
12:00	5	0	1	0	0	0	0	0	1	0	0	0	7
13:00	5	0	1	1	1	0	0	0	1	0	0	0	9
14:00	5	0	1	1	0	0	0	0	0	0	0	0	7
15:00	5	1	1	0	1	0	0	0	0	0	0	0	8
16:00	3	1	1	0	0	0	0	0	0	0	0	0	5
17:00	3	0	1	0	0	0	0	0	0	0	0	0	4
18:00	2	0	0	0	0	0	0	0	0	0	0	0	2
19:00	2	0	0	0	0	0	0	0	0	0	0	0	2
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	57	3	10	5	4	0	0	0	5	1	1	0	86

Peak Statistics

		1	2	3	4	5	6	7	8	9	10	11	12	All
AM	TIME	09:15	08:00	10:30	06:30	08:00				07:45	07:00	08:30		09:15
	VOL	8	1	2	1	1				1	1	1		12
PM	TIME	14:45	16:45	16:45	14:45	15:15				13:30				14:45
	VOL	6	1	2	1	1				1				10

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

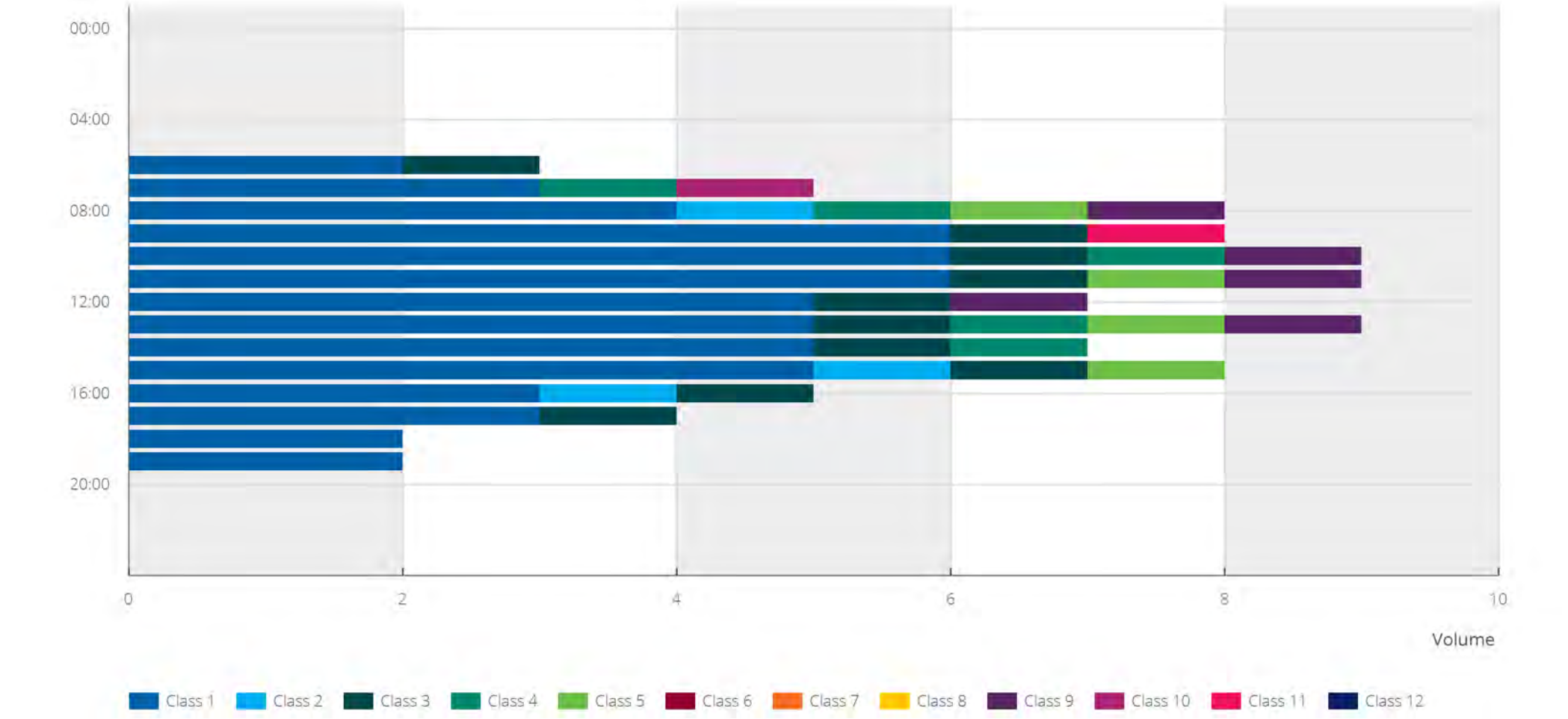
West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Monday to Sunday

Both Directions

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Weekend

Eastbound

	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00	1	0	0	1	0	0	0	0	0	0	0	0	2
08:00	1	0	0	0	1	0	0	0	1	0	0	0	3
09:00	2	1	0	1	0	0	0	0	0	0	0	0	4
10:00	2	0	0	1	0	0	0	0	1	0	0	0	4
11:00	1	0	1	0	0	0	0	0	0	0	0	0	2
12:00	1	0	0	0	0	0	0	0	0	1	0	0	2
13:00	2	0	0	1	1	0	0	0	0	0	0	0	4
14:00	2	0	0	0	0	0	0	0	0	0	0	0	2
15:00	3	0	0	0	0	0	0	0	0	0	0	0	3
16:00	1	0	0	0	1	0	0	0	0	0	0	0	2
17:00	2	0	0	0	0	0	0	0	0	0	0	0	2
18:00	1	0	0	0	0	0	0	0	0	0	0	0	1
19:00	1	0	0	0	0	0	0	0	0	0	0	0	1
20:00	1	0	0	0	0	0	0	0	0	0	0	0	1
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	1	0	0	0	0	0	0	0	0	0	0	0	1
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	22	1	1	4	3	0	0	0	2	1	0	0	34

Peak Statistics

AM	TIME	07:30	08:30	10:45	07:00	07:45				07:45	11:45			07:45
	VOL	2	1	1	1	1				1	1			5
PM	TIME	15:30			13:15	16:00					12:30			15:30
	VOL	3			1	1					1			4

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

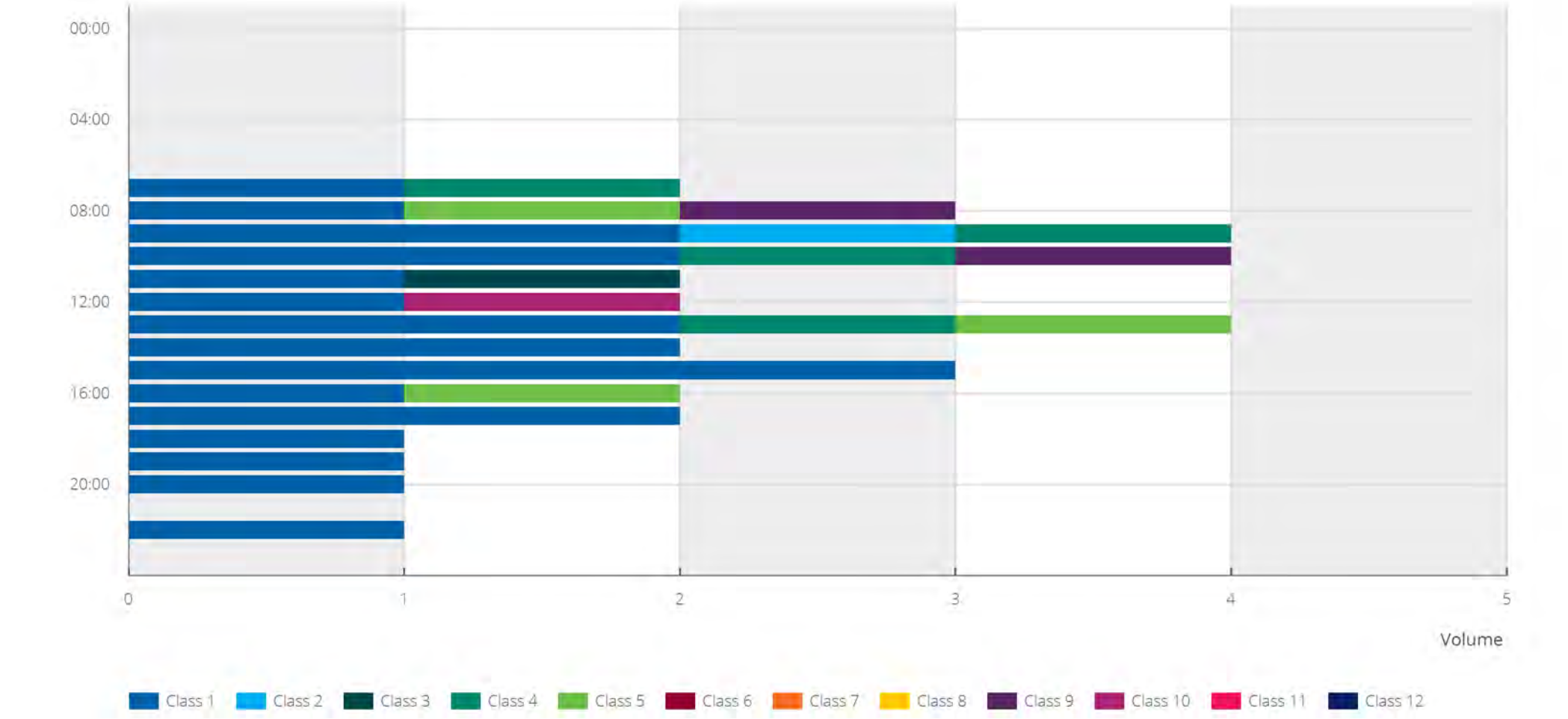
West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Weekend

Eastbound

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Weekend

Westbound

	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	1	0	0	0	0	0	0	0	0	0	1
07:00	1	0	0	0	0	0	0	0	0	0	0	0	1
08:00	1	0	1	0	0	0	0	0	0	0	0	0	2
09:00	2	0	1	0	0	0	0	0	1	0	0	0	4
10:00	1	0	1	0	0	0	0	0	0	0	0	0	2
11:00	1	0	0	0	1	0	0	0	0	0	0	0	2
12:00	1	0	0	0	0	0	0	0	0	0	1	0	2
13:00	1	0	0	0	0	0	0	0	0	0	0	0	1
14:00	1	0	0	1	0	0	0	0	0	0	0	0	2
15:00	3	0	1	0	0	0	0	0	1	0	0	0	5
16:00	1	0	1	0	0	0	0	0	0	0	0	0	2
17:00	1	0	0	0	0	0	0	0	0	0	1	0	2
18:00	1	0	0	0	0	0	0	0	0	0	0	0	1
19:00	1	0	0	0	0	0	0	0	0	0	0	0	1
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	16	0	6	1	1	0	0	0	2	0	2	0	28

Peak Statistics

AM	TIME	08:15	05:45	11:00		08:15	11:15	08:15
	VOL	2	1	1		1	1	4
PM	TIME	14:45	16:30	14:45		15:30	17:15	14:45
	VOL	4	1	1		1	1	7

