

2. BMP addendum or revised BMP: this BMP has been prepared at a strategic level to demonstrate development compliance will be met at future planning stages. Once further development detail is available, which is expected to be at the subdivision stage, a brief addendum to this BMP or revised BMP containing the necessary development and bushfire planning detail will need to be lodged with the subdivision application/s.
3. Compliance with current City of Swan annual firebreak notice: the developer/land manager and prospective land purchasers are to comply with the current City of Swan annual firebreak notice as outlined in Appendix 4 as amended.
4. Vulnerable land uses: Bushfire Emergency Evacuation Plans (BEEPs) will need to be prepared for any vulnerable land uses (such as primary schools, childcare facilities and aged care facilities) that are located in areas subject to BAL–12.5 to BAL–29 to address requirements of SPP 3.7 Policy Measure 6.6.1. This is to be completed at the development application or building permit stage once an adequate level of detail is available to inform such planning.
5. High risk land uses: Bushfire Risk Management Plans (BRMPs) will need to be prepared for any high risk land uses (such as service stations or land uses containing proposed storage of on-site flammable materials) that are located in areas subject to BAL–12.5 to BAL–29 to address requirements of SPP 3.7 Policy Measure 6.6.1. This is to be completed at the development application or building permit stage once an adequate level of detail is available to inform such planning.

4. Proposal compliance and justification

Proposed development within the project area is required to comply with SPP 3.7 under the following policy measures:

6.2 Strategic planning proposals, subdivision and development applications

- a)** Strategic planning proposals, subdivision and development applications within designated bushfire prone areas relating to land that has or will have a Bushfire Hazard Level (BHL) above low and/or where a Bushfire Attack Level (BAL) rating above BAL-LOW apply, are to comply with these policy measures.
- b)** Any strategic planning proposal, subdivision or development application in an area to which policy measure 6.2 a) applies, that has or will, on completion, have a moderate BHL and/or where BAL-12.5 to BAL-29 applies, may be considered for approval where it can be undertaken in accordance with policy measures 6.3, 6.4 or 6.5.
- c)** This policy also applies where an area is not yet designated as a bushfire prone area but is proposed to be developed in a way that introduces a bushfire hazard, as outlined in the Guidelines.

6.3 Information to accompany strategic planning proposals

Any strategic planning proposal to which policy measure 6.2 applies is to be accompanied by the following information prepared in accordance with the Guidelines:

- a) (i)** the results of a BHL assessment determining the applicable hazard level(s) across the subject land, in accordance with the methodology set out in the Guidelines. BHL assessments should be prepared by an accredited Bushfire Planning Practitioner; or
- a) (ii)** where the lot layout of the proposal is known, a BAL Contour Map to determine the indicative acceptable BAL ratings across the subject site, in accordance with the Guidelines. The BAL Contour Map should be prepared by an accredited Bushfire Planning Practitioner; and
- b)** the identification of any bushfire hazard issues arising from the relevant assessment; and
- c)** clear demonstration that compliance with the bushfire protection criteria in the Guidelines can be achieved in subsequent planning stages.

This information can be provided in the form of a Bushfire Management Plan or an amended Bushfire Management Plan where one has been previously endorsed.

Implementation of this BMP is expected to meet the following objectives of SPP 3.7:

- 5.1** Avoid any increase in the threat of bushfire to people, property and infrastructure. The preservation of life and the management of bushfire impact are paramount.
- 5.2** Reduce vulnerability to bushfire through the identification and consideration of bushfire risks in decision-making at all stages of the planning and development process.
- 5.3** Ensure that higher order strategic planning documents, strategic planning proposals, subdivision and development applications consider bushfire protection requirements and include specified bushfire protection measures.
- 5.4** Achieve an appropriate balance between bushfire risk management measures and, biodiversity conservation values, environmental protection and biodiversity management and landscape amenity, with consideration of the potential impacts of climate change.

In response to the above requirements of SPP 3.7, the bushfire management measures, as outlined in Section 3, have been devised for the proposed development in accordance with acceptable solutions of the Guidelines to meet compliance with bushfire protection criteria. An 'acceptable solutions' assessment is provided in Table 3 to assess the proposed bushfire management measures against each bushfire protection criteria in accordance with the Guidelines and demonstrate that the measures proposed meet the intent of each element of the bushfire protection criteria.

Table 3: Acceptable solutions assessment against bushfire protection criteria

Bushfire protection criteria	Intent	Acceptable solutions	Proposed bushfire management measures	Compliance statement
Element 1: Location	To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure	A1.1 Development location The strategic planning proposal, subdivision and development application is located in an area that is or will, on completion, be subject to either a moderate or low bushfire hazard level, or BAL-29 or below.	Refer to Sections 3.1 and 3.2, which demonstrate that development will only occur in areas of BAL-29 or lower. No development will occur in BAL-FZ or BAL-40 areas. Refer to Sections 2.3 and 2.4, which demonstrate that development will be located within areas of low or moderate bushfire hazard. This will be further confirmed as part of a BMP addendum or revised BMP to accompany future subdivision applications where appropriate.	The measures proposed are considered to comply and meet the intent of Element 1 Location.
Element 2: Siting and design of development	To ensure that the siting and design of development minimises the level of bushfire impact	A2.1 Asset Protection Zone Every building is surrounded by an APZ, depicted on submitted plans, which meets detailed requirements (refer to the Guidelines for detailed APZ requirements).	Refer to Section 3.1, which demonstrates that minimum width APZs (or other sufficient separation) will be provided at all development-vegetation interfaces. This will be further confirmed as part of a BMP addendum or revised BMP to accompany future subdivision applications where appropriate.	The measures proposed are considered to comply and meet the intent of Element 2 Siting and design of development
Element 3: Vehicular access	To ensure that the vehicular access serving a subdivision/development is available and safe during a bushfire event	A3.1 Two access routes Two different vehicular access routes are provided, both of which connect to the public road network, provide safe access and egress to two different destinations and are available to all residents/the public at all times and under all weather conditions.	Refer to Section 3.3, which demonstrates that a minimum of two different vehicular access routes will be provided for the proposed development at all times via the internal road network. This will be further confirmed as part of a BMP addendum or revised BMP to accompany future subdivision applications where appropriate.	The measures proposed are considered to comply and meet the intent of Element 3 Vehicular access

	A3.2 Public road A public road is to meet the requirements in Table 4 Column 1 of the Guidelines.	Refer to Section 3.3, which demonstrates that all proposed public roads will meet requirements of the Guidelines (refer to Table 2). This will be further confirmed as part of a BMP addendum or revised BMP to accompany future subdivision applications where appropriate.	
	A3.3 Cul-de-sac (including a dead-end-road) A cul-de-sac and/or a dead-end road should be avoided in bushfire prone areas. Where no alternative exists (i.e. the lot layout already exists and/or will need to be demonstrated by the proponent), detailed requirements will need to be achieved as per Table 4 Column 2 of the Guidelines.	Refer to Section 3.3, which demonstrates that cul-de-sacs will be avoided where possible as part of subdivision design. If unavoidable, cul-de-sacs will comply with technical requirements of the Guidelines (refer to Table 2). This will be further confirmed as part of a BMP addendum or revised BMP to accompany future subdivision applications where appropriate.	
	A3.4 Battle-axe Battle-axe access legs should be avoided in bushfire prone areas. Where no alternative exists, (this will need to be demonstrated by the proponent) detailed requirements will need to be achieved as per Table 4 Column 3 of the Guidelines.	Refer to Section 3.3, which demonstrates that battle-axe legs will be avoided where possible as part of subdivision design. If unavoidable, battle-axe legs will comply with technical requirements of the Guidelines (refer to Table 2). This will be further confirmed as part of a BMP addendum or revised BMP to accompany future subdivision applications where appropriate.	
	A3.5 Private driveway longer than 50 m A private driveway is to meet detailed requirements as per Table 4 Column 3 of the Guidelines.	Refer to Section 3.3, which demonstrates that any private driveways longer than 50 m will meet requirements of the Guidelines (refer to Table 2). This will be further confirmed as part of a BMP addendum or revised BMP to accompany future subdivision applications where appropriate.	

		A3.6 Emergency access way An access way that does not provide through access to a public road is to be avoided in bushfire prone areas. Where no alternative exists (this will need to be demonstrated by the proponent), an emergency access way is to be provided as an alternative link to a public road during emergencies. An emergency access way is to meet detailed requirements as per Table 4 Column 4 of the Guidelines.	Refer to Section 3.3, which demonstrates that any temporary EAWs will meet requirements of the Guidelines (refer to Table 2). This will be further confirmed as part of a BMP addendum to accompany future subdivision applications where appropriate.	
		A3.7 Fire service access routes (perimeter roads) Fire service access routes are to be established to provide access within and around the edge of the subdivision and related development to provide direct access to bushfire prone areas for fire fighters and link between public road networks for firefighting purposes. Fire service access routes are to meet detailed requirements as per Table 4 Column 5 of the Guidelines.	N/A It is not anticipated that FSARs will be required as part of development.	
		A3.8 Firebreak width Lots greater than 0.5 hectares must have an internal perimeter firebreak of a minimum width of three metres or to the level as prescribed in the local firebreak notice issued by the local government	Refer to Section 3.3, which demonstrates that no firebreaks will be required for individual residential lots. However, should any firebreaks be required for larger lots (such as POS) these will meet requirements of the Guidelines and the City of Swan annual firebreak notice. This will be further confirmed as part of a BMP addendum or revised BMP to accompany future subdivision applications where appropriate.	

Element 4: Water	To ensure that water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.	A4.1 Reticulated areas The subdivision, development or land use is provided with a reticulated water supply in accordance with the specifications of the relevant water supply authority and Department of Fire and Emergency Services.	Refer to Section 3.4, which demonstrates that all proposed lots will be provided a reticulated water supply and network of hydrants in accordance with local water authority, City and DFES requirements.	The measures proposed are considered to comply and meet the intent of Element 4 Water
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5. Implementation, enforcement and review

This BMP has been prepared at a strategic level to demonstrate how development compliance will be delivered at future planning stages in accordance with the Guidelines. In this respect, the management measures documented in Section 3, where applicable, will be incorporated into development design as early as possible and confirmed at the subdivision stage. Therefore, aside from preparation of a BMP addendum or revised BMP to accompany future subdivision applications where appropriate, there are no further items to implement, enforce or review at this stage of the planning process. Any BMP addendum/s or revised BMPs prepared to accompany future subdivision application/s will need to meet the relevant commitments outlined in this strategic level BMP, address the relevant requirements of SPP 3.7 (i.e. Policy Measure 6.4) and demonstrate in detail how the proposed development will incorporate the relevant acceptable solutions to meet the performance requirements of the Guidelines. The BMP addendum/s will be required to include the following detailed information:

- proposed lot layout
- post development vegetation classifications, effective slope and separation distances
- post development BAL application requirements through preparation of a BAL contour map demonstrating that proposed development areas will achieve a rating of BAL-29 or lower
- width and alignment of compliant APZs (or other sufficient separation)
- confirmation of how bushfire management will be addressed during development staging and any specific staging measures (i.e. low threat buffers, temporary EAWs, etc)
- confirmation of how bushfire management will be addressed with regards to bushfire hazards on adjacent landholdings
- fuel management or AS 3959 application in response to on-site POS (if and where required)
- vehicular access provisions, including demonstration that a minimum of two access routes will be achieved for each stage of subdivision in accordance with acceptable solution A3.1
- water supply provisions with regards to reticulated water
- future requirements for any identified vulnerable land uses, such as provision of a Bushfire Emergency Evacuation Plan at the development application or building permit stage
- future requirements for any identified high risk land uses, such as provision of a Bushfire Risk Management Plan at the development application or building permit stage
- provisions for Notification on Title as a subdivision condition
- compliance requirements with the current City of Swan annual firebreak notice
- acceptable solutions assessment against the bushfire protection criteria
- proposed works program outlining all measures requiring implementation and the appropriate timing and responsibilities for implementation.

