

Ordinary Council Meeting

13 July 2016

Minutes



Members of the public who attend Council meetings should not act immediately on anything they hear at the meetings, without first seeking clarification of Council's position. Persons are advised to wait for written advice from the Council prior to taking action on any matter that they may have before Council.

Agendas and Minutes are available on the City's website www.kwinana.wa.gov.au

Vision Statement

Kwinana 2030 Rich in spirit, alive with opportunities, surrounded by nature – it's all here!

Mission

Strengthen community spirit, lead exciting growth, respect the environment - create great places to live.

We will do this by –

- providing strong leadership in the community;
- promoting an innovative and integrated approach;
- being accountable and transparent in our actions;
- being efficient and effective with our resources;
- using industry leading methods and technology wherever possible;
- making informed decisions, after considering all available information; and
- providing the best possible customer service.

Values

We will demonstrate and be defined by our core values, which are:

- Lead from where you stand Leadership is within us all.
- Act with compassion Show that you care.
- Make it fun Seize the opportunity to have fun.
- Stand Strong, stand true Have the courage to do what is right.
- Trust and be trusted Value the message, value the messenger.
- Why not yes? Ideas can grow with a yes.

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Present:

HER WORSHIP MAYOR C ADAMS CR R ALEXANDER CR W COOPER CR S MILLS CR B THOMPSON CR D WOOD

MS C MIHOVILOVICH	-	Acting Director City Strategy
MR P NIELSON	-	Acting Director City Development
MRS B POWELL	-	Director City Living
MS M BELL	-	Corporate Lawyer
MR E LAWRENCE	-	Director Corporate and Engineering Services
MS V PATTON	-	Governance and Risk Administration Officer

Members of the Press	0
Members of the Public	2

1 Declaration of Opening:

Presiding Member declared the meeting open at 7:00pm and welcomed Councillors, City Officers and gallery in attendance and read the Welcome.

"IT GIVES ME GREAT PLEASURE TO WELCOME YOU ALL HERE AND BEFORE COMMENCING THE PROCEEDINGS, I WOULD LIKE TO ACKNOWLEDGE THAT WE COME TOGETHER TONIGHT ON THE TRADITIONAL LAND OF THE NOONGAR PEOPLE"

2 Prayer:

Councillor Bob Thompson to read the Prayer

"OH LORD WE PRAY FOR GUIDANCE IN OUR MEETING. PLEASE GRANT US WISDOM AND TOLERANCE IN DEBATE THAT WE MAY WORK TO THE BEST INTERESTS OF OUR PEOPLE AND TO THY WILL. AMEN"

3 Apologies/Leave(s) of Absence (previously approved)

Apologies

Leave(s) of Absence (previously approved):

Deputy Mayor Peter Feasey from 5 July 2016 to 19 July 2016. Councillor Sandra Lee from 10 July 2016 to 18 July 2016 inclusive.

4 Public Question Time:

Public Question Time commenced at 7:02pm

4.1 Mr Jamie Mack, Wellard

Question 1

What is going to be the permanent outcome with regards to the reopening of Johnson Road?

Response

The Mayor referred the question to the Acting Director City Development who advised that with regards to the Johnson Road closure it will need to be partially closed due to the development of a new primary school site in the area. The part of Johnson Road that is being recommended tonight to be closed will become a reserve for the school and in particular form part of the playing fields. Johnson Road past the school is to be maintained as a reserve to allow for access to the primary school which will be opening in 2017 and will provide access in due course to a community pavilion. In the longer term, Council will need to determine whether they treat the road as a local road or as a lower order access road to the oval and community pavilion.

The full closure of Johnson Road has been reconsidered due to discussions with the Education Department. The intent has always been that Johnson Road was going to be redirected into the Providence Estate, there needs to be that connection to the Peel Main Drain, integration of drainage, road pavement and footpath and link with Millar Road and Wellard Road. In the future, there will be parts of the existing Johnson Road reserve which will be retained and some of it will be closed.

The City has written to Main Roads seeking to reduce the speed limit along Johnson Road from 70km to 50km and it is hopeful that Main Roads will be in support of the request.

The Mayor added that the City has to consider the implications to the Long Term Financial Plan and the works that are scheduled in 2026 could be brought forward, depending on the Council of the day. The Mayor mentioned that there could be an opportunity to add some traffic calming measures to assist the residents.

The Acting Director City Development advised that the use of traffic calming measure could be looked into.

4 PUBLIC QUESTION TIME CONTINUED

4.2 Mr Prikshit Pandhi, Wellard

Question 1

If Johnson Road is closed and when the new school opens would this cause a traffic management and congestion problem through Providence Estate?

Response

The Mayor referred the question to Acting Director City Development who advised that as part of the planning of the Providence Estate as well as the surrounding estates, traffic modelling is undertaken by the engineers associated with the land development. The City's engineers will review the modelling and will determine whether the City will carry out further modelling for the area. The roads within the Providence Estate have been designed to deal with the volume of traffic that the modelling has indicated. The modelling has anticipated that there will be local traffic moving through the Providence Estate and that any other traffic will redirected to Wellard Road and Millar Road as it will be a much faster route.

Question 2

Will the closure of the southern end of Johnson Road be closed permanently, has the closure been finalised or is there room for it to be changed?

<u>Response</u>

The Mayor referred the question to Acting Director City Development who advised that the current closure on Johnson Road is only temporary and will be reopened next week. The existing road pavement for Johnson Road will need to be removed for the development of the new school site. Within the next six to 12 months the school will start work on that site and that will effectively close the existing Johnson Road between Irasburg Parade and Millar Road until 2026 (unless construction is brought forward). The school will construct a new road alignment to access the northern part of Johnson Road. It is likely that access through to Millar Road from Johnson Road will not be possible and will be redirected through the Providence Estate. Johnson Road, as it is today, will be partially permanently closed, however Johnson Road at the northern end will be used to access the primary school site and Johnson Road at the southern end to access Lots 1,2 and 10 via Millar Road will remain open in the long term.

Public Question Times ceased at 7:20 pm

5 Applications for Leave of Absence:

COUNCIL DECISION 256 MOVED CR R ALEXANDER

SECONDED CR B THOMPSON

That Cr Wendy Cooper be granted a leave of absence from 9 September 2016 to the 27 September 2016 inclusive.

CARRIED 6/0

6 Declarations of Interest by Members and City Officers:

Councillor Wendy Cooper declared an impartiality interest in item 15.3 Road Closure of a portion of Johnson Road, Wellard – Local Public Notice due to living in the area.

7 Community Submissions:

Nil

8 Minutes to be Confirmed:

8.1 Ordinary Meeting of Council held on 22 June 2016:

<u>COUNCIL DECISION</u> 257 MOVED CR W COOPER

SECONDED CR B THOMPSON

That the Minutes of the Ordinary Meeting of Council held on 22 June 2016 be confirmed as a true and correct record of the meeting.

CARRIED 6/0

8.2 Special Meeting of Council held on 6 July 2016:

COUNCIL DECISION 258 MOVED CR W COOPER

SECONDED CR B THOMPSON

That the Minutes of the Special Meeting of Council held on 6 July 2016 be confirmed as a true and correct record of the meeting.

CARRIED 6/0

9 Referred Standing / Occasional / Management /Committee Meeting:

Nil

10 Petitions:

Nil

11 Notices of Motion:

Nil

12 Reports – Community

Nil

13 Reports – Economic

Nil

14 Reports – Natural Environment

Nil

15 Reports – Built Infrastructure

15.1 Proposed Road Name for Lot 13 Lyon Road, Wandi

SUMMARY:

Oakstreet Project Management, advisors for the Education Department for the development of the future school site at Lot 13 Lyon Road, Wandi, have forwarded details of the proposed road name as well as alternative road names as indicated in Attachment A. The advisors are now seeking Council approval of this name

The proposed road name has been entered into Landgate's "request road name" web page and has passed preliminary validation. The listed alternative road names will be used as a substitute for the proposed road name if it is not approved by the Geographic Names Committee. The naming theme for this road is a continuation from the Honeywood Estate Theme of Australian National Parks.

OFFICER RECOMMENDATION:

That Council approve the following road name for use within Lot 13 Lyon Road, Wandi subdivision, as shown in Attachment A.

• Windjana

Alternative Names:

- Purnululu
- Boorabbin

DISCUSSION:

Before the developer of a subdivision can lodge survey diagrams for clearance, all road names need to be approved and indicated on the survey diagram. The process for naming roads must adhere to Landgate's Geographic Names Committee Guidelines to ensure no duplication of road names occurs within the surrounding areas.

The Geographic Names Committee has granted in principle approval for the use of this road name via passing preliminary validation on Landgate's "request road name" web page. The naming theme for this road is a continuation of the Honeywood Estate theme being "Australian National Parks". Two road names are proposed as alternative road names for use in the event that the proposed name is not approved by the Geographic Names Committee. Origin information for these road names is listed below.

The proposed road names for the Lot 13 Lyon Road, Wandi subdivision is;

 Windjana – Windjana Gorge National Park in the Kimberley region of WA, the Gorge has been carved from the Lennard River and is 3km long and about 100m wide.

Alternative Names:

- Purnululu A World Heritage Site in the East Kimberley region of WA, which is 239,723 hectares and includes the Bungle Bungle Range.
- Boorabbin Boorabbin National Park, located between Coolgardie and Southern Cross.

15.1 PROPOSED ROAD NAME FOR LOT 13 LYON ROAD, WANDI

LEGAL/POLICY IMPLICATIONS:

Geographic Names Committee Guidelines. Council Policy – Street Naming

FINANCIAL/BUDGET IMPLICATIONS:

No financial/budget implications have been identified as a result of this report or recommendation.

ASSET MANAGEMENT IMPLICATIONS:

No asset management implications have been identified as a result of this report or recommendation.

ENVIRONMENTAL IMPLICATIONS:

No environmental implications have been identified as a result of this report or recommendation.

STRATEGIC/SOCIAL IMPLICATIONS:

No strategic/social implications have been identified as a result of this report or recommendation.

RISK IMPLICATIONS:

The approval of the road names is required for titles to be issued for the lots within the subdivision. Should Council not approve these road names, clearances will be delayed which will have implications for the developer and the future owners of these lots.

259 MOVED CR D WOOD

SECONDED CR S MILLS

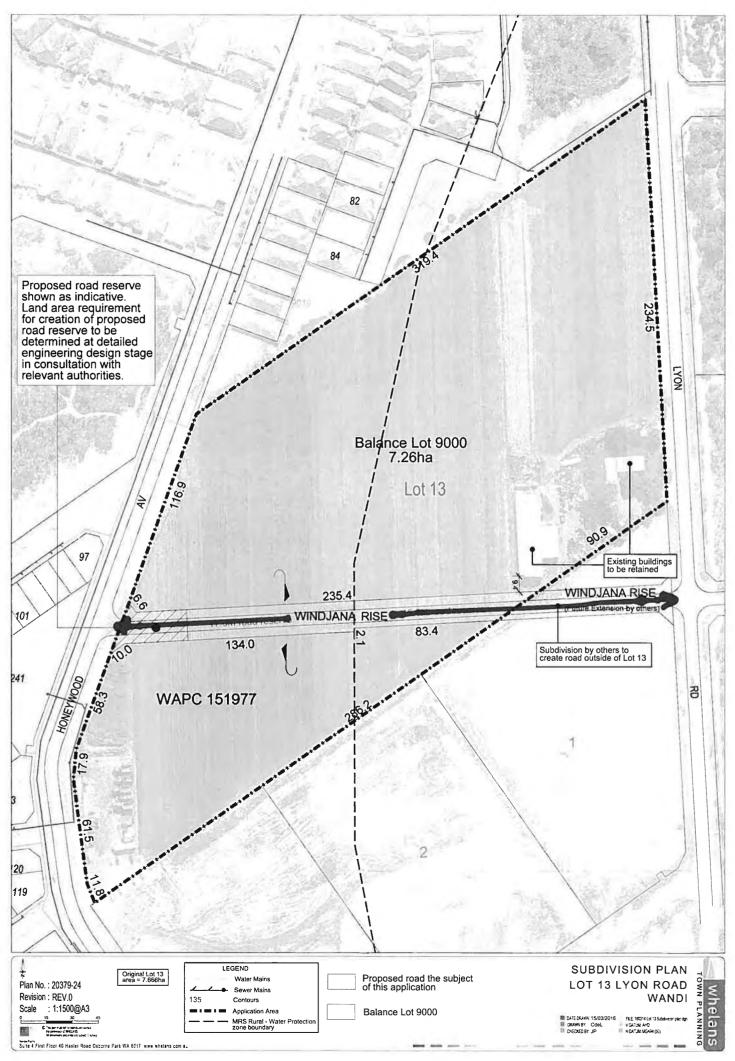
That Council approve the following road name for use within Lot 13 Lyon Road, Wandi subdivision, as shown in Attachment A.

• Windjana

Alternative Names:

- Purnululu
- Boorabbin

CARRIED 6/0



ATTACHMENT A

15.2 Proposed Road Names for Oakebella Estate, Wellard

SUMMARY:

McMullen Nolan Group, the surveyors for the developer of Oakebella Estate, have submitted details of the proposed road names, as well as alternative road names, for the Oakebella Estate development, as indicated in Attachment A. McMullen Nolan Group are now seeking Council approval of these names. One of the existing roads, Tamblyn Place, will have a suffix change, this is shown in Attachment A.

The proposed road names have been entered into Landgate's "request road name" web page and have all passed preliminary validation. The listed alternative road names will be used as a replacement for any proposed road name that is not approved by the Geographic Names Committee. The theme for the roads throughout this development is "Vegetables" in various languages, reflecting both the former use of land within the Wellard area and the cultural history in that market gardens were mostly taken up by European immigrants seeking a better life in Australia. The origin information for the proposed road names is contained in Attachment B.

OFFICER RECOMMENDATION:

That Council approve the following road names for use within the Oakebella development, as shown in Attachment A:

Proposed Names:	Alternative Names:
Apium	Agilo
Asparago	Allium
Capsico	Betis
Carota	Brassica
Cavolo	Chou
Celer	Panais
Chili	Pois
Cipolla	Porrum
Faba	Rapa
Herbes	Salade
Kurbis	Spargel
Mais	Tikva
Navet	Zucca
Concombre	
Pomodoro	
Lattuga	
Repa	
Rettich	
Sedano	
Tomate	

15.2 PROPOSED ROAD NAMES FOR OAKEBELLA ESTATE, WELLARD

DISCUSSION:

Before the developer of a subdivision can lodge survey diagrams for clearance, all road names need to be approved and indicated on the survey diagram. The process for naming roads must adhere to Geographic Names Committee guidelines to ensure no duplication of road names occurs within the surrounding areas.

The Geographic Names Committee has granted in principle approval for the use of these road names via passing preliminary validation on Landgate's "request road name" web page. The naming theme for these roads is "Vegetables". Thirteen road names are proposed as alternative road names for use in the event that the proposed names are not approved by the Geographic Names Committee. Origin information for these road names is contained in Attachment B.

Tamblyn Place will now be changed to Tamblyn Way with this approval.

Proposed Names:	Alternative Names:
Apium	Agilo
Asparago	Allium
Capsico	Betis
Carota	Brassica
Cavolo	Chou
Celer	Panais
Chili	Pois
Cipolla	Porrum
Faba	Rapa
Herbes	Salade
Kurbis	Spargel
Mais	Tikva
Navet	Zucca
Concombre	
Pomodoro	
Lattuga	
Repa	
Rettich	
Sedano	
Tomate	

The proposed road names for the Oakebella development are;

LEGAL/POLICY IMPLICATIONS:

Council Policy – Street Naming

FINANCIAL/BUDGET IMPLICATIONS:

No financial/budget implications have been identified as a result of this report or recommendation.

15.2 PROPOSED ROAD NAMES FOR OAKEBELLA ESTATE, WELLARD

ASSET MANAGEMENT IMPLICATIONS:

No asset management implications have been identified as a result of this report or recommendation.

ENVIRONMENTAL IMPLICATIONS:

No environmental implications have been identified as a result of this report or recommendation.

STRATEGIC/SOCIAL IMPLICATIONS:

No strategic/social implications have been identified as a result of this report or recommendation.

RISK IMPLICATIONS:

The approval of the road names is required for titles to be issued for the lots within the subdivision. Should Council not approve these road names, clearances will be delayed which will have implications for the developer and the owners of these lots.

15.2 PROPOSED ROAD NAMES FOR OAKEBELLA ESTATE, WELLARD

<u>COUNCIL DECISION</u> 260 MOVED CR B THOMPSON

SECONDED CR D WOOD

That Council approve the following road names for use within the Oakebella development, as shown in Attachment A:

Proposed Names:	Alternative Names:
Apium	Agilo
Asparago	Allium
Capsico	Betis
Carota	Brassica
Cavolo	Chou
Celer	Panais
Chili	Pois
Cipolla	Porrum
Faba	Rapa
Herbes	Salade
Kurbis	Spargel
Mais	Tikva
Navet	Zucca
Concombre	
Pomodoro	
Lattuga	
Repa	
Rettich	
Sedano	
Tomate	



Proposed Name	Proposed Suffix	Source of info	Background/origin/meaning/justification
Apium	Lane	https://en.wikipedia.org/wiki/Celery	Latin for Celery (Apium graveolens)
Asparago	Street	http://www.collinsdictionary.com/dictionary/english-italian/asparagus	Italian for Asparagus
Capsico	Grove	http://www.collinsdictionary.com/dictionary/english-italian/capsicum	Italian for Capsicum
Carota	View	https://en.wikipedia.org/wiki/Carrot	Latin for Carrot (Daucus carota)
Cavolo	Street	http://www.collinsdictionary.com/dictionary/english-italian/cabbage	Italian for Cabbage
Celer	Lane	https://glosbe.com/en/hr/celery	Croatian for Celery
Chili	Way	http://www.collinsdictionary.com/dictionary/english-german/chilli	German for Chilli
Cipolla	Street	http://www.collinsdictionary.com/dictionary/english-italian/onion	Italian for Onion
Faba	Place	https://en.wikipedia.org/wiki/Vicia_faba	Latin for Bean
Herbes	Way	http://www.collinsdictionary.com/dictionary/english-french/herb	French for Herbs
Kurbis	Road	http://www.collinsdictionary.com/dictionary/english-german/pumpkin	German for Pumkin
Mais	Lane	http://www.collinsdictionary.com/dictionary/english-german/sweetcorn	German for Sweet Corn
Navet	Street	http://www.collinsdictionary.com/dictionary/english-french/turnip	French for Turnip
Concombre	Street	http://www.collinsdictionary.com/dictionary/english-french/cucumber	French for Cucumber
Pomodoro	Crescent	http://www.collinsdictionary.com/dictionary/english-italian/tomato	Italian for Tomato
Lattuga	Drive	http://www.collinsdictionary.com/dictionary/english-italian/lettuce	Italian for Lettuce
Repa	Way	https://glosbe.com/en/hr/turnip	Croatian for Turnip
Rettich	Street	http://www.collinsdictionary.com/dictionary/english-german/radish	German for Radish
Sedano	Crescent	http://www.collinsdictionary.com/dictionary/english-italian/celery	Italian for Celery
Tomate	Crescent	http://www.collinsdictionary.com/dictionary/english-french/tomato	French for Tomato

Proposed Backup Name	Source of info	Background/origin/meaning/justification
Aglio	http://www.collinsdictionary.com/dictionary/english-italian/garlic	Italian for Garlic
Allium	http://latin-dictionary.net/search/english/garlic	Latin for Garlic
Betis	http://latin-dictionary.net/search/english/beetroot	Latin for Beetroot
Brassica	http://latin-dictionary.net/search/english/cabbage	Latin for Cabbage
Chou	http://www.collinsdictionary.com/dictionary/english-french/cabbage	French for Cabbage
Concombre	http://www.collinsdictionary.com/dictionary/english-french/cucumber	French for Cucumber
Panais	http://www.collinsdictionary.com/dictionary/english-french/lettuce	French for Parsnip
Pois	http://www.collinsdictionary.com/dictionary/english-french/pea	French for Pea
Porrum	http://latin-dictionary.net/search/english/leek	Latin for Leek
Rapa	http://latin-dictionary.net/search/english/turnip	Latin for Turnip
Salade	http://www.collinsdictionary.com/dictionary/english-french/lettuce	French for Lettuce
Spargel	http://www.collinsdictionary.com/dictionary/english-german/asparagus	German for Asparagus
Tikva	http://www.crodict.com/english-croatian/squash.html	Croatian for Squash
Zucca	http://www.collinsdictionary.com/dictionary/english-italian/pumpkin	Italian for Pumpkin

15.3 Road Closure of a portion of Johnson Road, Wellard – Local Public Notice

SUMMARY:

This report presents a partial road closure of the Johnson Road road reservation, south of the Emerald Park estate. Closure of this road reserve has long been contemplated and planned for and is now revised to incorporate road reserve land into the adjacent Primary School site and Public Open Space for a local sports ground. Full access to Millar Road was to be provided via a re-alignment of Johnson Road through the Providence Estate. This realignment is now completed and residents affected by the road closure now have alternative north-south access via the redirected Johnson Road through Providence Estate (these roads are now named Irasburg Parade & Fairhaven Boulevard).

A Project Group attended by City Officers and the Department of Education (DoE) (jointly funded) has undertaken a planning and design process for the school and POS. The Project Group is now recommending partial closure of the older Johnson Road Reserve in order to retain some of the old reserve alignment for the staged development of a lower order roadway for the benefit of the school and local traffic. This differs from previous planning that contemplated the road being closed altogether, effectively severing access to Millar Road. As the primary school is scheduled to open in February 2018, the City is now required to commence the road closure process under the Land Administration Act 1997 for a portion of the existing road reserve.

OFFICER RECOMMENDATION:

That Council give local public notice of the proposed road closure of a portion of Johnson Road, Wellard as detailed in Attachment C.

DISCUSSION:

At its meeting on 25 June 2014, Council resolved to adopt a major change to the Wellard West LSP for the Emerald Park Estate (Attachment B). This modification included the southern portion of Johnson Road adjacent to the Estate being partially closed to facilitate the development of a primary school and associated POS site (Attachment D). The closure of Johnson Road was consistent with the draft Eastern Residential Intensification Concept (ERIC) District Structure Plan which contemplated through traffic being redirected through the Providence Estate to Wellard Road. The road network through Providence from Wellard Road to Johnson Road is now complete.

Background

This major change to the Wellard West LSP reflected a proposal to close Johnson Road identified in the draft ERIC district structure plan. At the time of preparing the ERIC structure plan, the City had proposed a 'half diamond' interchange of the Kwinana Freeway at the Millar Road intersection. The plan proposed an on-ramp from Millar Road onto the Freeway travelling northbound and an off-ramp for traffic travelling south on the Freeway to exit at Millar Road.

In order to develop this Freeway interchange the southern portion of Johnson Road was required to be closed and north-south traffic re-directed further away from the Freeway/Millar Road interchange to increase the spacing between the proposed Millar Road/Freeway interchange and the Johnson Road/Millar Road intersection. To achieve the required intersection spacing, the ERIC structure plan proposed to re-route Johnson

Road across the Peel Main Drain and through what is now known as the Providence estate. However, in February 2011, Main Roads advised they did not support the construction of an interchange at Millar Road.

Notwithstanding the decision of Main Roads not to support the Millar Road interchange, Local Structure Plans received for the Providence estate in 2012 and a major change to the Wellard West LSP in 2014 continued to reflect the proposal to close and realign Johnson Road shown in the ERIC structure plan.

Wellard West Primary School and POS Master Plan

The City, in conjunction with the Department of Education has been working on a Master Plan (Attachment D) for the primary school and adjacent POS. The POS will serve as a Local Sports Ground for the surrounding community and also be shared with the school for their use. In developing the Master Plan for the site, the issue of access to the school and POS has arisen. The Wellard West LSP (Attachment B) proposed an access road running alongside the western edge of primary school site to provide access to the POS and future Local Sporting Pavilion. The structure plan shows this road terminating at the boundary of the POS site.

The project team (comprising of officers from the Department of Education and the City) have reviewed the access arrangements to the primary school, POS and future Local Sporting Pavilion and now consider that a through connection to Millar Road should be maintained – albeit via a lower order access road. This road will provide better circulation and access to the school and POS and will be designed and managed as a low speed access road. The main north-south traffic flow will continue to be via the redirected Johnson Road through Providence Estate.

Traffic Implications

The City's Engineering Department have considered a number of options regarding access to the primary school and playing fields. These options included full closure of Johnson Road, the approved Wellard West structure plan proposal, to close only a portion of Johnson Road which is required for the pavilion, and the option to maintain Johnson Road as a through road albeit as a lower order access road.

Given the school site and pavilion/playing fields, will generate high volumes of traffic for short periods of time. Be it school traffic at peak drop off and pick up times, or weekend sporting days at the playing fields, traffic congestion will be an issue with all entering and exiting traffic using a single entry/exit road that is a cul de sac with no alternate means to alleviate traffic congestion. This will result in traffic congestion, delays and increased travel times.

The initiative for Johnson Road to remain open to service the above uses will be beneficial by providing an interconnected street system, which offers traffic circulation and alternate routes that are able to distribute traffic more evenly during the peak times, rather than creating grid lock associated with a cul de sac. Maintaining Johnson Road open also provides reduced local travel distances for users of these facilities from South of the area, for example the Lots 1, 2 and 10 Johnson Road development or Wellard East developments, and in particular provides shorter travel distance and improved access for pedestrians and cyclists, which will encourage some cycling and walking trips over vehicle trips if the travel distances are shorter for the local community.

Rather than a full closure of Johnson Road, the City is now proposing a partial closure of the Johnson Road reservation. The current Johnson Road reservation is excessive for the needs of a lower order access road and can be reduced to 14-17.5m width to provide adequate room for drainage, road pavement and footpath. The alignment will immediately abut the Peel Main Drain reserve so that the surplus road reservation land can be incorporated in the primary school and POS sites. Refer to Attachment C for these details.

The DoE has scheduled the school to open in February 2018. In order to ensure the school development can be completed on schedule, the City is now required to commence the road closure process under the Land Administration Act 1997.

Construction and Staging

The purpose of this report is to commence the formal road closure process to enable land within the current road reserve to be incorporated into the Primary School site and for the playing fields. The staging of the removal of the existing road pavement and the construction of the new access road are summarised below:

Current Works

- Irasburg Parade and the crossing over the Peel Main Drain were opened recently. The main route for neighbourhood traffic to Millar Road / Wellard Road is now through Providence Estate as planned.
- The northern section of Johnson Road (Stage 1 on Attachment E) from the Breccia Parade intersection has been closed and the road pavement removed.
- Eastcourt (developer of the Providence estate) will construct Stage 1 of the new access road within approximately 1 week from the time of writing.
- At this time Johnson Road will re open to traffic.

2017/18 Works

- Subject to the road reserve closure process (initiation and advertising being undertaken), Stages 2 and 3 of the Johnson Road pavement will be removed to allow development of the primary school and public open space. This is anticipated to commence by the end of 2017.
- At this point, Johnson Road will no longer be trafficable between Irasburg Parade and Millar Road until 2026 (*unless construction is brought forward*).
- Access will still be possible to the primary school site (via Stage 1 of the new access road) and Lots 1, 2 and 10 Johnson Road will retain access from Johnson Road via Millar Road.
- 2017/18 the Department of Education will construct Stage 2 of the new access road within the reduced road reserve to access the primary school as per the concept plan (Attachment D) and consistent with the Wellard West LSP.

2026 Works

- The City will construct Stage 3 of the new access road to the sporting pavilion / community centre at the same time as the construction of the Community Pavilion which is currently scheduled to commence in 2026 under the City's Community Infrastructure Plan 2011 2031 (Revised 2015) (CIP).
- At this stage there two options: either to tie Stage 3 of the new access road into the old (existing) pavement of Johnson Road, south of the POS <u>or</u> to construct Stage 4 of the new access road within the reduced road reserve (subject to budgeting).

The CIP has been advertised however not finally adopted by Council. The timing of this community facility (and potentially Stage 3 of the new access road) could be changed, subject to further consideration, particularly the effect on the City's long term financial planning.

Summary

Closure of the southern portion of Johnson Road has been contemplated and planned for to allow the surplus road reserve land to be incorporated in the primary school and POS, thereby more effectively using the land. Formal closure of the land within the road reservation to be incorporated into the primary school and POS is now required so the primary school and POS can be developed in time for the opening of the primary school in 2018. However, full closure of the road is no longer the recommended approach, as the City considers that a lower order access road is a better long term outcome for access to the primary school and POS. Therefore a partial road closure is proposed.

Residents affected by the road closure now have alternative north-south access via the redirected Johnson Road through Providence Estate, as the culvert crossing over the Peel Main Drain has recently been completed. It is recommended that Council endorse the commencement of the road reserve closure process.

LEGAL/POLICY IMPLICATIONS:

Land Administration Act 1997

58. Closing roads

(3) A local government must not resolve to make a request under subsection (1) until a period of 35 days has elapsed from the publication in a newspaper circulating in its district of notice of motion for that resolution, and the local government has considered any objections made to it within that period concerning the proposals set out in that notice.

FINANCIAL/BUDGET IMPLICATIONS:

The provision of the Local Public Notice advertisement will cost approximately \$200 and will be funded from the GOVADV account.

As mentioned in this report, development contributions will fund some of the works associated with the ripping up of the existing road pavement (DCP1) and construction of the new access road (DCP12). The southern most portion of the access road would need to be funded by the City at a later date, likely to align with the opening of the Local Sporting Pavilion / Community Centre. Currently this facility is planned for 2026, however the City is considering revising that schedule to an earlier date due to likely demand for such a facility. Both of these points (funding the southern section of access road and bringing forward the Local Sporting Pavilion / Community Centre) will require further consideration and endorsement by Council. If Council were not to fund the southern portion of the new road, the POS and primary school could still function, however at a less than optimal standard in terms of traffic access. Nonetheless, this discussion can be held at a later date, as this report does not commit the Council to funding this road, but instead recommends the partial closure of the existing road reservation so that the land can be incorporated in the primary school and POS sites.

ASSET MANAGEMENT IMPLICATIONS:

There are no asset management implications identified as a direct result of this report. However, the City will take on management responsibilities of the new road once that is constructed.

ENVIRONMENTAL IMPLICATIONS:

There are no environmental implications identified as a result of this report.

STRATEGIC/SOCIAL IMPLICATIONS:

The formal closure of the road reservation is an important step in delivering the primary school and POS by 2018. This action is consistent with the objectives of the City's Strategic Community Plan 2015-2025, specifically:

- 2.2 The community has a choice of quality public and private facilities to meet their education and training needs through their lifetime.
- 4.2 The community has easy access to well equipped, quality parks and public open spaces.

RISK IMPLICATIONS:

Should Council resolve not to give local public notice, as per Section 58 of the Land Administration Act 1997, the closure process cannot proceed.

COUNCIL DECISION

261

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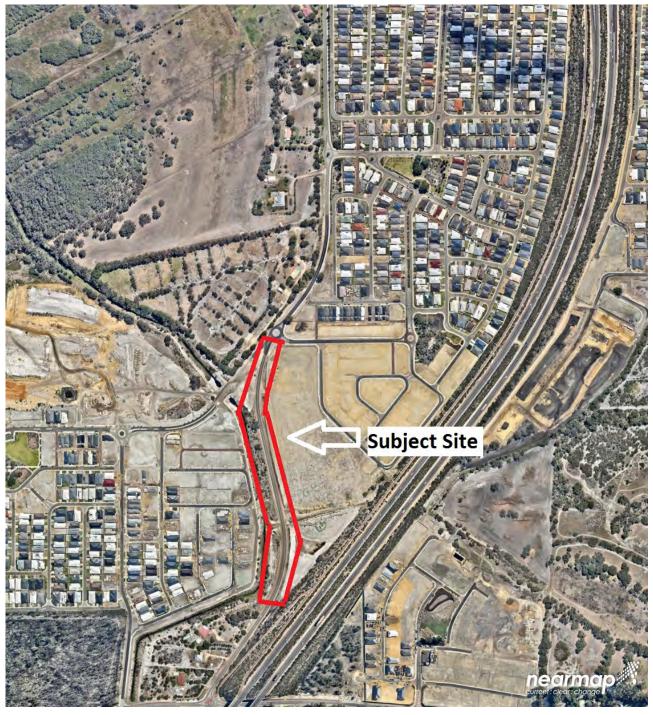
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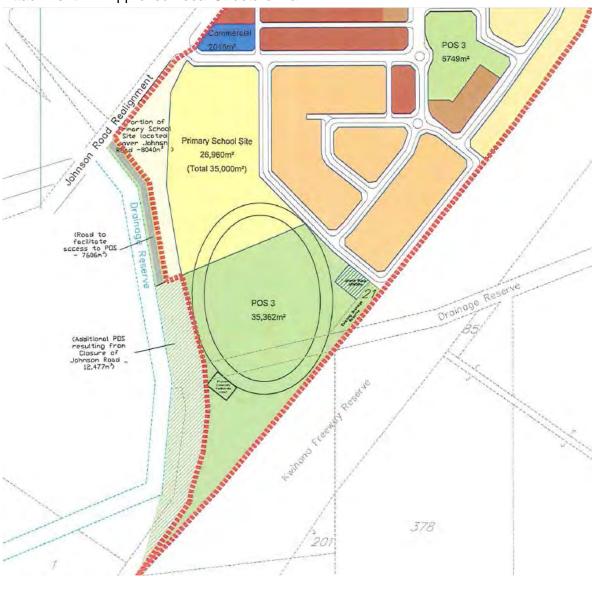
- 1 That Council give local public notice of the proposed road closure of a portion of Johnson Road, Wellard as detailed in Attachment C.
- 2 A report to be prepared by City Officers for the Ordinary Council Meeting to be held on 10 August 2016, to consider how best to progress the future of Johnson Road, Wellard.

CARRIED 6/0

NOTE – That the Officer Recommendation has been amended to include point 2.

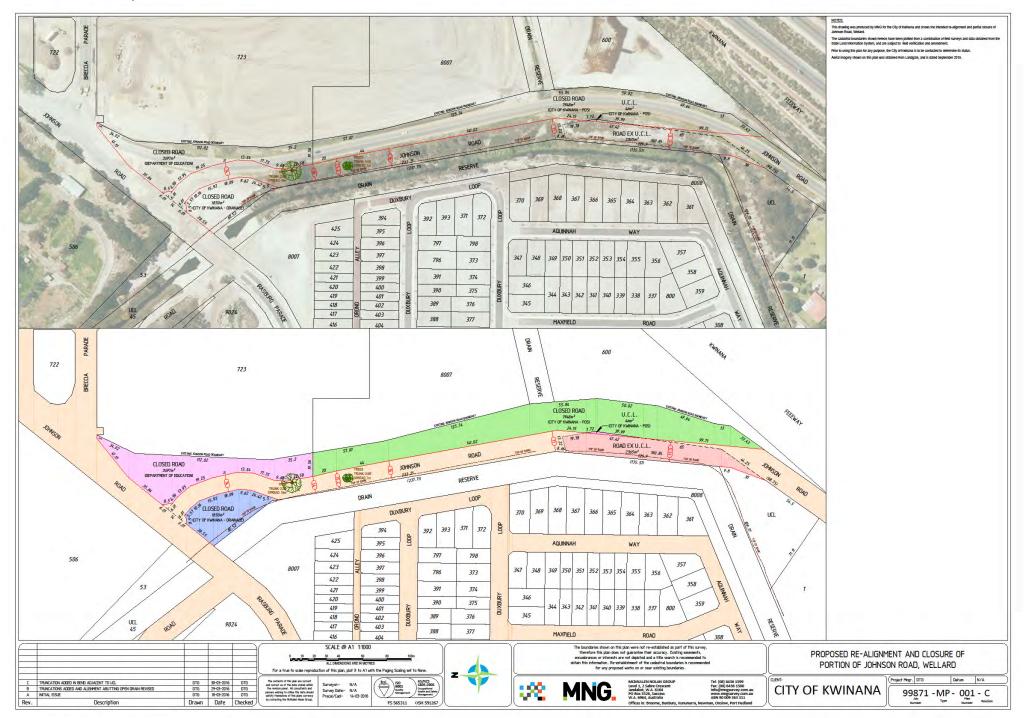
Attachment A – Location Plan





Attachment B – Approved Local Structure Plan





Attachment D – Proposed Master Plan of Primary School and Shared Use POS



Johnson Road Closure Staging Plan

the same last when when same same

ATTACHMENT C

Stage 1 - Eastcourt to Remove once Road is constructed across Peel Main Drain

Drainage basin

Commercial

2016m²

Staff Parking - 28 bays

Main pedestr

Stage 2 - Dept of Education to Remove - Construction of Primary School



15.4 Fremantle to Rockingham Controlled Access Highway – Route Definition Study – City of Kwinana Submission

SUMMARY:

Main Roads WA (MRWA) have approached the City seeking preliminary comments on the design concept for a portion of the Fremantle to Rockingham Controlled Access Highway (FRCAH). The FRCAH is intended to provide a strategic north – south connection to industrial and commercial centres in the south west sub region of Perth. The FRCAH route has been reserved under the Metropolitan Region Scheme (MRS) since 1981 (see Attachment C). Main Roads are currently undertaking a concept design of the section of the FRCAH from Thomas Road to Mundijong Road.

Main Roads presented the design concept to Council at a Councillor Forum on 15 February 2016. Following this forum, the City received a formal request for comment from Main Roads. City Officers have assessed the Route Definition Study (see Attachment B) and have made a number of recommendations to MRWA which incorporate comments raised by Elected Members at the Councillor Forum. City Officers now request Council endorsement of the City's submission (Attachment D).

OFFICER RECOMMENDATION:

That Council endorse the attached submission (Attachment D) and forward the City's submission to Main Roads WA.

DISCUSSION:

Main Roads WA (MRWA) are seeking preliminary comments on the design concept for a portion of the FRCAH. Main Roads presented the design concept to Council at a Councillor Forum on 15 February 2016. Following this Forum, the City received a formal request for comment from Main Roads (Attachment A). City Officers have assessed the Route Definition Study (see Attachment B) and have made a number of recommendations to MRWA based on comments, including those raised by Elected Members at the Councillor Forum.

Background

The FRCAH is intended to provide a strategic north – south connection to industrial and commercial centres in the south west sub region of Perth. The FRCAH will provide improved regional access to the Western Trade Coast from the Kwinana Freeway, Rockingham and Fremantle. The FRCAH route travels south from Rockingham Road in Hope Valley, crossing Anketell Road, Thomas Road and Wellard Road before continuing south through the Leda Reserve to connect to Gilmore Avenue/Dixon Road intersection. Finally the FRCAH will connect to the recently constructed Kulija Road to provide access to the Kwinana Freeway. The FRCAH route has been reserved under the Metropolitan Region Scheme (MRS) since 1981. Main Roads are currently undertaking a concept design of the section of the FRCAH from Thomas Road to Mundijong Road.

Current Route Definition Study

The current Route Definition Study considers the issues surrounding the alignment of the FRCAH to enable progress towards detailed design of the preferred route. The study covers a 10.5 km section of the road from the intersection at Thomas Road in Medina to Mundijong Road in Baldivis. The road alignment identified in the current study shows the proposed road maintained within the current MRS road reservation for the section of road from Thomas Road to Gilmore Avenue. South of Gilmore Avenue, the current reservation shows the FRCAH intersecting Gilmore Avenue/Dixon Road, with traffic continuing south west towards Rae Road.

Studies to Consider a Revised Road Alignment

In recent times, a number of factors had influenced the alignment of the FRCAH route and led to the realignment of the FRCAH south of Gilmore Avenue. The current MRS reservation intended to route the FRCAH south west from the intersection of Gilmore Avenue/Dixon Road following the alignment of the Mandurah Railway towards Rockingham. Studies were undertaken in 2009, 2011 and 2013 which identified the need for the FRCAH to provide a connection to Mundijong Road and onto the Kwinana Freeway to allow freight traffic a direct connection to the Freeway. Main Roads undertook an alignment study in 2013 which identified Main Roads preferred option to route the FRCAH south from Gilmore Avenue to directly connect to Kulija Road. The West Australian Planning Commission subsequently endorsed this alignment in 2013.

The current FRCAH alignment south of Gilmore Avenue shows the road deviates from its current reservation travelling south east to connect to Kulija Road, providing a direct connection to the Freeway. The design of the intersection of the FRCAH and Gilmore Avenue has implications for access to the City which are discussed below. The Route Definition Study also shows proposed intersection treatments to the existing road network. The intersection of the FRCAH and Thomas Road is proposed as a full diamond intersection. The study proposes only a half diamond interchange at Gilmore Avenue, meaning there is no direct access for vehicles entering from Gilmore Avenue to the FRCAH travelling south. Also, there is no direct access to the FRCAH travelling south on the FRCAH wishing to exit at Gilmore Avenue. Access to the FRCAH travelling south is to be via Dixon Road and Mandurah Road. Finally, the study proposes to terminate Wellard Road at the FRCAH. The City has raised concerns regarding the treatment of these intersections which are outlined below.

City Recommendations

City Officers have reviewed the Route Definition Study. Whilst the City is broadly supportive of the concept design a number of concerns (particularly related to intersection treatments) have been raised in the City's submission. These issues are outlined further below.

Gilmore Avenue / Dixon Road / Mandurah Road intersection

The study proposes only a half diamond interchange at the intersection of Gilmore Avenue/ Dixon Road/Mandurah Road. This results in there being no access for vehicles entering the FRCAH travelling south from Gilmore Avenue. Also, there is no access available for traffic travelling north on the FRCAH wishing to exit at Gilmore Avenue. The City does not support this limited and indirect access to Gilmore Avenue, particularly when approaching along the FRCAH from the south. The City believes clear and direct access is critical for the economic development of the City and the viability of local business and residents in the area.

The current design provides stronger connectivity with Dixon Road rather than Gilmore Avenue. This is flawed principally as both roads provide critical access to each local authority's central areas and therefore should be treated with equal importance.

The City is not satisfied that the alternative means of access to the City along Mandurah Road and Dixon Road are appropriate. The City has requested further justification for the design concept (i.e. travel times and modelling) or a redesign of this intersection to provide direct access to Gilmore Avenue. The City also recommends planning for an upgrade of the Gilmore Avenue/Dixon Road/Mandurah Road should be considered as part of the planning for the FRCAH to resolve existing congestion issues.

Wellard Road

The current proposal identifies Wellard Road being terminated at the FRCAH. Termination of Wellard Road will be a poor outcome for the community and will have a severe adverse impact on the existing road network and future traffic flow within Kwinana as alternative routes to access Mandurah Road and Kwinana Industrial Area from western suburbs and central Kwinana will require a substantially longer travel route. The City does not accept that Wellard Road should be terminated by the FRCAH and suggests instead that sufficient land should be reserved at this intersection to enable Wellard Road to either pass over or under the FRCAH to allow this east west connection to remain.

Cycleways

The design concept does not show any cycleway connections to Gilmore Avenue, Wellard Road or Thomas Road in the same way that detail is provided for Baldivis Road. The City has recommended the design concept includes cycleway connections to all intersecting roads and to ensure that the cycleways fit within the road reservation.

Environment

The City has also made a recommendation in relation to environmental issues. The FRCAH passes through an area of Bush Forever between Thomas Road and Kulija Road (Bush Forever Site 349). Main Roads have undertaken an extensive flora survey within this area. The City has made a recommendation that areas affected by, or adjacent to the road construction being rehabilitated including the off road vehicle area south of Thomas Road. The City's submission also includes recommendations for fauna tunnels to be constructed along the route of the FRCAH.

Noise / visual impact

The City has raised concerns regarding the impact (both visually and noise implications) for existing residential areas on the eastern side of the FRCAH route in the suburbs of Medina, Calista and Parmelia. Further details are requested on the visual impact of the FRCAH as viewed from Thomas Oval and the surrounding residential area of Medina. The FRCAH is proposed to cross above Gilmore Avenue and Mandurah Railway. The City has requested details of the proposed height of the road in this location and recommended an acoustic assessment be undertaken to determine the impact of road noise and to surrounding residential suburbs and whether there is a need for noise walls to be constructed as part of the FRCAH construction.

Conclusion

City Officers have assessed the Route Definition Study and have a number of concerns regarding the intersection treatments, environmental implications and impacts on surrounding residents. The City has made a range of recommendations to MRWA based on these concerns. City Officers now request Council endorsement of the City's submission prior to the submission being forwarded to Main Roads for its consideration.

LEGAL/POLICY IMPLICATIONS:

For the purpose of Councillors considering a financial or impartiality interest only, the proponent is Main Roads WA.

FINANCIAL/BUDGET IMPLICATIONS:

There are no financial implications as a result of this report.

ASSET MANAGEMENT IMPLICATIONS:

There are no asset management implications as a result of this report.

ENVIRONMENTAL IMPLICATIONS:

Main Roads have engaged GHD and AECOM consultants to undertake environmental surveys of the proposed road reservation. This analysis included a Preliminary Environmental Review of the road alignment, Black Cockatoo breeding habitat survey and Flora surveys to identify any Threatened Ecological Communities (TEC). These findings have been forwarded to the Environmental Protection Authority (EPA) for their preliminary advice. The EPA has advised the section of the FRCAH south of Gilmore Avenue, the portion of road which deviates from the current MRS reservation, will require formal assessment of the EPA. This referral will be undertaken as part of the MRS amendment process.

STRATEGIC/SOCIAL IMPLICATIONS:

The proposed FRCAH provides an important strategic transport link between commercial and industrial centres in Perth's south western suburbs, particularly for road freight servicing the Kwinana Industrial Area (KIA) and future outer harbour. City Officers consider the road link vital to upgrade the transport network servicing KIA. Whilst the proposal does have a strategic purpose, the City considers Main Roads also need to determine any impact the road may have to existing residents. These concerns have been included in the City's submission, with a view that further information (visual and acoustic assessments) be undertaken by Main Roads prior to the finalisation of the current design.

RISK IMPLICATIONS:

Should the City not make a submission to Main Roads the City reduces its ability to have its views considered as part of the route planning process.

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That Council endorse the attached submission (Attachment D) and forward the City's submission to Main Roads WA.

CARRIED 6/0

ATTACHMENT A





Enquiries: Our Ref: Your Ref: David Van Den Dries on 08 9323 4917 06/7822-06

1 March 2016

Chief Executive Officer City of Kwinana PO BOX 21 Kwinana WA 6966

ATTENTION: Ms Joanne Abbiss

Dear Ms Abbiss

FREMANTLE ROCKINGHAM CONTROLLED ACCESS HIGHWAY – ROUTE DEFINITION STUDY

As you are aware, Main Roads have been undertaking a planning review for the section of the Fremantle Rockingham Controlled Access Highway (FRCAH) between Thomas Road in Medina to Mundijong Road in Baldivis to develop a revised planning design concept and to prepare land protection plans to support an amendment to the Metropolitan Region Scheme (MRS).

The planning for FRCAH has been in place for more than thirty years with gazettal of the original road reservation in April 1981. The current MRS reservation for the FRCAH runs east of Mandurah Road, crosses Gilmore Avenue / Dixon Road and then follows the passenger rail alignment to Ennis Avenue, tying in to the Rae Road alignment. In 2013, WAPC has approved the preferred alignment that retains the existing MRS 'Primary Regional Road' FRCAH reservation to Gilmore Avenue and then to extend the current FRCAH reservation south east of Dixon Road, through the Leda Nature Reserve, to Mandurah Road-Mundijong Road and connecting to the Kwinana Freeway.

To support the significant growth in industrial, commercial and residential developments in the region, the current planned road reservation for FRCAH was reviewed in line with *Directions 2031* principles to improve access for pedestrians, cyclists and those using public transport, as well as vehicle traffic. As such, future developments along the proposed FRCAH will require a balance between:

- Creating a safe and desirable route for the movement of freight and people (all modes of transport); and
- The ability for the movement corridor to function in accordance with its intended and required role as a primary distributor.

The review has been undertaken in consultation with key stakeholders including the City of Kwinana, City of Rockingham, Department of Lands, Office of Environmental Protection Authority, Public Transport Authority and Dampier Bunbury Pipeline.

This review concentrates on the planning issues associated with the development of the ultimate planning design concept of FRCAH, in particularly, the critical connections along the alignment. The ultimate planning design concept comprises of two 3 lane carriageways. Interchanges have been proposed at the intersections of Thomas Road (diamond), Gilmore Avenue (half diamond with north facing ramps), Mandurah Road (south facing ramps) and Nairn Drive (diamond). Due to the close proximity to the proposed system interchange at Kwinana Freeway, Baldivis Road will from an underpass maintaining the north south connectivity and providing access to the FRCAH via Nairn Drive interchange.

Therefore it is Main Roads considered opinion that the concept, as presented to Council on the 15th February 2016, should form the basis for the planning review and proposed MRS amendment.

It would be appreciated if you could now seek the City of Kwinana Council's endorsement to the planning design concept and land protection plans. A copy of the final land protection plans for FRCAH is enclosed.

Subsequent to Council's endorsement, Main Roads will prepare advice on the planning review and provide a report to the Western Australian Planning Commission, seeking endorsement of the planning design concept and reservation.

I would like to thank you for your time and input to this study. Please also extend my appreciation of any other members of your organisation who contributed to the study.

If you require any further information please contact Mr David Van Den Dries on 08 9323 or myself 08 9323 4511. In reply please quote file reference 06/7822-06

Lindsay Broadhurst Director Road Planning and Development

CITY OF KWIMANA	TTA-
- 3 MAR 2016	
Officer:	1
No:	1



Fremantle Rockingham Controlled Access Highway

Route Definition Study

Route Definition Report

Planning & Technical Services Directorate Revision: A Date: 27 November 2015







Document Control

Rev. No	Reviewer	Date	Approved	Date	
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EXECUTIVE SUMMARY

Main Roads Western Australia (Main Roads) is proposing to upgrade the Fremantle Rockingham Controlled Access Highway (FRCAH) to a six lanes dual carriageway freeway between Thomas Road in Medina and Mundijong Road in Baldivis. The purpose of this report is to support the detailed planning of the preferred alignment of the FRCAH to more precisely define its location and layout and to update the land protection plans for inclusion into the Metropolitan Region Scheme (MRS) amendment.

The FRCAH has been planned as part of a strategic north-south transport corridor to provide high standard connectivity between important commercial and industrial centres in the Perth South West Metropolitan Corridor. This planning has been in place for more than thirty years with gazettal of the original road reservation in April 1981. Significant growth in industrial activity is planned for this region, with the Kwinana/ Western Trade Coast Strategic Industrial Area continuing to be a major focus of metropolitan and state industrial activity, generating substantial employment opportunities for metropolitan Perth.

Extensive urban and residential developments are also planned for the broader area, including in Baldivis and Mandurah. Transport modelling has shown that the planned developments will in future generate high freight and general traffic flows which cannot be accommodated on the existing north-south routes which include Ennis Avenue, Mandurah Road and Kwinana Freeway. The FRCAH will become an essential component of the regional transport network supporting the growth and viability of the region.

The current MRS alignment for the FRCAH as it enters Rockingham crosses Gilmore Avenue/ Dixon Road and then follows the existing passenger rail alignment to Ennis Avenue, tying in to the Rae Road alignment (former Garden Island Highway alignment). In 2002 the WAPC Sustainable Transport Committee endorsed a proposal to realign the future FRCAH south of Gilmore Avenue to follow the Dixon Road alignment. Following a review by ARRB Group, the Department of Planning subsequently recommended in 2009 that the FRCAH to connect directly with Mundijong Road and therefore the Kwinana Freeway, as this would achieve a better road network outcome. The Department of Planning investigated 8 alignment options for the FRCAH between Anketell Road and Mundijong Road, recommending a preferred option which follows the Mandurah Road corridor.

Main Roads Road Planning Branch undertook an alignment selection study for the FRCAH between Thomas Road and Mundijong Road in March 2013. The main purpose of the study was to assess the viability of co-locating Water Corporation infrastructure within the future FRCAH road reservation. The outcome of this study was to co-locate the Water Corporation infrastructure in the Mandurah Road Other Regional Road reserve and the FRCAH alignment to remain on the existing MRS Primary Regional Road reservation to Dixon Road and then to extend the current FRCAH reservation south east of Dixon Road, through the Leda Nature Reserve, to Mandurah Road-Mundijong Road and connecting to the Kwinana Freeway. In April 2013, the Western Australia Planning Commission provided endorsement for the FRCAH alignment from Thomas Road through to Kwinana Freeway.

This study builds upon the endorsed alignment and the previous studies. It includes comprehensive reviews of the traffic modelling, environmental and engineering constrains and design standards which led to the development of the ultimate planning design concept and road reservation for FRCAH. It is intended to be suitable for public review and for use as a reference document in MRS amendment process.

This study concentrates on the planning issues associated with the development of the ultimate planning design concept of FRCAH, in particularly, the critical connections at Thomas Road, Wellard Road, Gilmore Avenue, Mandurah Road, Nairn Drive, Baldivis Road and Kwinana Freeway.

FRCAH is currently shown as a Controlled Access Highway in the MRS and no change to this status is proposed. The ultimate planning design concept comprise of two 3 lane carriageways. A principle share path is also proposed along the left hand side of the carriageway. Interchanges have been proposed at the intersections of Thomas Road (diamond), Gilmore Avenue (half diamond with north facing ramps), Mandurah Road (south facing ramps) and Nairn Drive (diamond). Due to the close proximity to the proposed system interchange at Kwinana Freeway, Baldivis Road will from an underpass maintaining the north south connectivity and providing access to the FRCAH via Nairn Drive interchange.

The minimization of environmental impact was a primary concern for this study. The extent to which the area encompassed by Bush Forever Protection Area would be affected, the impact on wetland areas, the type and quality of vegetation that would be disturbed, the potential impact to local fauna, the visual impacts and noise impacts are all important factors that contributed to the development of the ultimate planning design concept of FRCAH. In addition, engineering constraints such as topography, existing services, other infrastructures, reserves and land uses all limited the development of alternative concepts.

A comprehensive environmental review, included a level 2 flora and vegetation assessment and targeted Threatened and Priority flora searches was completed as part of this study. The level 2 flora and vegetation survey was conducted incorporating the consolidated of data collected previously by GHD (2012) and AECOM (2014 and 2015) data. The project area which has not been reserved in the MRS was transverse on foot to search for Threatened and Priority Flora species identified as potentially occurring within the project area. No Threatened or Priority flora was recorded during these searches.

The construction of FRCAH has a long planning horizon, with works unlikely to commence before 2030. In order to ensure that the corridor is available for the construction of the FRCAH project, Main Roads is requesting an amendment to the Metropolitan Region Scheme (MRS) to extend the Primary Regional Road zoning so that it covers the extent of the proposed FRCAH alignment. Carriageway patterns, profiles and land protection plans to support this has been prepared for the preferred option and included in this report. The proposed FRCAH will significantly improve network reliability, reduce level of congestion and improve safety and it is imperative that an early decision be made to the future planning of the network to ensure the feasibility and successful implementation of planned developments.

Fremantle Rockingham Controlled Access Highway Route Definition Report



1 INTRODUCTION

1.1 Purpose of Study

Main Roads Western Australia (Main Roads) is proposing to upgrade the Fremantle Rockingham Controlled Access Highway (FRCAH) to a six lane dual carriageway between Thomas Road in Medina and Mundijong Road in Baldivis. The purpose of this report is to support the detailed planning of the preferred alignment of the FRCAH to more precisely define its location and layout and to update the land protection plans for inclusion into the Metropolitan Region Scheme (MRS) amendment.

This report examines future operation of the road and its role within the regional transport network and surrounding communities. It considers the preferred route configuration in relation to the design objectives, the engineering and environmental constraints. In doing so, it aims to provide concise assessments of the benefits and impacts of the route, and the necessity of the MRS amendment.

1.2 Study Area

The proposal is located within the City of Rockingham and City of Kwinana, crossing the suburbs of Baldivis and Leda. The limits of the study area are confined to the preferred FRCAH alignment from Thomas Road in the north to Mundijong Road in the east as defined in the Locality Plan. The 10.5km Project Area commences at Thomas Road in Media, travelling south and crossing Wellard Road and Gilmore Avenue in Leda, before connecting into the existing reservation for Mundijong Road in Baldivis, where it heads east to Kwinana Freeway.

1.3 Report Outline

This report outlines the following topics:

- Background
- Literature Review
- Planning Context
- Transport Network
- Engineering Constraints
- Preliminary Option Assessment
- Design Elements and Standards
- Traffic Analysis
- Concept Development
- Conclusion

This report should be read in conjunction with the following reports:

- Preliminary Environmental Review and Impact Assessment (GHD, 2012)
- Fremantle Rockingham Controlled Access Highway- Alignment Selection Study (Main Roads, 2013)
- Mundijong Road/ Kwinana Freeway Interchange- Interchange Configuration Assessment (Main Roads, 2014)

- Preliminary Basin Design Report for Kwinana Freeway/ Rockingham Highway Interchange (Main Roads, 2014)
- Fremantle Rockingham Controlled Access Highway Thomas Road to Mundijong Road Ultimate Planning Design Concept Wellard Road Connectivity review (Main Roads, 2015)
- Transportation Noise Assessment FRCAH (Lloyd George Acoustics, 2015)
- Flora and Vegetation Assessment (AECOM, 2015)
- Black-Cockatoo Potential Breeding Habitat Survey (AECOM, 2015)
- FRCAH Environmental Review (AECOM, 2015)

1.4 Glossary

The following abbreviations, as shown in **Table 1-1**, were used in this report.

Terms and Abbreviations	Definition
DoP	Department of Planning
DoS	Degree of Saturation
DoT	Department of Transport
DPI	Department for Planning and Infrastructure
FRCAH	Fremantle Rockingham Controlled Access Authority
LoS	Level of Service
Main Roads	Main Roads Western Australia
MRS	Metropolitan Region Scheme
OEPA	Office of Environmental Protection Authority
PRR	Primary Regional Road
PSP	Principal Shared Path
PTA	Public Transport Authority
ROM	Regional Operations Model
vpd	Vehicle per Day
WAPC	Western Australian Planning Commission
	Table 1-1: Glossary of Terms

2 BACKGROUND

2.1 General

The City of Rockingham is located 40km south west of the Perth CBD and has a population of approximately 100,000 people (ABS 2009). Rockingham has extensive industrial and commercial areas including a naval area on Garden Island and a rapidly expanding residential area. The Town of Kwinana lies to the north of the City of Rockingham, with a population of approximately 30,000 people (Town of Kwinana Website). Kwinana also has substantial industrial and commercial areas.

The FRCAH has been planned as part of a strategic north-south transport corridor to provide high standard connectivity between important commercial and industrial centres in the Perth South West Metropolitan Corridor. This planning has been in place for more than thirty years with gazettal of the original road reservation in April 1981. Significant growth in industrial activity is planned for this region, with the Kwinana/ Western Trade Coast Strategic Industrial Area continuing to be a major focus of metropolitan and State industrial activity, generating substantial employment opportunities for metropolitan Perth.

Extensive urban and residential development is also planned for the broader area. Transport modelling has shown that the planned developments will generate high freight and general traffic demand which cannot be accommodated on existing north-south routes, which include Ennis Avenue, Mandurah Road and Kwinana Freeway. The FRCAH will become an essential component of the regional transport network as development progresses, and development will be compromised and constrained if the FRCAH is not constructed.

The draft *Outer Metropolitan and Peel Sub Regional Strategy*, which represents the implementation of *Directions 2031 and Beyond*, identifies the FRCAH as a strategic road planning initiative linking with Mundijong Road to the south and Rockingham Road to the north. The FRCAH is also shown as a future primary freight route.

The current MRS reservation for the FRCAH runs east of Mandurah Road, crosses Gilmore Avenue / Dixon Road and then follows the passenger rail alignment to Ennis Avenue, tying in to the Rae Road alignment (former Garden Island Highway alignment). In 2002 the WAPC Sustainable Transport Committee endorsed a proposal to realign the future FRCAH south of Gilmore Avenue to follow the Dixon Road alignment. However, Dixon Road terminates at Patterson Road west of Ennis Avenue, is not connected to a major road network and would discharge significant volumes of traffic on to the local road network.

Following a review by ARRB Group, the Department of Planning subsequently recommended in 2009 that the FRCAH connect directly with Mundijong Road and ultimately the Kwinana Freeway, as this would achieve a better road network outcome. The Department of Planning investigated eight alignment options for the FRCAH between Anketell Road and Mundijong Road, recommending a preferred option which follows the Mandurah Road corridor.

The WAPC-ICC subsequently endorsed in December 2012 that Main Roads and Water Corporation should investigate co-locating the FRCAH and infrastructure corridor within the Mandurah Road reservation between Dixon and Millar Roads.

In March 2013 Main Roads' Road Planning Branch undertook an alignment selection planning study to investigate and select the preferred alignment and network configuration for the future FRCAH between Thomas Road and Mundijong Road. Consideration of a multi-constraint assessment for the option following Mandurah Road corridor indicated significant environmental impacts on this route. Main Roads preferred alignment was to retain the existing MRS 'Primary Regional Road' FRCAH reservation to Gilmore Avenue and extend this to Mundijong Road through a portion of the Leda Nature Reserve. The alignment was subsequently endorsed by the WAPC in April 2013.

The alignment selection study had considered environmental, social, heritage and engineering constraints. The study area has very high environmental value, confirmed through field surveys that were undertaken by GHD Consultants. Significant constraints include Threatened Ecological Communities (TECs) with associated vegetation in excellent condition either side of Mandurah Road between Dixon and Millar Roads, the A-Class Leda Nature Reserve to the south of Gilmore Avenue, Conservation Category Wetlands and Environmental Protection Policy Lakes. The study area includes feeding habitat and potential breeding habitat for EPBC listed species such as the Black Cockatoo.

This study builds upon the endorsed alignment and the previous studies. It includes comprehensive reviews of the traffic modelling, environmental and engineering constrains and design standards which led to the development of the ultimate planning design concept and road reservation for FRCAH. It is intended to be suitable for public review and for use as a reference document in MRS amendment process.

2.2 WAPC Decisions

June 2010 - Mandurah Road Infrastructure Corridor Alignment

The WAPC Infrastructure Coordinating Committee:

 Endorsed a 30m wide corridor for the ERWWTP infrastructure corridor extending into the Rockingham Lakes Regional Park southwest of the Mandurah Road 'Other Regional Road' reservation or northeast into the Leda Reserve between Dixon road and Millar road which also retains flexibility for the location of the future FRCAH

December 2012 - East Rockingham Waste Water Treatment Plant Infrastructure Corridor

The WAPC Infrastructure Coordinating Committee:

• Requested Water Corporation to undertake a preliminary scoping and costing of an offset mitigation package for the endorsed 30m corridor to determine its capacity for, and cost of, implementation.

• Advised Water Corporation and Main Roads to develop a second option in consultation with the City of Rockingham that co-locates the infrastructure corridor in a future four lane Mandurah Road, located wholly within the current MRS 'Other Regional Road' and 'Controlled Access Highway' reservations.

May 2013- Fremantle Rockingham Controlled Access Highway and East Rockingham Waste Water Treatment Plant Infrastructure Corridor: Investigation of Alignments

The WAPC Infrastructure Coordinating Committee:

- note that following the ICC resolution of 12 December 2012, Main Roads and the Water Corporation have undertaken extensive investigations for the future Fremantle to Rockingham Controlled Access Highway (FRCAH) and Water Corporation East Rockingham Waste Water Treatment Plant (ERWWTP) infrastructure corridor. This work has included significant technical and engineering considerations which have not previously been undertaken for the Mandurah Road Infrastructure Corridor;
- note that both Main Roads and the Water Corporation have taken into account the demands that will be generated from future development in accordance with work being undertaken by DoP as part of the Southern Metropolitan Perth and Peel Sub-Regional Structure Plan which provides for a future population of 3.5 million in Perth and Peel;
- note that all potential co-location opportunities have been considered by both Main Roads and the Water Corporation and it has been determined that the co-location of all infrastructure along the Mandurah Road corridor is not preferred due to significant environmental impacts and engineering difficulties;
- note that the preferred alignment for the future six lane FRCAH is Option 1A/1B as it avoids significant impacts on the most sensitive environmental areas and provides the optimum transport outcome;
- note Main Roads progress to confirm the reservation requirements for the FRCAH so that it can be included in the MRS as a priority and that this includes further road planning investigations for the continuation of the FRCAH along the Mundijong Road alignment to Kwinana Freeway;
- endorse the preferred alignment for the Water Corporation ERWWTP infrastructure corridor being located in the current Mandurah Road reserve;
- note that unless both the FRCAH reservation and ERWWTP infrastructure corridor are achieved then the extent of future development in the Southern Metropolitan and Peel Sub-Region could be significantly constrained;
- note that further collaboration between the Water Corporation, City of Rockingham and Main Roads will be undertaken as a priority to identify the optimum location for the ERWWTP infrastructure corridor along the FRCAH/Mundijong Road alignment.