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

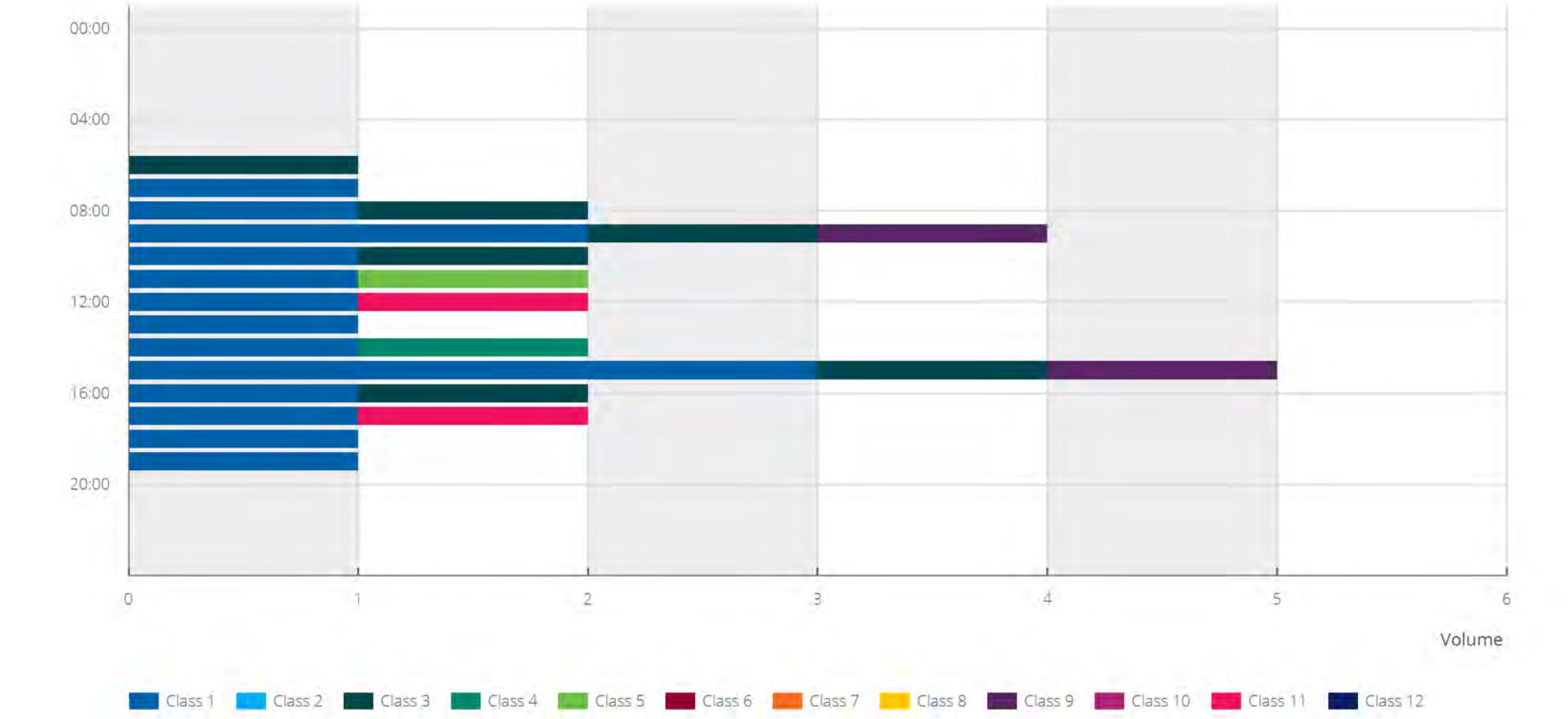
West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Weekend

Westbound

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Weekend

Both Directions

	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	1	0	0	0	0	0	0	0	0	0	1
07:00	2	0	0	1	0	0	0	0	0	0	0	0	3
08:00	2	0	1	0	1	0	0	0	1	0	0	0	5
09:00	4	1	1	1	0	0	0	0	1	0	0	0	8
10:00	3	0	1	1	0	0	0	0	1	0	0	0	6
11:00	2	0	1	0	1	0	0	0	0	0	0	0	4
12:00	2	0	0	0	0	0	0	0	0	1	1	0	4
13:00	3	0	0	1	1	0	0	0	0	0	0	0	5
14:00	3	0	0	1	0	0	0	0	0	0	0	0	4
15:00	6	0	1	0	0	0	0	0	1	0	0	0	8
16:00	2	0	1	0	1	0	0	0	0	0	0	0	4
17:00	3	0	0	0	0	0	0	0	0	0	1	0	4
18:00	2	0	0	0	0	0	0	0	0	0	0	0	2
19:00	2	0	0	0	0	0	0	0	0	0	0	0	2
20:00	1	0	0	0	0	0	0	0	0	0	0	0	1
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	1	0	0	0	0	0	0	0	0	0	0	0	1
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	38	1	7	5	4	0	0	0	4	1	2	0	62

Peak Statistics

AM	TIME	09:00	08:30	05:45	07:00	07:45			08:15	11:45	11:15	08:15
	VOL	4	1	1	1	1			2	1	1	8
PM	TIME	14:45		16:30	14:45	16:00			15:30	12:30	17:15	14:45
	VOL	7		1	1	1			1	1	1	10

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Pingaring Varley Rd (4120005)

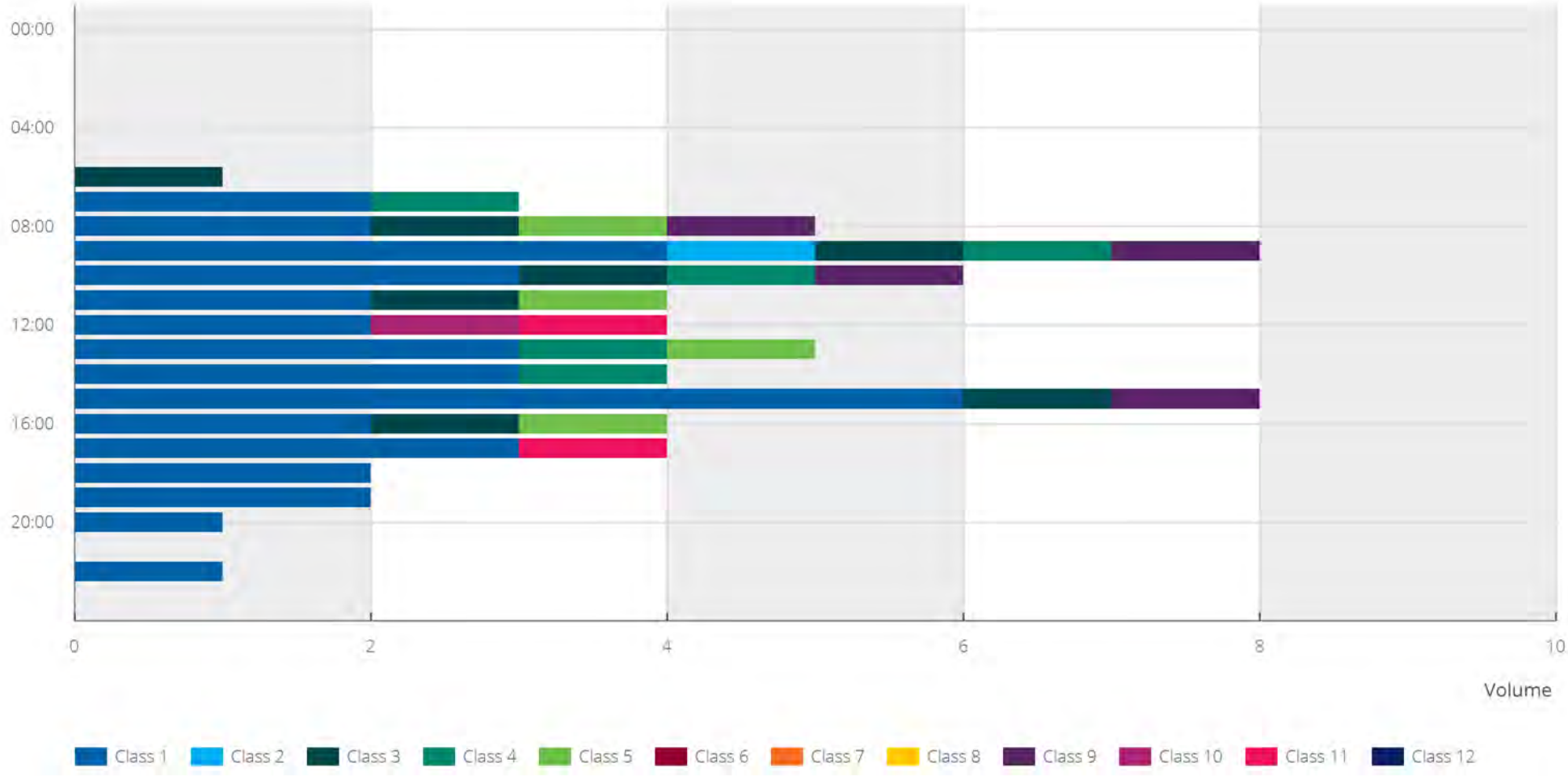
West of Luke Price Rd (SLK 72.30)

SITE 53256

2020/21
Weekend

Both Directions

Vehicle Type



mainroads WESTERN AUSTRALIA

SITE 53256

Hourly Volume

Pingaring Varley Rd (4120005)

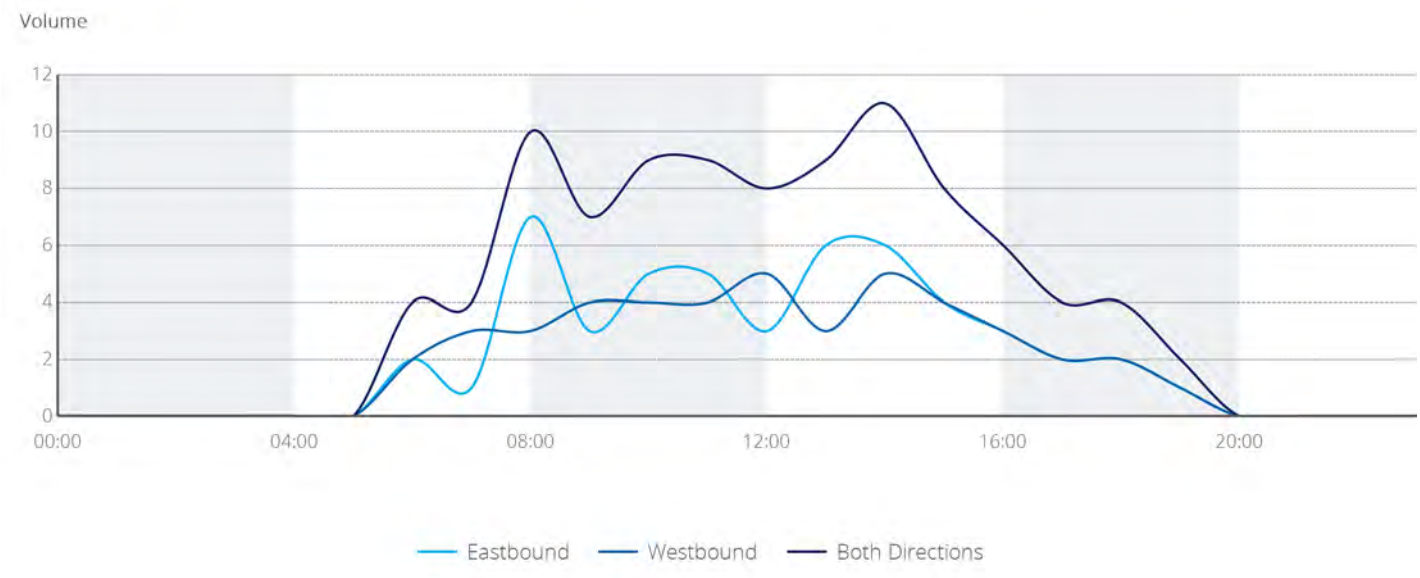
West of Luke Price Rd (SLK 72.30)