Based on the information contained in this BMP, Strategen-JBS&G considers the bushfire hazards within and adjacent to the project area and the associated bushfire risk is readily manageable through standard, acceptable management responses outlined in the Guidelines and AS 3959. Strategen-JBS&G considers that on implementation of the proposed management measures, the project area will be able to be developed with a manageable level of bushfire risk whilst maintaining full compliance with the Guidelines and AS 3959.

6. Limitations

Scope of services

This report ("the report") has been prepared by Strategen-JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Strategen-JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

Reliance on data

In preparing the report, Strategen-JBS&G has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, Strategen-JBS&G has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Strategen-JBS&G has also not attempted to determine whether any material matter has been omitted from the data. Strategen-JBS&G will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Strategen-JBS&G. The making of any assumption does not imply that Strategen-JBS&G has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. Strategen-JBS&G disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

Strategen-JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by Strategen-JBS&G, and should not be relied upon by other parties, who should make their own enquiries.

7. References

- Department of Fire and Emergency Services (DFES) 2019, *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from: <http://www.dfes.wa.gov.au/regulationandcompliance/bushfireproneareas/Pages/default.aspx>, [Accessed: 04/07/2020].
- City of Swan (CoS) 2021, *City of Swan Fire Hazard Reduction Notice*, [Online], City of Swan, available from <https://www.swan.wa.gov.au/Services-support/Emergency-management/Fire/Fire-breaks-hazard-reduction> [Accessed 14/06/2021]
- Commonwealth Science and Industrial Research Organisation (CSIRO) 1999, *Fire Danger and Fire Spread Calculator*, Commonwealth Science and Industrial Research Organisation, Perth.
- Emerge Associates (Emerge) 2019, *Bullsbrook for Amex Local Structure Plan – Landscape and Irrigation Strategy*, report prepared for Amex, February 2019.
- McCaw L and Hanstrum B 2003, 'Fire environment of Mediterranean south-west Western Australia', in *Fire in Ecosystems of South-West Western Australia: Impacts and Management*, eds I Abbott & ND Burrows, Backhuys Publishers, Leiden, Netherlands, pp. 171–188.
- Standards Australia (SA) 2018, *Australian Standard AS 3959–2018 Construction of Buildings in Bushfire-prone Areas*, Standards Australia, Sydney.
- Western Australian Planning Commission (WAPC) 2015, *State Planning Policy 3.7 Planning in Bushfire-Prone Areas*, Western Australian Planning Commission, Perth.
- Western Australian Planning Commission (WAPC) 2017, *Guidelines for Planning in Bushfire-Prone Areas*, Western Australian Planning Commission, Perth.

Appendix A Georeferenced site photographs



Photo 1: Class B woodland to the south of the project area



Photo 2: Class B woodland to the east of the project area

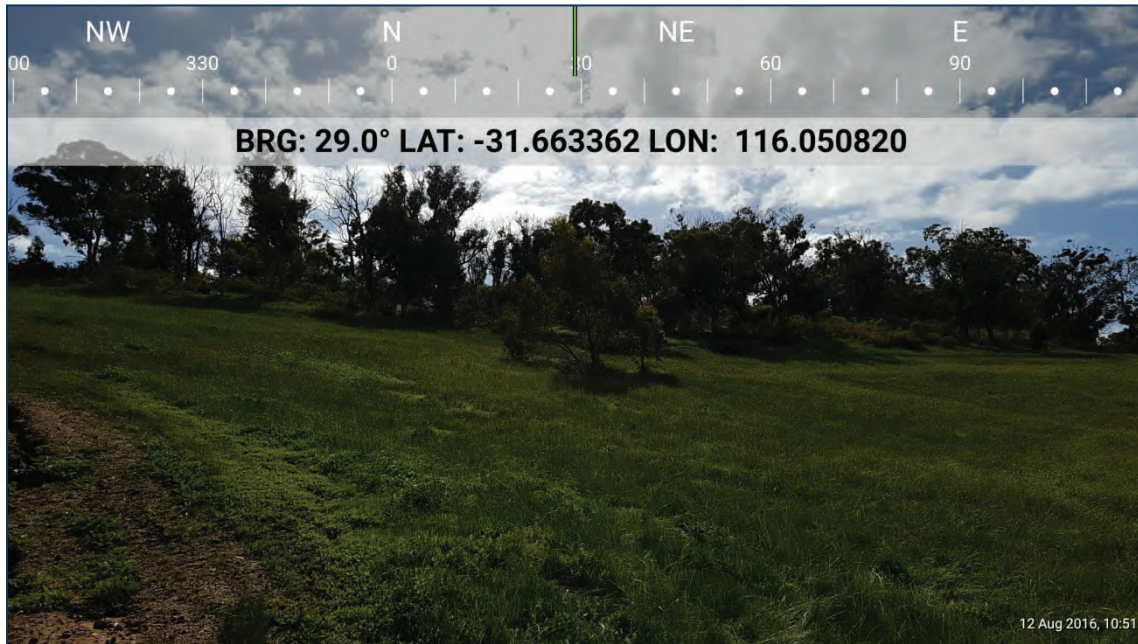


Photo 3: Class B Woodland to the northeast of the project area

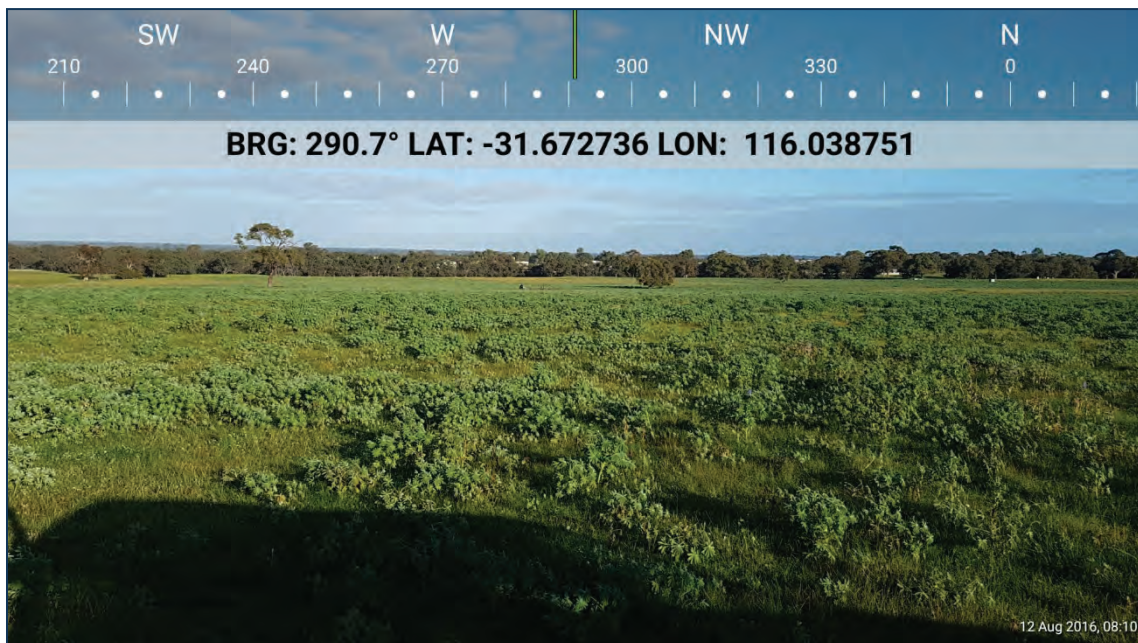


Photo 4: Class G grassland to the south of the project area



Photo 5: Class G grassland to the east of the project area (Class B woodland in background)



Photo 6: Non-vegetated area excluded under Clause 2.2.3.2 (e) to the east of the project area



Photo 7: Non-vegetated areas and low threat managed vegetation excluded under Clauses 2.2.3.2 (e) and (f) to the west of the project area



Photo 8: Class B woodland within the project area



Photo 9: Class B woodland within proposed conservation POS in the west of the project area