3 LITERATURE REVIEW

3.1 General Overview

To obtain a better understanding of the traffic demands and the previous planning, a literature review has been undertaken for the following reports:

- Fremantle to Rockingham Road Network -Network Evaluation (ARRB, 2007)
- Fremantle Rockingham Highway Alignment Selection (DoP, June 2009)
- Mandurah Road Infrastructure Corridor Planning Report (AECOM, Feb 2011)
- Fremantle Rockingham Controlled Access Highway- Alignment Selection Study (Main Roads, 2013)

A summary of the primary outcomes/issues identified in each report is discussed in further detail in the sections below.

Fremantle to Rockingham Road Network – Network Evaluation (ARRB, 2007)

Due to significant changes in planned corridors from Fremantle to Rockingham, the ARRB Group on behalf of DoP undertook a study of the Fremantle to Rockingham road network. In 2004 the Fremantle Eastern Bypass was deleted from the MRS. At that time, the Government gave clear direction that Roe Highway would not be extended west of Kwinana Freeway. The report recommended that Stock Road, Rockingham Road, Fremantle Rockingham Highway route be planned as a six-lane freeway, with full grade separated interchange at the major intersections. This network included the extension of FRCAH to Mundijong Road which enables the route to act as a substantial route carrying significant freight and as an alternative route to Kwinana Freeway.

Fremantle Rockingham Highway – Alignment Selection (DoP, June 2009)

The DoP proposed 8 options in this alignment study between Anketell Road and Mundijong Road, shown in **Figure 3-1** below. The environmental assessment for each option was based on desktop data. Main Roads and LandCorp strongly supported Option 8 shown in white below, as it uses the current MRS reservation. The detail of this option is summarised below.

- Uses existing PRR reservation between Anketell Road and Gilmore Avenue.
- Requires major 4 way junction or grade separation at Thomas Road.
- Cuts through Bush Forever Protection Area between Thomas Road and Wellard Road.
- Cut through proposed conservation parks IP14/ Sloans Ridge.
- Continues beyond existing PRR reservation southwards to Mundijong Road.
- Requires bridge with high embankments over passenger rail.
- Cut through Leda Nature reserve south of the passenger rail.
- Requires bridge with high embankment over freight rail.
- Requires new intersection at Millar Road/Mundijong Road.



Figure 3-1: FRCAH Alignment Options 2009

Mandurah Road Infrastructure Corridor Planning Report (AECOM, Feb 2011)

AECOM on the behalf of DoP completed a planning study in 2011 of Mandurah Road between Dixon Road / Gilmore Avenue and Millar Road as an infrastructure corridor, including allowances for existing and future road, rail and utility service requirements. The study considered the wider regional context including the proposed FRCAH, the extension of Mundijong Road and connections to the proposed ERWWTP. The study investigated two alignment options for the FRCAH, shown in **Figure 3-2**.

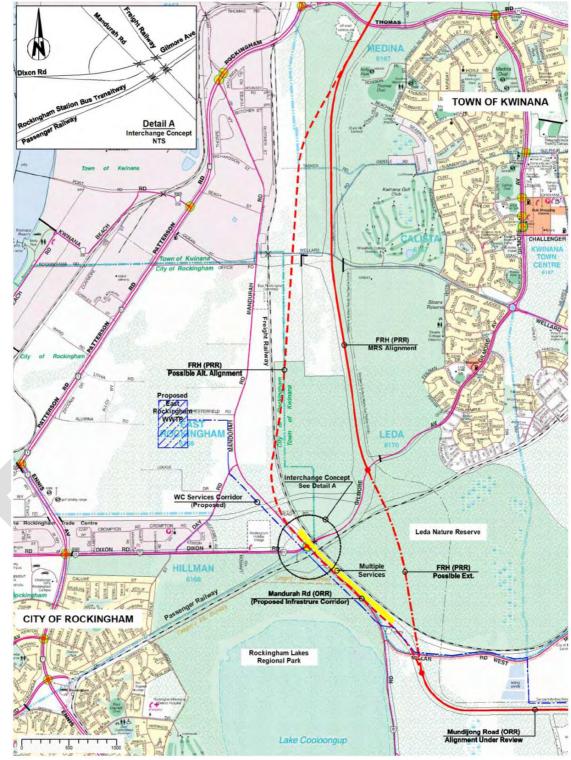


Figure 3-2: FRCAH Alignment Options 2011

Option A entailed the FRCAH running within the existing MRS road reservation to Gilmore Avenue, with an extension of the reservation through the Leda Nature Reserve to connect directly to Mundijong Road, by-passing Mandurah Road. Option B entailed relocating the FRCAH westwards from the existing MRS road reservation alignment to connect to Mandurah Road North of Dixon Road / Gilmore Avenue, and then connecting with Mundijong Road to the south.

AECOM recommended an extension of the existing Mandurah Road MRS reservation to allow for the carriageways, intersections, drainage basins and PSP associated with the Mandurah Road infrastructure corridor, to cater for both initial and ultimate requirements. This would create the flexibility of developing the FRCAH on either alignment option.

Fremantle Rockingham Controlled Access Highway- Alignment Selection Study (Main Roads 2013)

The purpose of the alignment selection planning study is to investigate and select the preferred alignment and network configuration for the future FRCAH between Thomas Road and Mundijong Road, including the possible co-location of the proposed ERWWTP Infrastructure Corridor. Three different options were developed in collaboration with Water Cooperation as part of the study:

- FRCAH Option 1A/1B with separate infrastructure corridor
 This network includes FRCAH Option 1A/1B running along the existing MRS
 'Primary Regional Roads' reservation to Gilmore Avenue, extending south
 through the A-Class Leda Nature Reserve to connect with Mundijong Road,
 and the infrastructure corridor located within the existing Mandurah Road
 reservation between Dixon Road and Millar Road.
- FRCAH Option 1A/1B with co-located infrastructure corridor This includes FRCAH Option 1A/1B with the infrastructure corridor co-located with the FRCAH through the Leda Nature Reserve for approximately 2.6km of its length from north of Gilmore Avenue to Millar Road.
- FRCAH Option 2D with co-located infrastructure corridor
 This includes FRCAH Option 2D running to the west of the existing MRS
 'Primary Regional Roads' reservation, and co-locates the FRCAH and
 infrastructure corridor along the existing Mandurah Road alignment between
 Dixon Road and Millar Road.

Water Corporation has indicated that co-locating the infrastructure corridor with either FRCAH Option 1A/1B through the Leda Nature Reserve, or FRCAH Option 2D along the existing Mandurah Road alignment is not technically feasible. Separating the FRCAH and the infrastructure corridor poses least operational risk and will be the most cost effective option.

An assessment of FRCAH Options 1A/1B and 2D showed that Option 1A/1B is preferred and provides significant benefits, including lower overall environmental impact, improved connectivity and road safety, lower construction cost and less impact on existing infrastructure, including the Mandurah passenger railway line.

FRCAH Options 1A and 1B impact differently on the potential location of the ERWWTP infrastructure corridor along Mundijong Road and further collaboration is required between the Water Corporation, City of Rockingham and Main Roads.

The report recommended that FRCAH Option 1A/1B is adopted as the preferred long term regional road network configuration. This recommendation was subsequently endorsed by WAPC in 2013.

4 PLANNING CONTEXT

4.1 Metropolitan Region Scheme

Current MRS zoning is shown in **Figure 4-1**. The study area is zoned predominantly 'Parks and Recreation' between Thomas Road and Millar Road, and 'Rural' between Millar Road and Mundijong Road. The FRCAH 'Primary Regional Roads' reservation passes through the 'Parks and Recreation' zoned land tying in to the Rae Road alignment in Rockingham.

A wide strip of land east of Mandurah Road is zoned 'Industrial' and 'Railways'. An area of land lying south of Wellard Road and west of the current FRCAH reservation is zoned 'Public purposes – special uses'.

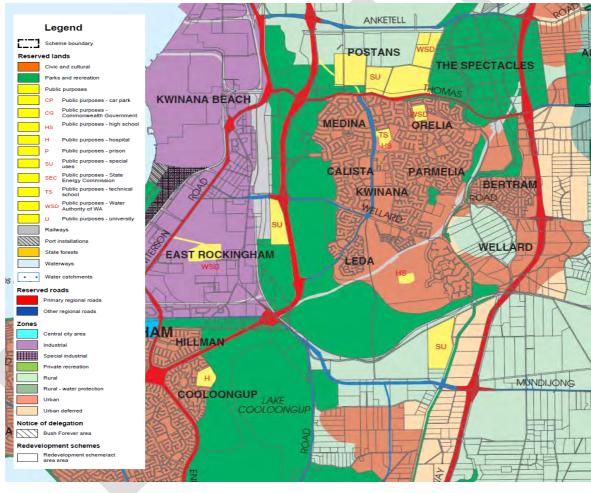


Figure 4-1: MRS Plan

4.2 Local Planning Schemes

The Town of Kwinana Town Planning Scheme No. 2 extends from the north of the study area to Millar Road, south of which is covered by the City of Rockingham Local Planning Scheme No. 2.

Zoning in both schemes is consistent with the MRS zoning. The Town of Kwinana Town Planning Scheme indicates primarily 'Parks and Recreation' within the study area bordered by 'Residential' to the east and 'General Industry' and 'Railways' to the west. The City of Rockingham Town Planning Scheme No. 2, which covers the southern section of the FRCAH study area, indicates primarily 'Parks and Recreation' and 'Rural' within the study area.

4.3 Directions 2031 and Beyond

Directions 2031 and Beyond is a high level spatial framework and strategic plan that aims to establish the vision and framework to guide planning and development of the Perth and Peel region. The vision is to create medium to high density urban villages that are significantly self-sustained in local activity centres which are connected by activity corridors, served by an efficient public transport system. A core focus is to improve the link between where people live and work.

The draft Outer Metropolitan Perth and Peel Sub Regional Strategy (along with the Central Metropolitan Sub Regional Strategy) represents the implementation of Directions 2031. The strategy is intended to inform the preparation of sub-regional structure plans and local planning strategies. The strategy is divided into 5 sub regions, with the FRCAH lying in the south-west sub-region.

The south-west sub-region, shown in **Figure 4-2**, includes the City of Rockingham, Town of Kwinana and City of Cockburn. Within this sub-region Rockingham is identified as a strategic metropolitan centre, Kwinana and Cockburn Central as secondary centres and Jandakot Airport as a specialised centre.

The sub-regional strategy identifies Kwinana Freeway, Patterson Road, Rockingham Road, Thomas Road and Ennis Avenue as important transport routes. The FRCAH is shown as a strategic road planning initiative linking with Mundijong Road to the south and Rockingham Road to the north. The strategy states that the route, which is planned to freeway standard, provides a strong north-south connection along the coast from Fremantle to Rockingham.

According to the sub-regional strategy, employment self-sufficiency in the south-west sub-region is currently approximately 60 per cent. An estimated 87,000 to 113, 000 additional jobs will need to be provided in the sub-region over the next 25 years to achieve the Directions 2031 employment self-sufficiency target of 70 per cent.

Significant growth in industrial activity is planned for the south-west sub-region. The Kwinana/ Western Trade Coast strategic industrial centre will continue to be a major focus of metropolitan and State industrial activity, with a focus on heavy manufacturing, processing, fabrication and export. It comprises the Kwinana Industrial Area core, Latitude 32 and the Rockingham industry zone, which includes East Rockingham, and the Australian Marine Complex at Henderson. These industrial centres make an important contribution to meeting the short, medium and long term market demand for industrial land in metropolitan Perth and will generate significant employment opportunities for the south-west sub-region.

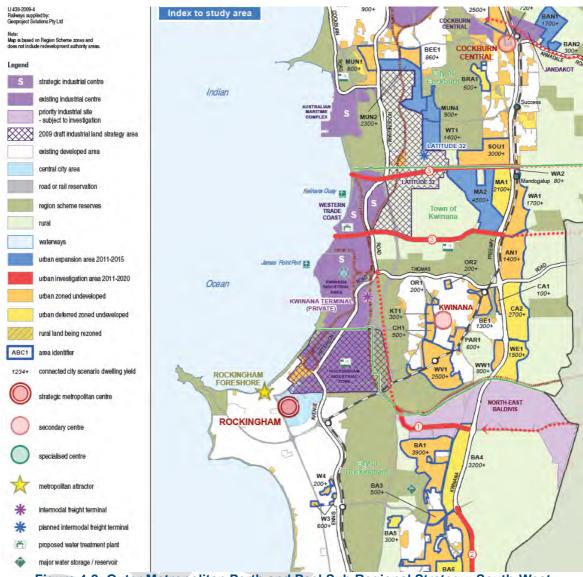


Figure 4-2: Outer Metropolitan Perth and Peel Sub Regional Strategy: South-West

4.4 Economic and Employment Lands Strategy

The Economic and Employment Lands Strategy: non-heavy industrial Perth metropolitan and Peel regions, April 2012 (EELS), has been prepared in response to the shortfall in industrial land supply and focusses on general and light industry. Heavy industry is excluded from this strategy. The study area for the EELS encompasses the statutory boundaries of the Perth Metropolitan and Peel regions, with the FRCAH lying in the south-west sub-region.

Besides the Kwinana/ Western Trade Coast strategic industrial area which will generate significant employment opportunities, the identified future non-heavy industrial sites include Jandakot Airport, Latitude 32 and north-east Baldivis.

The strategy recognizes that the continued rapid expansion of the south-west subregion is dependent on infrastructure servicing issues, including the development of the ERWWTP and provision / upgrading of east-west road links such as Rowley Road, Anketell Road and Mundijong Road.

4.5 Metropolitan Freight Network and High Wide Load Routes

The Statement of Planning Policy: Metropolitan Freight Network (Draft), May 2005, shows Kwinana Freeway, Patterson Road / Rockingham Road, Anketell Road, Thomas Road and Mundijong Road as primary freight routes. The FRCAH is shown as a future primary freight route running along the previous alignment into Dixon Road, including a connection with Mundijong Road to the south.

The Department of Transport is currently reviewing the Metropolitan freight network. The FRCAH linking with Mundijong Road will remain part of the strategic freight network.

The current High Wide Load route linking the Kwinana/ Western Trade Coast strategic industrial area with the Kewdale / Forrestfield industrial areas runs along Ennis Avenue, Patterson Road, Anketell Road, Thomas Road east of Nicholson Road and Tonkin Highway.

4.6 Fremantle Rockingham Industrial Area Regional Strategy

The "Towards Optimising Kwinana Study (1996)", identified the potential for eastward expansion of the Kwinana Industrial Area to the north of the Kwinana urban area in order to satisfy projected regional industrial demand. This has led to the completion of The Fremantle Rockingham Industrial Area Regional Strategy (FRIARS) in April 2000. The FRIARS is a high level strategic land use planning prepared by Western Australia Planning Commission for the Fremantle Rockingham region for the next 20-25 years. The strategy involved extensive assessments and reviews of the existing challenges and constraints in the region to develop recommendations on land use, infrastructure, social issues and environmental management for the region.

The proposal involves the ultimate development of approximately 900 hectares of General Industrial land, within both the Town of Kwinana and the City of Cockburn, as an adjunct to the existing Kwinana Industrial Area. Though the FRIARS strategy has been focus on land use in the Kwinana EPP buffer, the report has identified a number of other regional planning issues that require resolution in the future. One of the key issues identified is the planning of FRCAH.

The report has identified FRCAH as a major transport link critical in servicing the proposed land use in the area and the associated industrial, retail and residential land uses as well as the future designated fright route for the region. The currently gazetted FRCAH alignment, with connection to Garden Island Highway has been adopted for as basis for transport network discussions in the report. The Highway is shown with linkage to Kwinana Freeway through the east west route of Mandurah Road.

4.7 Baldivis North District Structure Plan

In 2006, the City of Rockingham has adopted the District Structure Plan as depicted in **Figure 4.3** for the proposed urban area of Baldivis located north of Safety Bay Road. The Baldivis North District Structure Plan area includes all the 'Urban' and 'Urban Deferred' zoned land located within Kerosene Lane, Baldivis Road, Safety Bay Road and Mandurah Road.

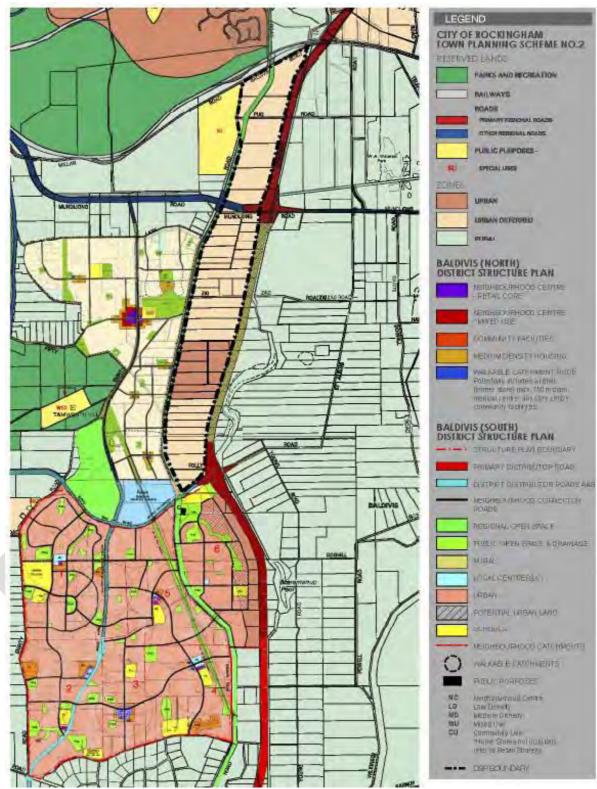


Figure 4-3: Composite District Structure Plan (East Baldivis District Structure Plan Report)

The total structure plan area is 442ha, approximately sub-dividable to 4290 lots. A total population of 11,583 is estimated for the Baldivis North District Structure Plan area based on the average of 2.7 people per household. This estimated population generates the need for 6138m² of neighbourhood/local level retail floor space.

The structure plan aimed to utilises the existing constructed roads, being Kerosene Lane, Ingram Road, Fifty Road, McDonald Road, Baldivis Road and Eighty Road and the proposed Nairn Drive. Nairn Drive will provide the main district/regional access function by linking the Structure Plan area with the Freeway via FRCAH to the north and Safety Bay Road to the South. It is anticipated that Nairn Drive will be constructed to dual carriageway standard. The interchange between Nairn Drive and FRCAH plays a key element in supporting the viability of the structure plan.

4.8 Baldivis East District Structure Plan

In 2014, The City of Rockingham has adopted the East Baldivis District Structure Plan for the area generally bounded by Baldivis Road to the west, Kwinana Freeway to the east, Millar Road to the north and Safety Bay Road to the south.

The total structure plan area is 3769.5ha, approximately sub dividable to 4,581 lots. A total population of 12,800 people is estimated for the East Baldivis District Structure Plan based on the average of 2.8 people per household.

It is envisaged in the structure plan that Nairn Drive, approximately 1 km to the west and running parallel to Baldivis Road, will ultimately be the primary north south road through the Baldivis District. The plan has acknowledged that the intersection of Baldivis Road and Mundijong Road, Mundijong Road and the Kwinana Freeway and the alignment of Baldivis Road north of Mundijong Road are subject to the regional transport planning investigations with possible changes, in particular, grade separation options at Nairn Drive and Mundijong Road and Baldivis Road and Mundijong Road.

5 TRANSPORT NETWORK

5.1 Existing Road Network

Roads in the broader study area are shown in **Figure 5-1**. The Primary Regional Road network includes Thomas Road, Kwinana Freeway, Patterson Road, Rockingham Road and Ennis Avenue.

East-west roads include Safety Bay Road, Millar Road, Dixon Road / Gilmore Avenue, Wellard Road / Bertram Road, Thomas Road, Anketell Road and Mundijong Road. Besides Millar Road, the east-west roads connect with Kwinana Freeway, distributing traffic between the freeway and urban and industrial areas to the west. North-south roads include Ennis Avenue / Patterson Road / Rockingham Road, Mandurah Road and Kwinana Freeway.

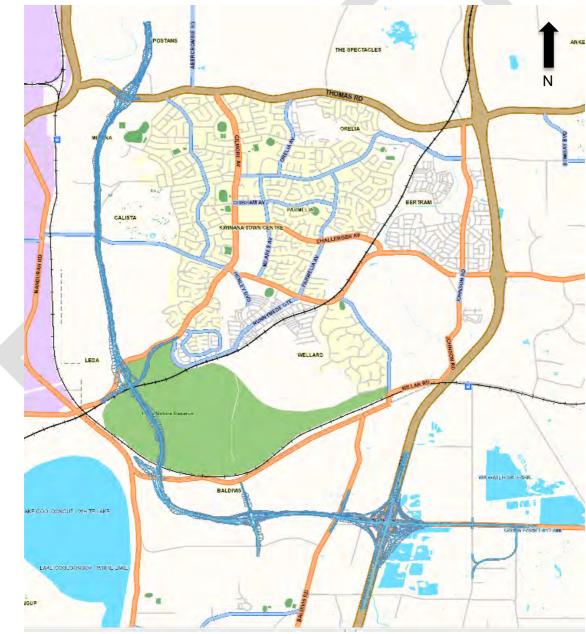


Figure 5-1: Current Road Network

Kwinana Freeway

Kwinana Freeway is currently reserved as a 'Primary Regional Road' in the MRS. In the Road Hierarchy, Kwinana Freeway is identified as a 'Primary Distributor' road. The speed limit is 100km/h north of Safety Bay Road and 110km/h to the South. From Perth to Mill Point Road, Kwinana Freeway has five lanes northbound and six lanes southbound. South of Mill Point Road to Roe Highway the Freeway has three lanes in each direction. Beyond Roe Highway the Freeway has two lanes in each direction. The median strip of the Freeway north of the Spectacles contains the Mandurah Railway Line. A shared pedestrian and cycle path has been build alongside the Freeway.

Thomas Road

Thomas Road is an urban arterial and primary freight route providing direct access from the freeway to the Kwinana/ Western Trade Coast (Kwinana and Rockingham industrial areas) and the Town of Kwinana. Thomas Road is reserved as a 'Primary Regional Road' in the MRS and is classified as a 'Primary Distributor' in the Road Hierarchy. It is a four-lane divided carriageway with a posted speed limit of 80km/h. The road forms part of the RAV4 network, allowing access to heavy vehicles up to 27.5m in length, and is currently constructed to its ultimate 4-lane divided standard.

Wellard Road

Wellard Road is reserved as an 'Other Regional Road' in the MRS and is classified as a local distributor in the Road Hierarchy. Between Mandurah Road (to the west) and Gilmore Avenue (to the east), Wellard Road is predominately a two lane undivided carriageway with a posted speed limit of 80km/h west of Westbrook Street and 70km/h east of Westbrook Street.

Mandurah Road

North of Wellard Road, Mandurah Road is classified as a 'Distributor A' in the Road Hierarchy while south of Wellard Road, Mandurah Road is classified in the Road Hierarchy as a Regional Distributor. Mandurah Road is a two-lane, undivided carriageway with a posted speed limit of 70km/h for the northern half and 80km/h for the southern section.

Dixon Road/Gilmore Avenue

Gilmore Avenue is reserved as an 'Other Regional Road' in the MRS. In the Road Hierarchy, Gilmore Avenue is identified as a 'Distributor A'. West of Mandurah Road, Gilmore Avenue becomes Dixon Road. Dixon Road is also reserved in the MRS as an 'Other Regional Road' and is classified as a 'Distributor B' in the Road Hierarchy. Dixon Road is then a four-lane divided carriageway through to the Rockingham City Centre. Gilmore Avenue and Dixon Road alternate between speed zones of 60km/h and 70km/h.

Mandurah Road (Mundijong Road extension)

Mandurah Road is the 4.5km extension of Mundijong Road west of the Kwinana Freeway, which ties in to Mandurah Road and forms part of the Gateway to Rockingham. Mandurah Road is classified as a 'Regional Distributor in the Road Hierarchy and is an 'Other Regional Road' reservation in the MRS. Mandurah Road is a two-lane largely undivided carriageway with a posted speed limit of 80km/h.

Baldivis Road

Baldivis Road south of Millar Road has been constructed as a two – lane undivided rural road and currently operates under an 80km/h speed limit which reduces to 70km/h north of Zig Zag Road. A section of Baldivis Road between Pemberton Boulevard and Key close has been upgraded to an urban standard district distributor Baldivis currently perform a District Distributor function. Baldivis Road has an 80m wide road reserve, but a significant proportion is reserved as a greenbelt recreational spine following the former Baldivis Tramway Reserve.

Baldivis Road will need to remain as a District Distributor (B) road (or an Integrator B under Liveable Neighbourhoods) with provision for a two lane boulevard treatment, and allowance for extra widening for turn lanes at intersections. These arrangements are consistent with what has been identified by the City of Rockingham in relation to the Baldivis Central, The Chase & Tuart Ridge Estates.

Nairn Drive

Nairn Drive alignment is reserved as an 'Other Regional Road' in the MRS and proposed as a District Distributor road under the Local Structure Plan. In the current built form, Nairn Drive is a two lane local road with a posted speed of 50km/hr running between Fairchild Drive and Fifty Road and ultimately, Nairn Drive will be developed as a 4 lane dual carriageway. The planned Nairn Drive will run north to the proposed FRCAH and south to Paganoni Road in Karnup, providing the main district/regional access function linking North Baldivis with the Baldivis District Centre. In the local structure plan, Nairn Drive has generally a 40m wide road reservation.

Mundijong Road

Mundijong Road is reserved as an "Other Regional Road" in the MRS. In the Road Hierarchy, Mundijong Road is identified as a Distributer B. Mundijong Road is identified as a strategic freight route in Master Plan studies for the area and a high priority freight route for the future in the Integrated Regional Transport Plan for South West Metropolitan Perth April 2003. The two lane road has posted speed of 100km/h. The current road reservation for Mundijong Road approaching Kwinana Freeway allows for a four lane dual carriageway.

5.2 High Wide Load Routes

The FRCAH does not form part of the Main Roads High Wide Load network shown in **Figure 5.2**. The current High Wide Load route linking the Kwinana/ Western Trade Coast strategic industrial area with the Kewdale / Forrestfield industrial areas runs along Anketell Road, Thomas Road east of Nicholson Road and Tonkin Highway.



6 ENGINEERING CONSTRAINTS

6.1 General Overview

Constraints and opportunities which could influence the development and selection of network options were investigated. This assisted in identifying network solutions that minimize impact on major constraints which exist in the study area.

6.2 Environmental

In 2012, MRWA engaged GHD to undertake a preliminary environmental review for the proposed FRCAH. This piece of work was to assist the alignment selection assessment for FRCAH between Thomas Road and Mundijong Road and to assess all environmental aspects for the road proposal. The study also included an Aboriginal Heritage study and a European Heritage study. Please refer Preliminary Environmental Review and Impact Assessment Report (GHD, August 2012) for more details.

In early 2015, AECOM was engaged by Main Roads to undertake a Black Cockatoo potential breeding habitat survey within the preferred alignment of FRCAH. Subsequently, a flora and vegetation survey to document the floristics of the project area was undertaken. The summary these findings were submitted to the Office of Environmental Protection Authority (OEPA) for preliminary comments. As the section of the proposed alignment between Thomas and Gilmore Avenue has been reserved in the MRS, OEPA has indicated that only the section between Gilmore Avenue and Nairn Drive may require referral to OEPA during the MRS amendment. Main Roads has undertaken two additional flora surveys (hammer orchid survey and Caladenia Hugelii) following the preliminary comments from EPA to further scrutinize the study area to ensure the comprehensiveness of the environmental investigation. No threatened or Priority flora was recorded during these searches. In late 2015, AECOM completed the Environmental Review for FRCAH between Thomas Road and Mundijong Road.

The Environmental Review Report forms part of this study documenting the critical environmental constraints and the related mitigation strategy. The report should be read in conjunction to this report. A summary of the report is provided below.

Eight preliminary key environmental factors were identified as being potentially impacted by the project. These are:

- Flora and Vegetation
- Terrestrial Environmental Quality
- Terrestrial Fauna
- Hydrological Processes
- Inland Waters Environmental Quality
- Amenity
- Heritage
- Human Health.

For each preliminary key environmental factor, the existing environment within the Study Area was described. Potential impacts and proposed mitigation measures to manage these impacts were determined as well as residual impacts that are likely to remain following the implementation of these mitigation measures. The key outcomes of the assessment for each factor is summarised below.

It is anticipated that some of the residual impacts are likely to remain for several of the key factors with the implementation of the proposed mitigation measures. Potential offsets and rehabilitation requirements to address residual impacts will be developed in consultation with the EPA.

Flora and Vegetation

A number of flora and vegetation surveys have been undertaken for the FRCAH Proposal including several targeted surveys for Threatened and Priority flora. No Threatened or Priority flora species have been recorded within the Project area during these surveys.

One Threatened Ecological Community (TEC) occurs within the Project area: Sedgelands in Holocene dune swales. This TEC is listed as Endangered under the Environment Protection and Biodiversity Conservation Act 1999 and listed by the Western Australian Minister of the Environment as Critically Endangered. Road design has been undertaken to avoid any impacts on this TEC.

Approximately 55.7ha of native vegetation occur within the Project area. Of this, a total of approximately 36.0ha will be removed for construction of the FRCAH. This will include the removal of 0.04ha of wetland and riparian vegetation. Two Bush Forever sites will be directly impacted by the proposed project with approximately 25.5 ha of native vegetation proposed to be removed from within these sites. Two Class A Reserves are intersected by the proposed FRCAH. A total of 23.7ha of vegetation are predicted to be removed from within these Class A Reserves.

Terrestrial Environmental Quality

The Project area intersects a number of registered contaminated sites as well as the City of Rockingham Landfill, which is considered likely to be a contaminated site although it is not currently registered as such. The majority of the Project area is mapped as having no known risk of Acid Sulfate Soils (ASS), however, portions of the Project area corresponding to wetland areas have a moderate to low or high to moderate risk of ASS occurrence.

Potential impacts on Terrestrial Environmental Quality may occur as a result of future construction of a highway within the Project area. These potential impacts are primarily associated with potential disturbance of existing contamination or ASS during construction.

Key mitigation measures proposed to address contamination and ASS include a Preliminary Site Investigation, avoidance of excavation and dewatering in proximity to known contamination or ASS where practicable, and management of any contamination or ASS in accordance with all relevant Department of Environment Regulation Guidelines. Implementation of these mitigation and management measures is considered to be sufficient to prevent any significant impacts on Terrestrial Environmental Quality. It is unlikely that any residual impacts will remain in relation to this factor.

Several fauna assessments including a Black Cockatoo habitat survey have been undertaken within the Project area. Seven fauna habitats have been described within the Project area that provide habitat for a range of birds, reptile species, frogs and small ground mammals. The three threatened Black Cockatoo species (Forest Red-tailed Black Cockatoo, Carnaby's Black Cockatoo and Baudin's Black Cockatoo) as well as the Quenda (Priority 5) have been recorded within the Project area. The Little Bittern (Priority 4) and the Graceful Sun-Moth (Priority 4) were not recorded during surveys but are considered likely to occur based on the presence of suitable habitat and nearby records.

Following implementation of management and mitigation measures, the proposed FRCAH is likely to result in clearing of a total of approximately 52.9ha of fauna habitat including potential habitat for the Australian Little Bittern and the Graceful Sun Moth. This clearing will result in the removal of 32.7ha of medium to high quality Black Cockatoo foraging habitat and 398 Black Cockatoo potential breeding habitat trees. It will also include the removal of 2.6 ha of habitat for the Quenda.

Hydrological Processes

The Project area intersects the boundary of three listed Conservation Category Wetlands (CCWs) and one Multiple Use Wetland under the Geomorphic Wetlands of the Swan Coastal Plain Dataset. It also intersects two lakes classified under the Environmental Protection (Swan Coastal Plain Lakes) Policy 1992 (EPP Lakes). An area of artificial wetlands (the Alcoa Wellard Wetlands) is also located in the Project area adjacent to the Kwinana Freeway interchange.

Potential impacts on hydrological processes resulting from the proposed FRCAH and eventual road construction include direct disturbance and clearing of mapped wetlands and associated riparian vegetation communities. Indirect impacts on wetlands may also occur as a result of disruption to hydrological flows and alteration of surface drainage resulting from changes to ground contours during and post construction.

Further detailed hydrological studies are required to determine the current hydrological and hydrogeological environment within the Project area. These studies are required before residual impacts on hydrological processes can be adequately quantified. Once these studies are completed, Main Roads will determine project specific engineering and management requirements necessary to mitigate impacts on hydrology or hydrogeology and to ensure there is no change to hydrological function of any wetlands as a result of the project.

Inland Waters Environmental Quality

The Project area is not within a public drinking water source area. Nor do any watercourses intersect the Project area. Two EPP Lakes and three CCWs occur partially within the Project area. No water quality studies specific to the Proposal have been undertaken and, therefore, the water quality of the existing wetlands within the Project area is currently unknown. Management actions will be required during construction aimed at ensuring that construction of the proposed road does not reduce the water quality of the wetlands. It is unlikely that constructing a road in the Project area will result in a significant impact on inland water quality.

Amenity

The key potential sensitive receptors in relation to amenity which may be impacted by the project are private residences which occur primarily to the south and northeast of the Project area. Potential amenity impacts that may result from the project are associated with visual amenity, air emissions, access, noise and vibration. The potential impacts associated with amenity are considered to be predominantly temporary and minor in duration and extent. These impacts will be able to be readily managed by standard management measures and no residual impacts on amenity are predicted as a result of the proposed FRCAH or subsequent road construction.

Heritage

Construction of the FRCAH is unlikely to have an impact on Aboriginal heritage. Nonetheless, potential impacts on unknown Aboriginal heritage sites will be investigated prior to construction. If impacts are identified, these impacts can be readily managed by other regulatory processes. Where there is an impact on an Aboriginal heritage site, as defined under Section 5 of the Aboriginal Heritage Act 1972 (AH Act), Main Roads will obtain consent to disturb the site under Section 18 of the AH Act. In accordance with the South West Native Title Settlement, the South West Land and Sea Council or the relevant Regional Corporations (Whadjuk and Gnaala Karla Booja) if they are established will be consulted regarding the construction of the FRCAH project.

It is unlikely that there will be any significant impact on any State Heritage Place or Municipal Heritage Inventory Place. Whilst it is possible that there may be an impact on non-indigenous heritage during the construction of the FRCAH Project, these impacts can be readily managed by other regulatory processes. Any impacts on State Heritage Places or Municipal Heritage Inventory Places will be managed under the Heritage of Western Australia Act 1990.

Human Health

In relation to human health, current and future road users, local residents and construction workers have the potential to be impacted by the proposed FRCAH. Potential impacts that may occur as a result of future road construction and operation within the Project area include impacts on human health resulting from long term traffic noise, dust generated during road construction and exposure to contaminated soil disturbed during construction. Public safety could also be at risk during construction if traffic and site access are not managed properly.

Construction noise will be managed to comply with requirements of the Environmental Protection (Noise) Regulations 1997. Traffic noise modelling will be undertaken to determine any noise mitigation requirements during operation. Dust and Traffic Management Plans will be developed to adequately manage construction impacts associated with dust and traffic. Appropriate health and safety measures will be implemented should there be any potential risks to the health of construction workers being exposed to contamination. Following implementation of these mitigation measures, no residual impacts are expected on human health.

6.3 Existing Land Use and Facilities

The existing land use is predominantly parks and recreation. Additional land use includes rural, railway, industrial, public purposes and road reservation. Existing infrastructure includes roads, houses, fertilizer plant, Mandurah passenger railway line and freight railway.

6.4 Engineering

Engineering constraints, including topography, geology, services and the existing transport network within the project area are discussed in the section below.

6.4.1 Topography and Hydrology

Between Thomas Road and Gilmore Avenue, to the east of Mandurah Road and the freight rail, a strip of marshy wetlands runs north-south through the study area. The wetland area is very low-lying at a height of 1m to 3m above sea level. A 30m to 45m high sandy ridge lies to the east of the wetland. The existing FRCAH MRS reservation lies just to the east of the wetland at the foot of the ridge.

The wetland area extends down to the environmentally sensitive Lake Cooloongup which lies south of Dixon Road and west of Mandurah Road. Lake Cooloongup is also low-lying at a height of 1m to 3m above sea level. The sandy ridge extends to the south across Gilmore Avenue and Millar Road, running to the east of Mandurah Road.

6.4.2 Geology and Soil Conditions

Three predominant soil types exist in the study area. Deep calcareous sandy soils lie to the west of the wetland area. Soils with shallow water tables exist in the wetland areas and deep siliceous sandy soils exist in the ridges to the east of the wetland area. Most of the wetland areas are mapped as having a high probability of Acid Sulphate Soil occurrence, generally below 1 m from the surface.

6.4.3 Services

The Dampier to Bunbury Natural Gas Pipeline

The Dampier to Bunbury Natural Gas Pipeline runs along the eastern boundary of the existing FRCAH 'Primary Regional Roads' reservation between Thomas Road and Gilmore Avenue. South of Gilmore Avenue the pipeline swings east and then south before crossing Millar Road and then running eastwards along the northern Mundijong Road reservation boundary. The pipeline is a strategically important underground gas transmission line transporting gas from WA's North West gas fields to Perth and the South West for residential and commercial use. The pipeline is owned by the Dampier to Bunbury Pipeline group, comprised of the DUET Group and Alcoa.

Parmelia Gas Pipeline

The Parmelia Gas Pipeline (Dongara to Pinjarra Gas Pipeline) runs along Mandurah Road between Wellard Road and Millar Road. Between Gilmore Avenue and Millar Road the pipeline runs between Mandurah Road and the freight rail line.

Western Power Services

Western Power services include a 132kV overhead transmission line which runs along the southern side of the Dixon Road reservation, crosses Mandurah Road and runs between Mandurah Road and the freight rail line before running along the northern Millar Road boundary.

6.4.4 Infrastructure

Key infrastructure includes the Mandurah passenger rail line and the freight rail line as shown in **Figure 6-1**.

The Perth – Mandurah passenger railway, which has two tracks, passes east-west through the study area. West of Mandurah Road the railway is located within the previously planned FRCAH Primary Regional Road reservation. East of Mandurah Road the railway passes through the Leda Nature Reserve. The line runs parallel with and to the south of Gilmore Avenue for a length of approximately 600m, where it passes over a freight railway and Mandurah Road.

A single track freight railway passes north-south through the study area. It is the primary facility linking industrial areas in the Perth Metropolitan South West Corridor with the south west of the State. The line crosses both Gilmore Avenue and Wellard Road at grade. Whereas Rockingham Road is grade separated. A large rail marshalling yard serving the Kwinana Beach industrial area is located just south of Thomas Road to Wellard Road. Current planning allows this facility to be extended south of Wellard Road. South of Gilmore Avenue the line runs parallel with and to the east of Mandurah Road.

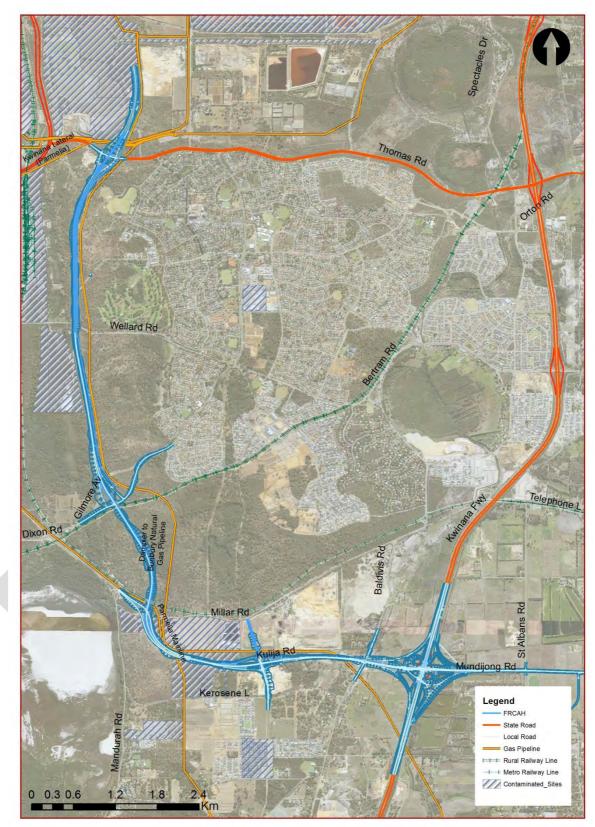


Figure 6-1: Engineering Constraints

7 PRELIMINARY OPTION ASSESSMENTS

7.1 General Overview

In general, the FRCAH route is seen as a future major north south route. It is currently shown as a Primary Regional Road (Controlled Access Highway) in the MRS and no change to this status is proposed.

The scope of this study is limited to the proposed FRCAH alignment of approximately 13km between Thomas Road to Mundijong Road and includes:

- Thomas Road/FRCAH interchange;
- Wellard Road/FRCAH interchange;
- Dixon Road/ Gilmore Road/ Mandurah Road/ FRCAH interchange;
- Nairn Drive/FRCAH interchange;
- Baldivis Road underpass; and
- Kwinana Freeway/ FRCAH interchange.

7.2 Interchange Spacing

Table 7-1 below outlines the spacing between the interchanges along the proposed FRCAH. The distance is measured between the proposed intersections and does not consider the spacing between successive ramp entry and exit points.

Highway Section	Interchange Spacing
Thomas Road to Wellard Road	2.61 km
Wellard Road to Gilmore	2.54 km
Gilmore Road to Nairn Drive	3.47 km
Nairn Drive to Kwinana Freeway	1.99 km
Table 7-1: Intercha	nge Spacing

The interchange spacing meets the minimum suggested spacing for interchange in an urban environment of 1.5km -2.0km specified in *Austroads Guide to Traffic Management Part 6- Section 6.3.*

7.3 Thomas Road/ FRCAH Interchange

The location of the Thomas Road interchange is constrained by the Dampier Gas Pipeline, the Bush Forever Protection Area and the aboriginal heritages. The existing planning design concept proposed a diamond interchange at Thomas Road and due to the environmental and engineering constraints, no change to the interchange type is proposed at Thomas Road.

7.4 Wellard Road/FRCAH Interchange

The review of the ultimate planning design concept of Wellard Road has been undertaken and documented in the Wellard Road Connectivity Review Report, Main Roads 2015. This report should be read in conjunction to this report. A brief summary of the report is included below. Driven by the imminent developments in the area, Main Roads Road Planning Branch has undertaken a review of the ultimate Wellard Road connectivity requirement. Three network options were considered in the assessment:

- Option 1: Base Case Network is as per the current planning design concept, a full diamond interchange with all north / south connections is provided between FRCAH and Wellard Road (Wellard Road over FRCAH). Wellard Road maintains connection through to Patterson Road.
- *Option 2*: Wellard Road maintains connection through to Patterson Road as per Option 1 but is a flyover at the FRCAH. No connection to the FRCAH is provided.
- Option 3: Wellard Road is cul-de-sac on the eastern side of the FRCAH. On the western side of the FRCAH Office Road terminates at the intersection of Mandurah Road. Wellard Road provides no east-west continuity and no connection to the FRCAH.

Preliminary observations have indicated that full connectivity of Wellard Road to the FRCAH and Patterson Road (via Office Road) may be difficult to achieve due to the location of the existing freight railway line and Mandurah Road. Previous Road Planning of Wellard Road east of the Railway provided a very wide road reservation width for the future grade separation of the road and railway. However at the west of the existing freight railway line to Mandurah Road, no provision in terms of land has been planned for in the MRS. Due to the closeness of Mandurah Road with the existing freight railway line, Wellard Road would also require to be grade separated with Mandurah Road. The existing development west of Mandurah Road may preclude any ability to grade separate the intersection of Wellard Road and Mandurah Road.

Analysis undertaken indicated that at a network level key road links have adequate mid-block capacity available to accommodate the forecast all-day 2031 traffic volumes in any of the three options assessed. This suggests that if Wellard Road is closed east of the FRCAH, the surrounding road network can adequately cater for the increase in traffic that will occur as a result. This is further supported by SIDRA assessment that indicates the key interchanges in the study area can perform satisfactorily in Option 3 under 2031 forecast traffic demand.

While Main Roads appreciates the likely desire to maintain the east-west connection offered by Wellard Road, the high cost of grade separating Wellard Road from both the freight rail and Mandurah Road is the most prohibitive factor in Main Roads consideration. Given that the surrounding network has been demonstrated to have capacity sufficient to meet demands, the economic, environmental and engineering costs associated with maintaining the long term connectivity of Wellard Road are fatal flaws in Options 1 and 2. As such cul-de-sac Wellard Road east of the FRCAH is recommended.

Based on the findings and recommendations of the Wellard Road Connectivity Review Report (Main Roads 2015), it is suggested for the cul-de-sac of Wellard Road east of FRCAH. Consultation with the City of Kwinana indicated interests to grade separate Wellard Road and FRCAH, mainly due to the concerns of the existing capacity of Gilmore Avenue to cater for the additional traffic. Further traffic analysis indicated that the surrounding network has sufficient capacity to cater for the 2031 traffic volume without a connection between FRCAH and Wellard Road. As such, it is recommended to cul-de-sac Wellard Road east of FRCAH. The existing planning design concept proposed a diamond interchange at Wellard Road and it is recommended that the road reservation for the diamond interchange to be retained in the MRS.

7.5 Gilmore Avenue / Mandurah Road / FRCAH Interchange

The existing planning design concept proposed a half trumpet interchange to provide the predominant north eastern traffic movements. This is based on the proposed FRCAH alignment connecting to Garden Island Highway. This type of interchange is no longer feasible as the new FRCAH alignment will now be connected to Mundijong Road instead of the previously proposed Garden Island Highway.

The land surrounding the interchange is predominantly Bush Forever and it is unlikely that the land use in this area will change in the future. In addition, there is also a Conservation Category Wetland, Lake Cooloongup located approximately 300m from the existing Gilmore Avenue alignment. The location of the interchange is also constrained by the existing Dampier to Bunbury Gas Pipe Corridor on the east quadrants and the existing passenger railway, approximately 360m south of the existing Gilmore Avenue. Due to the proximity to the passenger railway line, FRCAH will need to be grade separated over both Gilmore Avenue and the existing passenger railway line.

Previous proposal suggested realigning Gilmore Avenue to the south to run parallel with the passenger railway line for an additional 1.1km. This realignment is supported in this study for the following reasons:

- A large portion of the land has been reserved north of the passenger railway as the result of the previously proposed trumpet type interchange.
- The vegetation near the existing Gilmore Avenue categorised as 'Good' condition, this included a riparian vegetation community which provides an important drought refuge for the local flora and fauna species. An interchange at this location would result in excessive environmental impacts.
- Eliminate the need of separate structures or very long structures for the crossings at Gilmore Avenue and the crossing at the passenger railway.

To achieve the required angle of crossing, between 45-90 degrees, to the Dampier Perth Gas Pipe Corridor, the proposed Gilmore Avenue will need to be constructed through the hilly area south of existing alignment. Though this requires additional earthworks, the additional cost is justified through the minimisation of environmental impacts and the need of additional structures as well as the associate cost for the maintenance of these structures.

Two interchange types shown in **Figure 7-1** have been considered as part of this review.

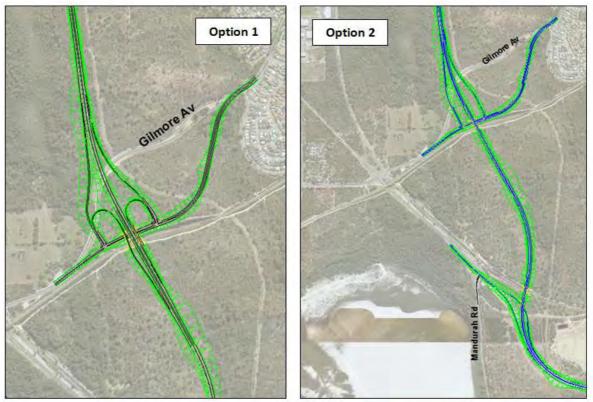


Figure 7-1: Interchange Options at Gilmore Avenue

The first option proposes full connectivity at the realigned intersection of Gilmore Avenue with the FRCAH. The second option proposed a half diamond interchange at the realigned Gilmore Avenue and direction ramps at Mandurah Road. This second option was developed in collaboration with the City of Rockingham to improve access to the City from the south.

It was found that both options would impinge on the Bush Forever Protection Areas to some extent. Option 1 has more significant environmental impact because the land north of the passenger railway line has higher conservative values and this Option requires additional footprints at this location. Option 2 has fewer impacts to conservation category wetlands and Bush Forever Protection Areas in comparison to Option 1. The proposed location for the ramps near Mandurah Road in Option 2 has less conservative value due to the industrial activities in proximity. Although the proposal will have some impacts to some combination of Good and Degraded rated vegetation, no apparent alternative exists due to the location of the Dampier to Bunbury Gas Pipeline corridor on the north side of the road and the conservative Kerosene Land Swamp on the south side of the road. Options of relocating the ramps further east are considered unfeasible due to the proximity of Nairn Drive interchange and also the accessibility for the local residents and industries.

Option 2, shown in **Figure 7-2**, will require the cul-de-sac of the Millar Road West to accommodate the ramps however access to the FRCAH from the north will be provided at Nairn Drive interchange via Baldivis Road underpass.

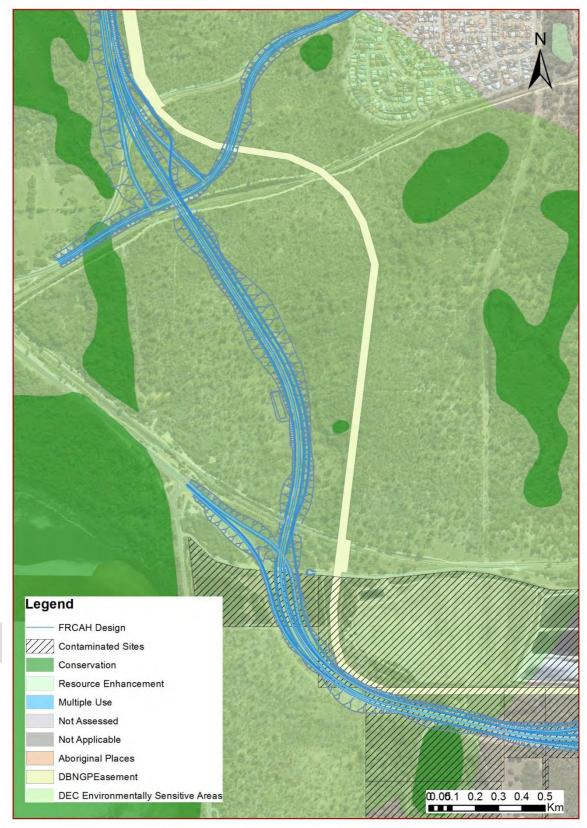


Figure 7-2: Gilmore Avenue, Mandurah Road and FRCAH Interchange

Main Roads could accept either Option 1 or Option 2. For Option 1 all movements are accommodated at the Gilmore Avenue interchange providing a more legible and logical regional road network solution. Option 2 does provide more direct connectivity to the Rockingham City Centre and has smaller environmental footprint. Main Roads

recommended that Option 2 is adopted as the preferred long term regional road network configuration in supporting the City of Rockingham's strategic planning,

7.6 Nairn Drive / FRCAH Interchange

The City of Rockingham has indicated that a connection of Nairn Drive to FRCAH is vital for the success implementation of the proposed Baldivis District Structure Plan. Nairn Drive is identified as the main route linking the Structure Plan area to Kwinana Freeway via FRCAH/ Mundijong Road. The ROM forecasts significant traffic volumes that exceed the junction capacity and provides warrant for an interchange at this location.

The location of the Nairn Drive and FRCAH interchange is physically controlled by the Dampier to Bunbury Gas Pipe Corridor on the northern side of the FRCAH alignment as shown in **Figure 7-3**. This physical control precludes the use of the other interchange types except a conventional diamond interchange.

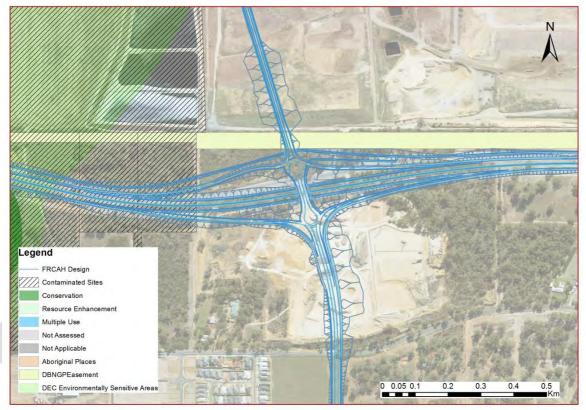


Figure 7-3: Nairn Drive and FRCAH Interchange

The City of Rockingham has indicated preference for a fourth leg on the north side of the interchange to provide heavy vehicle access to the existing industrial facilities nearby, namely, the City of Rockingham's Landfill located between Millard Road and the FRCAH. The City's preference is prompted by the proposed cul-de-sac of Millar Road located east of the FRCAH alignment. The main concern relates to the potential implications of heavy vehicles using the local streets of the proposed residential area south on Kerosene Lane to access FRCAH via Nairn Drive. With limited information on the operational life of the industrial facilities, it is very difficult to assess the necessity of the additional northern leg.

It is envisage that the first stage of the construction of this interchange will be an at grade intersection with the northern leg to maintain the connectivity for the industrial

area. The necessity of the fourth leg to the interchange can be reviewed during the detail design stage for the interchange.

7.7 Kwinana Freeway / FRCAH Interchange

As a result of the land developments between Baldivis and Kwinana Freeway north and south of Mundijong Road extension, Main Road has undertaken a review of the long term planning design concept for the intersection of Mundijong Road and Kwinana Freeway. This review is documented in the Mundijong Road/ Kwinana Freeway Interchange Configuration Assessment (Main Roads WA 2014) and should be read in conjunction to this report. A brief summary of the report is included below. The Mundijong Road/ Kwinana Freeway Interchange Configuration Assessment included analysis of three interchange configurations, a diamond interchange, elevated roundabout and system interchange, and two forecast years; 2031 ROM forecasts and 2050 Sensitivity assessment.

While upgrades to the existing diamond interchange can work for interim traffic demands, it has been identified that a systems interchange is required to meet ultimate development requirements and the strategic vision for the network at this location. It is therefore Main Roads preferred position that a systems interchange be planned for in the ultimate scenario and that this assessment may form the basis for development of a concept design to better define the interchange requirements and ensure sufficient reservation can be included in the Metropolitan Region Scheme (MRS) in order to provide the City of Rockingham more certainty in progressing development in the surrounding area.

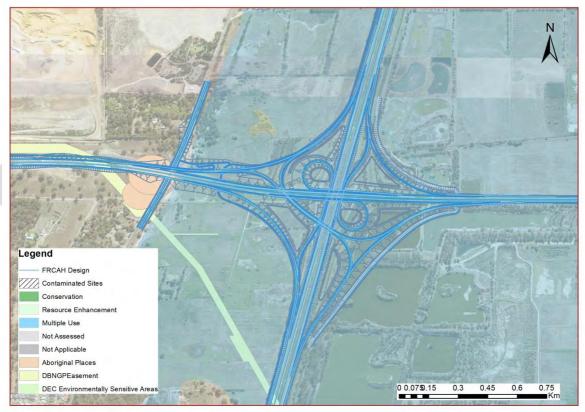


Figure 7-4: Kwinana Freeway and FRCAH Interchange

As a result of the above report and the high traffic volume predicted, a system interchange is recommended for the intersection of Kwinana Freeway and FRCAH shown in **Figure 7-4**. The interchange will provide free flow for both major

movements and for the interconnecting ramps. Due to the proximity to the Kwinana Freeway / Mundijong Road interchange, the previously proposed quarter-loop connection at Baldivis Road has been replaced by an underpass at Baldivis Road to maintain the north south connectivity.

8 DESIGN ELEMENTS AND STANDARDS

8.1 General Overview

The FRCAH is planned as a Highway with control of access. The primary purpose of the FRCAH is to improve the network reliability, access for freight to the surrounding industrial land areas and supporting the economic vitality of the region. The planning design concept of the main alignment is designed to accommodate 36.5m double road trains. The design speed is 110km/h.

8.2 Traffic Performance

8.2.1 Roadway

Level of Service (LOS), as defined by the Transportation Research Board Highway Capacity Manual 2000, is a quality measurement describing the operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience. Six LOS types are defined with LOS A representing the best operating condition and LOS F the worse. Each level of service represents a range of operating conditions and the drivers' perception of those conditions.

General definition for LOS is shown in the **Table 8-1** below:

Level of Service	General Operating Conditions
А	Free flow, low traffic density
В	Minimum delay, stable traffic flow
С	Stable condition, movements somewhat restricted due to higher volumes but not objectionable for motorist
D	Movements more restricted, travel speeds begin to decline
E	Traffic fills capacity of the roadway, vehicles are closely spaced
F	Forced flow with demand volumes greater than capacity
	Table 8-1: Level of Service Definition

It is a requirement of Main Roads that any road network modifications or improvement will perform adequately in the future by maintaining traffic flow and limiting congestion to an acceptable level. The peak hour volumes are used for the LOS assessment. The target level of service applied to the various road network elements are summarised in **Table 8-2** below:

Road Element	Target LOS	Minimum LOS
FRCAH	С	D
Freeway Ramps	С	D
Collector- Distributor Road	С	E
T - 1-1 -	0.0. Louis Lof Comiles Townsh	

 Table 8-2: Level of Service Targets

8.2.2 Traffic Performance- Signalised Intersection

The Level of Service (LOS) for intersections is defined in the Transportation Research Board Highway Capacity Manual 2000, as the average vehicle delay, which includes both stopped time and geometric delay (slowing down). This may be calculated as an average for the intersection overall, for each approach, or for each individual movement. Six LOS types are defined with LOS A representing the best operating condition and LOS F the worse. Level of service is measured with respect to control delay as shown in the **Table 8-3** below, in accordance to Highway Capacity Manual.

Level of Service	Control Delay per vehicle in seconds		
Level of Service	Signals	Roundabout	Stop and Giveaway Yield
А	$d \leq 10$	$d \leq 10$	$d \leq 10$
В	$10 {<} d \leq 20$	$10{<}d \le 20$	$10 {<} d \leq 15$
С	$20 {<} d \leq 35$	$20{<}d \leq 35$	$15 {<} d \leq 25$
D	$35 \le d \le 55$	$35 < d \le 50$	$25 \le d \le 35$
Е	$55{<}d \le 80$	$50{<}d \le 70$	$35{<}d \le 50$
F	80 <d< th=""><th>70<d< th=""><th>50<d< th=""></d<></th></d<></th></d<>	70 <d< th=""><th>50<d< th=""></d<></th></d<>	50 <d< th=""></d<>

Table 8-3: Level of Service Signalised Intersection

For the design of Main Roads' infrastructure, the target Level of Service for the overall intersection should generally be LOS 'C' with no individual movement less than LOS 'D' for the design year. In the case of signalised intersections where the anticipated cycle length is greater than 120 seconds, or where site constraints limit the number of lanes that can be constructed, a lower LOS may be accepted provided that the Degree of Saturation (DOS) meets the criteria in Table 8-4.

For signalised intersections, the degree of saturation (DOS) represents the proportion of available green time capacity taken up for the critical movement(s). For unsignalised intersections, it is the utilisation ratio (volume / capacity or service volume / service rate) for entering movements that must give way.

Intersection Type	DOS	
Signalised intersections	Critical movement(s) should not exceed 0.9	
Roundabout	No movement should exceed 0.85	
Unsignalised Intersection	No movement should exceed 0.80	
Table 8-4: Limits of Operation for Different Types of Intersection		

Table 8-4: Limits of Operation for Different Types of Intersection

The target levels of service applied to the Signalised intersection analysis are summarized in the Table 8-5 below:

Road Element		
Intersection Average	LOS C	LOS D
Worse Movement		
Major Movement	LOS D	LOS E, but DOS <0.9
Minor Movement	LOS D	LOS F, but DOS <0.9
Maximum degree of saturation (overall)	0.85	0.95
Table 8-5: Signalised Intersection Target LOS and DOS Criteria		

8.3 Traffic Analysis Methodology

8.3.1 Network Traffic Volumes

The Main Roads ROM is a strategic traffic forecasting tool, made up of approximately 1160 zones and a network of links to represent the Perth metropolitan road network. ROM uses mathematical models to estimate daily traffic volumes on each link in the network.

While the ROM presents an accurate picture of traffic movement at a strategic network level, there are often limitations associated with the traffic volume predicted on individual links, and thus some forms of adjustment are necessary. Adjustments to the existing road network are made by comparing the ROM model against observed traffic volume. Main Roads produces a document called Average Weekday Traffic Flow that provides daily flows on main roads in Perth metropolitan area. These flows are usually measured by automatic traffic counters that are installed for a few days at regular intervals at a number of sites. These classified counts have been used as the observed volumes where available. Where classified data is not available, SCATS data and site counts have been used.

ROM outputs are presented as Annual Average Weekday Traffic (AAWT) volumes. For Freeway and intersection capacity analysis, peak hour volumes are required. The ROM forecast volumes must be factored to one hour peak periods, for the AM peak and PM peak. For the analysis of Signalised intersection, adjusted approach volumes are distributed to individual movement according to ROM 2031 turning proportion. Where new section of network are under consideration, namely from Thomas Road to Gilmore Avenue, no observed data is available. A 9% peak hour factor was applied to the 2031 all day turning volume diagrams for Thomas Road/FRCAH, Wellard/ FRCAH, Gilmore Avenue/FRCAH, Nairn Drive/FRCAH interchanges.

For the system interchange, traffic modelling was undertaken using the Main Roads ROM for the 3.8 million population scenario for the road network option. This "interim" scenario using the most recent available land use data developed by Department of Planning for the South Metropolitan Perth and Peel Structure Plan was based on the 2031 population. A 30% increase of the 2031 forecast volumes was used for the traffic assessment of the 'ultimate' scenario of a population of 5 million in 2050.

8.3.2 Freight traffic

Primary freight routes include the FRCAH, Thomas Road, Mundijong Road and Patterson Road. Current vehicle composition on the road network is available for some of the networks through Main Roads classified counts database. The proportion of Heavy Vehicles ranges from 4% to 15% of the total traffic volume. Given that there is no Heavy Vehicle compositions data available for the new section of the network, an average of the existing classified count and ROM data is used to

investigate the future heavy vehicle flows for each of the options. The modelling shows that the FRCAH will carry in the order of 6,000 to 7,000 heavy vehicles per day.

8.3.3 Freeway Analysis

Freeway capacity analysis has been analysed based on the procedures presented in the Highway Capacity Manual (HCM), using HCS software by McTrans. Traffic analysis has been undertaken for mid-block segments, merge and diverge segments and weaving segments.

For the HCM analysis, the following factors have been generally adopted:

Freeway free flow speed:	100km/hr
Ramp free flow speed:	80km/hr
Terrain:	Level (mid block)
• Terrain:	3.0% /-3.0 % Grade(ramps)
Peak Hour Factor (PHF):	0.95
Passenger Car Equivalent (PCEs) for heavy ve	ehicles: 1.5
Driver Population Adjustment, fp:	1.0

8.3.4 Intersection Analysis

Intersection analysis has been analysed using the software SIDRA Intersection Version 6 for all the service interchanges using the traffic volumes derived from 2031 ROM turning movement plots and adjustment described in the earlier section of this report.

The default values in SIDRA have been used for the intersection analysis. The cycle times has been adjusted to suit Main Roads requirements for signalised intersection and also to improve the coordination between the intersections. Calibration of vehicle data to reflect the percentage of the heavy vehicles expected on the route formed part of the analysis.

8.4 Design Standards

A number of key design objectives have been identified for the proposed FRCAH. These objectives are aimed at not only providing sufficient traffic carrying capacity of the route, but also maintaining and maximizing the economic viability of the adjacent land, improving the general amenity of the surrounding area, and improving the conditions for high occupancy and non-motorized vehicles.

The FRCAH will be designed based on the following standards and guidelines:

- Main Roads WA supplement to AustRoads Guide to Road Design
- AustRoads Guide to Road Design Part 1 to 6
- Main Roads WA Horizontal Curve Table (2004)
- Main Roads WA Standards Drawings
- Highway Capacity Manual

8.5 Design Vehicles

The main alignment of FRCAH is designed to accommodate RAV (Restricted Access Vehicles) Network 5, 6 & 7 equivalents to commercial vehicles up to 36.5m long. The interchanges at Thomas Road and Gilmore Avenue are designed to accommodate vehicles up to 27.5m long.

8.6 Main Alignment

Design Speed

A horizontal and vertical design speed of 110km/hr was adopted throughout the entire length of the proposed FRCAH from Thomas Road to Mundijong Road.