2020/21
Monday to Friday

	All Vehicles			Heavy Vehicles			
	EB	WB	Both	EB	WB	Both	%
00:00	0	0	0	0	0	0	0.0
01:00	0	0	0	0	0	0	0.0
02:00	0	0	0	0	0	0	0.0
03:00	0	0	0	0	0	0	0.0
04:00	0	0	0	0	0	0	0.0
05:00	0	0	0	0	0	0	0.0
06:00	2	2	4	1	1	2	50.0
07:00	1	3	4	0	1	1	25.0
08:00	7	3	10	3	1	4	40.0
09:00	3	4	7	0	1	1	14.3
10:00	5	4	9	1	1	2	22.2
11:00	5	4	9	2	1	3	33.3
12:00	3	5	8	0	2	2	25.0
13:00	6	3	9	3	1	4	44.4
14:00	6	5	11	2	2	4	36.4
15:00	4	4	8	0	2	2	25.0
16:00	3	3	6	0	1	1	16.7
17:00	2	2	4	0	1	1	25.0
18:00	2	2	4	0	1	1	25.0
19:00	1	1	2	0	0	0	0.0
20:00	0	0	0	0	0	0	0.0
21:00	0	0	0	0	0	0	0.0
22:00	0	0	0	0	0	0	0.0
23:00	0	0	0	0	0	0	0.0
TOTAL	50	45	95	12	16	28	29.5

Peak Statistics

AM	TIME	08:00	11:45	10:30	08:00	09:45	10:30
	VOL	7	6	12	3	2	5
PM	TIME	13:30	14:45	13:30	13:30	14:45	13:30
	VOL	8	7	12	5	4	6



mainroads WESTERN AUSTRALIA

SITE 53256

Hourly Volume

Pingaring Varley Rd (4120005)

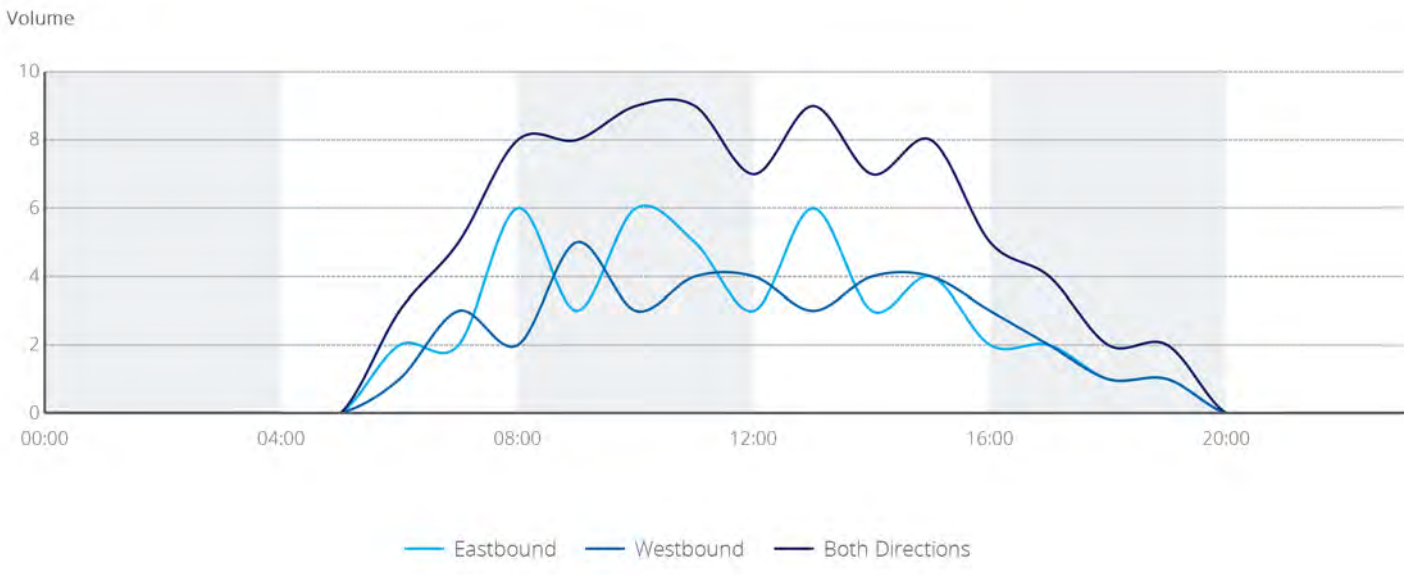
West of Luke Price Rd (SLK 72.30)

2020/21
Monday to Sunday

	All Vehicles			Heavy Vehicles			
	EB	WB	Both	EB	WB	Both	%
00:00	0	0	0	0	0	0	0.0
01:00	0	0	0	0	0	0	0.0
02:00	0	0	0	0	0	0	0.0
03:00	0	0	0	0	0	0	0.0
04:00	0	0	0	0	0	0	0.0
05:00	0	0	0	0	0	0	0.0
06:00	2	1	3	1	0	1	33.3
07:00	2	3	5	1	1	2	40.0
08:00	6	2	8	3	0	3	37.5
09:00	3	5	8	0	2	2	25.0
10:00	6	3	9	2	1	3	33.3
11:00	5	4	9	2	1	3	33.3
12:00	3	4	7	0	2	2	28.6
13:00	6	3	9	3	1	4	44.4
14:00	3	4	7	0	2	2	28.6
15:00	4	4	8	0	2	2	25.0
16:00	2	3	5	0	1	1	20.0
17:00	2	2	4	0	1	1	25.0
18:00	1	1	2	0	0	0	0.0
19:00	1	1	2	0	0	0	0.0
20:00	0	0	0	0	0	0	0.0
21:00	0	0	0	0	0	0	0.0
22:00	0	0	0	0	0	0	0.0
23:00	0	0	0	0	0	0	0.0
TOTAL	46	40	86	12	14	26	30.2

Peak Statistics

AM	TIME	10:30	09:15	09:15	08:00	09:15	08:30
	VOL	8	7	12	3	3	4
PM	TIME	13:30	14:45	14:45	13:30	14:45	14:45
	VOL	6	7	10	3	4	4



mainroads WESTERN AUSTRALIA

SITE 53256

Hourly Volume

Pingaring Varley Rd (4120005)

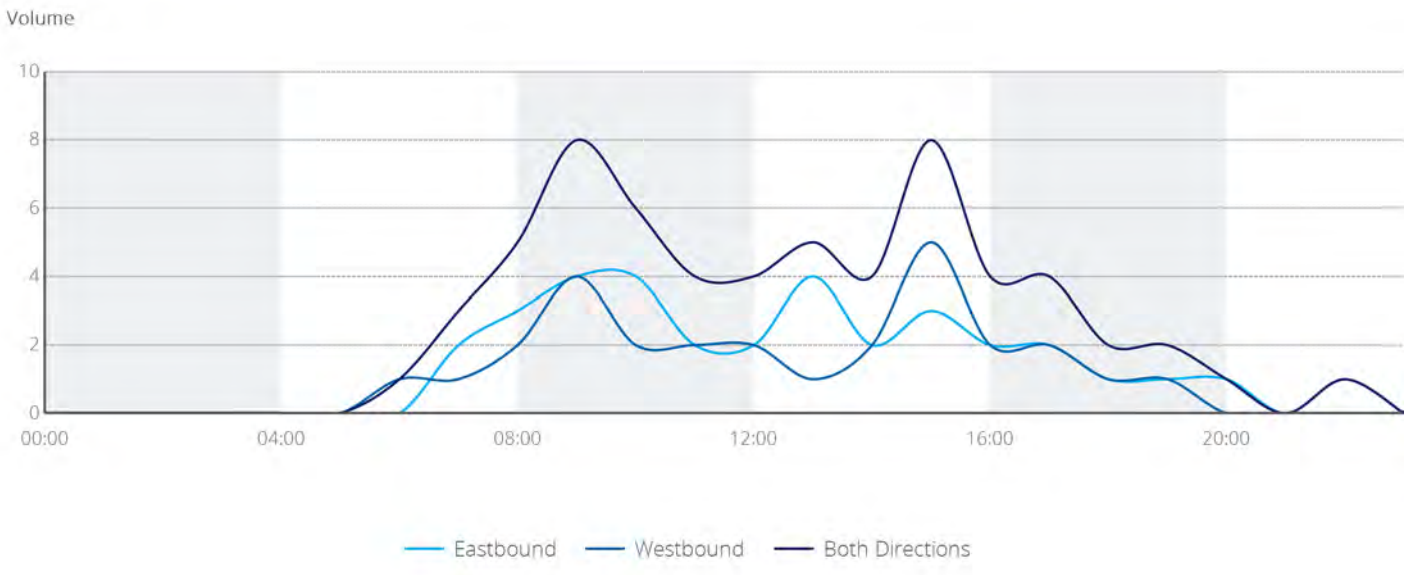
West of Luke Price Rd (SLK 72.30)

2020/21
Weekend

	All Vehicles			Heavy Vehicles			
	EB	WB	Both	EB	WB	Both	%
00:00	0	0	0	0	0	0	0.0
01:00	0	0	0	0	0	0	0.0
02:00	0	0	0	0	0	0	0.0
03:00	0	0	0	0	0	0	0.0
04:00	0	0	0	0	0	0	0.0
05:00	0	0	0	0	0	0	0.0
06:00	0	1	1	0	1	1	100.0
07:00	2	1	3	1	0	1	33.3
08:00	3	2	5	2	1	3	60.0
09:00	4	4	8	1	2	3	37.5
10:00	4	2	6	2	1	3	50.0
11:00	2	2	4	1	1	2	50.0
12:00	2	2	4	1	1	2	50.0
13:00	4	1	5	2	0	2	40.0
14:00	2	2	4	0	1	1	25.0
15:00	3	5	8	0	2	2	25.0
16:00	2	2	4	1	1	2	50.0
17:00	2	2	4	0	1	1	25.0
18:00	1	1	2	0	0	0	0.0
19:00	1	1	2	0	0	0	0.0
20:00	1	0	1	0	0	0	0.0
21:00	0	0	0	0	0	0	0.0
22:00	1	0	1	0	0	0	0.0
23:00	0	0	0	0	0	0	0.0
TOTAL	34	28	62	11	12	23	37.1

Peak Statistics

AM	TIME	07:45	08:15	08:15	07:45	08:15	08:15
	VOL	5	4	8	3	2	5
PM	TIME	15:30	14:45	14:45	12:30	14:45	14:45
	VOL	4	7	10	3	3	3



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Monday to Friday

Northbound

Vehicle Type

	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	1	0	0	0	0	0	0	0	0	0	0	0	1
06:00	2	0	0	0	0	0	0	0	0	0	0	0	2
07:00	1	0	1	0	0	0	0	0	0	0	0	0	2
08:00	1	0	0	0	0	0	0	0	0	1	0	0	2
09:00	1	0	0	0	0	0	0	0	0	0	0	0	1
10:00	1	0	1	0	0	0	0	0	0	0	0	0	2
11:00	1	0	0	0	0	0	0	0	0	0	1	0	2
12:00	1	0	0	0	0	0	0	0	0	0	0	0	1
13:00	1	0	0	0	0	0	0	0	0	0	0	0	1
14:00	1	1	0	0	0	0	0	0	0	0	0	0	2
15:00	1	0	1	0	0	0	1	0	0	0	0	0	3
16:00	2	0	1	0	0	0	0	0	0	0	0	0	3
17:00	1	0	0	0	0	0	0	0	0	0	0	0	1
18:00	1	0	0	0	0	0	0	0	0	0	0	0	1
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	16	1	4	0	0	0	1	0	0	1	1	0	24