Photo 10: Class C shrubland (background) to the west of the project area

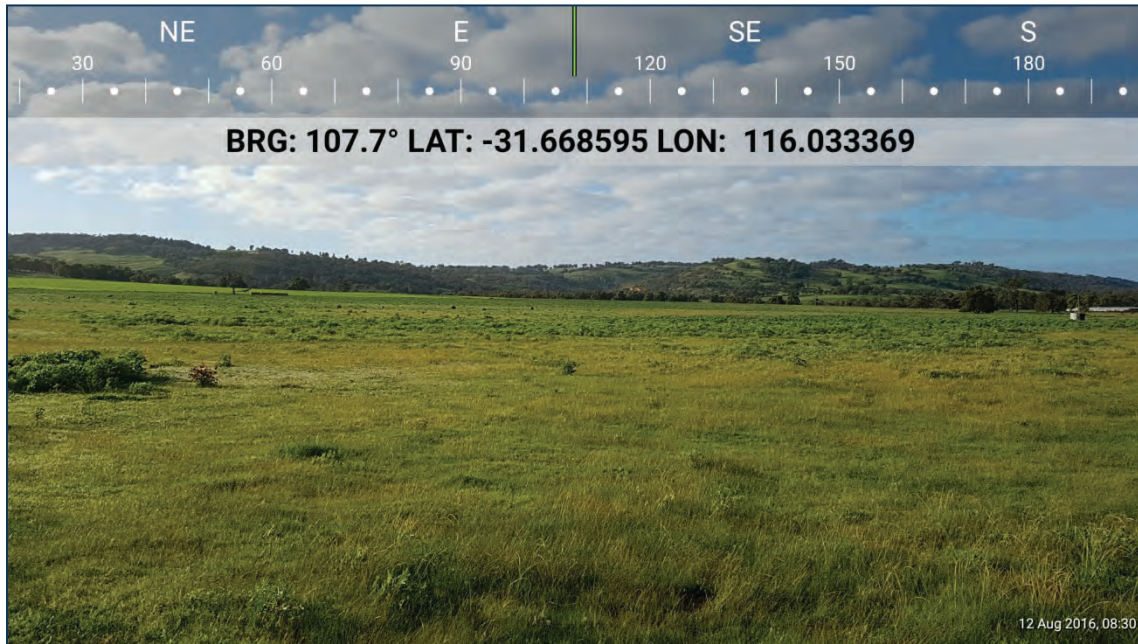


Photo 11: Class G grassland in the southwest of the project area

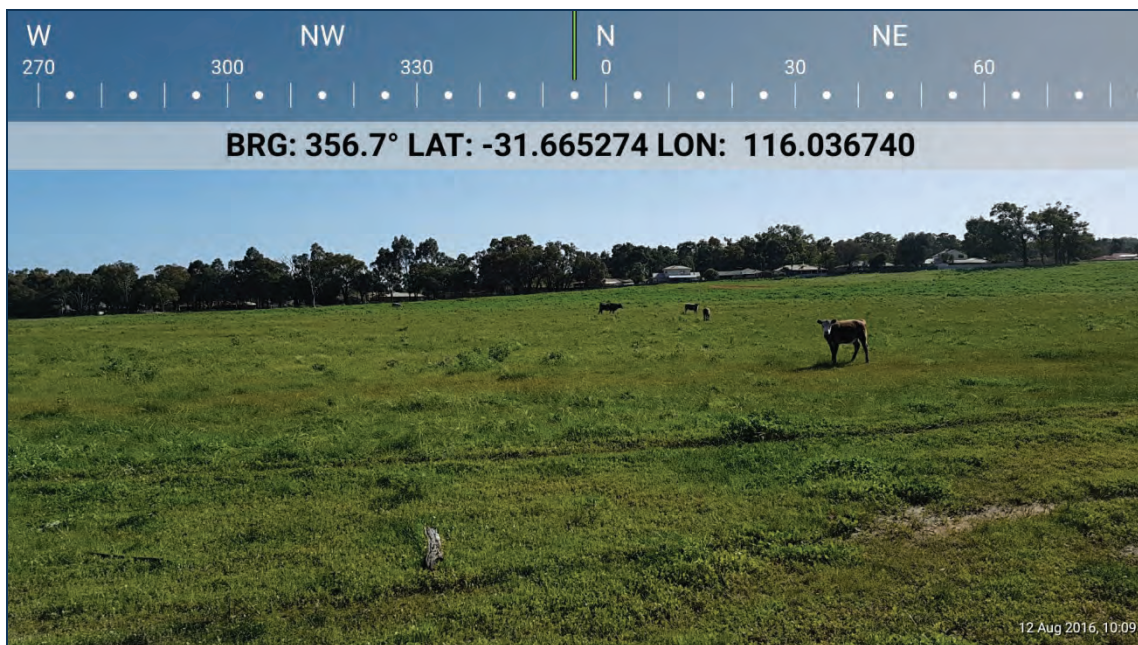


Photo 12: Class G grassland vegetation in the northwest of the project area



Photo 13: Non-vegetated areas and low threat managed vegetation excluded under Clauses 2.2.3.2 (e) and (f) to the north of the project area



Photo 14: Non-vegetated areas and low threat managed vegetation excluded under Clauses 2.2.3.2 (e) and (f) to the northwest of the project area

Appendix B Summer wind profiles for Pearce RAAF weather station

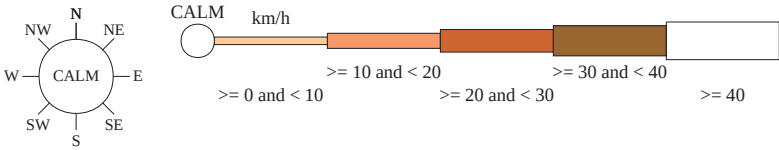
Rose of Wind direction versus Wind speed in km/h (02 Nov 1940 to 31 Oct 2011)

Custom times selected, refer to attached note for details

PEARCE RAAF

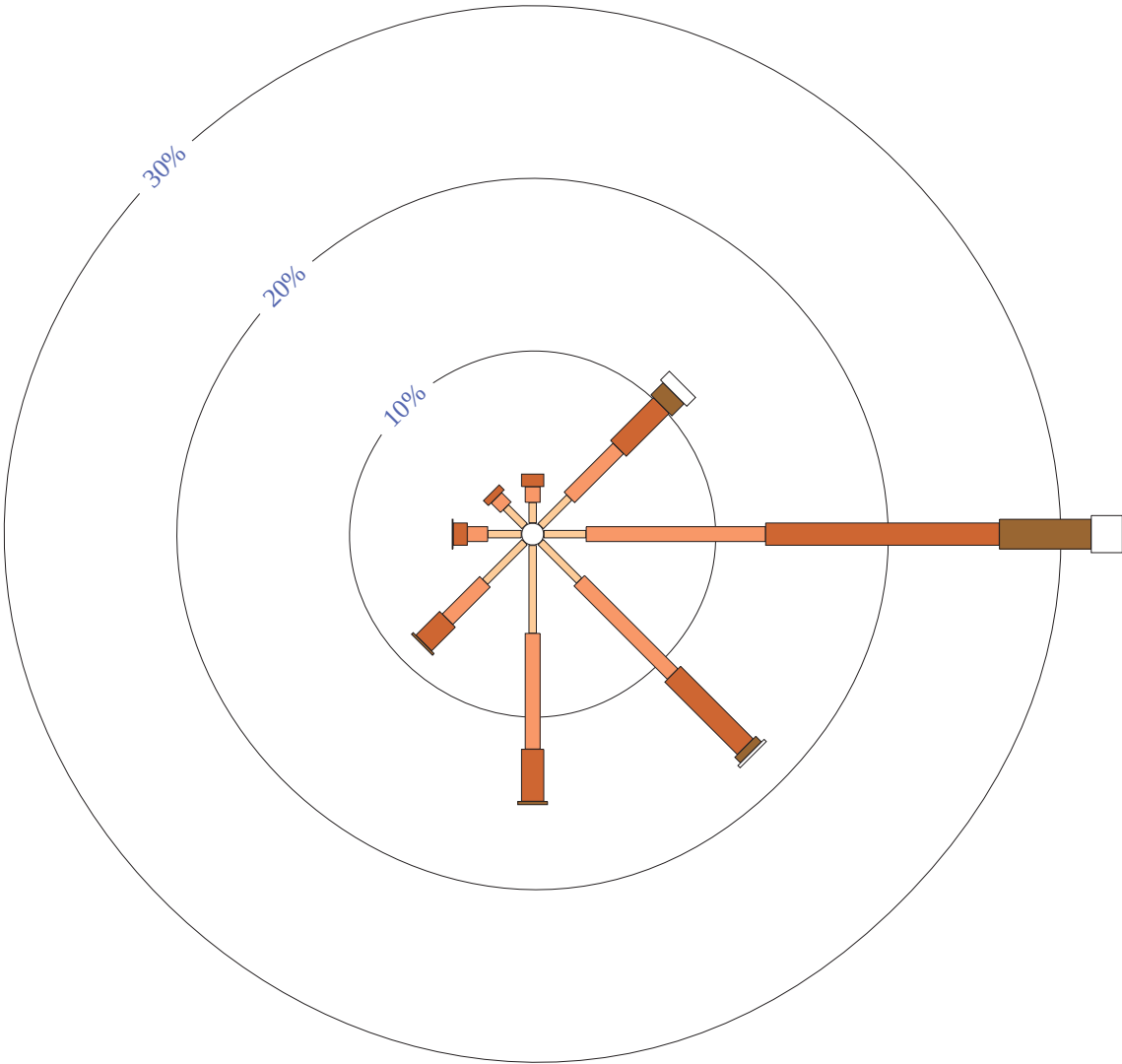
Site No: 009053 • Opened Jan 1937 • Still Open • Latitude: -31.6669° • Longitude: 116.0189° • Elevation 40m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



9 am Jan
1093 Total Observations

Calm 3%



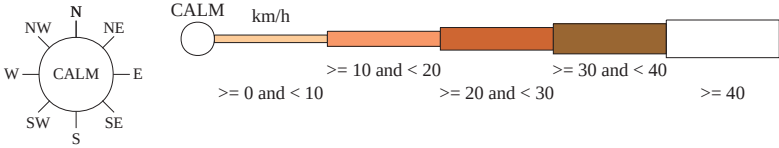
Rose of Wind direction versus Wind speed in km/h (02 Nov 1940 to 31 Oct 2011)

Custom times selected, refer to attached note for details

PEARCE RAAF

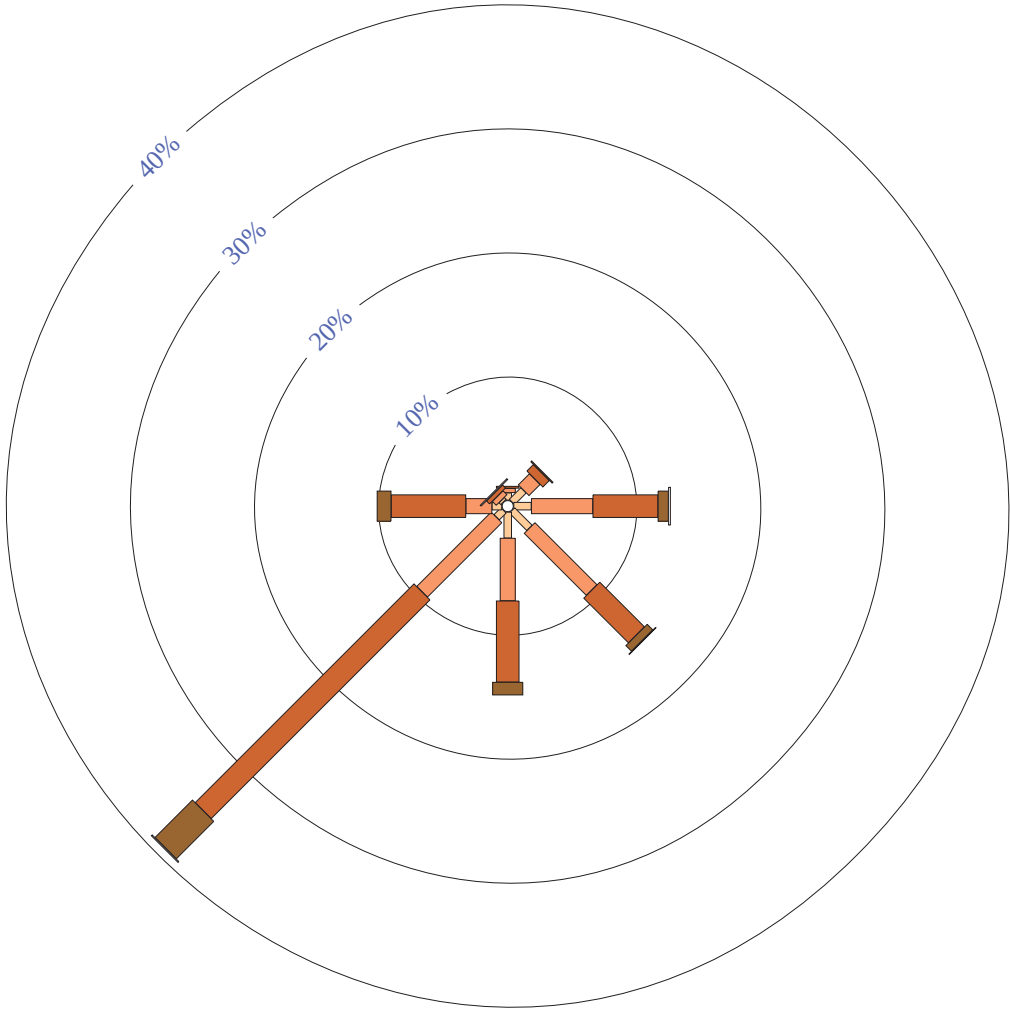
Site No: 009053 • Opened Jan 1937 • Still Open • Latitude: -31.6669° • Longitude: 116.0189° • Elevation 40m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



