Two Wells Ambulance Station

Stormwater Management Plan

Grieve Gillett Architects

17 July 2025
Ref: 241697R004C

Building exceptional
outcomes together

Document History and Status

Rev	Description	Author	Reviewed	Approved	Date
A	Stormwater Management Plan	CRBH	BJT	TCP	31 Jan 2025
B	Additional carparking	CRBH	BJT	TCP	4 Mar 2025
C	Removal of additional carparking	CRBH	BJT	TCP	17 Jul 2025

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Client: Grieve Gillett Architects
Ref: 241697R004C

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1 Background

Lot 51 Old Port Wakefield Road, Two Wells is being considered for redevelopment to feature a new ambulance station (see Appendix A: Site plan, Appendix B: Survey). The site currently features a carpark and has a mixture of impervious, semi-pervious and pervious surfaces.

As part of these works, it is proposed to convert a portion of 1 Wells Road to a carpark (Appendix A).

This stormwater management plan (SMP; see drainage strategy in Appendix C) has been prepared to manage flood risks and meet planning requirements (stormwater-related planning code requirements are listed in Appendix D).

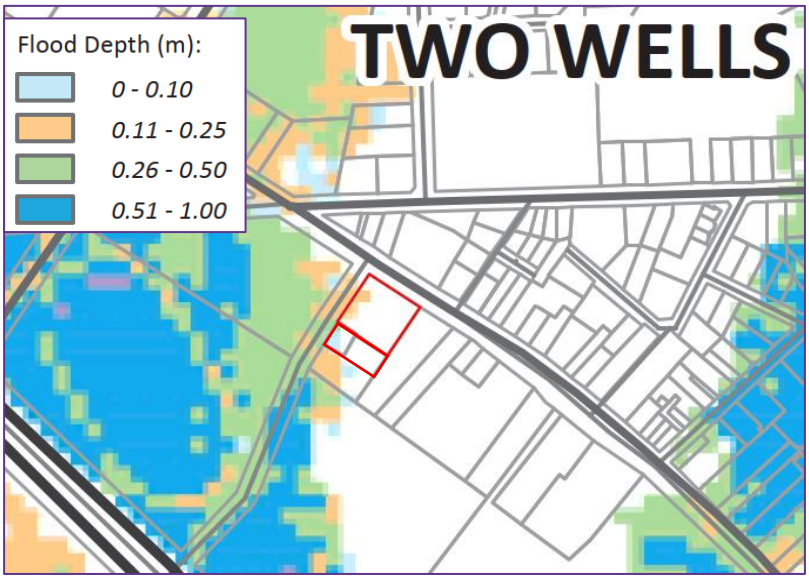
1.1 Site characteristics

The site currently receives stormwater discharge from the neighbouring Council chambers at 65 Old Port Wakefield Road, Two Wells. Stormwater drainage infrastructure in the area is generally informal with no known nearby stormwater infrastructure that can be connected into. No water sensitive urban design (WSUD) or water quality devices have been identified within the existing site, with water generally draining overland to the kerb.

1.2 Site in context of Two Wells flood modelling

The Two Wells Stormwater Management Plan ('TWSMP'; Australia Water Environments (AWE), 2017) includes flood mapping of the current scenario (Figure 1.1). The flood mapping indicates some flooding of the western portion of the site in the 1% annual exceedance probability (AEP) event. However, a flood mitigation levee is being constructed to the east of Two Wells township. The 1% AEP event was also modelled with the levee (Figure 1.2; being constructed as of September 2024). Mapping indicates the proposed ambulance station area would now be flood free in the 1% AEP event.

As the proposed development is an emergency service, consideration should be given to operation of the site in the event of a levee failure. According to the 2017 flood mapping, the site should be able to be accessed via Old Port Wakefield Road during a 1% AEP flood event even if the levee becomes ineffective. Due to the emergency service nature of the site, which could be critical to be operational during a significant levee failure, this SMP relies on the no-levee mapping to inform flood risk.



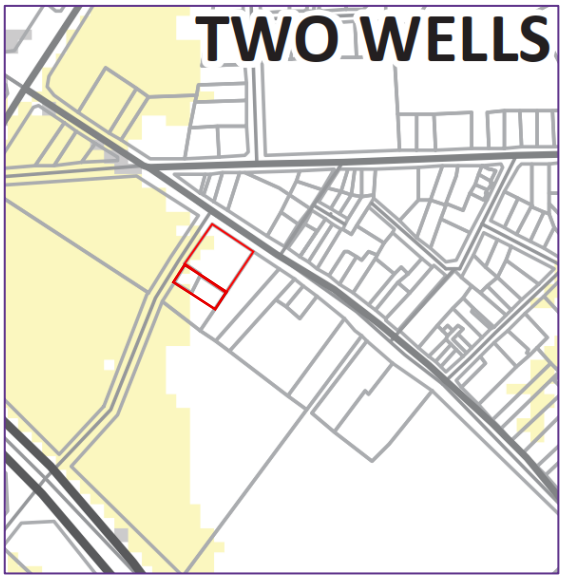


Figure 1.1 (Left) Modelled 1% AEP flood depths without levee, Figure 1.2 (Right) Modelled 1% AEP flood depths with levee - yellow indicates 'Dry, previously wet' areas to be protected by the levee

2 Stormwater Management Strategy

While the development site currently includes a carpark, the proposed development will increase the impervious proportion and therefore increase runoff. To mitigate the increase in peak runoff rates the site will employ a stormwater detention and retention strategy through the capture of roof runoff.

To achieve water quality outcomes, it is proposed to retain and reuse roof runoff. Additionally, surface flows from the new carpark will be treated through a Atlan stormsack. The system will also feature a perforated stormwater sump pit to allow infiltration through the calcareous sandy clay soils in the upper one-meter-depth of soil on site. Both of these strategies will mitigate the pollutant load reaching Wells Road.