Peak Statistics

		1	2	3	4	5	6	7	8	9	10	11	12	All
AM	TIME	05:30		06:30							07:15	10:30		06:30
	VOL	2		1							1	1		3
PM	TIME	16:30	14:45	16:45				15:15						16:30
	VOL	2	1	1				1						3

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

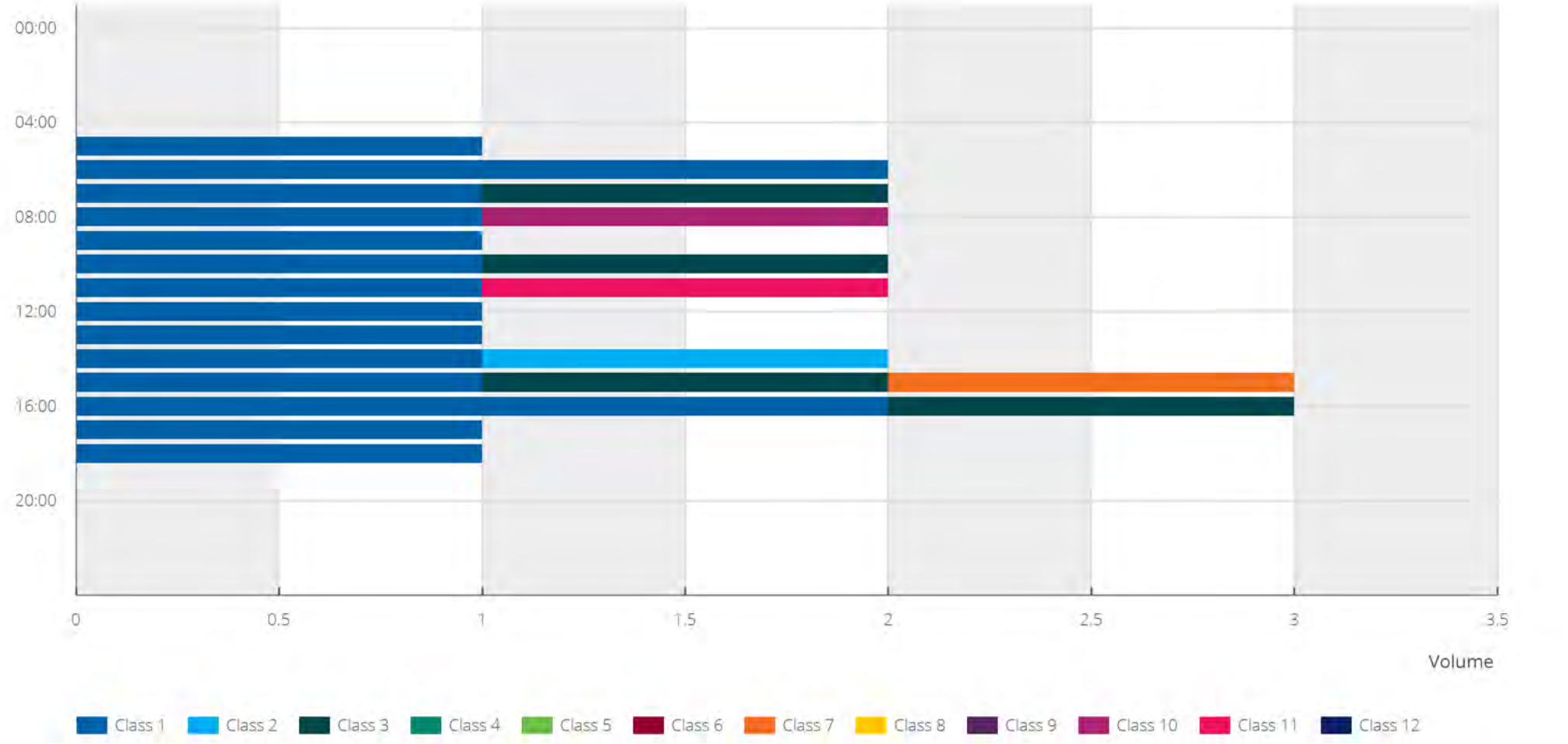
North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Monday to Friday

Northbound

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Monday to Friday

Southbound

	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	1	0	0	0	0	0	0	0	0	0	0	0	1
07:00	1	0	0	0	0	0	0	0	0	0	0	0	1
08:00	1	0	0	0	0	0	0	0	0	0	0	0	1
09:00	1	0	0	0	0	0	0	0	0	0	0	0	1
10:00	0	1	0	0	0	0	0	0	0	0	0	0	1
11:00	1	0	0	0	0	0	1	0	0	0	0	0	2
12:00	1	0	0	0	0	0	0	0	0	0	1	0	2
13:00	1	0	0	0	0	0	0	0	0	0	0	0	1
14:00	1	0	0	0	0	0	0	0	0	0	0	0	1
15:00	1	0	1	0	0	0	0	0	0	0	0	0	2
16:00	2	0	1	0	0	0	0	0	0	0	0	0	3
17:00	2	0	0	0	0	0	0	0	0	0	0	0	2
18:00	1	0	0	0	0	0	0	0	0	0	0	0	1
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	14	1	2	0	0	0	1	0	0	0	1	0	19

Peak Statistics

		1	2	3	4	5	6	7	8	9	10	11	12	All
AM	TIME	07:15	09:30					10:30						07:15
	VOL	2	1					1						2
PM	TIME	17:15		16:45								12:45		17:15
	VOL	3		1								1		3

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

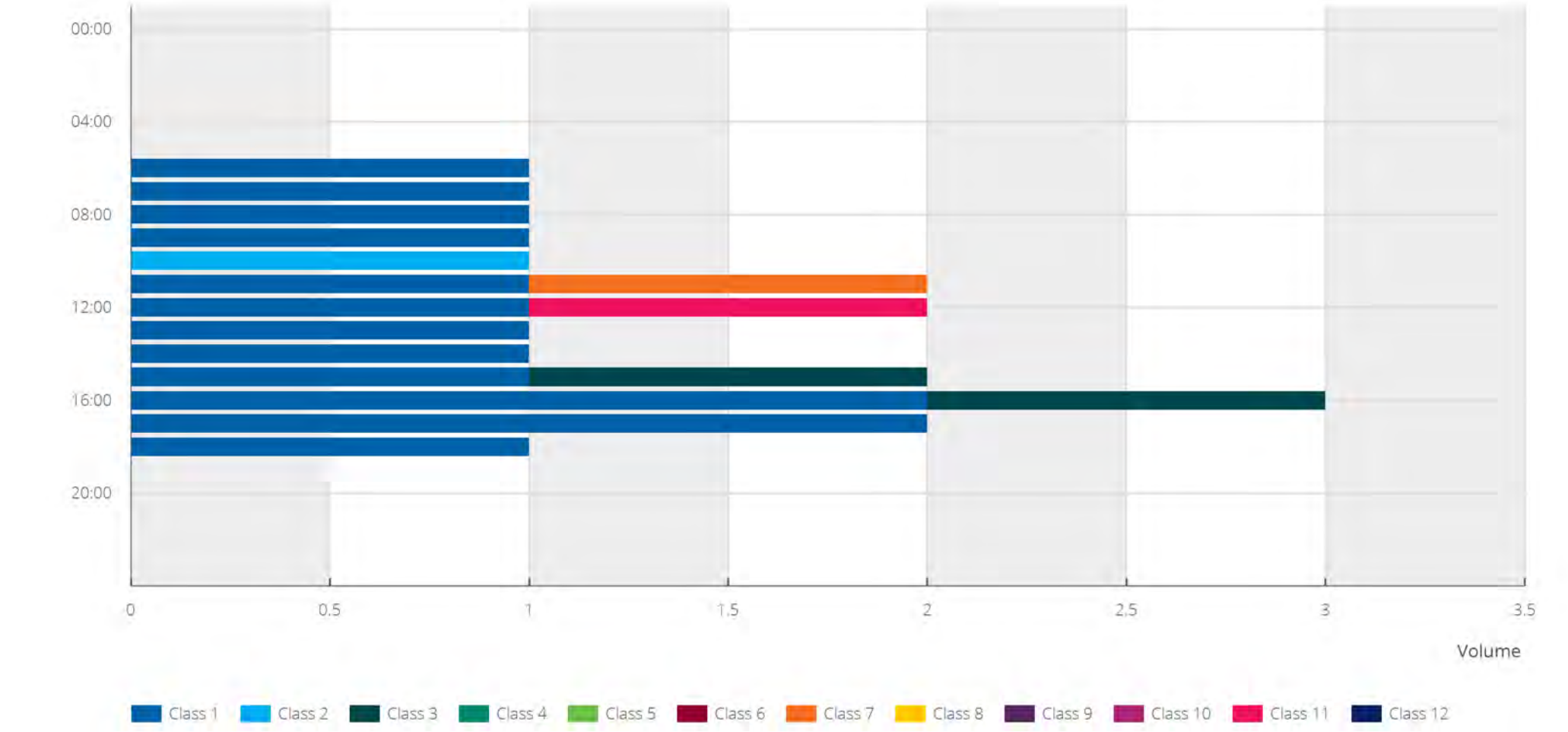
North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Monday to Friday

Southbound

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Monday to Friday

Both Directions

Vehicle Type

	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	1	0	0	0	0	0	0	0	0	0	0	0	1
06:00	3	0	0	0	0	0	0	0	0	0	0	0	3
07:00	2	0	1	0	0	0	0	0	0	0	0	0	3
08:00	2	0	0	0	0	0	0	0	0	1	0	0	3
09:00	2	0	0	0	0	0	0	0	0	0	0	0	2
10:00	1	1	1	0	0	0	0	0	0	0	0	0	3
11:00	2	0	0	0	0	0	1	0	0	0	1	0	4
12:00	2	0	0	0	0	0	0	0	0	0	1	0	3
13:00	2	0	0	0	0	0	0	0	0	0	0	0	2
14:00	2	1	0	0	0	0	0	0	0	0	0	0	3
15:00	2	0	2	0	0	0	1	0	0	0	0	0	5
16:00	4	0	2	0	0	0	0	0	0	0	0	0	6
17:00	3	0	0	0	0	0	0	0	0	0	0	0	3
18:00	2	0	0	0	0	0	0	0	0	0	0	0	2
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	30	2	6	0	0	0	2	0	0	1	2	0	43

Peak Statistics

		1	2	3	4	5	6	7	8	9	10	11	12	All
AM	TIME	05:45	09:30	06:30			10:30				07:15	10:30		07:15
	VOL	3	1	1			1				1	1		5
PM	TIME	17:15	14:45	16:45			15:15					12:45		16:30
	VOL	4	1	2			1					1		6