3 pm Jan
1015 Total Observations

Calm 2%



Appendix C Landscape Masterplan (Emerge 2019)

4. APPENDIX A LANDSCAPE MASTERPLAN



LEGEND

Site Boundary

POS

Indicative 1:1 ARI Drainage

Existing Dam

Existing Vegetation



Neighbourhood POS/Recreation nodes (high order)



Neighbourhood POS/Recreation nodes (low order)



Entry Statements



Green Streets



Town Centre

400m Ped Shed

800m Ped Shed

Appendix D City of Swan Fire Hazard Reduction Notice (as amended)

Bush Fires Act 1954

City of Swan

Fire Hazard Reduction Notice (Firebreak Notice)

Notice to Owners and/or Occupiers of land situated within the City of Swan.

To assist in the control of bush fires, and pursuant to Section 33 of the Bush Fires Act 1954, all owners and occupiers of land within the City of Swan are required on or before the 1st day of November, 2020, or within 14 days of becoming an owner or occupier of land after that date, must meet the fire hazard reduction conditions described in this notice and maintain these conditions up to and including the 30th day of April, 2021.

1. All land up to 5,000m² (0.5 Hectares or 1.2 Acres)

- 1) Install and maintain an asset protection zone in accordance with the requirements specified in clause 13 of this notice.
- 2) Maintain all grass to a height of no greater than 10cm.
- 3) Areas of natural vegetation to be maintained at or below 8 tonnes per hectare.
- 4) Where a property is affected by an approved bushfire management plan, property owners must still comply with all requirements in this notice and with any additional requirements outlined within that plan.

2. All land between 5,000m² and 25,000m² (0.5 - 2.5 Hectares) or (1.2 - 6.2 Acres)

- 1) Install and maintain an asset protection zone in accordance with the requirements specified in clause 13 of this notice.
- 2) Install firebreaks immediately inside and adjacent to all external property boundaries. Firebreaks need to be 3 metres wide with a 4 metre vertical height clearance free from flammable materials and overhanging branches (see section 10 in this notice for further details).
- 3) Maintain all grass to a height of no greater than 10cm.
 - a) If the land is stocked, the grass must be reduced and maintained to a height of no greater than 10cm by the 1st day of December.
- 4) Natural vegetation within 100 metres of buildings including attached and adjacent structures and essential infrastructure shall be maintained at or below 8 tonnes per hectare, by passive methods of fuel reduction that does not permanently remove or reduce the quantity or occurrence of the native plants, shrubs and trees within the subject area.
- 5) Where a property is affected by an approved bushfire management plan, property owners must still comply with all requirements in this notice and with any additional requirements outlined within that plan.

3. All land with an area greater than 25,000m² (2.5 Hectares or 6.2 Acres)

- 1) Install and maintain an asset protection zone in accordance with the requirements specified in clause 13 of this notice.
- 2) Install firebreaks immediately inside and adjacent to all external property boundaries. Firebreaks need to be 3 metres wide with a 4 metre vertical height clearance free from flammable materials and overhanging branches (see section 10 in this notice for further details).
 - a) Properties over 100 hectares require additional firebreaks to divide the land into areas not exceeding 100 hectares.
- 3) Slash or mow grass to a height no greater than 10cm immediately adjacent to firebreaks to a minimum width of 3 metres.
 - a) If the land is stocked, this grass must be reduced and maintained to a height of no greater than 10cm by the 1st day of December.
- 4) Natural vegetation within 100 metres of buildings including attached and adjacent structures and essential infrastructure shall be maintained at or below 8 tonnes per hectare, by passive methods of fuel reduction that does not permanently remove or reduce the quantity or occurrence of the native plants, shrubs and trees within the subject area.
- 5) Where a property is affected by an approved bushfire management plan, property owners must still comply with all requirements in this notice and with any additional requirements outlined within that plan.

4. Plantations

- 1) Install and maintain external and internal firebreaks, firebreaks that form compartments (cells), firebreaks and hazard reduction measures that protect neighbouring communities and essential infrastructure in accordance with the requirements of a fire management plan approved in writing by the City; or
- 2) Where no such approved fire management plan exists,
 - a) Unless the City approves an alternative plan in writing in accordance with clause 4(2)(b), install and maintain external and internal firebreaks and firebreaks that form compartments (cells), and carry out all other firebreaks and hazard reduction measures which are required in accordance with the requirements and specifications within the Department of Fire & Emergency Services 'Guidelines for Plantation Fire Protection' 2011 publication; or
 - b) If it is considered impractical for any reason to carry out the plantation requirements outlined above in clause 4 (2)(a), plantation owners and managers may apply in writing to the City to implement an alternative plan or measures in accordance with clause 4 of this notice. A Fire Management Plan may be required to be developed and submitted as part of the application.

5. Application to Vary Firebreak and Hazard Reduction Requirements

- 1) If it is considered impractical for any reason to clear firebreaks in a manner or location required by this notice, or to carry out any fire hazard reduction work or measures required by this notice, you may apply in writing on or before the 15th day of October, for approval to provide firebreaks in alternative positions or to take alternative measures to abate fire hazards on the land. Alternative firebreak application forms can be downloaded from the City of Swan website.
- 2) If permission is not granted in writing by the City prior to the 1st day of November, you shall comply with the requirements of this notice.
- 3) When permission for alternative firebreaks or fire hazard reduction measures has been granted, you shall comply with all conditions on the endorsed permit and maintain the land to the required standard throughout the period specified by this notice.
 - a) Where a property is affected by an approved bushfire management plan, property owners must comply with any additional requirements and responsibilities outlined within that plan.

6. Fuel Dumps and Depots

Remove all flammable material within 10 metres of fuel dumps, fuel ramps or where fuel drums, whether containing fuel or not, are stored.

7. Hay Stacks

Clear and maintain a firebreak completely surrounding any haystack on the land, within 60 metres of the haystack.

8. Fire Service Access (Strategic Firebreaks)

- 1) Where under a written agreement with the City, or where depicted on an approved bushfire management plan Fire Service Access (Strategic Firebreaks) are required on the land, you are required to clear and maintain the Fire Service Access (Strategic Firebreaks) a minimum of 6 metres wide along the agreed alignment to provide restricted vehicular access to emergency services and authorised vehicles.
- 2) Fire Service Access (Strategic Firebreaks) must be free from flammable material and unimpeded by obstructions including boundary fences and gates unless approved in writing by the City.
- 3) Gates may only be secured with City of Swan Fire Service padlock.
- 4) Fire Service Access (Strategic Firebreaks) shall be graded to provide a continuous 4 wheel drive trafficable surface a minimum of 4 metres wide with a 1 metre shoulder on either side.
- 5) All branches must be pruned and obstacles removed to maintain a 4 metre vertical height clearance above the full 6 metre width of the trafficable surface.

9. Emergency Access Ways

- 1) Where under a written agreement with the City, or where depicted on an approved bushfire management plan, Emergency Access Ways are required on private land, you are required to clear and maintain a vehicular access way to a minimum of 6 metres wide along the agreed alignment.
- 2) Emergency access ways must be free from flammable material and unimpeded by obstructions including boundary fences and gates unless approved in writing by the City.
- 3) Gates on Emergency Access Ways must remain unlocked at all times.
- 4) Emergency Access Ways shall be graded and have suitable drainage to provide a minimum 6 metre wide continuous trafficable surface suitable for all types of 2 wheel drive vehicles.

- 5) All branches must be pruned and obstacles removed to maintain a 4 metre vertical height clearance above the full 6 metre width of the trafficable surface.

10. Firebreak Construction

- 1) Firebreaks are to be developed and maintained clear of all obstacles and flammable materials to create a minimum of 3 metres wide trafficable surface suitable for 4 wheel drive vehicles.
- 2) Overhanging branches must be pruned to provide a 4 metre vertical clearance above the full width of the firebreak surface.
- 3) Boundary firebreaks must be aligned immediately inside and adjacent to the external property boundaries.
- 4) Alternative Firebreaks that are approved in writing by the City, or as depicted within a bushfire management plan approved in writing by the City, are to be constructed to the same standard as general firebreaks and must be constructed along the specified alignment.
- 5) Firebreaks must not terminate in a dead end.
- 6) Firebreaks may be constructed by ploughing, grading, raking, burning, chemical spraying or any other approved method that achieves the required standard.

11. Driveways

Where building sites are situated more than 50 metres from a public road,

- 1) Driveways must be maintained clear of all permanent obstacles and flammable materials to create a minimum 3 metre wide trafficable surface suitable for all types of 2 wheel drive vehicles.
- 2) Overhanging branches must be pruned to provide a 4 metre vertical clearance above the driveway.

12. Fuel Reduction – Natural Vegetation

- 1) Available bushfire fuels must be maintained at or below:
 - a) Asset Protection Zones - 2 tonnes per hectare
 - b) Hazard Separation Zones - 8 tonnes per hectare

*This requirement only applies where HSZs are depicted within a Fire Management Plan approved in writing by the City.

 - c) Natural Vegetation - 8 tonnes per hectare for areas of natural vegetation within 100 metres of buildings, attached and adjacent structures and essential infrastructure
- 2) Passive Fuel Reduction within natural vegetation may be achieved by burning, raking, pruning, weed management, removal of dead materials and any other approved method.
- 3) Permanent removal or partial clearing of natural vegetation including individual or groups of native grasses, shrubs or trees may only be carried out to meet the minimum requirements of this notice.
- 4) Permanent clearing of natural vegetation structures including individual plants, shrubs or trees, that exceeds the requirements of this notice or the specifications outlined within a bushfire management plan approved in writing by the City, is only permitted in accordance with the provisions and exemptions outlined within the Environmental Protection Act 1986, or with the approval of the Department of Water and Environmental Regulation and the City of Swan.