The design speeds for various road elements are outlined in the **Table 8-6** below:

Road Element	Design Speed (km/h)	Posted Speed (km/h)	
FRCAH	110	100	
Freeway Ramp	90	80	
Collector- distributor roads	90	80	
Principle Share Path	30	n/a	
Table 9 Gr Design Speeds			

 Table 8-6: Design Speeds

Horizontal Alignment

An absolute minimum horizontal curves radius of 800m and a desirable minimum horizontal curve radius of 1000m are required.

Superelevation was applied to all curves, based on the "Horizontal Curve Tables" (2011) developed by Main Roads WA.

Vertical Alignment

The maximum and minimum longitudinal grades achieved for the road are as follows:

Maximum Longitudinal Grade:	3%
Minimum Longitudinal Grade:	0.04%
• Minimum K value for crest curve (for 110km/hr design speed):	151
Minimum K value for crest curves at intersections:	198
• Minimum K value for sag curves (for 110km/hr design speed):	84

For the calculation of sight distances, the following factors were applied:

•	Height of eye of driver (h1):	1.1m
٠	Object cut off height (h2):	0.2m
٠	Reaction time (Rt):	2.5 seconds

8.7 Ramps

Ramp Lengths

Ramp lengths are based on the traffic volume determined by the traffic analysis and storage length.

Minimum Radius (On Ramp)

Minimum horizontal radius for On Ramps is based on a typical design speed of 90km/h.

With Transition: 340mWithout Transition: 450m

Loop Ramps

Minimum horizontal radius for Loop Ramps is based on a typical design speed of 50km/h.

5%

4%

• With Transition: 55m

Ramp Grades

- Maximum Grades On Ramps:
- Maximum Grades Off Ramps:

8.8 Bridge Clearance

Freeways & Arterial:
Baldivis Road:
Local Roads:
Passenger Rail:
Freight Rail:
6.5m + Structure Depth
6.5m + Structure Depth
5.2m + Structure Depth
7.2m + Structure Depth

(If no rail picked up on survey an additional 0.86m will need to be added for the ballast)

8.9 Cross-Section

- Number of lanes:
- Lane width:
- Seal width :
- Median Width:
- Shoulder Width:
- Pavement crossfall:

6 lanes 3.5m 16m each carriageway 5.8m 3.0m (left) and 2.5m (median) 3%

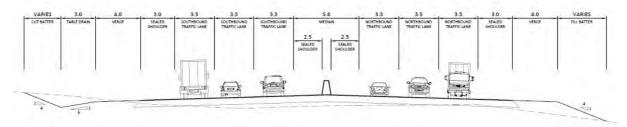


Figure 8-1: Proposed FRCAH Cross Section

8.10 Earthworks and Batter Slopes

Fill batters

Height 'H'	Slope (H to V)	Width 'W'
0 to 300	1.8m width table	drain required
300 to 1000	6 to 1	0 to 6000(i)
1000+	4 to 1	6000+
(1)	The solution frame O to A to A to A should be	

(i) Transition from 6 to 1 to 4 to 1 should occur over 20m Table 8-7: Desirable Fill Batter

(Table 4.5.3.3 MRWA Supplement to Austroads Guide to Road Design - Part 3)

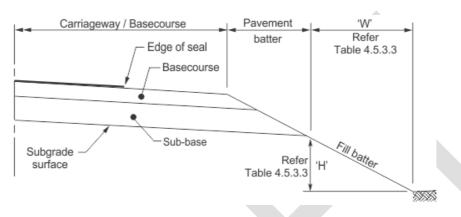


Figure 8-2: Typical Section in Fill

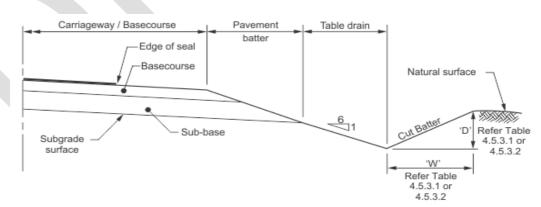
(Figure 4.5.3.2 MRWA supplement to Austroads Guide to Road Design - Part 3)

Cut batters

Depth 'D'	Slope (H to V)	Width 'W'
0 to 2500	4 to 1	0 to 10000(i)
2500+	3 to 1(ii)	10000+

 (i) Transition from 4 to 1 to 3 to 1 should occur over 20m
 (ii) Batters 3 to 1 or steeper will generally require road safety barriers Table 8-8: Desirable Earth Cut Batter







(Table 4.5.3.1 MRWA Supplement to Austroads Guide to Road Design - Part 3)

9 TRAFFIC ANALYSIS

9.1 General Overview

As part of the planning design concept, the key intersections along FRCAH were examined using the traffic analysis software. Traffic forecasts based on Department of Planning's projected land use data for the South Metropolitan and Peel Structure Plan have been obtained from Main Roads Regional Operations Model (ROM) all day plots. The volumes of the main intersections are shown in **Figure 9-1** below.

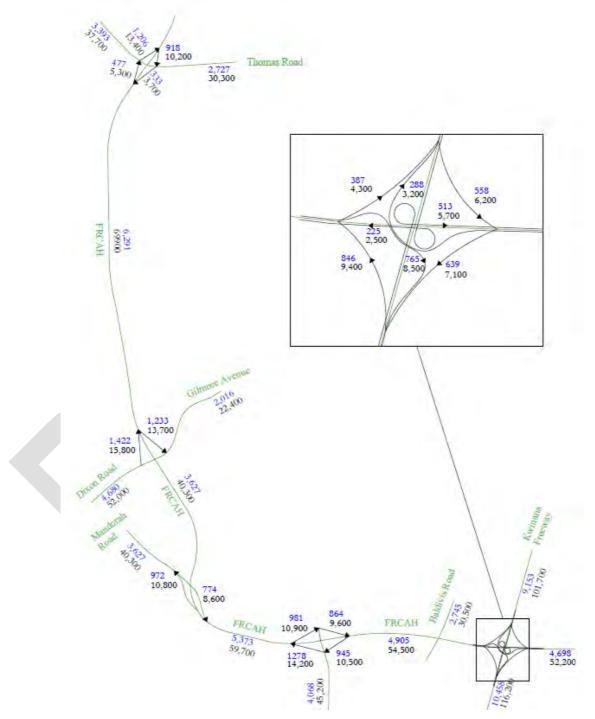


Figure 9-1: Forecast All Day Traffic Volumes

The key intersections along FRCAH have been assessed using SIDRA for the intersection performance. It is anticipated that further SIDRA and microsimulation modelling will be undertaken during project definition and project development. The intersection at Thomas Road, Wellard Road and Gilmore Avenue has been assessed as part of the Wellard Road Connectivity Review. A brief discussion of the results are included in the sections below, please refer to the Wellard Road Connectivity Review Report, Main Roads 2015 for more details.

Location	Intersection Option	Level of Service (LOS)	Maximum Degree of Saturation (DOS)
Thomas Road	Signalised	LOS C	0.736
momas Roau	Dogbone Roundabout	LOS A	0.856
Gilmore	Signalised	LOS B	0.822
Avenue	Dogbone Roundabout	LOS B	0.820
	Dogbone Roundabout	LOS B	0.703
Nairn Drive	Dogbone Roundabout (with additional northern leg)	LOS B	0.847
	Signalised (with additional northern leg)	LOS D	0.955
	Table 9-1: Summary of SI	ORA Results	

A summary of the SIDRA results is presented in **Table 9-1** below.

9.2 Thomas Road

The intersection assessment at Thomas Road included options of signalised intersection and dogbone roundabout. The merges and diverges of each of the Thomas Road ramps and the FRCAH were assessed using Highway Capacity Software HCS+ and confirmed that single lane ramps would be sufficient for traffic volumes. This may be subject to further widening to accommodate stand up traffic lanes for managed freeways.

9.2.1 Signalised

The proposed intersection shown in **Figure 9-2** operates at an overall LOS C and DOS of 0.736, indicating additional capacity available at the intersection using this configuration. The maximum queue length is 132m for the vehicles turning right to FRCAH on ramp from Thomas Road east. The movement summary is provided in **Table 9-2.**

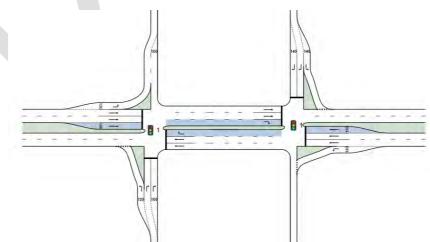


Figure 9-2: Thomas Road Intersection Lane Configuration- Signalised

MOVEMENTSUMMARY

Site: Thomas Road West Option 3

^{¢¢} Network: Thomas Road Option 3 Signals

New Site

Signals - Fixed Time Coordinated Cycle Time = 100 seconds (User-Given Phase Times)

Move	ement Per	formance	e - Vehic	les							
	D ODMo		Flows D HV		Average Delay	Level of Service	95% Back Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		perveh	km/h
South	: FRCAH (Off-Ramp									
	L2	180	15.0	0.465	9.0	LOSA	3.1	28.6	0.43	0.71	49.6
5	R2	301	8.0	0.736	56.5	LOSE	7.7	62.4	1.00	0.86	11.
ppro	bach	481	10.6	0.736	38.7	LOSD	7.7	62.4	0.79	0.81	23.0
ast:	Thomas R	oad									
j –	T1	1564	8.0	0.549	1.7	LOSA	5.2	42.2	0.15	0.14	56.4
	R2	338	8.0	0.575	44.8	LOSD	16.1	130.7	1.00	0.86	17.1
ppro	bach	1902	8.0	0.575	9.4	LOSA	16.1	130.7	0.30	0.27	45.6
Vest	Thomas F	Road									
0	L2	868	15.0	0.525	6.9	LOSA	0.0	0.0	0.00	0.56	56.3
1	T1	780	8.3	0.540	30.6	LOSC	14.2	114.9	0.84	0.79	32.5
ppro	bach	1648	11.8	0.540	18.1	LOSB	14.2	114.9	0.40	0.67	43.9
All Ve	hicles	4031	9.9	0.736	16.4	LOSB	16.1	130.7	0.40	0.50	41.0

MOVEMENTSUMMARY

Site: Thomas Road East Option 3

^{¢¢} Network: Thomas Road Option 3 Signals

New Site

Signals - Fixed Time Coordinated Cycle Time = 100 seconds (User-Given Phase Times)

Mov	ement Per	formance	- Vehic	les							
	ID ODMo	Demand Total			Average Delay	Level of Service	95% Back Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		perveh	km/h
East:	Thomas R	oad									
4	L2	278	7.9	0.187	7.4	LOSA	1.5	12.4	0.19	0.63	55.2
5	T1	1202	8.0	0.641	32.0	LOSC	17.6	142.8	0.88	0.82	31.7
Appr	oach	1480	8.0	0.641	27.4	LOSC	17.6	142.8	0.75	0.79	35.4
North	h: FRCAH C	Off-Ramp									
7	L2	217	7.8	0.249	7.9	LOSA	1.9	15.5	0.26	0.66	52.8
9	R2	700	15.0	0.633	36.7	LOSD	14.5	132.0	0.90	0.84	16.3
Appr	oach	917	13.3	0.633	29.9	LOSC	14.5	132.0	0.75	0.80	25.2
West	t: Thomas F	Road									
11	T1	1030	8.0	0.509	3.1	LOSA	5.4	43.6	0.18	0.16	54.4
12	R2	51	13.7	0.255	53.3	LOSD	2.6	22.8	1.00	0.76	15.2
Appr	oach	1081	8.2	0.509	5.5	LOSA	5.4	43.6	0.22	0.19	51.1
All Ve	ehicles	3478	9.5	0.641	21.2	LOSC	17.6	142.8	0.59	0.60	37.1

Table 9-2: Thomas Road Intersection Movement Summary- Signalised Intersection

9.2.2 Dogbone Roundabout

The proposed intersection shown in Figure 9-3 operates at an overall LOS A and DOS of 0.856 using this configuration. The maximum queue length is 84.1m for the eastbound approach to the second roundabout. Though the proposed interchange achieves the required LOS, but it exceeds the DOS limits. This oversaturation is due to the heavy conflicting right turn movement from the FRCAH southbound off-ramp, which in turn is restricted by the heavy through movement from the west approach. The movement summary is provided in **Table 9-3**.

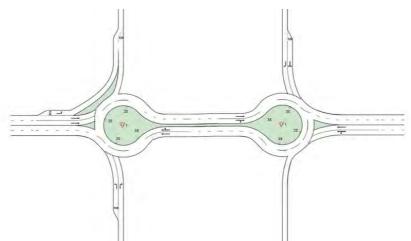


Figure 9-3: Thomas Road Intersection Lane Configuration- Dogbone Roundabout

MOVEMENTSUMMARY

Site: Thomas Road West Option 3

^{¢¢} Network: Thomas Road Option 3 Roundabout

New Site Roundabout

Move	ement Per	formance	e - Vehic	les							
Mov II	D ODMo	Demand	Flows D	eg. Satn	Average	Level of	95% Back	ofQueue	Prop.	Effective	Average
		Total	HV		Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		perveh	km/h
South	: FRCAH C	Off-ramp									
1	L2	180	15.0	0.381	15.2	LOSB	1.8	16.4	0.79	0.95	48.2
3	R2	301	8.0	0.412	18.6	LOSB	2.3	18.7	0.79	0.99	30.8
Appro	bach	481	10.6	0.412	17.3	LOSB	2.3	18.7	0.79	0.98	39.4
East: 1	Thomas R	oad									
5	T1	1564	8.0	0.585	0.0	LOSA	0.0	0.0	0.00	0.08	58.9
6	R2	338	8.0	0.585	5.0	LOSA	0.0	0.0	0.00	0.23	42.4
Appro	bach	1902	8.0	0.585	0.9	LOSA	0.0	0.0	0.00	0.11	56.5
West:	Thomas F	Road									
10	L2	868	15.0	0.499	4.3	LOSA	0.0	0.0	0.00	0.46	60.2
11	T1	780	8.3	0.397	8.7	LOSA	3.1	25.3	0.79	0.75	51.6
Appro	bach	1648	11.8	0.499	6.4	LOSA	3.1	25.3	0.37	0.60	56.4
All Ve	hicles	4031	9.9	0.585	5.1	LOSA	3.1	25.3	0.25	0.41	54.4

MOVEMENTSUMMARY

Site: Thomas Road East Option 3

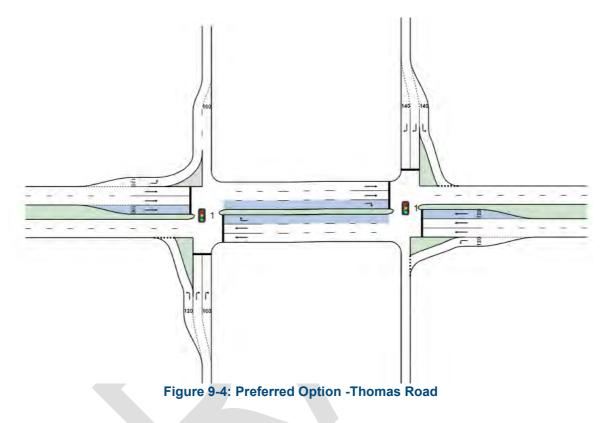
New Site Roundabout

Mov ID (ODMo v	Demand	Flows D	eg. Satn	Average Delay	Level of Service	95% Back	ofQueue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total	HV				Vehicles	Distance				
		veh/h	%	v/c	sec		veh	m		perveh	km/h	
East: Th	omas Ro	oad										
4	L2	278	7.9	0.856	10.1	LOSB	10.4	84.1	0.93	1.23	42.0	
5	T1	1202	8.0	0.856	11.3	LOSB	10.4	84.1	0.93	1.24	38.1	
Approa	ch	1480	8.0	0.856	10.9	LOSB	10.4	84.1	0.93	1.24	39.0	
North: F	RCAH O	ff-ramp										
7	L2	217	7.8	0.563	8.4	LOSA	3.4	29.5	0.70	0.96	47.5	
9	R2	700	15.0	0.563	15.5	LOSB	3.4	29.5	0.71	0.98	32.1	
Approa	ch	917	13.3	0.563	13.8	LOSB	3.4	29.5	0.71	0.98	37.7	
West: T	homas R	load										
11					4.6	LOSA	0.0	0.0	0.00	0.43	41.2	
12	R2	51	13.7	0.333	10.7	LOSB	0.0	0.0	0.00	0.45	55.3	
Approa	pproach 108		8.2	0.333	4.9	LOSA	0.0	0.0	0.00	0.43	41.5	
All Vehi	cles	3478	9.5	0.856	9.9	LOSA	10.4	84.1	0.58	0.92	39.6	

 Table 9-3: Thomas Road Intersection Movement Summary- Dogbone Roundabout

9.2.3 Preferred Option

The preferred option for this intersection is the signalised intersection in **Figure 9-4**. At the western side intersection, a left turn pocket of approximately 120m on Thomas Road will provide the sufficient storage required for the access to the northbound FRCAH south. Off Ramp of approximately 572m on the north and 451m on the south will be providing the sufficient deceleration length and storage for the forecast traffic demands. It is anticipated that the existing 2 lane dual carriageway on Thomas Road would be sufficient in catering the future through traffic demands.



9.3 Gilmore Avenue

The intersection assessment at Gilmore Avenue included analysis of a signalised intersection and a dogbone roundabout. The summary of the assessment of each option is detailed below. Further rigorous assessment may be done at a detailed design stage to determine the prefer treatment option.

The merges and diverges of each of the Gilmore Avenue and Mandurah Road ramps and the FRCAH were assessed using Highway Capacity Software HCS+ and confirmed that single lane ramps would be sufficient for traffic volumes. This may be subject to further widening to accommodate stand up traffic lanes for managed freeways.

9.3.1 Signalised

The proposed intersection shown in **Figure 9-5** operates at an overall LOS B and DOS of 0.822. The maximum queue length is 140m for the through vehicles travelling west following by a queue length of 120m for right turn vehicles on the FRCAH off ramp. The movement summary is provided in **Table 9-4**.

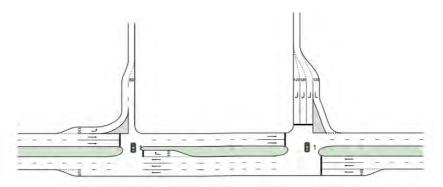


Figure 9-5: Gilmore Avenue Intersection Lane Configuration-Signalised

MOVEMENTSUMMARY

Site: Gilmore Avenue West Option 3

^{\$\phi \u00e9} Network: Gilmore Avenue Option 3 Signals

New Site

Signals - Fixed Time Coordinated Cycle Time = 100 seconds (User-Given Phase Times)

Move	ement Per	formance	- Vehic	les							
Movi	D ODMo	Demand	Flows D	eg. Satn	Average	Level of	95% Back	ofQueue	Prop.	Effective	Average
		Total	HV		Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		perveh	km/h
East:	Gilmore Av	/enue									
5	T1	2248	8.0	0.250	0.0	LOSA	0.0	0.0	0.00	0.00	39.9
6	R2	50	8.0	0.069	33.1	LOSC	2.3	17.3	0.98	0.77	20.3
Appr	oach	2298	8.0	0.475	0.7	LOSA	2.3	17.3	0.02	0.02	39.5
West	: Gilmore A	venue									
10	L2	1422	7.9	0.822	7.1	LOSA	0.0	0.0	0.00	0.56	56.7
11	T1	1012	8.0	0.587	24.7	LOSC	18.2	139.7	0.79	0.80	36.1
Appr	oach	2434	8.0	0.822	14.4	LOSB	18.2	139.7	0.33	0.66	47.7
All Ve	hicles	4732	8.0	0.822	7.8	LOSA	18.2	139.7	0.18	0.35	43.4

MOVEMENTSUMMARY

Site: Gilmore Avenue East Option 3

^{¢¢} Network: Gilmore Avenue Option 3 Signals

New Site

Signals - Fixed Time Coordinated Cycle Time = 100 seconds (User-Given Phase Times)

Movement P	erformanc	e - Vehi	cles							
Mov ID ODMo	Deman	d Flows [Deg. Satn	Average	Level of	95% Bacl	k of Queue	Prop.	Effective	Average
v	Total	HV		Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
	veh/h	%	v/c	sec		veh	m		perveh	km/h
East: Gilmore	Avenue									
5 T1	1060	7.9	0.410	22.8	LOSC	11.4	87.5	0.71	0.74	37.8
Approach	1060	7.9	0.410	22.8	LOSC	11.4	87.5	0.71	0.74	37.8
North: FRCAH	I Off-Ramp									
7 L2	50	8.0	0.052	7.8	LOSA	0.4	2.7	0.21	0.63	52.8
9 R2	1238	8.0	0.577	30.2	LOSC	15.4	118.5	0.82	0.83	18.6
Approach	1288	8.0	0.577	29.3	LOSC	15.4	118.5	0.80	0.82	20.2
West: Gilmore	e Avenue									
11 T1	1012	7.9	0.587	5.2	LOSA	6.5	50.2	0.29	0.25	52.0
Approach	1012	7.9	0.587	5.2	LOSA	6.5	50.2	0.29	0.25	52.0
All Vehicles	3360	7.9	0.587	20.0	LOSB	15.4	118.5	0.62	0.63	35.8

Table 9-4: Gilmore Avenue Intersection Movement Summary - Signalised

9.3.2 Dogbone Roundabout

The proposed intersection shown in **Figure 9-6** operates at an overall LOS A and DOS of 0.856 using this configuration. The maximum queue length is 84.1m for the eastbound approach to the second roundabout. Though the proposed interchange achieves the required LOS, but exceed in the required DOS. This oversaturation is due to the heavy conflicting right turn movement from the FRCAH southbound off-ramp, which in turn is restricted by the heavy through movement from the west approach. The movement summary is provided in **Table 9-5**.

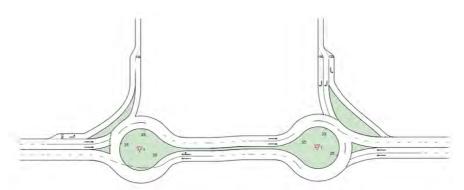


Figure 9-6: Gilmore Avenue Intersection Lane Configuration- Dogbone Roundabout

MOVEMENTSUMMARY

Site: Gilmore Avenue West Option 3

^{\$\dothed{\phi}\$} Network: Gilmore Avenue Roundabout Option 3

New Site Roundabout

Move	ement Pe	rformance	- Vehic	les							
Movi	D ODMo	Demand	Flows D	eg. Satn	Average	Level of	95% Back	of Queue	Prop.	Effective	Average
		Total	HV		Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		perveh	km/h
East:	Wellard R	V Total HV veh/h % ellard Road T1 2248 8.0 R2 50 8.0 ch 2298 8.0 Vellard Road 1422 7.9 T1 1012 8.0 ch 2434 8.0									
5	T1	2248	8.0	0.706	0.0	LOSA	0.0	0.0	0.00	0.01	59.9
6	R2	50	8.0	0.706	5.0	LOSA	0.0	0.0	0.00	0.03	44.9
Appro	oach	2298	8.0	0.706	0.1	LOSA	0.0	0.0	0.00	0.01	59.6
West	: Wellard F	Road									
10	L2	1422	7.9	0.781	4.2	LOSA	0.0	0.0	0.00	0.46	60.7
11	T1	1012	8.0	0.316	5.1	LOSA	1.9	14.6	0.19	0.41	57.6
Appro	oach	2434	8.0	0.781	4.8	LOSA	1.9	14.6	0.08	0.44	59.6
All Ve	hicles	4732	8.0	0.781	2.4	LOSA	1.9	14.6	0.04	0.23	59.6

MOVEMENTSUMMARY

Site: Gilmore Avenue East Option 3

^{¢¢} Network: Gilmore Avenue Roundabout Option 3

New Site Roundabout

Move	ement Per	formance	- Vehic	les							
Mov II	D ODMo	Demand	Flows D	eg. Satn	Average	Level of	95% Back	of Queue	Prop.	Effective	Average
		Total	HV		Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		perveh	km/h
East: 1	Wellard Ro	bad									
5	T1	1060	7.9	0.820	12.6	LOSB	8.5	65.3	0.94	1.28	32.6
Appro	bach	1060	7.9	0.820	12.4	LOSB	8.5	65.3	0.94	1.28	32.6
North	: FRCAH C)ff-ramp									
7	L2	50	8.0	0.039	5.0	LOSA	0.1	1.1	0.49	0.59	52.9
9	R2	1238	8.0	0.561	13.4	LOSB	3.6	27.6	0.67	0.95	33.6
Appro	bach	1288	8.0	0.561	13.1	LOSB	3.6	27.6	0.67	0.94	34.8
West:	Wellard R	load									
11	T1	1012	7.9	0.311	4.6	LOSA	0.0	0.0	0.00	0.41	41.4
Appro	bach	1012	7.9	0.311	4.6	LOSA	0.0	0.0	0.00	0.41	41.4
All Ve	hicles	3360	7.9	0.820	10.4	LOSB	8.5	65.3	0.55	0.89	36.3

Table 9-5: Gilmore Avenue Intersection Movement Summary - Roundabout

9.3.3 Preferred Option

The preferred intersection configuration for Gilmore Avenue is the signalised intersection shown in **Figure 9-7**. An off ramp of approximately 625m will be required at the Gilmore interchange as a result of the high right turn demands. A left turn pocket of 120m has been proposed for the 620m long on ramp. The SIDRA assessment has indicated a right pocket of 100m will be sufficient for the right turn vehicles to the FRCAH on ramp.

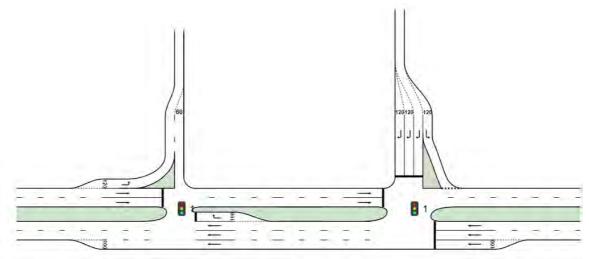


Figure 9-7: Preferred Option- Gilmore Avenue

9.4 Nairn Drive

SIDRA assessment of a dogbone roundabout at Nairn Drive has been performed to assess the capacity of the intersection. Further consultation with the local government has prompted further intersection assessments to determine the feasibility of an additional leg to the northern roundabout. The configuration with the best performance is detailed below. Further rigorous assessment may be done at a detailed design stage to determine the prefer treatment option.

9.4.1 Dogbone Roundabout

The proposed intersection shown in **Figure 9-8** operates at an overall LOS B and DOS of 0.703 using this configuration. The maximum queue length of 20.3m is prompted by the right turn vehicles from FRCAH off ramp. The proposed interchange achieves the required LOS and DOS. The movement summary is provided in **Table 9-6**.

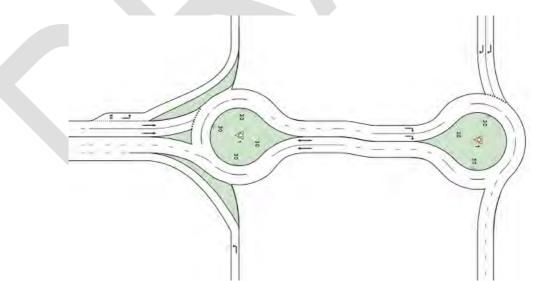


Figure 9-8: Nairn Drive Intersection Lane Configuration- Dogbone Roundabout

MOVEMENT SUMMARY

Site: North

Roundabout

Move	ementF	Performa	nce-	Vehio	des								
Mov ID	ODMov	Demand I	Flows		Arrival Flows		Average	Level of Service		k of Queue	Prop. Queued	Effective Stop	Average
ID.		Total	HV	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queueu	Rate	Speed
		veh/h	%	veh/h	%		sec		veh	m		per veh	km/h
South	h: Naim D	Dr											
3	R2	615	4.0	615	4.0	0.191	13.3	LOS B	0.0	0.0	0.00	1.43	50.8
Appro	bach	615	4.0	615	4.0	0.191	13.3	LOS B	0.0	0.0	0.00	0.71	50.8
West	: Mundijo	ng W											
12	R2	847	4.0	847	4.0	0.410	13.5	LOS B	1.9	14.0	0.55	1.68	44.4
Appro	bach	847	4.0	847	4.0	0.410	13.5	LOS B	1.9	14.0	0.55	0.84	44.4
All Ve	hicles	1462	4.0	1462	4.0	0.410	13.5	LOS B	1.9	14.0	0.32	0.79	47.0

MOVEMENT SUMMARY

🗑 Site: South

[¢]
[♦] Network: Network1

Roundabout

Move	ementF	erforma	nce-V	'ehic	les								
Mov ID	OD Mov	Demand	Flows		lows	Deg. Satn	Average	Level of Service	95% Bac	k of Queue	Prop. Queued	Effective Stop	Average
		Total	ну т	fotal	HV	oaui	Delay	Service	Vehicles	Distance	Queueu	Rate	Speed
		veh/h	% v	eh/h	%		sec		veh	m		per veh	km/h
South	n: Nairn D	Dr											
1	L2	1016	4.0 1	016	4.0	0.542	5.4	LOSA	0.0	0.0	0.00	0.91	52.4
2	T1	647	4.0	647	4.0	0.188	4.3	LOSA	0.0	0.0	0.00	0.76	53.7
Appro	bach	1663	4.0 1	663	4.0	0.542	5.0	LOS A	0.0	0.0	0.00	0.43	52.9
East:	Mundijo	ngE											
4	L2	585	4.0	585	4.0	0.313	6.7	LOSA	0.0	0.0	0.00	1.00	58.2
Appro	bach	585	4.0	585	4.0	0.313	6.7	NA	0.0	0.0	0.00	0.50	58.2
North	: Naim D	r											
8	T1	847	4.0	847	4.0	0.263	4.3	LOSA	0.0	0.0	0.00	0.77	53.7
Appro	bach	847	4.0	847	4.0	0.263	4.3	LOS A	0.0	0.0	0.00	0.38	53.7
All Ve	hicles	3096	4.0 3	096	4.0	0.542	5.1	LOSA	0.0	0.0	0.00	0.43	54.1

Table 9-6: Nairn Drive Intersection- Dogbone Roundabout

9.4.2 Dogbone Roundabout with additional northern leg

The proposed intersection operates at an overall LOS B and DOS of 0.578 using this configuration. The maximum queue length of 28m is prompted by the vehicles from FRCAH off ramp. The capacity of this intersection is close to acceptable limits.

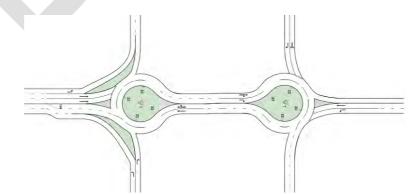


Figure 9-9: Nairn Drive Lane Configuration- Dogbone Roundabouts with Additional Leg

MOVEMENT SUMMARY

𝒜 Site: North Option 3 with additional leg

[¢][¢] Network: Option 3

Roundabout

Movement Performance - Vehicles Movement Demand FlowsArrival Flows Den Averane Level of 95% Back of Queue Prop Effective Averance													
Mov	ODMov	Demand	Flows/	Arrival	Flows		Average		95% Back		Prop.	Effective Stop	verage
ID	0011104	Total	HV	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Rate	Speed
		veh/h	%\	/eh/h	%	v/c	sec		veh	m		perveh	km/h
South	: Naim D	Dr											
2	T1	193	11.0	193	11.0	0.301	3.2	LOSA	0.0	0.0	0.00	0.57	53.7
3	R2	798	4.0	798	4.0	0.301	9.3	LOS A	0.0	0.0	0.00	0.61	52.9
Appro	ach	991	5.4	991	5.4	0.301	8.1	LOSA	0.0	0.0	0.00	0.60	53.0
North	: Naim D	rive North	1										
7	L2	169	11.0	169	11.0	0.364	11.6	LOS B	1.8	13.5	0.79	0.92	50.1
8	T1	263	11.0	263	11.0	0.393	9.3	LOS A	2.2	16.9	0.82	0.92	46.8
Appro	ach	433	11.0	433	11.0	0.393	10.2	LOS B	2.2	16.9	0.81	0.92	48.6
West:	FRCAH	ł											
10	L2	178	11.0	178	11.0	0.578	7.9	LOSA	3.7	27.7	0.68	0.95	50.4
12	R2	926	4.0	926	4.0	0.578	14.2	LOS B	3.7	27.7	0.69	0.97	43.1
Appro	ach	1104	5.1	1104	5.1	0.578	13.2	LOS B	3.7	27.7	0.69	0.96	44.8
All Ve	hicles	2527	6.2	2527	6.2	0.578	10.7	LOSB	3.7	27.7	0.44	0.82	48.5

MOVEMENT SUMMARY

Site: South Option 3 with additional leg Roundabout

Move	ementF	Performa	ince-\	Vehio	les								
Mov ID	ODMov	Demand				Deg.	Average			c of Queue	Prop.	Effective Stop	Average
U		Total	HV	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Rate	Speed
		veh/h	%\	/eh/h	%		sec		veh	m		per veh	km/h
South	n: Naim D	Dr											
1	L2	1188	4.0	1188	4.0	0.652	3.3	LOSA	0.0	0.0	0.00	0.41	56.6
2	T1	888	4.0	888	4.0	0.313	4.5	LOS A	1.6	12.3	0.38	0.44	50.6
Appro	ach	2076	4.0	2076	4.0	0.652	3.9	LOS A	1.6	12.3	0.16	0.43	54.7
East:	FRCAH												
4	L2	834	4.0	834	4.0	0.457	3.1	LOSA	0.0	0.0	0.00	0.40	57.0
6	R2	97	11.0	97	11.0	0.056	9.3	LOS A	0.0	0.0	0.00	0.64	47.4
Appro	ach	931	4.7	931	4.7	0.457	3.8	NA	0.0	0.0	0.00	0.43	56.3
North	: Naim D)r											
8	T1	1023	4.0	1023	4.0	0.397	3.5	LOSA	0.0	0.0	0.00	0.39	56.9
9	R2	162	11.0	162	11.0	0.325	9.3	LOS A	0.0	0.0	0.00	0.48	55.4
Appro	ach	1185	5.0	1185	5.0	0.397	4.3	LOS A	0.0	0.0	0.00	0.40	56.7
All Ve	hicles	4192	4.4	4192	4.4	0.652	4.0	LOSA	1.6	12.3	0.08	0.42	55.6

Table 9-7: Nairn Drive Intersection -Dogbone Roundabout with Additional Leg

9.4.3 Signalised with additional northern leg

The proposed intersection operates at an overall LOS D and DOS of 0.955 using this configuration. This is exceeds the acceptable limit specified in **Table 9-8** and therefore option is discounted.

MOVEMENT SUMMARY

Site: North Option 3 Signalised

\$\phiq\$ \phiq\$ Network: Option 3 Signalised

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Cycle Time)

Move	ementP	erforma	nce-	Vehio	les								
Mov	ODMov	Demand	Flows	Arrival	Flows	Deg.	Average		95% Back	of Queue	Prop.	Effective Stop Rate	Verage
ID	OD MOV	Total	HV	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued		Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South	i: Naim D	Dr											
2	T1	193	11.0	193	11.0	0.653	34.8	LOSIC	25.9	196.5	0.95	0.86	29.9
3	R2	798	4.0	798	4.0	0.653	40.7	LOS D	25.9	196.5	0.95	0.87	28.5
Appro	ach	991	5.4	991	5.4	0.653	39.5	LOS D	25.9	196.5	0.95	0.87	28.8
North	: Naim D	rive North	1										
7	L2	169	11.0	169	11.0	0.161	12.3	LOS B	3.6	27.4	0.42	0.67	49.1
8	T1	263	11.0	263	11.0	0.930	77.0	LOSE	9.2	70.6	1.00	1.05	17.2
Appro	ach	433	11.0	433	11.0	0.930	51.7	LOS D	9.2	70.6	0.77	0.90	27.1
West	: FRCAH	l											
10	L2	178	11.0	178	11.0	0.142	7.4	LOSA	1.7	13.0	0.23	0.61	52.5
12	R2	926	4.0	926	4.0	0.660	38.9	LOS D	22.4	169.5	0.89	0.85	26.5
Appro	ach	1104	5.1	1104	5.1	0.660	33.9	LOSIC	22.4	169.5	0.78	0.81	30.7
All Ve	hicles	2527	6.2	2527	6.2	0.930	39.1	LOS D	25.9	196.5	0.85	0.85	29.2

MOVEMENT SUMMARY

Site: South Option 3 Signalised

¢¢ Network: Option 3 Signalised

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Cycle Time)

Move	ementF	Performa	ince-	Vehio	les								
Mov	ODMov	Demand	Flows/	Arrival	Flows	Deg.	Average	CEVEL VI		of Queue	Prop.		
ID	OD MOV	Total	HV	Total	ΗV	Satn	Delay	Service	Vehicles	Distance	Queued		
		veh/h	%)	veh/h	%	v/c	sec		veh	m		per veh	km/h
South	:: Naim D	Dr											
1	L2	1188	4.0	1188	4.0	0.652	5.8	LOSA	0.0	0.0	0.00	0.53	54.6
2	T1	888	4.0	888	4.0	0.659	13.3	LOS B	15.9	120.3	0.65	0.59	41.9
Appro	ach	2076	4.0	2076	4.0	0.659	9.0	LOS A	15.9	120.3	0.28	0.55	50.5
East:	FRCAH												
4	L2	834	4.0	834	4.0	0.457	5.7	LOSA	0.0	0.0	0.00	0.53	54.7
6	R2	97	11.0	97	11.0	0.918	89.3	LOSF	3.6	31.0	1.00	1.01	15.5
Appro	ach	931	4.7	931	4.7	0.918	14.4	LOS B	3.6	31.0	0.10	0.58	48.0
North	: Naim D)r											
8	T1	1023	4.0	1023	4.0	0.309	1.8	LOSA	5.2	39.3	0.19	0.17	57.4
9	R2	162	11.0	162	11.0	0.681	68.4	LOSE	9.8	83.7	1.00	0.82	21.0
Appro	ach	1185	5.0	1185	5.0	0.681	10.9	LOS B	9.8	83.7	0.30	0.26	46.4
All Ve	hicles	4192	4.4	4192	4.4	0.918	10.7	LOS B	15.9	120.3	0.25	0.48	48.8

Table 9-8: Nairn Drive Intersection- Signalised with Additional Leg

9.4.4 Preferred Option

Dogbone roundabout without the additional northern leg consist of two roundabouts of radius of 35m and 30m as shown in **Figure 9-10** is the preferred option. This intersection type is particularly appropriate where the space exists since this form of intersection provides few delays and provides a higher level of safety than other forms of intersection. The northern roundabout is provided for the 2 lane right turn movement of vehicles exiting FRCAH and from Nairn Drive entering FRCAH. The southern roundabout facilitates 2 through movements to the northern roundabout and a single lane access to the on ramp to FRCAH west as well as an off ramp connection. The traffic assessment indicated approximate 1200 vehicles using the off ramp during the peak hour. A merging distance of 120m is proposed to facilitate the vehicular movements from the off ramp and the through vehicles exiting the roundabout.

Figure 9-10: Preferred Option- Nairn Drive

10 CONCEPT DEVELOPMENT

10.1 General Overview

Geometric design has been undertaken based on the Design Criteria outline in **Section 8**. The planning design concept is developed to sufficient detail to assess its engineering feasibility and to ensure adequate land is included in the proposed road reservation. The planning design concept was developed in three dimensions using Moss MX.

The recommended concept design is documented on the carriageway pattern and profile drawings. The land requirements for FRCAH are based on the foot print for the proposed dual carriageway, verge and median, and plus allowances for the following:

- Earthwork batter;
- Table drains, drainage basins and catch drains where required;
- Principal shared path along the north side of the freeway; and
- Infiltration basin with storage for the 10 year ARI storm event

For Thomas Road, Wellard Road & Gilmore Avenue Cut and Fill Batters of 3:1 from the back of verge have been used. The purpose of this is to minimise environmental footprint, intrusion into the Dampier to Bunbury Gas corridor and reduce the land requirement outside the existing MRS. The batter slope has been steepened at the locations listed in Table 10.1. Where the 3:1 batter slope is insufficient to achieve this, retaining walls are proposed. Furthermore, to minimise the environmental impacts, the proposed median is reduced from the conservative 15m in width to 5.8m.

LEFT HAND SIDE			FRCAH	RIGHT HAND SIDE				
COMMENT	START CHAINAGE	END CHAINAGE		START	END	COMMENT		
Retaining Wall (Between PSP and MRS)	28350	28490						
				28390	29155	Cut Batter Steepened to 3:1 (Between Northbound Carriageway and MRS)		
Retaining Wall (Between PSP and MRS)	29170	29280						
Retaining Wall (Between PSP and MRS)	29310	29540						
Retaining Wall (Between PSP and MRS)	29630	29790						
				29645	29770	Retaining Wall (Between Northbound Carriageway and MRS)		
				29970	30100	Cut Batter Steepened to 3:1 (Between Northbound Carriageway and MRS)		
				30310	30430	Cut Batter Steepened to 3:1 (Between Northbound Carriageway and MRS)		
				31190	31340	Cut Batter Steepened to 3:1 (Between Northbound Carriageway and MRS)		
				31500	31690	Cut Batter Steepened to 3:1 (Between Northbound Carriageway and MRS)		
Cut Batter Steepened to 3:1 (Between PSP and MRS)	31595	32065						
				31810	32010	Cut Batter Steepened to 3:1 (Between Northbound Carriageway and MRS)		
Cut Batter Steepened to 3:1 (Between PSP and MRS)	32630	32740						
Retaining Wali (Between PSP and MRS)	33020	33330						
				33900	34180	Fill Batter Steepened to 3:1 (Between Northbound Carriageway and MRS)		
Retaining Wall (Between PSP and MRS)	34180	34255						
				34470	34535	Fill Batter Steepened to 3:1 (Between Northbound Carriageway and MRS)		
				36930	37230	Cut Batter Steepened to 3:1 (Between Northbound Carriageway and MRS)		
Retaining Wall with 2:1 Backslope Behind (Between PSP and Gas Pipeline)	36985	37210						

Figure 10-1 FRCAH Batter Slopes

An overview of the proposed ultimate planning design concept is shown in **Appendix A**. Detail of the proposed ultimate planning design concept is shown in Carriageway Pattern and Profile Plan xxx, **Appendix B**.

10.2 Principal Shared Paths

Pedestrians and bicycles will be prohibited on the main carriageway to maintain safety for motorist, pedestrian and cyclist. A principle shared path (PSP) has been designed for the full length of the project on the left of the southbound main carriageway. The PSP cross section is based on a width of 3.5m, a desirable minimum share path width specified by Austroads. The location of the underpasses and overpasses has been selected to facilitate and encourage local trips by cyclists, pedestrian and other users by considering the current and future demand, connectivity and access to transport routes. The PSP will be grade separated at Thomas Road, Gilmore Avenue over the on ramp, Mandurah Road and Baldivis Road. Underpass structures are proposed beneath the western and eastern approach to the Kwinana Freeway system interchange to maintain the north south connectivity. The connectivity to local road will be via a series of ramps at the maximum grade of 3% in accordance to Austroads Guide to Road Design Part 6A.

10.3 Drainage Consideration

A drainage basin has been designed at CH35700 to collect runoff from the road before the runoff from the road enters the waterway and reserves. The basin has been designed to hold the 1 in 10 year ARI storm events. For safety reasons, the basin was designed with 1:4 side slopes.

A preliminary basin design analysis has been conducted for the Kwinana Freeway/FRCAH interchange and documented in the Preliminary Basin Design Report for Kwinana Freeway/ Rockingham Highway Interchange (Main Roads, 2014). The objective was to identify the number and location of drainage basin required considering run-off from contributing catchment areas such as road surface, shoulder and batter. A total of 7 basins are proposed to capture run off from this interchange. The report concluded that no additional land is required for drainage requirements.

More accurate basin analysis and design will be required during the detailed design stage. A more accurate detailed survey may be required for this purpose. Also required during the detailed design will be the design of drainage structure for flood management and storm water structure.

10.4 Dampier to Bunbury Gas Pipeline

In order to minimise the impacts on the Bush Forever Protection Area, the alignment has been located as close as possible to the Dampier to Bunbury Gas Pipe corridor. The 32m gas pipe corridor restrict housing or any other buildings, however some road may cross the pipeline but are required to cross between 45° -90° angle to the pipeline.

Every effort has been made to minimise conflict between the pipe corridor and road reserves, however, due to the topology and environmental constraints, the proposed alignments conflicts with the Dampier to Bunbury Gas Pipeline corridor at numerous locations as shown in **Figure 10-2**. Generally, engineering solution of shifting the proposed PSP closer to the main alignment to minimise earthwork footprint has been adopted where possible. However it was found that at the most constraint location, where the alignment curves right near Mandurah Road, the conflict between the road reserve and pipe corridor cannot be eliminated through shifting the PSP. The other main conflict point is located near the PSP on the approach to Gilmore Avenue.

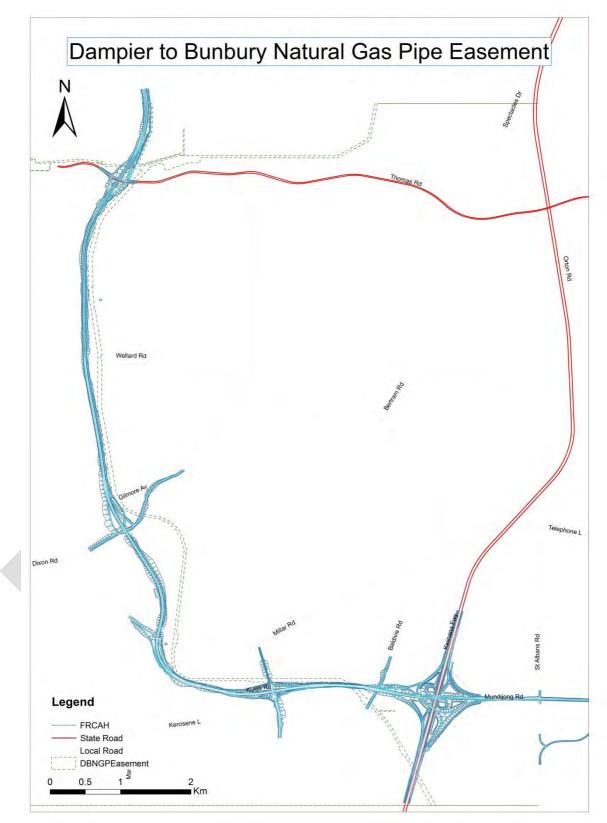


Figure 10-2: Dampier to Bunbury Gas Pipe Corridor

The proposed PSP at Gilmore Avenue approach will cross the pipe corridor at approximate 90 degrees. Though this angle of crossing at this location is acceptable, the new alignment transverse through a cut section, where the road will be constructed below the existing ground level. As such, it was necessary to relocate the pipe for engineering and safety reasons. Consultation with the asset owner included different proposals to relocate the pipe. Due to the size of pipe at this corridor; the preferred option is to use the 'Hot Tub' method with thrust boring. This is done by installing of a new length of pipe parallel to the main and then connects each end of the new pipe to the main pipe through a diagonal section. The average cost to relocate one kilometre of pipe using this method is approximately \$3 million dollars. It is expected that the asset owner will be engaged during the detail design stage to provide a more comprehensive relocation strategy however the asset owner has provided their principle support for the proposed road design at Gilmore Avenue.

The other main conflict point is located on the PSP earthwork near Mandurah Road where the main alignment curves east towards Kwinana Freeway. The Department of Land has informed their proposal to widen this section of the pipe corridor. The corridor is currently being widening on the eastern side along the north south alignment and then on the southern side along the east west alignment. Relocation of the road corridor is not feasible from both engineering and environmental perspectives at this location. This is due to the proximity to the Kerosene Lane Swamp located on the south and the connection to the proposed Nairn Drive interchange. After further discussions, approval for the road reserve to enter into the pipe corridor has been obtained from both the asset owner and the Department of Land with a condition that sufficient offset for the maintenance of the pipeline has been allowed for. Engineering consultation suggested a possible solution of constructing a retaining wall along the curve to reduce the amount of earthwork required. This would result in a 7m encroachment into the pipe corridor. The asset owner has provided principle support for this. The asset owner suggested that the retaining wall to be constructed next to the main carriageway and the proposed PSP on the existing ground level. Main Roads highlighted that the purpose of the current project is to reserve land in the MRS and that the asset owner will be engaged in the detail stage to discuss the feasibility of this. This is supported by the asset owner and the DoL for agreement.

The other conflicts points has been presented to the key stakeholders, no objection has been raised during these consultations.

11 CONCLUSION

Main Roads Western Australia (Main Roads) is proposing to upgrade the Fremantle Rockingham Controlled Access Highway (FRCAH) between Thomas Road in Medina and Mundijong Road in Baldivis. The purpose of this study is to undertake the detailed planning for the preferred alignment of FRCAH to more precisely define its location and layout, and to prepare land protection plan suitable for inclusion of the road in the MRS and local town planning scheme.

This report covers matters of importance that were considered in the study including data and analysis, which have led to the recommendation of the proposed ultimate planning design concept and road reservation. It is intended to be suitable for public review and for use as a reference document in the MRS process.

The FRCAH is planned as urban highway (6 lane dual carriageway) with control of access. The FRCAH will significantly improve the network reliability, access for freight to the surrounding industrial land areas and plays a critical role in promoting and facilitating the economic vitality of the region. The FRCAH will provide the much needed relief to the minor road and greater utilization of Kwinana Freeway. The planning designed concept is designed for 36.5 m double road trains with a design speed of 110km/hr.

The planning design concept is developed to sufficient detail to assess its engineering feasibility and the determination of the required road reservation. The environmental and social impacts of the proposed alignment and the corresponding required mitigating measured were discussed in **Section 6.** Engineering aspects that relate to the Planning Design Concept are discussed in **Section 7**, **Section 8** and **Section 9**.

An overview of the proposed ultimate planning design concept is shown **Appendix A**. Detailed of the proposed ultimate planning design concept are shown in Carriageway Pattern and Profile Plan xxxx, **Appendix B**. The land requirement for the FRCAH is based on the footprint for the proposed ultimate planning design concept plus the required drainage facilities and desirable clearance and included in xxxx **Appendix C**.

Through the course of this planning study a review of potential issues and deficiencies were undertaken. Summary of the recommendations are listed below:

- The proposed ultimate planning design concept for the FRCAH as per the Carriageway Pattern and Profile Drawings in **Appendix B** is adopted as the basis for road reservation for the FRCAH.
- The proposed MRS is amended in accordance to the Land Protection Plan in **Appendix C** for the purpose of land reservation for FRCAH.

12 REFERENCE

AECOM, February 2011. Mandurah Road Infrastructure Corridor Planning Report

ARRB Group, 2007. Fremantle to Rockingham Road Network – Network Evaluation. Department of Planning

Cecchi, J.B. May 2012. Report on a European Heritage Study of the Fremantle to Rockingham Control Access Highway Project

Department of Planning, June 2009. Fremantle Rockingham Highway – Alignment Selection

GHD, August 2012. Report for Fremantle Rockingham Control Access Highway Environmental and Heritage Investigations Preliminary Environmental Review and Impact Assessment

R & E O'Connor Pty Ltd, Feb 2012. Indigenous Heritage Analysis of Fremantle Rockingham Control Access Highway

Western Australian Planning Commission, August 2010. Directions 2031 and Beyond

Western Australian Planning Commission, August 2010. Outer Metropolitan Perth and Peel Sub-Regional Strategy (Draft)

APPENDIX A CONCEPT PLAN

APPENDIX B

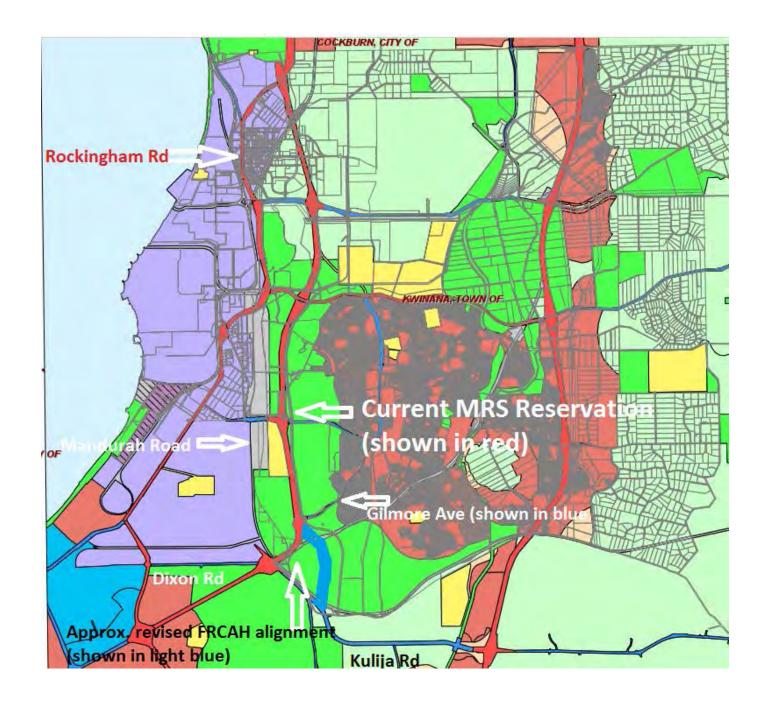
CARRIAGEWAY PATTERN AND PROFILE

APPENDIX C

LAND REQUIRMENTS PLAN







8 June 2016



Mr Lindsay Broadhurst Main Roads Western Australia PO Box 6202 EAST PERTH WA 6892 Our Ref: D16/31257 / ENG10 Your ref: 06/7822-06

Dear Mr Broadhurst

FREMANTLE ROCKINGHAM CONTROLLED ACCESS HIGHWAY – ROUTE DEFINITION STUDY

I refer to your letter dated 1 March 2016 seeking the City of Kwinana's (City) comments on the 'ultimate planning design concept' (design concept) for the Fremantle Rockingham Controlled Access Highway (FRCAH), between Thomas Road in Medina and Mundijong Road in Baldivis.

The City appreciates the attention and planning directed towards the FRCAH by Main Roads WA (MRWA) given the significant transport and growth benefits the FRCAH will bring to the City.

The design concept for the FRCAH is broadly supported by the City, however there are a number of points the City wishes to make under the following five headings.

Gilmore Avenue / Dixon Road / Mandurah Road intersection

1. Access to Gilmore Avenue is limited and indirect, particularly when approaching along the FRCAH from the south. This is not acceptable to the City as clear and direct access is critical for the economic development of the City, the viability of local business and residents in the area.

The current design provides stronger connectivity with Dixon Road rather than Gilmore Avenue. This is flawed principally as both roads provide critical access to each local authority's central areas and therefore should be treated with equal importance.

The City is not satisfied that the alternative means of access to the City along Mandurah Road and Dixon Road are appropriate. Further justification for the design concept (i.e. travel times and modelling) or a redesign of this intersection to provide direct access to Gilmore Avenue is requested.

Administration

- 2. Planning for the upgrade of this intersection needs to be undertaken as part of further detailed planning for the FRCAH. There are existing congestion and movement issues with the road network and freight rail that must be addressed as part of the FRCAH planning and construction.
- 3. The rehabilitation of defunct portions of Gilmore Avenue must be included in the construction stage of the FRCAH and intersection works.

Wellard Road

- 1. The City does not accept that Wellard Road should be terminated by the FRCAH.
- 2. Preliminary designs show that an overpass is possible to retain Wellard Road's access to Mandurah Road and further westwards.
- 3. The future Metropolitan Region Scheme amendment for the design concept should reserve sufficient land as either Primary Regional Road or Other Regional Road to enable an overpass that preserves the east-west linkage that Wellard Road provides.
- 4. Termination of Wellard Road will be a poor outcome for the community and will have a severe adverse impact on the existing road network and future traffic flow within Kwinana as alternative routes to access Mandurah Rd and Kwinana Industrial Area from western suburbs and central Kwinana will require a substantially longer travel route.

Environment

- 1. Rehabilitation of land adjacent to or affect by the FRCAH construction must be undertaken, in particular the Bush Forever Site 349 south of Thomas Oval and the off-road vehicle area south of Thomas Road.
- 2. Tunnels for fauna to provide east west crossing of the FRCAH and connections of the recognised environmental areas should be included in the design concept.

Cycleways on northern side of FRCAH

1. The design concept does not show any cycleway connections to Gilmore Avenue, Wellard Road or Thomas Road in the same way that detail is provided for Baldivis Road. The design concept needs to include these cycleway connections and to ensure that the cycleways fit within the road reservation.

Noise / visual impact

1. Further details are requested on the visual impact of the FRCAH as viewed from Thomas Oval and the surrounding residential area of Medina.

- 2. Further details are also requested that demonstrate the height of the FRCAH over Gilmore Avenue where it crosses the passenger rail line.
- 3. A noise impact assessment should be undertaken and the design concept should show any noise mitigation measures that may be required eg. Noise walls.

Please contact Brett Cammell, Acting Coordinator Strategic Planning, on 9439 0416 or Reza Najafzadeh, Manager Engineering Services, on 9439 0267 if you require more information or wish to discuss this matter further.

Yours sincerely

Joanne Abbiss Chief Executive Officer

15.5 Proposed Local Structure Plan for Lots 670 and 1338 Bertram Road and Reserve 50672, Wellard – Consideration of Submissions and Recommendation to the Western Australian Planning Commission

SUMMARY:

A proposed Local Structure Plan (LSP) for Lots 670 and 1338 Bertram Road and Reserve 50672, Wellard (Attachment A) has been lodged with the City of Kwinana (the City), in accordance with clause 16(3) of the *Planning and Development Regulations 2015* (P&D Regulations). The LSP was presented at *Councillor Forums* held on 16 May and 3 July 2016.

The proposed LSP comprises 8.7 hectares (ha) of land situated to the east of the Peel Main Drain, north of Bollard Bulrush Swamp and south of Bertram Road, Wellard (Attachment B). The LSP (as advertised) proposes to create approximately 99 residential lots of varying sizes and 1.7539ha of open space (including 1.089ha for conservation purposes).

There is currently a single dwelling and associated outbuildings situated on Lot 670, these will be removed when the land is developed.

The following reports have been prepared, on behalf of the proponent, to support the proposed LSP:

- Bushfire Management Plan (Fire Plan, February 2016)
- Local Water Management Strategy (JDA Consultants, February 2016)

The City advertised the LSP for 26 days, between 4 April and 29 April 2016, in accordance with clause 18 of the P&D Regulations. Submissions were received from eight State government agencies during the advertising period. Submissions were also received from The Kings College and Freeway Church (owner of Lot 680). The submissions, and the City's comments on the submissions, are summarised in the *Schedule of Submissions* (Attachment D) in accordance with clause 20(2) of the P&D Regulations.

The Western Australian Planning Commission (WAPC) requires local structure plans to be prepared in accordance with objectives and requirements of *Liveable Neighbourhoods* (WAPC, 2009). The proposed LSP has been assessed, by the City, against the following elements of *Liveable Neighbourhoods*:

- Element 1- Community Design
- Element 2 Movement Network

Element 3 - Lot Layout

- Element 4 Public Parkland
- Element 5 Urban Water Management
- Element 6 Utilities
- Element 7 Activity Centres and Employment
- Element 8 Schools

The proposed LSP has, also, been assessed by the City in accordance with a number of other relevant planning policies, including the following:

- State Planning Policy 3.7 Planning in Bushfire Prone Areas (WAPC, 2015)
- City of Kwinana Public Open Space Policy
- Draft Local Planning Policy 1: Landscape and Tree Retention and Protection in Development Areas
- Draft Local Planning Policy 3: Bollard Bulrush East Landscape Masterplan

Interface with The Kings College

The LSP proposes to have residential lots backing directly onto the boundary of The Kings College (school).

Liveable Neighbourhoods (Clause R30) states the street network surrounding a school "should be designed to overlook the school. Side and rear fencing abutting school sites will generally not be acceptable."

The City is of the view that a road interface should be provided between the proposed residential area and the existing school to avoid undesirable urban design outcomes. Should the proposed LSP (as advertised) proceed, the City considers that this would result in a fragmented community where the school would be fenced off from the residential area on Lot 670 and be disconnected from the community. The City considers that the *Indicative Structure Plan* is an improvement on the proposed LSP because it will:

- a) Facilitate the creation of a permeable and integrated neighbourhood;
- b) Enable residential lots to overlook the school and public spaces; consistent with Crime Prevention Through Environmental Design (CPTED) principles; and
- c) Provide for increased visual amenity from the proposed residential area over the school ovals and trees.

The City recommends that the LSP be modified so that there is a road interface between the school and the proposed residential development on Lot 670. An *Indicative Structure Plan* (Attachment C) has been prepared by the City to demonstrate the City's preferred road layout and school interface.

The Freeway Church (owner of Lot 680) has advised that it supports a road interface between the school and the proposed residential area as shown in the *Indicative Structure Plan*.

The applicant has advised that the cost of providing the road interface between Lot 670 and Lot 680 (school site) should not be imposed solely on Lot 670 given that the road is also providing access to Lot 680 (school site). The City acknowledges that the road is positioned wholly within Lot 670, however, this not an unusual situation in development areas with fragmented land ownership. Section 159 of the *Planning and Development Act 2005* enables the developer to recover half the cost of constructing the road along the common boundary when the adjoining lot is subdivided. In this case, however, whilst the school site (Lot 680) is zoned for potential residential subdivision, the Freeway Church has advised that it intends to retain the site as a school for many years. The City takes the view that the applicant has chosen to develop Lot 670 for residential purposes, and, the best planning and urban design outcome should apply (which is that the road interface should be provided). It is further noted that the applicant's proposed LSP includes a road connecting to Bertram Road. The City's recommended modification merely shifts this proposed road to the east along the boundary of Lot 670. It is therefore argued that there

is no additional requirement for a road being imposed by the City's recommended modification.

The City supports the proposed LSP (as advertised) for Lot 670 subject to the plan being modified so that a road reserve is provided along the eastern boundary of Lot 670 to act as an interface between the existing school and the proposed residential development on Lot 670 (as shown in Attachment C).

Management Plans

It is recommended that the following management plans and strategy should be prepared to the City's satisfaction at subdivision stage:

- a) Urban Water Management Plan
- b) Wetland Management Plan
 - To determine the future vesting of the open space buffer area surrounding Bollard Bulrush Swamp.
- c) Acid Sulfate Soils Management Plan
- d) Mosquito Management Plan
- e) Landscape Management Strategy
 - To coordinate the alignment and specifications of a Dual Use Path (DUP) and recreational facilities in the open space surrounding Bollard Bulrush in accordance with the draft Bollard Bulrush East Landscape Masterplan and draft Local Planning Policy No. 3 which are currently being advertised for public comment by the City.

OFFICER RECOMMENDATIONS:

That Council:

- 1. Advise the Western Australian Planning Commission (WAPC) that the City supports the Local Structure Plan for Lot 607 and 1338 Bertram Road and Reserve 50672, Wellard as submitted, subject to the following modifications:
 - a road reserve being shown along the eastern boundary of Lot 670 to provide an interface between the existing school (The King's College) and the proposed residential development of Lot 670 as shown in Attachment C.
 - b) inclusion of a statement in the Local Structure Plan text requiring the preparation of the following management plans to the City's satisfaction as part of the subdivision application process:
 - i. Wetland Management Plan
 - ii. Urban Water Management Plan
 - iii. Acid Sulfate Soils Management Plan
 - iv. Mosquito Management Plan
 - v. Landscape Management Strategy

- c) inclusion of the following provisions in the Local Structure Plan text:
 - i. Local Development Plan(s) are to be prepared for lots with a frontage of 7.5m, or less, and are to include design criteria that requires:
 - Two storey development;
 - Appropriate noise requirements for quite house design;
 - Fencing within the front setback (including boundary fencing) to be a maximum height of 1.2m, and 50% visually permeable above 600mm;
 - The interaction of the development with the public realm through the use of the front setback area, visual surveillance from habitable rooms and visually permeable fencing;
 - Promotion of design variety through design features and use of materials;
 - Mitigation of the potentially dominating visual presence of any garage structures;
 - Promotion of visual presence of the dwelling to the street (i.e. gable ends).
 - ii. Local Developments Plan(s) are to be prepared for lots with a frontage of between 7.6m and 10m and are to include design criteria that will:
 - Promote the interaction of the development with the public realm through the use of the front setback area, visual surveillance from habitable rooms and visually permeable fencing;
 - Promote design variety through design features and use of materials;
 - Mitigate the potentially dominating visual presence of any garage structures;
 - Promote visual presence of the dwelling to the street (i.e gable ends); and
 - Include appropriate noise requirements for quite house design.
- 2. Request the WAPC that the 50 metre buffer to the boundary of the Conservation Category Wetland (situated within the 'Development' zone), be ceded free of cost to the Crown as a condition of subdivision approval.
- 3. Forward this Ordinary Council Meeting Report, Council's recommendations and the *Schedule of Submissions* (Attachment D) to the WAPC pursuant to clause 20 of the *Planning and Development Regulations 2015.*

DISCUSSION:

Metropolitan Region Scheme Amendment 1188/57 and EPA Assessment The WAPC initiated *Metropolitan Region Scheme* (MRS) Amendment 1188/57 to rezone land on the eastern side of Bollard Bulrush Swamp from 'Rural' to 'Urban Deferred' (Attachment I). Lots 670 and 1338 Bertram Road were situated within Amendment 1188/57. The, then, Town of Kwinana supported the initiation of Amendment 1188/57 in 2008.