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

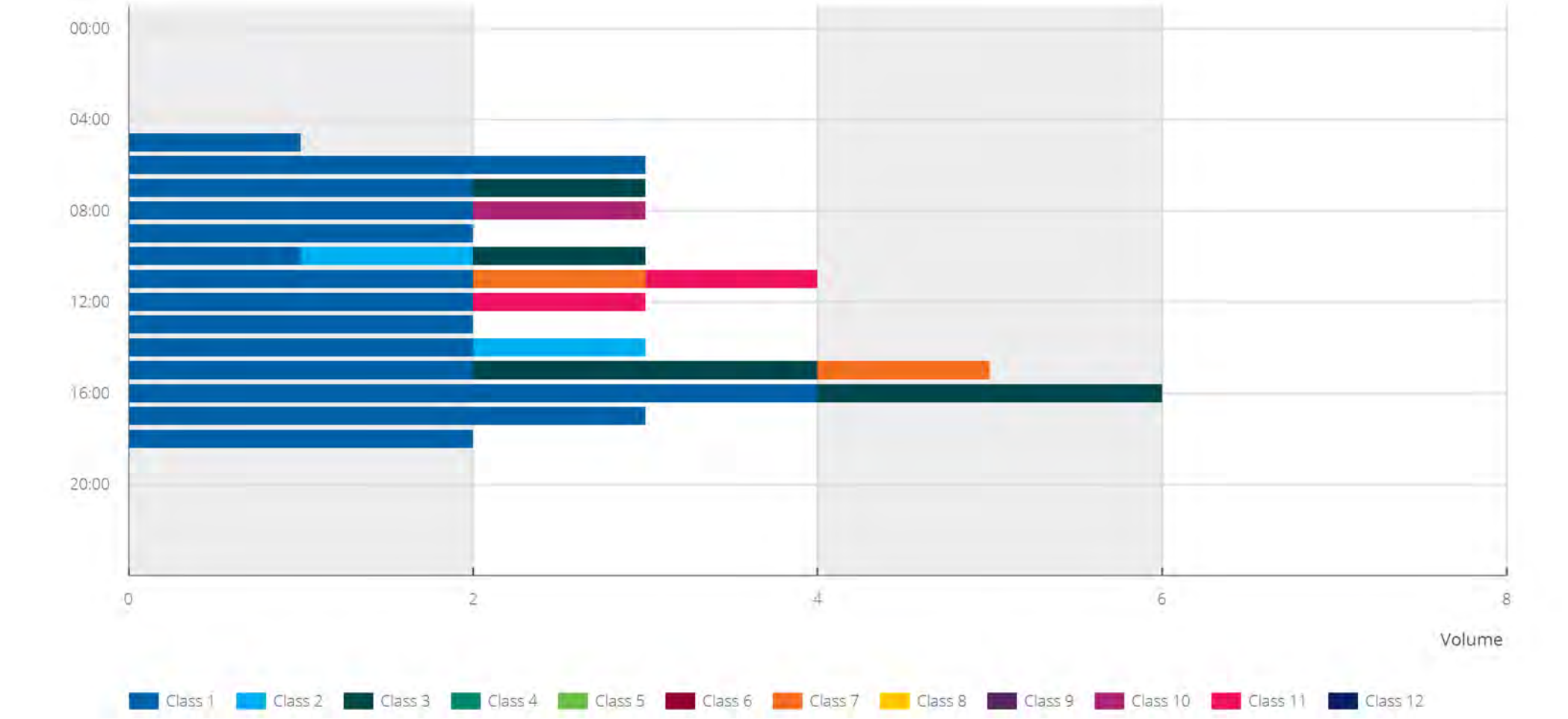
North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Monday to Friday

Both Directions

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Monday to Sunday

Northbound

	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	2	0	0	0	0	0	0	0	0	0	0	0	2
07:00	1	0	0	0	0	0	0	0	0	0	0	0	1
08:00	0	0	0	0	0	0	0	0	0	1	0	0	1
09:00	1	0	0	0	0	0	0	0	0	0	0	0	1
10:00	1	0	1	0	0	0	0	0	0	0	0	0	2
11:00	1	0	0	0	0	0	0	0	0	0	1	0	2
12:00	1	0	0	0	0	0	0	0	0	0	0	0	1
13:00	1	1	0	0	0	0	0	0	0	0	0	0	2
14:00	1	0	1	0	0	0	0	0	0	0	0	0	2
15:00	0	0	1	0	0	0	1	0	0	0	0	0	2
16:00	1	0	0	0	0	0	0	0	0	0	0	0	1
17:00	1	0	0	0	0	0	0	0	0	0	0	0	1
18:00	1	0	0	0	0	0	0	0	0	0	0	0	1
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	12	1	3	0	0	0	1	0	0	1	1	0	19

Peak Statistics

AM	TIME	06:00		09:30						07:15	10:30		11:15
	VOL	2		1						1	1		3
PM	TIME	18:15	13:00	15:45			15:15						15:45
	VOL	1	1	1			1						2

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

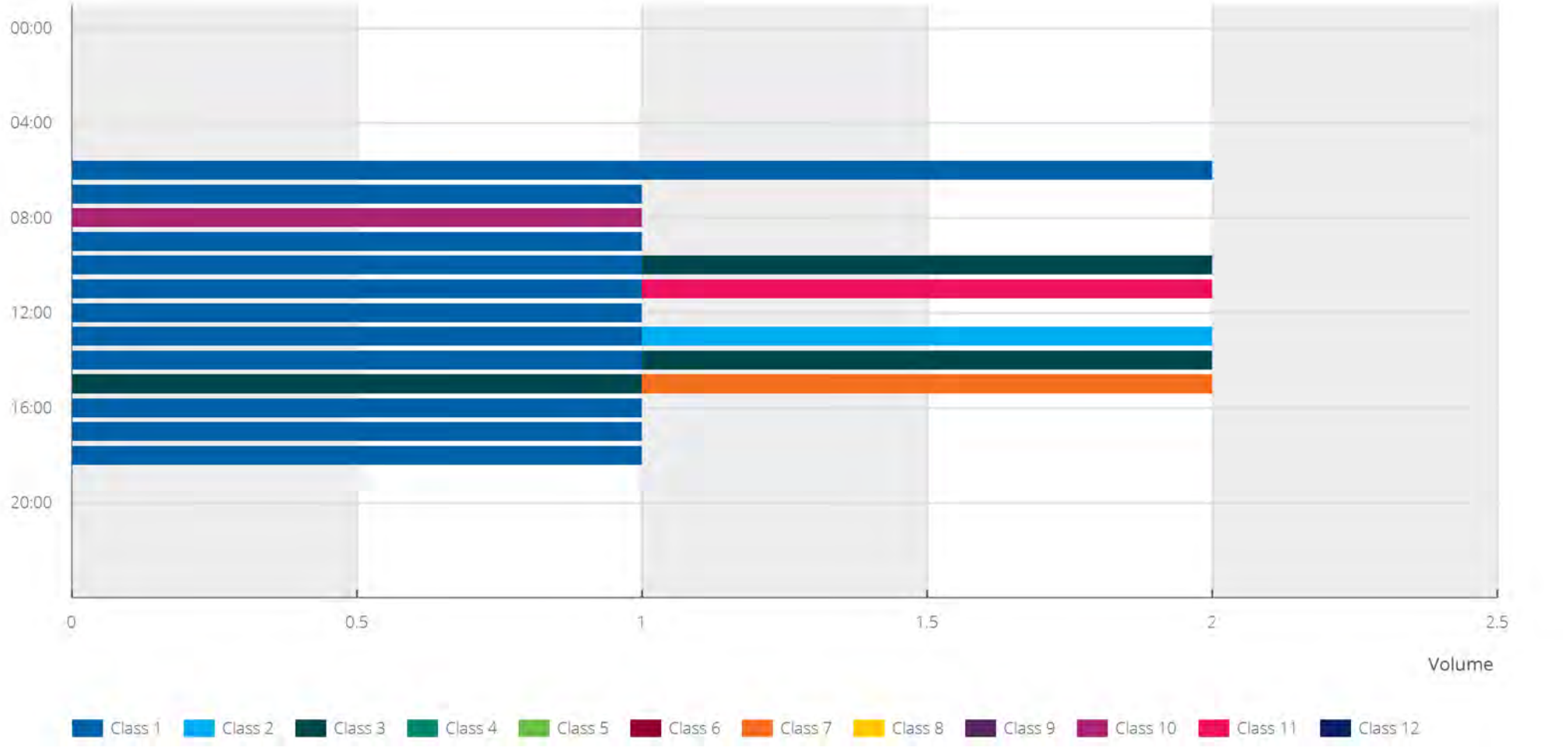
North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Monday to Sunday

Northbound

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Monday to Sunday

Southbound

	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	1	0	0	0	0	0	0	0	0	0	0	0	1
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	1	0	0	0	0	0	0	0	0	0	0	0	1
10:00	0	1	0	0	0	0	0	0	0	0	0	0	1
11:00	1	0	0	0	0	0	0	0	0	0	0	0	1
12:00	1	0	0	0	0	0	0	0	0	0	0	0	1
13:00	1	0	0	0	0	0	0	0	0	0	0	0	1
14:00	1	0	1	0	0	0	0	0	0	0	0	0	2
15:00	1	0	0	0	0	0	0	0	0	0	0	0	1
16:00	2	0	1	0	0	0	0	0	0	0	0	0	3
17:00	2	0	0	0	0	0	0	0	0	0	0	0	2
18:00	1	0	0	0	0	0	0	0	0	0	0	0	1
19:00	1	0	0	0	0	0	0	0	0	0	0	0	1
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	13	1	2	0	0	0	0	0	0	0	0	0	16

Peak Statistics

AM	TIME	05:45	09:30										09:30
	VOL	1	1										2
PM	TIME	18:45		16:45									16:45
	VOL	2		1									3

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

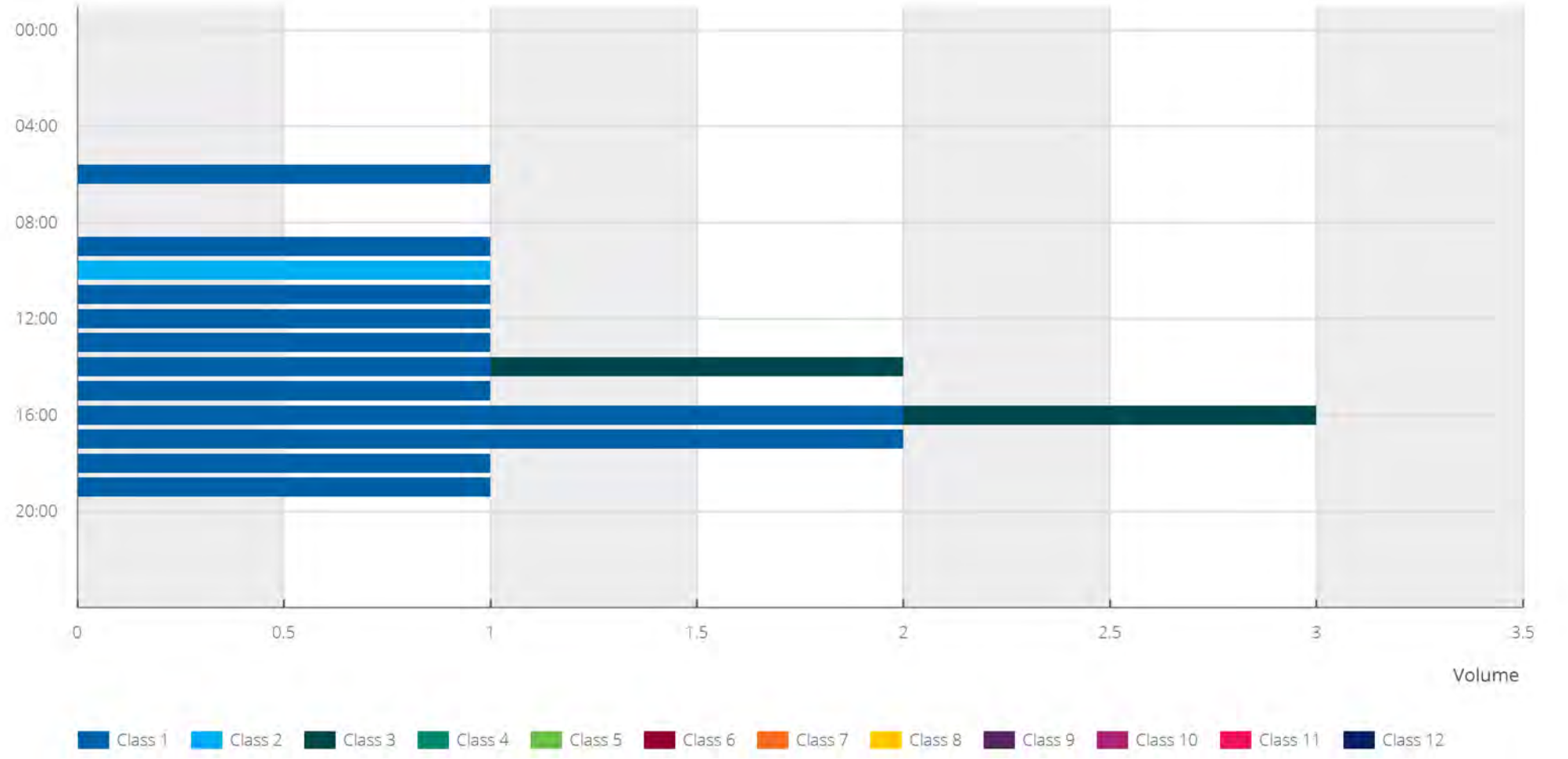
North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Monday to Sunday