Note: Advice and resources on how to measure and manage native vegetation fuel loads are available from the Department of Fire and Emergency Services or the City of Swan.

13. Asset Protection Zones Specification

Asset protection zones for habitable buildings and other assets must meet the following requirements:

- 1) Extend 20 metres out from any external walls of the building, attached structures, or adjacent structures within 6 metres of the habitable building, unless varied under an approved bushfire management plan.
- 2) On sloping ground the asset protection zone distance shall increase with 1 metre for every degree in slope on the sides of the building/ structure that are exposed to down slope natural vegetation.
- 3) Asset protection zone requirements only apply within the boundaries of the lot on which the asset is located and cannot be enforced across boundaries.
- 4) Recommendation Only - Asset protection zones predominantly consist of non-flammable managed vegetation, reticulated lawns and gardens and other non-flammable features.
- 5) All grass is maintained to or under 10cm.
- 6) Fuel loads must be reduced and maintained at 2 tonnes per hectare or lower.
- 7) The crowns of trees are to be separated where possible to create a clear separation distance between adjoining or nearby tree crowns. The separation distance between tree crowns is not required to exceed 10 metres. Clearing or thinning existing trees to create distances greater than 10 metres separation between tree crowns within an asset protection zone is not required or supported by this notice and requires approval from the Department of Water and Environmental Regulation and the City of Swan.

- 8) A small group of trees within close proximity to one another may be treated as one crown provided the combined crowns do not exceed the area of a large or mature crown size for that species.
- 9) Trees are to be low pruned (or under pruned) to at least a height of 2 metres from ground.
- 10) No tree, or shrub over 2 metres high is planted within 2 metres of a building, especially adjacent to windows.
- 11) There are no tree crowns or branches hanging over buildings.
- 12) Clear and prune scrub to reduce to a sparse density (able to walk through vegetation with relative ease with minimal deviation around trees and shrubs).
- 13) Install paths or clear flammable or dry vegetation, debris and materials immediately adjacent to the building.
- 14) Wood piles and flammable materials stored a safe distance from buildings.

14. Burning

All burning must be carried out in accordance with the relevant provisions of this notice and the Bush Fires Act 1954, Health Act 1911 and the City's Consolidated Local Laws 2005.

Prohibited Period: All burning, including garden refuse and camping fires are prohibited.

Restricted Period: All burning requires a permit except for the burning of garden refuse and camping fires which are subject to the following conditions:

- 1) The fire must not be lit if the Fire Danger Rating is Very High or above, or if a Total Fire Ban or a Harvest and Vehicle Movement Ban is declared.
- 2) Only one fire is allowed at any time and it does not exceed 1 cubic metre in size.
- 3) No flammable material within 5 m of the fire.
- 4) The fire is only lit between 6 pm and 11 pm and completely extinguished by midnight.
- 5) At least one person capable of controlling the fire is in attendance at all times with adequate means of extinguishing the fire.

15. Cooking Fires

Fires for the purpose of cooking are exempt from burning period restrictions subject to the following conditions:

- 1) The fire must not be lit if the Fire Danger Rating is Very High or above, or if a Total Fire Ban or a Harvest and Vehicle Movement Ban is declared.
- 2) The fire is contained in a purpose built appliance and
 - a) at a person's home; or
 - b) an area is set aside for that purpose by the State Authority or City of Swan
- 3) No flammable material within 5 m of the fire.
- 4) At least one person capable of controlling the fire is in attendance at all times with adequate means of extinguishing the fire.

16. Compliance

- 1) In addition to the requirements of this notice, further works which are considered necessary by an Authorised Officer of the City may be required as specified in writing in a subsequent notice addressed to the land owner.
- 2) Where the owner or occupier of the land fails or neglects to comply with the requirements of this notice or a subsequent notice addressed to the land owner, the City of Swan may enter onto the land with workmen, contractors, vehicles and machinery to carry out the requisitions of the notice at the expense of the land owner.
- 3) Failure to comply with this notice and subsequent written notices may result in a penalty not exceeding \$5,000, or the issue of a \$250 infringement notice and liability for any costs incurred by the City in relation to works undertaken on behalf of the land owner
- 4) Where a property is affected by an approved bushfire management plan, property owners must still comply with all requirements in this notice and with any additional requirements outlined within that plan.

17. Definitions

'Alternative Firebreak' is a firebreak that is in an alternative position or alignment to the external boundaries of a property.

'Alternative Firebreak Application' is an application that may be made by a land owner to install firebreaks in an alternative position, or to carry out alternative measures in lieu of general firebreaks.

'Available Fuel' is the bush fuel consisting of live and dead vegetation such as stubble, mulch, leaf litter, twigs, trash, scrub and other vegetation less than 6mm in diameter capable of carrying a running fire and will actually burn under prevailing conditions.

'City' means the City of Swan.

'Buildings, Attached and Adjacent Structures' means habitable buildings that are used as a dwelling, workplace, place of gathering or assembly, a building that is a car park, or a building used for the storage

or display of goods or produce for sale by whole sale in accordance with classes 1-9 of the Building Code of Australia. The term building includes attached and adjacent structures like garages, carports verandas or similar roofed structure(s) that are attached to, or within 6 metres of the dwelling or primary building.

'Asset Protection Zone (APZ)' is a low fuel area that is reduced of flammable vegetation and materials surrounding buildings and essential infrastructure to minimise the likelihood and impact that direct flame contact, radiant heat or ember attack may have on buildings and assets in the event of a bushfire. This area must extend out from the external walls of a building or asset a minimum of 20 metres.

'Bushfire Management Plan' or 'Fire Management Plan' is a comprehensive plan that may be placed on the certificate of title(s) of land that has been developed as a condition of development or subdivision. Bushfire Management Plans may become out dated and it's the responsibility of the property owner to review and keep them current. Where a property is affected by an approved bushfire management plan, property owners must still comply with all requirements in the Annual Fire Hazard Reduction Notice and with any additional requirements outlined within that plan.

'Emergency Access Way' is a two wheel drive trafficable, 6 metre wide access route to provide local residents, general public and emergency services alternative links to road networks at the end of cul- de-sacs or areas where access is limited during an emergency incident.

'Essential Infrastructure' or **'Critical Infrastructure'** means assets, infrastructure, systems and networks that provide essential services necessary for social and economic wellbeing and is typically public infrastructure. Assets and infrastructure, usually of a public nature, that generate or distribute electricity, water supply, telecommunications, gas and dams are typical assets that are essential to society and are often located in, or traverse areas that are prone to bushfires.

'Firebreak' is an area of land cleared of flammable material (see available fuel above) to minimise the spread of a bushfire and to provide access for firefighting services. For the purpose of this notice the term firebreak is a strip of land at minimum 3 metres with a 4 metres vertical clearance, constructed to provide a 4 wheel drive trafficable surface for access by emergency and authorised vehicles. Boundary firebreaks are installed immediately adjacent the external boundaries of a property.

'Fire Hazard' means accumulated fuel (living or dead) such as leaf litter, twigs, trash, bush, dead trees and scrub capable of carrying a running fire, but excludes standing living trees and isolated shrubs.

'Hazard Separation Zone (HSZ)' means an area extending out from an asset protection zone a distance of 80 metres unless otherwise specified, to create a graduated fuel reduction and separation from natural vegetation.

'Natural Vegetation' means natural areas of forest, woodland, shrubland, scrub, mallee or mulga.

'Passive Fuel Reduction' means lowering the amount of available fuel that will burn under prevailing conditions by means that will not permanently reduce or modify the structure or life cycle of plant, shrub, scrub or tree communities within an treated area. This is typically achieved by undertaking a cool, controlled burn of an area during cooler, damper months, or by physical removal of built up leaf litter, dead materials, weeds and slashing long dry grasses without damaging live native plants within the area.

'Plantation' is any area of native or exotic planted trees that exceeds three hectares in a gazetted town site, or elsewhere a stand of trees of 10 hectares or larger that has been planted and managed intensively for their commercial and environmental value. A plantation includes roads, firebreaks and small areas of native vegetation.

'Fire Service Access (Strategic Firebreaks)' is a firebreak that is 6 metres wide established to provide strategic access and links to road networks whilst providing a wider control/ containment line to protect town sites, estates and similar exposures during bushfire operations.

By order of the Council,

MJ Foley

Chief Executive Officer

City of Swan

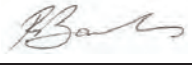
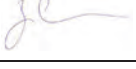
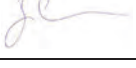
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Document Status

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		Name	Name	Signature	Date
Rev A	P Molinari	R Banks (BPAD36857)	R Banks		9/1/2017
Rev B	P Molinari (BPAD39183)	R Banks (BPAD36857)	R Banks		7/07/2017
Rev 0	P Molinari (BPAD39183)	R Banks (BPAD36857)	R Banks		18/07/2017
Rev 1	P Molinari (BPAD39183)	R Banks (BPAD36857)	R Banks		26/09/2017
Rev 2	P Molinari (BPAD39183)	R Banks (BPAD36857)	R Banks		27/11/2017
Rev 3	B Mastrangelo (BPAD45985)	Z Cockerill (BPAD37803)	Z Cockerill		15/03/2019
Rev 4	Z Cockerill (BPAD37803)	Z Cockerill (BPAD37803)	Z Cockerill		16/06/2021



APPENDIX H

Local Water Management Strategy

RPS

MEMO

Date: 30 June 2021
Pages: 17 inc. this page
Regarding: Kingsford town centre - Bullsbrook

Addendum to the Bullsbrook landholding local water management strategy

1 INTRODUCTION

An approved Local Water Management Strategy (LWMS) was previously prepared by RPS (2018) to support the Local Structure Plan (LSP) for the Bullsbrook Landholding, now referred to as the Kingsford development. Hatch is lodging a Precinct Plan for the Kingsford town centre which constitutes a modification to the layout shown in the approved LSP. This LWMS addendum has been prepared to support the proposed modification of the town centre layout and addresses the implications to the drainage strategy.

2 TOWN CENTRE PRECINCT PLAN

A plan of the proposed Kingsford town centre is shown in Appendix A. The town centre includes general commercial, residential and public open space/conservation zonings, as well as a primary school and co-located district open space.

The current estimate for residential lot yield within the town centre is 385 lots:

- 180 lots between 180 m² and 299 m²
- 205 lots greater than 300 m².

The distribution of the different-sized lots that was assumed for the stormwater modelling is shown in Figure B (noting that lots smaller than 300 m² were modelled as having direct stormwater connections in line with City of Swan requirements).

3 STORMWATER MANAGEMENT

3.1 Drainage strategy

The drainage strategy for the Kingsford town centre is consistent with the strategy outlined in the LWMS (RPS 2018). The design criteria are summarised in Table 1.