2.1 Stormwater tank detention and retention

To reduce peak flows from the development site, a stormwater detention tank is to be connected to the roofed area. The catchment area and reserved detention volume required is shown in Table 2.1. The detention volume would be used to temporarily hold roof runoff, and discharge it slowly over time, rather than discharging to the street at an uncontrolled rate.

To improve water quality outcomes, additional tank volume will be installed to capture, retain, and reuse roof runoff. Uses of the roof runoff could include irrigation, cleaning, and toilet and laundry facilities.

Table 2.1: Proposed Tank Designs

Roof area connected (m^2)	Detention Volume (kL)	Orifice diameter (mm)
340	4	35

2.2 Climate change risk

Risk from climate change is likely to come from either extreme flooding of Salt Creek concurrent with levee failure, or increased flows from Old Port Wakefield Road overtopping the kerb and spilling into the site. The 2017 modelling by AWE does not appear to address climate change.

Climate change is expected to have the most significant impact on short duration, high-intensity, low volume events, which would increase the risk of the Old Port Wakefield Road kerb flows spilling into the site.

It is also expected that climate change will have a less significant impact on long-duration, high volume rainfall events, which is what would likely drive a 1% and/or 0.5% AEP flood event for Salt Creek in Two Wells.

While a levee failure along Salt Creek could inundate the Wells Road site entrance, and may be exacerbated by climate change, the access via Old Port Wakefield Road is very likely to still be traversable in such an event. The exact nature of impacts associated with a levee break would be dependent upon the location and rate of levee failure which is impossible to predict. Due to climate change-affected modelling not being available, recommended finished floor levels (FFL) in section 3.3 are made in consideration of the risks posed by climate change at a high-level. This includes consideration of both flows coming from Old Port Wakefield Road and flooding from a compromised levee along Salt Creek.

3 Hydrological and hydraulic modelling

Hydrological and hydraulic modelling was undertaken using DRAINS (version 2025.01.9147.24925) in accordance with Australian Rainfall and Runoff 2019 (ARR2019).

3.1 Hydrological modelling

Hydrological modelling was undertaken using DRAINS to model pre- and post-development peak flows discharged from the site. The model was run for the 0.2 exceedances per year (EY) and 1% AEP events.

Catchment hydrology was modelled in DRAINS using an initial-loss continuing-loss model, with parameters shown in Table 3.1. Pervious parameters were obtained from AAR Data Hub. The gravelly portions of the existing site were assumed to offer some infiltration, rather than being fully impervious. The times of concentration are listed in Table 3.2.

Table 3.1: Hydrological model parameters

Parameter	Value
Impervious area initial loss	1 mm
Impervious area continuing loss	0 mm/hr
Existing site gravelly area initial loss	3 mm
Existing site gravelly area continuing loss	1 mm/hr
Pervious area initial loss	54 mm
Pervious area continuing loss	0.7 mm/hr

Table 3.2: Times of concentration

Area type	Time of concentration (minutes)
Impervious	5
Semi-impervious	5
Pervious	15

3.2 Hydraulic modelling

Hydraulic modelling was undertaken using the DRAINS lite hydraulic mode to assess the rainwater tank volume and orifice sizing required to ensure post-development flows do not exceed pre-development flows. The DRAINS model schematic is shown in Figure 3.1. The developed site was represented using two catchments representing the roof area connected to the tank and the remaining area.

Modelling assumed no benefit from any retention volume within the tanks (i.e. assuming that retention is full at the start of the event), though in real-world practice, retention tanks may provide some benefit to reducing peak flow rates by capturing roof runoff before detention volume is relied upon to do so.

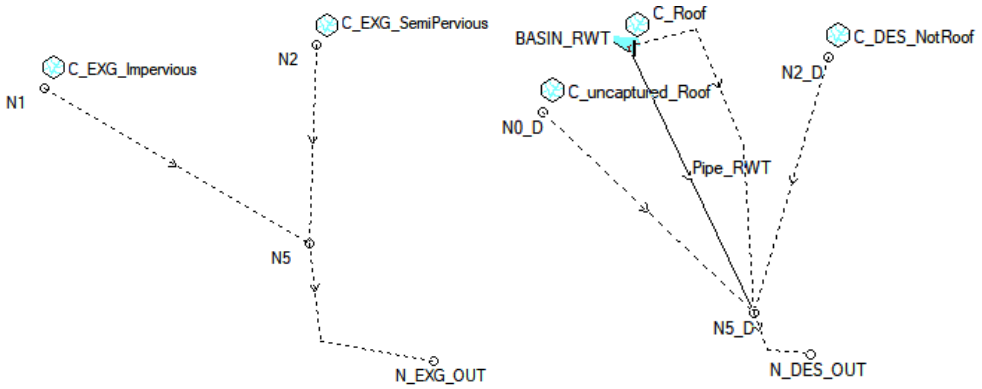


Figure 3.1: DRAINS diagrammatical model – Pre-development (left), Post-development (right).

Table 3.3 summarises the peak flows from the modelled scenarios. This clearly shows the increase in flows caused by development, and the need for a stormwater management strategy. It also shows that a rainwater tank with 4kL of volume reserved for detention limited by a 35mm outlet orifice is capable of matching or reducing peak runoff rates to pre-development rates.

Table 3.3: Comparison of peak flows and time-to-peak

Event	Pre-Development (L/s)	Post-development without detention tank(L/s)	Post-development with detention tank* (L/s)
0.2EY	**26**	30	**23**
1%AEP	**57**	66	**51**

** Modelled detention tank of 4kL volume and limited by 35mm outlet orifice*

3.3 Minimum finished floor levels

Minimum finished floor levels (FFLs) are recommended based on achieving an appropriate level of flood resilience for major events. This includes allowance for sufficient freeboard above the defined flood level to meet that flood resilience.