The *Wellard Indicative Structure Plan* (Attachment G) was prepared to support Amendment 1188/57 to the MRS.

The EPA decided to formally assess Amendment 1188/57 under the *Environmental Protection Act 1986* due to the potential for future residential development to directly impact on Bollard Bulrush Swamp. Bollard Bulrush Swamp is identified as a Conservation Category Wetland (CCW) in the Department of Parks and Wildlife's *Geomorphic Wetlands Swan Coastal Plain* dataset and parts of the CCW boundary were situated within Amendment 1188/57. In essence, the purpose of the EPA's assessment was to determine which areas on the eastern side of Bollard Bulrush Swamp could be developed and which areas should be conserved.

The EPA provided its report to the Minister for Environment in January 2014, recommending that Amendment 1188/57 be approved (EPA Report 1500, January 2014). The alignment of the proposed 'Urban Deferred' zone boundary (adjacent to Bollard Bulrush Swamp) was modified during the EPA's formal assessment so that future development did not directly impact on the CCW. Therefore, the EPA concluded that Amendment 1188/57 could be managed to meet the EPA's environmental objective without the requirement for environmental conditions and further modifications to Amendment 1188/57.

The *Wellard Concept Plan* (Attachment H) was prepared in response to the EPA's requirement that the alignment of the 'Urban Deferred' zone boundary be modified to protect the CCW.

The EPA noted in its report to the Minister for the Environment, the Department of Water's (DoW) advice that surface water and ground water impacts can be managed through the preparation and implementation of district, local and urban water management plans (UWMP).

The EPA advised that it would support the reservation of the Bollard Bulrush as 'Parks and Recreation' reserve to provide a consolidated wetland conservation area. The City supports the EPA's recommendation to reserve Bollard Bulrush as 'Parks and Recreation' and to cede the land to the Crown free of cost for conservation purposes.

The City also recommends that the 50 metre buffer to the boundary of the CCW (situated within the 'Development' zone) be ceded free of cost to the Crown as a condition of subdivision approval.

The Minister for Planning approved Amendment 1188/57 on 12 March 2014 (Statement 961). The eastern side of Bollard Bulrush Swamp was then rezoned from 'Rural' to 'Urban Deferred'.

The lifting of urban deferment was approved by the WAPC (MRS Amendment 1296/27) on 31 March 2015 following the DoW's approval of the District Water Management Strategy (DWMS).

TPS 2 was amended concurrently with the lifting of urban deferment, resulting in land situated outside the CCW boundary being zoned 'Development' and land within the CCW remaining in the 'Rural A' zone (Attachment I).

Other LSPs in the Bollard Bulrush east urban cell

Two local structure plans within the Bollard Bulrush east urban cell have been previously endorsed by the City and it is anticipated that an additional four local structure plans within the urban cell will be lodged in the future, to complete the development of the east side of Bollard Bulrush. Local structure plans have been approved by the City for the following landholdings:

- a) Lots 503 505, 507 and 900 Johnson Road; and
- b) Lot 502 Tamblyn Place.

Bollard Bulrush East Landscape Masterplan

The *Bollard Bulrush East Landscape Masterplan* (landscape masterplan) (Attachment F) has been prepared by Emerge Associates, on behalf of the City, to ensure that the following matters are provided during the development of the open space in the Bollard Bulrush east urban cell in a uniform and coordinated manner:

- a) a dual use path around the eastern side of Bollard Bulrush Swamp, including pedestrian/cycle bridges over the Peel Main Drain;
- b) playground equipment, fitness equipment, park benches and lighting;
- c) 'kick about' spaces;
- d) conservation fencing;
- e) stormwater detention areas that do not interfere with the function of public open space (POS);
- f) fire breaks and fire access tracks; and
- g) wetland revegetation.

The landscape masterplan has been prepared by the City as part of a draft local planning policy and will be presented to the Council in the near future for final adoption. The City will request a condition to be added to the subdivision approval that the POS be developed in accordance with the landscape masterplan local planning policy.

CONSIDERATION OF SUBMISSIONS

The proposed LSP was advertised for a period of 26 days, between 4 April and 29 April 2016. Public advertising was carried out in the following manner:

- a) Nearby land owners and State government agencies were notified of the proposal in writing and invited to comment;
- b) The proponent erected one sign on site;
- c) A notice was placed in the *Weekend Courier* for two weeks over the course of the advertising period; and
- d) Copies of the proposed LSP and relevant documents were made available for inspection at the City's Administration Office and placed on the City's website.

The following State government agencies were notified of the proposal in writing and invited to comment:

- Department of Education
- Department of Fire and Emergency Services
- Department of Health
- Department of Parks and Wildlife
- Department of Transport
- Department of Water
- Main Roads WA
- Public Transport Authority
- Water Corporation
- Western Power

Eight submissions were received from State government agencies during the advertising period.

After the submission period it was found that due to a data error a letter was not sent to The Kings College or the Freeway Church. The City subsequently contacted the school and met with representatives from the school and the Freeway Church on a number of occasions to discuss the proposed LSP for Lot 670. A written submission was also received from the Freeway Church which owns the school site adjoining the western boundary of Lot 670.

The submissions and the City's comments are summarised in the *Schedule of Submissions* (Attachment D) in accordance with clause 20(2) of the P&D Regulations. They are also included and commented on in the next section of this Report dealing with the assessment of the LSP.

ASSESSMENT OF THE LOCAL STRUCTURE PLAN

Liveable Neighbourhoods

The proposed LSP has been assessed, by the City, in accordance with the objectives and requirements of each element of *Liveable Neighbourhoods* (WAPC, 2009) as described below:

Element 1 - Community Design

The LSP report states that a range of lot sizes are intended to be provided to facilitate a diversity of dwelling types. The density codes shown on the LSP are Residential 25 and 40.

The LSP (as advertised) proposes a yield of approximately 99 lots. This equates to 12.8 lots per gross 'Urban' zoned hectare or 23 lots per net site hectare. The yield falls short of *Direction 2031* which requires 15 dwellings per gross hectare, but exceeds *Liveable Neighbourhoods* which requires 22 dwellings per net hectare.

The *Indicative Structure Plan* (Attachment C) prepared by the City will result in a yield of approximately 93 dwellings.

Interface with The Kings College

The LSP proposes that the residential lots will back directly onto the school. The City recommends that the LSP (as advertised) be modified to provide a road interface

between the school and the proposed residential development of Lot 670 in accordance with clause R30 of *Liveable Neighbourhoods*.¹

An *Indicative Structure Plan* (Attachment C) has been prepared by the City to demonstrate the City's preferred road layout and school interface. The City considers that the *Indicative Structure Plan* is an improvement on the proposed LSP for the following reasons:

- a) Facilitate the creation of a permeable and integrated neighbourhood;
- b) Enable residential lots to overlook the school and public spaces; consistent with Crime Prevention Through Environmental Design (CPTED) principles; and
- c) Provide for increased visual amenity from the proposed residential area over the school ovals and trees.

The City has met with representatives from the school several times to discuss the proposed LSP and the City's *Indicative Structure Plan*. The school advised the City (email dated 23 May 2016), that the proposed LSP would adversely impact on the school's long term plans and could potentially result in a poor visual amenity and interaction between the school and the residential development on Lot 670. The Freeway Church has also advised the City (in a letter dated 22 June 2016) that the LSP should provide a road abutting the school site.

On behalf of the applicant, the Rowe Group has stated that:

- a) Lot 680 (school site) is zoned 'Development' under the City of Kwinana Town Planning Scheme No. 2 ('TPS 2'). In accordance with TPS 2, a LSP will therefore need to be adopted prior to subdivision or development for this adjacent site;
- b) An LSP for the school site will be required to show roads, including connections to Lot 670 in the north and Lot 500 in the south, whilst providing for the required wetland buffer to the Bollard Bulrush Swamp in accordance with EPA Report 1500 (dated January 2014). Any departure from the EPA decision could potentially trigger a further environmental review for this site;
- c) The school site is a large development site of some 10 hectares in area which is more than enough land to cater for its own facilities and make provisions for roads and access. This is particularly the case given Lot 680 currently only utilises circa 20% of its site;
- d) The school site is not designated for any 'Public Purposes' and does not restrict development of the site for any one purpose, including school purposes. The site is zoned 'Urban' under the MRS and may be developed for urban residential purposes should the current or future owner choose to do so;
- e) Lot 670 should not need to cater for the access requirements of the school; and

¹ Clause R30 states that "Surrounding residential development should be designed to overlook the school. Side and rear fencing abutting school sites will generally not be acceptable."

f) Residential lots backing onto the school site, as shown in the proposed LSP, would provide security to the school, rationalise access to Bertram Road and the ground level differences between the LSP area and the school.

The City acknowledges the points raised by Rowe Group against the City's *Indicative Structure Plan*, however, the City is of the view that a road interface between Lot 670 and 680 (school site) should be provided to ensure acceptable neighbourhood design outcomes. To proceed with the proposed LSP (as advertised) would not, in the City's view, meet the objectives of *Liveable Neighbourhoods* and would result in a fragmented community where the residential area on Lot 670 would be fenced off from the school and disconnected from surrounding residential areas.

The Rowe Group has also advised that the cost of providing the road interface between Lot 670 and Lot 680 (school site) should not be imposed solely on Lot 670 given that the road is also providing access to Lot 680 (school site). The City acknowledges that the road is positioned wholly within Lot 670, however, this not an unusual situation in greenfields development areas with fragmented land ownership.

Section 159 of the *Planning and Development Act 2005* enables the developer to recover half the cost of constructing the road along the common boundary in the event that the adjoining landowner subdivides its property. In this case, however, whilst the school site is zoned to allow residential development (subject to the necessary approvals), the Freeway Church has advised that it wishes to remain as a school site indefinitely.

The City takes the view that the applicant has chosen to develop Lot 670 for residential purposes, and, the best planning and urban design outcome should apply (which is that the road interface should be provided) which the City considers to be the provision of a road interface between Lot 670 and the school site. It is further noted that the proposed LSP (as advertised) includes a road connection to Bertram Road. The City's recommended modification shifts this proposed road to the east, alongside the boundary of Lot 670. It is ,therefore, argued that there is no additional requirement for a road being imposed by the City's in it's *Indicative Structure Plan*.

The City recommends that the proposed LSP (as advertised) be modified to provide a road interface between the school and the proposed development of Lot 670 as required by *Liveable Neighbourhoods*. An *Indicative Structure Plan* (Attachment C) has been prepared by the City to demonstrate the City's preferred road layout and school interface.

The Freeway Church and the school were initially concerned that there would be significant finished ground level differences between Lot 670 and the school site. However, following a review of the *Local Water Management Strategy* (included in the LSP documentation) by the City, the City is satisfied that minimal land fill will be required along the majority of the boundary length between Lots 670 and the (Lot 680 (school site). The proposed road interface between Lot 670 and the school site will be level and there will be no need for retaining walls or a batter.

Element 2 - Movement Network

Main Roads advised in its submission to the City that the LSP is supported on the basis that access to the structure plan area via Bertram Road is restricted to a left in / left out arrangement.

Main Roads also advised that a *Transport Statement* should have been provided as part of the LSP in accordance with the *Transport Guidelines for Structure Plans* (WAPC). The

City (Engineering Department) is of the view that the proposed LSP will not generate sufficient traffic to justify a *Transport Statement*. Main Road's comment and this matter is best negotiated between the WAPC and Main Roads.

Element 3 - Lot Layout

The proposed LSP is designed in a manner that will enable:

- views of Bollard Bulrush Swamp from within the subdivision; and
- lots to be orientated east west to facilitate solar access.

The proposed residential densities (R25 up to R40) in the LSP seek to meet the density targets set by the WAPC. The design allows smaller narrow lots at subdivision stage (specifically lots with a frontage of 7.5m or less). It is recommended that the LSP be modified to include the following criteria:

- a) Local Development Plan(s) are to be prepared for lots with a frontage of 7.5m, or less, and are to include design criteria that requires:
 - a) Two storey development;
 - b) Appropriate noise requirements for quite house design;
 - c) Fencing within the front setback (including boundary fencing) to be a maximum height of 1.2m, and 50% visually permeable above 600mm;
 - d) The interaction of the development with the public realm through the use of the front setback area, visual surveillance from habitable rooms and visually permeable fencing;
 - e) Promotion of design variety through design features and use of materials;
 - f) Mitigation of the potentially dominating visual presence of any garage structures;
 - g) Promotion of the visual presence of the dwelling to the street (i.e. gable ends.
- b) Local Developments Plan(s) are to be prepared for lots with a frontage of between 7.6m and 10m and are to include design criteria that will:
 - a) Promote the interaction of the development with the public realm through the use of the front setback area, visual surveillance from habitable rooms and visually permeable fencing;
 - b) Promote design variety through design features and use of materials;
 - c) Mitigate the potentially dominating visual presence of any garage structures;
 - d) Promote visual presence of the dwelling to the street (i.e gable ends); and
 - e) Include appropriate noise requirements for quite house design.

The matter of narrow single house lots affects this structure plan and other developing urban areas within the City. The City is considering the statutory mechanisms, such as policy provisions, to implement Council's vision in future local structure plans and subdivision applications.

It is worth noting that the City has only recently received advice from the Department of Planning that the request of the Council for mandatory 2 storey development on the 7.5 metre frontage lots or less in the Living Edge Estate LSP in Wellard East was not supported by the WAPC. It may well be that a similar stance is taken with this LSP. In this respect, it is considered important that City Officers meet with the Department to discuss

Council's concerns about small frontage lots and / or alternatively, seeking alternative design outcomes for the LSP which facilitate group dwelling developments in appropriate locations to achieve density outcomes.

Element 4 - Public Parkland

The LSP provides 1.7539ha of POS, including 1.089ha for conservation purposes (wetland buffer).

The POS in the LSP has been situated adjacent to Bollard Bulrush Swamp in order to create a community focal point for recreational activity. POS is situated within a 400m walkable catchment of all residential lots consistent with *Liveable Neighbourhoods*.

The City appointed Emerge Associates to prepare a landscape masterplan for the proposed open space flanking the eastern side of Bollard Bulrush Swamp (Attachment F). The purpose of the masterplan is to ensure that the location and design of recreational facilities is provided in a uniform and coordinated manner across a number of local structure plan areas. Without a landscape masterplan, it would be difficult for the City to coordinate the provision of recreation facilities (such as a dual use path circuit) to a consistent design as part of the structure planning and subdivision approval processes.

The LSP states that a *Landscape Management Strategy* will be prepared at the subdivision stage to guide the development of the open space. The City will ensure that the strategy is consistent with the *Bollard Bulrush East Landscape Masterplan*, prepared by the City.

Element 5 - Urban Water Management

The following water management plans and strategies have been prepared for the LSP area. These strategies include:

- Jandakot Drainage and Water Management Plan No.3 (JDWMP)- Peel Main Drain Catchment (DoW, 2009)
- Wellard Urban Precinct (East) District Water Management Strategy (DWMS) (Emerge, October 2014)
- Local Water Management Strategy (JDA, February 2016)

These plans address water management across the LSP area providing a greater level of detail at each successive stage of the planning process.

The Department of Water (DoW) has advised that amendments to the LWMS are recommended and the LSP should not be finalised until the Local Water Management Strategy (LWMS) has been approved by the DoW.

The City (Engineering Department) is liaising with the proponent and the DoW to resolve these concerns and takes the view that these matters can be addressed as part of the *Urban Water Management Plan* to be provided to the City's satisfaction at subdivision stage.

The infiltration basin situated between Lot 670 and the Peel Main Drain (Attachment A) was constructed by the City to receive stormwater runoff from the water catchment north of Bertram Road. The City and the owner of Lot 670 have 'agreed in principle' to relocate the retention basin to the southern end of the LSP. The terms of the final agreement will require Council endorsement.

Element 6 - Utilities

The LSP area is able to be connected to water, sewer, electricity, gas and telecommunications services. It is normal practice for the WAPC to impose subdivision conditions requiring that these services be provided to an urban standard.

The servicing agencies did not raise any concerns with the proposed LSP.

Element 7 - Activity Centres and Employment

There are no Activity Centres proposed within the east Bollard Bulrush urban cell or within the LSP area. There is a small Local Centre located nearby, at Emerald Park, which will be readily accessible by future residents.

Element 8 – Schools

The Department of Environment (DoE) has advised that the LSP will increase the number of lots within the catchment area of the future Wellard West Primary School and put pressure on the capacity of the school.

The DoE has explained that residential lot yields were not provided by the WAPC at the time the Bollard Bulrush east urban cell was rezoned as part of MRS Amendment 1118/57. At that time, the DoE assumed that students would attend the future Wellard West Primary School, and, that it would be unfeasible to develop an additional primary school in the area.

The DoE advised in its submissions that because lot sizes in the Bollard Bulrush east urban cell are now smaller than originally anticipated, it is estimated that more than 3,000 residential lots will eventually be situated within the catchment of the future Wellard West Primary School. There are a sufficient number of lots to justify two primary school sites in Wellard in accordance with the WAPC's School Sites policy (DC 2.4) and *Liveable Neighbourhoods*.

The DoE wishes to discuss with the City a location on the west side of Bollard Bulrush Swamp that the DoE considers to be suitable for an early childhood centre. The DoE advise that early childhood centres are typically 1-2ha in area and may accommodate pupils from Kindergarten to Year 3. It would be appropriate for the City to liaise with the DoE, WAPC and affected landowners prior to the lifting of the current urban deferred zoning on the western side of Bollard Bulrush Swamp.

Other matters assessed by the City

In addition to *Liveable Neighbourhoods,* the City has also assessed the LSP against the following matters:

Biodiversity (Vegetation, Flora & Fauna)

The LSP area has been substantially cleared and used for various rural pursuits in the past. The City does not consider that there are any 'significant trees' on site worthy of retention in accordance with the City's draft *Landscape and Tree Retention Policy*.

A 50m buffer to the wetland boundary ('Rural' zone boundary) has been identified in the LSP. This was required as part of the EPA assessment of MRS Amendment 1188/57.

The LSP document states that a *Wetland Management Plan* will be prepared at subdivision stage.

On 16 December 2015, the draft *Local Planning Policy 1: Landscape and Tree Retention and Protection in Development Areas (Tree Retention Policy)* was adopted by Council for advertising. A number of complex submissions were received during the advertising period which the City is reviewing. Nevertheless, the City (Environment Team) has assessed the vegetation within the LSP area in light of the draft *Landscape and Tree Retention Policy* and is of the opinion that there are no trees suitable for protection, as part of the future development of the LSP area.

Bushfire Management

The State Planning Policy 3.7 – Planning in Bushfire Prone Areas (SPP 3.7) (WAPC 2015) and Guidelines for Planning in Bushfire Prone Areas (WAPC, 2015) are the predominant documents used by decision making authorities and referral agencies during the consideration of strategic planning proposals, subdivisions and development applications.

SPP 3.7 states that local structure plans should be accompanied by a *Bushfire Management Plan* which includes a *Bushfire Hazard Level* assessment or *BAL Contour Map* for those areas identified as bushfire prone.

The LSP area is identified as a *Bushfire Prone Area* in the *Map of Bushfire Prone Areas* (2015), therefore, a *Bushfire Management Plan* is required to support the LSP.

The Guidelines state that the following matters should be addressed in the *Bushfire Management Plan:*

- a) Location of bushfire prone areas
- b) Avoidance of land use and development intensification extreme hazards areas
- c) Existing fire fighting infrastructure
- d) Existing and proposed road network and its effectiveness in a bushfire emergency
- e) Integration of biodiversity protection in a bush fire management plan

The City's bushfire management consultant (Preplan) has advised that the *Bush Fire Management Plan* (FirePlan WA, February 2016) is consistent with the current *Guidelines for Planning in Bushfire Prone Areas*.

Acid Sulfate Soils

The DoE's *Acid Sulfate Soil Risk Mapping* identifies the majority of the local structure plan area as having a 'high' risk of Acid Sulfate Soils (ASS) within 3 metres of the surface. Conditions are likely to be imposed by the WAPC on the subdivision requiring that ASS is managed in accordance with the WAPC's Guidelines.

Consistency of Infrastructure Standards across Multiple Development Sites

The City will require a consistent standard of infrastructure (roads and streetscape, lighting, POS landscaping) to be provided within the various landholdings in the east Bollard Bulrush urban cell. This will be achieved through implementation of the draft *Bollard Bulrush East Landscape Master Plan* (draft LPP3) and through appropriate conditions of subdivision approval.

CONCLUSION:

The City recommends that the LSP be supported subject to modifications so that there is a road interface between the school and the proposed residential development on Lot 670. An *Indicative Structure Plan* (Attachment C) has been prepared by the City to demonstrate the City's preferred road layout and school interface.

The City is of the view that the road interface should be provided to ensure acceptable neighbourhood design outcomes. To proceed with the proposed LSP (as advertised) would result in a fragmented community where the residential area on Lot 670 would be fenced off from the school and disconnected from surrounding residential areas.

LEGAL / POLICY IMPLICATIONS:

For the purposes of Council considering a financial or impartiality interest only, the land owner is Byblos Holdings and the LSP was prepared by Rowe Group.

Legislation

- Planning and Development Act, 2005
- Metropolitan Region Scheme
- Planning and Development (Local Planning Schemes) Regulations 2015
- City of Kwinana Town Planning Scheme No. 2

Policies and Strategies

- Draft South Metropolitan Peel Sub-Regional Planning Framework (WAPC, 2015)
- District Water Management Strategy Wellard Urban Precinct (East), Perth WA (Emerge, 2014)
- State Planning Policy 3.7 Planning for Bushfire Risk Management (Draft) (WAPC, 2015)
- Better Urban Water Management (WAPC, 2008)
- Residential Design Codes (WAPC, 2013)
- Structure Plan Guidelines (WAPC, 2012)
- Jandakot Drainage and Water Management Plan Peel Main Drain Catchment (DoW, 2009)
- Liveable Neighbourhoods (Edition 3) (WAPC, 2009
- Guidelines for Planning in Bushfire Prone Areas (WAPC, 2015)
- Map of Bushfire Prone Areas
- Designing Out Crime Planning Guidelines (WAPC, 2006)

<u>Other</u>

- Report and recommendations of the Environmental Protection Authority Metropolitan Region Scheme Amendment 1188/57 – Wellard Urban Precinct (EPA Report 1500) (EPA, January 2014)
- Statement that a scheme may be implemented (pursuant to the provisions of Division 3 of Part IV of the Environmental Protection Act 1986) (Ministerial Statement 961) (12 March 2014)
- Stormwater Management Manual for WA (DoW, 2007)

FINANCIAL / BUDGET IMPLICATIONS:

The City will be financially responsible for:

- a) maintaining POS and possibly that part of the 50 metre wetland buffer abutting Bollard Bulrush Swamp situated within the LSP.
- *b)* managing bushfire fuel loads in POS and the wetland buffer in accordance with the requirements for low threat vegetation listed in *Australian Standard* S39459.

ENVIRONMENTAL IMPLICATIONS:

The EPA formally assessed Amendment 1188/57 under section 48A of the *Environmental Protection Act 1986* due to the potential for future residential development to impact on Bollard Bulrush Swamp which is recognised as an environmentally significant CCW.

The EPA provided its report and recommendation to the Minister for Environment, in January 2014, recommending that Amendment 1188/57 be approved (EPA Report 1500, January 2014).

The EPA's report concluded that Amendment 1188/57 could be managed to meet the EPA's environmental objective without the requirement for environmental conditions because the alignment of the proposed 'Urban' zone boundary (adjacent to Bollard Bulrush Swamp) had been modified during the EPA's formal assessment to satisfy the EPA's environmental objectives.

STRATEGIC / SOCIAL IMPLICATIONS:

The City is of the view that the LSP for Lot 670 and 1338 Bertram Road and Reserve 50672, Wellard addresses the future strategic and social requirements of the locality.

RISK IMPLICATIONS:

Council approves development under its Scheme to meet its statutory obligations and facilitate proper and orderly development of the municipality to accommodate development in accordance with the objectives of Council's Strategic Plan. Development approvals, scheme amendments, subdivision and local structure planning allows land use to change over time, in order to meet Council and State Government policies and practices, community values and provide protection to the environment.

COUNCIL DECISION 263 MOVED CR W COOPER

SECONDED CR R ALEXANDER

That Council:

- 4. Advise the Western Australian Planning Commission (WAPC) that the City supports the Local Structure Plan for Lot 607 and 1338 Bertram Road and Reserve 50672, Wellard as submitted, subject to the following modifications:
 - d) a road reserve being shown along the eastern boundary of Lot 670 to provide an interface between the existing school (The King's College) and the proposed residential development of Lot 670 as shown in Attachment C.
 - e) inclusion of a statement in the Local Structure Plan text requiring the preparation of the following management plans to the City's satisfaction as part of the subdivision application process:
 - vi. Wetland Management Plan
 - vii. Urban Water Management Plan
 - viii. Acid Sulfate Soils Management Plan
 - ix. Mosquito Management Plan
 - x. Landscape Management Strategy
 - f) inclusion of the following provisions in the Local Structure Plan text:
 - iii. Local Development Plan(s) are to be prepared for lots with a frontage of 7.5m, or less, and are to include design criteria that requires:
 - Two storey development;
 - Appropriate noise requirements for quite house design;
 - Fencing within the front setback (including boundary fencing) to be a maximum height of 1.2m, and 50% visually permeable above 600mm;
 - The interaction of the development with the public realm through the use of the front setback area, visual surveillance from habitable rooms and visually permeable fencing;
 - Promotion of design variety through design features and use of materials;
 - Mitigation of the potentially dominating visual presence of any garage structures;
 - Promotion of visual presence of the dwelling to the street (i.e. gable ends).

- iv. Local Developments Plan(s) are to be prepared for lots with a frontage of between 7.6m and 10m and are to include design criteria that will:
 - Promote the interaction of the development with the public realm through the use of the front setback area, visual surveillance from habitable rooms and visually permeable fencing;
 - Promote design variety through design features and use of materials;
 - Mitigate the potentially dominating visual presence of any garage structures;
 - Promote visual presence of the dwelling to the street (i.e gable ends); and
 - Include appropriate noise requirements for quite house design.
- 5. Request the WAPC that the 50 metre buffer to the boundary of the Conservation Category Wetland (situated within the 'Development' zone), be ceded free of cost to the Crown as a condition of subdivision approval.
- 6. Forward this Ordinary Council Meeting Report, Council's recommendations and the Schedule of Submissions (Attachment D) to the WAPC pursuant to clause 20 of the Planning and Development Regulations 2015.

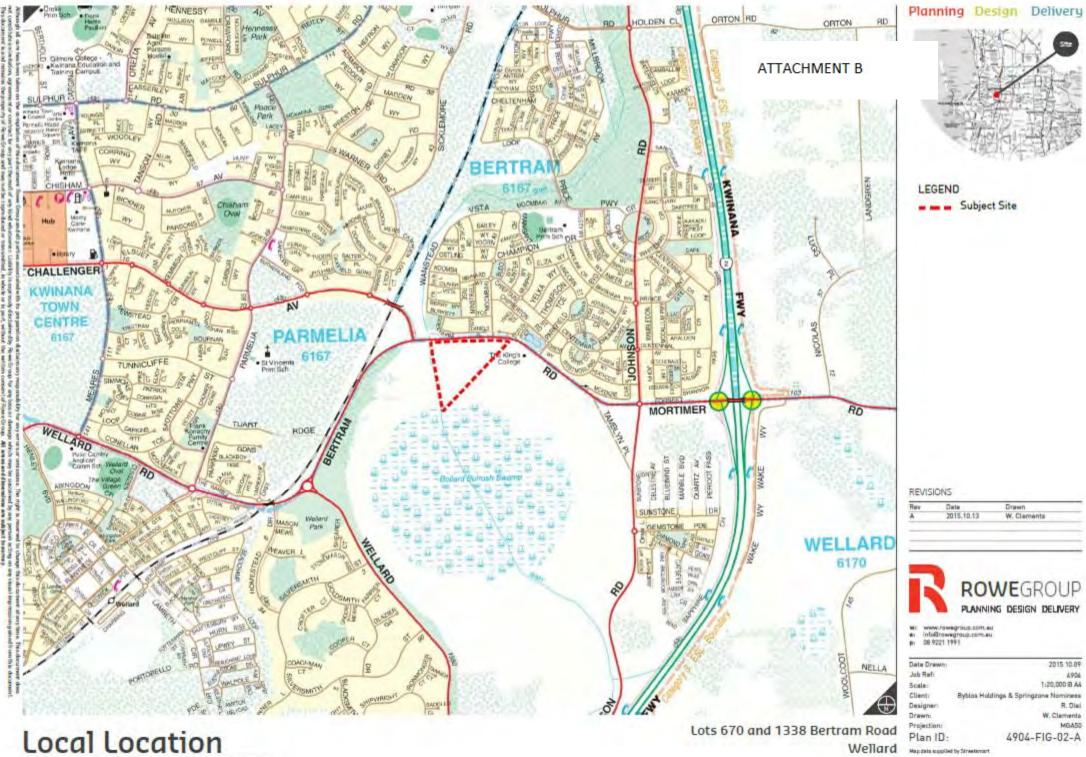
CARRIED 6/0



Rev	Date	Drawn
В	2015.11.26	M. Sullivan
С	2015.12.08	W. Clements
D	2016.01.29	W. Clements
E	2016.02.03	W. Clements

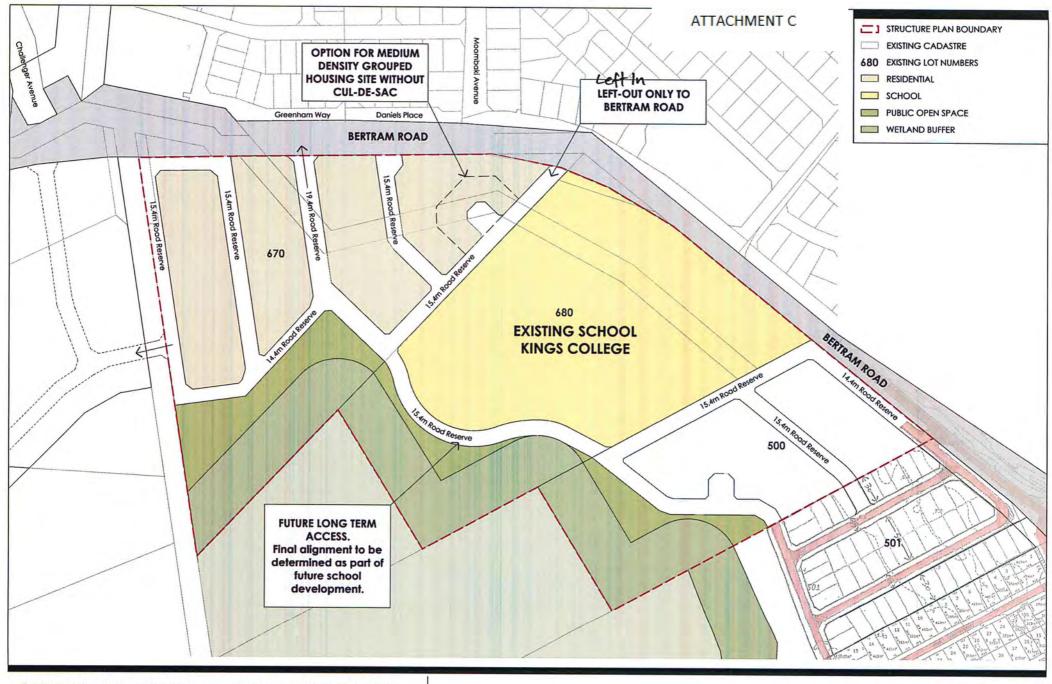
Plan 1

Drawn:	2015.11.17
Ref:	4904
le:	1:2000 @ A3
nt:	Byblos Holdings & Springzone Nominees
igner:	R. Dial
wn:	W. Clements
ection:	MGA50 GDA94
an ID:	4904-LSP-03-E
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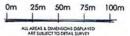
N. ITOWN PLANNING USE-1999, 924/DRAFTING A-CADVING_FIRE A_DISTORE S. DOAL LICATION. DWG William Camerica S. December 2015

Figure 2



OPTION PLAN - ROADS ABUTTING KINGS COLLEGE LOTS 670, 680 AND 500 BERTRAM ROAD, WELLARD SOURCE: CITY OF KWINANA, ROWE GROUP

scale - 1:2500 @ A3 | date - 10 JUNE 2016 plan no. 16-001-001B



SCHEDULE OF SUBMISSIONS Proposed Local Structure Plan Lots 670 and 1338 Bertram Road and Reserve 50672, Wellard

	SUBMITTER AND ADDRESS	NATURE AND SUMMARY OF SUBMISSION	CITY COMMENT
1.	Department of Education 151 Royal Street East Perth WA 6004 Contact: Stephen Muldoon Senior Consultant Strategic Asset Planning	 NO OBJECTION TO THE LOCAL STRUCTURE PLAN – COMMENTS / RECOMMEDATION PROVIDED a) The structure plan is situated within the catchment for the future Wellard West Primary School located along Johnson Road. b) DoE is concerned that the proposed additional residential development surrounding the Bollard Bulrush Swamp will significantly increase the number of lots within the catchment area for the future school. At full development there is likely to be accommodation pressure on this school. c) DoE request that the City of Kwinana liaise with DoE to identify a location in the north west sector for an early childhood centre. These centres are typically 1 - 2ha in area and may accommodate students from Kindergarten to Year 3. 	It would be approp between the WAPC , urban deferment in th
2.	Main Roads WA PO Box 6202 East Perth WA 6892 Contact: Ms Assunta Dinardo Road Planning & Development	NO OBJECTION TO THE LOCAL STRUCTURE PLAN – COMMENTS / RECOMMEDATION PROVIDED The proposed local structure plan is supported on the basis that access to the structure plan area via Bertram Road is restricted to a left in /left out arrangement. Whilst it is recognised that the daily vehicle numbers are relatively low, under the WAPC's Transport Guidelines for Structure Plans, as a minimum requirement a Transport Statement should have been provided as part of this Structure Plan.	Noted Noted The City is of the vie sufficient traffic to wa is best negotiated be
3.	Department of Water PO Box 332 Mandurah WA 6210 Contact: Jane Sturgess Urban Water Management Peel Region	OBJECTION TO THE LOCAL WATER MANAGEMENT STRATEGY – COMMENTS PROVIDED The DoW has reviewed the Local Water Management Strategy (JDA, 2016) and advises that amendments are required. It is recommended that the LSP should not be finalised in the absence of a LWMS that has been approved by the City of Kwinana and DoW, in accordance with the BUWM. DoW is yet to receive an amended LWMS and the LSP does not contain a revised strategy.	The City (Enginee proponent and the D the view that these <i>Urban Water Manag</i> satisfaction at subdivi
4.	Water Corporation PO Box 100 Leederville WA 6902 Contact: Brett Coombes	NO OBJECTION TO THE LOCAL STRUCTURE PLAN – COMMENTS / RECOMMEDATION PROVIDED The Corporation has no objections to the proposed LSP.	Noted
	Senior Urban Planner Development Services	The Corporation has prepared water and wastewater planning for this and other nearby urban growth areas. This conceptual planning provides a guide to the developer's consulting engineers on the preferred method of servicing the land. The engineers can vary, adapt and stage this planning in consultation with the Corporation's Land Servicing Branch at the subdivision stage.	Noted

ATTACHMENT D

ropriate for this matter to be negotiated C , DoE and landowners prior to the lifting of the MRS.

view that the Structure Plan will not generate warrant a transport statement and this matter between the WAPC and Main Roads.

eering Department) is liaising with the e DoW to resolve these concerns and takes e matters can be addressed as part of the pagement Plan to be provided to the City's division stage.

SCHEDULE OF SUBMISSIONS Proposed Local Structure Plan

Lots 670 and 1338 Bertram Road and Reserve 50672, Wellard

		The site is situated within the Corporation's Medina Gravity Water supply zone. Provision has been made in the Corporation's long term planning for the urbanisation of this land. Water supply to the proposed subdivision will need to be provided by the developer designing and constructing water main extensions from the surrounding network on Johnson Road and Wellard Road.	A reticulated water su construction of the subdivision condition Planning Commissi Corporation and the 0
		The Peel Main Drain abuts the western boundary of the site. The operation of the main drain is critical to the drainage of the area and is maintained by the Corporation under license conditions set by the Economic Regulation Authority.	Noted
		Runoff from the development area must be contained on site to pre-development levels and the local urban drainage system must be designed and operated to accord with the objectives and requirements of the Jandakot DWMP.	Noted
		The Corporation will not permit any additional drainage connection or discharge to the Peel Main Drain.	
		The proponents are required to prepare a UWMP for the development area. The finished development site levels must be determined by the City's engineers in consultation with the Department of Water having regard to the 100 year ARI flood levels recommended in the Serpentine River Floodplain Management Study.	Noted
		From time to time the Corporation needs to access the main drain for emergency works or routine maintenance. The previous semi-rural use of this land has allowed the Corporation to enter into arrangements with abutting landowners regarding physical and vehicular access. Ongoing access to this section of drain needs to be provided to ensure the Corporation has 24 hour access to the eastern and western sides of the drain.	Subsequent to thi agreement with prop the Peel Main Drain require the road re- widened.
		The proposed road reserve shown along the western side of the LSP may need to be widened to provide a wider verge abutting the drain to allow for vehicular access to the drain and the safe operation of an excavator for drain maintenance. It is requested that this issue be noted on the LSP and addressed by the proponent at the subdivision stage. The Corporation has previously provided similar advice in relation to the LSP on the western side of the main drain.	 The solution reached requires that the: southern end and a gated POS be iden Watercorp has submitted at s interface betwroad reserve access to the
5.	Department of Health PO Box 8172 Perth Business Centre WA 6849 Contact Vic Andrich	NO OBJECTION – COMMENTS PROVIDED The proposed development is to connect to scheme water and reticulated sewerage as required by the Government Sewerage Policy – Perth Metropolitan Region.	Reticulated water an site during the consi with standard subdiv Australian Planning C Corporation and the C

supply will be provided to the site during the e subdivision in accordance with standard ons imposed by the Western Australian ssion, in consultation with the Water e City of Kwinana.

his comment, Watercorp has reached oponent concerning the interface between ain and the LSP. The solution does not reserve along the Peel Main Drain to be

ed between Watercorp and the proponent

d of the access track to the Peel Main Drain d entry into the reserve at the edge of the entified and secured at subdivision stage. has requested that a detailed sketch be t subdivision stage.

tween the access track and the subdivision e will need to be fenced to exclude public e satisfaction of Watercorp.

and sewer systems will be provided to the instruction of the subdivision in accordance livision conditions imposed by the Western Commission, in consultation with the Water e City of Kwinana.

SCHEDULE OF SUBMISSIONS

Proposed Local Structure Plan

Lots 670 and 1338 Bertram Road and Reserve 50672, Wellard

		The City of Kwinana should use this opportunity to minimise potential negative impacts of the increased density development such as noise (air conditioning units), odour, light and other lifestyle activities.	Where appropriate provisions on Loca requirements to mitig narrower lots.
		 a) The subject land is within 3km of a mosquito breeding site and regularly experiences problems with nuisance and disease carrying mosquitoes. Current and future workers and residents in this location will be at risk from mosquito borne diseases. The DoH recommends that: The proponent works with the City to determine the extent of risk from mosquitoes and mosquito borne diseases New residents are to be warned of the risk of mosquito borne diseases via notices on title The City ensures that there are sufficient resources for mosquito management to protect future residents from mosquito borne diseases. 	The City recommends prepared at subdivision
6.	DepartmentofFireandEmergency ServicesPO Box 1174PERTH WA 6844Contact:Shannon BrophyA/District Officer Cockburn Sound	NO OBJECTION – COMMENTS PROVIDED DFES has reviewed the local structure plan and any future development would need to comply with the DFES and WAPC document Planning for Bushfire Protection Guidelines 9edition 2).	The City's bushfire advised that the Bus February 2016) is c Planning in Bushfire
7.	Department of Transport 140 Williams Street PERTH WA 6000 Contact: Stanley Naicker Integrated Transport Planning	NO COMMENTS The Department of Transport advised that it had no comments to provide.	Noted
8.	Department of Parks and Wildlife Locked Bag 104 BENTLEY DELIVERY CENTRE WA 6983 Contact: Lyndon Mutter	NO OBJECTION – COMMENTS PROVIDED Parks and Wildlife supports the requirement of the LSP to prepare a wetland management plan. The Wetland Management Plan should address revegetation in the buffer consistent with the department's guidelines for the preparation of wetland management plans. It is department's view that appropriate setbacks and all bushfire protection requirements should be provided for within the development land and not place reliance or impositions on the management of the wetland or wetland buffer, nor place limitations on revegetation within the buffer required to protect the wetland core and manage surface water flow through the buffer.	The City recommend prepared at subdivision
		Parks and Wildlife expects that the City of Kwinana and the Department of Water will assess the adequacy of the Local Water Management Strategy and ensure the proposed development doesn't have an adverse hydrological impact on the Conservation Category wetland. Drainage infrastructure should be located outside of the wetland buffer. The drainage basin shown on the structure plan appears to be partially located within 50 metres of the CCW boundary located to the	The City acknowled within 50m of the CO Drain. However, the will not impact of t situated on the west groundwater and sur

)	the	City	will	imp	ose	add	litiona	al no	oise
С	al [Develo	pmer	nt	Plans	w	hich	spe	cify
ti	gate	noise	trans	sfer	betw	een	dwel	lings	on

nds that a Mosquito Management Plan be ision stage.

ire management consultant (Preplan) has Bush Fire Management Plan (FirePlan WA, s consistent with the current Guidelines for re Prone Areas.

ends that a wetland management plan be ision stage.

ledges that the drainage basin is situated CCW on the western side of the Peel Main he City is of the view that the drainage basin of the hydrology of that part of the CCW, estern side of the Peel Main Drain because surface water drainage will be retained in the

SCHEDULE OF SUBMISSIONS Proposed Local Structure Plan Lots 670 and 1338 Bertram Road and Reserve 50672, Wellard

		west of lot 670.	retention basin, with the Peel Main Drain.
			The City discussed conceded that the dr on the CCW on the v
9.	The Kings College	NO OBJECTION - COMMENTS PROVIDED	
	(Letter dated 1 June 2016) PO Box 450 KWINANA WA 6966 Contact:	The proposed LSP adversely impacts on the schools long term plans and could adversely impact on the appearance of the interface between the residential development on Lot 670 and the Kings College. (email dated 23 May 2016)	The City has met wit the development of I City on 22 June 2 Structure Plan.
	Mihael McCoy Board Chair	That any proposed site elevation and landfill include either appropriate elevation of parts of the school land and integrate the highest standard of streetscape, landscape, tree planting and water drainage to maximise integration of the school with any proposed development.	The Indicative Stru connectivity betweer school by providing a Grounds levels sho Strategy indicate tha boundary between th
		That no fencing be placed alongside the school property that would devalue, or "cut off" the school from the proposed developments.	The Indicative Stru connectivity betweer school by providing a
		That the proposed developments are integrated together with TKC's Master Plan.	The King's College M City although the Ind will integrate with the
		That the proposed development takes into consideration the long term plans of Freeway Church to develop their proposed auditorium.Future proposed developments need to take into consideration increased traffic, noise, outdoor entertainment space such as is required for a Church and community space. TKC and Freeway Church wish to have constructive and positive relationships with the local community and would expect that these aspects have been given a high level of consideration and appropriate treatment.	The City has not reproposed auditorium been adopted althouby the City will integrated by the City will be contended by the City will integrated by the City will be contended by t
		That any proposed development not infringe further on utility of land set aside by the College and its moral owners. Should there be any need to infringe on existing boundaries to provide easements or other access, that appropriate compensation in a land for land style arrangement be offered to the College and/or the owners.	Noted
		That all residential dwellings be required to include appropriate noise reduction/insulation elements to ensure minimal impact on the residents and reduce likelihood of complaints of noise pollution emanating from the College and Church site. TKC and the Church will also need to factor this into their own planning and development proposals.	The City has not reproposed auditorium designed to reduce n
		Signage, Lighting, Art, & Vegetation – attractive, comprehensive and consistent signage lighting of a high quality in any proposed development.	Noted

h any surplus overflow to be discharged into n.

d this matter with Parks and Wildlife which drainage basin is unlikely to have an impact western side of the Peel Main Drain.

with the school a number of times to discuss f Lot 670. The City submitted a letter to the 2016 supporting the proposed Indicative

ructure Plan improves the interface and een the proposed residential area and the g a road along the boundary of Lot 670. The shown in the Local Water Management that minimal fill will be required along the the school and the Lot 670.

ructure Plan improves the interface and een the proposed residential area and the g a road along the boundary of Lot 670.

e Master Plan has not been adopted by the ndicative Concept Plan prepared by the City he school.

received a development application for the im. The King's College Master Plan has not ough the Indicative Concept Plan prepared grate with the school.

received a development application for the um. The proposed auditorium should be noise emissions if it is constructed.

SCHEDULE OF SUBMISSIONS

Proposed Local Structure Plan

Lots 670 and 1338 Bertram Road and Reserve 50672, Wellard

	Vehicle, Transport, Wayfinding and Pedestrian – the Kings College Master Plan has been devised with the existing traffic management system and site entrances as they are. Currently they feed in and out of the site from Bertram Road. Safety and site supervision are high priorities for any independent/private school and we would submit that this is a high priority for consideration in any development.	Noted
The Freeway Church	NO OBJECTION - COMMENTS PROVIDED	
(Letter from MW Urban dated 22 June 2016 on behalf of the Freeway Church)	The LSP should provide a road abutting Lot 680.	The City's Indicative boundary of Lot 670 a
	Concerned that the finished levels within the proposed LSP area may be significantly higher that Lot 680	Grounds levels sho Strategy indicate tha boundary between the
	Post development drainage and stormwater from the proposed LSP should not disperse onto the school site nor adversely affect Lot 680.	The road between Lo stormwater water wi runoff onto the schoo
	An existing drainage line straddles the common boundary of the proposed LSP. It is not clear how this will be treated as part of the subdivision of the LSP area, especially that portion within Lot 680.	The drainage of Lot 6 as part of the usual private land.
	The school does not support the proposed road traversing the rear of the site given there will be not community facilities or destinations necessitating the connection. The school wishes to retain direct frontage to the wetland as part of the schools education programme.	The road will provid abutting Bollard Bulru school. The road w recreation area arour City's Bollard Bulrush
		This road lies outside by the City as part Masterplan.
	The proposed LSP shows future POS on Lot 680 abutting the wetland buffer as a continuation of the POS within the proposed LSP area. It is understood a POS provision will not be required given there will be no residential development on the site.	Agree.

ve Structure Plan shows a road along the 0 abutting the school.

hown in the Local Water Management that minimal fill will be required along the the school and the Lot 670.

Lot 670 and the school site will ensure that will be contained within Lot 670 and not pol site.

t 680 will need to be managed by the school al management of stormwater drainage on

vide connection between residential areas ilrush Swamp situated on either side of the will also provide public access to the und Bollard Bulrush proposed as part of the sh East Landscape Masterplan.

de of LSP for Lot 670 and will be considered rt of the Bollard Bulrush East Landscape



Indicative Development Plan

Lots 670, 1338,680 & 500 Bertram Road

Wellard

Planning Design Delivery



LEGEND

	Structure Plan Boundary
	Existing Cadastre
680	Existing Lot Numbers
	Indicative Layout
	Residential
	School
	Public Open Space
	Wetland Buffer
	Limestone Retaining with Colorbond Fencing

REVISIONS

Rev	Date
A	2016.05.17

Drawn W. Clements





www.rowegroup.com.au e: info@rowegroup.com.au p: 08 9221 1991

Date Drawn Job Ref: Scale: Client: Designer: Drawn: Projection: Plan ID:

Cadastre supplied by Watercorp

2016.05.17 4904 1:2000 @ A3 Byblos Holdings & Springzone Nominees R. Dial W. Clements MGA50 GDA94 4904-CON-02-A



DUAL USE PATH

Provides secondary fire access between buffer and POS. Access points to core firebreak to be provided every 400m. DUP to align where possible with developers approved LSP plans. Path alignment adjacent existing trees where possible for shade and interest DUP to link to future Tramway Trail and possible future trail along Pach Main Drain to recent trail long

Peel Main Drain to create trail loops. Themed elements will be incorporated into the DUP to indicate the main path of travel around the wetland for users.

PEEL MAIN DRAIN CROSSINGS Bridge crossings across Peel Main Drain at 2 locations, north and south of the wetland to create a trail loop.



CONSERVATION FENCE 1.2m high reserve fence with ringlock mesh, top wire and galvanised steel picket posts to core edge. 3.5m wide access gates with treated timber posts every 400m.

BUFFER ZONE

Developers to create irregular, 'organic' batter from road to existing buffer/tree levels to create a more natural aesthetic and not to create an 'over-engineered' look. High quality revegetation to be focused around areas of retained vegetation to assist with ongoing environmental management Areas of mulch only to be considered where high quality revegetation manided buffered

provided by developer Irrigated turf to be permitted within buffer adjacent POS where

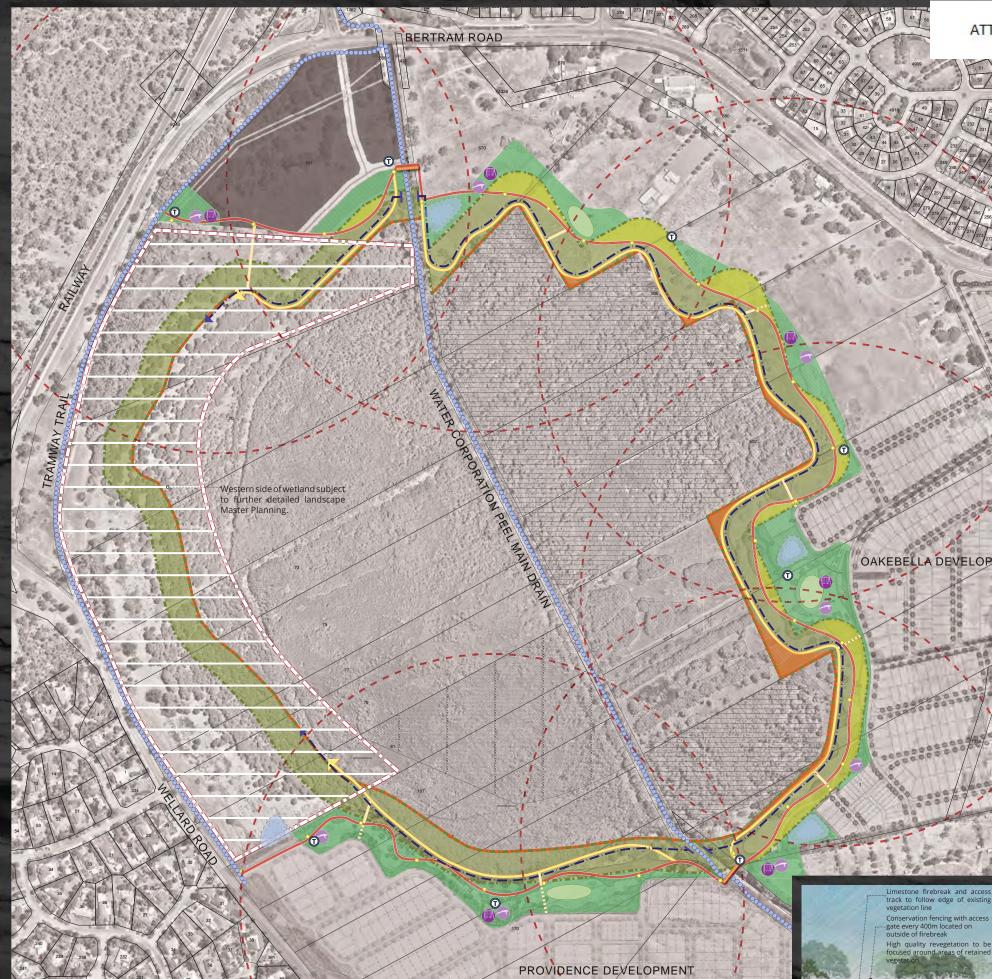
FIREBREAK 3m wide firebreak and access track to be located adjacent existing Vegetation line, internal of conservation fencing Overtaking lane provided every 200m (4m wide). Doubles as walking trail and located adjacent existing trees where possible for users comfort/shade.



PLAY ELEMENTS Natural style and colours to be used to complement the surrounding environment. Multi user/ age, interpretive and inclusive play opportunities. Nature play elements are encouraged to be provided where operible.

 \bigcirc

DWG • COK01-LO1 REV • D DATE • May 16 SCALE • 1:3000 @ A1



BOLLARD BULRUSH EAST LANDSCAPE MASTER PLAN

Kw1nana



LEGEND WETLAND CORE BOUNDARY

50M BUFFER ZONE

- VEGETATION COMMUNITIES Eucalyptus rudis ssp. rudi

- Open Forest of Melaleuco nylla, Melaleuca preissiana s rudis ssp. rudis and Baumo

WEST SIDE SUBJECT TO FURTHER MASTER

- CONSERVATION FENCE 1.2M HEIGHT IREBREAK - 3M WIDE LIMESTON
 - PATH RED ASPHALT DUAL USE PROVIDES SECONDARY FIRE ACCESS
 - FUTURE BRIDGE LINK
 - PLAYGROUND

 - TRAIL HEAD

 $\overline{\mathbf{T}}$

- FUTURE TRAIL LINKS
 - STORMWATER DETENTION AREA
 - KICKABOUT SPACE
 - PUBLIC OPEN SPACE AREA
 - TENTIAL PUBLIC OPEN SPACE ARE WITHIN BUFFER
 - REVEGETATION TO WETLAND SIDE REVEGETATION IN BUFFER ZONE
 - 400M WALKABLE CATCHMENT BETWEEN JUNIOR PLAYGROUNDS
 - WETLAND FIREBREAK ACCESS LINK AND GATE



FURNITURE

Clear - anodised aluminium furniture elem from Cox Urban furniture Urban Edge range Mid Grey/Cedar colours to complemen natural environment rather than co



SIGNAGE Trail heads to include interpretive and directional

signage. Interpretive signage themes include; vegetation communities, wetland / Peel Main Drain history,

Areas of POS amenity within buffer may be considered outside of DUP Dual use path to provide secondary fire access and recreational link-around wetland Organic batter to be pro wetland and developm

TYPICAL SECTION



7.0 INDICATIVE STRUCTURE PLAN

ATTACHMENT G



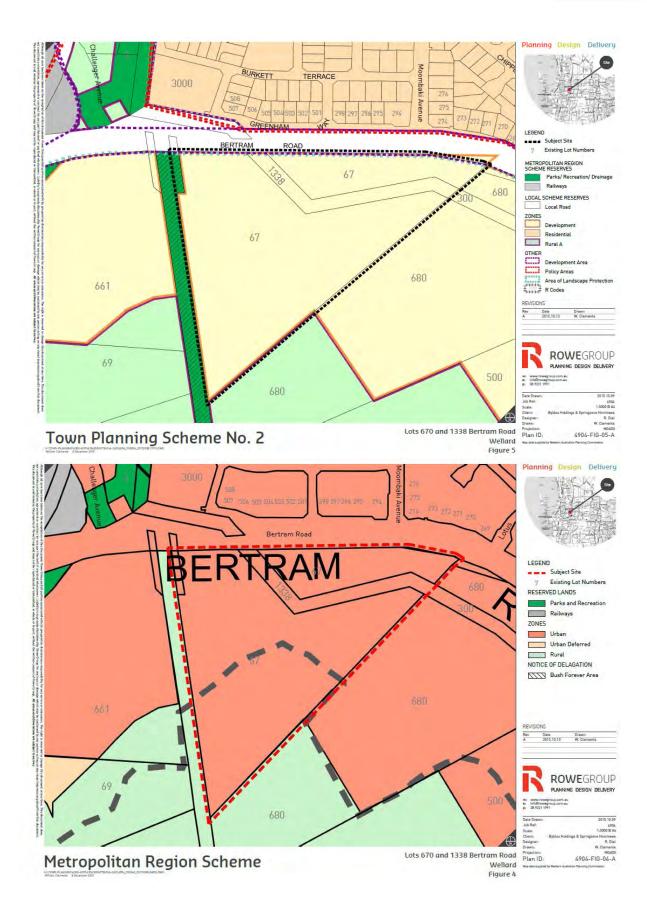
ATTACHMENT H

CONCEPT STRUCTURE PLAN





ATTACHMENT I





ATTACHMENT J

LOTS 670 AND 1338 BERTRAM ROAD AND RESERVE NO. 50672 WELLARD



OUR REF: 4904 29/02/2016

DOCUMENT CONTROL

Printed 29 February 20166 4904_15dec01R_rd

Version	File Name	Prepared by	Approved by	Date
1	4904_15nov01R_rd	Reyne Dial	Darren Evans	29/02/2016

This report has been authorised by;

Darren Evans Senior Project Manager

Reyne Dial Planner

Jamie Baxter Quality Control

CONTACT PERTH OFFICE

p 9221 1991 e info@rowegroup.com.au w rowegroup.com.au a 3/369 Newcastle Street, Northbridge 6003

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RECORD OF ENDORSEMENT

This structure plan is prepared under the provisions of the City of Kwinana Town Planning Scheme No. 2.

CERTIFIED THAT THIS STRUCTURE PLAN WAS ADOPTED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

Signed for and on behalf of the Western Australian Planning Commission:

an officer of the Commission duly authorised by the Commission pursuant to section 16 of the Planning and Development Act 2005 for that purpose, in the presence of:

__ Witness

_____Date

_____ Date of Expiry



TABLE O	F AMENDMENTS Summary of the Amendment	Amendment Type	Date Approved by the WAPC



EXECUTIVE SUMMARY

This Local Structure Plan (LSP) addresses Lots 670 and 1338 Bertram Road and Reserve No. 50672 (Lot 1421 on Plan 156437), Wellard. The LSP area comprises 8.3 hectares of urban zoned land which is zoned 'Development' under the City of Kwinana's Town Planning Scheme No. 2.

The site is situated approximately 36 km south of Perth Central Area and approximately 2.5 km southeast of the Kwinana Town Centre.

The LSP seeks to facilitate the subdivision and development of the land for residential land use in a manner that interacts appropriately with both the developing urban environment in this locality and the adjoining Bollard Bulrush Swamp. Specifically, the LSP will provide for:

- Residential lots ranging in density from R25 to R40; and
- Public Open Space (POS), including wetland buffer and drainage function, which integrates with the adjoining Bollard Bulrush Swamp and ensures the conservation and protection of the wetland.

This LSP is therefore prepared to satisfy the requirements of Town Planning Scheme No. 2 to facilitate subdivision and development of the site.

The preparation of this LSP has been undertaken in liaison with the City of Kwinana and government authorities.





	Local Structure Plan Sum	mary Table	
	Item	Data	Section number referenced in report
	Total area covered by the Structure Plan	8.3 hectares	1.2.2
	Area of each land use proposed: Residential Public Open Space	Hectares Lot Yield 4.6 ha 106 lots 2.1 ha -	4.1
	Estimated lot yield	Minimum 99 lots	4.3
	Estimated number of dwellings	Minimum 104 dwellings	4.3
	Estimated residential site density: Dwellings Per Gross Urban Hectare Dwellings Per Site Hectare	12.8 dwellings per gross urban hectare 23 dwellings per site hectare	4.3
	Estimated population	359 people @ 2.9 people per household	4.3
	Number of high schools	nil	4.6
	Number of primary schools	nil	4.6
	Estimated area and % of public open space:		
	Total Public Open Space	1.754 ha	4.4
	Unrestricted Public Open Space	0.5865 ha	
	Restricted Public Open Space	1.2974 ha	

LOCAL STRUCTURE PLAN WELLARD



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- **6.** EPA Wetland Management Categories
- 7. Acid Sulphate Soils
- 8. Public Open Space Plan

- 1. Land Ownership
- 2. Public Open Space Schedule



	CHNICAL AP	PENDICES		
Appendix Number	Document Title	Nature of Document	Referral/Approval Agency	Summary of Document Modifications
1.	Certificates of Title	Supporting document only	-	
2.	Fire Management Plan	Approval Required	Department of Fire and Emergency Services / City of Kwinana	
3.	Local Water Management Strategy	Approval Required	Department of Water	







1. Structure Plan Area

This Structure Plan applies to Lots 670 and 1338 Bertram Road and Reserve No. 50672 (Lot 1421 on Plan 156437), Wellard being the land contained within the inner edge of the line denoting the Structure Plan boundary on the Structure Plan map (refer Plan 1).

2. Operation

This Structure Plan comes into effect on the day it is approved by the Western Australian Planning Commission.

3. Staging

Development of the site will commence following issue of subdivision approval. Specific staging and timing for the development is unknown at this stage.

4. Subdivision and Development Requirements

- a) Residential densities for the structure plan area are the residential densities shown on the Local Structure Plan Map.
- b) Public open space is to be provided in accordance with the Local Structure Plan Map.
- c) Land use permissibility within the structure plan area shall accord with the corresponding land use classification in the City of Kwinana Town Planning Scheme No. 2.
- d) This Structure Plan is supported by a Bushfire Management Plan (BMP), Fire Management Plan Lots 670 and 1338 Bertram Road, Wellard (November 2015). Any land falling within 100 metres of a bushfire hazard identified in the BMP is designated as a Bushfire Prone Area for the purpose of the Building Code of Australia.
- e) Notification(s) on Title

The Council shall recommend to the Western Australian Planning Commission that a condition be imposed on the grant of subdivision approval for a notification to be placed on the Certificate of Titles to suitably respond to the following:

- The *Fire Management Plan* for lots with a bushfire attack level (BAL) rating of 12.5 or higher.
- f) Management Plans

The Council shall recommend to the Western Australian Planning Commission that a condition be imposed on the grant of subdivision approval to respond to the following as identified by the structure plan:

- The preparation, approval and implementation of a Wetland Management Plan providing for the conservation of the adjoining Bollard Bulrush Swamp; and
- The preparation and implementation of a mosquito and midge management plan.

5. Local Development Plan(s)

Local Development Plan(s) are to be prepared for lots with one or more of the following attributes:

a) Rear-loaded vehicle access;



- b) Having the potential for grouped and/or multiple dwellings;
- With frontages of less than 12 metres; and c)
- The subject of a Bushfire Management Plan. d)

Other Requirements

Development Contribution Arrangements a)

> Under the City of Kwinana Town Planning Scheme No. 2, the following development contribution arrangements apply and/or are contemplated:

- Development Contribution Area 12 for the funding of community infrastructure; and _
- Development Contribution Area 7 for 'hard' infrastructure. _
- b) City of Kwinana Drainage Basin

An agreement between the City of Kwinana and the proponent is to be reached to address land and construction costs associated with the relocation of the City's drainage basin as shown on the Structure Plan Map (Plan 1).



Planning Design Delivery



LEGEND

- Structure Plan Boundary
 - Existing Cadastre
- Existing Lot Numbers 7
- Indicative Layout

RESIDENTIAL

LSIDEN	HAL
	Residential - R25
	Residential - R30
	Residential - R40
PARKS, F	RECREATION & CONSERVATION
F	Public Open Space
	Wetland Buffer
(City of Kwinana - Drainage Basir
	ORT

- (1)Left-in/Left-out Access Only Neighbourhood Connector B
 - Access Street Local Road

REVISIONS

Rev	Date	Drawn	
В	2015.11.26	M. Sullivan	
С	2015.12.08	W. Clements	
D	2016.01.29	W. Clements	
E	2016.02.03	W. Clements	



ROWEGROUP PLANNING DESIGN DELIVERY

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Date Drawn: Job Ref: Scale: Client: Designer: Drawn: Projection: Plan ID: Cadastre supplied by Watercorp

2015.11.17 4904 1:2000 @ A3 Byblos Holdings & Springzone Nominees R. Dial W. Clements MGA50 GDA94 4904-LSP-03-E

Wellard Plan 1





01 Planning Background

The purpose of the Local Structure Plan (LSP) is to facilitate the development of the Urban zoned land within Lots 670 and 1338 Bertram Road and Reserve No. 50672 (Lot 1421 on Plan 156437), Wellard (the 'subject site'), for residential purposes.