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Date: 30 June 2021
Regarding: Kingsford town centre - Bullsbrook

Table 1: Stormwater management design criteria

Objective	Design criteria
Retention / treatment (15 mm event)	1 year ARI - 1 hour (15 mm) storm event to be retained on site as close to source as possible through lot soakwells and biofiltration areas. - Construction of bioretention areas sized at a minimum 2% of connected impervious catchment areas to retain and treat the 15 mm event. - Other water sensitive urban design (WSUD) features such as tree pits, rain gardens and roadside swales will also be investigated and incorporated into the drainage system where practical during detailed design.
Conveyance (5 year ARI event)	- A pit and pipe system will convey up to and including the 5 year ARI event to the biofiltration basins. Biofiltration areas located adjacent to the Ki-it Monger Brook will discharge into the brook. - Road drainage system to be designed so that roads will be passable in the 5 year ARI event. - Overland conveyance systems (e.g. vegetated swales) will be incorporated where appropriate during detailed design to increase treatment area and reduce reliance on piped systems.
Flood protection (100 year ARI event)	- Development will not occur in the floodway of the Ki-It Monger Brook, and habitable floor levels will be at least 0.5 m above the top water level of the 100 year ARI flood event. - Finished lot levels will be at least 0.3 m above the 100 year ARI top water level of local drainage systems. - Flood storage areas will also be incorporated in POS areas throughout the development to ensure that peak post-development flow rates are maintained relative to pre-development flow rates for the Ki-it Monger Brook. - Flood conveyance pathways (including the road reserve) will be provided for safe passage of flows through the development during the 100 year ARI event. - Attenuated flood flows will be conveyed to the Ki-it Monger Brook and discharge from the site as per pre-development conditions.
Nutrient management	- Any imported fill used beneath drainage areas will have a sufficient PRI (>10) to reduce phosphorus export via soil leaching. - Biofiltration areas will be designed to retain nutrients through the use of amended soil and appropriate plant species selection. - Amended soil will also be used throughout other POS areas.

A preliminary plan showing proposed earthwork contours and drainage alignments within the main town centre area is shown in Appendix C.

3.1.1 Residential lots

As per City of Swan (2013) guidelines, residential lots greater than 300 m² are to provide soakwells sized for the first 15 mm of rainfall. Lots less than 300 m² may be connected directly to the City's drainage system as long as the downstream drainage infrastructure and stormwater treatment areas are designed accordingly. Soakwells are to be located at the front of lots where possible and should be a minimum of 1.8 m from the building footings or property boundary.

3.1.2 Commercial lots

Commercial lots are to provide interconnected soakwells with an overflow connection to the City's drainage system. Whilst a Class S geotechnical soil profile may be considered for the commercial areas, it is anticipated that the lots will be constructed with at least a portion of the lot area having >1.5 m of imported sand fill to facilitate retention and infiltration of the 15 mm event within soakwells. Where there is <1.5 m of imported sand fill available for soakwells, alternative infiltration devices such as tree pits, rain gardens and rainwater tanks may be utilised to retain the 15 mm event.

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There may be additional opportunity identified during the detailed design where commercial lots are able to manage larger rainfall events on-site. This will be investigated at UWMP stage to reduce the load on the final drainage basins.

3.1.3 Primary school drainage

The primary school will manage its own drainage up to the 100 year ARI event on-site. The drainage infrastructure within the development has not made allowance for run-off generated from the school site.

3.2 Changes to catchments and discharge rates

Due to the proposed LSP layout modification, the boundaries of the town centre catchments have changed. Table 2 summarises the changes to the town centre catchments and the land use breakdown. The contributing catchment area of the town centre has increased from the LWMS (RPS 2018). The stormwater catchment plan showing both the LWMS catchments and revised catchments is shown in Figure A.

Table 2: Town centre catchment areas (ha)

Catchment	9	10	15	16	Total
Residential lots >300 m ²	2.72	2.48	0.21	7.18	12.59
Residential lots <300 m ²	-	2.56	0.57	1.34	4.48
Road reserve	3.49	3.87	3.56	3.43	14.34
POS / DOS	-	0.68	0.79	5.77	7.24
Commercial	-	-	8.40	-	8.40
School	-	-	-	3.52	3.52
Total area (ha) in LWMS addendum	6.21	9.59	13.53	21.23	50.57
Area (ha) in LWMS (RPS 2018)	5.24	6.36	13.98	20.30	45.88

Increases in catchment area has been highlighted in blue; decreases in catchment area has been highlighted in green.

As per the LWMS (RPS 2018), Catchments 9 to 18 discharge to the Ki-it Monger Brook via the town centre. The total area of these ten catchments was 146.21 ha, with a combined peak discharge rate of 4.31 m³/s in the 100 year ARI - 6 hour storm (the critical duration for flows within the Ki-it Monger Brook). The pro rata discharge rate is 0.03 m³/s/ha.

Changes to the town centre catchment boundaries have a flow-on effect on the adjacent catchment boundaries. Outside the town centre, indicative catchment areas have been revised based on the current draft masterplan shown in Appendix B (this draft master plan differs from the LSP and is not statutory yet). Catchment 14 previously discharged via Catchment 9, however due to the town centre catchment boundary changes, it has now been diverted through Catchment 15.

Modelling and refinement of drainage areas within the affected catchment areas outside of the Kingsford Town Activity Centre will be undertaken during the relevant detailed design stages. Changes to catchment areas and estimates of the allowable peak discharge based on the pro rata rate is shown in Table 3. There is flexibility for individual catchments to discharge more or less than the estimated discharge rates in response to space availability for drainage infrastructure, however the LSP area should meet the overall LWMS discharge criteria of 12 m³/s at the Great Northern Highway.

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Table 3: Estimated allowable peak discharge rate in the 100 year ARI - 6 hour storm

Catchment	Area (ha) in LWMS (RPS 2018)	Area (ha) in LWMS addendum	Estimated allowable peak discharge (m³/s)
9	5.24	6.21	
10	6.36	9.59	
11	23.25	13.52	
12	10.00	14.86	
13	12.81	10.38	
Total (discharge via Catchment 9)	57.66	54.56	1.64
14	5.39	11.40	
15	13.98	13.53	
16	20.30	21.23	
17	22.80	26.63	
18	14.48	15.30	
Total (discharge via Catchment 15)	76.95	88.09	2.64

Increases in catchment area has been highlighted in blue; decreases in catchment area has been highlighted in green.

3.3 Drainage modelling

The XP-SWMM flood model developed for the LWMS has been updated with the town centre layout modifications. The breakdown of the different catchment types modelled has been summarised in Table 4. Direct connected catchment was defined as impervious catchment areas which are connected to the drainage network. This includes the impervious surfaces of road reserves and lot areas that are serviced by a direct drainage connection. The indirect connected catchment refers to areas that are not directly connected to the drainage system and includes pervious areas and impervious lot areas which drain to on-site soakwells.

Table 4: Modelled catchment type areas (ha)

Catchment type	9	10	15	16	Total
Direct connected impervious	2.44	4.50	2.89	3.34	13.17
Indirect connected	3.77	4.41	1.45	8.61	18.24
Commercial	-	-	8.40	-	8.40
POS/DOS	-	0.68	0.79	5.77	7.25

3.3.1 Stormwater storage

The stormwater management plan, including drainage areas and flow directions, is shown in Figure B. Due to space restrictions within Catchment 15, stormwater storage for this catchment is proposed to be split across a rain garden, storage in the median strip and two interconnected basins. All lots <300 m² in Catchment 15 are proposed to be directly connected to the rain garden, which will be sized to retain the 15 mm event run-off from these lots. Run-off from other areas will be directed towards the median strip storage and basins downstream. Storage in the Catchment 15 median strip may take the form of a median swale or underground storage cells, or a combination of the two to achieve the required detention volumes.

The estimated bioretention volumes required for retention of the 15 mm rainfall event is shown in Table 5. These bioretention volumes account for some infiltration (20-40 mm/hr) within the biofiltration areas. All biofiltration areas are at least 3% of the connected impervious area.

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Table 5: Bioretention (minor event) stormwater volumes

Catchment	Bioretention volume (m ³)	Max water depth (m)	Indicative biofiltration area (m ²)
9	295	0.5	753
10	540	0.5	1331
15 (rain garden)	46.2	0.3	240
15 (median strip storage)	29.5	0.3	-
15 (interconnected basins)	375	0.55	963
15 total	451	-	-
16	408	0.25	1750

Flood detention storages are required to limit discharge rates from the site into the Ki-it Monger Brook so as to maintain pre-development flow rates within the brook. The modelled flood storage volumes are presented in Table 6 and indicative inundation areas are shown in Figure B. As per the LWMS (RPS 2018), Catchments 9 and 10 are only required to retain the 15 mm rainfall event within a biofiltration basin. Flows exceeding this may discharge into the Ki-it Monger Brook without further flood storage.

Table 6: Flood storage (major events) stormwater volumes

Catchment	5 year ARI			100 year ARI		
	Volume (m ³)	Depth (m)	Inundation area (m ²)	Volume (m ³)	Depth (m)	Inundation area (m ²)
9	295	0.5	753	295	0.5	753
10	540	0.5	1331	540	0.5	1331
15 (rain garden)	55	0.33	260	65	0.37	284
15 (median strip)	81	0.37	-	126	0.42	-
15 (interconnected basins)	550	0.72	1152	1184	1.16	1734
15 total	686	-	-	1375	-	-
16	1114	0.62	2144	6376	1.20	12785

All basins have been assumed to have 1:6 side slopes, except for the Catchment 15 basins due to space restrictions and the requirement for all drainage infrastructure to be located outside the Conservation Category Wetland (CCW) buffer. Engineering plans for the proposed Catchment 15 basins are shown in Appendix C. The basins are proposed to be walled on one side adjacent to the sewer pump station (where public access is limited) and have 1:4 side slopes on the remaining sides. Due to the depth of the basin and steeper sides, balustrading may be required around the basins and it is anticipated that a water safety audit will be required following final design and construction of these basins.

The basin for Catchment 16 has been sized as a rectangular basin that is 0.65 m deep with 1:6 batters to contain up to the 5 year ARI event to maximise usability of the District Open Space. Events greater than the 5 year ARI will overtop the basin and inundate a much larger area comprised of the sporting fields proposed for that location. The larger flood area has been modelled at 1:20 batters with a maximum water depth of 0.55 m (resulting in a maximum water depth of 1.2 m within the basin area). However, this aspect of the design will be further refined at detailed design stage to optimise POS useability (e.g. the 100 year inundation area could be increased to reduce water depth).

Drainage areas will be integrated into POS. A landscape concept plan for the town centre is shown in Appendix D.

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3.3.2 Discharge rates

The modelled peak discharge rates at key locations are shown in Table 7. Flow hydrographs at the LSPs final discharge point – the culvert under the Great Northern Highway – are presented in Figure 1 and show that the peak post-development discharge from the LSP site has been attenuated to pre-development conditions.