This SMP recommends a minimum FFL of 10.55mAHD (top of kerb at Port Wakefield Road plus 300mm vertical clearance), to mitigate risk from inflow from Old Port Wakefield Road (see section 4.1). This is greater than the 10.10mAHD that would otherwise be recommended to mitigate concerns from regional flooding (see section 4.2).

4 External flows

4.1 Risk of flows from Old Port Wakefield Road

The existing site surface levels are below the top of kerb level on Old Port Wakefield Road, therefore risk of gutter flows entering the site needs to be carefully considered.

DRAINS modelling was undertaken to give an estimate of 0.5% AEP flows along Old Port Wakefield Road, assuming a 40% increase in rare rainfall events due to climate change. Flows are estimated to be 370 L/s, modelled from a 7,000m^2 subcatchment with 90% imperviousness.

With a 1.5% grade along the road gutter, and 3% crossfall, the flow depth would be approximately 160mm. That depth would exceed the top of kerb by 10mm leading to water 'jumping the kerb' and entering the site.

This high-level hydraulic assessment separately investigated the effect of the disconnected protuberances along Old Port Wakefield Road (seen in Figure 4.1). These would create a constriction to flow, increasing the likelihood of flow height exceeding the kerb and spilling into the site. Modelling showed that (assuming no blockage), the capacity of the flow in the water table is at full capacity in the 0.2EY event in current climate conditions. These disconnected protuberances restrict the water table capacity to convey the more onerous 10% AEP. The risk of overflows entering the site from Old Port Wakefield Road will be exacerbated under future climate conditions where peak flows will be higher as short duration rainfall intensities increase.

Figure 4.1 - Disconnected protuberances along Old Port Wakefield Road and expected flow paths for gutter flow spill

Due to the risks of flow entering from Old Port Wakefield Road, it is recommended that FFLs of the site along Old Port Wakefield Road have a height that exceeds Old Port Wakefield Road kerb height by 300mm (10.55mAHD which is 300mm above kerb height of 10.25mAHD).

4.2 General floodplain inundation

This section discusses general floodplain inundation risk and ultimately recommends that FFLs are considered against the potential risks outlined below. Establishing an FFL of 10.55mAHD as discussed in sections 3.3 & 4.1 will mitigate the risks associated with local stormwater flows, noting that site access via Wells Road could become inundated in an extreme event.

4.2.1 Selecting 0.5% AEP (1 in 200-year ARI) flood resilience

The proposed site use is an emergency service facility (ambulance station). Relevant guidelines have been collected and presented in Table 4.1**Error! Reference source not found.** and Table 4.2**Error! Reference source not found.**. Institute of Public Works Engineering Australasia (IPWEA) clearly recommends a 0.5% AEP standard and is South Australia-specific. QUDM recommends a higher standard of 0.2% AEP, however is Queensland-specific. In consideration of both guidelines, a 0.5% AEP standard is recommended.

Table 4.1 – Except of table 8 of Infrastructure Guidelines SA (IPWEA 2020)

Stormwater Drainage System	Capacity (Major event)
Local emergency facilities (CBD)	200 yr. ARI (0.5% AEP)

Table 4.2 – Excerpt of Queensland Urban Drainage Manual (QUDM 2017) Table 7.3.2

Development category	ARI (yrs)	AEP
Reference flood for setting floor levels in hospitals, **emergency services**, flood evacuation buildings and Civil Defence HQ	500	0.2%
Reference flood for setting floor levels of emergency shelters, police facilities, museums, libraries, storage facilities for valuable records or item of historical or cultural significance, and housing for aged and those with impaired mobility; and the setting design levels for water and wastewater centres	200	0.5%

4.2.2 Interpretation of Two Wells SMP flood map levels and required freeboard

Floodplain modelling has indicated that Two Wells may be impacted by breakouts from flooding along the Light River and Gawler River during major flood events. Flood mapping of the scenarios with no levee indicates partial inundation of the site in the 1% AEP (100-year ARI) flood event. Cross-referencing the extent against LiDAR data, the peak flood level is approximately 9.8mAHD.

The worst-case flood mapping available is only the 1% AEP flood event. The desired flood resilience is the greater standard of 0.5% AEP. It is understood from the Water Connect Flood Awareness Map that "1 in 200 chance" (equivalent to 0.5% AEP) may exist with the Gawler River Flood Management Authority, however it does not appear to be publicly available.

There is also an unknown risk from climate change. The consequences of which cannot be accurately quantified without updating the regional flood modelling.

To have a greater understanding of the risks of a levee failure and climate change, the site would likely require a dedicated study similar to the 2017 regional flood study for the Two Wells area as a whole. That is beyond the scope of this site-level SMP. While the in-place levee provides significant protection to the site, there is a risk that basing FFLs on the "existing 1% AEP no-levee flood levels plus 300mm" (10.10mAHD) may be inadequate to give a 0.5% AEP standard of protection. Setting the minimum FFL

at 10.55mAHD (section 4.1) provides substantially more protection to infrastructure than FFLs of 10.10mAHD based to protect against regional flooding.

4.3 Discharge from 65 Port Wakefield Road

During a site visit on 12 Dec 2024, downpipe outlets were identified at 65 Old Port Wakefield Road (which is occupied by Council). These appear to discharge towards the site (Figure 4.2). Some outlets discharge directly towards the new building, while elsewhere they could cause premature wear and tear on the new carparking surface. During development of the site, these discharge points should be redirected to discharge elsewhere, and not into the site.

In anticipation of development of the site, Council will be provided with a high-level concept plan for rerouting these outlets to discharge via a kerb outlet to Old Port Wakefield Road.