The LSP will guide future land use and development over the subject site and provide a framework for more detailed planning at subdivision. This Part 2 of the Structure Plan provides explanation for the Part 1 provisions.

1.2 Land Description

1.2.1 Location

The LSP area is located within the metropolitan south-west corridor, within the municipality of the City of Kwinana. The site is situated approximately 36 km south of Perth Central Area, and is accessible via the Kwinana Freeway. The Kwinana Town Centre is located approximately 2.5 km south-east of the subject site.

The subject site is generally bound by Bertram Road to the north, the Peel Main Drain (a road reserve) to the west and other development lots to the south and east.

Refer to Figure 1 - Regional Location.

Refer to Figure 2 – Locality Plan.

1.2.2 Area and Land Use

The LSP area comprises approximately 8.3 hectares and is currently accessed via Bertram Road which connects to the Kwinana Freeway in the east.

The subject site has generally been previously been utilised for rural living purposes and is predominantly cleared with paddocks. There is an existing dwelling located within the northern portion of the site which is to be demolished as part of the redevelopment of the site. The City of Kwinana's drainage infiltration basin also exists within the northwest corner of the site.

1.2.3 Legal Description and Ownership

The LSP comprises three land parcels, being:

Lot Number	Address	Plan/ Diagram No.	Vol./Folio	Land Ownership
670	150 Bertram Road	P66358	2802-877	Byblos Holdings Pty Ltd and Springzone Nominees Pty Ltd
1338	No registered address	P184473	1636-857	Byblos Holdings Pty Ltd and Springzone Nominees Pty Ltd
1421 (Reserve No. 50672)	No Address	P156437	-	City of Kwinana

Table 1: Lot Details

Refer to Appendix 1 - Certificates of Title.



02 Planning Framework 2.1 Zoning

2.1.1 **Metropolitan Region Scheme**

The subject site is zoned 'Urban' under the Metropolitan Region Scheme (MRS). The subject site was zoned 'Urban' following gazettal of MRS Amendment No. 1296/26.

The land was transferred to the 'Urban' zone under the MRS on 21 April 2015, by notice in the Government Gazette (notice reference PL403). Upon Gazettal of the Urban zone, the site was concurrently zoned 'Development' under the City of Kwinana Town Planning Scheme No. 2, by resolution of the WAPC and notice in the Government Gazette.

Refer to Figure 4 – Metropolitan Region Scheme Map.

2.1.2 City of Kwinana Town Planning Scheme No. 2

The subject site is zoned 'Development' under the City of Kwinana Town Planning Scheme No. 2 (TPS 21.

In accordance with the provisions of the 'Development' zone under the Scheme, a LSP is required as a precursor to subdivision and development. This LSP has therefore been prepared in accordance with provisions of Clause 6.17 of the Scheme.

Refer to Figure 5 – City of Kwinana Town Planning Scheme No. 2 Zoning.

2.2 Regional and Sub-Regional Structure Plan

2.2.1 Directions 2031 and Beyond

Directions 2031 and Beyond provides a broad strategic framework defining the overall visions for the Perth and Peel Regions for the next 20 years. It sets out the planning framework and objectives for the delivery of housing, infrastructure and services to accommodate future projected population growth within both regions. The document primarily seeks to control urban growth by maximising infill of existing urban zoned land. Directions 2031 also sets a density target of 15 dwellings per gross urban zoned hectare.

The subject site is situated within the south-west sub-region, as identified under Directions 2031.

Directions 2031 notes the south-west sub-region will require 41,000 additional dwellings and 41,000 new jobs. Growth will be accommodated by a combination of infill and Greenfields development. The subject site has since been transferred to the 'Urban' zone under the MRS and as such the development of the site will contribute to meeting these growth targets for the wider region.

2.2.2 Draft Perth and Peel @ 3.5 Million

The Draft Perth and Peel @ 3.5 Million was released for public comment in May 2015, and seeks to provide a framework for the development of the Perth and Peel regions as the population reaches an estimated 3.5 million by 2050. The document seeks to meet the targets identified under Directions 2031 and the State Planning Strategy 2050. The suite of documents include the over-arching Perth and Peel @ 3.5 million report and four draft planning frameworks for the Central, North-West, North-East and South Metropolitan sub-regions.



The subject site is situated within the South Metropolitan Sub-Region and is identified as 'Urban'. The development of the land for residential purposes is consistent with the draft Peel and Peel @ 3.5 Million framework.

2.2.3 Draft South Metropolitan Peel Sub-Regional Planning Framework

As noted above, the subject site is identified as 'Urban' under the draft South Metropolitan Sub-Regional Planning Framework (the 'Framework'). The development of the subject site will therefore contribute to reaching the urban infill targets specified under the Framework. Urban infill targets for the City of Kwinana are 1,365 dwellings, with an estimated population of 3,003 people. The Framework requires new urban development to meet a residential density target of 15 dwellings per gross hectare of which the LSP is capable of achieving.

2.2.4 Jandakot Structure Plan

The Jandakot Structure Plan (JSP) was adopted in August 2007 and operates as a Sub-regional Structure Plan. The JSP provides a guide to the future land use and development of the study area, the management of environmental influences and attributes in addition to natural resources.

The subject land is identified for urban development and is included within the Short Term Urban Area (0 – 5 years) under the JSP.

The land is located within Area 2: Bertram / Wellard under the JSP, which is expected to house 9,840 people. The proposed LSP will assist in the delivery of housing to the Bertram / Wellard area and is considered to be consistent with the intent and requirements of the JSP.

2.2.5 Eastern Residential Intensification Concept

The Eastern Residential Intensification Concept (ERIC) was prepared by the City of Kwinana as a district level Structure Plan. ERIC provides a framework within which Local Structure Planning can be undertaken. The ERIC was advertised for public comment in 2006, and while it remains in draft form, it has nevertheless as the basis for assessment of Local Structure Plans by both the City of Kwinana and the Department of Planning.

2.3 Planning Strategies

2.3.1 City of Kwinana Draft Local Planning Strategy

The City of Kwinana draft Local Planning Strategy (the 'Strategy') was released for public comment in April 2015 and provides the planning framework and strategic foundation for the future City of Kwinana Town Planning Scheme No. 4.

The subject site is identified under the Strategy as 'Future Residential'.

As the land is zoned 'Development' under TPS 2, the LSP will facilitate the development of the site for residential purposes. In this regard, the proposed LSP is consistent with the intent of the draft Strategy.

2.4 Policies

2.4.1 Liveable Neighbourhoods

Liveable Neighbourhoods (LN) represents the WAPC's primary policy to guide the design and assessment of structure plans and subdivision for new urban development of residential communities in Western Australia. The underlying objective is to create quality neighbourhoods with site responsive



identity supportive of local community that reduce dependency on private vehicles, and are more energy and land efficient. As such, LN focuses on an urban structure based on walkable mixed-use neighbourhoods with interconnected street patterns. It functions by drawing together key policy aspects into a single 'integrated planning and assessment policy' to provide for a performance based approach to planning assessment.

It does so according to a range of considerations including:

- Community;
- Movement;
- Lot Layout;
- Urban Water Management;
- Public Open Space; and
- Schools.

Liveable Neighbourhoods identifies a series of Objectives and Requirements for Local Structure Plans that, when met, demonstrate compliance with the overall outcomes sought by LN. These objectives and requirements relate to items such as road layout, relationship of housing to open space and schools, school location/distribution, POS layout and location and housing densities.

The LSP has been prepared to satisfy the various objectives and requirements of LN to ensure that more detailed proposals at subdivision stage are also capable of satisfying the relevant criteria.

2.4.2 Local Planning Policies

Development within the LSP area shall be in accordance with the following City of Kwinana Local Planning Policies, except where otherwise varied by this LSP, an approved Detailed Area Plan (DAP), or by the City of Kwinana.

- Design Guidelines for Medium Density Development;
- Conservation of Remnant Vegetation;
- Crossovers;
- Footpaths;
- Planning for Bushfire Protection Guidelines;
- Public Open Space;
- Residential Development;
- Residential Subdivision Development Guidelines;
- Residential Subdivision Road Standards;
- Retaining Wall Levels;
- Street Lighting;
- Street Naming; and
- Street Trees and Verge Treatments.



Site Conditions and Constraints

3.1 Biodiversity and Natural Area Assets

An Environmental Review (Report 11/079) was prepared over the Wellard Urban Precinct East to support the rezoning of the site from 'Rural' to 'Urban Deferred' (Amendment 118/57). The report identified all environmental factors and their management in relation to potential impacts, management objectives and proposed mitigation and management actions.

With regard to the LSP area, the Environmental Review identified potential threats to the adjacent Bollard Bulrush Swamp to include:

- Alteration to the water regime;
- Habitat modification;
- Inappropriate recreational use;
- Weed invasion; and
- Diminished water quality.

To ensure the protection of the Bollard Bulrush Swamp, a 50m wetland buffer has been identified with other measures such as a Wetland Management Plan and Construction Environmental Management Plan to be implemented as a result of subdivision.

The following provides a summary of the environmental site conditions and constraints. For further information, it is recommended the reader consult the Environmental Protection Authority's Report 1500 (January 2014) relating to Amendment 1188/57. A copy of the report can be accessed from the following link:

http://edit.epa.wa.gov.au/EPADocLib/Rep%201500%20Wellard%20MRS%20ER%20200114%20.pdf.

3.1.1 Flora and Vegetation

A Flora and Vegetation Assessment was prepared as part of the Environmental Review to support the lifting of deferment request.

The subject site was identified as being in 'Completely Degraded' condition as a result of onsite disturbances which includes invasive weeds, livestock grazing and trampling and historical clearing.

3.1.2 Wetlands

The Environmental Review undertaken for the consideration of the MRS rezoning of the land, approved a wetland boundary and wetland buffer in order to delineate the conservation and development areas of the site. Under the Environmental Review determination by the EPA, no portion of the subject site was found to contain any areas of wetland, however, from the southern boundary of the site there is an applicable 50m wetland buffer. It is recommended the reader refer to EPA Report 1500 (January 2014) for details of the wetland decision and the applicable wetland buffer boundaries.

The LSP proposes to retain the area identified as wetland buffer within an area of public open space along the southern boundary of Lot 680 which will be protected from residential development. The area mapped wetland buffer is consistent with the approved wetland boundary and approved 50m buffer as determined by the Environmental Review (refer EPA Report 1500 January 2014).

Refer to Figure 6 – EPA Wetland Management Categories.



3.1.3 Fauna

A Level One Fauna and Fauna Habitat Assessment was undertaken as part of the Environmental Review which included a field survey undertaken by a qualified Zoologist.

As noted above, the subject site is identified as being in 'Completely Degraded' condition and is considered to provide limited or no habitat value for fauna species. The Environmental Review and field survey confirmed that those areas of the site identified as being in 'Degraded' or 'Completely Degraded' condition are considered to provide limited or no habitat value for fauna species.

3.2 Landform and Soils

The subject site is generally flat which slopes gently towards the Peel Main Drain from Bertram Road. The elevation of the land across the site varies between approximately 4.5m AHD to 9.0m AHD.

The site is underlain by swamp deposits (MS₅). MS₅ is described as a dark to grey black sandy clay with firm, variable quartz sand content, occasional silty of lacustrine origin.

A fringe of S8 sand encroaches the boundary of the site adjacent to Bertram Road and is described as a Bassendean sand that is very light at the surface and yellow at depth, fine to medium grained, sub-rounded quartz, moderately well sorted, of eolian origin.

3.2.1 Acid Sulphate Soils

The Department of Environmental Regulation (DER) Acid Sulphate Soil Risk Mapping identifies the majority of the site as having 'high to moderate risk of acid sulphate soils occurring within 3m of the natural surface' with a minor portion of the site in the north being identified as having 'moderate to low risk of acid sulphate soils occurring within 3m of the natural soil surface'.

The land is likely to be the subject of filling to facilitate development and therefore Acid Sulphate Soils 3m below the existing surface are unlikely to be disturbed through any excavation works.

3.2.2 Contamination

The Department of Environmental Regulation Contaminated Sites Database does not list the site as being a known or suspected contaminated site.

3.3 Groundwater and Surface Water

3.3.1 Groundwater

Groundwater on the site generally flows a south-westerly direction towards the Peel Main Drain. The maximum groundwater level is below natural surface across the majority of the Study Area, ranging from 0m clearance in the south west to 2m in the north east. These Maximum Groundwater Contours do not appear to include the drawdown influence of the Peel Main Drain. Regardless of the localised drawdown, the adopted MGL for design is considered a conservative approach.

Regional groundwater level seasonal variation on the Swan Coastal Plain is in the order of 1.5m, however due to the close proximity of the Bollard Bulrush Swamp, the groundwater level seasonal variation has been calculated by JDA to be 0.8m from nearby Department of Water Bore T240 (I).

3.3.2 Surface Water

Pre-development surface water quality has not yet been undertaken within the site, however the Peel Main Drain which is adjacent to the Study Area has been monitored. The Jandakot DWMP indicates that Total Phosphorous and Total Nitrogen concentrations are low in comparison to the ANZECC (2000)





Trigger values for streams in south-west Western Australia. These results are to be used to provide baseline water quality parameters for future development of the Study Area.

The long term targets for Total Phosphorous and Total Nitrogen for the Peel Main Drain as identified in the Jandakot DWMP are 0.1mg/L and 1.0mg/L respectively.

3.4 Bushfire Hazard

A Bushfire Management Plan has been prepared for the LSP in accordance with the WAPC's Planning for Bushfire Protection Guidelines 2010. The Bushfire Management Plan has considered the requirements of draft State Planning Policy 3.7: Planning for Bushfire Risk and Management. The Bushfire Management Plan is provided within Appendix 3, however the following provides an overview of the fire management assessment undertaken and applicable provisions to development of the site.

3.4.1 Hazard Assessment

The Bushfire Management Plan (BMP) identifies the site as comprising predominantly a low to moderate fire hazard threat with the area of extreme bushfire hazard being identified from the adjoining wetland. Specifically, the bushfire hazard assessment for the site is identified as follows:

- Grassland Class G: Low
- Scrub Class D: Moderate
- Open Forest Class A: Extreme located Wetland Open Forest to the south of the site.

The development of the LSP area as per the proposed layout will result in a reduced threat of bushfire due to urbanisation of the site and removal of bushfire prone vegetation.

3.4.2 Management Requirements

The FMP proposes a variety of measures to manage the fire hazard, including:

- A minimum 20 metre Building Protection Zones separating future development from fire hazard;
- Dwelling construction to a standard to align with the designated bush fire attack level (BAL) within the Building Protection Zone;
- A notification on title to inform prospective purchasers that the use and development lots within 100 metres of the wetland buffer area are to be constructed in accordance with AS 3959-2009; and
- Compliance with the annual Fire Control Notice issued by the City of Kwinana under the Act.

The Fire Management Plan will be required to be implemented as a condition of subdivision approval.

3.5 Heritage

3.5.1 Indigenous Heritage

A search of the Department of Aboriginal Affairs Aboriginal Heritage Inquiry System identified no registered sites within the LSP area or immediate surrounds.

3.5.2 Non-Indigenous Heritage

No places were identified on the Heritage Council of Western Australia Heritage Places Database or the City of Kwinana Municipal Heritage List for the LSP area.



04 Land Use and Subdivision Requirements **4.1** Land Use

The LSP sets out land use, residential densities, public open space, vehicle and pedestrian access and servicing requirements.

The LSP is proposed to comprise residential development with densities ranging from R25 to R40. The LSP also comprises public open space in accordance with Liveable Neighbourhoods requirements.

The following describes the design response proposed under the LSP and addresses the relevant elements of Liveable Neighbourhoods. Please refer to the land use summary table provided within the Executive Summary on Page iii of this report.

Please also refer to Plan 1 – LSP.

4.2 Public Open Space

The LSP provides for approximately 1.754 ha of public open space (POS) within a single parcel within the southern portion of the site.

Refer Figure 7 – Public Open Space Plan.

The below Public Open Space Schedule provides a breakdown of the POS within the LSP area.

Table 1: Public Open Space S	Schedule		
Site Area (Local Structure Pl	an boundary)		8.52 ha
Less			
City's Drainage Basin		0.185 ha	
Total		0.185 ha	
Deductions			
Drainage (1:1 yr)		0.078 ha	
Total		0.078 ha	
Gross Subdivisible Area			8.26 ha
POS @10%			0.826 ha
Public Open Space Contribut	tion		
May comprise:			
- Min 80% unrestricted	POS	0.66 ha	
- Min 20% restricted use	e POS	0.17 ha	
Total Required POS			0.83 ha
POS Reference Number		Unrestricted Urban POS sites (m²)	Restricted Urban POS sites (m²)
1		0.5865 ha	1.167 ha
Total	1.754 ha	0.5865 ha	1.167 ha



//////////////////////////////////////	Restricted POS Surplus		1.002 ha
	Revised Unrestricted POS Calculation (8%) 7.258 ha revised Gross Subdivisible Area	0.58 ha	
MININ MILLS	TOTAL POS PROVIDED:	0.587 ha	1.297 ha
		8.09%	9.05%
	- Table 2: POS Schedule		
	The proposed POS is to serve a range of func purposes and drainage function. The design	-	•

Table 2: POS Schedule

The proposed POS is to serve a range of functions including both active and passive recreation purposes and drainage function. The design and configuration of the POS area will be determined under a Landscape Management Plan, to be prepared during the detailed design stage as a condition of subdivision approval.

The City of Kwinana's drainage basin is currently located within Lot 1421 on Plan 156437 which abuts Bertram Road in the north of the site. At present, drainage from Lot 1421 is directly draining into the Peel Main Drain, which is not supported by the Water Corporation as a long term solution. To address this issue, the City proposes to relocate the existing drainage basin to a new location within Lot 670 which integrates with the proposed development drainage basin and POS of the development. In this regard, the City's future drainage requirements have been accommodated in the southern area of POS adjacent to the Peel Main Drain and will be integrated within the subject development. It is intended that the City will purchase from the owners of Lot 670, land for its share of the drainage basin. It is also intended that a proportional contribution to the construction of the basin will occur between the City and the owners of Lot 670.

In accordance with the Local Water Management Strategy prepared by JDA for the site, an indicative bioretention basin of 780m² has been provided for adjacent to the wetland buffer area. This basin will accommodate drainage from the internal road network up to the 15mm rainfall event with larger events ultimately flowing toward the wetland area and the Peel Main Drain.

As previously noted under Section 3.1.2, the subject site is located adjacent to the Bollard Bulrush Swamp which abuts the south-eastern boundary of the site. An area of 1.0885 hectares has been set aside to accommodate the required 50m buffer to the wetland as shown on the LSP Plan 1. The wetland buffer will need to be managed in accordance with an approved Wetland Management Plan in accordance with the EPA's requirements

In accordance with Liveable Neighbourhoods, POS is provided within 200 metres of all lots within the LSP area.

4.3 Residential

The LSP proposes a target minimum average residential density of 22 dwellings per residential site hectare and 15 dwellings per gross urban hectare. This is consistent with Liveable Neighbourhoods requirements, which stipulates a minimum average of 22 dwellings per site hectare for green field subdivision areas. This is also consistent with Directions 2031 and the Draft Sub-Regional Planning Framework targets of a minimum 15 dwellings per gross urban hectare.

Based on these target densities, the subject site will need to achieve a minimum yield of 99 dwellings. Preliminary concept planning undertaken for the subject site indicates the proposed LSP layout is capable of achieving this.

29/02/2016 4904_15DEC01R_RD



Residential density codes have been allocated across the site, ranging from R25 to R40. The various density codes will facilitate a diversity of lot product across the site, providing for a range of dwelling types. Areas of higher density have generally been located adjacent to areas of public open space.

The preparation of Local Development Plans can also assist in facilitating the delivery of diversity in housing product, as well as seeking to achieve built form outcomes consistent with the development intent of the site.

4.4 Movement Networks

The following provides a brief summary of the proposed movement network.

4.4.1 Existing Road Network

Bertram Road

Access to the site is currently taken from Bertram Road which forms the northern boundary of the subject site. Bertram Road is constructed as a dual divided carriageway which connects to Mortimer Road in the east and Challenger Avenue in the west. Mortimer Road connects to the Kwinana Freeway which affords the land with high accessibility to the strategic regional road network.

Access to and from Bertram Road is restricted to left-in, left-out in its current form due to a central median which runs down the road reserve.

The proposed LSP maintains the existing access scenario, restricting access to Bertram Road to a single point of access in a left-in, left-out arrangement only.

Challenger Avenue

Challenger Avenue is located approximately 120 metre west of the subject site and is accessed via Bertram Road. Challenger Avenue is constructed as a single divided carriageway which provides a direct connection to the Kwinana Town Centre.

Johnson Road

Johnson Road is located approximately 800 metres south-east of the subject site which connects to Millar Road in the south. Access to Johnson Road from the subject site is via Bertram Road to the east.

4.4.2 Proposed Road Network

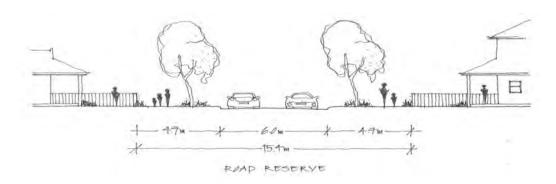
The proposed road network is largely defined by access requirements to Bertram Road and future connection points to adjoining development areas. Direct lot access to Bertram Road shall not be permitted as part of the development of the site.

External road connections are provided in two locations within the LSP area, being north to Bertram Road and west over the Peel Main Drain as required by the relevant development contribution plan.

The proposed road network predominantly consists of Access Street C roads, designed to a 15.4 metre cross-section (or 13.2 metres where adjoining public open space or the Peel Main Drain), with a central Neighbourhood Connector B road reserve proposed from Bertram Road. The proposed Neighbourhood Connector B will provide a future connection to the development sites to the south of the LSP area.



TYPICAL ACCESS STREET C ROAD CROSS-SECTION



The LSP proposes two cul-de-sacs to Bertram Road to ensure access to and from Bertram Road is restricted to a single point of access and ensuring permeability for pedestrians to the overall road network

Estimated traffic volumes along the Access Street C road reserves are not expected to exceed 1,000 vehicle movements per day. This is consistent with Liveable Neighbourhoods requirements for Access Street C, which caters for traffic volumes less than 3,000 vehicle movements per day.

4.4.3 Public Transport

The LSP area is located within 3km to both the Kwinana and Wellard Railway Stations affording the land high accessibility to the public transport network. Transperth Bus Service 543 traverses Bertram Road west of Johnson Road and connects the site to both the Kwinana Railway Station and the Kwinana Town Centre, along with the broader public transport network.

Bus Stop No. 22987 is located along the northern boundary of the subject site on Bertram Road, approximately 30m west of entry to the site. Bus Stop 22988 is located on the adjacent side of Bertram Road, approximately 70m of the subject site.

4.4.4 Pedestrian and Cycle Networks

In accordance with Liveable Neighbourhoods requirements, footpaths will be provided on at least one side of every street.

4.5 Water Management

4.5.1 Regional Water Management Strategy

The Jandakot Drainage and Water Management Plan (JDWMP) was released by the Department of Water in December 2009. The JDWMP provides district scale flood modelling, a surface water management strategy and a groundwater management strategy, which specify post-development levels and flows to address the City of Kwinana's District Structure Plan (ERIC).

4.5.2 District Water Management Strategy

A District Water Management Strategy (DWMS) was prepared in 2015 and provides revised drainage management concepts based on the JDWMP for the area east of Bollard Bulrush Swamp. Specific discharge rates and conceptual estimated attenuation volumes are provided in the DWMS for sub-





catchments of the Bollard Bulrush Swamp east catchment The DWMS also provides appropriate district scale water design and management principles and objectives which are refined in the Local Water Management Strategy.

The DWMS has been approved by both the City of Kwinana and the Department of Water.

4.5.3 Local Water Management Strategy

A Local Water Management Strategy (LWMS) has been prepared in support of this LSP, and is provided as Appendix 4.

The LWMS addresses the LSP area, and provides a refinement of flood modelling, the surface water management strategy and the groundwater management strategy to a local scale. The LWMS has been prepared in accordance with the water sensitive urban design practices as described in the Stormwater Management Manual of WA and the WAPC's Better Urban Water Management (2008).

4.5.4 Proposed Drainage Network and Infrastructure Requirements

4.5.4.1 Regional / District Drainage

The subject site is located within the Peel Main Drain and Bollard Bulrush Swamp catchments which are significant in post-development regional flood management. The DWMS identified the required storage volumes within the East Precinct in the 10 and 100 year ARI as 12,146m³ and 15,790m³ respectively. This is based on a percentage ratio approach. As such, the required detention volumes in the Study Area are 1,020m³ in the 10yr ARI event and 1,326m³ in the 100yr ARI event.

As summarised in the LWMS, the above criterion was later superseded following advice from the Department of Water at an on-site meeting in 2014 with a neighbouring proponent. It was agreed that the development will retain, treat and infiltrate the first 15mm (small events), with the preferred management of this first 15mm being as close to source as possible. Additional stormwater for greater events is to be directed towards another biofiltration area located within the POS adjacent to the wetland and its buffer. Excess stormwater will discharge slowly as sheet flow overland into the wetland area as it does pre-development with scour and erosion protection. No infrastructure is to be included within the wetland or its buffer.

This approach has been accepted and applied to the subject site, therefore no attention of the 10yr and 100yr ARI peak volume is provided. The bioretention basin has been sized to hold the first 15mm of stormwater from the development. It is expected that the wetland and buffer itself will act as the detention storage areas, so pre and post development flows will inherently match.

4.5.4.2 Local Drainage

The local stormwater drainage system has been designed using a major/minor approach. The minor system consists of pipes, kerbs and gutters designed to convey the stormwater to the median swales, roadside swales and bioretention basins designed to infiltrate stormwater as close to the source as possible. The major system consists of the road, median and road-side swales, bioretention basins and POS areas to provide protection of the community from extreme flooding events (up to the 100 year ARI rainfall event) that exceed the capacity of the minor system.

The existing City of Kwinana Bertram Road infiltration basin will be relocated within the POS area and will be managed separately to stormwater runoff from the Study Area.

The major drainage system has been designed to accommodate rainfall events greater than 15mm. Stormwater run-off from the development will be directed along the roads towards the swale and



basin system. When the capacity of the swale and bioretention basin is reached, overflow will be directed towards the wetland buffer and storage area, which will be designed to minimise erosion and scouring during discharge events. The larger events will ultimately flow toward the wetland area and the Peel Main Drain.

The key elements of the stormwater management strategy area:

- To retain, treat and infiltrate the first 15mm of the rainfall event across the development area.
 - Retention of the first 15mm of rainfall on lots within soakwells or other infiltration structures.
 - To treat the first 15mm of rainfall event from roads through bioretention areas/swales or other techniques as close to source as feasible.
- Any additional stormwater run-off created during rainfall events greater than 15mm will be directed towards the wetland buffer.
- ▲ No stormwater infrastructure will be constructed within the CCW wetlands or its buffers.
- The discharge of these larger stormwater run-off events should occur as sheetflow across a vegetation surface towards the wetland buffer to replicate the pre-development environment (with scour and erosion protection at the initial discharge point).
- Bioretention areas should be located outside of the 10yr ARI Top Water Level (TWL) boundary.
- The City of Kwinana Bertram Road infiltration basin will be relocated within the POS within the subject site, with the concept design to be completed by the City. Stormwater discharged into this basin will be managed separately to stormwater runoff from the Study Area.
- Habitable floor levels are to be minimum 6.12m AHD above the adjacent Peel Main Drain 100yr ARI flood level.
- There is to be a minimum of 500mm clearance from the base of any bioretention basins or swales to the Maximum Groundwater Level (MGL) at that specific location.
- Use of subsoil drains to mitigate the rise of groundwater within fill and maintain a minimum separation of 1.5m between MGL and finished lot level.

The design strategy is generally consistent with the objectives provided within the DWMS and the drainage approach most recently adopted by the Department of Water for an adjacent development.

In accordance with the processes defined under *Better Urban Water Management*, an Urban Water Management Plan (UWMP) will be required to be prepared and implemented at the time of subdivision. The UWMP will refine and implement the proposed drainage network/system, as defined under the LWMS.

4.6 Education Facilities

The LSP does not propose any primary, secondary or tertiary education facilities consistent with both the ERIC and the JSP.



The site is well catered for with existing and planned educational facilities within the surrounding urban areas including the existing Bertram Primary School, King's College, St Vincent's Primary School and Gilmore College. In addition, there are future Primary School sites identified at the southern end of the Emerald Park Structure Plan and the Wellard Village Structure Plan along with an additional High School.

4.7 Activity Centres and Employment

The LSP does not propose any retail or commercial uses, consistent with SPP 4.2: Activity Centres for Perth and Peel, and the City of Kwinana Local Commercial and Activity Centres Strategy. Further, it is noted the land is not remote from a developed urban front and an employment strategy is therefore not required.

The site is catered for existing and planning employment and activity centres in the surrounding urban areas including the Kwinana Industrial Area, Latitude 32, Rockingham Strategic Regional Centre, Kwinana Secondary Centre, Bertram Neighbourhood Centre and the future Activity Centre in the Emerald Park estate on Johnson Road to the south.

4.8 Infrastructure Coordination, Servicing and Staging

Wood and Grieve Consulting Engineers have confirmed there are no significant constraints to servicing the Structure Plan area with all required urban utilities.

The following provides a summary of the infrastructure and servicing for the LSP area:

4.8.1 Water Supply

The Water Corporation has advised that supply to the development can come from the existing DN300 water main within Johnson Road. Upgrades to the water distribution infrastructure may be required to service the ultimate development however, Water Corporation water planning is currently under review.

4.8.2 Sewerage

The Water Corporation's wastewater planning over the development area indicates that there is currently capacity within the existing Bertram Road wastewater pump station located to the north west of the site which can accommodate gravity flows from the subject site.

4.8.3 Natural Gas

ATCO Gas has advised that the development can be supplied from connection into existing gas mains at Tamblyn Place / Johnson Road intersection. The installation of gas mains will be undertaken by ATCO Gas.

4.8.4 Electricity

The proposed development will likely be serviced via connection to existing underground power cables within Bertram Road.

4.8.5 Telecommunications

In accordance with the National Broadband Network (NBN) legislation, developers are required to fund the design and installation of infrastructure suitable for handover to NBN Co. The developers will construct the pit and pipe telecommunications infrastructure across the site to enable the NBN Co. provision of services.

4.9 Developer Contribution Arrangements

The subject site is situated within Development Contribution Area 12 – Wellard West (DCA 12), as detailed in Schedule 12 of the City of Kwinana Town Planning Scheme No. 2. The City of Kwinana has advised the current costs associated with DCA 12 are \$4,107.71 per lot.

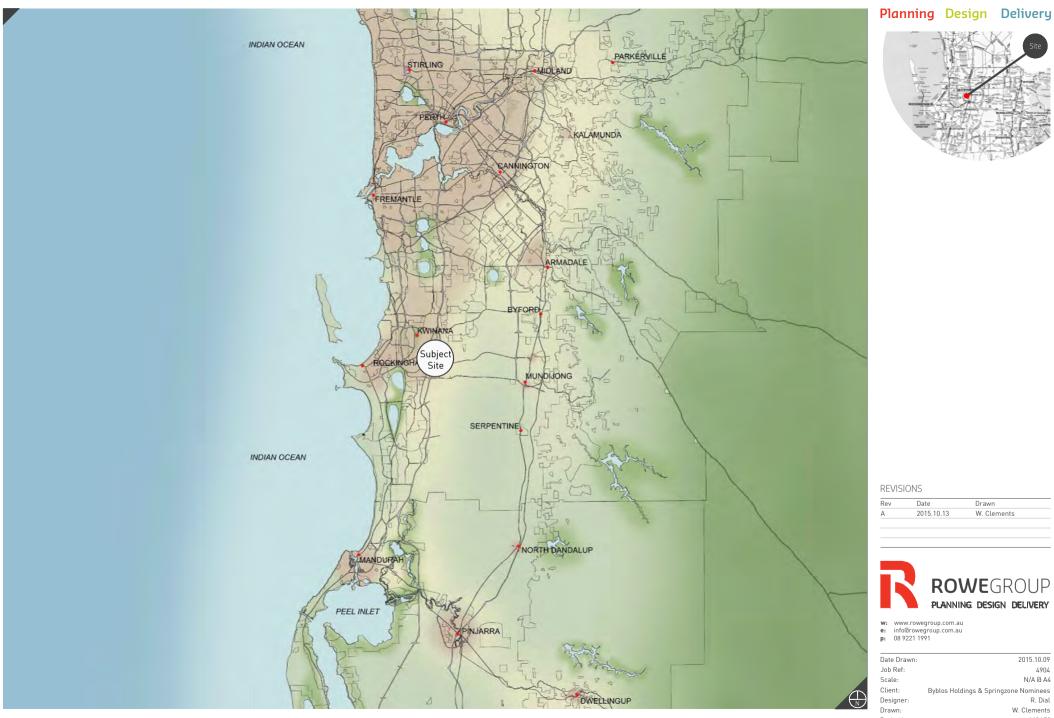
At the time of preparing this report, the City of Kwinana is advertising its Community Infrastructure Plan and associated Amendment 100A and Amendment 145.

Amendment 100A addresses 'hard' infrastructure items and identifies the site under Development Contribution Area 7 – Wellard West / Bertram (DCA 7). In accordance with the advertised Amendment documentation, development contributions are to be collected from landowners to fund the District Sporting Ground. The costs for DCA 7 are estimated at \$1,513,770 with contributions being made at a 'price per hectare' rate of \$3,792.66. The advertised Amendment states a net contribution of \$24,599.14 is required for Lot 670 Bertram Road.

Concurrent with Amendment 100A, the City is also advertising Amendment 145 to TPS 2 which identifies the site under Development Contribution Area 12 – Wellard West (DCA 12) which addresses 'soft' or 'community' infrastructure items. DCA 12 currently requires landowners to contribute funds towards '1 Local Sports Ground with Pavilion'. Under Amendment 145, development contributions are required from landowners to fund '1 Local Sports Ground with combined Local Community Centre / Pavilion'. The advertised cost per dwelling amount is \$5,759.78 per lot, however it is noted this is subject to both Council and WAPC approval.







Regional Location N:\TOWN PLANNING\4000-4999\4904\ William Clements 8 December 2015 A-CAD\4904 FIG01A 20151008 (REGIONAL LOCATION).DWG

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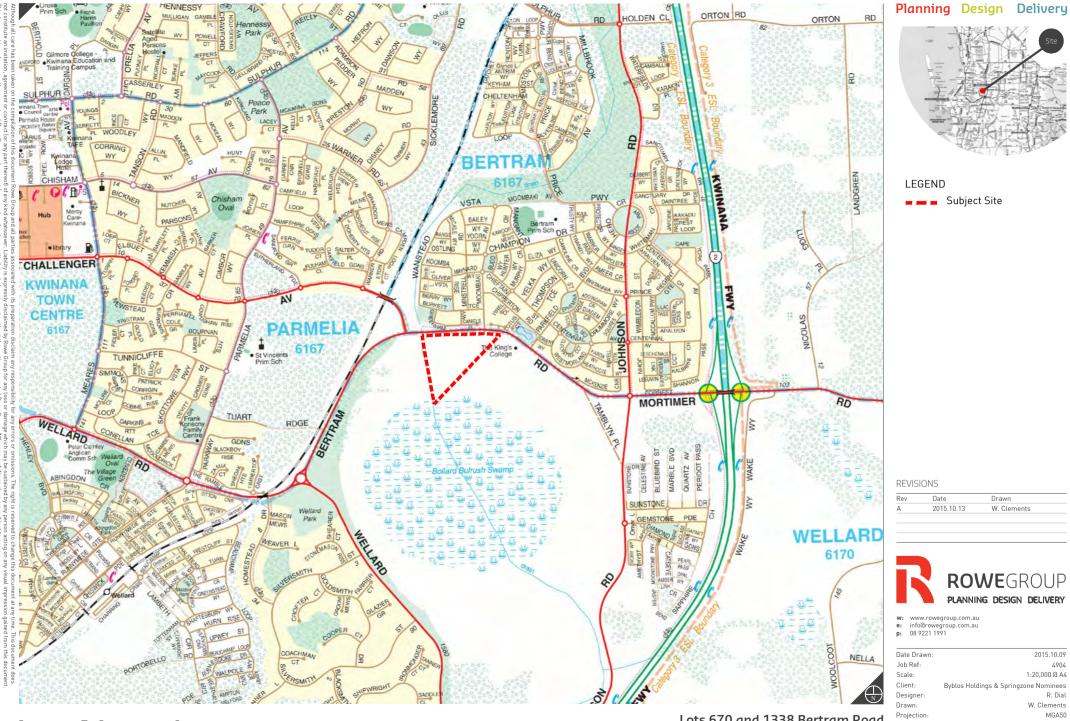
Lots 670 and 1338 Bertram Road Wellard

2015.10.09 4904 N/A @ A4 Byblos Holdings & Springzone Nominees

R. Dial W. Clements MGA50 Projection: Plan ID: 4904-FIG-01-A

Map data supplied by WA Planning Commission

Figure 1



Local Location G\A-CAD\4904_FIG02A_20151008 (LOCAL LOCATION).DWG N-\TOWN PLANNING\/000_/0990\/00/\DI

Lots 670 and 1338 Bertram Road Wellard Figure 2

ROWEGROUP PLANNING DESIGN DELIVERY

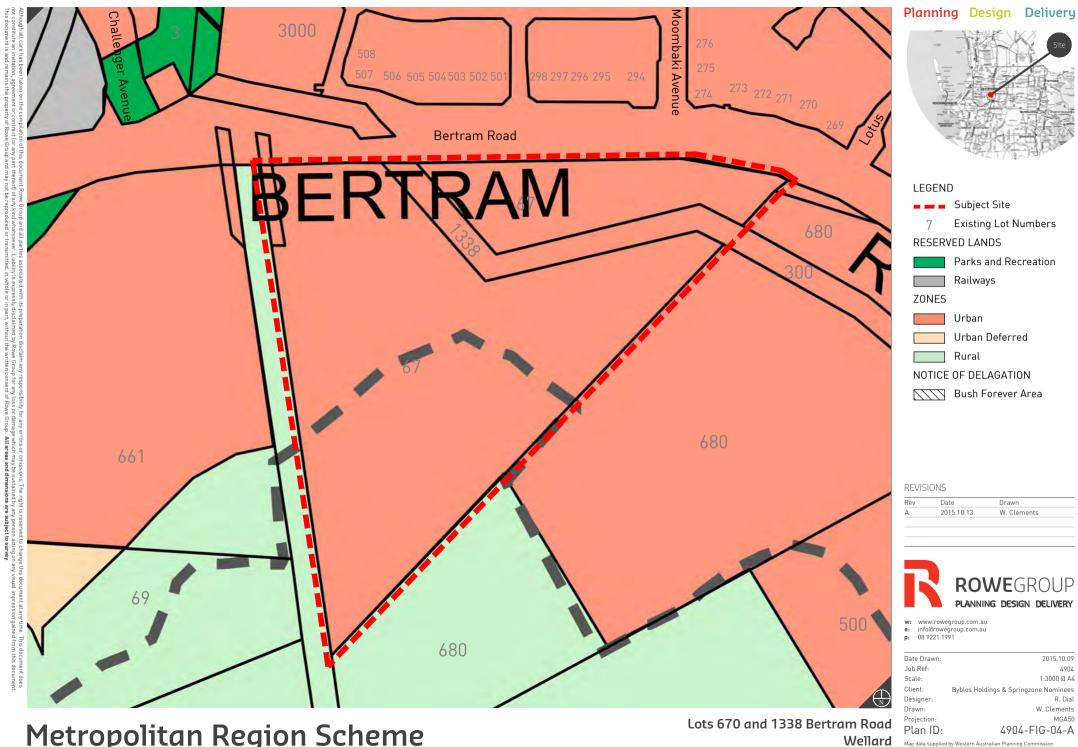
Date Drawn:	2015.10.09
Job Ref:	4904
Scale:	1:20,000 @ A4
Client:	Byblos Holdings & Springzone Nominees
Designer:	R. Dial
Drawn:	W. Clements
Projection:	MGA50
Plan ID:	4904-FIG-02-A
Map data supplied by Streetsmart	



Site Plan N-TOWN PLANNING/4000-4999/4904/DRAFTING/4-CAD/4904_FIG03A_20151008 (SITE).DWG William Clements 8December 2015 Lots 670 and 1338 Bertram Road Wellard Figure 3

Plan ID: 4904-f

4904-FIG-03-A

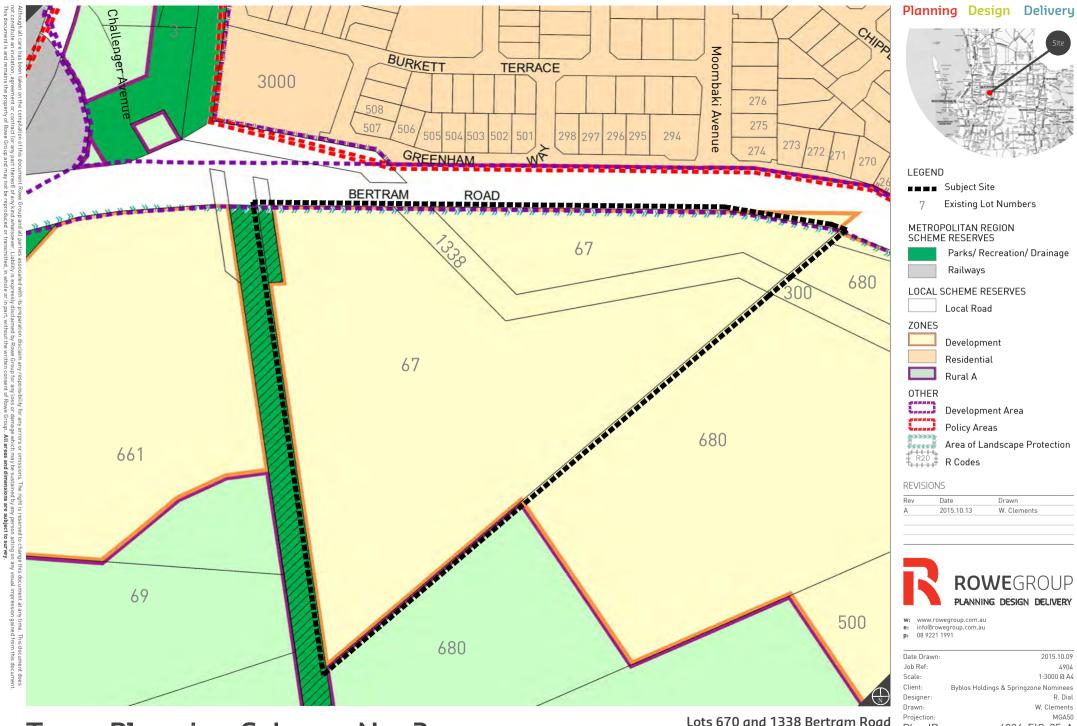


Map data supplied by Western Australian Planning Commission

Figure 4

Metropolitan Region Scheme

N:\TOWN PLANNING\4000-4999\4904\E William Clements 8 December 2015



Town Planning Scheme No. 2 N:\TOWN PLANNING\4000-4999\4904\D William Clements 8 December 2015

Lots 670 and 1338 Bertram Road Wellard Plan ID: 4904-FIG-05-A

Map data supplied by Western Australian Planning Commission

Figure 5





LEGEND Subject Site

Wellard Urban Precinct East - MRS Amdt. 1188/57 Current Proposed Amendment Boundary (2013), Wetlands and SCP Lakes



REVISIONS

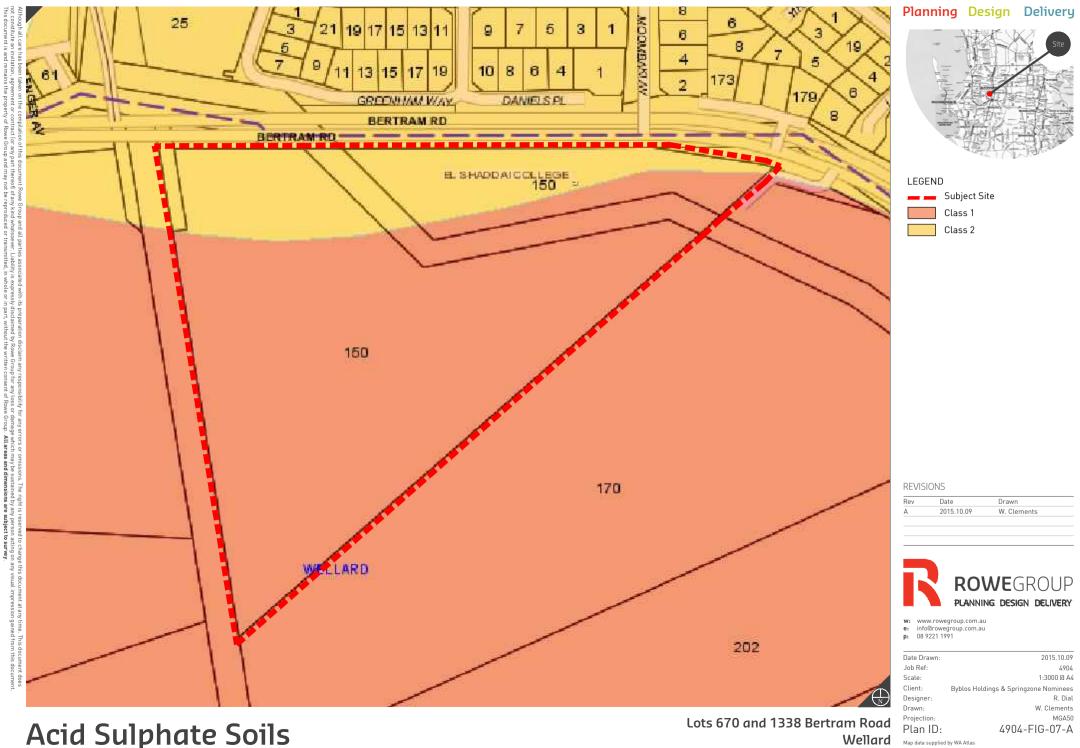
Rev	Date	Drawn
A	2015.10.13	W. Clements
В	2015.10.14	W. Clements
С	2015.12.08	W. Clements



www.rowegroup.com.au info@rowegroup.com.au 08 9221 1991

Date Drawn:	2015.10.09
Job Ref:	4904
Scale:	N.T.S. @ A4
Client:	Byblos Holdings & Springzone Nominees
Designer:	R. Dial
Drawn:	W. Clements
Projection:	MGA50
Plan ID:	4904-FIG-06-C
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Lots 670 and 1338 Bertram Road EPA Wetland Management Categories Nati Sullivan 10 December 2015



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Figure 7



Planning Design Delivery



LEGEND

	Subject Site
	Existing Cadastre
7	Existing Lot Numbers
	Indicative Layout
	Public Open Space
	Indicative Bioretention Area (subject to agreed final location)
	City of Kwinana - Drainage Basin
	Wetland Buffer
	200m Walkable Catchment

REVISIONS

Rev	Date	Drawn	
A	2015.11.17	W. Clements	
В	2015.12.08	W. Clements	
С	2016.01.29	W. Clements	
D	2016.02.03	W. Clements	





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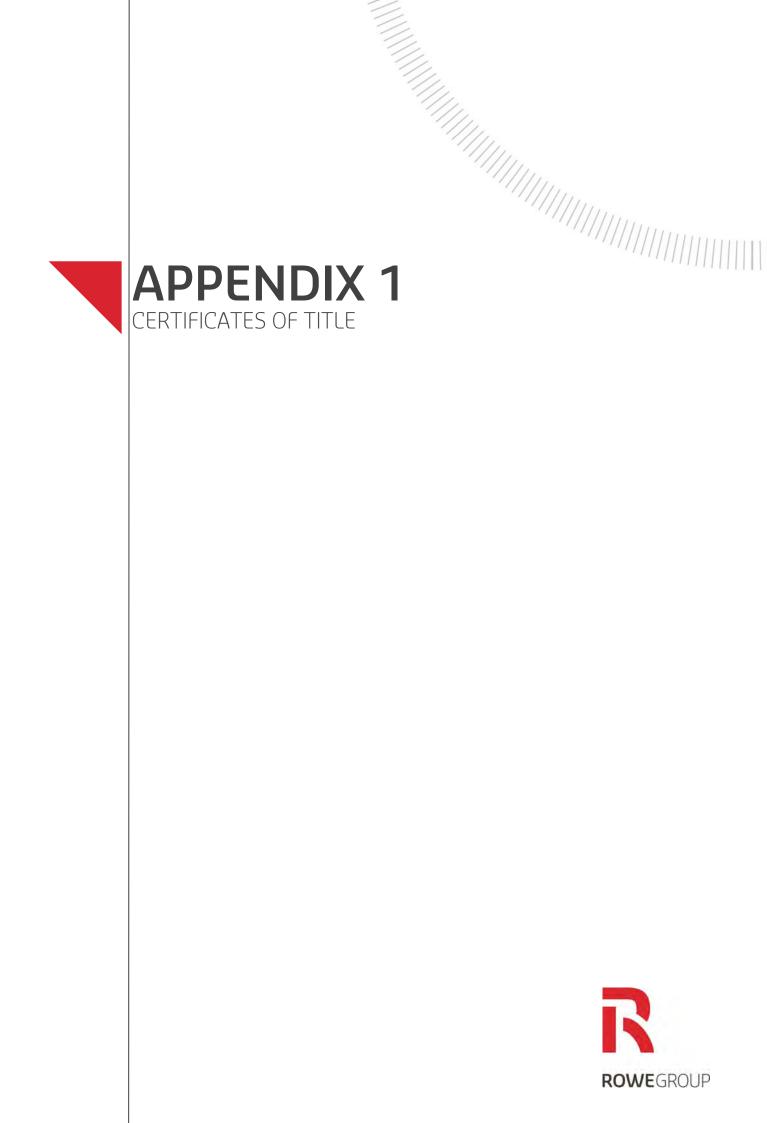
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2015.11.17 4904 1:2000 @ A3 Byblos Holdings & Springzone Nominees R. Dial W. Clements MGA50 GDA94 4904-FIG-08-D

Wellard Figure 8







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WESTERN	1 LA	AUSTRALIA	1	5/12/2	2012
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The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTER NUMBER

REGISTRAR OF TITLES

LOT 670 ON DEPOSITED PLAN 66358

LAND DESCRIPTION:

REGISTERED PROPRIETOR: (FIRST SCHEDULE)

SPRINGZONE NOMINEES PTY LTD OF POST OFFICE BOX 369, CLOVERDALE IN 1/2 SHARE BYBLOS HOLDINGS PTY LTD OF UNIT 4, 190 ABERNETHY ROAD, BELMONT IN 1/2 SHARE AS TENANTS IN COMMON

DP66358.

(AF M085857) REGISTERED 26 OCTOBER 2012

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

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. * Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title. Lot as described in the land description may be a lot or location.

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

STATEMENTS:

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

SKETCH OF LAND: PREVIOUS TITLE: PROPERTY STREET ADDRESS: LOCAL GOVERNMENT AREA:

1617-788. 150 BERTRAM RD, WELLARD. CITY OF KWINANA.



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WESTERN 12	AUSTRALIA	3	28/2/2	2012
RECORD OF CERTIFICATE OF TITLE			volume 1636	folio 857

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



REGISTRAR OF TITLES

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REGISTER NUMBER

LAND DESCRIPTION:

LOT 1338 ON DEPOSITED PLAN 184473

REGISTERED PROPRIETOR: (FIRST SCHEDULE)

SPRINGZONE NOMINEES PTY LTD OF POST OFFICE BOX 369, CLOVERDALE IN 1/2 SHARE BYBLOS HOLDINGS PTY LTD OF UNIT 4, 190 ABERNETHY ROAD, BELMONT IN 1/2 SHARE AS TENANTS IN COMMON

(T L808963) REGISTERED 14 DECEMBER 2011

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

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. * Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title. Lot as described in the land description may be a lot or location.

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

STATEMENTS:

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

SKETCH OF LAND:	1636-857 (1338/DP184473).
PREVIOUS TITLE:	This Title.
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AREA:	CITY OF KWINANA.

NOTE 1:A000001ALAND PARCEL IDENTIFIER OF PEEL ESTATE LOT 1338 (OR THE PART THEREOF) ON
SUPERSEDED PAPER CERTIFICATE OF TITLE CHANGED TO LOT 1338 ON DEPOSITED
PLAN 184473 ON 23-JUL-02 TO ENABLE ISSUE OF A DIGITAL CERTIFICATE OF TITLE.NOTE 2:THE ABOVE NOTE MAY NOT BE SHOWN ON THE SUPERSEDED PAPER CERTIFICATE
OF TITLE OR ON THE CURRENT EDITION OF DUPLICATE CERTIFICATE OF TITLE.



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AUSTRALIA



VOLUME

RECORD OF QUALIFIED CERTIFICATE

LR3000 657

FOLIO

OF

CROWN LAND TITLE

UNDER THE TRANSFER OF LAND ACT 1893 AND THE LAND ADMINISTRATION ACT 1997

NO DUPLICATE CREATED

The undermentioned land is Crown land in the name of the STATE of WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES



LOT 1421 ON DEPOSITED PLAN 156437

STATUS ORDER AND PRIMARY INTEREST HOLDER: (FIRST SCHEDULE)

LAND DESCRIPTION:

STATUS ORDER/INTEREST: RESERVE UNDER MANAGEMENT ORDER

PRIMARY INTEREST HOLDER: TOWN OF KWINANA OF PO BOX 21, KWINANA (XE L412040) REGISTERED 26 AUGUST 2010

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

RESERVE 50672 FOR THE PURPOSE OF DRAINAGE REGISTERED 26.8.2010. 1. L412039 L412040 MANAGEMENT ORDER. CONTAINS CONDITIONS TO BE OBSERVED. **REGISTERED 26.8.2010.**

A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Warning: (1) Lot as described in the land description may be a lot or location. (2)

The land and interests etc. shown hereon may be affected by interests etc. that can be, but are not, shown on the register. (3)

The interests etc. shown hereon may have a different priority than shown.

--- END OF CERTIFICATE OF CROWN LAND TITLE----

STATEMENTS:

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

SKETCH OF LAND: PREVIOUS TITLE: PROPERTY STREET ADDRESS: LOCAL GOVERNMENT AREA: **RESPONSIBLE AGENCY:**

DP156437. THIS TITLE. NO STREET ADDRESS INFORMATION AVAILABLE. CITY OF KWINANA. DEPARTMENT OF LANDS (SLSD).

CORRESPONDENCE FILE 00924-1997-01RO NOTE 1: K661626







2016

Bush Fire Management Plan

Lots 670 and 1338 and Reserve 50672

Bertram Road

Wellard

City of Kwinana

FirePlan WA February 2016

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Bush Fire Management Plan

Lots 670 & 1338 Bertram Road Wellard

Document prepared for:

Byblos Holdings Pty Ltd & Springzone Nominees Pty Ltd C/- Rowe Group Level 3, 369 Newcastle Street Northbridge WA 6003

Document prepared by: FirePlan WA 10 Bracken Road THORNLIE WA 6108

> M: 0418 941 540 Email: <u>firepla@bigpond.net.au</u> ABN: 44 116 937 762

Document Status

Version	Comment	Reviewer	Review Date	
Version 1		BWH	17.12.2015	
Version 2	Comments Rowe Group		18.12.16	
Version 3	Changes to LSP	Rowe Group	29.02.16	

Disclaimer: The measures contained in this fire management plan are considered to be minimum standards and they do not guarantee that a building will not be damaged in a bush fire. All surveys, forecasts, projections and recommendations made in this report associated with the project are made in good faith on the basis of information available to FirePlan WA at the time; and achievement of the level of implementation of fire precautions will depend among other things on the actions of the landowners or occupiers over which FirePlan WA has no control. Notwithstanding anything contained therein, FirePlan WA will not, except as

the law may require, be liable for any loss or other consequences (whether or not due to the negligence of the consultants, their servants or agents) arising out of the services rendered by the consultants.

1.0 PURPOSE OF THE MANAGEMENT PLAN

The purpose of this Bushfire Management Plan (BMP) is to detail the fire management methods and requirements that will be implemented for Lots 670 & 1338 Bertram Rd. (Refer Figure 1: Location Plan).

This Bushfire Management Plan satisfies the requirements of the City of Kwinana and the Western Australian Planning Commission (WAPC) (via WAPC, DFES and Department of Planning document, *Planning for Bush Fire Protection* Guidelines Edition 2 2010). Due Regard has been given to the Draft *Guidelines for Planning in Bushfire Prone areas* (September 2015 Department of Planning).

This Bushfire Management Plan will outline the responsibility and timing for implementing and maintaining the fire protection measures and strategies contained within this Bushfire Management Plan, allocating these responsibilities between individual land owners, the developers and the City of Kwinana.

As fire management strategies may require altering to meet changing weather, environment and land use needs, it must be advised that the provisions of the *Bush Fires Act 1954* may still be enforced, in addition to this Bushfire Management Plan.

The City of Kwinana will be responsible for initiating a review of this Bushfire Management Plan as it may deem necessary to do so.

FirePlan WA prepared (August 2014) a Bushfire Hazard Assessment for the Wellard Landowners Group Concept Structure Plan that was used in the Rezoning of the Land to Urban.

The Western Australian Planning Commission and the City of Kwinana require the preparation of a "Bushfire Management Plan" to support a Local Structure Plan. This document has been prepared to satisfy that requirement and becomes operational as a condition of subdivision.

This Bushfire Management Plan complies with the acceptable solutions detailed in Appendix 2 of *Planning for Bush Fire Protection Guidelines Edition 2 2010* and as summarised in 'Compliance Checklist for Performance Criteria and Acceptable Solutions' at the end of this Bushfire Management Plan (Section 9).

In the Foreword of AS 3959- 2009 it states that "It should be borne in mind that the measures contained in this standard cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the degree of vegetation management, the unpredictable nature and behavior of fire and extreme weather conditions."

Figure 1 Development Plan Location

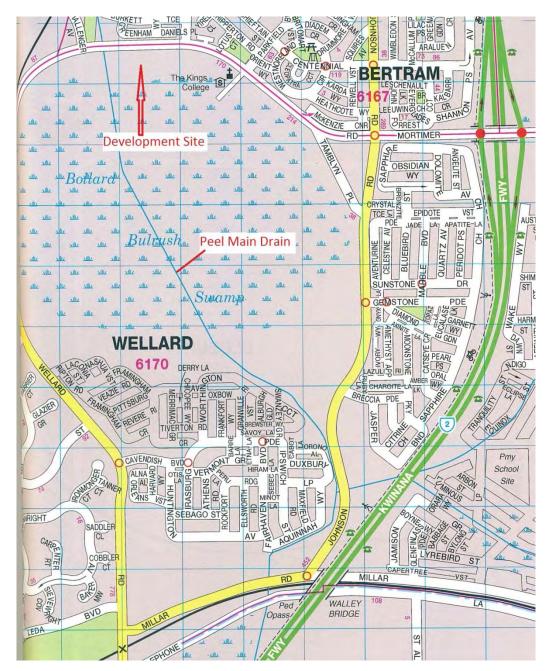
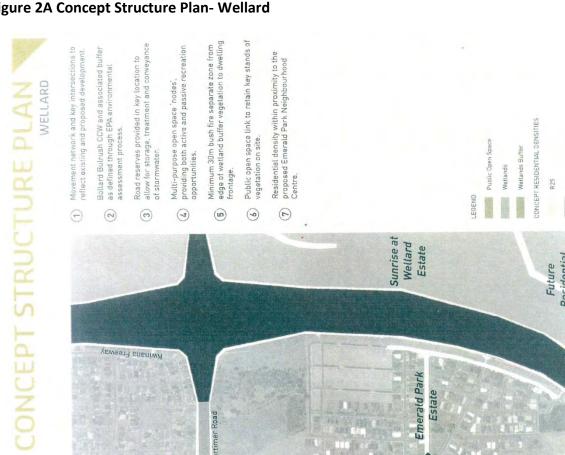
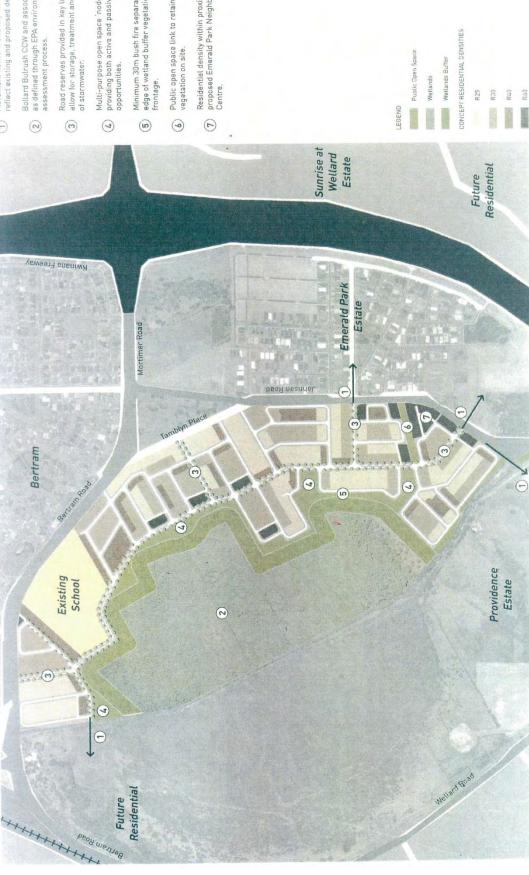


Figure 2 Development Layout







ROWEGROUP

Figure 2A Concept Structure Plan- Wellard

2.0 **OBJECTIVES**

The objectives of this Bushfire Management Plan are to:-

- Achieve consistency with objectives and policy measures of SPP 3.7 and the *Planning for Bush Fire Protection*, and any local planning scheme provisions relating to bushfire.
- Understand and document the extent of bushfire risk for the BMP area;
- Prepare bushfire risk management measures for bushfire management and all land subject of the Plan, with due regard for people, property, infrastructure and the environment;
- Nominate individuals and organisation's responsible for fire management and associated works within the plan area (e.g. Local government for land vested in it and private property owners for freehold land); and

3.0 DESCRIPTION OF THE SUBJECT AREA

3.1 General

The subject land comprises part Lot 670 & 1338 Bertram Rd Wellard is to be subdivided into urban residential with Public Open Space (POS) located on the outside of the Wetland Buffer. The Lot adjoining to the east is occupied by The Kings College Education facility. To the west of the Site is the Peel Main drain Reserve 50672 and adjoining that is grassland that is proposed to be developed into Urban Residential.

Lots 670 & 1338 Bertram Rd are cleared grassland with several dwellings and sheds located on the Site which will be removed as part of the Site Works when development commences. Bertram Road is located on the northern boundary of the Site.

The Bollard Bulrush Swamp wetland consists of Open Forest Class A vegetation with Paper Bark trees and Scrub Class D in the wetter areas of the wetland.

3.2 Topography

The site slopes to the south at 1° towards the wetland however the wetland itself is flat. The slopes of Flat/upslope will be used as a factor to determine the setbacks from wetland vegetation and habitable building construction standards.

3.3 **Bushfire Fuels**

The Site is generally cleared grassland with scattered trees and scrub. The site other than Public Open Space and the wetland buffer will be cleared and developed for urban residential housing.

In wetland Open Forest, fuel loads (as detailed in AS 3959-2009 Appendix B2) are 25-35 tonnes/ha and areas of Grassland from 4.5 tonnes/ha. There are areas containing Cotton Bush which is a declared weed in the southern part of the site

It is proposed that the POS separating the residential lots from the Wetland Open Forest vegetation will be landscaped and contain a drainage basin will be maintained as a low fuel area complying with the Building Protection Zone standard.

BMP Lots 670 & 1338 Bertram Rd Wellard

February 2016 2015



Photo 1 Grassland scattered trees wetland in background



Photo 2 Grassland within site, urban area north of Bertram Rd



Photo 3 Grassland with Open Forest wetland in background



Photo 4 Grassland with Open Forest wetland in background



Photo 5 Grassland with Open Forest wetland in background



Photo 6 Grassland with existing house & buildings in Background.

BMP Lots 670 & 1338 Bertram Rd Wellard

February 2016 2015



Photo 7 Peel Drain from Bertram Rd looking south

Photo 8 Scrub Vegetation to west of Peel Drain and grassland Lot

3.4 Land Use

The subject area will be developed into urban residential, Public Open Space (POS) and a 50 metre wetland buffer

The Kings College Site will remain as an Education facility but some area may be further developed into School facilities or urban residential. For the near to medium future the Site will remain as cleared grassland with some scattered trees.