Southbound

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Monday to Sunday

Both Directions

Vehicle Type

	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	3	0	0	0	0	0	0	0	0	0	0	0	3
07:00	1	0	0	0	0	0	0	0	0	0	0	0	1
08:00	0	0	0	0	0	0	0	0	0	1	0	0	1
09:00	2	0	0	0	0	0	0	0	0	0	0	0	2
10:00	1	1	1	0	0	0	0	0	0	0	0	0	3
11:00	2	0	0	0	0	0	0	0	0	0	1	0	3
12:00	2	0	0	0	0	0	0	0	0	0	0	0	2
13:00	2	1	0	0	0	0	0	0	0	0	0	0	3
14:00	2	0	2	0	0	0	0	0	0	0	0	0	4
15:00	1	0	1	0	0	0	1	0	0	0	0	0	3
16:00	3	0	1	0	0	0	0	0	0	0	0	0	4
17:00	3	0	0	0	0	0	0	0	0	0	0	0	3
18:00	2	0	0	0	0	0	0	0	0	0	0	0	2
19:00	1	0	0	0	0	0	0	0	0	0	0	0	1
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	25	2	5	0	0	0	1	0	0	1	1	0	35

Peak Statistics

		1	2	3	4	5	6	7	8	9	10	11	12	All
AM	TIME	06:00	09:30	09:30							07:15	10:30		09:45
	VOL	3	1	1							1	1		4
PM	TIME	17:15	13:00	14:15				15:15						16:45
	VOL	3	1	2				1						4

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

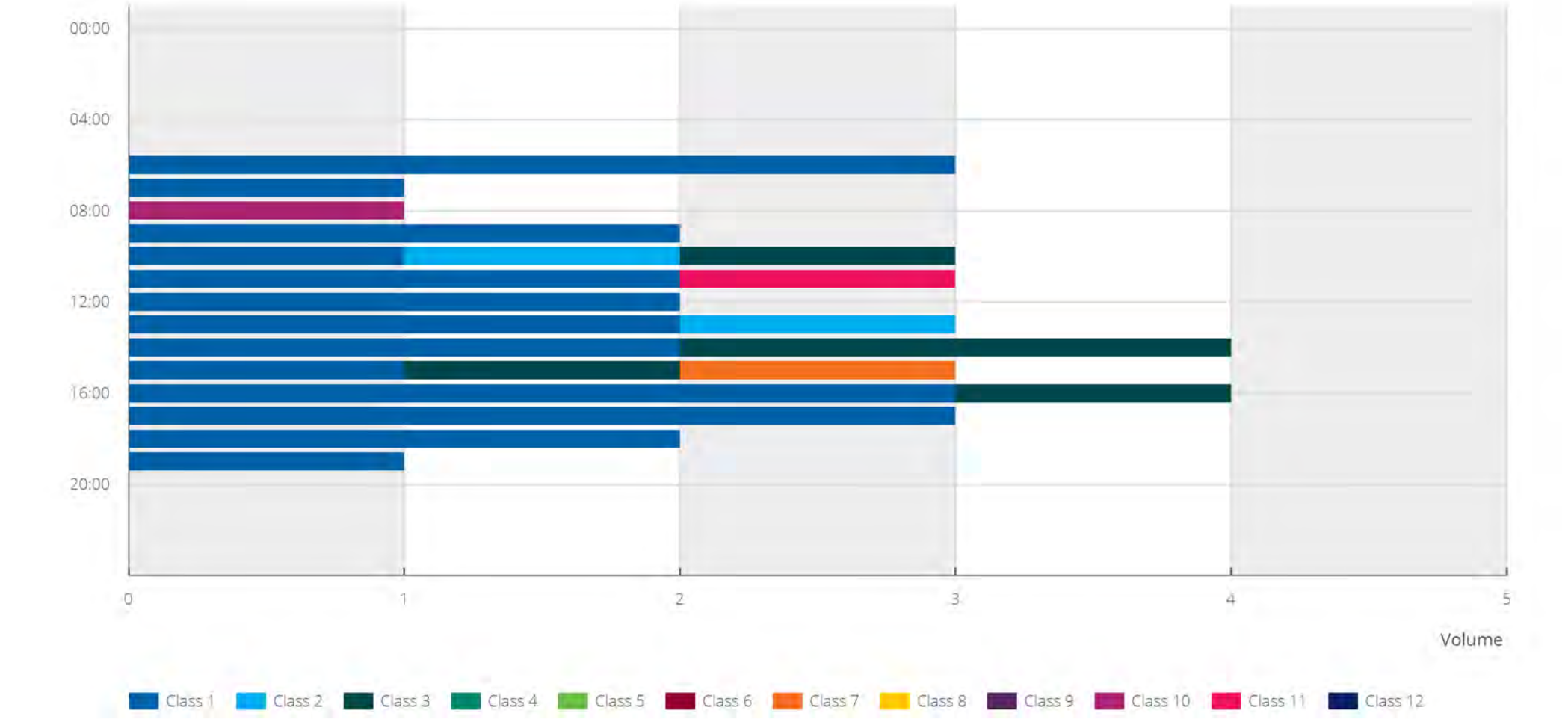
North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Monday to Sunday

Both Directions

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Weekend

Northbound

	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	1	0	0	0	0	0	0	0	0	0	0	0	1
06:00	2	0	1	0	0	0	0	0	0	0	0	0	3
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	0	0	1	0	0	0	0	0	0	0	0	0	1
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	1	0	0	0	0	0	0	0	0	0	0	0	1
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	0	1	0	0	0	0	0	0	0	0	0	0	1
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	1	0	0	0	0	0	0	0	0	0	0	0	1
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	1	0	0	0	0	0	0	0	0	0	0	0	1
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6	1	2	0	0	0	0	0	0	0	0	0	9

Peak Statistics

AM	TIME	05:15		06:00									06:00
	VOL	2		1									3
PM	TIME	18:45	13:00										18:45
	VOL	1	1										1

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

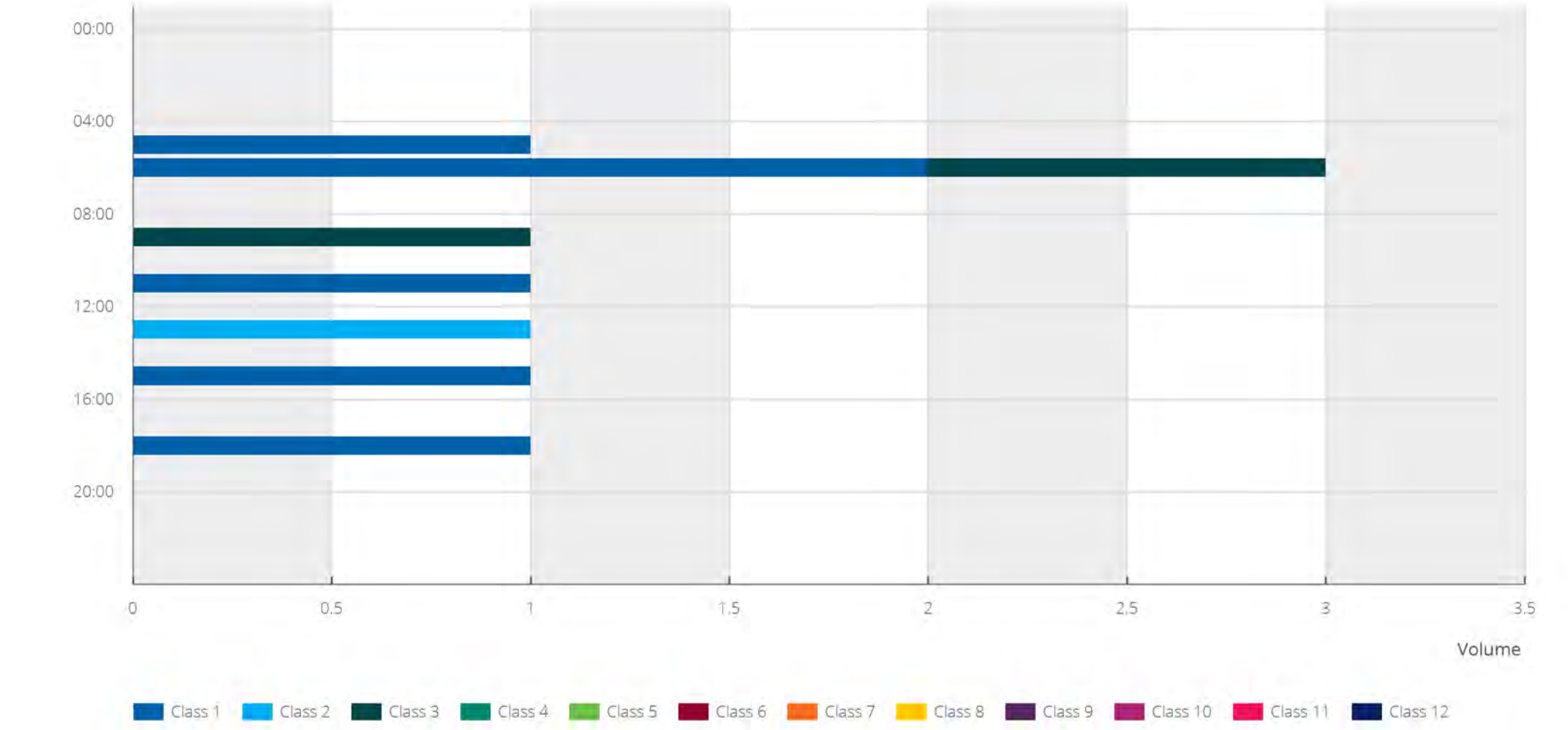
North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Weekend