Figure 4.2 Discharge pipes from 65 Old Port Wakefield Road

5 Conclusions

This SMP has been developed to understand local drainage and flood issues and manage the stormwater flows from the site at Lot 51 Old Port Wakefield Road, Two Wells, and 1 Wells Road, Two Wells. In summary:

- It is proposed to redevelop Lot 51 Old Port Wakefield Road, Two Wells, from a carpark to an ambulance station.
- The proposed development will increase the impervious proportion of the site, and therefore increase runoff.
- There is no existing underground drainage network in the vicinity of the site.
- The development is unlikely to negatively impact the water quality of site runoff.
- The proposed development is recommended to feature 4,000 L of detention storage connected to the roof area to maintain peak flows.
- Discharge from this detention storage will be constricted by a 35mm outlet orifice and be directed to the Wells Road water table (gutter).
- Additional storage beyond 4kL will be used for roof runoff capture and reuse, reducing runoff volume.
- It appears that runoff is currently discharged from 65 Old Port Wakefield Road into the site. This runoff should be redirected such that it does not flow into the site. Council (who occupies 65 Old Port Wakefield Road) will be given a high-level concept plan to reroute the discharge via a kerb outlet fronting 65 Old Port Wakefield Road.
- The site natural surface levels are below the top of kerb level. There is an existing risk of water overtopping the kerb and spilling from Old Port Wakefield Road into the site at greater frequency than the 10% AEP event.
- Finished floor levels along Old Port Wakefield Road should be 300mm above the top of Old Port Wakefield Road kerb, giving FFLs of up to 10.55mAHD. The site is to be graded such that external flows from Old Port Wakefield Road spilling into the site grade back to Old Port Wakefield Road.
- As an emergency service facility, the flood resilience for a major event should be at least 0.5% AEP.
- Flood mapping indicates that in the scenario without a levee to the east of Two Wells, a portion of the site could be subject to flooding in the 1% AEP. Flood mapping for the 0.5% AEP event has not been identified as publicly available but might be available from the Gawler River Floodplain Management Authority.
- Finished floor levels should be at least 300mm above top of kerb along Old Port Wakefield Road (10.55mAHD), which is above the 10.1mAHD which would be otherwise recommended to allow for 300mm of freeboard above the anticipated existing no-levee 1% AEP flooding event. It is unclear whether 10.55mAHD will provide adequate protection to the site for a 0.5% AEP flooding event with the levee in place.

Appendix A – Site master plan

Scale Bar Units in Millimetres
10 20 50 100 200 300 400 500 600 700

OLD PORT WAKEFIELD ROAD

TITLE BOUNDARY LINE

EXISTING BUILDING
NO: 69
SINGLE STOREY
DISTRICT GOVERNMENT OFFICE BUILDING

EXISTING SOAKAGE PIT

EXISTING TREES (TYPICAL)

EXISTING SOAKAGE PIT

LANDSCAPING. REFER TO LANDSCAPE DRAWINGS AND SPECIFICATIONS

SUBJECT LAND

NEW 2100mm FENCE. REFER TO LANDSCAPE DRAWINGS AND SPECIFICATIONS

NEW AMBULANCE STATION BUILDING

LANDSCAPING. REFER TO LANDSCAPE DRAWINGS AND SPECIFICATIONS

HOLDING TANK BELOW GROUND. REFER TO HYDRAULICS ENGINEERS DOCUMENTATIONS.

BELOW GROUND PIPEWORKS CONNECTING TO HOLDING TANK. REFER TO HYDRAULICS ENGINEERS DOCUMENTATIONS

SUBJECT LAND HIGHLIGHTED IN RED

PAVING + PLANTING TO FRONT SETBACK AND COUNCIL NATURE STRIP. REFER TO LANDSCAPE DRAWINGS AND SPECIFICATIONS

APPROXIMATE LOCATION OF FUTURE LIGHT POST

NEW AMBULANCE CROSSOVER. REFER TO CIVIL DRAWINGS AND SPECIFICATIONS

INDICATIVE SOLAR AREA ON ROOF (DASHED TYPICALLY). REFER TO SERVICES DRAWINGS AND SPECIFICATIONS

NEW ASPHALT SURFACE + KERB TO MATCH EXISTING ADJACENT TO INFILL REMOVED COUNCIL NATURE ISLAND STRIP.

EASEMENT SHOWN DASHED GREY

TRENCHING 300mm DEPTH OR LOWER WITHIN 3000mm OF TRANSFORMER REQUIRES A NETWORK ACCESS PERMIT (NAP) FROM SAPN

EXISTING TRANSFORMER

LANDSCAPING. REFER TO LANDSCAPE DRAWINGS AND SPECIFICATIONS

NEW 2100mm FENCE. REFER TO LANDSCAPE DRAWINGS AND SPECIFICATIONS

NEW LANDSCAPE + KERB TO MATCH EXISTING ADJACENT TO INFILL REMOVED CROSSOVER.

NEW CARD-READER. REFER TO SERVICES ENGINEERS DOCUMENTATIONS.

NEW CROSSOVER + KERB TO SUIT. REFER TO CIVIL DRAWINGS AND SPECIFICATIONS

NEW GENERATOR. REFER TO SERVICES ENGINEERS DOCUMENTATIONS.