3.5 Assets

The assets within and adjoining the Site are the urban area (north of Bertram Rd), existing dwellings, sheds, retained vegetation, proposed urban residential area, POS and adjoining wetland.

3.6 Access

Access to the existing Lots 670 & 1338 is off Bertram Rd. It is proposed that there will be road linkages to Bertram Rd. In the concept Plan for the whole of the area Bertram Rd, Tamblyn Way and Johnson road it is proposed that a road system will be located on the eastern side of the POS will connection back to Bertram Rd, Tamblyn Way and Johnson Road. The area to the west of the Peel drain is also proposed to be subdivided and a access linking development on both side of the Peel Drain is proposed. An alternative access is proposed to Bertram Road from the north-eastern cul de sac. This access is temporary only, to be removed once the external road connections have been constructed. .

3.7 Water Supplies

3.7.1 Water for Fire Fighting

Fire Hydrants are to be installed by the Developer in accordance with *Water Corporations No 63 Water Reticulation Standard.* See Details in Section 5.3.

3.7.2 Domestic Water Supply

Reticulated water will be supplied by the Developer to each Lot.

4.0 BUSHFIRE ASSESSMENT

Bushfire Risk is the chance of a bushfire starting that will have harmful consequences on life, property and the environment. It is measured in terms of consequences and likelihood and arises from the interaction of vegetation, communities and the environment expressed as a level of risk.

Table 1 Bushfire Risk Analysis

Risk Statement	Consequence	Likelihood	Risk Level	Prevention Controls (Planning Specific)
There is the potential that a bushfire will impact the proposed development which in turn may cause injury , first aid may be required	Insignificant	Possible	Low	 Required increased construction standard to BAL for new dwellings constructed with 100 metres of vegetation Construction standard in accordance with AS 3959-2009 will provide bushfire resilient dwellings for people to seek shelter in. The development provides access and egress routes from the development area. Fire hydrants available within local streets to support firefighting operations.
There is the potential that a bushfire will impact the proposed development which in turn may cause some damage to the proposed buildings.	Insignificant	Possible	Low	 Increased construction standard to all new dwellings. Fire hydrants available within local streets to support firefighting operations. The site is located within an urban area. Wetland to south of development site. Grassland to west and east of the Site to be developed into urban residential. Area to north of Bertram Rd is urban residential.
There is the potential that a bushfire will impact the proposed development which in turn will cause damage to the environment	Insignificant	Possible	Low	 Wetland Vegetation to South of development site to be separated from residential are by POS and road managed to BPZ standard. Compliance with Total Fire Bans Fire Breaks to be maintained in accordance with Fire Break Notice. POS to be maintained in Low Fuel Hazard state POS separates development from adjoining vegetation

Residual bushfire related risk to identified assets within the proposed development following implementation of risk management strategies detailed in Section 5.0 of this Bushfire Management Plan.

The bushfire hazard assessment for the site is:-

Grassland Class G	-	Low
Scrub Class D	-	Moderate
Open Forest Class A	-	Extreme located Wetland Open Forest to south of site

See Figure 3 Bushfire Hazard Assessment

Bushfire Attack Level (BAL) assessment classifies land into 6 categories based on a combination of vegetation type (fuel type, load and structure), effective slope of the land and the proposed distance from predominant vegetation. BAL assessment for the proposed development is detailed in Section 5.0.

Bushfire Prone Areas

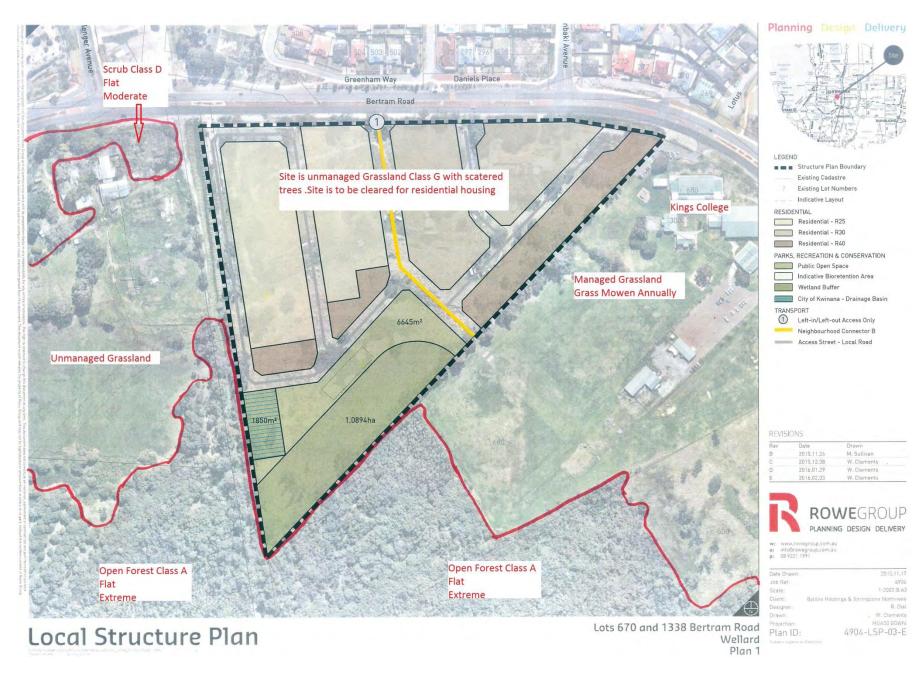
Due the Vegetation within the Wetland –bollard Bulrush Swamp- is greater than 1 ha in size then it is considered to be a Bushfire Prone Area and any dwelling within 100 metres of that Bushfire Prone Area is to be constructed to AS 3959-2009 or the current version of AS 3959.

Bushfire Attack Level (BAL)

Is a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared and is the basis for establishing the requirements for the construction to improve protection of building elements from attack by bushfire. The setbacks from vegetation identified in Table 3 in this report are part of the fire mitigation strategies detailed in the Bushfire Management Plan

BAL	Classified Vegetation within 100 metres of the site and heat flux exposure	Description of predicted bush fire attack and levels of exposure	Construction Section as per AS 3959
BAL-LOW		There is insufficient risk to warrant any specific construction requirements but there is still some risk.	4
BAL – 12.5	≤12.5 kW/m²	There is a risk of ember attack.	3 and 5
BAL – 19	>12.5 kW/m² ≤19 kW/m²	There is a risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to radiant heat.	3 and 6
BAL – 29	>19 kW/m² ≤29 kW/m²	There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level of radiant heat.	3 and 7
BAL – 40	>29 kW/m² ≤40 kW/m²	There is much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front. Not supported by planning.	3 and 8
BAL – Flame Zone	>40 kW/m²	There is an extremely high risk of ember attack and burning debris ignited by windborne embers, and a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front. Not supported by planning	3 and 9

Figure 3 Bush Fire Hazard Assessment



5.0 BUSHFIRE RISK MANAGEMENT MEASURES

The bushfire management strategies detailed in this BMP are designed to comply with the Performance Criteria and Acceptable Solutions detailed in *Planning for Bushfire Protection* Edition 2 2010.

5.1 Element 1 – Development Location

The Wetland area is surrounded by a 50 metre wide Wetland Buffer then a Public Open Space (minimum 13 metres wide) area that will be landscaped then a road reserve (13 or 20 metre wide) separating the urban residential from the wetland area. The POS and the road reserve will form the required BAL setback from the Wetland buffer and will be managed to comply with the Building Protection Zone Standard.

All proposed habitable building in the residential area will be located in cleared areas. Habitable Buildings adjoining the Road reserve will have a construction standard of BAL 19. See Section 5.4 for details. Complies with *Planning for Bush Fire Protection* Edition 2 acceptable solution A1.1.

Residential Buildings within 100 meters of classified vegetation will have an increased construction standard in accordance with AS 3959. Details in Section 5.4.

5.2 Element 2 – Access

5.2.1 Road System Public Roads.

The road system within the "Site" will be integrated into the future adjoining urban development of Lots to the East as shown in the Concept Structure Plan. Also a link is proposed from this "Site" to the area to the west of the Peel Drain which is proposed to be developed into future urban residential.

Until the road system within the adjoining areas to the east is developed so as to provide a second access onto Bertram Road temporary access will be require to be installed so as to provide two access/egress points from the development.

The second access route is as follows

In the north-east corner of the Site a temporary Emergency Access Way is to be constructed from the end of that cul de sac in a north-east direction to Bertram Road

A 4.2 metre wide Gate is to be installed of the boundary between the development and Bertram Road to restrict day to day traffic. A sign is to be placed on both sides of the gate with wording *Emergency Access Only.* The gate and signage is to be installed and maintained by the Developer until a Public Road to the West

The access would need to comply with acceptable solution A2.6 see Table 3.

Note: This emergency access way is temporary only until external road network /connections are complete.

Emergency Access Way (EAW)

The EAW to link from the cul de sac head in the northeast corner of the Site onto Bertram Road as detailed above. To comply with acceptable solution A2.6 detailed in Table 3.

<u>Cu de sac</u>

Two Cul de sacs (approximately 200 metre long and 190 metre long) will be constructed off the entrance road into the Site and will comply with acceptable solution A2.3. Minimum Specifications are detailed in Table 4. A turn around at the end of the cul de sac will need to comply with the Standards in Figure 4.

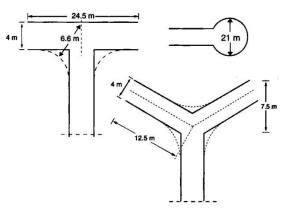
5.2.2 Internal Firebreaks

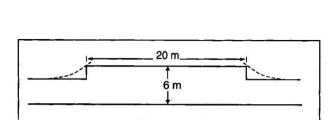
Notwithstanding the provisions of this Bushfire Management Plan, landowners of all lots within the site must comply with the requirements of the City of Kwinana Firebreak Notice, as published annually.

Table 3. Vehicle Access Technical Requirements as detailed in Planning for Bush Fire Protection Edition 2 2010

Technical	A2.2	A2.3	A2.4	A2.5	A2.6	A2.7
Requirements	Public Roads	Cul De sac	Battle axes	Private	Emergency	Fire Service
				Driveways	Access Ways	Access
Minimum trafficable surface (m)	6*	6	4	4	6	6
Horizontal clearance (m)	6	6	6	6	6	6
Vertical clearance (m)	4	4	4	4	4	4
Maximum grades	1 in 8	1 in 8	1 in 8	1 in 8	1 in 8	1 in 8
Maximum grade over	1 in 5	1 in 5	1 in 5	1 in 5	1 in 5	1 in 5
<50 metres						
Maximum average	1 in 7	1 in 7	1 in 7	1 in 7	1 in 7	1 in 7
grade						
Minimum weight capacity (t)	15	15	15	15	15	15
Maximum crossfall	1 in 33	1 in 33	1in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius (m)	12	12	12	12	12	12
		Maximum	Maximum	Passing bays	Passing bays	Passing bays
		200 metres	600 metres	and turn	and turn	and turn
		Long	Long	around	around areas	around areas
				areas are	are required	are required
				required		

Figure 4 Turn around and Passing Bay Specifications





Turn around area measurements.

Passing bay measurements.

5.3 Element 3 Water Supplies

Water Supply for Fire Fighting:

Reticulated water via the Water Corporation system will be installed by the Developer within this site. The developer will install and mark Fire Hydrants in accordance with the specification of the Water Corporation and DFES. Complies with Acceptable Solution A4.1 – "Water Corporation No. 63 Water Reticulation Standard". Fire Hydrant locations are provided to the City of Kwinana along with the Engineering drawings for the Site.

Water Supply for Domestic Use:

Each Lot will be connected to the Water Corporation reticulated system by the developer.

5.4 Element 4 – Siting and Design of Development

5.4.1 Setback from Classified Vegetation

Individual dwellings on all lots shall be designed and built to conform with:

The Building Code of Australia; and

• AS 3959 Construction of Buildings in a Bushfire Prone Area;

In *Planning for Bush Fire Protection* Edition 2 it states that the minimum distance of 100 metres from classified vegetation (rated 'Moderate' or 'Extreme') may be reduced in compliance with AS 3959. Under AS 3959 as the distance from the vegetation is reduced, the construction standard must be increased. Table 2.4.3 AS 3959- 2009 sets out this relationship and Section 2 of AS 3959 - 2009 details the methodology of determining the Bushfire Attack Level (BAL).

BAL (Bushfire Attack Level) Determination Using Methodology from Section 2.2.1 of current adopted AS 3959-2009 and Table 2.4.3 which applies to this development:

Area	Class of Vegetation	Slope	Setback	BAL Rating	AS 3959-	Width of BPZ
			Distance		2009	metres
Adjoining Peel	Grassland Class G	Flat	17-50	12.5	S3&5	20
Drain						
Adjoining Wetland	Open Forest Class A	Flat	31-42	19	S3&6	31 includes
Buffer						POS
Adjoining Wetland	Open Forest Class A	Flat	42-100	12.5	S3&5	Whole of
Buffer						each Lot
Adjoining Wetland	Open Forest Class A	Flat	100+	Low	Nil	Nil
Buffer						

Table 4. Setback of Habitable Buildings from Classified Vegetation

All habitable buildings within 100 metres of classified vegetation (Wetland Buffer) will be constructed to AS 3959 BAL 19 and BAL 12.5 and must be setback in accordance with Table 4. The setback will consist of the Public Open Space, the front setback within a lot and the road reserve and must be managed to the Building Protection Zone standards as detailed in Section 5.4.2

The above BAL ratings are indicative only and the Developer is to provide the City of Kwinana with a map showing the BAL ratings for each Lot once the roads have been constructed and prior to the issue of Land Titles.

The Kings College Education Facility grass areas are mown each year by the school management. The Lots that are adjoining the schools site along the eastern boundary of the Site will not be influenced by the BAL - Low grassland within the School Site.

Indicative BAL ratings are shown in Figure 6.

As part of the Building Permit Application a landowner may request a Fire Consultant to carry out a BAL assessment to confirm the indicative BAL or determine the BAL rating for a Lot with a specific habitable building design. This report is to be sent to the City of Kwinana as part of the Building Permit Application.

In AS 3959-2009 Section 3.5

"The construction requirements for the next lower BAL than that determined for the site may be applied to an elevation of the building where the elevation is not exposed to the source of bushfire attack. An elevation is deemed to be not exposed to the source of bushfire attack if all the straight lines between that elevation and the source of bushfire attack are obstructed by another part of the Building (See Figure 7 of BMP or Figure 3.1 of AS 3959-2009).

The construction requirements for a shielded elevation shall not be less than that required for BAL 12.5, except where the exposed elevations have been determined as BAL LOW".

The developer is to place a Section 70A notification on the Land Title of each Lot that is within 100 metres of the Wetland Buffer area which will require a dwelling to be constructed in accordance with AS 3959-2009.

This Wetland area is going to be separated from the dwellings within the Site by POS and a road reserve which will be managed to the Building Protection Zone standard. Dwellings within 100 metres of the wetland buffer will be constructed to AS 3959-2009. The dwellings will be located within areas of Low bushfire hazard rating. Complies with acceptable solutions A4.1 and A4.2.

5.4.2 Building Protection Zone Acceptable Solution A4.3

The aim of the Building Protection Zones (BPZ) is to reduce bush fire intensity close to buildings, and to minimise the likelihood of flame contact with buildings.

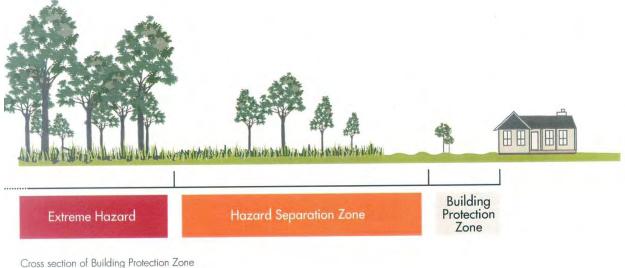
The Building Protection Zone is a low fuel area immediately surrounding a building complying with *Planning for Bush Fire Protection* Acceptable Solution A4.3.

A Building Protection Zone must fulfil the following conditions:-

- The minimum width of the BPZ measured from front of the Lot is shown in Table 4
- Loose flammable material within the BPZ should be removed to reduce the fuel load to less than 2 tonnes per hectare and this is to be maintained to this level.
- All grasses within the BPZ are to be maintained to a maximum height of a 50mm.
- The crowns of trees within the BPZ should be separated where practical such that there is a clear distance of 10 metres between adjoining tree crowns. Prune lower branches of trees within the BPZ (up to 2 metres off the ground) to stop a surface fire spreading to the canopy of the trees.
- There are to be no tree crowns or branches overhanging the building or asset and a minimum horizontal clearance of 2 metres is required between tree branches and buildings or assets.
- Do not clump shrubs close to building. Ensure that there is a gap of at least 3 times the height (at maturity) of the shrub away from the building.
- Install paths and non-flammable features immediately adjacent to the habitable building.
- Trees or shrubs in the BPZ are to be cleared of any dead material.
- Fences, sheds and structures within the BPZ should be constructed of non-flammable material and be clear of trees and shrubs as per building requirements.
- Gas Cylinders should be isolated from the Flame Zone and should be stored in an area that is clear of all flammable material. Gas vent valves should face away from the building and anything flammable. Gas cylinders should be securely tethered with non-flammable fastenings to prevent toppling over.
- Driveways and access ways must allow for the safe passage of a fire appliance to all buildings and assets on the land.

- Roof gutters should be free of leaves and other combustible material.
- Roof mounted evaporative air coolers should be fitted with ember proof screens to the filter media to reduce the possibility of bushfire embers igniting the air cooler.

Figure 5 Relationship of BPZ & HSZ to Bushfire Hazard and Habitable building



and Hazard Separation Zone.

5.5 Vulnerable Uses

There is no proposed vulnerable land use proposed within this Development.

5.6 Hazard Reduction

There will be no vegetation within the site that will not be managed to the Building Protection Zone standards. Grass fuels must be maintained below 50mm over the whole of each lot annually and can be achieved by mowing and slashing.

Figure 6 Indicative BAL RATINGS and Building Protection Zones.



Local Structure Plan

Lots 670 and 1338 Bertram Road Wellard Plan 1

Figure 7 Example of Walls Subject to Shielding – AS 3959 Figure 3.1.

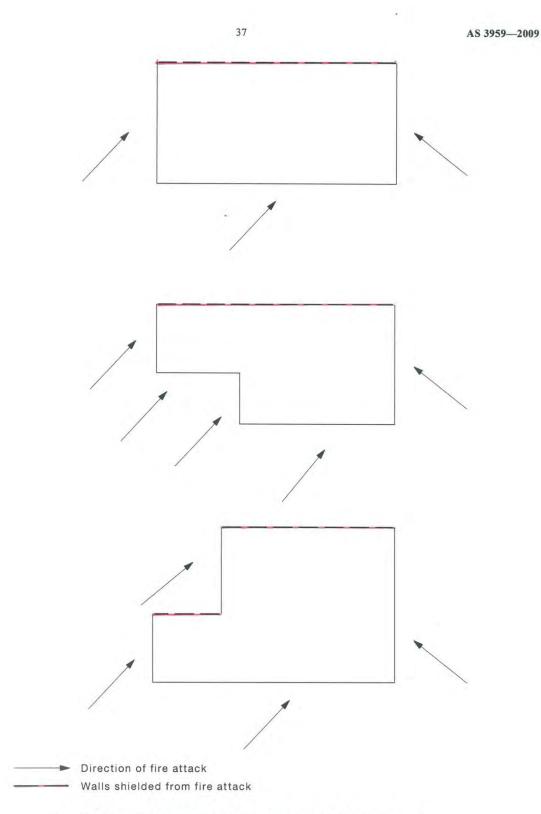


FIGURE 3.1 EXAMPLES OF WALLS SUBJECT TO SHIELDING

5.7 Restrictions on the Use of Machinery, Tools, Vehicles and Tractors

5.7.1 Total Fire Ban Days

A Total Fire Ban is declared because of the extreme weather conditions or when fires are seriously stretching fire fighting resources. A Total Fire Ban is declared by DFES following consultation with Local Governments.

When a Total Fire Ban is declared it prohibits the lighting of any fires in the open air and any activities that might start a fire. The ban includes all open fires for the purpose of cooking or camping. It also includes incinerators, welding, grinding, soldering and gas cutting.

The Department of Fire and Emergency Services and the City of Kwinana are to continue to educate the public on what a Total Fire Ban means and what actions members of the public need to take.

Public Education Program

The City of Kwinana is to continue to provide the community with advice on bush fire prevention and preparedness through brochures, newspaper articles, the Firebreak Notice issued to rate payers and on their web site.

The developer is to provide a copy of the current City of Kwinana *Firebreak Notice, The Homeowners Survival Manual* and *Prepare Act Survive* brochure and this *Bushfire Management Plan* at the time of sale of a Lot. It is essential that the Real Estate agent handling the sale of Lots on behalf of the Developer advises potential landowners that a Bushfire Management Plan exists and the modification of vegetation and ongoing fuel reduction will be required within this development.

Other Public Safety and Community information on Bush Fires is available on the Department of Fire and Emergency Services Authority web site <u>www.dfes.wa.gov.au</u> and the City of Kwinana website <u>www.kwinana.wa.gov.au</u>.

5.7.2 Fire Safer Areas

In the event of a bush fire, the Incident Controller of Fire Fighting operations will advise if an evacuation is necessary and, in conjunction with the City of Kwinana Emergency Services, direct residents to Safer Refuge Areas.

6.0 IMPLEMENTATION OF BUSHFIRE MANAGEMENT PLAN

This Bushfire Management Plan becomes operational as a condition of subdivision and or development approval.

In implementing this Bushfire Management Plan, the following responsibilities have been determined.

6.1 **Responsibilities**

6.1.1 Property Owners Responsibilities

To maintain the reduced level of risk and threat of fire, the owners/occupiers of all lots created by this proposal will be responsible for undertaking, complying and implementing measures protecting their own assets from the threat and risk of bush fire:

- Maintaining the property in good order to minimize potential bushfire fuels to mitigate the risk of fire on the property;
- Ensuring that the lot complies with the City of Kwinana Firebreak Notice. To be carried out annually;
- Ensuring that new dwellings are constructed to AS 3959 Table 6 Section 5.4. There will be a Section 70A notification on the Certificate of Title for each Lot requiring an increased construction standard in accordance with AS3959;
- As part of the Building Permit Application a landowner may request a Bushfire Consultant to carry out (at cost to the landowner) a BAL assessment to confirm the indicative BAL or determine the BAL rating for a Lot with a specific habitable building design.
- Complying with the instructions of DFES Fire Services, the City of Kwinana and/or volunteer fire services in maintaining the property or during the event of a bushfire;
- Ensuring that in the event an evaporative air conditioner is installed at the property, suitable external ember screens are installed to roof mounted units and that they comply with AS 3959, check annually.

6.1.2 Developer's Responsibilities

As a condition of subdivision the Developer shall be required to carry out works described in Section 6 of this Fire Management Plan to the satisfaction of the City of Kwinana and the Western Australian Planning Commission:

- All driveway crossovers are to comply with the design requirements of the City of Kwinana;
- Each lot requiring an increased construction standard in accordance with AS 3959-2009 is to have a Section70A Notification placed on the land title advising the landowner of the existence of this Bushfire Management Plan;
- Install Road System, Emergency Access Way and firebreaks as detailed in Section 5.2;
- Install fire hydrants as detailed in Section 5.3
- Install and maintain the Building Protection Zone within the Road Reserve as detailed in Section 5.4 and maintain until all Lots are sold;

- Each lot is to comply with the City of Kwinana Firebreak Notice as published annually. This is to be maintained until lots are sold;
- Provide each prospective land purchaser with a copy of the map showing AS 3959-2009 BAL ratings for each Lot and;
- Supply a copy of this *Bushfire Management Plan* and *The Homeowners Bush Fire Survival Manual, Prepare Act Survive* (or similar suitable documentation) and the City of Kwinana *Firebreak Notice* to each affected property purchaser on sale of the allotment;

6.1.3 City of Kwinana

The responsibility for compliance with the law rests with individual property owners and occupiers and the following conditions are not intended to unnecessarily transfer these responsibilities to the City of Kwinana.

The City of Kwinana shall be responsible for:

- Ensuring compliance with the current adopted AS3959, of any new habitable structure, renovation or extension to existing dwellings within each lot that is required to have an increased construction standards, is undertaken at the time of Building Permit Application;
- Enforcing the City of Kwinana Firebreak Notice;
- Maintain Road Systems and Public Open Space as detailed in Section 5.4 in perpetuity.

6.2 Assessment of Fire Management Strategies

All the actions and recommendations in this BMP, meet the Bushfires Act 1954 compliant with the acceptable solutions detailed in *Planning for Bush Fire Protection Edition 2* and are sound, measurable and practical having been used and proven over time. These recommendations take into account the various costs, alternatives available, benefits for protection of residents and the wider community, the environment and biodiversity protection.

This Bushfire Management Plan will be implemented as a condition of subdivision and or development approval for the site.

It will be the responsibility of the developer to implement the provisions of this Bushfire Management Plan in order to seek clearance of those conditions of subdivision.

Likewise it is the responsibility of the City of Kwinana to ensure that all standards required in this Bushfire Management Plan are met by the developer prior to clearing any conditions of subdivision relating to this Bushfire Management Plan.

After any major fires that may occur during or once this development has been completed, the City of Kwinana may conduct a Post Incident Analysis of the fire, which may include identifying and implementing any changes that may be needed to improve the performance of fire prevention strategies.

6.3 Works Program

Table 5 Works Program Prior to issue of Titles and Ongoing Maintenance

Developer				
Responsibilities				
Activity	Responsibility	Maintenance	Responsibility	Timing
Installation & Maintain of Roads & cul de sac Standards Section 5.2.	Developer	Checking of quality of Roads	City of Kwinana	Developer clearance of Condition of subdivision
Implement fire protection measures as detailed in Sections 5.4	Developer	Annually maintenance required until Lots sold. Maintain POS to Building Protection Zone standard	City of Kwinana	Ongoing in perpetuity
Compliance with Firebreak Notice. Details Section 5.2.	Developer	Compliance with Firebreak Notice annually	Landowner	Developer clearance of Condition of subdivision
Installation of Fire Hydrants. Water Corporation Standards. Details Section 5.3	Developer	Water Corporation Standards	Water Corporation	Ongoing
Section 70 A notification on Tile of each Lot advising BMP applies to each Lot	Developer	Maintain Lot in accordance with Landowners responsibilities	Landowner	Developer clearance of Condition of subdivision
Provide the City of Kwinana with BAL Ratings for prior to land release	Developer	Provide a copy to each prospective purchaser of a Lot	Developer	Developer clearance of Condition of subdivision
Landscape POS to BPZ standard	Developer	Maintain POS to BPZ standard	City of Kwinana	Ongoing in perpetuity
Provide a copy of following a sale of Lot:- Bushfire Management Plan Home Owners Survival Manual Prepare Act Survive Fire Control Notice	Developer	Landowners to familiarise themselves and annually update actions in the event of fire and annual maintenance.	Landowner	Developer clearance of Condition of subdivision
Fire Control Notice Landowner Responsibilities				
Landowner may request BAL reassessment to confirm or amend BAL rating. Copy of report to City of Kwinana	Landowner	Ensure Building design complies with relevant AS 3959 BAL rating	City of Kwinana to approve Building Permit	Re-assessment completed report sent to CoK as part of Building Permit Application
Compliance with Firebreak Notice. Details Section 5.3.	Developer until Lot is sold then landowner	Compliance with Firebreak Notice annually	Landowner	Completed by 1st November each year.
Section 70 A notification on Tile of each Lot advising BMP applies to each Lot	Developer	Maintain Lot in accordance with Landowners responsibilities in perpetuity.	Landowner	Completed by 1st November each year.

7.0 **DISCLAIMER**

In the event of large bushfires it is essential that landowners understand that fire appliances may not be available to protect each dwelling/building, landowners are responsible for the protection of their own assets which may require additional protection above the minimum detailed in this Bushfire Management Plan.

8.0 APPENDICES

8.1 Glossary

Acceptable Solution

A statement describing an acceptable means of complying with the requirements of corresponding performance criteria.

Appliance or Fire Appliance

A fire fighting appliance (vehicle) with structural, grass and bushfire fighting capabilities, with either a 2000 litres water capacity (2.4 appliance) or a 3000 litre water capacity (3.4 appliance) and four (4) wheel drive.

BAL – (abb) Bushfire Attack Level.

Bushfire Attack Level – an assessed rating of a site's risk to a bushfire, based on vegetation type, slope of the land and its proximity to buildings.

Building Construction Standard Buffer - An area 100 metres wide Including a Building Protection Zone in which an increase in building construction standard in accordance with AS3959 will apply.

Building Protection Zone (BPZ)

Low fuel area immediately surrounding buildings. Minimum width 20 metres, increasing with slope. Maintained by the landowner.

Bush

Under the Bush Fires Act 1954 the term bush is defined to include trees, bushes, plants, stubble, scrub and undergrowth of a kind whatsoever whether dead or alive and whether standing or not standing.

Bush Fire or Wildfire

A general term used to describe fire in vegetation that is not under control.

Bush Fire Hazard.

The flammability, arrangement and quantity of vegetation, dead or alive, that can be burnt in a bush fire. Development is to be avoided in extreme bush fire hazard designated areas.

Bush fire prone area - for the purposes of this fire management plan, a bush fire prone area is an area that has been declared as such by the relevant local government responsible for an area. Once an area is declared bush fire prone, then AS 3959 applies to new residential development in it.

Bush Fire Risk

The chance of a bush fire starting that will have harmful consequences on life and property. It is measured in terms of consequences and likelihood and arises from the interaction of hazards, communities and the environment.

Development Application

An application for approval to carry out a development under either a local planning scheme or regional planning scheme.

Dwelling setback – the horizontal distance between a wall of the dwelling at any point, and an adjacent lot boundary, measured at right angles (90 degrees) to the boundary.

DFES

The Department of Fire and Emergency Services of Western Australia previously FESA.

Emergency Access Way

Road not normally open but available to the public (using two wheel drive vehicles) for evacuation during a bush fire emergency.

Fire Break or Firebreak

Any natural or constructed discontinuity in a fuel bed used to segregate, stop and control the spread of a bush fire or to provide a fire line from which to suppress a bush fire. This is an area cleared to reduce the risk of bush fire damage.

FDI- Fire Danger Index

The chance of a fire starting, its rate of spread, its intensity and the difficulty of its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long and short-term drought effects.

Fire Protection

A generic term used to describe the range of services and systems used to mitigate the impact of fire on the community. It encompasses both fire prevention and emergency response.

Fire Management Plan or Bushfire Management Plan

Ongoing, dynamic document that sets out the medium to long term mitigation strategies for fire hazards and risks in particular developments within local government areas.

Fire Services Access Route

Accessible by heavy four wheel drive fire fighting vehicles.

Fuel Reduction also Hazard Reduction

Removal and modification of bush fire fuel, or increase in building construction standards or a combination of the two.

Hazard Separation Zone (HSZ)

The fuel reduction area between an area bush fire hazard and the buildings (and associated building protection zones) of a development.

Low Fuel Area

An area 100 metres wide of reduced bush fire fuels that is required to surround a Stage of land release and negates the need to increase the standard of dwelling construction on the edge of the Stage of land release. It complies with the Building Protection Zone standards is temporary until the next stage of land is cleared for release.

Performance Criteria.

Statement which specifies the outcomes required for the protection of life and property from bush fires.

SPP 3.7 (Abbreviation) State Planning Policy 3.7 Planning in Bushfire Prone Areas

Structural Fire

A fire in a building.

9.0 COMPLIANCE CHECKLIST PERFORMANCE CRITERIA AND ACCEPTABLE SOLUTIONS Property Details: Lots 670 & 1338 Bertram Rd Wellard

Local Government:

City of Kwinana

Acceptable	Element		Compliance		Comment
Solution					
Element 1: Lo	ocation				
		Yes	No	N/A	
A1.1	Subdivision/development				All lots BAL – 19 to
	is located on land that is	\checkmark			BAL LOW
	not subject to either an	v			
	extreme bushfire hazard				
	land classification or				
	requires construction to				
	BAL 40 or BAL FZ				
AD 1		nent 2: Vehic	ular Access		
A2.1	Two different vehicular	v			
	access routes, both of which connect to the				
	public Road network, are available to all				
	residents/the public at all				
A2.2	times Public Roads	✓			
A2.2 A2.3	Cul-de-sacs	 ✓			
A2.5 A2.4	Battle axes	v		✓	
A2.4 A2.5				 ✓	
	Private driveways	✓		•	
A2.6	Emergency access ways	v			Emergency Access
					Way to provide
					temporary second
A2.7	Fire services access			✓	access
AZ.7	routes			v	
A2.8	Gates	✓			Gate on EAW
		 ✓			Gate on EAW
A2.9	Firebreak Notice	• •			
A2.10	Signs	•	Notor		Signs on EAW
42.4	Deticulate devece	Element 3: \	water		
A3.1	Reticulated areas	v		✓	
A3.2	Non-reticulated areas			 ✓	
A3.3	Static water supply –			v	
	Dams				
		nt 4: Siting of	development		
A4.1	The siting of the	v			All dwellings
	development minimises				located within
	the bush fire risk to life				Grassland areas.
	and property. Hazard				
	separation – moderate to				
	extreme bush fire hazard				
	level.	1			
A4.2	Hazard separation – low	\checkmark			
	bush fire hazard level.		<u> </u>		
A4.3	Building protection	\checkmark			
	zones.				
A4.4	Hazard separation zones.			\checkmark	FireP

BMP 2196 Lots 670 & 1338 Bertram Rd Wellard V3 29.2.16

A4.5	Reduction in bush fire attack level due to shielding			~	
	Elemer	nt 5: Design of	development		
A5.1	P5 – Compliant with acceptable solutions A4.1, A4.2, A4.3 & 4.4	~			
A5.2	Non-compliant development			~	

Applicant Declaration:

I declare that the information provided is true and correct to the best of my knowledge.

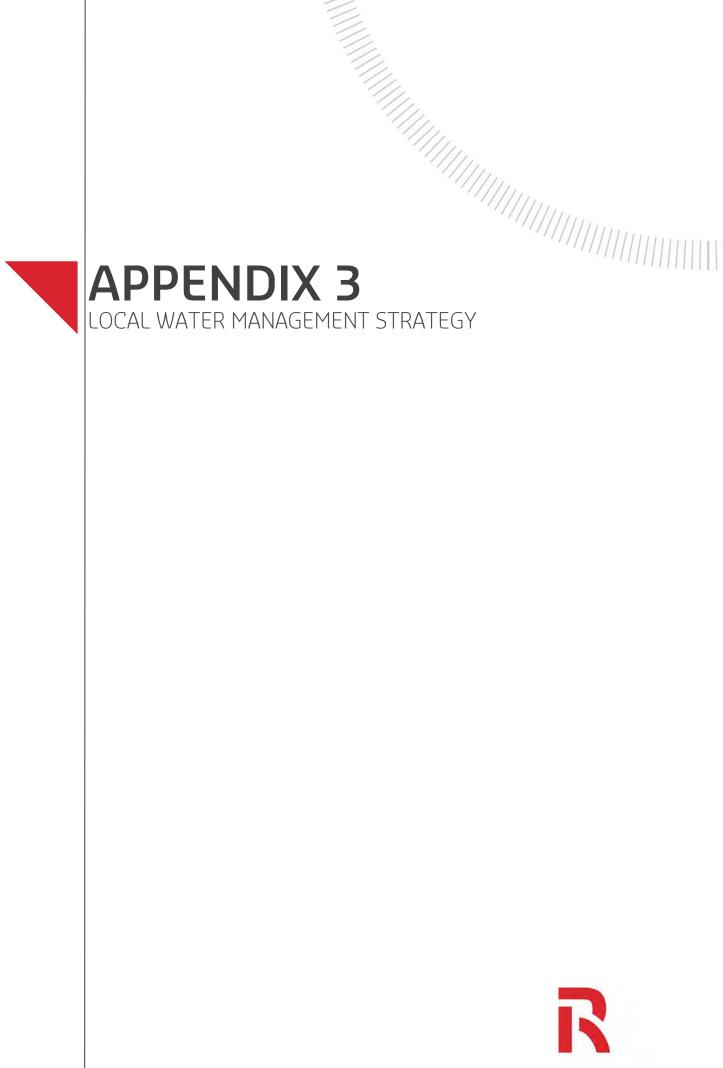
Name of Person Preparing the Fire Management Plan:

Full Name	B.W. Harris	for FirePlan WA
run name:	N.W. WUTT	IOI FILEPIAN WA

Date: 17/12/2015

Developer:

Full Name:	S	ignature:	 Date:



ROWEGROUP

Byblos Holdings Pty Ltd and Springzone Nominees Pty Ltd

Lots 670 and 1338 Bertram Rd and Reserve No. 50672, Wellard

Local Water Management Strategy



February 2016





DISCLAIMER

This document is published in accordance with and subject to an agreement between JDA Consultant Hydrologists ("JDA") and the client for whom it has been prepared ("Client"), and is restricted to those issues that have been raised by the Client in its engagement of JDA. It has been prepared using the skill and care ordinarily exercised by Consultant Hydrologists in the preparation of such documents.

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JDA does not take responsibility for checking landscape and engineering plans attached to this report for accuracy or consistency with this report.

This Report is based on the current edition of Australian Rainfall & Runoff – A Guide to Flood Estimation (Engineers Australia, 1987) referred to as ARR.

Engineers Australia released a partial update to ARR in December 2015. The completed version of ARR may include different design methods and data for flood estimation in Australia including rainfall intensity, rainfall temporal patterns, rainfall runoff coefficients as well as a guideline for taking into account the effect of climate change on design rainfall and hence design floods depending on projected design life of land development. The revised version of ARR may include information which may require this Report to be revised.

QUALITY ASSURANCE

JDA provides quality assurance through all aspects of the company operation and is endorsed to AS/NZS ISO 9001:2008 Quality Assurance Certification, with third party certification to Bureau Veritas.



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	Name	Signature	Date
Author	Pandora Mavromatidis	Jeg for PM	15 February 2016
Checked by	Matthew Yan	Matth	15 February 2016
Approved by	Jim Davies	Are Dones,	15 February 2016



EXECUTIVE SUMMARY

JDA has been engaged by Byblos Holdings Pty Ltd and Springzone Nominees Pty Ltd to complete a Local Water Management Strategy (LWMS) for Lots 670 and 1338 Bertram Rd and Reserve No. 50672, Wellard. This LWMS has been prepared to guide water management for proposed residential development of approximately 8.35 ha, and to support the Local Structure Plan (LSP) for the Study Area. This document provides conceptual level drainage planning to assist in providing a coordinated approach to future subdivision.

This document addresses the principles and objectives of the overarching Wellard Urban Precinct East District Water Management Strategy (DWMS) (Emerge, 2015). Table 1 below provides a summary of the key elements of the LWMS in addressing the DWMS principles and objectives.

Principle	Key LWMS Elements	
Water Quantity To maintain the total water cycle balance within development areas relative to the pre-development conditions.	 Maintain flow paths for existing catchments; Retain and treat 1yr ARI event post development discharge relative to pre-development conditions; 	
Water Quality To maintain or improve the surface and groundwater quality within development areas relative to pre- development conditions.	 Change in land use and WSUD to reduce nutrient input in the site; Use of treatment train approach to stormwater management; Application of source controls – including street sweeping, education to reduce nutrient application, native plantings, swales and lot soakwells; and Application of structural controls – bioretention areas 	
Water Conservation To maximise the reuse of stormwater	 Encourage implementation of water efficiency and demand management measures both internal and external of buildings; Maximise stormwater infiltration opportunities where possible; and Use of native plantings in drainage areas to minimise irrigation. 	
Ecosystem Health To retain natural drainage systems and protect ecosystem health	 Retain and treat 1yr ARI event post development discharge relative to pre-development conditions; and Manage major event flows from the site. 	
Public Health To minimise the public risk, including risk of injury or loss of life to the community	Design in accordance with relevant design standards, best management practices, council regulations and government agency requirements.	
Protection of Property To protect the built environment from flooding and waterlogging	 Identification of 100yr ARI flood levels for site; Protection of downstream areas by managing stormwater discharge; and Sub-soil drainage to be implemented to control seasonal groundwater rise to a controlled watertable level. 	
Development To ensure the delivery of best practice stormwater management through planning and development of high quality developed areas in accordance with sustainability & precautionary principles.	 Urban water management in accordance with Better Urban Water Management (WAPC, 2008); and Development of the LWMS in accordance with government agency guidelines and best management practice recommendations. Post-development monitoring for a period 2 years 	

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1. INTRODUCTION

1.1 Background and Statutory Framework

This LWMS has been prepared by JDA Consultant Hydrologists on behalf of Byblos Holdings Pty Ltd and Springzone Nominees Pty Ltd for the development of Lots 670 and 1338 Bertram Rd and Reserve No. 50672, Wellard (herein referred to as the Study Area). The location of the Study Area is shown in Figure 1.

This LWMS document has been prepared to support the Local Structure Plan (LSP) for the Study Area and to provide conceptual level drainage planning to assist in providing a coordinated approach to future subdivision.

This document presents a recommended approach for total water cycle management within the Study Area consistent with sustainability principles. The document is consistent with State Planning Policy 2.9 Water Resources (WAPC, 2006) and guidelines presented in Better Urban Water Management (WAPC, 2008). The preparation of this document in relation to the requirements of Better Urban Water Management (BUWM) (WAPC, 2008) is shown in Table 2.

The compilation of this document has included a range of expertise and guidelines from leading government authorities including the Department of Environment and Conservation (DEC), Department of Water (DoW), and City of Kwinana (CoK), to assist in achieving the implementation of best practice in sustainable urban development and urban water management.

A copy of a completed LWMS Checklist for Developers (WAPC, 2008) and DoW LWMS Checklist have been included as Appendix A to assist the City and DoW in review of this document.

Planning Phase	Planning Document	Urban Water Management Document and Status
Regional	-	Jandakot Drainage and Water Management Plan (DoW, 2009b)
District	Amendment 1189/57	Wellard Urban Precinct East District Water Management Strategy (Emerge, 2015)
Local	Lots 670 & 1333 Bertram Rd, Wellard - Local Structure Plan	Lots 670 & 1333 Bertram Rd Wellard Local Water Management Strategy (LWMS) THIS DOCUMENT
Subdivision	Subdivision Application	Urban Water Management Plan (UWMP) (required for individual stages of development) FUTURE PREPARATION

TABLE 2: INTEGRATED PLANNING AND URBAN WATER MANAGEMENT PROCESS

1.2 Previous Studies

This LWMS uses the following key documents to define its principles, criteria, and objectives:

- Statement of Planning Policy 2.9: Water Resources (WAPC, 2006);
- Stormwater Management Manual for WA (Department of Water, 2007)
- Decision Process for Stormwater Management in WA (Department of Water, 2009a)
- Better Urban Water Management (WAPC, 2008)

- Peel-Harvey WSUD Local Planning Policy (PDC, 2006a);
- Peel-Harvey Water Sensitive Urban Design Technical Guidelines (PDC, 2006b)
- Peel-Harvey Water Quality Improvement Plan (PDC, 2008);
- Jandakot Drainage and Water Management Plan: Peel Main Drain catchment (DoW, 2009b)
- Wellard Urban Precinct East District Water Management Strategy (Emerge, 2015)

1.2.1 Planning Policy 2.9 and Liveable Neighbourhoods

The LWMS has been developed in accordance with regional and local principles and objectives of integrated urban water management (IUWM).

The Western Australian Planning Commission (WAPC) (2008) defines IUWM (also known as total water cycle management) as promoting 'management of the urban water cycle as a single system in which all urban water flows are recognised as a potential resource and where the interconnectedness of water supply, stormwater, wastewater, flooding, water quality, waterways, estuaries and coastal waters is recognised'.

IUWM should also promote water conservation measures, reuse and recycling of water and best practice in stormwater management (WAPC, 2008). These objectives are consistent with Liveable Neighbourhoods (WAPC, 2009).

1.2.2 Stormwater Management Manual for WA

DoW's current position on Urban Stormwater Management in Western Australia is outlined in Chapter 2: Understanding the Context of the Stormwater Management Manual for Western Australia (DoW, 2007), which details the management objectives, principles, and a stormwater delivery approach for WA. Principal objectives for managing urban water in WA are stated as:

- Water Quality: To maintain or improve the surface and groundwater quality within development areas relative to pre-development conditions.
- Water Quantity: To maintain the total water cycle balance within development areas relative to the pre-development conditions.
- Water Conservation: To maximise the reuse of stormwater.
- Ecosystem Health: To retain natural drainage systems and protect ecosystem health.
- Economic Viability: To implement stormwater systems that are economically viable in the long term.
- Public Health: To minimise the public risk, including risk of injury or loss of life to the community.
- Protection of Property: To protect the built environment from flooding and waterlogging.
- Social Values: To ensure that social aesthetic and cultural values are recognised and maintained when managing stormwater.
- Development: To ensure the delivery of best practice stormwater management through planning and development of high quality developed areas in accordance with sustainability and precautionary principles.

The DoW has also released a Decision Process for Stormwater Management in WA (DoW, 2009a) to provide a framework for the planning and design of stormwater management systems and assist in meeting the objectives specified above.



1.2.3 Better Urban Water Management

This LWMS has been developed to be consistent with the framework and process detailed in WAPC's urban water management planning guideline document Better Urban Water Management (WAPC, 2008).

This LWMS has been prepared to support local structure planning for the Study Area. Consistent with WAPC (2008) an Urban Water Management Plan (UWMP) will be required to support subdivision applications within the Study Area in due course. Further details specifying requirements of a UWMP are contained in Chapter 6 Implementation.

1.2.4 Regional Document Summary

Regional planning guidelines for the Study Area include the following three important documents:

- Peel-Harvey WSUD Local Planning Policy (PDC, 2006a);
- Peel-Harvey Water Sensitive Urban Design Technical Guidelines (PDC, 2006b);
- Peel-Harvey Water Quality Improvement Plan (PDC, 2008)

These documents provide guidance on the design, application, implementation and assessment of water sensitive urban design (WSUD) for the soil-hydrological conditions prominent throughout the Peel-Harvey region (PDC, 2006b).

The Local Planning Policy (PDC, 2006a) encourages the application of the WSUD principles discussed in the Technical Guidelines and provides advice for local government for the assessment of proposals. The Water Quality Improvement Plan provides specific environmental quality objectives for WSUD in the region.

1.2.5 District Document Summary

District drainage and water management guidance is provided by the Jandakot Drainage and Water Management Plan (DWMP) (DoW, 2009b) and the Wellard Urban Precinct East DWMS (Emerge, 2015). The DWMP provides conceptual drainage management for the Jandakot Structure Plan area including the Peel Main Drain. The Plan provides a catchment scale plan for drainage and water management on which smaller scale developments are based.

The DWMS (Emerge, 2015) provides revised drainage management concepts based on the DWMP for the area east of Bollard Bulrush Swamp. Specific discharge rates and conceptual estimated attenuation volumes are provided in the DWMS for sub-catchments of the Bollard Bulrush Swamp east catchment. The DWMS also provides appropriate district scale water design and management principles and objectives which are refined in this document.

1.3 Key Principles and Objectives

Summaries of key principles and objectives applicable to the LWMS for the Study Area based on these documents are provided in Table 3.



TABLE 3: SUMMARY OF LWMS PRINCIPLES AND OBJECTIVES

Key Guiding Principles

- Facilitate implementation of sustainable best practice in urban water management
- Encourage environmentally responsible development
- Provide integration with planning processes and clarity for agencies involved with implementation
- Facilitate adaptive management responses to the monitored outcomes of development
- To minimise public risk
- To maintain the total water cycle

Category	Principles	Objectives
Water Use	 Consider all potential water sources in water supply planning Integration of water and land use planning Sustainable and equitable use of all water sources having consideration of the needs of all users, including community, industry and environment No potable water should be used outside of homes and buildings 	 Minimise the use of potable water where drinking water quality is not essential, particularly ex-house uses Consumption target for potable water of 40 – 60 kL/ person/ year
Groundwater Levels and Surface Water Flows	 To retain natural drainage systems and protect ecosystem health To protect from flooding and waterlogging To implement economically viable stormwater systems Post development annual discharge volume and peak flow rates to remain at predevelopment levels or defined environmental water requirements Minimise change in peak winter levels at groundwater dependent wetlands due to urbanisation 	 The minimum habitable floor level will be 6.12 mAHD in order to provide a minimum 0.5 m clearance to the 100 year ARI flood level in the Peel Main Drain. Maintain 1.5m clearance between habitable floor level and MGL 1 year ARI 1 hour event from lots will be infiltrated on lot via soakwells 1 year ARI 1 hour event from the road network will retain in bioretention areas Where there are identified impacts on significant ecosystems, maintain or restore desirable environmental flows and/or hydrological cycles Retain and restore existing elements of the natural drainage system.
Groundwater and Surface Water Quality	 To maintain or improve groundwater and surface water quality Where waterways/open drains intersect the water table, minimise the discharge of pollutants from groundwater Where development is associated with an ecosystem dependent upon a particular hydrologic regime, minimise discharge or pollutants to receiving waterways and maintain water quality in specified environment. As compared to a development that does not actively manage stormwater quality: At least 80% reduction of TSS At least 45% reduction of TN At least 70% reduction of gross pollutants 	 Implement current known best management practice as detailed in the DoW's Stormwater Management Manual for Western Australia (2007) and the Decision Process for Stormwater Management in Western Australia. (DoW 2009), with an emphasis on a treatment train approach including nutrient input source control, use of bioretention systems, rehabilitation of waterways as living streams, and maintaining 1 year ARI post development discharge volumes and peak flow rates at pre development levels.
Disease and Nuisance Insect Management	• To reduce health risks from mosquitoes, retention and detention treatments should be designed so that between November and May, detained immobile stormwater is fully infiltrated in a time period not exceeding 96 hours	 Permanent water bodies not proposed for the Study Area.



2. PRE-DEVELOPMENT ENVIRONMENT

2.1 Location and Topography

The Study Area is approximately 8.35 ha located 35km south of the Perth CBD within the City of Kwinana, see Figure 1.

The topography is generally flat with a gentle grade north east to south west (Figure 2). Elevations range between approximately 4.5 mAHD and 9 mAHD.

A detailed feature survey of the Study Area has not been undertaken. LiDAR contours at 1m are shown in Figure 2.

2.2 Climate

The Study Area has a Mediterranean climate with warm dry summers and cool wet winters. The mean summer maximum temperature is 29.5 °C and the mean winter minimum temperature of 17.7 °C.

Annual rainfall recorded at the Bureau of Meteorology's Medina Research Centre station (009194) is shown in Figure 3. The 1983 – 2015 average annual rainfall for this site is 747 mm. The 2000 – 2015 average annual rainfall has declined to 675 mm, a 10% reduction.

2.3 Existing Land Use

An aerial photograph (Nearmap, 2015) showing existing land use within the Study Area is shown in Figure 2. The Study Area is predominately cleared with few, scattered remnant trees and vegetation. A house and sheds are present in the northeast corner of the Study Area.

In the northwest corner of the Study Area is the City of Kwinana Bertram Road infiltration basin. JDA understands that the City of Kwinana has proposed redesign of this basin, and to relocate it within the future POS area to the south within the Study Area.

A search by JDA of the Aboriginal Heritage Site database indicates no known Aboriginal Heritage Sites within the Study Area. A search of the DEC Contaminated Sites database indicates no known contaminated sites within the Study Area.

2.4 Surface Geology

Surface geology mapping is shown in Figure 4. The 1:50,000 Rockingham Environmental Geology Map (GSWA 1985) indicates the geology of the Study Area is typically as follows:

- Ms5 SANDY SILT dark brownish grey silt, with disseminated fine-grained quartz sand, firm, variable clay content, of lacustrine origin
- S8 SAND pale yellowish brown, medium to coarse-grained, sub-angular to well-rounded quartz, trace of feldspar, shell debris, variably lithified, surface kankar, of eolian origin.

A geotechnical investigation has not been undertaken for the Study Area. A geotechnical investigation will be required prior to subdivision and the results of the investigation included in a future Urban Water Management Plan (UWMP).

Based on JDA's experience on the Swan Coastal Plain, sands within post-development Study Area (S8) have a low Phosphorus Retention Index (PRI).

Due to the high proportion of silty soils over the Study Area, opportunities for infiltration of stormwater will be limited.



2.5 Acid Sulfate Soils

Acid Sulfate Soil mapping is shown in Figure 4. Regional ASS mapping indicates majority of the Study Area is classified High to Moderate Risk of ASS within 3m of the natural surface. A small northern portion of the Study Area is classified as Moderate to Low Risk of ASS within 3 m of natural surface.

A preliminary site ASS investigation has not been performed as the majority of the site is already classified at the highest level of High Risk. A detailed ASS Investigation will be undertaken prior to subdivision and relevant management, presented in an ASS Management Plan, referenced in the UWMP.

2.6 Wetlands

The Study Area is bounded by the Bollard Bulrush Swamp. The swamp is classified as a Conservation Category (CCW) Wetland (DEC, 2013). Majority of the Study Area is classified as Multiple Use Sumpland, with the south west portion classified as Conservation Sumpland. Wetlands and significant environmental features are shown in Figure 5.

A detailed Environmental Review (ENV, 2013) was assessed by the Environment Protection Authority (EPA). The Review highlighted the potential to amend the boundary of the CCW due to the poor condition of existing vegetation in certain areas (ENV Australia, 2013).

The EPA (2014) Report and Recommendations approved a wetland boundary and wetland buffer to delineate conservation and development areas.

A 50m buffer applies to the approved wetland boundary as shown in Figure 5.

In 2007 Ecoscape undertook an assessment of wetland ecological water requirements (EWRs) for the Bollard Bulrush Swamp. The EWRs were presented in the DWMP (DoW, 2009b) and are reproduced in Table 4.

TABLE 4: BOLLARD BULRUSH SWAMP ECOLOGICAL WATER REQUIREMENTS (ECOSCAPE, 2007 IN DOW, 2009B)

Most Vulnerable Species			Least vulnerable species	Most vulnerable species	Preferred maximum (mAHD)
Wetland	Upper max. groundwater level (mAHD)	Lower max. groundwater level (mAHD)	Lower max. groundwater level (mAHD)	Upper min. groundwater level (mAHD)	0.50 < Upper min.
Bollard Bulrush Swamp	4.11	1.99	0.67	5.99	5.49

DoW (2009b) recommends post-development monitoring of groundwater levels in locations with groundwater levels within and directly adjacent to the Swamp do not rise above the preferred maximum of 5.49 mAHD or fall below the lower maximum groundwater level of 1.99 mAHD.

2.7 Surface Water Hydrology

2.7.1 Existing Surface Drainage

The Study Area is located within the floodplain of the regionally significant Peel Main Drain (PMD) and the Bollard Bulrush Swamp within the Peel Main Drain Catchment. The Study Area drains to the Bollard Bulrush



Swamp in the south west via overland flow. The Peel Main Drain flows south discharging via a culvert under Millar Rd and ultimately discharging to the Serpentine River. Surface water flow is shown in Figure 6.

2.7.2 Previous Drainage Planning

The Jandakot DWMP (DoW, 2009b) provides pre-development peak 10 and 100 year ARI flows and levels for the PMD and Bollard Bulrush Swamp as modelled by GHD. Peak flows and levels are presented in Table 5 and locations shown in Figure 6.

	10 Year ARI Level (mAHD)	10 Year ARI Flow (m³/s)	100 Year ARI Level (mAHD)	100 Year ARI Flow (m³/s)
PMD56 (Peel Main Drain Upstream, Bertram Rd Culvert)	7.90	3.25	8.20	3.82
BOLLCB (Bollard Bulrush Swamp)	4.82	3.38	5.62	4.00
PMD55 (Peel Main Drain Downstream, Millar Rd Culvert)	4.70	4.38	5.59	5.06

2.7.3 Surface Water Quality

Pre-development surface water quality has not yet been undertaken within the site, however the Peel Main Drain which is adjacent to the Study Area has been monitored. The Jandakot DWMP indicates that Total Phosphorous and Total Nitrogen concentrations are low in comparison to the ANZECC (2000) trigger values for streams in south-west Western Australia. These results are to be used to provide baseline water quality parameters for future development of the Study Area.

The long term targets for Total Phosphorous and Total Nitrogen for the Peel Main Drain as identified in the Jandakot DWMP and are 0.1mg/L and 1.0mg/L respectively.

2.8 Groundwater Hydrology

An 18 month pre-development groundwater investigation was undertaken by ENV (2011) from July 2010 to December 2011. Of the network of six groundwater monitoring bores installed by ENV, two of the bores, MW1E and MW2E, are located within the Study Area, see Figure 7.

2.8.1 Maximum Groundwater Level (MGL)

Groundwater levels were measured by Emerge (2015) for bore MW1E in September and October 2014, however this data is limited due to access issues on site as well as the poor condition of the bores.

Maximum Groundwater Contours over the 18 month monitoring period were estimated for the wider DWMS area by ENV (2011) and presented in the DWMS (Emerge, 2015), see Figure 7. The maximum groundwater level is below natural surface across the majority of the Study Area, ranging from 0m clearance in the south west to 2m in the north east. These MGL contours do not appear to include the drawdown influence of the Peel Main Drain. Regardless of the localised drawdown, the adopted MGL for design is considered a conservative approach.



Regional groundwater level seasonal variation on the Swan Coastal Plain is in the order of 1.5m, however due to the close proximity of the Bollard Bulrush Swamp, the groundwater level seasonal variation has been calculated by JDA to be 0.8m from nearby DoW Bore T240 (I) (WIN Site ID: 3038), see Appendix B.

2.8.2 Groundwater Quality

Groundwater quality was recorded by ENV on four occasions over the 18 month period. Results for bores MW1E and MW2E are presented in Table 6. ANZECC assessment levels (ANZECC, 2000) are provided for reference only and do not indicate baseline trigger values. The water quality results presented in Table 6 are to be used as baseline water quality parameters for assessment post-development.



TABLE 6: GROUNDWATER QUALITY RESULTS

Sample Date	рН	EC (uS/cm)	Total P (mg/L)	FRP (mg/L)	Total N (mg/L)	NH₃ (mg/L)	TKN (mg/L)	NOx (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)
ANZECC1	6.5 – 8.0	-	0.065	0.04	1.2	-	-	0.15	-	
MW1E										
8/07/2010	7.3	810	1.30	0.25	3.8	0.02	3.0	-	0.72	0.039
28/10/2010	7.6	530	1.30	0.30	1.3	0.02	1.2	0.092	-	-
20/01/2011	7.7	510	0.79	0.17	3.7	0.047	1.4	2.80	-	-
1/12/2011	7.6	2100	0.67	0.12	4.0	0.10	5.6	0.09	0.04	0.04
Mean	7.55	763	1.02	0.21	3.2	0.05	2.3	0.99	0.38	0.0395
MW2E										·
8/07/2010	7.6	1200	0.58	<0.005	1.10	0.57	1.1	-	0.007	<0.005
28/10/2010	7.4	1000	0.12	0.005	1.3	0.64	1.2	0.008	-	-
20/01/2011	7.7	910	0.21	0.03	1.7	0.65	1.4	0.28	-	-
10/05/2011	7.5	1200	0.17	0.02	5.6	0.13	5.6	<0.05	-	-
14/06/2011	7.2	1100	0.86	0.05	1.9	0.41	1.9	<0.05	-	-
6/10/2011	7.7	1300	0.46	0.02	1	0.43	1.0	<0.05	<0.02	<0.02
1/12/2011	7.7	1300	0.43	0.04	1.9	0.05	1.4	0.52	0.41	0.12
Mean	7.76	927	0.23	0.03	3.9	0.44	3.6	0.24	0.13	0.19

1. Fresh Waters. Australian and New Zealand Environment and Conservation Council (ANZECC) (2000) Australian Water Quality Guidelines for Fresh and Marine Water Quality;



2.9 Water Resources

The Study Area is located within the DoW's Serpentine River Catchment Surface Water Management Area and Lower Serpentine Surface Water Management Sub-area (SWMA). Use of surface water for water supply within the Study Area is not considered appropriate as surface water is required to maintain the Bollard Bulrush Swamp hydrological regime.

The Study Area is within the DoW's Serpentine Groundwater Management Area (GMA), and Jandakot Mound 2 Groundwater Management Sub-area. A search of the online DoW Water Register indicates the Jandakot Mound 2 Superficial aquifer currently has water available. Limited information is available for the Perth-Leederville aquifer however as this water resource is currently used for potable water use, an alternate non-potable water supply is not considered appropriate.

Potable water supply to homes currently in the Study Area is via the Water Corporation managed Medina Water Scheme which is primarily fed by the Jandakot Mound (Perth-Leederville aquifer). Connection to the existing supply scheme will require the extension of existing infrastructure. Confirmation and details of Water Corporation supply will be provided in the UWMP. There are no existing DoW groundwater licences within the Study Area.

2.10 Hydrological Opportunities and Constraints

The above described characteristics of the pre-development environment in the Study Area provide a number of key constraints and opportunities for the application of water sensitive urban design with land use change:

- Silty clay soils are likely to limit post development infiltration opportunities in the Study Area, and this
 will impact the ability to meet DoW's preference to infiltrate frequently occurring storm events (typically
 less than 1 year ARI). Frequently occurring storm events (1 yr ARI 1hr) will be infiltrated at source
 where possible via soakwells in imported fill; subsoils will be required to avert rising of groundwater
 within fill.
- WAPC's Bulletin 64 (WAPC, 2003) ASS risk mapping for the Study Area indicates high risk of Actual ASS or Potential ASS within 3 m of the existing surface for the vast majority of the Study Area. An ASS Investigation and Management Plan will be required prior to development.
- There is a Conservation Category Wetland and EPP Lake within the Study Area which requires consideration in regard to drainage and water quality. Drainage infrastructure is to be placed outside of the 50m wetland buffer.
- Groundwater monitoring and mapping within the Study Area (ENV, 2011) has allowed for a local assessment of groundwater levels in relation to existing natural surface level. High groundwater levels will require management and control in the post-development environment to prevent rising groundwater table and inappropriate draining of groundwater.
- Habitable floor levels are to be minimum 6.12 mAHD, that is 0.5m above the adjacent Peel Main Drain 100 year ARI flood level of 5.62 mAHD.
- Historical rural land use within the Study Area has to varying degrees affected groundwater quality and there are currently no water quality controls. Change in land use provides an opportunity to improve groundwater quality through application of sustainability principles, water sensitive urban design, and establishment of water quality targets, monitoring and compliance reporting.

These constraints and opportunities are used in to assist development of a suitable Local Water Management Strategy (LWMS) for the Study Area.



3. PROPOSED DEVELOPMENT

The proposed Local Structure Plan for the Study Area is shown in Figure 8.

Key elements of the LSP related to urban water management include:

- Establishment of a buffer for the future protection of the Bollard Bulrush Swamp. This buffer area will include restricted POS but will not contain any active POS or drainage infrastructure;
- POS area proposed to be passive with mulching and use of native water-wise plantings for revegetation. No active turf areas are proposed. City of Kwinana has requested POS area to remain as existing natural condition with only minor revegetation around perimeter. Detailed landscaping to be provided at UWMP stage.
- Use of ephemeral bioretention areas for management of local stormwater in POS;
- At-source infiltration of frequently occurring storm events, up to 1yr ARI 1hr duration, in road reserves and POS where practical;
- Maintenance of drainage/stormwater discharge points from the Study Area to the receiving environment;
- Control of post-development groundwater rise within imported fill via subsoil drainage;
- Minimisation of fill consistent with sustainability principles.
- Lot size and yield to be determined at subdivision stage.



4. WATER USE SUSTAINABILITY INITIATIVES

4.1 Water Conservation

Development of the Study Area will lead to an increased demand for water for new residents as well as irrigation of public open space areas.

Water conservation measures will be implemented to reduce scheme water consumption within the development and will be consistent with Water Corporation's "Waterwise" land development criteria, and include:

- Use of medium density residential zoning and smaller lots to reduce garden (ex-house) use of water.
- Promotion of use of waterwise practices including water efficient fixtures and fitting (taps, showerheads, toilets and appliances, rainwater tanks, waterwise landscaping).
- Consumption target for water of 100 kL/person/year, including not more than 40-60 kL/person/year scheme water.
- All houses to be built to 5 star building standards.
- Utilise fit for purpose water sources throughout the development.
- Use of native plants in POS areas and buffer areas.
- Maximising on site retention of stormwater (where practicable).

Specific agreed measures and locations to achieve water conservation will be detailed in the UWMP.