Northbound

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Weekend

Southbound

	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	1	0	0	0	0	0	0	0	0	0	0	0	1
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	1	0	1	0	0	0	0	0	0	0	0	0	2
12:00	1	0	0	0	0	0	0	0	0	0	0	0	1
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	1	0	0	0	0	0	0	0	0	0	0	0	1
16:00	1	0	0	0	0	0	0	0	0	0	0	0	1
17:00	1	0	0	0	0	0	0	0	0	0	0	0	1
18:00	1	0	0	0	0	0	0	0	0	0	0	0	1
19:00	2	0	0	0	0	0	0	0	0	0	0	0	2
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	9	0	1	0	0	0	0	0	0	0	0	0	10

Peak Statistics

AM	TIME	11:15	10:30										11:15
	VOL	2	1										3
PM	TIME	18:45											18:45
	VOL	3											3

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

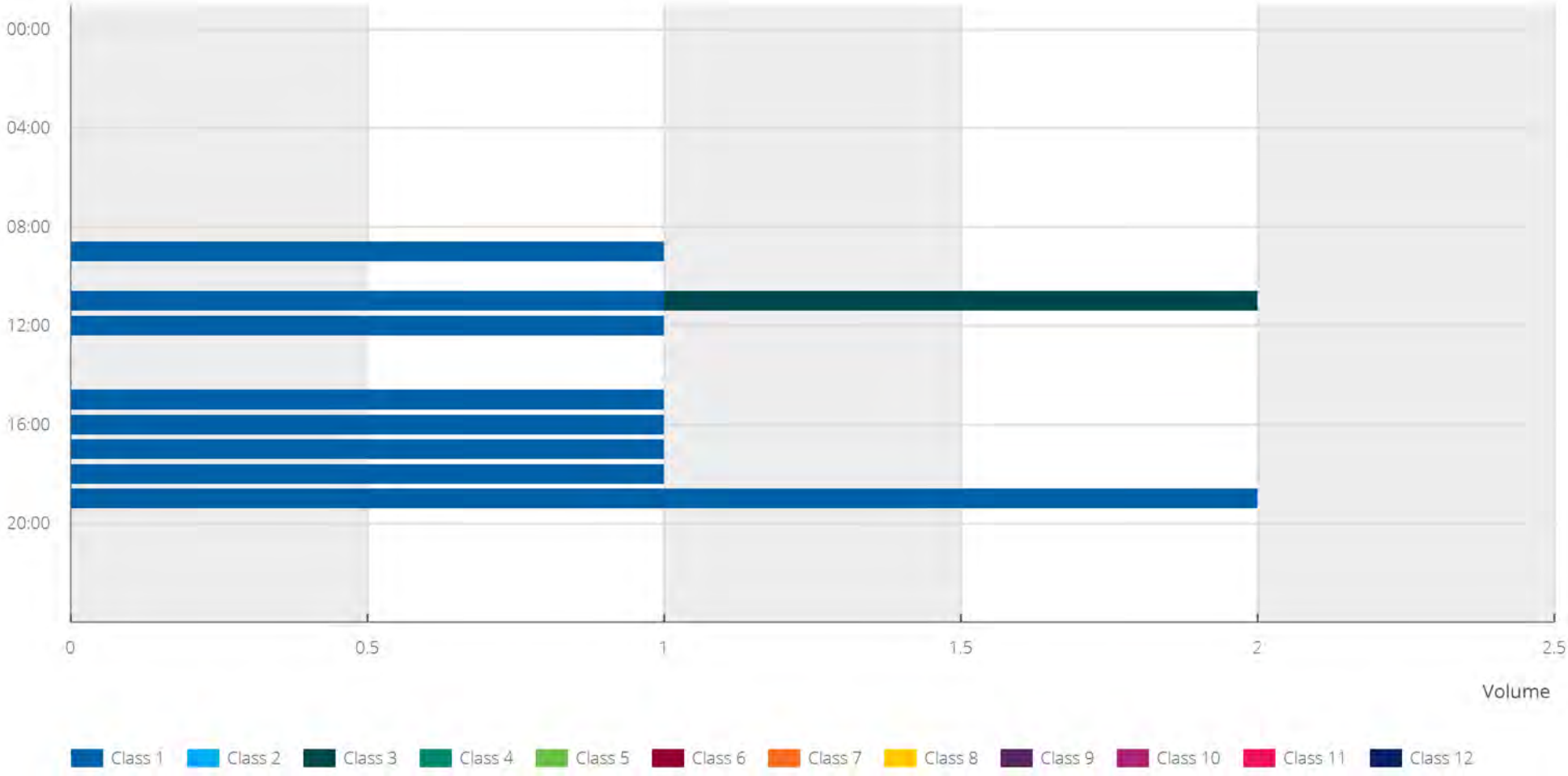
North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Weekend

Southbound

Vehicle Type



mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Weekend

Both Directions

Vehicle Type

	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	1	0	0	0	0	0	0	0	0	0	0	0	1
06:00	2	0	1	0	0	0	0	0	0	0	0	0	3
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	1	0	1	0	0	0	0	0	0	0	0	0	2
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	2	0	1	0	0	0	0	0	0	0	0	0	3
12:00	1	0	0	0	0	0	0	0	0	0	0	0	1
13:00	0	1	0	0	0	0	0	0	0	0	0	0	1
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	2	0	0	0	0	0	0	0	0	0	0	0	2
16:00	1	0	0	0	0	0	0	0	0	0	0	0	1
17:00	1	0	0	0	0	0	0	0	0	0	0	0	1
18:00	2	0	0	0	0	0	0	0	0	0	0	0	2
19:00	2	0	0	0	0	0	0	0	0	0	0	0	2
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	15	1	3	0	0	0	0	0	0	0	0	0	19

Peak Statistics

AM	TIME	11:15		06:00									11:15
	VOL	3		1									4
PM	TIME	18:45	13:00										18:45
	VOL	4	1										4

mainroads WESTERN AUSTRALIA

Hourly Vehicle Type Volumes

Luke Price Rd (4120134)

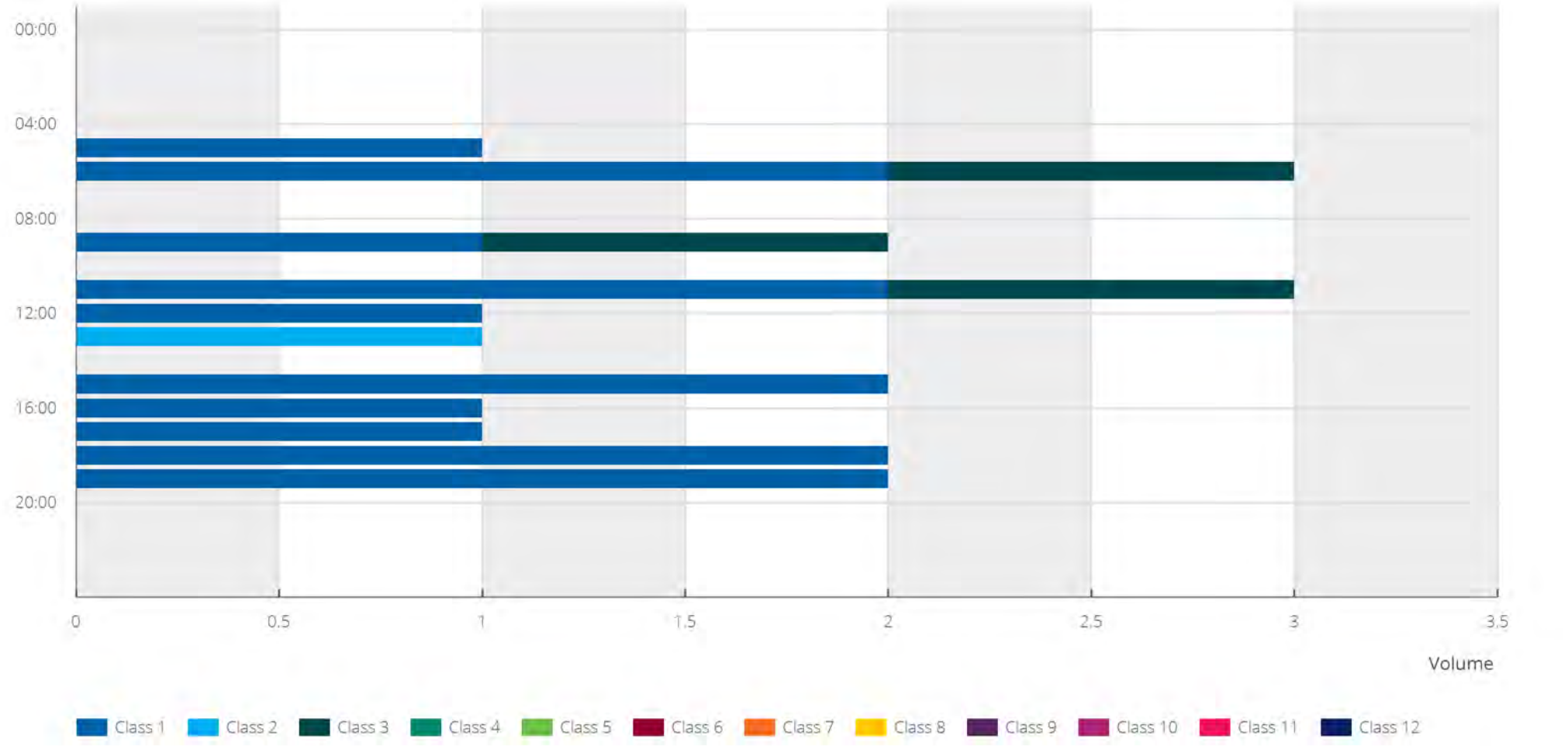
North of Pingaring Varley Rd (SLK 0.75)

SITE 53257

2020/21
Weekend

Both Directions

Vehicle Type



mainroads WESTERN AUSTRALIA

SITE 53257

Hourly Volume

Luke Price Rd (4120134)

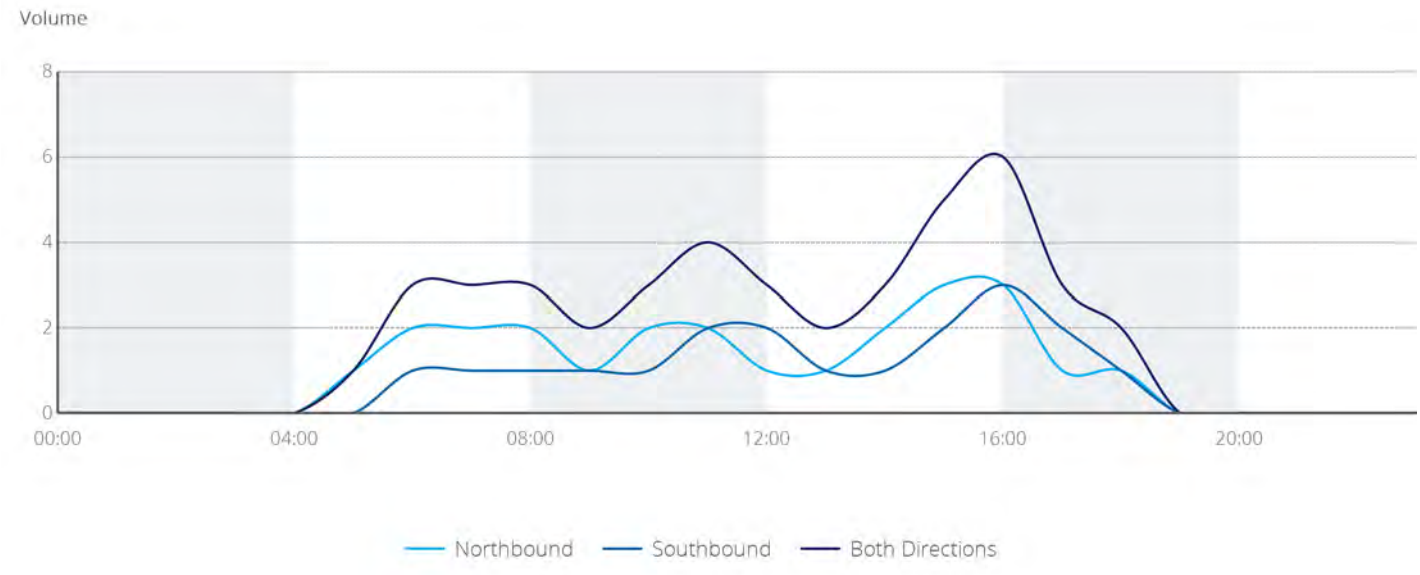
North of Pingaring Varley Rd (SLK 0.75)