NEW AUTOMATED SLIDING GATE. REFER TO LANDSCAPE DRAWINGS AND SPECIFICATIONS

NEW 2100mm FENCE. REFER TO LANDSCAPE DRAWINGS AND SPECIFICATIONS

15x CARPARKING SPACE

EXISTING BUILDING
NO: 1
SINGLE STOREY
COUNTRY FIRE SERVICE SHED

EXISTING CONCRETE DRIVEWAY

2600 TYP.
100
4800 TYP.
6200
1554
4800 TYP.
5480
3200
548
350
6000 CROSSOVER
3726
12300 CROSSOVER

WELLS ROAD

PN

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Drawing Status
95% ISSUE

REV.	DATE	AMENDMENTS	INITIAL
12	04.08.25	ISSUE FOR COORDINATION	JN
11	31.07.25	ISSUE FOR COORDINATION	JN
10	22.07.25	ISSUE FOR COORDINATION	JN
9	20.06.25	ISSUE FOR COORDINATION	WS
8	19.06.25	ISSUE FOR COORDINATION	WS
7	13.06.25	95% DOCUMENTATION ISSUE	WS
6	22.05.25	ISSUE FOR COORDINATION	WS
5	16.05.25	ISSUE FOR COORDINATION	DM
4	17.04.25	60% DOCUMENTATION ISSUE	DM
3	02.04.25	ISSUE FOR COORDINATION	DM
2	28.03.25	ISSUE FOR COORDINATION	HB
1	07.03.25	ISSUE FOR COORDINATION	DM
0	18.02.25	ISSUE FOR COORDINATION	HB

Government of South Australia
Department for Infrastructure and Transport

PRE-TENDER
CONTRACTOR DATE

WITNESS DATE

CONTRACT NAME
SAAS AMBULANCE STATION

SITE ADDRESS
LOT 51 OLD PORT WAKEFIELD ROAD,
TWO WELLS, SOUTH AUSTRALIA, 5501

DRAWING TITLE
SITE PLAN

CONTRACT NO. 209-A-2025
DRAWN BY - CHECKED BY Author Checker
PSC JOB NO. 24081
SCALE - SHEET SIZE 1 : 200@A1
DPTI ASSET NO. 14077
SHEET NO. A1001
DPTI DRAWING NO. 7231-AR-2025
REVISION 12

Appendix B – Site survey

TOPOGRAPHIC SURVEY

LOT 51 OLD PORT WAKEFIELD ROAD
ALLOT 51 IN D73399
CR 6215/365
TWO WELLS

LEGEND

- AC = AIR CONDITIONER
- PSM = PERMANENT SURVEY MARK
- MP = METAL PIN
- MN = MASONRY NAIL
- POST
- STP = TOP OF PIPE
- VENT
- SIP = SEWER IP
- SMH = SEWER MANHOLE
- EMB = ELECTRIC METER BOX
- EE = EARTH ELECTRODE
- SB = SWITCHBOARD
- PIT = ELECTRIC PIT
- EIP = ELECTRIC IP
- STOBIE POLE
- ETC = TOP OF CONDUIT
- TP = TELECOM PIT
- DP = DOWNPIPE
- TREE
- NATURAL SURFACE
- IB = IRRIGATION BOX
- UPIT = UNCLASSIFIED PIT
- BOUNDARY
- BOUNDARY
- MAJOR CONTOUR
- MINOR CONTOUR
- BOTTOM OF BANK
- TOP OF BANK
- FENCE
- G.I.FENCE
- WT = WATER TABLE
- EB = EDGE OF BITUMEN
- TK = TOP OF KERB
- EDGE OF CONCRETE
- EDGE OF PATH
- BDR = BORDER
- TW = TOP OF RETAINING WALL
- BUILDING
- SHED

UNDERGROUND SERVICES LEGEND:

- UG ELECTRICAL QL-B
- UG COMMUNICATIONS QL-B
- UG WATER QL-B
- UG SEWER QL-B
- UG DRAINAGE QL-B
- UG ELECTRICAL QL-C
- UG COMMUNICATIONS QL-C
- UG WATER QL-C
- UG SEWER QL-C
- UG DRAINAGE QL-C
- UG ELECTRICAL QL-D
- UG COMMUNICATIONS QL-D
- UG WATER QL-D
- UG SEWER QL-D
- UG DRAINAGE QL-D

N

0 5 10 15 20 25
SCALE METRES
ORIGINAL SHEET SIZE A1

UNDERGROUND SERVICE WARNING NOTES:

1; This plan was prepared for the specific use of the client for the purpose of architectural and/or engineering design for siting of structural works and for no other purpose;

2; The Service Location by Sawley Lock O'Callaghan has been undertaken in accordance with Australian Standard 5488:2019 to QL-B standard as identified in the Explanatory Statement that accompanied out costing submission;

Only those underground services, inspection pits and invert levels shown on the plan as located by field survey should be regarded as having been traced using EMI / GPR electronic equipment to QL-B standard;

Our plan contains notations where exceptions, anomalies and end of traces occur, along with indicative service alignments derived from scaling/digitization of previous asset records. Indicative service alignments shown in this manner on the plan have not been able to be traced by electronic means; The plan MUST be read in conjunction with our Service Location Report which forms an integral part of the data we have supplied;

The Service Location report identifies in a qualitative form, where such anomalies and exceptions occur with the QL-B tracing exercise; The report identifies if and where service alignments shown cannot meet the QL-B quality level and that they should be regarded as being to QL-C or even QL-D standard;

QL-B data should be regarded as having a tolerance of +/-300mm for horizontal position and +/- depths cannot be accurately provided using EMI / GPR methods;
QL-C data should be regarded as having a horizontal positional tolerance of +/-300mm where interpretated from information located at ground level;
QL-D data tolerance levels cannot be provided, as they are plotted from asset records without surface interpretation and therefore, remain unverified;

Should accurate depths of services be required, potholing to QL-A standard remains the only satisfactory method of verifying this information. Sawley Lock O'Callaghan recommends that potholing occur prior to construction / excavation activities commencing on site and where this information is critical to the design process;

Sawley Lock O'Callaghan advises that some underground services may exist within the area of survey, but sue to the unavailability of records, or inability to quantify them from passive electronic tracing, we cannot provide further information about their existence/accuracy to classify them;

INDICATIVE SERVICE ALIGNMENTS
Shown to QL-C / QL-D standard based on following asset records:

Before You Dig Plans: Adelaide Plains Council, APA Group Gas Networks, NBN Co SANT, SA Power Networks Plan, SA Water Water Reticulation Plan & Testra SANT Plan;

3; Sawley Lock O'Callaghan does not accept liability for the loss or damage of other persons who do not use the plan within the limitations intended by these warning notes and we maintain copies of the data files provided;

IMPORTANT NOTE:

This plan was prepared for the purpose of designing new constructions on the land and should not be used for any other purpose. Services shown hereon have been located where possible by field survey. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.
The boundary corners have been identified by a licensed surveyor as an Identification Survey and as such, the plan should only be used for the purpose for which it was prepared.
Owners or purchasers should be aware that if utilising or building to the boundary, the author of the plan or consulting surveyor of choice should be first contacted in case boundary location on this or adjoining Allotments carries higher than normal risk.
Steed Surveyors therefore can accept no responsibility for failure to use this plan within the limitations intended.
This note is an integral part of this plan.