Table 7: Discharge rates at key locations

Discharge location	100 yr ARI 6 hr storm – peak discharge rate (m ³ /s)
Catchment 9	1.76
Catchment 15	2.67
Great Northern Highway	11.89

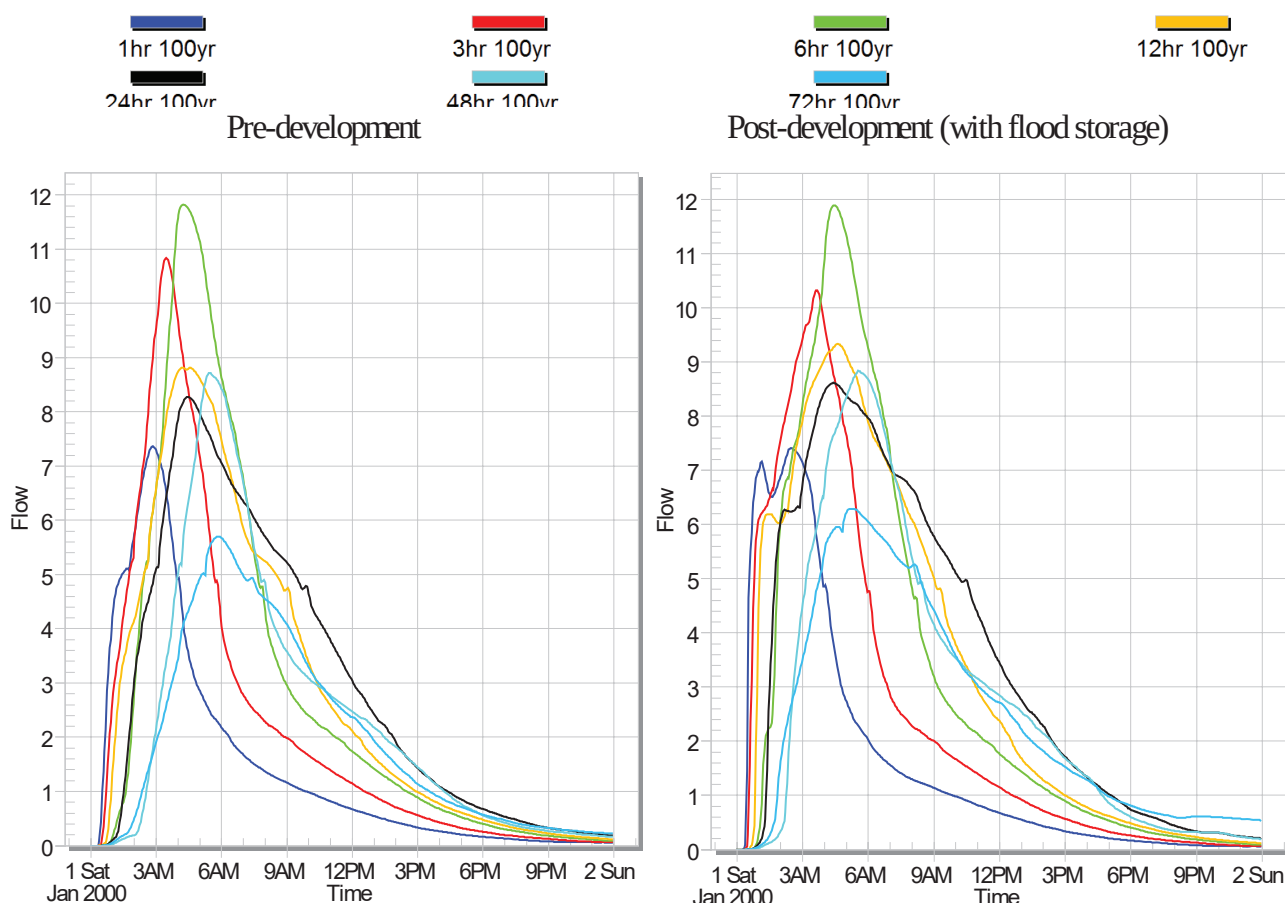


Figure 1: Great Northern Highway culvert – flow (m³/s)

MEMO

Date: 30 June 2021
Regarding: Kingsford town centre - Bullsbrook

4 CONCLUDING REMARKS

The Precinct Plan for the Kingsford Town Activity Centre proposes some changes to the layout that was modelled as part of the Local Structure Plan and Local Water Management Strategy. The changes result in some modifications to stormwater catchment boundaries and the breakdown of land uses and lot types. In terms of the proposed drainage design, the key change is the distribution of stormwater storage volumes within Catchment 15 which is now more spatially constrained due to a combination of the layout changes, the location of a sewer pump station within the POS area that was previously designated as drainage, and Conservation Category Wetland (CCW) buffer area constraints.

As detailed herein, the LWMS stormwater model has been updated with focus on the town centre catchments and drainage areas. Critical discharge points from the town centre have been modelled to achieve the overall LWMS drainage strategy and criteria, and drainage requirements within the Town Activity Centre have been defined. Due to the dynamic nature and uncertainty in the subdivision layout of the upstream catchments outside the town centre, drainage areas within those catchments have not been re-sized as part of this exercise. However, guidance has been provided within this addendum on estimated upstream catchment areas and area-based discharge rates. Design of the drainage areas within upstream catchments will be refined during detailed design once the proposed subdivision layout and catchment boundaries are confirmed.

5 REFERENCES

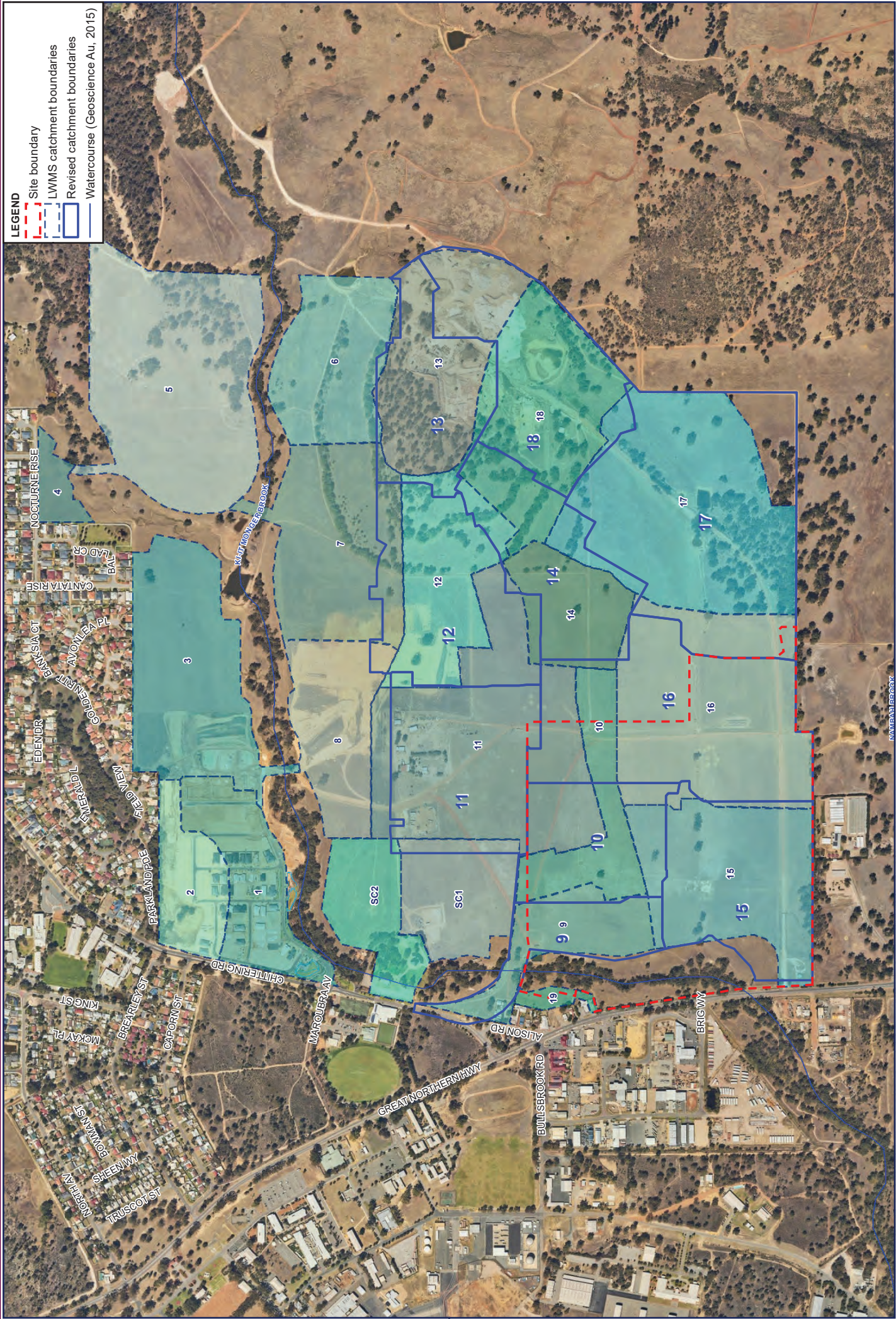
City of Swan 2013, *Stormwater Drainage Plan – Customer Checklist*, Planning Application, last updated 06 May 2013.

RPS 2018, *Local water management strategy: Bullsbrook Landholding*, prepared for Amex Corporation Pty Ltd, report ref. EWP13024.007 Rev 4, 2 May 2018.

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Date: 30 June 2021
Regarding: Kingsford town centre - Bullsbrook