4.2 Potable & Non-Potable Water Supplies

4.2.1 Household Scale

The water source planning strategy for the Study Area is for use of scheme water for domestic household use (both in and ex-house). The development will be connected to Water Corporation's Integrated Water Supply Scheme (IWSS). The Water Corporation has advised that supply to the development can come from the existing DN300 water main within Johnson Road. Upgrades to the water distribution infrastructure may be required to service the ultimate development however, Water Corporation water planning is currently under review. More detailed information and Water Corporation confirmation of supply will be provided at UWMP stage.

The use of rainwater tanks to supplement potable water use ex-house and in-house will be encouraged by the developer. The use of rainwater tanks will be assessed as part of the UWMP process at subdivision stage when more detailed planning is commenced. The integration of rainwater tanks for non-potable water with the domestic water supply scheme would assist in reducing excess stormwater generation and minimise scheme water importation.

Superficial groundwater abstraction via installation of domestic groundwater bores could also be used for ex-house uses such as irrigation of garden and lawn areas, where geology permits.

4.2.2 Public Open Space Areas

POS maintenance and irrigation supply requirements will be managed by the developer for a period of two years before hand-over to the City of Kwinana. Detail landscaping design and planting will be presented in the UWMP.



Sources of non-potable water supply for short-term and long-term irrigation of POS areas (should it be required) have been investigated. The DoW Water Register in January 2016 indicated that water allocations for the superficial groundwater aquifer in this area are currently available.

Based on the household and POS water strategies, a water balance for the site has not been provided in the LWMS, as it is typically required to support the identification of excess water generated by the development where use of this excess water as a non-potable water supply scheme is proposed. A water balance would not provide any further information on water use and potable/non-potable supply options. Furthermore, design and building of the proposed development to current industry standard should ensure water use is within current Water Corporation and Department of Water consumption targets.

4.3 Wastewater

Wastewater disposal from the development is proposed to be serviced via an extension of the Water Corporation's existing infrastructure. The Water Corporation's wastewater planning over the development area indicates that there is currently capacity within the existing Bertram Road wastewater pump station located to the north west of the site which can accommodate gravity flows from the Study Area. Further advice from Water Corporation on the completion of wastewater infrastructure planning for the Study Area will be provided at UWMP stage.



5. STORMWATER MANAGEMENT

5.1 District Flood Management

The Study Area is within the Peel Main Drain and Bollard Bulrush Swamp catchments which are significant in post-development regional flood management. As documented in Section 2.8 Regional Flood Management for the Peel Main Drain and Bollard Bulrush Swamp has previously been modelled by GHD and documented in the Jandakot DWMP (DoW, 2009b). Post-development modelling was based on the Infoworks CS model used in the Jandakot DWMP. The modelling identified storage volumes required by developments proposed within Bollard Bulrush Swamp to ensure pre-development peak flow rates and flood levels identified in the Jandakot DWMP are maintained. A summary of the post-development peak flows and rates in provided in Table 7 and the GHD modelling memorandum is provided in Appendix C.

Location	Top Water L	evel (mAHD)	Peak Flow (m ³ /s)		
	10 Year ARI	100 Year ARI	10 Year ARI	100 Year ARI	
Peel Main Drain at Bertram Rd	7.90	8.20	3.25	3.82	
Bollard Bulrush Swamp	4.82	5.61	3.38	4.00	
Peel Main Drain at Millar Rd	4.70	5.59	4.39	5.14	

TABLE 7: POST-DEVELOPMENT PEAK FLOW RATES AND WATER LEVELS (GHD, 2010)

When compared to Table 5, it is noted that pre and post-development top water levels are consistent. This was achieved by providing on-site detention throughout the Bollard Bulrush Swamp area; 30,000 m³ in the 10yr ARI event and 39,000 m³ in the 100yr ARI event. The DWMS identified the required storage volumes within the East Precinct in the 10 and 100 year ARI as 12,146 m³ and 15,790 m³ respectively. This is based on a percentage ratio approach. As such, the required detention volumes in the Study Area are 1,020 m³ in the 10yr ARI event.

This criterion was later superseded following advice from Bill Till (Department of Water) at an on-site meeting in 2014 with consultants, a neighbouring proponent and the City of Kwinana (*pers. comm.* Jane Sturgess, 2015). At this meeting, it was agreed that the development will retain, treat and infiltrate the first 15mm (small events). The preferred management of this first 15 mm is as close to source as possible. Additional stormwater for greater events is to be directed towards another biofiltration area located within the POS adjacent to the wetland and its buffer. Excess stormwater will discharge slowly as sheet flow overland into the wetland area as it does pre-development with scour and erosion protection. No infrastructure is to be included within the wetland or its buffer.

This advice has been accepted and applied to the Study Area, therefore no attention of the 10yr or 100yr ARI peak volume is provided. The bioretention basin has been sized to hold the first 15 mm of stormwater from the development. It is expected that the wetland and buffer itself will act as the detention storage areas, so pre and post development flows will inherently match.

5.2 Stormwater Management Strategy

The stormwater management strategy has been prepared to meet the objectives and principles of urban water management outlined in Table 3. In addition, the proposed strategy is consistent with the design



objectives from the Jandakot DWMP (DoW 2009a) and the Wellard Urban Precinct East DWMS (Emerge, 2015).

The key elements of the stormwater management strategy are:

- To retain, treat and infiltrate the first 15 mm of the rainfall event across the development area.
 - o Retention of the first 15mm of rainfall on lots within soakwells or other infiltration structures.
 - To treat the first 15 mm rainfall event from roads through bioretention areas/swales or other techniques as close to source as feasible.
- Any additional stormwater run-off created during rainfall events greater than 15 mm will be directed towards the wetland buffer.
- No stormwater infrastructure will be constructed within the CCW wetlands or its buffers.
- The discharge of these larger stormwater run-off events should occur as sheetflow across a vegetated surface towards the wetland buffer to replicate the pre-development environment (with scour and erosion protection at the initial discharge point).
- Bioretention areas should be located outside of the Bollard Bulrush Swamp 10yr ARI Top Water Level (TWL).
- The City of Kwinana Bertram Road infiltration basin will be relocated within the Study Area POS, with the concept design to be completed by the City. Stormwater discharged into this basin will be managed separately to stormwater runoff from the Study Area.
- Habitable floor levels are to be minimum 6.12 mAHD, that is 0.5m above the adjacent Peel Main Drain 100 year ARI flood level of 5.62 mAHD.
- There is to be a minimum of 500 mm clearance from the base of any bioretention basins or swales to the Maximum Groundwater Level (MGL) at that specific location.
- Use of subsoil drains to mitigate the rise of groundwater within fill and maintain a minimum separation of 1.5m between MGL and finished lot level.

5.2.1 Catchment Runoff Parameters

For 1 year ARI 1 hour storm the runoff coefficients include 80% for Road Reserves and 10% for POS to calculate the equivalent impervious areas. It is assumed that individual Lots will have soakwells with sufficient storage capacity for 15 mm of rainfall from the impervious lot area.

A breakdown of the land use area is presented in Table 8 and land use is shown in Figure 8.

Land Use	Total Area (ha)	1yr ARI Runoff Coefficient	Impervious Area (ha)
Lots	4.53	0.00	0.00
Road & Road Reserves	1.95	0.80	1.57
POS	0.57	0.00	0.00
Wetland Buffer	1.09	n/a	n/a
City of Kwinana Drainage Basin	0.21	n/a	n/a
Total	8.02	-	1.57

TABLE 8: LAND USE BREAKDOWN



5.2.2 Conceptual Stormwater System Design

A major and minor approach to the design of the stormwater management system has been adopted for this site. The minor system consists of pipes, kerbs and gutters designed to convey the stormwater to the median swales, roadside swales, and bioretention basins designed to infiltrate stormwater as close to source as possible. The major system consists of the road, median and road-side swales, bioretention basins and POS areas to provide protection of the community from extreme flooding events (up to the 100 year ARI rainfall event) that exceed the capacity of the minor system.

The City of Kwinana Bertram Road infiltration basin will be relocated within the POS area and will be managed separately to stormwater runoff from the Study Area. The proposed location for this basin is shown on Figure 9.

Drainage practices and concepts intended for stormwater management are described below and they will be subject to further design and engineering specifications during the detailed design phase, with this information included in future UWMPs.

Minor System (15 mm Rainfall Event)

Management of the frequent event (15 mm rainfall event) is largely related to water quality protection of the receiving environments. Run-off from this event is the most likely to contain pollutants originating within the catchment, and therefore measures are required to retain and treat this storm event on site.

Lots

At the lot scale, the 15 mm rainfall event will be retained within the lot boundary and be infiltrated using soakwells. Impervious areas, such as driveways will be connected directly to the soakwells. The system is achievable based on the adequate clearance to the groundwater level across the site (generally calculated to be greater than 1.5 metres) and favourable fill material suitable for sufficient infiltration rates.

Road Drainage Network

It is proposed that flows from the roads and road reserve areas are to be conveyed to tree pits, median swales, road-side swales, and to the bioretention basin for treatment and infiltration. The stormwater plan has been designed to maximise opportunities for infiltration throughout the site and as close to source as possible, helping to reduce the export of nutrients or pollutants in stormwater run-off from the site during the more frequent, minor storm events. The amount and location of any tree pits, median swales and/or road-side swales will be determined at UWMP stage.

Road drainage infrastructure will direct stormwater into the median or roadside swales via flush kerbing, or through a piped network to the bioretention basins. Stormwater will enter the street drainage system and discharge into these bioretention areas (swales or basin) where it will be infiltrated into an amended soil medium.

The total impervious road and road reserve area in the development is 1.56 ha. In a 15 mm rainfall event, a total of volume of 234 m³ will require treatment. Assuming a basin/swale depth of 0.3 m, this suggests that 780 m² of area is required for drainage throughout the development. Indicative locations of stormwater treatment areas and basins are provided in Figure 9. It is suggested that the basins are located outside of the Bollard Bulrush Swamp 10yr ARI TWL boundary, as shown in Figure 9.

Major System (Rainfall Events Greater than 15 mm)

Stormwater run-off from the development will be directed along the roads towards the swale and basin system. When the capacity of the swale and bioretention basin is reached (i.e. after the first 15 mm of rainfall), it is anticipated that the basin will overtop via an overflow spillway to mimic sheetflow and be directed towards the wetland buffer and storage area, which will be designed to minimise erosion and



scouring during discharge events. The larger events will ultimately flow toward the wetland area and the PMD.

5.3 Groundwater Management

Minimum separation between building floor levels for development and the Maximum Groundwater Level (MGL) will be achieved by combination of subsoil drainage and the importation of clean sand fill. The design of the proposed development should incorporate a minimum habitable floor level 1.5m above the MGL to meet the recommended clearance, unless otherwise indicated in future geotechnical reports completed as part of the UWMP.

Use of subsoil drains will also be required to mitigate the rise of groundwater within fill. It will not be used to lower groundwater levels, but will be installed as a backup to ensure post development groundwater levels are maintained and minimum separation 1.5m is achieved in imported fill. A design groundwater level (DGL) will be implemented by setting subsoil drainage inverts as a minimum at the MGL. Subsoil drains will be located in road reserves and throughout the proposed lot area to achieve the DGL. Subsoil is to discharge into the bioretention area and be free draining.

Detailed cross sections including stormwater pits and pipes and detailed design of subsoil drainage including spacing to achieve the DGL is to be undertaken at subdivision stage and included in the UWMP.

Finished lot levels and fill requirements are a detailed design issue to be addressed during preparation of the UWMP and submitted for council approval at that stage. Note that other factors such as geotechnical, sewerage infrastructure or clearance to 100 year ARI flood level may be the determining factor for fill level, rather than groundwater clearance.

Groundwater mapping presented in Figure 7 should be considered indicative only for assisting in LWMS strategy development purposes and subject to further investigation/refinement during UWMP stage.





5.4 Water Quality Management

With respect to water quality management the LWMS proposes the use of a treatment train approach including source control techniques. The proposed water quality management approach for the Study Area will include:

• Non Structural Controls

Planning practices (POS locations and configuration, watercourse buffers) Construction practices (construction management, use of plantings with City of Kwinana recommended Endemic Species (see Appendix D)) Maintenance practices (street sweeping, stormwater system, POS areas) Educational and participatory practices (community education)

• Structural Controls

- Infiltration of lot runoff at source via soakwells and gardens
- Infiltration of road runoff via bioretention swale or basin (designed with soils with a PRI >10 and City of Kwinana recommended Endemic Species List (see Appendix D))

Monitoring

Establishment of post development monitoring network Annual reporting, including assessment of BMP's performance

With respect to criteria for water quality, the principle of improving water quality in comparison to existing water quality will be adopted via Water Sensitive Urban Design, and water quality targets developed on this basis as percentage reductions as per Best Management Practise water quality targets (see Section 5.4.1). Assessment of compliance with targets will be through post-development monitoring (refer section 6.4).

To achieve its water quality objectives, the LWMS focuses on implementing current known best management practice as detailed in the DoW's Stormwater Management Manual for Western Australia (2007) and the Decision Process for Stormwater Management in Western Australia (DoE & SRT, 2005), with an emphasis on nutrient input source control, rehabilitation of EPP Lake buffer, and establishing bioretention systems for treatment of frequently occurring storm events and subsoil drainage. Detailed design of these management items will be presented in the UWMP.

Opportunities for infiltration and treatment of frequent rainfall events (15mm) higher in the catchment with roadside swales, tree pits, flush kerbing adjacent to POS and soakwells within fill etc. are to be investigated further during detail design and presented in the UWMP.

5.4.1 Assessment of Proposed Structural BMP's to Design Criteria

Table 9 details a summary from DoW's Stormwater Management Manual for Western Australia (2007) of expected pollutant removal efficiencies for vegetated swales and detention/retention systems in relation to the water quality design criteria specified in Table 1.

While DoW (2007) does not provide expected pollutant removal efficiencies for all BMP's, application of a treatment train approach using a combination of non-structural and structural measures detailed in Section 5.4 will therefore clearly achieve the design objectives for water quality.

Specific details on the location scale of application, and management responsibilities for individual BMP's are to be assessed for individual stages during development of the UWMP.

Parameter	Design Criteria via DWMP (required removal as compared to a development	Structural Controls Nutrient Output Reduction ¹		
	with no WSUD)	Vegetated Swales/ Bioretention Systems	Detention/ Retention Storages	
Total Suspended Solids	80%	60-80%	65-99%	
Total Phosphorus	60%	30-50%	40-80%	
Total Nitrogen	45%	25-40%	50-70%	
Gross Pollutants	70%	-	>90%	

TABLE 9: BMP WATER QUALITY PERFORMANCE IN RELATION TO DESIGN CRITERIA

1. Typical Performance Efficiencies via DoW (2007)

5.5 Construction Management

5.5.1 Dewatering

Dewatering of the superficial aquifer may be required for some elements of development construction. As the volume of dewatering will be small compared to aquifer storage and this is to be infiltrated back into the superficial aquifer, the impact upon the aquifer will be minimal.

Drawdown will occur at the dewatering site, and mounding where the water is infiltrated. It should be noted that there will be zero net loss of groundwater, as all water abstracted will be infiltrated (except for minor losses to evaporation).

Prior to the commencement of any dewatering, construction contractors will be required to apply for and obtain from DoW a 'Licence to Take Water'. All dewatering will be carried out in accordance with the conditions of this licence.

Where possible, construction will be timed to minimise impact on groundwater and dewatering requirement.

5.5.2 Acid Sulphate Soils

All assessment and management of ASS will be conducted in accordance with the Acid Sulfate Soil Guideline Series Identification and Investigation of Acid Sulfate Soils (DoE, 2004), including the Preliminary Site Assessment (PSA) involving a targeted soil and groundwater sampling and analysis program, detailed site assessment (if required), and ultimately and an ASS Management Plan if ASS is to be impacted.

During construction, appropriate handling methods will need to be employed by the construction contractor to manage any potential acid sulphate soils. Handling should be in accordance with the Acid Sulfate Soils Guidelines Series Treatment and Management of Disturbed Acid Sulphate Soils (DoE, 2003). These guidelines specify holding times and specific methods for treatment of such soils. To confirm the status of soils, the site engineer or scientist will regularly inspect the excavations and spoil, and ensure such soils are appropriately tested and managed before reuse or disposal off-site.



6. IMPLEMENTATION

6.1 Roles and Responsibilities

Table 10 details the roles and responsibilities to undertake the implementation plan.

TABLE 10: IMPLEMENTATION RESPONSIBILITIES

IMPLEMENTATION	RESPONSIBILITY		
Action	The Developer	City of Kwinana	
Preparation of an Urban Water Management Plan for individual development stages	~		
Construction of stormwater system and 12 months maintenance post construction (defects period)	4		
Long term stormwater system operation and maintenance		~	
Monitoring program – 2 years post development	√		

6.2 Subdivision Application Process

Consistent with processes defined in WAPC (2007) an Urban Water Management Plan (UWMP) will be developed and submitted to support subdivision application. The UWMP will address:

- Demonstrated compliance with LWMS criteria and objectives to the satisfaction of CoK and DoW.
- Agreed/approved measures to achieve water conservation and efficiencies of water use.
- Refine stormwater management design presented in the LWMS including the size, location and design of public open space areas, integrating major and minor flood management capability.
- Refine the management of groundwater levels (including proposed fill levels (if any) and subsoil drainage inverts) as presented in the LWMS.
- Specific structural and non-structural BMPs and treatment trains to be implemented including their function, location, maintenance requirements, expected performance and agreed ongoing management arrangements.
- Management of subdivisional works (including development of a strategy for sediment control during construction).
- Implementation plan including roles, responsibilities, funding and maintenance arrangements.
- Specific monitoring and reporting to be undertaken for each UWMP area consistent with the monitoring program defined in the LWMS (Section 6.4).
- Contingency plans (where necessary).
- A geotechnical investigation and Acid Sulfate Soil Investigation to be carried out for Lot 670 with results to be reported in a future UWMP for these lots.



6.3 Stormwater System Operation & Maintenance

Operation and maintenance of the drainage system will initially be the responsibility of the developer, ultimately reverting to the local authority, excluding proposed strata development areas. The surface drainage system will require regular maintenance to ensure its efficient operation. It is considered the following operating and maintenance practices will be implemented periodically:

- removal of debris to prevent blockages;
- street sweeping to reduce particulate build up on road surfaces and gutters;
- cleaning of sediment build up and litter layer on the bottom of basins;
- application of slow release/zero phosphorus fertilisers for maintenance of POS areas and any swales;
- undertake education campaigns regarding source control practices to minimise pollutant runoff into stormwater drainage system; and
- checks on any subsoil drainage function.

6.4 Monitoring Program

The monitoring program has been designed consistent with Joint Australian/ New Zealand Standards (2000) to allow quantitative assessment of hydrological impacts of proposed development within the Study Area.

In particular the program addresses the monitoring of surface water discharges and groundwater quality within the development area. The program may need to be modified as data are collected to increase or decrease the monitoring effort in a particular area or to alter the scope of the program itself. Any modification to the program would require the agreement of all parties (DoW, CoK, and developer). The program is designed to operate over a two year post development period including construction to allow for time lag for full impacts of development on the receiving environment to occur.

All water quality testing will be conducted by a NATA approved laboratory. Laboratory analysis results will be typically obtained within 1 month of sample submission.

The timing of commencement of the monitoring program should be negotiated at UWMP stage with DoW and the CoK. Typically the monitoring program is commenced at practical completion of the subdivision.

Surface and groundwater monitoring are described below and summarised in Table 11. Ongoing tracking of environmental performance will be undertaken as monitoring data becomes available through a series of consolidated data spreadsheets.

6.4.1 Groundwater

Monthly monitoring of groundwater levels in ~3 locations is proposed, with quarterly monitoring of groundwater quality for the following parameters:

- In situ pH, EC and Temperature
- Nitrogen & Phosphorus (full suite)

The depth to water table will be measured by electrical depth probe or an alternative suitable device. Water samples are to be taken after purging the bores to ensure a fresh sample is obtained.

6.4.2 Annual Reporting

Reporting is proposed to be annually, co-ordinated by the developer and submitted to CoK and DoW for review. The report will compare the monitoring results with target design criteria and performance objectives

and determine what, if any, further actions may be necessary, and provide ongoing assessment of the suitability of existing monitoring and reporting frequencies.

Assessment of performance compliance against water quality criteria will require careful consideration to account for inter seasonal and inter annual variability, and as both surface and groundwater quality will be a function of historical land use practices not only within the development area, but over the entire upstream catchment.

The proposed process for contingency action in the assessment of performance compliance is

- Assess if an isolated, development area or regional occurrence.
- Determine if due to the development or other external factors.
- Perform appropriate contingency action as required, which may include:
 - a) Identify and remove any point sources.
 - b) Reinforce Community Education/Awareness program.
 - c) Review constructional, operational and maintenance (e.g. fertilising) practices.
 - d) Consider alterations to POS areas including landscape regimes and soil amendment.
 - e) Consider modifications to the stormwater system.
 - f) Consider initiation of community based projects.
- Record in the annual report any action taken, and communicate findings with Department of Water and City of Kwinana.
- If necessary, inform residents of any required works and their purpose.

Monitoring and reporting outcomes will be used in a continual improvement capacity to review proposed WSUD, and inform the planning and design approaches for subsequent stages of development.

Monitoring Type	Parameter	Location	Method	Frequency and Timing	Reporting	
Groundwater Level	Water Level (m AHD)	~3 locations	Electrical depth probe or similar	Monthly for 2 years	Annual assessment reports to be submitted to DoW &	
Groundwater Quality	pH, EC Nitrogen Phosphorus	~3 locations	Pumped bore samples	Quarterly for 2 years (typically Jan, Apr, Jul & Oct)	CoK for a 2 year period. Suitability of existing monitoring and reporting frequencies to be assessed annually with any modifications requiring agreement by all parties (DoW, CoK, & Developer)	

TABLE 11: MONITORING SCHEDULE AND REPORTING



7. REFERENCES

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Department of Water (2009a), Decision Process for Stormwater Management in WA, August 2009

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ENV (2013) Environmental Review - Metropolitan Region Scheme Amendment 1188/57 Wellard Urban Precinct East, June 2013. Report to Wellard Landowner's Group

EPA (2014) Report and Recommendations of the EPA: MRS Scheme Amendment 1188/57 – Wellard Urban Precinct Report 1500 January 2014.

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Jane Sturgess (2015) Department of Water email 16 November 2015 to Pandora Mavromatidis JDA.

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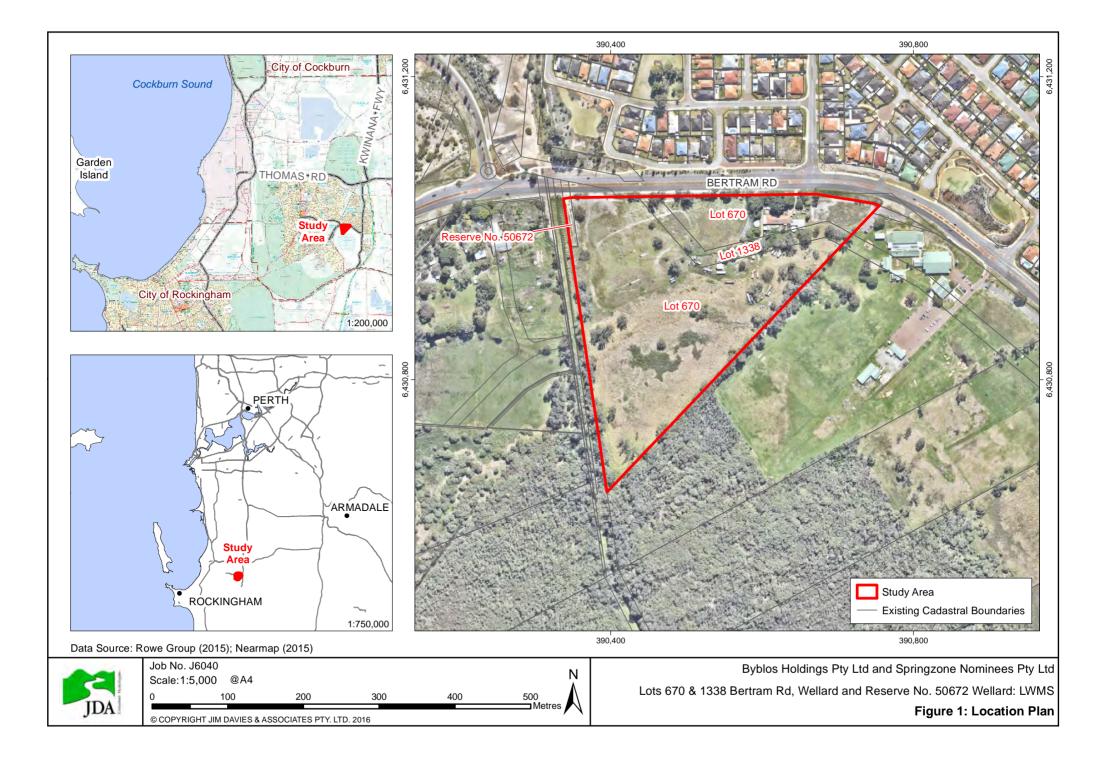
Peel Development Commission (2008), Peel-Harvey Water Quality Improvement Plan, November 2008

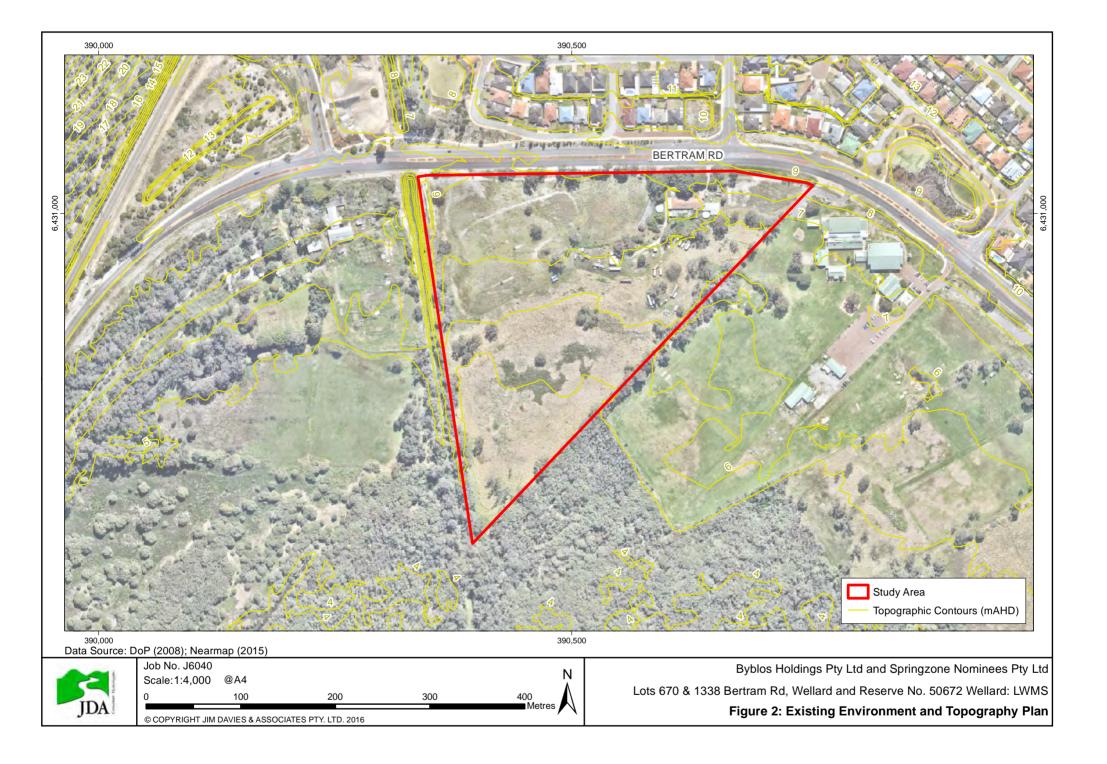
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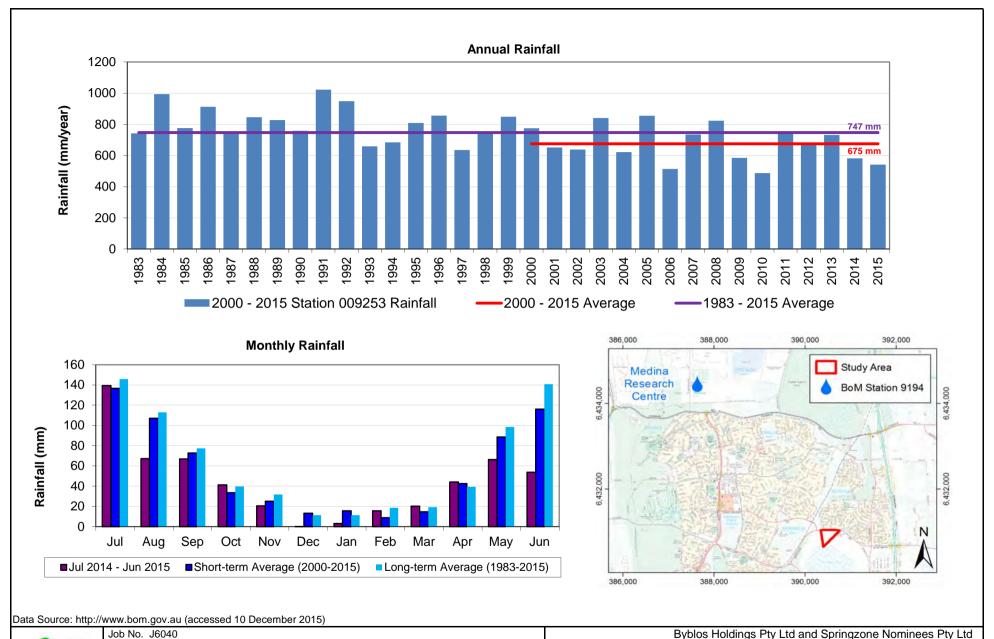
Western Australian Planning Commission (2009), Liveable Neighbourhoods, January 2009

Western Australian Planning Commission (2008), Better Urban Water Management, October 2008 Western Australian Planning Commission (2006), Statement of Planning Policy 2.9: Water Resources, December 2006.

FIGURES





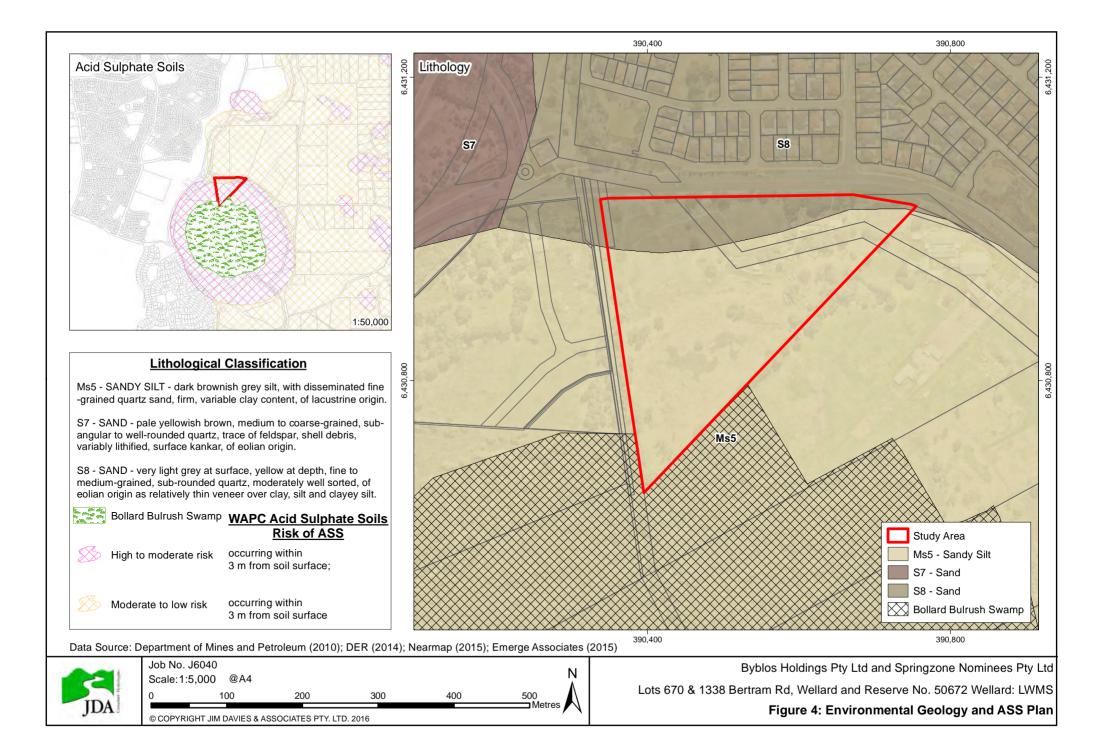


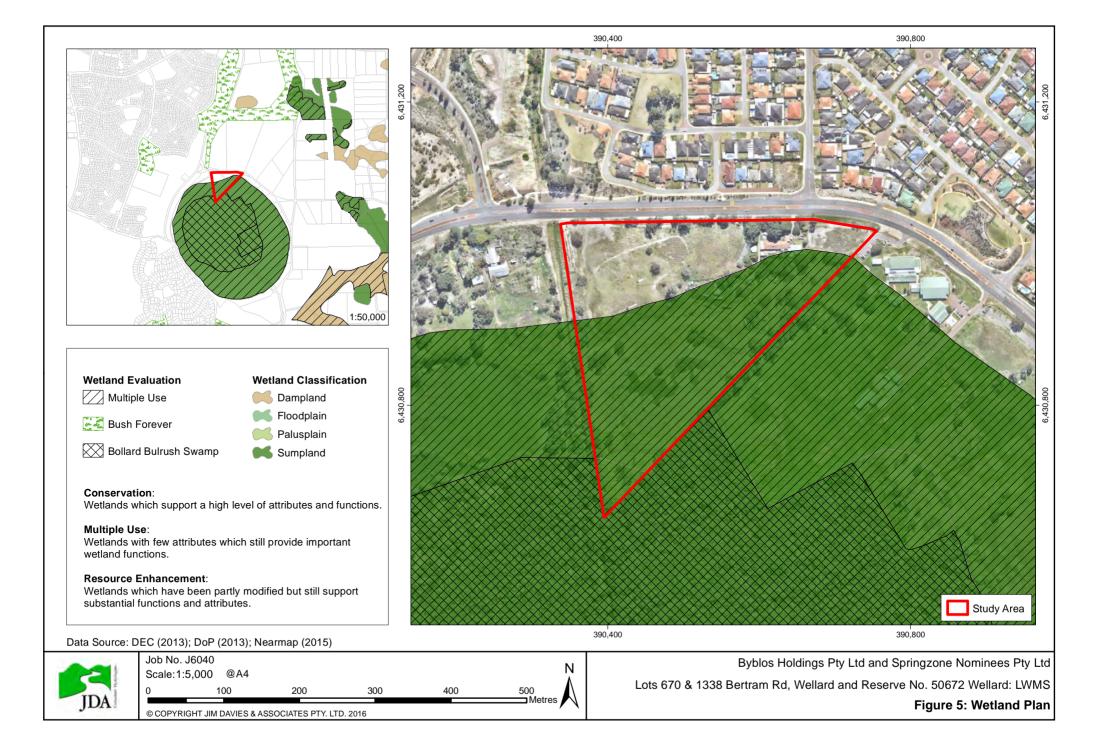
Lots 670 & 1338 Bertram Rd, Wellard and Reserve No. 50672 Wellard: LWMS

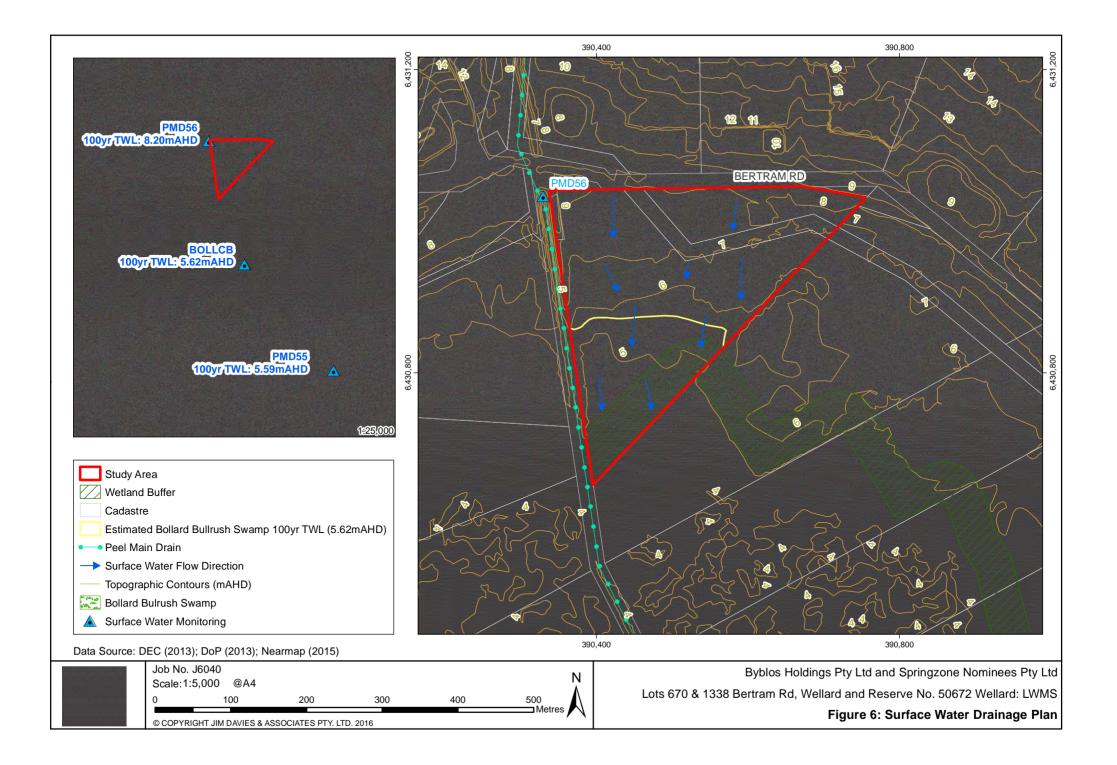
Figure 3: Annual and Monthly Rainfall

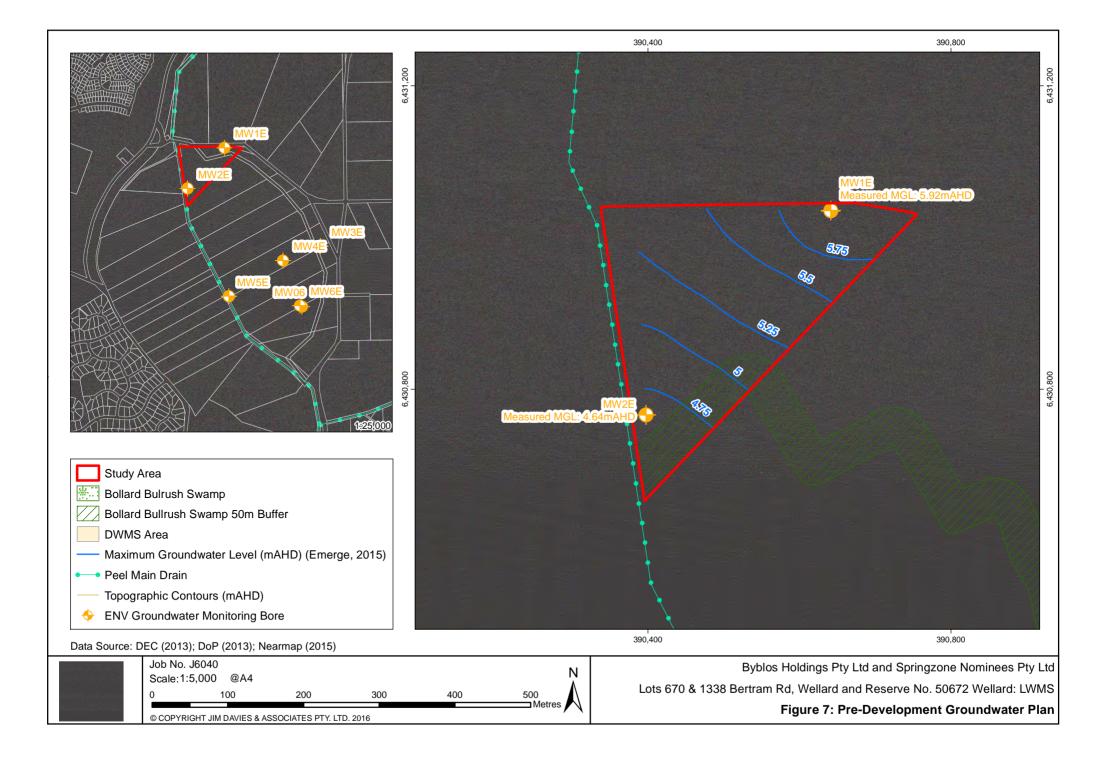
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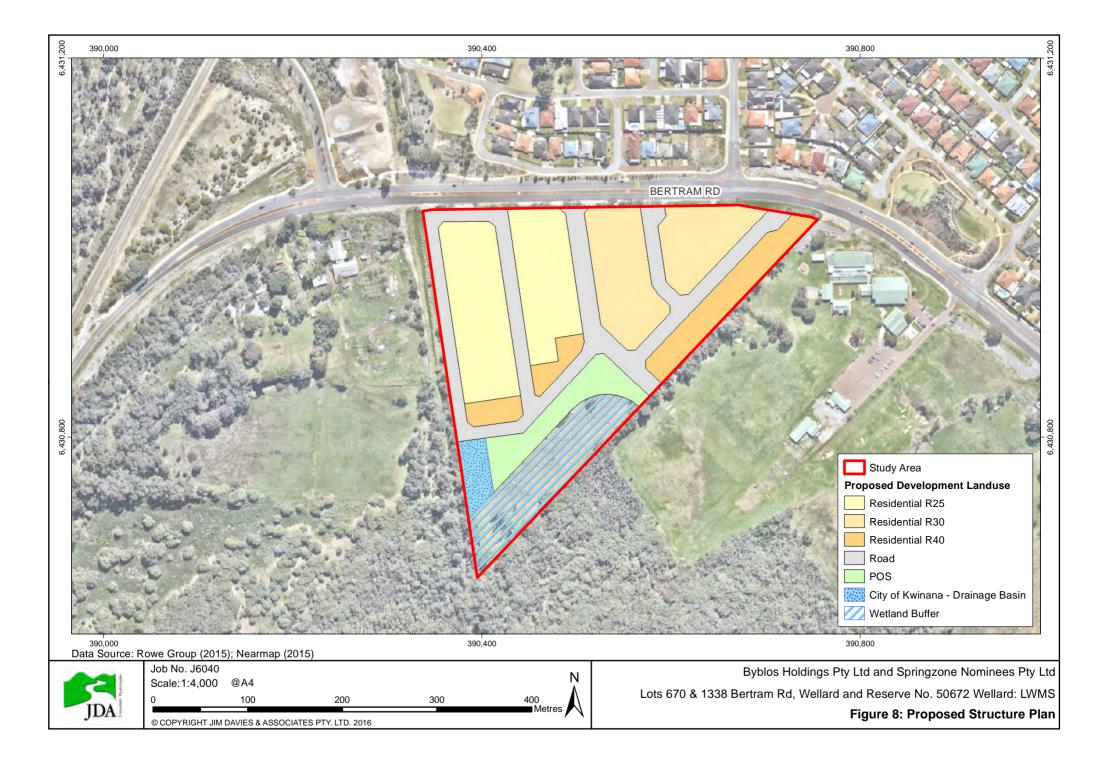
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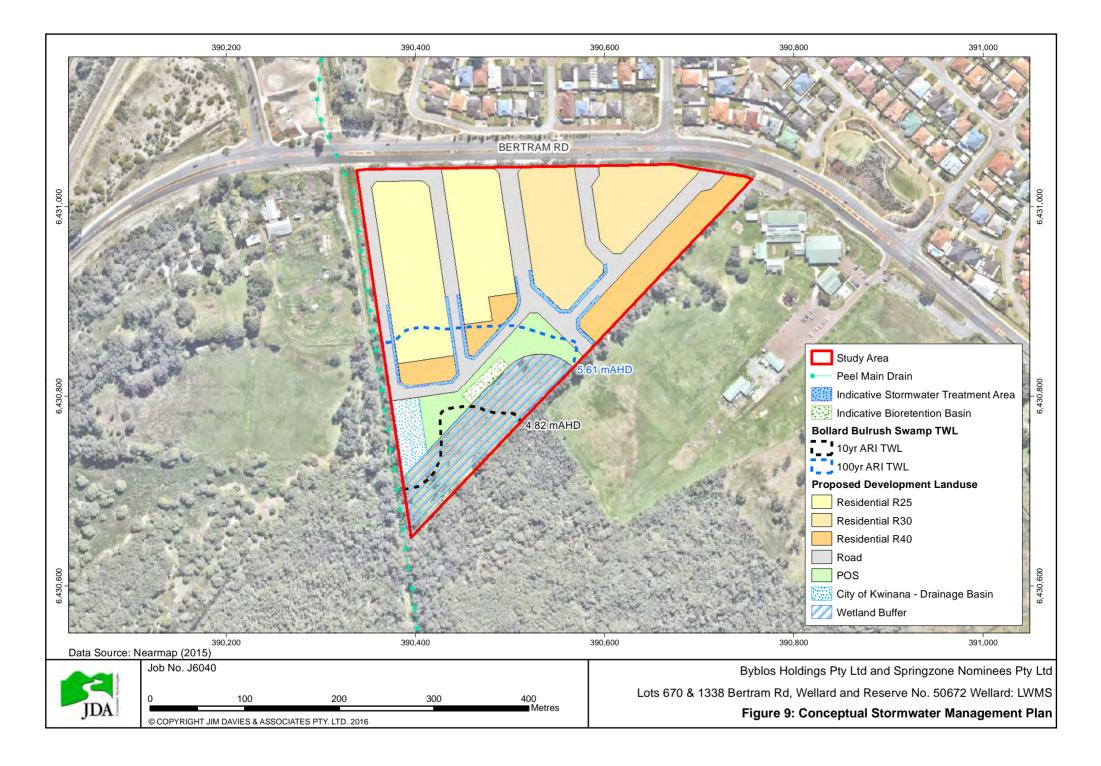












APPENDIX A

LWMS Checklist

LOCAL WATER MANAGEMENT STRATEGY: CHECKLIST (WAPC, 2008)

The following checklist provides a guide to items which should be addressed by developers in the preparation of Local Water Management Strategies for assessment by the local authority when an application for a structure plan is lodged.

- 1. Tick the status column for items for which information is provided
- 2. Enter N/A in the status column if the item is not appropriate and enter the reason in the comments column
- 3. Provide brief comments on any relevant issues
- 4. Provide brief descriptions of any proposed best management practices, e.g. multi-use corridors, community based-social marketing, water re-use proposals

Byblos Holdings Pty Ltd & Springzone Nominees Pty Ltd	Date: February 2016
Name of Plan: Lots 670 and 1338 Bertra Wellard	m Rd and Reserve No. 50672,
Contact: Matthew Yan, JDA Consultant Hydrologists	
Address: Suite 1, 27 York St Subiaco WA 6008	
Telephone: 9388 2436	Email: matt@jdahydro.com.au

Local Water Management Strategy Item	Required Deliverable	Deliverable LWMS Reference		Comment
Executive Summary				
Summary of the development design strategy, outlining how the design objectives are proposed to be met	Design elements and requirements for BMPs and critical control points	Executive Summary		Not Provided
Introduction				
Total water cycle management – principles & objectives Planning background Previous studies		Section 1.2 Section 1.1	✓	
Proposed Development				
Structure plan, zoning and land use. Key landscape features Previous land use	Site context plan Structure plan	Sections 2, 3 Fig 1	\checkmark	
Landscape - proposed POS areas, POS credits, water source, bore(s), lake details (if applicable), irrigation areas	Landscape Plan	Sections 3, 4 Figs 8, 9	✓	

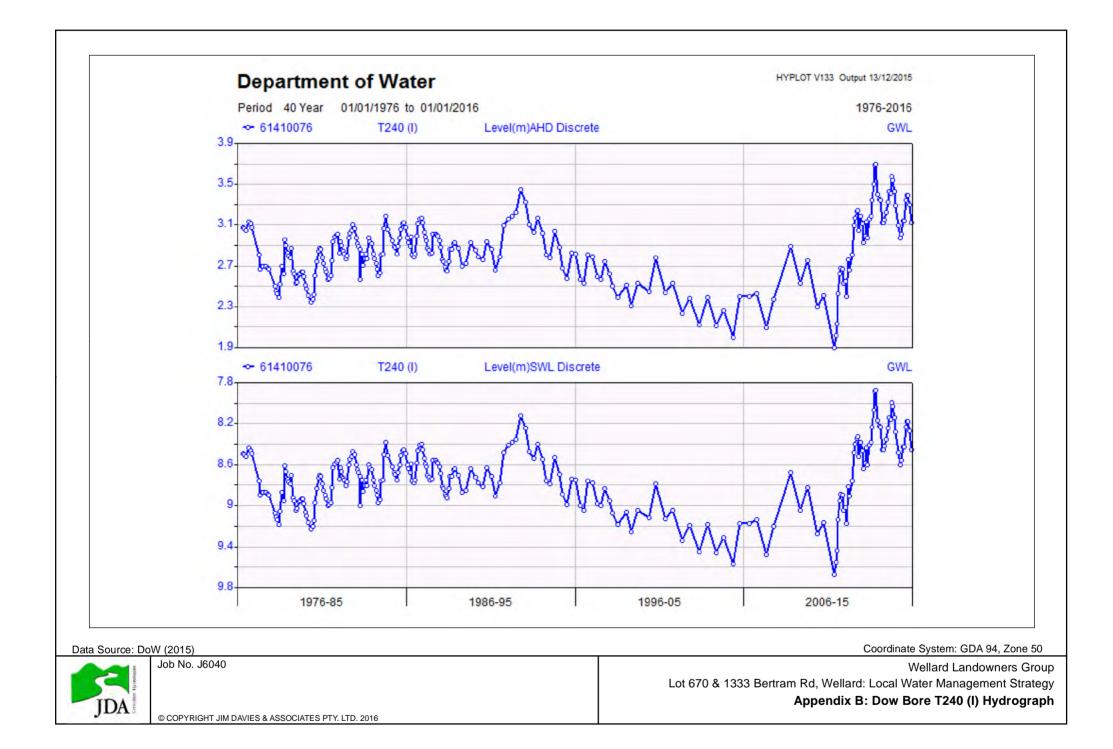
Local Water Management Strategy Item	Required Deliverable	Deliverable LWMS Reference		Comment
Design Criteria				
Agreed design objectives and source of objective		Sections 1.2	\checkmark	
Pre-development Environment				
Existing information and more detailed assessments (monitoring). How do the site characteristics affect the design?	Existing Site Charicteristics	Section 2, Figs 1 - 7	✓	
Site Conditions - existing topography / contours, aerial photo underlay, major physical features	Site Condition Plan	Section 2.1, Figs 1, 2	✓	
Geotechnical - topography, soils including acid sulfate soils and infiltration capacity, test pit locations	Geology Description	Sections 2.4 & 2.5 Fig 4	✓	
	Environmental Plan plus supporting datasets where appropriate	Sections 2.6, 2.7, Figs 2, 5	✓	
Surface Water – topography, 100 year floodways and flood fringe areas, water quality of flows entering and leaving (if applicable)	Surface Water Plan	Section 2.8, Fig 6	✓	
Groundwater – topography, pre development groundwater levels and water quality, test bore locations	Groundwater Plan	Section 2.9, Fig 7	\checkmark	
Water Use Sustainability Initiatives				
Water efficiency measures – private and public open spaces including method of enforcement		Section 4, Fig 8	~	
Water supply (fit-for-purpose strategy), agreed actions and implementation. If non-potable supply, support with water balance		Section 4.2	<	
Wastewater management		Section 4.3	\checkmark	
Stormwater Management Strategy				
Flood protection - peak flow rates, volumes and top water levels at control points,100 year flow paths and 100 year detentions storage areas		Section 5.2, Fig 9	✓	
Manage serviceability - storage and retention required for the critical 5 year ARI storm events Minor roads should be passable in the 5 year ARI event		Section 5.2, Fig 9	✓	

Local Water Management Strategy Item	Required Deliverable	Deliverable LWMS Reference		Comment
Protect ecology – detention areas for		Section 5.2, Fig 9		
the 1 yr 1 hr ARI event, areas for water				
quality treatment and types of (including				
indicative locations for) agreed				
structural and non-structural best				
management practices and treatment			\checkmark	
trains. Protection of waterways,				
wetlands (and their buffers), remnant vegetation and ecological linkages				
vegetation and ecological linkages				
Groundwater Management Strategy				
Post development groundwater levels,	Groundwater Plan	Section 5.4		
fill requirements (including existing and				
likely final surface levels), outlet			\checkmark	
controls, and subsoils areas/exclusion				
zones				
Actions to address acid sulfate soils or		Section 5.5.2, Fig 4		
contamination			\checkmark	
The Next Stage - Subdivision and Urb	an Water Management Pl	ans		
Content and coverage of future urban		Section 6		
water management plans to be				
completed at subdivision. Include areas			\checkmark	
where further investigations are				
required prior to detailed design.				
Monitoring				
Recommended future monitoring plan		Sections 6.4		
including timing, frequency, locations			\checkmark	
and parameters, together with			v	
arrangements for ongoing actions				
Implementation				
Developer commitments		Section 6.1	\checkmark	
Roles, responsibilities, funding for		Section 6.1	/	
implementation			\checkmark	
Review		Section 6.1	\checkmark	

Western Australian Planning Commission (2008), Better Urban Water Management, Perth,

APPENDIX B

DoW Bore T240 Hydrograph



APPENDIX C

GHD Modelling Memorandum



Memorandum

10 December 2010

То	Darren Evans, Greg Rowe & Associates		
Copy to			
From	Helen Brookes	Tel	61 8 6222 8702
Subject	Wellard Urban Precincts East and West	Job no.	61/25042/01

Introduction

It is proposed to develop land immediately surrounding the Bollard Bullrush Swamp environmental protection policy lake boundary. The development proposes to amend the environmental protection policy boundary in the Eastern Precinct and extend development into the floodway. In order that development may occur areas of the floodway will have to be filled and so it is necessary to determine the up and downstream impacts of this effective reduction in the flood capacity of the swamp.

GHD have been engaged to undertake preliminary investigations into the impact of the proposed fill for the purposes of rezoning and structure planning.

It is noted that the Water Corporation may have made some revisions to the Peel Main Drain InfoWorks model since the completion of the Jandakot Drainage and Water Management Plan that are not available at this time and that future assessments may need to be done with an updated version of the model. However since this is a comparative assessment of the impact from a specific development proposal it is not likely that any changes to other sections of the model will make substantial difference to the results.

Both the Department of Water and Water Corporation have been consulted during this study to gain approval to use the Peel Main Drain InfoWorks model for this purpose and correspondence with them is attached.

Methodology

The dimensions of the Bollard Bullrush Swamp as modelled for the Jandakot Drainage and Water Management Plan were amended to reflect the proposed filling of the proposed development areas to the south and north east of the swamp as seen in Figure 1. Modelling assumed that the environmental protection policy boundary and buffer are successfully moved in the Eastern Precinct so that the full extent of development can go ahead. In the Western Precinct the environmental protection policy boundary and buffer are maintained.

In addition, because of the proposed change in land use within the development areas, the percentage of impermeable area (and hence generated runoff) was increased according the local structure plan shown in Figure 1. This will give a worst case indication of the likely impact, since it does not take into consideration that the development will provide additional compensation and promote additional infiltration through the use of water sensitive urban design and therefore is likely to retain or reduce predevelopment runoff characteristics.

A second scenario has also been modelled which incorporates detention capacity within the development to maintain the pre-development discharge peak flow rates into the Main Drain.



The modelling parameters used adapted from those established within the Jandakot DWMP and are presented in Tables 1 and 2 below.

Land use	Area (m ²)	Percent impervious	Impervious area (m²)
School	77797	72%	56014
Grouped Dwellings	7682	28%	2151
Aged Persons	10020	35%	3507
Low Density	481644	28%	134860
Existing Residential	223430	28%	62560
Roads	381155	80%	304924
Medium Density	209403	28%	58633
POS	144472	0%	0
Drainage	935238	0%	0
Total	2,470,841		622,649

Table 1Land use impervious areas

Table 2 Runoff surface characteristics

Runoff surface ID	Description	Surface type	Surface roughness (Manning's n)	Initial loss (mm)	Fixed runoff coefficient
61	URBAN (Perv') 2yr	Pervious	0.025	0	0.1
62	URBAN (Perv') 10yr	Pervious	0.025	0	0.15
63	URBAN (Perv') 100yr	Pervious	0.025	0	0.2
7	URBAN (IMP)	Impervious	0.015	15	1



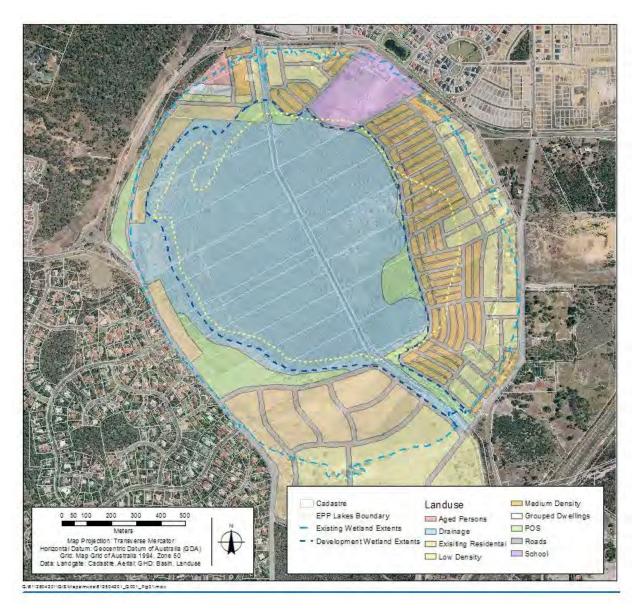


Figure 1 Exiting and Ultimate Wetland Extents with Proposed Landuse

Notes to figure 1:

- 1. Wetland extents indicated by the hatched lines are the areas available within the pre- and post-development models to accept overflow from the Peel Main Drain.
- 2. The land use type 'drainage' is used to define runoff parameters only and does not reflect the flooded area predicted by the model.



Results

Table 3 below presents top water levels and peak flow rates from modelling undertaken in support of the Jandakot Drainage and Water Management Plan at critical locations. Tables 4 and 5, also below, present a summary of the results of modelling for the two scenarios described above. Table 6 presents the discharge peak flow rates and required detention capacities within the development.

Location	Top Water Level (mAHD) Peak Flow (m ³ /s					
	10 year ARI	100 year ARI	10 year ARI	100 year ARI		
Peel Main Drain at Bertram Road	7.90	8.20	3.25	3.82		
Bollard Bullrush Swamp	4.82	5.61	3.38	4.00		
Peel main Drain at Millar Road	4.70	5.59	4.38	5.06		

Table 3 Jandakot Drainage and Water Management Plan modelling results

Table 4 Modelling of full extent of proposed development without stormwater detention

Location	Top Water L	.evel (mAHD)	Peak Flo	ow (m³/s)
	10 year ARI	100 year ARI	10 year ARI	100 year ARI
Peel Main Drain at Bertram Rd	7.90 (no change)	8.20 (no change)	3.25 (no change)	3.82 (no change)
Bollard Bullrush Swamp	4.85 (+ 30 mm)	5.65 (+ 40 mm)	3.38 (no change)	4.00 (no change)
Peel main Drain at Millar Road	4.72 (+20 mm)	5.62 (+ 30 mm)	4.73 (+ 350 L/s)	5.77 (+ 710 L/s)

Table 5 Modelling of proposed development including provision of on-site detention

Location	Top Water Level (mAHD)		Peak Flo	ow (m³/s)
	10 year ARI	100 year ARI	10 year ARI	100 year ARI
Peel Main Drain at Bertram Rd	7.90 (no change)	8.20 (no change)	3.25 (no change)	3.82 (no change)
Bollard Bullrush Swamp	4.82 (no change)	5.62 (no change)	3.38 (no change)	4.00 (no change)
Peel main Drain at Millar Road	4.70 (no change)	5.59 (no change)	4.39 (+ 10 L/s)	5.14 (+ 80 L/s)

Table 6 Discharge peak flows and required detention volumes for the proposed development

ARI storm event Basin outflow (m ³ /s)		Storage volume required (m ³)
10 Year	0.2	30,000
100 Year	0.35	39,000

Notes to table 6:

1. Detention volumes are provided as a guide only for the entire development. Detention areas have not been determined at this time since this will be dependent on the depth and landscaping configuration of the designed basin.



Conclusions

The modelling summarised above indicates that in scenario 1, which is the worst case scenario given no detention capacity within the development area, the top water level within the Bollard Bullrush Swamp changes by less than 100 mm for the 100 year ARI event and that levels both up and downstream also remain relatively unchanged.

The scenario 2 results indicated that by providing a total detention capacity of approximately 39,000 m³ for a 100 year ARI event (30,000 m³ for a 10 year ARI event) within the development area the change in top water level will be zero.

Suitable fill levels for development must be determined by detailed site investigations in conjunction with drainage and earthworks design for the site. This modelling indicates that a minimum habitable floor level of 6.12 m AHD will be required to ensure that 500 mm of clearance is provided from the 100 year ARI event flood level in Bollard Bullrush Swamp.

In scenario 1, peak flows within the Peel Main Drain upstream of and within the swamp also remain unchanged, however there is an increase of up to 710 L/s on the downstream peak flow rate in the Peel Main Drain for the 100 year ARI event. This increase in flow rate is related to the increased impervious area and it will be a requirement of development that sufficient detention capacity is provided within the drainage system and public open space areas to ensure that this does not occur.

In scenario 2 the increase in downstream peak flow rate is managed through the provision of 39,000 m³ total detention capacity within the development area. This results in a downstream peak flow rate in the Peel Main Drain for the 100 year ARI event of 5,140 L/s which is within 80 L/s of the predevelopment downstream peak flow rate.

The indicated detention capacity of 39,000 m³ for the 100 year ARI event which is required in order to maintain the peak discharge peak flow rates for the development will need to reviewed during the development of drainage designs. It is likely that the drainage design process will be able to reduce this detention capacity through water sensitive urban design practices, providing capacity for minor events throughout the development on lots and in road reserves as well as provision of flood detention areas within the normal public open space provision.

Recommendations:

- 1. Rezoning submissions should indicate that the change in top water level is predicted to be zero in the 10 and 100 year ARI events as a result of the proposed development.
- 2. Rezoning submissions should also indicate that there is less than 100 L/s predicted increase in peak downstream flow rates in the 10 and 100 year ARI events as a result of the proposed development, and that this is not likely to cause any downstream impacts.
- 3. The design of the proposed development should provide sufficient detention capacity within lots, road reserves and/or public open space to ensure that predevelopment peak discharge flow rates are not exceeded (indicatively 30,000 m³ and 39,000 m³ respectively for the 10 and 100 year ARI events).
- 4. The design of the proposed development should incorporate a minimum habitable floor level of 6.12 m AHD.