COORDINATE DATUM: PLANE
HEIGHT DATUM: PSM 6628/2771 RL 9.703m AHD
CONTOUR INTERVAL: 0.25 metre
SURVEY DATE: 28/01/25 & 19/03/25
CLIENT: GRIEVE GILLETT ARCHITECTS

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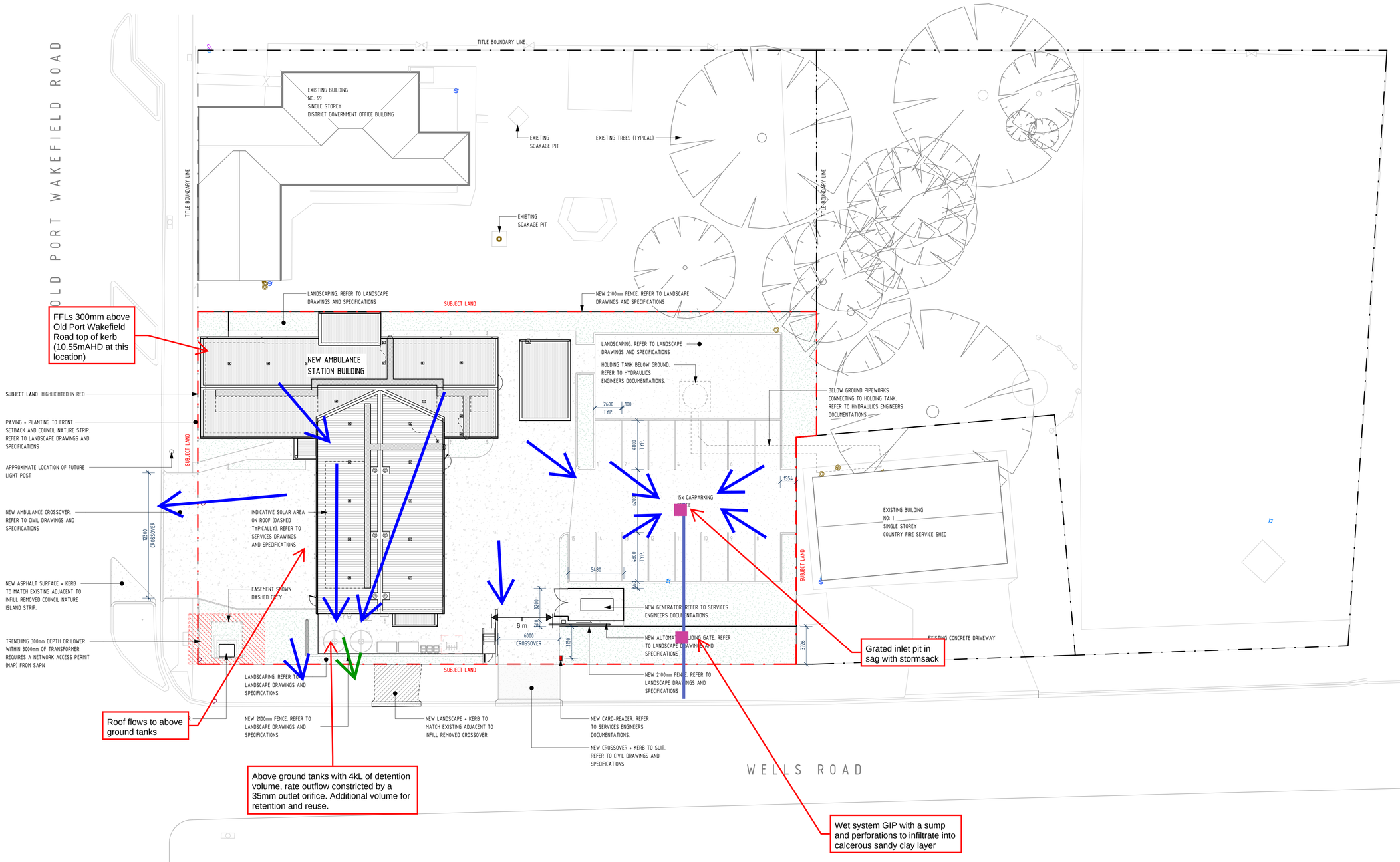
Murrundi Building, 30 Seventh Street 5253
Kangaroo Island - 08 8559 4283

REFERENCE: 14220E1.2 24/03/25 JEH,JFM

Appendix C – Drainage strategy

Scale Bar Units in Millimetres
10 20 50 100 200 300 400 500 600 700



PN

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Drawing Status
95% ISSUE

REV.	DATE	AMENDMENTS	INITIAL
12	04.08.25	ISSUE FOR COORDINATION	JN
11	31.07.25	ISSUE FOR COORDINATION	JN
10	22.07.25	ISSUE FOR COORDINATION	JN
9	20.06.25	ISSUE FOR COORDINATION	WS
8	19.06.25	ISSUE FOR COORDINATION	WS
7	13.06.25	95% DOCUMENTATION ISSUE	WS
6	22.05.25	ISSUE FOR COORDINATION	WS
5	16.05.25	ISSUE FOR COORDINATION	DM
4	17.04.25	60% DOCUMENTATION ISSUE	DM
3	02.04.25	ISSUE FOR COORDINATION	DM
2	28.03.25	ISSUE FOR COORDINATION	HB
1	07.03.25	ISSUE FOR COORDINATION	DM
0	18.02.25	ISSUE FOR COORDINATION	HB