Figures



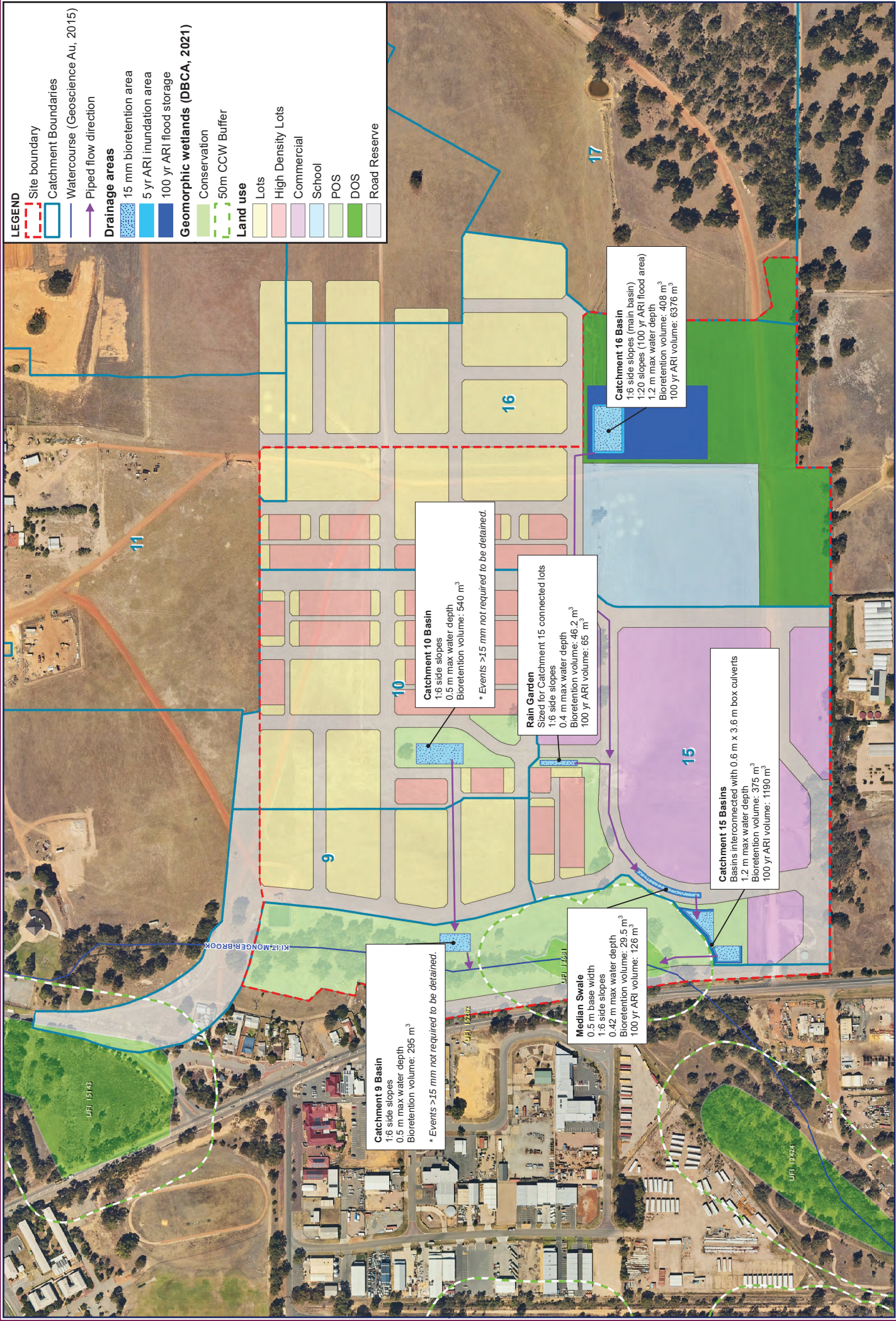


Figure B

Stormwater management plan



GDA 1984 MGA Zone 50



MEMO

Date: 30 June 2021
Regarding: Kingsford town centre - Bullsbrook

Appendix A Kingsford town centre plan



LEGEND

ACTIVITY CENTRE BOUNDARY



ZONES

GENERAL COMMERCIAL

RESIDENTIAL R40-R60

PUBLIC PURPOSE
PRIMARY SCHOOL

PS

POS/ CONSERVATION

DISTRICT OPEN SPACE

CHARACTER AREA

RETAIL

MAIN STREET

SERVICE COMMERCIAL

RESIDENTIAL

EDUCATION/RECREATION

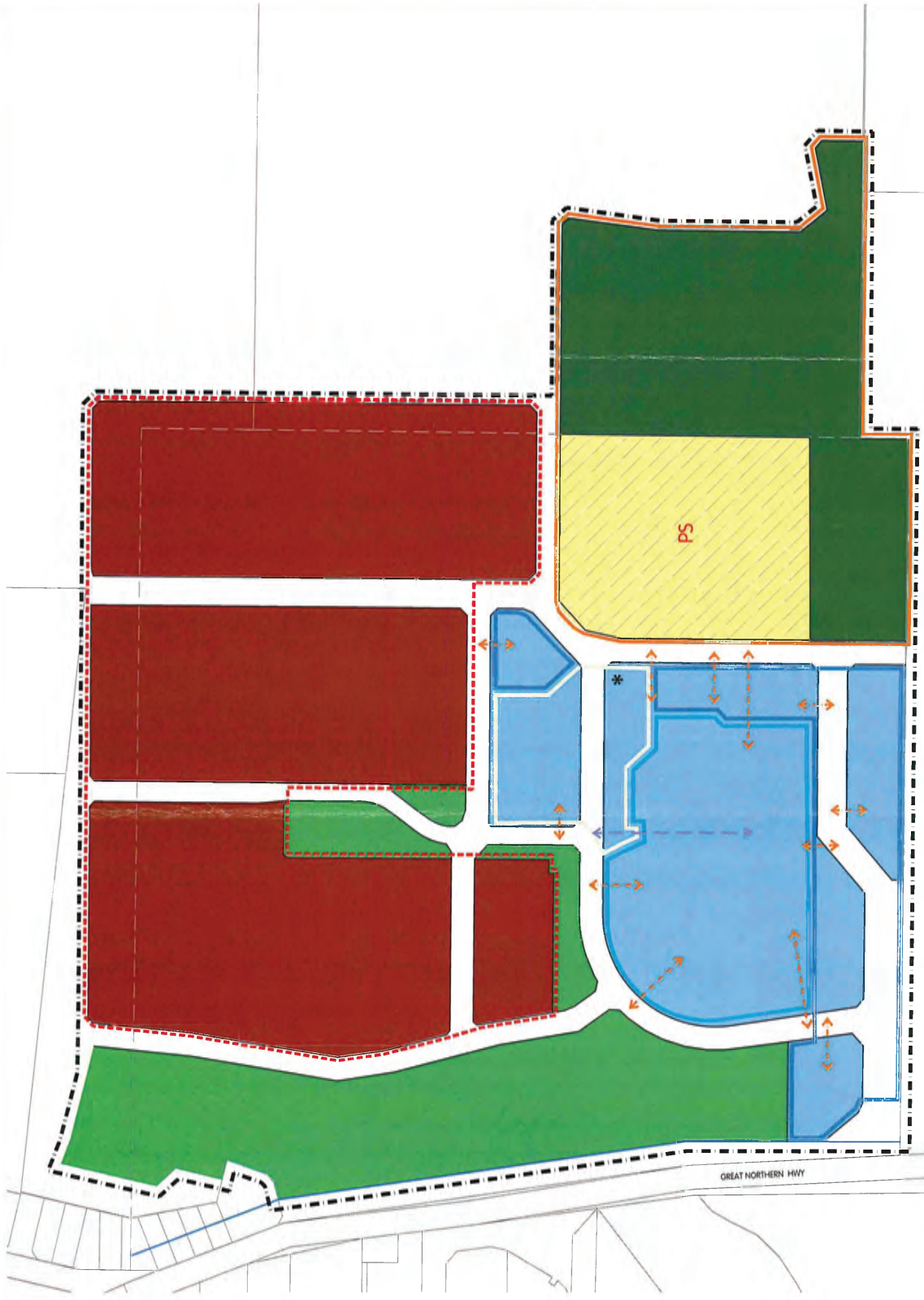
OTHER

R-CODE R80

PEDESTRIAN LINKAGES

VEHICLE ACCESS

LANDMARK BUILDING



CADASTRAL INFORMATION
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YYMMDD: 200407
DWG REF: RD1301A
PROJECTION: PCG94

AERIAL PHOTOGRAPHY
SOURCE: NA
YYMMDD: NA

HATCH | Robert'sDay

ACTIVITY CENTRE PLAN
Kingsford Town Centre - Bullsbrook
City of Swan

REF NO. DRAW NO. REV.
AMX BUL RD1 240 F



DISCLAIMER: ISSUED FOR DESIGN INTENT ONLY. ALL AREAS AND DIMENSIONS ARE SUBJECT TO DETAIL DESIGN AND SURVEY

MEMO

Date: 30 June 2021
Regarding: Kingsford town centre - Bullsbrook

Appendix B Kingsford masterplan (draft)

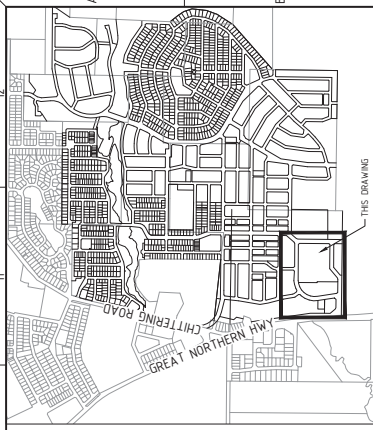
MEMO

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Regarding: Kingsford town centre - Bullsbrook

Appendix C Engineering plans



EXISTING LOT 1445



LOCALITY PLAN
SCALE 1:5

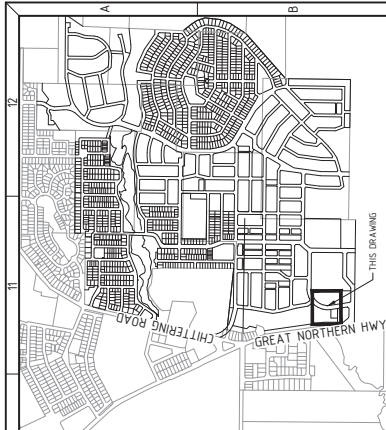
LEGEND

- PROPOSED ROAD
- PROPOSED/FUTURE SEWER
- PROPOSED SEWER RISING MAIN
- PROPOSED/FUTURE WATER
- PROPOSED DISTRIBUTION WATER MAIN
- EXISTING DISTRIBUTION WATER MAIN
- PROPOSED DRAINAGE PIT AND PIPE
- EXISTING TELSTRA
- PROPOSED HV ELECTRICAL CABLE
- EXISTING TREE TO BE PROTECTED
- PROPOSED VERGE SPOT HEIGHT
- PROPOSED FINISHED LOT SPOT LEVEL
- PROPOSED CONTOURS (0.5m INTERVAL)
- PROPOSED TRANSFORMER AND SWITCHGEAR
- PROPOSED POWER PILLAR
- OVERLAND/CATCHMENT FLOW ARROWS

WARNING
TRAFFIC LIGHTS
This drawing is not to be used for any purpose other than the design of the proposed traffic lights. It is not to be used for any other purpose. The design of the proposed traffic lights is the responsibility of the designer. The designer shall be responsible for the design of the proposed traffic lights and for the design of the proposed traffic lights. The designer shall be responsible for the design of the proposed traffic lights and for the design of the proposed traffic lights.

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STAGE KINGSFORD - BULLSBROOK TOWN CENTRE		PROJECT KINGSFORD		CLIENT okeland COMMUNITIES		DRAWING TITLE PRELIMINARY TOWN CENTRE ROADS AND SERVICES LAYOUT PLAN		MUNICIPALITY 0		MUNICIPALITY 0		MUNICIPALITY 0		MUNICIPALITY 0	
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DRAINAGE ARRANGEMENT AND BASINS UPDATED.		HV POWER CONCEPT UPDATED.		SEWER LOT CONNECTIONS, HW POWER AND CONTOURS ADDED TO DRAWING.		ISSUED FOR INFORMATION.		APPROVED		APPROVED		APPROVED		APPROVED	
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MEMO

Date: 30 June 2021
Regarding: Kingsford town centre - Bullsbrook

Appendix D Landscape concept plan