2020/21
Monday to Friday

	All Vehicles			Heavy Vehicles			
	NB	SB	Both	NB	SB	Both	%
00:00	0	0	0	0	0	0	0.0
01:00	0	0	0	0	0	0	0.0
02:00	0	0	0	0	0	0	0.0
03:00	0	0	0	0	0	0	0.0
04:00	0	0	0	0	0	0	0.0
05:00	1	0	1	0	0	0	0.0
06:00	2	1	3	0	0	0	0.0
07:00	2	1	3	1	0	1	33.3
08:00	2	1	3	1	0	1	33.3
09:00	1	1	2	0	0	0	0.0
10:00	2	1	3	1	0	1	33.3
11:00	2	2	4	1	1	2	50.0
12:00	1	2	3	0	1	1	33.3
13:00	1	1	2	0	0	0	0.0
14:00	2	1	3	0	0	0	0.0
15:00	3	2	5	2	1	3	60.0
16:00	3	3	6	1	1	2	33.3
17:00	1	2	3	0	0	0	0.0
18:00	1	1	2	0	0	0	0.0
19:00	0	0	0	0	0	0	0.0
20:00	0	0	0	0	0	0	0.0
21:00	0	0	0	0	0	0	0.0
22:00	0	0	0	0	0	0	0.0
23:00	0	0	0	0	0	0	0.0
TOTAL	24	19	43	7	4	11	25.6

Peak Statistics

AM	TIME	06:30	07:15	07:15	07:15	10:30	07:15
	VOL	3	2	5	2	1	2
PM	TIME	16:30	17:15	16:30	15:15	16:45	15:15
	VOL	3	3	6	2	1	3



mainroads WESTERN AUSTRALIA

SITE 53257

Hourly Volume

Luke Price Rd (4120134)

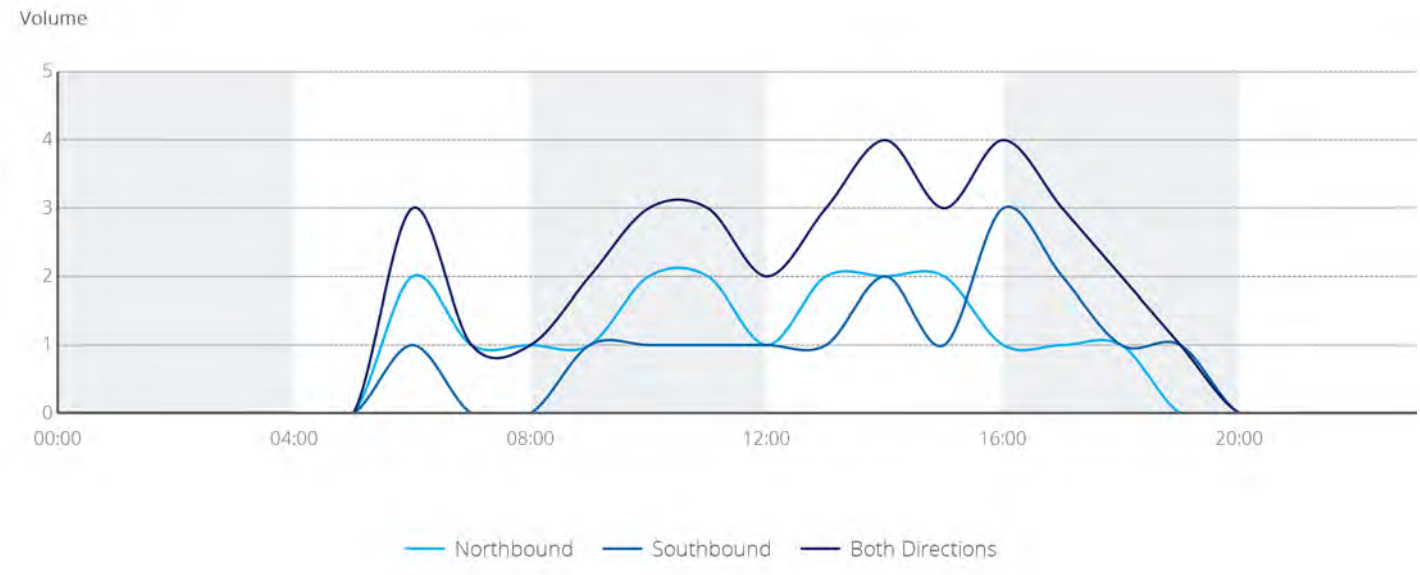
North of Pingaring Varley Rd (SLK 0.75)

2020/21
Monday to Sunday

	All Vehicles			Heavy Vehicles			
	NB	SB	Both	NB	SB	Both	%
00:00	0	0	0	0	0	0	0.0
01:00	0	0	0	0	0	0	0.0
02:00	0	0	0	0	0	0	0.0
03:00	0	0	0	0	0	0	0.0
04:00	0	0	0	0	0	0	0.0
05:00	0	0	0	0	0	0	0.0
06:00	2	1	3	0	0	0	0.0
07:00	1	0	1	0	0	0	0.0
08:00	1	0	1	1	0	1	100.0
09:00	1	1	2	0	0	0	0.0
10:00	2	1	3	1	0	1	33.3
11:00	2	1	3	1	0	1	33.3
12:00	1	1	2	0	0	0	0.0
13:00	2	1	3	0	0	0	0.0
14:00	2	2	4	1	1	2	50.0
15:00	2	1	3	2	0	2	66.7
16:00	1	3	4	0	1	1	25.0
17:00	1	2	3	0	0	0	0.0
18:00	1	1	2	0	0	0	0.0
19:00	0	1	1	0	0	0	0.0
20:00	0	0	0	0	0	0	0.0
21:00	0	0	0	0	0	0	0.0
22:00	0	0	0	0	0	0	0.0
23:00	0	0	0	0	0	0	0.0
TOTAL	19	16	35	6	2	8	22.9

Peak Statistics

AM	TIME	11:15	09:30	09:45	07:15	00:00	07:15
	VOL	3	2	4	1	0	1
PM	TIME	15:45	16:45	16:45	15:15	16:45	15:15
	VOL	2	3	4	2	1	2



mainroads WESTERN AUSTRALIA

SITE 53257

Hourly Volume

Luke Price Rd (4120134)

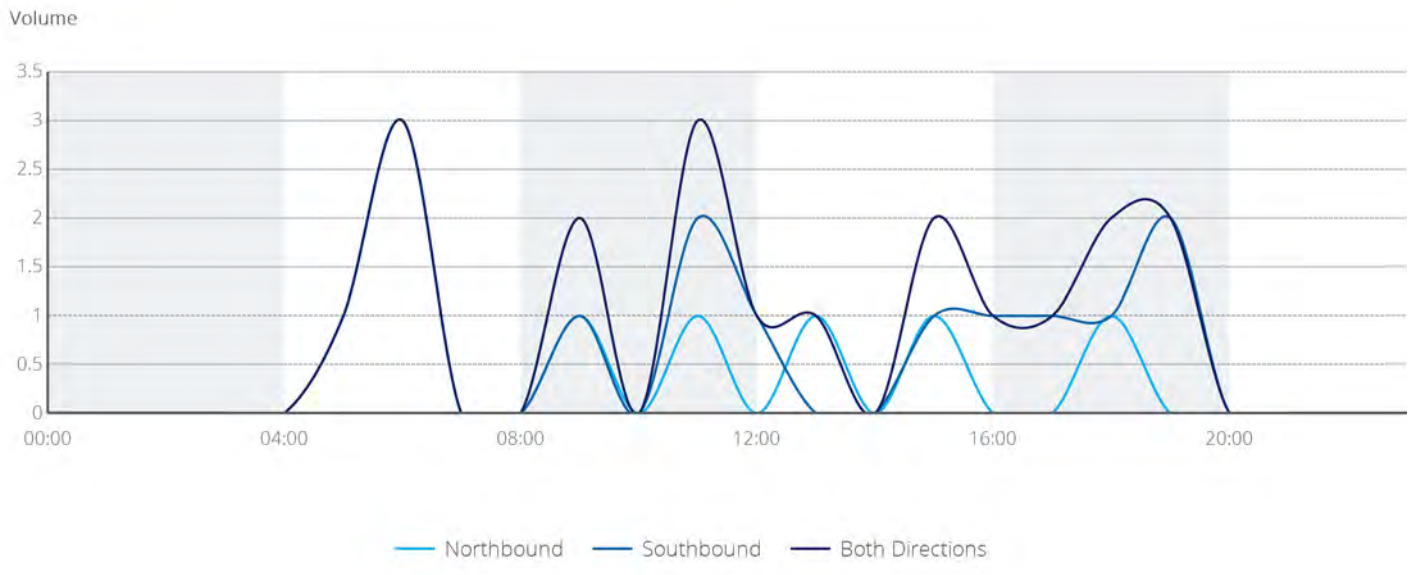
North of Pingaring Varley Rd (SLK 0.75)

2020/21
Weekend

	All Vehicles			Heavy Vehicles			
	NB	SB	Both	NB	SB	Both	%
00:00	0	0	0	0	0	0	0.0
01:00	0	0	0	0	0	0	0.0
02:00	0	0	0	0	0	0	0.0
03:00	0	0	0	0	0	0	0.0
04:00	0	0	0	0	0	0	0.0
05:00	1	0	1	0	0	0	0.0
06:00	3	0	3	1	0	1	33.3
07:00	0	0	0	0	0	0	0.0
08:00	0	0	0	0	0	0	0.0
09:00	1	1	2	1	0	1	50.0
10:00	0	0	0	0	0	0	0.0
11:00	1	2	3	0	1	1	33.3
12:00	0	1	1	0	0	0	0.0
13:00	1	0	1	0	0	0	0.0
14:00	0	0	0	0	0	0	0.0
15:00	1	1	2	0	0	0	0.0
16:00	0	1	1	0	0	0	0.0
17:00	0	1	1	0	0	0	0.0
18:00	1	1	2	0	0	0	0.0
19:00	0	2	2	0	0	0	0.0
20:00	0	0	0	0	0	0	0.0
21:00	0	0	0	0	0	0	0.0
22:00	0	0	0	0	0	0	0.0
23:00	0	0	0	0	0	0	0.0
TOTAL	9	10	19	2	1	3	15.8

Peak Statistics

AM	TIME	06:00	11:15	11:15	06:00	10:30	06:00
	VOL	3	3	4	1	1	1
PM	TIME	18:45	18:45	18:45	23:00	23:00	23:00
	VOL	1	3	4	0	0	0



Appendix A – MRWA Traffic Volumes