PRE-TENDER

CONTRACTOR DATE

WITNESS DATE

CONTRACT NAME
SAAS AMBULANCE STATION

SITE ADDRESS
LOT 51 OLD PORT WAKEFIELD ROAD,
TWO WELLS, SOUTH AUSTRALIA, 5501

DRAWING TITLE
SITE PLAN

CONTRACT NO. 209-A-2025
DRAWN BY - CHECKED BY Author Checker
PSC JOB NO. 24081
SCALE - SHEET SIZE 1 : 200@A1
DPTI ASSET NO. 14077
SHEET NO. A1001
DPTI DRAWING NO. 7231-AR-2025
REVISION 12

Appendix D - Planning code requirements

The stormwater-related provisions below were identified as relevant to Lot 51 Old Port Wakefield Road. The performance outcomes were identified based on the site's function as an emergency service facility and to satisfy general urban water design criteria.

Hazards (Flooding – General) Overlay

Performance Outcome (PO)	Deemed-to-satisfy critera	Tonkin Comment
PO 1.1 "…emergency services are sited away from flood areas enable uninterrupted operation of services and reduce likelihood of entrapment."	"…emergency services facilities, hospitals and prisons located outside the 1% AEP flood event."	Site borders 1% AEP flood plain. Wells Road within 1% AEP flood plain Recommend designing with assumption of levee breach. Facilitate the ability to enter/leave via Old Port Wakefield Road during 1% AEP event (not necessarily primary entry/exit at other times).
PO 2.1 "Development is sited, designed and constructed to prevent the entry of floodwaters where the entry of flood waters is likely to result in undue damage to or compromise ongoing activities within buildings".	"… a building incorporates a finished floor level at least 300mm above the height of a 1% AEP flood event."	Recommend designing with assumption of levee breach. Flood mapping indicates finished floor levels ~550mm above lowest top of kerb along Wells Road.
PO 3.1 "Buildings and structures used either partly or wholly to contain or store hazardous materials are designed to prevent spills or leaks leaving the confines of the building during a 1% AEP flood event to avoid potential environmental harm".	"Development involving the storage or disposal of hazardous materials is wholly located outside of the 1% AEP flood plain or flow path."	Most of site outside of flood plain and should not be a major issue.

General Development Policies: Design in Urban Areas

Performance Outcome (PO)	Deemed-to-satisfy critera	Tonkin Comment
PO 42.1 "Development likely to result in risk of export of sediment, suspended solids, organic matter, nutrients, oil and grease include stormwater management systems designed to minimise pollutants entering stormwater..."	"None are applicable."	Stormwater management plan was developed during early design stage. Early concept plans did not include a built-up site. The stormwater management plan stated that the expected devices were impractical due to insufficient depth to an outlet. Introducing a pollutant trap is not practical due to lack of existing underground stormwater and will introduce design and construction complexities. The design looks to adopt some infiltration of stormwater as part of the sites stormwater management.
PO 42.2 "Water discharged from a development site is of a physical, chemical and biological condition equivalent to or better than its pre-developed state."	"None are applicable."	No WSUD seen on-site. A reduction of pollutant discharge (compared to existing) will be achieved if the designed onsite rainwater tanks feature retention volume for reuse (in addition to the detention volume mandated in the stormwater management plan). It is understood that the rainwater tanks will be oversized and feature rainwater reuse. Some infiltration of stormwater is being adopted in the design.
PO 42.3 "Development includes stormwater management systems to mitigate peak flows and manage the rate and duration of stormwater discharges from the site to ensure that development does not increase peak flows in downstream systems".	"None are applicable."	Existing site is mostly impervious. Will very likely be able to match peak flows with use of underground stormwater detention, or aboveground stormwater detention tanks (off-the-shelf rainwater tanks can be repurposed for this).
PO 43.1 To summarise, washdown areas and other pollutant areas must be bunded and must capture runoff for treatment.	"None are applicable."	If washdown area incorporated, then it will need to be bunded and meet the other requirements of PO 43.1
Multiple Performance Outcomes		Multiple POs mention use of infiltration of stormwater. Being able to infiltrate some stormwater via landscaping is likely a 'nice-to-have'

Building exceptional outcomes together

Memorandum

To	Wayne Schiller - GGA		
From	Tonkin	**Date**	17 July 2025
Job Number	241697		
Subject	Council Concerns Regarding Stormwater Management for New Two Wells Ambulance Station		

Adelaide Plains Council ('Council') has raised concerns regarding stormwater management for the new Two Wells Ambulance Station. The concerns quote the stormwater management plan ('SMP'), however the concerns that pertain to stormwater do not quote the South Australian Planning and Development Code.

This memo concludes with a review of the SA Planning and Development Code provisions that were raised in the previous memo *241697M001A - Preliminary Stormwater Memo*

Below are the council concerns that this memo addresses/discusses/responds to. The council concerns are in *italics*, and where council quotes the SMP, the italics are removed, the text indented, and double quote marks are included.

Council Concern 1.

'Stormwater must be managed onsite and must not discharge directly into the street.

'Section 2.2 – Surface Flow Management and WSUD Considerations (Page 6, Stormwater Management Plan):

> "Surface flow within Lot 51 Old Port Wakefield Road should be directed to landscaped areas, as this will provide some infiltration to reduce runoff volumes prior to discharge to Wells Road."

'Comment: The current design does not reflect this approach. Instead, stormwater is collected from the proposed car park via a spoon drain and grated inlet pit and discharged directly into Wells Road — this is not supported by Council.'

The design has evolved since the SMP was written and opportunities for infiltration are now more limited. Rainwater tanks that include retention-reuse volume in addition to the minimum retention volume mandate in the SMP .

The SMP recommends oversizing of rainwater tanks to reduce runoff volume. The underground drainage from the new SAAS carpark will also feature perforations and granular backfill in the trench to encourage infiltration and reduce runoff to Wells Road.

Also see near the end of this memo, "Hydrocarbon and pollutant management from carpark", "PO 42.1", "PO 42.2", and "Multiple PO".

Council Concern 2.

Council concern 2 relates to the new carpark and is therefore not included in this memo.

Council Concern 3.

'Stormwater from the existing office building must also be managed onsite and must not cross property boundaries. An alternative solution is required.

Section 4.3 – Discharge from 65 Port Wakefield Road (Page 12, Stormwater Management Plan): (sic)

Stormwater systems must be designed and constructed independently for each land parcel. Shared systems spanning property boundaries are not supported.

Council does not support stormwater systems that cross allotment boundaries without formal legal agreements. The proposal must demonstrate that stormwater can be lawfully contained and discharged within the development site to ensure long-term functionality and compliance.'

Council has been supplied with a concept markup plan on rerouting the existing downpipes to Old Port Wakefield Road via kerb outlets that front council chambers' allotment.

Hydrocarbon and pollutant management from carpark

Council's comment of ''*Stormwater must be managed onsite and must not discharge directly into the street'* is a broad statement and not referencing to any policy requirements. The design is being updated to include a trash basket at the parking lot to treat gross pollutants, sediment and nutrients. To effectively manage treatment of any hydrocarbons, typically a gross pollutant trap would be introduced into the design. However, given the lack of stormwater infrastructure to connect into and site constraints, introducing a pollutant trap into the carpark design and layout will introduce design and construction complexities as well as result in additional maintenance for the client. A practical approach originally adopted was for runoff to discharge across a vegetated buffer strip to be partially infiltrated. The current stormwater design does not allow for runoff to be discharged across a vegetated buffer strip. The latest designs feature perforations in the carpark drainage pit so that there will be opportunities for runoff to infiltrate into the surrounding soils before discharging to Wells Road, which will be similar to the original stormwater management plan.

Considering the above, the perforated underground drainage system is similar to the concept SMP and is being adopted to avoid delay, site complexities and expense.

Planning code

Hazards (Flooding – General) Overlay

Performance Outcome	Deemed-to-satisfy critera	Tonkin Review Comment
PO 1.1 "…emergency services are sited away from flood areas enable uninterrupted operation of services and reduce likelihood of entrapment."	"…emergency services facilities, hospitals and prisons located outside the 1% AEP flood event."	Site borders 1% AEP flood plain (pre-levee). Wells Road within 1% AEP flood plain (pre-levee). Facility features crossover via Old Port Wakefield Road usable during 1% AEP event (when levee in-place). Wells Road crossover outside of 1% AEP event when levee in place.
PO 2.1 "Development is sited, designed and constructed to prevent the entry of floodwaters where the entry of flood waters is likely to result in undue damage to or compromise ongoing activities within buildings".	"… a building incorporates a finished floor level at least 300mm above the height of a 1% AEP flood event."	Building is greater than 300mm above 1% AEP flood event in pre and post levee scenarios
PO 3.1 "Buildings and structures used either partly or wholly to contain or store hazardous materials are designed to prevent spills or leaks leaving the confines of the building during a 1% AEP flood event to avoid potential environmental harm".	"Development involving the storage or disposal of hazardous materials is wholly located outside of the 1% AEP flood plain or flow path."	All covered areas are built-up well-above 1% AEP flood plain and are not within a 1% AEP flow path.

General Development Policies: Design in Urban Areas

Performance Outcome	Deemed-to-satisfy critera	Tonkin Comment
PO 42.1 "Development likely to result in risk of export of sediment, suspended solids, organic matter, nutrients, oil and grease include stormwater management systems designed to minimise pollutants entering stormwater..."	"None are applicable."	Stormwater management plan was developed during early design stage. Early concept plans did not include a built-up site. The stormwater management plan stated that the expected devices were impractical due to insufficient depth to an outlet. Introducing a pollutant trap is not practical due to lack of existing underground stormwater and will introduce design and construction complexities. The design looks to adopt some infiltration of stormwater as part of the sites stormwater management.
PO 42.2 "Water discharged from a development site is of a physical, chemical and biological condition equivalent to or better than its pre-developed state."	"None are applicable."	No WSUD seen on-site. A reduction of pollutant discharge (compared to existing) will be achieved if the designed onsite rainwater tanks feature retention volume for reuse (in addition to the detention volume mandated in the stormwater management plan). It is understood that the rainwater tanks will be oversized and feature rainwater reuse. Some infiltration of stormwater is being adopted in the design.
PO 42.3 "Development includes stormwater management systems to mitigate peak flows and manage the rate and duration of stormwater discharges from the site to ensure that development does not increase peak flows in downstream systems".	"None are applicable."	Peak flows are matched when comparing existing scenario and design scenario. Through use of above-ground rainwater tanks that feature volume reserved for stormwater detention, as directed by the stormwater management plan. Note: Changes to pervious (e.g. 'landscaped') area or the area of roof connected to rainwater tanks will require an update of the rainwater tank detention outlet and possibly the minimum size of retention volume required.

PO 43.1 To summarise, washdown areas and other pollutant areas must be bunded and must capture runoff for treatment.	"None are applicable."	If an ambulance washdown area is incorporated, then it will need to be bunded and meet the other requirements of PO 32.1. It is understood ambulance washdown will not occur on site.
Multiple PO		Multiple POs mention use/maximisation of infiltration of stormwater. Current detailed design features limited opportunities for infiltration. Therefore there may be a stronger argument to be made for the inclusion of rainwater tanks featuring retention and detention volume.