Helen Brookes

Manager, Waterways

APPENDIX D

City of Kwinana Endemic Species

CENTRAL SOILS SPECIES LIST

Start of flowering time: Spring Summer Autumn Winter All Year

Kwinana Rwinana Paral Coastal Plain a, Wandi and Wellard* East of Wellard Road. Titler, money ur gorden ow Local Plants & bring life back to your garden save water, money Anketell, Bertram, Casuarina, Wandi and Wellard *

	flowering time: Spring S					
Common Name	Botanical Name	Height (m)	Flower Colour	Flower Time	Other Info	
Trees (Up to 15m)						
Fraser's Sheoak	Allocasuarina fraseriana	15	brown	May-Oct	el .	
Candle Banksia	Banksia attenuata	5-8	yellow	Sep-Oct	S.	
Bull Banksia	Banksia grandis	10	yellow	Sep-Dec	* 🖌	
Holly-leaf Banksia	Banksia ilicifolia	10	pink & cream	Mar-Jan	v	
Firewood Banksia	°Banksia menziesii	10	pink & red	Feb-Aug	* \$	
Red Flowering Gum	Eucalyptus ficifolia	8	red	Dec-May	🔆 💥 💓 😽 🗰	
Coastal Blackbutt	Eucalyptus todtiana	9-16	creamy white	Feb		
Coral Gum	Eucalyptus torquata	4-11	pink, red	Aug-Dec	😽 WA	
Sandplain Woody Pear	Xylomelum angustifolium	7	creamy white	Dec-Feb	* 🖌 WA	
Sandplain Woody I ear		1	creanly white	Dec-reb	1 2 WA	
Shrubs (3 to 5m)						
Coojong	Acacia saligna	5	yellow	Aug-Oct	X \	
Common Woollybush	Adenanthos cygnorum	2-4	red	Sep-Feb	* 🖌	
Tree Smokebush	Conospermum triplinervium	4.5	greyish white	Aug-Nov	*	
Red Pokers	Hakea bucculenta	4.5	red	Aug-Sep	* 🖋 WA	
Royal Hakea	Hakea victoria	3	white, colourful foliage	• ·	* WA	
Zamia Palm	Macrozamia riedlei	3	red cones	Sep-Oct		≥
River Pea	Oxylobium lineare	3	red, yellow	Sep-Jan	×	Po
(Weill ed	Cxylobiant inteare	3	red, yenow	Oep-Jan	397"991	loo
Shrubs (1 to 3m)						Kangaroo Pav
	Acacia dentifera	3	golden	Aug-Nov	×	¥
Prickly Moses	Acacia pulchella	1.5	yellow	Jun-Oct	X	
Basket Flower	Adenanthos obovatus	2	scarlet, orange	May-Dec	R	
One-sided Bottlebrush	°Calothamnus quadrifidus	1-2	red	Aug-Dec	* \$	
Silky-leaved Blood Flower	Calothamnus sanguineus	1.5	blood red	Mar-Oct	* \$	
Plume Smokebush	Conospermum incurvum	0.4-1	white-grey	Jul-Nov		
Ferete-leaved Dampiera	Dampiera teres	0.2-0.6	blue	Aug-Nov	*	
Prickly Dryandra	Dryandra armata	1.5	yellow	Jun-Nov	S.	
Drange-flowered Eremaea	Eremaea pauciflora	1.5-2	orange	Sep-Dec	* 🖌	1
Purple-flowered Eremaea	Eremaea purpurea	1.5	pink-purple	Oct-Feb		
Pink Pokers	Grevillea petrophiloides	3	pink	Jan-Nov	💥 😽 🕷	
Honey Bush	Hakea lissocarpha	3	white-yellow, pink	Jun-Sep	S	
Candle Hakea	Hakea ruscifolia	3	white	Dec-Mar	*	
Many-flowered Honeysuckle		2.5	yellow	Jun-Dec		1980
Coast Honey-myrtle	Melaleuca acerosa	1	cream	Sep-Dec	×	light
	Melaleuca conothamnoides	0.3-1.5	pink-purple	Apr-Jun/ Sep-Nov	* *	COURS
Thread-leaf Snottygobble	Persoonia saccata	0.2-1.5	yellow	Jul-Jan	1 1970K	
Spiked Scholtzia	Scholtzia involucrata	1.5	white, pale pink	Dec-Mar		
Grass Tree	Xanthorrhoea preissii	3	white	Nov-Jan	* \$	
	Xanunonnoea preissii	5	WINC	NOV-Jali	1 P	and the second
Shrubs (less than 1m)						1.16
Varrow-winged Wattle	Acacia stenoptera	0.3-1	cream-yellow	May-Sep	×	1000
Grass Wattle	Acacia willdenowiana	0.5	yellow	Jun-Oct	×	
	Andersonia lehmanniana	0.5	white, pink-purple	May-Sep		
Camphor Myrtle	Baeckea camphorosmae	1	white-pink	May-Feb	×	
	Beaufortia elegans	1	purple, pink	Nov-Feb		
Aniseed Boronia	Boronia crenulata	1	pale red	Aug-Oct		
Common Brown Pea	Bossiaea eriocarpa	0.6	brown & yellow	Jul-Oct		-
Summer Starflower	Calytrix flavescens	0.8	yellow	Nov-Jan		1
Pink Summer Calytrix	Calytrix fraseri	0.6-1	pink, purple	all year		SP.
Common Dampiera	Dampiera linearis	0.5	indigo	Jul-Nov		Ble.
Couch Honeypot	Dryandra lindleyana	low	gold	May-Sep	the second secon	.41
ouder Honeypor	Gompholobium confertum	1	blue-purple	Aug-Mar	74	
Hainy Vellow Poo	Gompholobium tomentosum	0.3-1	yellow	Aug-Mar Aug-Dec		
Hairy Yellow Pea				•		
Stalked Guinea-flower	Hibbertia racemosa	0.3	yellow	Jul-Nov		
Drange Stars	Hibbertia stellaris	1	orange-yellow	Aug-Dec		
Devil's Pins	Hovea pungens	1	purple	Jun-Nov		
Common Hovea	Hovea trisperma	0.7	purple	Jun-Sep		
Swan River Myrtle	Hypocalymma robustum	1	pale-deep pink	Jul-Oct		
Granny's Bonnets	Isotropis cuneifolia	0.3	yellow & red	Aug-Oct		
Valdjumi	Jacksonia sericea	0.6	orange	Dec-Feb		
ance-leaved Cassia	Labichea punctata	1	yellow	Jul-Oct		
Rough Honey-myrtle	Melaleuca scabra	1	pink-purple	Sep-Dec	XX	
	Melaleuca trichophylla	0.7	pink-purple	Nov-Jan	×	
Pixie-mops	Petrophile linearis	0.7	pink, mauve	Sep-Nov		
	Petrophile macrostachya	1	yellow	Aug-Nov		
Pepper-and-salt	Philotheca spicatus	0.6	lilac	Jun-Oct		
Rose Banjine	Pimelea rosea	1	pale-deep pink	Aug-Nov		
Yellow Banjine	Pimelea sulphurea	0.5	yellow	Oct-Nov		
Bushy Featherflower	Verticordia densiflora	1	pink, white	Nov-Jan	R	
Bushy reallemower			pink, write	NUV-Jall	2	

Kangaroo Paw	Anigozanthos humilis	0.5				
U		0.5	orange	Aug-Oct		Central Co
	Anigozanthos manglesii	1	red & green	Sep-Nov	* 😒	
Green Kangaroo Paw	Anigozanthos viridis	1	green	Sep-Nov	\$	
Tall Speargrass	Austrostipa flavescens	0.5	silver	Sep-Oct	X	Cent Bertram.
Bearded Speargrass	Austrostipa semibarbata	0.6	white hairy	Aug-Nov	×	
Blue Squill	Chamaescilla corymbosa	0.3	blue	Aug-Oct		
Spiny Cottonheads	Conostylis aculeata	0.3	yellow	Sep-Nov		(et
Grey Cottonheads	Conostylis candicans	0.5	yellow	Aug-Sep	* 🗙	Anketell.
Bristly Cottonheads	Conostylis setigera	0.3	yellow	Sep-Oct		-
Blueberry Lily	Dianella revoluta	1	purple	Sep-Jan		
Foxtail Mulga-grass	Neurachne alopecuroidea	0.5	grey	Aug-Nov		
Morning Iris	Orthrosanthus laxus	0.4-0.6	blue	Aug-Oct		
Purple Flag	Patersonia occidentalis	0.5-0.8	purple	Sep-Oct		1t
						G
Climbers & Groundcovers						-3,
Native Wisteria	°Hardenbergia comptoniana	climber	purple	Jun-Sep	* 🗙	ET.
Snakebush	°Hemiandra pungens	low	mauve	all year		
Running Postman	Kennedia prostrata	low	red	Aug-Nov	* 🗙 🖌	- a -
Pronaya	Pronaya fraseri	climber	pale mauve	Dec-Feb		8 -
						= 2

★ - Star Performer (hardy or long flowering) X - Butterfly attracting WA - Western Australian plant not a local plant





MINANA

arina, Wandi and Wellard* This brochure was prepared by Melinda Picton-King, North Metro Catchment Group Inc. *East of Wellard Road.

oastal Plain

Department of the Premier and Cabinet

Sponsored by: State Water Strategy

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W LOCAL PLANTS		
	Anigozanthos humilis Hovea pungens Hemi	emiandra pungens Conostylis aculeata Hardenbergia comptonia
WA PLANT NURSERIES	PRUNING	How much mulch
Different nurseries have varying ranges of WA plants so you might need to shop around. If you really want a particular selection of plants, then it	To keep WA plants looking their best, it is necessary to do some pruning to help keep the plant in shape and promote flowering.	Apply mulch about 5cm thick, creating a bowl shape around the plant to aid water retention.
is a good idea to order ahead in about September so the plants can be grown ready for planting in autumn. Some specialist local nurseries are:	When to prune	What to avoid:
APACE Nursery: 1 Johanna St, NORTH FREMANTLE Boola Wongin: 619 Armadale Rd (near Nicholson Rd),	In general prune after flowering has finished in late spring or early summer. Avoid pruning in winter or mid summer, as this may cause	 Avoid layering mulch too thickly as this can impede water infiltration and reduce plant survival. Avoid mulching too close to the chan of the closet of the constant.
FORRESTUALE Carramar Coastal Nursery: Lot 5 885 Mandurah Rd SECRET HARBOUR	plants to die back extensively. It is better to prune young plants lightly and regularly. Older plants can be rejuvenated by more extensive pruning after flowering.	 Avoid inducting too close to the steril of the plant as the constant humidity encourages plant diseases and WA plants prefer the surrounding soil surface to be dry.
Lullfitz Nursery: 1071 Thomas Road, OAKFORD Men of the Trees: Rockingham Golf Club, Elanora Dr,	How to prune	Avoid using sawdust and raw wood products (eg wood chips) as they can interfere with iron uptake, draw nitrogen out of the soil and
COOLOONGUP Ngulla Community Nursery: 65 Born Road CASUARINA	There are two main types of plant flowering habits each requiring different pruning methods:	cause the soli to become water repenent. Atways composit woody mulches for at least 6 months before use.
Australian Native 141 King Rd, OAKFORD Nurseries Group: 155 Watsonia Rd, MAIDA VALE Zanthorrea Nursery: 155 Watsonia Rd, MAIDA VALE	. E .	 Avoid using multimum rout reaved prants intermany exolic species, as it decays too fast and releases too many nutrients for WA plants. Avoid some packaged mulches as they contain high levels of
WATERING		nitrogen and phosphorus which isn't suitable for WA plants.
WA plants are adapted to our dry climate and low rainfall - they are used	Plants that flower on old wood – remove the oldest wood from the centre of the plant, letting the younger wood remain.	FERTILISERS
to a bit of stress and in fact need this to perform their best. Overwatering leads to shorter lived plants with excessive growth and less prolific	Eg some species of <i>Melaleuca</i> .	As WA plants are adapted to soils that are low in nutrients they usually don't require fertiliser. In a garden situation you can apply a
flowering. An excess of water leads to leaching of nutrients from sandy soils and encourages diseases that can lead to fatal root rot.	Tips for pruning	little fertiliser to keep plants looking geneert, but be cautious as some sneries are sensitive in fertilisers, particularly photochanics. Sufficients
Remember the aim is to encourage plants to grow strong root systems,	 Cut off the whole branch cleanly at the join leaving no protruding stump. 	phosphorus is naturally present in the soil.
which makes them more water efficient and drought tolerant. To keep your garden looking its best, it may be desirable to give some plants a	 Remove low branches to make weeding easier. Itee channed in principles as multich 	When to apply
supplementary watering over summer.	 Only prune the softer wooded plants (eg large wattles) lightly as they 	Apply fertiliser when planting by mixing into the soil at the bottom of the hole. Subsequent fertilising should be done on the surrounding root
When to water (always follow water restrictions)	 aren't as hardy as the woodler plants and tend to die back extensively. Eucalypts, Callistermons and Melaleucas respond well to pruning 	zone only when nutrient deficiency is apparent and only when plants
 For new plants water: Once or twice a week in the first few weeks after planting. 	and can tolerate a hard prune.	are acuvely growing in spring.
 Unce or twice a week in the summer period for the first 1-2 years until plants are established (generally from about November to May until the first mood rain occurs) 	 Out back hange of raws to the ground after nowening each year. It helps prevent black ink disease and promotes better growth. 	What fertiliser to use (Note: always follow the manufacturer instructions on dosage and application)
unu ure mat good ram occurs). For established plants water:		 Slow release fertilisers for native plants. Low pheerborie and low pitronan fartilisers
 When there is a heat wave When the soil under the surface is dry 	Muich	 Every prior prior and row murder returned s. Fish emulsion or seaweed fertiliser to boost plants immunity
 When signs of stress are apparent (eg wilting, dull foliage colour, 		to disease.
leaf shrinkage) In general the watering regime for mature plants varies with the soil type, origin of the plant, season and natural rainfall.	Good mulch consists of a mixture of different sized materials such as leaves, twigs and bark, lets water easily penetrate through to the soil and prevents evaporation. The mulch materials shouldn't absorb too	 What not to fertilise Some plants are highly sensitive to fertilisers, particularly
What irrigation to use	The heat mutter otherwise they make less available to the plants.	fertilisers that contain phosphorus. Eg: Banksias, Grevilleas, Dryandras,
WA plants like the soil surface to remain dry and many are sensitive to overhead watering (eg sprinklers, misters). Thus the best irrigation to	 Groundcovers and natural leaf litter formed by the plants in 	 Hakeas (Proteaceae family). Don't overfertilise Everlastings as they get too tall
use is adjustable dripper/trickle systems or subsurface irrigation.	 your gardern. Street tree loppings – may contain some weeds but they are easily seen and removed 	and weak and lie down when flowering.
 Watering ups Watering in the moming is preferable as moisture sitting on plant 	 Inert materials (eg gravel, crushed brick) are particularly good in windy areas as they don't blow around. 	
 Avoid watering only the soil surface layer as this encourages challow roots making plants more suscertible to draing out and 	When to mulch	
blowing over. Longer deeper watering encourages the growth of deeper. more stable roots.	Organic mulches need renewing seasonally as they break down over time but are best applied at the start of warmer weather in spring and	REFERENCES
 If water repellence occurs, apply a wetting agent. Ilse a drinner with a high flow rate for water demanding plants 		FOI MOIE INFORMATION FETER TO A New Image for WA Plants - George Lullifit Grow With Us - Wildflower Society of WA
VIA 1 VIA AVII VVIII I IVANI IVANI IVANI VIA VIA VIA VIA VIA VIA VIA VIA VIA VI		

WHAT ARE LOCAL PLANTS?

Local plants are species that would naturally occur in your neighbourhood and are therefore adapted to the local climate and soil.



There are a huge range of local WA plants that can be used to create many contemporary garden styles such as cottage, formal, Mediterranean and bushland. Be creative with local plants and use them in hanging baskets and containers, as hedges and as topiary.

Garden Design Tips

- Plan your garden design on graph paper.
- Think about areas of usage (eg eating areas, play areas) and incorporate these into your garden design.
 - Keep in mind views from the house
- (eg retain good views and use plants to hide eyesores).
 Plant trees at least 3m from fences and walls so their growth isn't harmonia and they don't harmonia and unserve.
 - hampered and they don't become a nuisance.Make sure you prepare the site and remove all weeds prior to mulching or planting.
 - You can use local plants in your whole garden, in a garden bed or mixed in with exotics.
 - Group plants with similar water and fertiliser requirements
 transforments
- together, especially if mixing local plants with exotics.
 Keep in mind the growing requirements of plants (eg don't plant a
 - Neep in mind the growing requirements or plants (eg don't plant a sun loving plant in the shade of a larger shrub).
 Be aware that there are different forms of plants you can use in
 - your garden (eg dwarf forms of trees and groundcover forms of many shrubs).
- Select plants that flower in each season to provide colour in your garden all year round.
 - Use a diverse range of plants but repeat themes of plants and place them in groups of uneven numbers for greater impact.
 Vary the height layers in your garden to add interest and
- vary the height layers in your garden to add interest and habitat. (eg tree canopy, shrubs, groundcovers).
 Think of your garden like a room in your house and plant in stages.
- Think of your garden like a room in your house and plant in stages. Lay the carpet (groundcovers) in first, then place the furniture (theme shrubs and trees) and then dress the room with the smaller flowering shrubs and feature plants.
- Continually review your design and keep complementing your garden with new plants. Think of your garden as progressive and ever changing to be built upon over time.

PLANT SELECTION & PLANTING OUT

- Buy plants local to your area or suited to your soil type (see list).
- Buy small plants in bigger pots as they aren't root bound and better establish in the garden. You can buy some larger feature plants for a more instant effect.
 - Always read the labels to check the size of the plant when mature to be sure that you are getting the desired plant form.
 Coastal plants will grow inland, but inland plants don't grow well on the coast.
 - Don't choose plants that are environmental weeds.
- Plant in late April or May after the first good autumn rains, as plants have more time to establish before summer.

eg Boronia, Scaevola.

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16 Reports – Civic Leadership

16.1 Monthly Statement of Financial Activity for the Period Ending 31 May 2016

SUMMARY:

The Monthly Statement of Financial Activity and explanation of material variances for the period ending 31 May 2016 has been prepared for Council acceptance.

OFFICER RECOMMENDATION:

That Council accepts:

- 1. The Monthly Statements of Financial Activity for the period ending 31 May 2016; and
- 2. The explanations for material variances for the period ending 31 May 2016.

DISCUSSION:

Variance percentages between budget estimates to the end of May and actual amounts to the end of May have been presented in the attached Statement of Financial Activity.

The material variances that are required to be reported on are:

Description	Actual	Y-T-D Budget		Variance (%)
Directorate City Strategy Revenue	467,382	353,518		32.21%
Directorate City Living Revenue	16,538,337	14,689,852		12.58%
Directorate City Strategy Expenditure	(4,058,938)	(5,077,748)	▼	20.06%
Directorate Corporate & Engineering Services Expenditure	(18,902,475)	(24,950,796)	•	24.24%
Directorate City Development Expenditure	(3,222,613)	(4,110,160)	▼	21.59%
Depreciation on Assets	6,528,690	10,595,570	▼	38.38%
Purchase Plant and Machinery	(250,160)	(557,558)	▼	55.13%
Purchase Land & Buildings	(1,278,834)	(1,913,927)	▼	33.18%

Description	Actual	Y-T-D Budget		Variance (%)
Purchase Reserve Development	(719,513)	(1,069,447)	▼	32.72%
Purchase Playground Equipment	(1,886,958)	(770,000)		(145.06%)
Purchase Infrastructure – Roads to Recovery	(712,637)	(1,159,269)	▼	38.53%
Purchase Infrastructure – Road Resurfacing	(172,975)	(301,825)	•	42.69%
Purchase Infrastructure – Drainage	(852,920)	(1,102,840)	▼	22.66%
Purchase Infrastructure – Municipal Roadworks	(596,777)	(722,141)	▼	17.36%
Grants/Contributions for the Development of Assets	4,838,244	5,616,314	▼	(13.85%)
Transfer from Reserves (Restricted Assets)	4,126,169	5,353,965	▼	22.93%

Note: A negative (%) variance indicates additional expenditure or reduced revenue than budgeted. A positive % variance indicates additional revenue or reduced expenditure than budgeted.

Directorate City Strategy Revenue – 32.21%

This area shows increased income mainly due to the following areas:

- a. Economic Development (*Waste Management Services*) higher than anticipated rent has been received for the Thomas Road Landfill as a result of a lease review and indexation.
- b. Human Resource Management (*Risk Management*) reimbursements for Workers Compensation claims are higher than had been forecasted.

Directorate City Living Revenue – 12.58%

This area shows increased income mainly due to the following areas:

- a. Community Development (CDO Recreation) grant income for the SilverSport Program due to commence in July 2016/17 has resulted in additional income.
- b. Family Day Care (FDC General) higher than anticipated participation rate.
- c. Family Day Care (FDC In-Home) higher than anticipated participation rate.

Directorate City Strategy Expenditure – 20.06%

This area shows reduced expenditure mainly due to the following areas:

- a. Executive Office (Marketing & Communications) expenditure in relation to the new Corporate Website and Intranet had been forecasted to occur in previous months however the project has since been split into two separate streams, meaning the payment cycles have become less aligned than planned. The funds will be spent as planned by end of financial year.
- b. Governance (Governance & Compliance) expenditure in relation to the Transformation project is yet to be approved until project documentation is complete.
- c. Human Resource Management (Human Resources) a timing variance has resulted in expenditure being less than budgeted to date for staff training and staff employment expenditure. Purchase orders have been raised and training and recruitment is scheduled to occur in May and June. Staff vacancies, work load and limited availability of suitable conferences and seminars have resulted in a variance for conference expenditure.

Directorate Corporate & Engineering Expenditure – 24.24%

- This area shows reduced expenditure mainly due to the following:
 - a. Engineering Services (Engineering Services Overheads) due to the allocation of overheads.
 - b. Facilities Management (Reserves & Parks) Reserve & Park maintenance programs are ongoing, purchase orders are in the system and will continue throughout the year.

Directorate City Development Expenditure – 21.59%

This area shows reduced expenditure mainly due to the following areas:

- a. Planning & Building Services (*Building Control/Approvals*) due to the allocation of overheads.
- b. Planning & Building Services (*Developer Contributions Administration*) Consultants have been engaged with funds committed. Partial payments paid.
- c. Planning & Building Services (*Strategic Planning*) Consultants have been engaged to finalise the Local Planning Strategy and undertake related planning studies. The updates required from these studies are unlikely to take place this financial year and have been budgeted for the 2016/2017 financial year.

Depreciation on Assets - 38.38%

Nil effect on rates as non-cash item. Less than budgeted due to the delayed processing of depreciation resulting in a timing variance.

Purchase Plant and Machinery - 55.13%

Purchase of a 4.5T Drainage Truck for the Depot is delayed due to supply issues. The purchase order has been raised however the truck will not be delivered until July 2016.

Purchase Land & Buildings – 33.18%

The Family Day Care extension will now not occur this financial year as all tenders exceeded the available budget. This will now be reviewed in 2016/17. The Leda Hall replacement of Kitchen Cabinetry and Thomas Oval Netball Clubroom roof repairs projects have been delayed until June 2015. Chalk Hill Lookout remedial repairs are further delayed due to vandalism that has changed the project. Specialist services are now being sought and the possibility of an insurance claim investigated.

Purchase Reserve Development – 32.72%

Works on carried forward projects, Hennessy and Skottowe Parks are now substantially complete and invoices are expected. The M^cGuigan Park upgrade was initially delayed by the contractor and availability of equipment; works are almost complete with invoices expected in the coming weeks. The discovery of asbestos at Kwinana Beach Road delayed the streetscape beautification project. This project has now been completed.

Purchase Playground Equipment – (145.06%)

Environmental Industries were awarded the contract for construction of the Calista Oval Destination Adventure Playground. Works are now underway with purchase orders raised in the system. The budget had been allocated mostly to the months of May and June 2016 as it was unclear when the project would commence, resulting in a timing variance.

Infrastructure – Roads to Recovery – 38.53%

Practical completion for the Moombaki Avenue extension project occurred during the month with minor items to be rectified. Invoices are expected.

Infrastructure – Road Resurfacing – 42.69%

All projects are now substantially complete however invoices are still to be presented for the Chester Court and Yeates Road intersection projects.

Infrastructure - Drainage - 22.66%

All projects are now complete however invoices are still to be presented for the Casserley Way and Office Road projects.

Infrastructure – Municipal Roadwork's – 17.36%

The Cromer Gardens and Inglis Court projects have now commenced and will be complete mid June 2016. Purchase orders are in the system for all other projects and works are ongoing.

Grants/Contributions for the Development of Assets - 13.85%

The Department of Education contribution towards the Moombaki Avenue extension was expected to have been received by May however delays in the completion of the project have resulted in a timing variance.

Transfers from Reserves – 22.93%

Transfers from Reserves are processed monthly as costs are realised.

Investment activity May 2016

- *Tier 1* Investment rates available to the City were not favourable therefore no funds were invested in this tier.
- *Tier 2* Funds were allocated in accordance with the guidelines of the Investment Policy.
- Tier 3 Total funds held in Tier 3 exceeded allowable amounts at month end partially due to the allocation of interest and cash requirements. This will be rectified during the month of June 2016.
- Tier 4 Funds were allocated in accordance with the guidelines of the Investment Policy.

Total funds held in Tier 3 exceeded allowable amounts at month end partially due to the allocation of interest and cash requirements. This will be rectified during the month of June 2016.

LEGAL/POLICY IMPLICATIONS:

Local Government (Financial Management) Regulations – Clause 34.

FINANCIAL/BUDGET IMPLICATIONS:

As outlined in the 'Discussion' and 'Risk' sections.

ASSET MANAGEMENT IMPLICATIONS:

No asset management implications have been identified as a result of this report or recommendation.

ENVIRONMENTAL IMPLICATIONS:

No environmental implications have been identified as a result of this report or recommendation.

STRATEGIC/SOCIAL IMPLICATIONS:

Continuous monitoring and review ensures the future sustainability of the City through the implementation of sound revenue and expenditure policies, and seeking additional revenue sources.

RISK IMPLICATIONS:

The report is provided to highlight 'over' and 'under' provisions, revenues and expenditures. Monitoring the City's financials enables the City to suitably manage these financial risks by allowing for suitable responsible adjustments to be proposed if necessary. No such adjustments are considered to be required at this point in time.

COUNCIL DECISION

264 MOVED CR B THOMPSON

SECONDED CR R ALEXANDER

That Council accepts:

- 1. The Monthly Statements of Financial Activity for the period ending 31 May 2016; and
- 2. The explanations for material variances for the period ending 31 May 2016.

CARRIED 6/0



CITY OF KWINANA

MONTHLY STATEMENT OF FINANCIAL ACTIVITY

FOR THE PERIOD 1 JULY 2015 TO 31 MAY 2016

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CITY OF KWINANA RATE SETTING STATEMENT by DIRECTORATE FOR THE PERIOD 1 JULY 2015 TO 31 MAY 2016

	NOTE	May	May	2015/2016		Variar Budget to	
		2016 Actual \$	2016 Y-T-D Budget \$	Revised Budget \$		YTD \$	Y-T-D %
Estimated Surplus/(Deficit) July 1 B/Fwd	7	2,917,706	2,917,706	2,917,706		v	70
Revenues	1						
Directorate City Strategy		467,382	353,518	388,935	A	(113,864)	(32.21%)
Directorate Corporate & Engineering Services		5,158,080	4,844,906	5,218,598		(1 0 4 0 4 0 5)	(10 500/)
Directorate City Living Directorate City Development		16,538,337 5,262,046	14,689,852 5,513,189	15,623,378 5,781,273	A	(1,848,485)	(12.58%)
Directorate only Development		27,425,845	25,401,465	27,012,184			
Expenses	1						
Directorate City Strategy		(4,058,938)	(5,077,748)	(4,874,797)	•	(1,018,810)	20.06%
Directorate Corporate & Engineering Services Directorate City Living		(18,902,475)	(24,950,796) (25,581,324)	(28,183,964)	•	(6,048,321)	24.24%
Directorate City Development		(23,333,413) (3,222,613)	(4,110,160)	(28,191,685) (4,485,272)	•	(887,547)	21.59%
		(49,517,439)	(59,720,028)	(65,735,718)		(001,011)	21.0070
NET OPERATING RESULT EXCLUDING RATES	_	(22,091,594)	(34,318,563)	(38,723,534)			
Adjustments for Cash Budget Requirements:							
Non-Cash Expenditure and Revenue (Profit) on Asset Disposals	4	(E1 604)	(60 107)	(110 107)			
(Profit) on Asset Disposals Loss on Asset Disposals	4	(51,694) 16,521	(60,137) 21,848	(110,137) 132,788			
Movement in Deferred Pensioner Rates		32,889	- 21,040				
Movement in Employee Leave Provision		-	-	-			
Depreciation on Assets	_	6,528,690	10,595,570	11,558,780	•	4,066,880	38.38%
		6,526,406	10,557,281	11,581,431			
Capital Revenue							
Grants/Contributions for Development of Assets		4,838,244	5,616,314	11,074,011	▼	778,070	13.85%
Proceeds from Disposal of Assets	4	<u>357,896</u> 5,196,140	436,800 6,053,114	<u>464,800</u> 11,538,811			
		-,,	-,,	,,			
Capital Expenditure Purchase Furniture and Equipment	3	(72,683)	(141,935)	(151,935)			
Purchase Computing Equipment	3	(255,679)	(308,900)	(368,526)			
Purchase Plant and Machinery	3	(250,160)	(557,558)	(583,503)	•	(307,398)	55.13%
Purchase Transportation Vehicles	3	(898,725)	(954,225)	(1,059,225)			
Purchase Land and Buildings	3	(1,278,834)	(1,913,927)	(2,612,545)	<u> </u>	(635,093)	33.18%
Purchase Reserve Development Purchase Playground Equipment	3 3	(719,513) (1,886,958)	(1,069,447) (770,000)	(1,516,934) (6,048,944)		(349,934) 1,116,958	32.72% (145.06%)
Purchase Infrastructure - Urban Road Grant	3	(2,092,622)	(2,314,135)	(2,314,135)		1,110,950	(145.00%)
Purchase Infrastructure - Black Spot Grant	3	(2,201,847)	(2,245,458)	(2,245,458)			
Purchase Infrastructure - Roads to Recovery	3	(712,637)	(1,159,269)	(1,159,269)	•	(446,632)	38.53%
Purchase Infrastructure - Road Resurfacing	3	(172,975)	(301,825)	(301,825)	•	(128,850)	42.69%
Purchase Infrastructure - Street Lights Purchase Infrastructure - Bus Shelters	3 3	(16,546) (540)	(25,000) (20,000)	(25,000) (24,824)			
Purchase Infrastructure - Footpaths	3	(95,377)	(113,000)	(113,000)			
Purchase Infrastructure - Drainage	3	(852,920)	(1,102,840)	(1,102,840)	•	(249,920)	22.66%
Purchase Infrastructure - Other Structures	3	-	-	-			
Purchase Infrastructure - Municipal Roadworks	3	(596,777)	(722,141)	(722,141)	•	(125,364)	17.36%
Purchase Infrastructure - Car Parks Purchase of Land held for resale	3 3	(2,122)	-	-			
	· _	(12,106,915)	(13,719,660)	(20,350,104)			
Financing Expenditure & Revenue Repayment of Loans Principal	5	(444,167)	(444,167)	(670,482)			
Repayment of Liquidity Advance	5	(444,107)	191,360	(070,402)			
Proceeds from New Loan Borrowings	5	-	-	1,891,360			
Self-Supporting Loan Principal Revenue	5	63,570	63,265	66,272			
Transfer from Loan Fund for Capital	5	20,044	-	94,435			
Transfers to Reserves (Restricted Assets) Transfers from Reserves (Restricted Assets)	6 6	(4,796,874) 4,126,169	(4,949,085) 5,353,965	(12,114,693) 9,979,105	•	1,227,796	22.93%
	<u> </u>	(1,031,258)	215,338	(754,003)		1,221,130	22.30 /0
Estimated Surplus/(Deficit) Year to Date	7	13,246,458	5,444,909	-			
Amount Required to be Raised from Rates	8 _	(33,835,973)	(33,739,693)	(33,789,693)			
	-	<u>, , , - , ,</u>		<u> </u>			

This statement is to be read in conjunction with the accompanying notes.

CITY OF KWINANA STATEMENT OF COMPREHENSIVE INCOME BY PROGRAM FOR THE PERIOD 1 JULY 2015 TO 31 MAY 2016

	NOTE	May 2016 Actual \$	May 2016 Y-T-D Budget \$	2015/2016 Revised Budget \$
Revenues	1			
General Purpose Funding	•	37,686,963	37,525,334	37,735,069
Governance		221,838	180,128	180,391
Law, Order, Public Safety		447,414	411,102	432,196
Health		236,577	216,974	220,805
Education and Welfare		6,571,536	5,292,631	5,931,201
Community Amenities		11,723,028	11,400,866	11,618,382
Recreation and Culture		2,401,385	2,454,763	2,732,589
Transport		268,547	199,878	272,867
Economic Services		1,220,993	1,101,023	1,220,824
Other Property and Services		431,843	298,322	347,416
		61,210,124	59,081,021	60,691,740
Expenses Excluding Finance Costs	1			
General Purpose Funding	•	(1,211,735)	(1,348,654)	(1,777,057)
Governance		(4,657,086)	(5,623,706)	(5,456,976)
Law, Order, Public Safety		(1,958,841)	(2,177,457)	(2,390,526)
Health		(950,196)	(1,094,686)	(1,182,821)
Education and Welfare		(8,098,729)	(7,382,510)	(8,354,052)
Community Amenities		(7,277,070)	(10,385,615)	(11,373,001)
Recreation & Culture		(13,312,618)	(15,593,745)	(16,961,815)
Transport		(7,111,707)	(10,600,202)	(11,711,632)
Economic Services		(1,336,405)	(1,520,569)	(1,654,847)
Other Property and Services		(3,022,036)	(3,359,672)	(3,579,144)
		(48,936,423)	(59,086,816)	(64,441,871)
Finance Costs	1			
Governance	I	(33,780)	(34,561)	(67,973)
Education and Welfare		(47,929)	(49,380)	(98,385)
Recreation & Culture		(426,143)	(437,927)	(822,599)
Transport		(55,117)	(407,327)	(169,766)
Economic Services		(1,526)	(2,336)	(2,336)
		(564,495)	(611,364)	(1,161,059)
		11,709,206	(617,159)	(4,911,190)
Grants/Contributions for the Development		4,838,244	5,616,314	11,074,011
of Assets				
Profit on Disposal of Assets	4	51,694	60,137	110,137
(Loss) on Disposal of Assets	4	(16,521)	(21,848)	(132,788)
NET RESULT	_	16,582,623	5,037,444	6,140,170
Other Comprehensive Income		-	-	-
TOTAL COMPREHENSIVE INCOME		16,582,623	5.037.444	6,140,170
		10,002,020	0,007,117	0,110,170

This statement is to be read in conjunction with the accompanying notes.

CITY OF KWINANA STATEMENT OF COMPREHENSIVE INCOME BY NATURE & TYPE FOR THE PERIOD 1 JULY 2015 TO 31 MAY 2016

	NOTE	May 2016 Actual \$	May 2016 Y-T-D Budget \$	2015/2016 Revised Budget \$
Revenues	1			
Rates	8	33,835,974	33,739,693	33,789,693
Operating Grants, Subsidies & Contributions		11,478,719	10,178,930	11,071,815
Reimbursements and Donations		1,040,664	571,469	601,672
Fines & Penalties		134,829	171,576	175,500
Fees and Charges		11,234,741	11,046,786	11,410,104
Interest Earnings		1,880,659	1,811,648	1,958,409
Income from Property		1,503,546	1,467,047	1,588,405
Other Revenue	_	100,992	93,872	96,142
		61,210,124	59,081,021	60,691,740
Expenses Excluding Finance Costs	1			
Employee Costs		(21,613,625)	(22,809,205)	(24,708,163)
Materials and Contracts		(17,390,500)	(22,222,442)	(24,016,442)
Utilities Charges (gas, electricity, water, etc)		(2,112,384)	(1,977,440)	(2,263,757)
Leases		(214,725)	(314,380)	(342,951)
Depreciation on Non-current Assets		(6,528,691)	(10,595,570)	(11,558,780)
Insurance Expenses		(524,862)	(528,549)	(541,187)
Other Expenditure		(551,636)	(639,230)	(1,010,591)
		(48,936,423)	(59,086,816)	(64,441,871)
Finance Costs				
Interest Expenses	5	(564,495)	(611,364)	(1,161,059)
	_	11,709,206	(617,159)	(4,911,190)
Grants/Contributions for the Development of Assets				
Non-operating Grants, Subsidies & Contributions		4,554,942	5,342,515	10,800,212
Non-operating Reimbursements & Donations		283,302	273,799	273,799
		4,838,244	5,616,314	11,074,011
Profit/(Loss) on Disposal of Assets	4			
Profit on Asset Disposals		51,694	60,137	110,137
Loss on Asset Disposals		(16,521)	(21,848)	(132,788)
·	_	35,173	38,289	(22,651)
NET RESULT	=	16,582,623	5,037,444	6,140,170
Other Comprehensive Income		-	-	-
TOTAL COMPREHENSIVE INCOME	=	16,582,623	5,037,444	6,140,170

This statement is to be read in conjunction with the accompanying notes.

CITY OF KWINANA NOTES TO AND FORMING PART OF THE STATEMENT OF FINANCIAL ACTIVITY FOR THE PERIOD 1 JULY 2015 TO 31 MAY 2016

1. SIGNIFICANT ACCOUNTING POLICIES

The significant accounting policies which have been adopted in the preparation of this statement of financial activity are:

(a) Basis of Accounting

The budget has been prepared in accordance with applicable Australian Accounting Standards, other mandatory professional reporting requirements and the Local Government Act 1995 (as amended) and accompanying regulations (as amended).

(b) The Local Government Reporting Entity

All Funds through which the Council controls resources to carry on its functions have been included in this statement.

In the process of reporting on the local government as a single unit, all transactions and balances between those funds (for example, loans and transfers between Funds) have been eliminated.

All monies held in the Trust Fund are excluded from the financial statement, but a separate statement of those monies appears at Note 9 to this budget.

(c) Rounding Off Figures

All figures shown in this statement, other than a rate in the dollar, are rounded to the nearest dollar.

(d) Rates, Grants, Donations and Other Contributions

Rates, grants, donations and other contributions are recognised as revenues when the local government obtains control over the assets comprising the contributions. Control over assets acquired from rates is obtained at the commencement of the rating period or, where earlier, upon receipt of the rates.

(e) Goods and Services Tax

In accordance with recommended practice, revenues, expenses and assets capitalised are stated net of any GST recoverable. Receivables and payables are stated inclusive of applicable GST.

(f) Fixed Assets

Property, plant and equipment and infrastructure assets are brought to account at cost or fair value less, where applicable, any accumulated depreciation or amortisation and any accumulated impairment balances.

CITY OF KWINANA NOTES TO AND FORMING PART OF THE STATEMENT OF FINANCIAL ACTIVITY FOR THE PERIOD 1 JULY 2015 TO 31 MAY 2016

1. SIGNIFICANT ACCOUNTING POLICIES (Continued)

(g) Depreciation of Non-Current Assets

All non-current assets having a limited useful life are systematically depreciated over their useful lives in a manner which reflects the consumption of the future economic benefits embodied in those assets.

Depreciation is recognised on a straight-line basis, using rates which are reviewed each reporting period. Major depreciation periods are:

ASSET CLASS	ASSSET DESCRIPTION	Economic	Depreciation
Land	Land	Life	Rate
Land	Land	Nil	
	Vested Land	Nil	
	Other Vested Land	Nil	
Buildings	Fencing	20 to 50	5% to 2%
	Building Structure	40 to 60	2.5% to 1.67%
	Air conditioning	10 to 30	10% to 3.33%
	Soft Furnishings	10	0.10%
	Fixtures	10	0.10%
	Other	10 to 30	10% to 3.33%
	Alarms	3 to 10	33.33% to 10%
Plant & Equipment	Vehicles	5 to 10	20% to 10%
	Major Plant	5 to 10	20% to 10%
	Minor Plant & Equipment	3 to 10	33.33% to 10%
Furniture & Equipment	Computing Equipment	2 to 7	50% to 14.29%
	Office Furniture	7 to 13	14.29% to 7.69%
	Office Equipment	3 to 10	33.33% to 10%
	Audio Visual Equipment	3 to 10	33.33% to 10%
	Specialised Equipment	7 to 13	14.29% to 7.69%
	White Goods	7 to 13	14.29% to 7.69%
	Art Works	Nil	
Infrastructure - Roads		50	0.02%
Infrastructure - Footpaths		50	0.02%
Infrastructure - Drainage	Drainage	75	0.0133%
° °	Sewerage	75	0.0133%
Infrastructure - Crossovers	C C	50	0.02%
Infrastructure - Car Parks		20 to 40	5% to 2.5%
Infrastructure - Bus Shelters		20	0.05%
Infrastructure - Street Lights	Street Lights	30	0.0333%
· · · · · · · · · · · · · · · · · · ·	Other Lights	30	0.0333%
Infrastructure – Parks & Ovals	Playground Equipment	5 to 15	20% to 6.67%
	Bores/Pumps/Irrigation	8 to 20	12.5% to 5%
	BBQ's	10 to 20	10% to 5%
	Streetscapes	20 to 50	5% to 2%
	Landscape Surrounds	10 to 50	10% to 2%
	Sportsgrounds - Reticulated	15 to 25	6.67% to 4%
	Public Open Space Not Reticul	20 to 50	5% to 2%
Infrastructure - Other Structures	Jetties	20 to 40	5% to 2.5%
	Other Structures	20 to 50	5% to 2%
	Tennis Courts	30 to 50	3.33% to 2%
		30 10 30	3.33 /0 to 270

2. STATEMENT OF OBJECTIVE

In order to discharge its responsibilities to the community, the City has developed a set of operational and financial objectives. These objectives have been established both on an overall basis, reflected by the City's Vision, and for each of its broad activities/programs.

CITY'S VISION

"Kwinana 2030: Rich in spirit, alive with opportunities, surrounded by nature - it's all here!"

Council operations as disclosed in this budget encompass the following service orientated activities/programmes:

GENERAL PURPOSE FUNDING

Rates Income and Expenditure, Grants Commission and Pensioner Deferred Rates interest and interest on Investments. Principal and Interest payments on borrowing's.

GOVERNANCE

Members of Council and Governance (includes Audit and other costs associated with reporting to council). Administration, Financial and Computing Services are included.

LAW, ORDER, PUBLIC SAFETY

Supervision of various local laws, fire prevention and animal control.

HEALTH

Prevention and treatment of human illness, including inspection of premises/food control, immunisation and child health services.

EDUCATION AND WELFARE

Provision, management and support of services for families, children and the aged and disabled within the community; including pre-school playgroups, day and after school care, assistance to schools, senior citizens support groups, meals on wheels provision and Aged Persons Units and Resident Funded Units.

COMMUNITY AMENITIES

City planning and development, rubbish collection services, stormwater drainage, the provision of public conveniences, bus shelters, roadside furniture and litter control.

RECREATION AND CULTURE

Provision of facilities and support for organisations concerned with leisure time activities and sport, support for the performing and creative arts and the preservation of the national estate. This includes maintenance of halls, aquatic centre, recreation and community centres, parks, gardens, sports grounds and the operation of Libraries.

TRANSPORT

Construction, maintenance and cleaning of streets, roads, bridges, drainage works, footpaths, parking facilities, traffic signs and the City depot, including plant purchase and maintenance.

ECONOMIC SERVICES

Rural services and pest control and the implementation of building controls.

OTHER PROPERTY & SERVICES

Private works, public works overheads, council plant operations, materials, salaries and wages. With the exception of private works, the above activities listed are mainly summaries of costs that are allocated to all works and services undertaken by the council.

3. ACQUISITION OF ASSETS

The following assets are budgeted to be acquired during the period under review:

)15/16 evised	May 2016	The following assets are budgeted to be acquired during he period under review:
udget \$	Actual \$	By Directorate
		City Strategy
(16,690)	(15,717.00)	Furniture & Equipment
(132,000) (562,311)	(117,295.00) (422,424.00)	Transportation Vehicles Land & Buildings
(711,001)	(555,436.00)	
<i></i>		Corporate & Engineering Services
(31,335)	(19,950)	Furniture & Equipment
(368,526) (501,750)	(255,679) (196,158)	Computing Equipment Plant & Equipment
(386,000)	(190,100) (297,232)	Transportation Vehicles
(281,400)	(133,486)	Land & Buildings
(1,516,934)	(719,513)	Reserve Development
(6,028,944)	(1,886,958)	Playground Equipment
(2,314,135)	(2,092,622)	Urban Road Grant
(2,245,458) (1,159,269)	(2,201,847) (712,637)	Black Spot Grant Roads to Recovery Grant
(301,825)	(172,975)	Road Resurfacing
(25,000)	(16,546)	Street Lighting
(24,824)	(540)	Bus Shelter Construction
(113,000)	(95,377)	Footpath Construction
(1,102,840)	(852,920)	Drainage Construction
(722,141)	(596,777) (2,122)	Municipal Roadworks Carpark Construction
(17,123,381)	(10,253,339)	
		City Living
(103,910)	(37,016)	Furniture & Equipment
(81,753)	(54,002)	Plant & Equipment
(471,225) (1,768,834)	(414,756) (722,924)	Transportation Vehicles Land & Buildings
(1,708,834)	(722,324)	Playground Equipment
(2,445,722)	(1,228,698)	
(=0.000)	(00,440)	City Development
(70,000) (70,000)	(69,442) (69,442)	i ransportation venicles
(20,350,104)	(12,106,915)	
(20		Transportation Vehicles

3. ACQUISITION OF ASSETS (Continued) <u>By Class</u>	May 2016 Actual \$	2015/16 Revised Budget \$
Furniture and Equipment	(72,683)	(151,935)
Computing Equipment	(255,679)	(368,526)
Plant and Equipment	(250,160)	(583,503)
Transportation Vehicles	(898,725)	(1,059,225)
Land and Buildings	(1,278,834)	(2,612,545)
Reserve Development	(7,19,513)	(1,516,934)
Playground Equipment	(1,886,958)	(6,048,944)
Infrastructure - Urban Road Grant	(2,092,622)	(2,314,135)
Infrastructure - Black Spot Grant	(2,201,847)	(2,245,458)
Infrastructure - Roads to Recovery	(712,637)	(1,159,269)
Infrastructure - Road Resurfacing	(172,975)	(301,825)
Infrastructure - Street Lights	(16,546)	(25,000)
Infrastructure - Bus Shelters Infrastructure - Footpaths	(10,340) (540) (95,377)	(23,000) (24,824) (113,000)
Infrastructure - Drainage	(852,920)	(1,102,840)
Infrastructure - Municipal Roadworks	(596,777)	(722,141)
Infrastructure - Carpark	(2,122)	(20,350,104)

4. DISPOSALS OF ASSETS

The following assets have been disposed of during the period under review

By Class	Net Book Value May Actual \$	Sale Proceeds May Actual \$	Profit(Loss) May Actual \$
Furniture and Equipment Plant and Equipment Transportation Vehicles Buildings Reserve Development Land Other	- - (322,723) - - - - - - -	3,300 17,394 337,202 - - - - -	3,300 17,394 14,479 - - - -
	(322,723)	357,896	35,173

Summary	May Actual \$
Profit on Asset Disposals	51,694
(Loss) on Asset Disposals	(16,521)
	35,173

5. INFORMATION ON BORROWINGS

(a) Loan Repayments

	Principal 1-Jul-15	Interest Rate	Maturity Date	New Loans	Prine Repay		Prine Outsta		Inter Repayı	
Particulars				May-16 Actual \$	May-16 Actual \$	2015/16 Budget \$	May-16 Actual \$	2015/16 Budget \$	May-16 Actual \$	2015/16 Budget \$
Goverance										
Loan 99 - Administration Office Renovations	1,000,000	6.25%	25-Jun-25	-	36,745	74,638	963,255	925,362	33,780	67,973
Education & Welfare										
Loan 96 - Youth Specific Space	213,599	7.53%	19-Jun-23	-	9,973	20,321	203,626	193,278	8,232	17,107
Loan 100 -Youth Specific Space	1,521,312	4.67%	25-Jun-28	-	-	· -	1,521,312	1,521,312	39,697	81,278
Recreation & Culture										
Loan 90 - Kwinana Bowling Club*	29,996	6.42%	30-Apr-16	-	29,996	29,996	-	-	1,196	1,576
Loan 94 - Wellard Sports Pavilion	327,987	6.38%	04-May-22	-	38,505	38,505	289,482	289,482	18,161	22,449
Loan 95 - Orelia Oval Pavilion	512,637	7.53%	19-Jun-23	-	23,934	48,770	488,703	463,867	19,757	41,055
Loan 97 - Orelia Oval Pavilion Extension	2,212,711	6.25%	25-Jun-25	-	81,306	165,153	2,131,405	2,047,558	74,746	150,404
Loan 102 - Resource & Knowledge Centre	7,421,567	4.54%	28-Jun-29	-	-	-	7,421,567	7,421,567	188,962	386,856
Loan 103 - Kwinana Golf Club	334,010	4.07%	25-Jun-23	-	17,871	36,106	316,139	297,904	7,734	15,409
Loan 104 - Recquatic Upgrade	3,350,000	4.05%	26-Jun-30	-	-	-	3,350,000	3,350,000	79,659	154,000
Loan 105 - Bertram Community Centre	1,296,840	3.25%	27-Mar-30	-	-	-	1,296,840	1,296,840	35,928	50,850
New - Calista Destination Park	-			-	-	-	-	1,700,000	-	-
New - Darius Wells Building Solar Panels	-			-	-	-	-	191,360	-	-
Transport										
Loan 92 - Sulphur Rd Bridge	87,880	5.94%	19-Oct-15	-	87,880	87,880	-	-	1,962	3,003
Loan 98 - Streetscape Beautification	1,350,000	6.25%	25-Jun-25	-	49,606	100,762	1,300,394	1,249,238	45,603	91,763
Loan 101 - City Centre Road Network**	2,500,000	2.33%	24-Jun-16	-	-		2,500,000	2,500,000	7,552	75,000
Economic Services										
Loan 93 - DOE Building	68,351	5.94%	18-Oct-15	-	68,351	68,351	-	-	1,526	2,336
	22,226,890			-	444,167	670,482	21,782,723	23,447,768	564,495	1,161,059
	<u></u>	Delecto	al Danauna di	Dahastus	444 407	070 400				
			al Repayments		444,167	670,482				

Liquidity Advance Repayments

444,167 670,482 -0

(*) Self Supporting loan financed by payments from third parties (**) Short Term Facility Loans All loan repayments were financed by general purpose revenue.

5. INFORMATION ON BORROWINGS (Continued)

(b) New Debentures

Particulars/Purpose	Amount I	Borrowed	Institution	Loan Type	Term (Years)	Total Interest	Interest Rate	Amount	t Used	Balance Unspent
·	Actual	Budget				& Charges		Actual	Budget	\$
Calista Destination Park	-	1,700,000	WA Treasury	Debenture	15	144,902	4.0% & 0.7%	-	1,700,000	-
Darius Wells Building Solar Panels	-		WA Treasury		15	8,994	4.0% & 0.7%	-	191,360	-
	-	1,891,360				153,896		-	1,891,360	-

(c) Unspent Debentures

Particulars	Date Borrowed	Balance 1-Jul-15 \$	Borrowed During Year \$	Expended During Year	Liquidity Repayment \$	Balance 31-May-16 \$
Loan 99 - Administration Office Renovations	25-Jun-10	94,435	-	20,044		74,391
		94,435	-	20,044	-	74,391

(d) Self Supporting Loan Repayments

	Principal 1-Jul-15	New Loans	Princ Repay		Princ Outsta		Inter Repayı	
Particulars			May-16 Actual \$	2015/16 Budget \$	May-16 Actual \$	2015/16 Budget \$	May-16 Actual \$	2015/16 Budget \$
Recreation & Culture Loan 90 - Kwinana Bowling Club Loan 103 - Kwinana Golf Club	30,166 334,010	-	30,166 33,404	30,166 36,106	- 300,606	- 297,904	1,155 13,639	1,483 13,455
	364,176	-	63,570	66,272	300,606	297,904	14,794	14,938

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6. RESERVES

Reserve Accounts Transactions

			Transfers			
RESERVE FUND DETAILS	Opening Balance 1 July 2015	To Reserve	Interest	From Reserve	Movements	Closing Balance 31 May 2016
Aged Persons Units Reserve	404,358	-	9,695	(142,553)	-	271,500
Asset Management Reserve	1,277,498	-	32,436	(380,446)	-	929,488
Asset Replacement Reserve	457,328	-	9,566	(165,201)	-	301,693
Banksia Park Reserve	173,273	-	3,517	(82,059)	-	94,731
CLAG Reserve	180,211	60,033	4,850	-	-	245,094
Community Services & Emergency Relief Reserve	24,542	-	678	-	-	25,220
Employee Leave Reserve	3,695,958	-	-	-	-	3,695,958
Family Day Care Reserve	1,282,200	-	34,997	-	-	1,317,197
Future Community Infrastructure Reserve	2,215,240	455,333	66,915		-	2,737,488
Golf Course Cottage Reserve	25,677	-	709	-	-	26,386
Infrastructure Reserve	167,558	-	3,876	(55,371)	-	116,063
Refuse Reserve	6,351,966	-	173,032	(22,952)	-	6,502,046
Restricted Grants & Contributions Reserve	4,065,475	-	-	(2,659,061)	-	1,406,414
Settlement Agreement Reserve	150,000	150,042	-	-	-	300,042
Un-Restricted Reserves Sub Total	20,471,284	665,408	340,271	(3,507,643)	-	17,969,320

			Transfers			
RESERVE FUND DETAILS	Opening Balance 1 July 2015	To Reserve	Interest	From Reserve	Movements	Closing Balance 31 May 2016
DCA 1 - Hard Infrastructure - Bertram	1,758,122	214,190	48,568	-	(542,218)	1,478,662
DCA 2 - Hard Infrastructure - Wellard East	816,633	655,160	35,743	-	(, , ,	1,507,536
DCA 5 - Hard Infrastructure - Wandi	2,634,885	-	72,789	-		2,707,674
DCA 9 - Soft Infrastructure - Wandi/Anketell	8,422,111	51,214	233,729	(1,489)		8,705,565
DCA 11 - Soft Infrastructure - Wellard East	2,513,635	1,034,887	88,855	(29,774)		3,607,603
DCA 12 - Soft Infrastructure - Wellard West	4,651,447	488,817	132,093	(53,380)	542,218	5,761,195
DCA 13 - Soft Infrastructure - Bertram	260,897	23,829	7,425	(6,663)		285,488
DCA 14 - Soft Infrastructure - Wellard/Leda	268,434	504,168	9,102	(390,246)		391,458
DCA 15 - Soft Infrastructure - Townsite	83,377	187,372	3,254	(136,974)		137,029
Developer Contribution Reserves Sub Total	21,409,541	3,159,637	631,558	(618,526)	-	24,582,210

Reserves Total	41,880,825	3,825,045	971,829	(4,126,169)	- 42,551,530

All of the above reserve accounts are to be supported by money held in financial institutions.

6.	RESERVES	May Actual	2015/16 Budget
		\$	\$
	Cash/Investment Backed Reserves		
(a)	Aged Persons Units Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	404,358 9,695 (142,553) 271,500	404,358 287,984 8,997 (275,315) 426,024
(b)	Asset Management Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	1,277,498 32,436 (380,446) 929,488	1,277,498 500,000 20,692 (817,377) 980,813
(c)	Asset Replacement Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	457,328 9,566 (165,201) 301,693	457,328 250,000 7,308 (434,900) 279,736
(d)	Banksia Park DMF Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	173,273 3,517 (82,059) 94,731	173,273 2,705 (126,047) 49,931
(e)	CLAG Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	180,211 60,033 4,850 	180,211 48,450 4,176 (36,620) 196,217
(f)	Community Services & Emergency Relief Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	24,542 678 	24,542 - 664 - 25,206
(g)	Employee Leave Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	3,695,958 - - - - 3,695,958	3,695,958 - - - 3,695,958
(h)	Family Day Care Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	1,282,200 34,997 	1,282,200 26,674 (590,000) 718,874
(i)	Future Community Infrastructure Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	2,215,240 455,333 66,915 - 2,737,488	2,215,240 600,239 62,898 (1,383,017) 1,495,360

6.	RESERVES	May Actual	2015/16 Budget
	Cash/Investment Backed Reserves	\$	\$
(j)	Golf Course Cottage Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	25,677 709 	25,677
(k)	Infrastructure Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	167,558 3,876 (55,371) 116,063	167,558 3,765,864 11,848 (75,343) 3,869,927
(I)	Refuse Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	6,351,966 173,032 (22,952) 6,502,046	6,351,966
(m)	Restricted Grants & Contributions Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	4,065,475 - (2,659,061) 1,406,414	4,065,475 1,336,515 (4,065,475) 1,336,515
(n)	Settlement Agreement Reserve Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve Un-Restricted Reserves Sub Total	150,000 150,042 - - - - - - - - - - - - - - - - - - -	150,000 150,042 - (300,042) - - 18,906,154
(0)	Developer Contributions Reserve - DCA 1 - Hard Infrastucture Bertram Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve Movement	1,758,122 214,190 48,568 (542,218) 1,478,662	1,758,122 214,189 39,885 (308,167) - 1,704,029
(p)	Developer Contributions Reserve - DCA 2 - Hard Infrastucture Wellard Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	816,633 655,160 35,743 	816,633 999,723 22,298 1,838,654
(q)	Developer Contributions Reserve - DCA 5 - Hard Infrastucture Wandi Opening Balance Amount Set Aside / Transfer to Reserve Interest Applied to Reserve Amount Used / Transfer from Reserve	2,634,885 72,789 	2,634,885 2,187 2,637,072

6.	RESERVES		
		May	2015/16
	Cash/Investment Backed Reserves	Actual \$	Budget \$
	Developer Contributions Reserve - DCA 8 -Soft		
(r)	Infrastucture Mandogalup		
.,	Opening Balance	-	-
	Amount Set Aside / Transfer to Reserve Interest Applied to Reserve	-	-
	Amount Used / Transfer from Reserve	-	(54,782)
		-	(54,782)
	Developer Contributions Reserve - DCA 9 -Soft		
(s)	Infrastucture Wandi/Anketell		
	Opening Balance	8,422,111	8,422,111
	Amount Set Aside / Transfer to Reserve Interest Applied to Reserve	51,214 233,729	58,531 189,773
	Amount Used / Transfer from Reserve	(1,489)	(47,347)
		8,705,565	8,623,068
	Developer Contributions Reserve - DCA 10 -Soft		
(t)	Infrastucture Casuarina/Anketell		
	Opening Balance Amount Set Aside / Transfer to Reserve	-	-
	Interest Applied to Reserve	-	710
	Amount Used / Transfer from Reserve	-	-
		<u> </u>	710
	Developer Contributions Reserve - DCA 11 -Soft		
(u)	Infrastucture Wellard East	0 540 005	0 540 005
	Opening Balance Amount Set Aside / Transfer to Reserve	2,513,635 1,034,887	2,513,635 1,544,937
	Interest Applied to Reserve	88,855	75,035
	Amount Used / Transfer from Reserve	<u>(29,774)</u> 3,607,603	<u>(97,131)</u> 4,036,476
		3,007,003	4,030,470
	Developer Contributions Reserve - DCA 12 -Soft		
(v)	Infrastucture Wellard West Opening Balance	4,651,447	4,651,447
	Amount Set Aside / Transfer to Reserve	488,817	677,771
	Interest Applied to Reserve	132,093	157,233
	Amount Used / Transfer from Reserve Movement	(53,380) 542,218	(34,529)
		5,761,195	5,451,922
	Developer Contributions Reserve - DCA 13 -Soft		
(w)	Infrastucture Bertram		
	Opening Balance	260,897	260,897
	Amount Set Aside / Transfer to Reserve Interest Applied to Reserve	23,829 7,425	142,972 18,715
	Amount Used / Transfer from Reserve	(6,663)	(53,243)
		285,488	369,341
	Developer Contributions Reserve - DCA 14 -Soft		
(x)	Infrastucture Wellard/Leda		
	Opening Balance Amount Set Aside / Transfer to Reserve	268,434 504,168	268,434 506,716
	Interest Applied to Reserve	9,102	6,595
	Amount Used / Transfer from Reserve	(390,246)	(430,352)
		391,458	351,393
	Developer Contributions Reserve - DCA 15 -Soft		
(y)	Infrastucture Townsite	00.077	00.077
	Opening Balance Amount Set Aside / Transfer to Reserve	83,377 187,372	83,377 230,760
	Interest Applied to Reserve	3,254	2,124
	Amount Used / Transfer from Reserve	<u>(136,974)</u> 137,029	(163,886) 152,375
		137,029	102,070
	Developer Contributions Reserves Sub Total	24,582,210	25,110,258
	Total Cash/Investment Backed Reserves	42,551,530	44,016,412
		,001,000	~

All of the above reserve accounts are to be supported by money held in financial institutions.

6. RESERVES

In accordance with council resolutions in relation to each reserve account, the purpose for which the reserves are set aside are as follows:

Aged Persons Units Reserve

This Reserve has been established to provide funds for the capital acquisition and maintenance of the Aged Persons Units, Callistemon Court

Arts Centre Reserve

This Reserve was established to cover any increases in the cost of operations and maintenance for the Kwinana Arts Centre

Asset Management Reserve

This Reserve is utilised to provide funds for renewal projects for the City's building and infrastructure assets.

Asset Replacement Reserve

This Reserve is utilised to replace existing fleet, plant and other City assets

Banksia Park Reserve

This Reserve has been established to provide funds for the capital acquisition and maintenance of the Banksia Park Retirement Village

CLAG Reserve

This Reserve has been established to provide funds for the prevention and education of Mosquito management.

Community Services & Emergency Relief Reserve

This Reserve is established to provide funding to alleviate the effect of any disaster within the City of Kwinana boundaries and to provide funds to develop

Employee Leave Reserve

This Reserve is established for the purpose of ensuring that adequate funds are available to finance employee leave entitlements

Family Day Care Reserve

This Reserve provides for the capital acquisitions and maintenance of this facility

Future Community Infrastructure Reserve

This Reserve is established to accumulate the City's contributions for the capital funding of future community infrastructure in accordance with Town Planning Scheme #2

Golf Course Cottage Reserve

This Reserve was established to provide funds for the maintenance of this building

Infrastructure Reserve

This Reserve was established to be used to provide funds to create new City assets or for the major upgrade of City assets to increase the service level provided by the asset

Refuse Reserve

This Reserve was established to provide funds for the costs and subsidy of Waste Management in the City

Restricted Grants & Contributions Reserve

The Reserve is utilised to restrict funds required to complete projects from prior financial years

Settlement Agreement Reserve

This Reserve was established to provide funds to account for future negotiated settlement agreement payments.

DCA 1 - Hard Infrastructure - Bertram

This Reserve is established to restrict funds received from Developers for contributions towards future infrastructure costs and administrative costs for DCA 1 - Hard Infrastructure Bertram

DCA 2 - Hard Infrastructure - Wellard

This Reserve is established to restrict funds received from Developers for contributions towards future infrastructure costs and administrative costs for DCA 2 - Hard Infrastructure Wellard

DCA 5 - Hard Infrastructure - Wandi

This Reserve is established to restrict funds received from Developers for contributions towards future infrastructure costs and administrative costs for DCA 5 - Hard Infrastructure Wandi

DCA 8 - Soft Infrastructure - Mandogalup

This Reserve is established to restrict funds received from Developers for contributions towards future infrastructure costs and administrative costs for DCA 8 - Soft Infrastructure Mandogalup

DCA 9 - Soft Infrastructure - Wandi/Anketell

This Reserve is established to restrict funds received from Developers for contributions towards future infrastructure costs and administrative costs for DCA 9 - Soft Infrastructure Wandi/Anketell

CITY OF KWINANA NOTES TO AND FORMING PART OF THE FINANCIAL ACTIVITY

FOR THE PERIOD 1 JULY 2015 TO 31 MAY 2016

6. RESERVES

DCA 10 - Soft Infrastructure - Casuarina/Anketell

This Reserve is established to restrict funds received from Developers for contributions towards future infrastructure costs and administrative costs for DCA 10 - Soft Infrastructure Casuarina/Anketell

DCA 11 - Soft Infrastructure - Wellard East

This Reserve is established to restrict funds received from Developers for contributions towards future infrastructure costs and administrative costs for DCA 11 - Soft Infrastructure Wellard East

DCA 12 - Soft Infrastructure - Wellard West

This Reserve is established to restrict funds received from Developers for contributions towards future infrastructure costs and administrative costs for DCA 12 - Soft Infrastructure Wellard West

DCA 13 - Soft Infrastructure - Bertram

This Reserve is established to restrict funds received from Developers for contributions towards future infrastructure costs and administrative costs for DCA 13 - Soft Infrastructure Bertram

DCA 14 - Soft Infrastructure - Wellard/Leda

This Reserve is established to restrict funds received from Developers for contributions towards future infrastructure costs and administrative costs for DCA 14 - Soft Infrastructure Wellard/Leda

DCA 15 - Soft Infrastructure - Townsite

This Reserve is established to restrict funds received from Developers for contributions towards future infrastructure costs and administrative costs for DCA 15 - Soft Infrastructure Townsite

7. NET CURRENT ASSETS

Composition of Estimated Net Current Asset Position

Composition of Estimated Net Current Asset Position		
	Мау 2016	Brought Forward
	Actual	1-Jul
CURRENT ASSETS	\$	\$
Cash - Unrestricted	10,296,855	6,397,721
Cash - Restricted (Reserves)	42,551,530	41,880,825
Cash - Restricted (Unspent Loan Funds)	74,391	94,435
Cash - Restricted (Restricted Creditors)	3,458,925	5,628,468
Rates - Current	2,446,119	1,429,979
Sundry Debtors	1,557,178	508,044
GST Receivable	-	531,719
Accrued Receivables	-	676,467
Inventories	33,763	20,926
	60,418,761	57,168,584
LESS: CURRENT LIABILITIES		
Sundry Creditors	(1,087,457)	(5,019,833)
Accrued payables - Current	-	(1,627,317)
Current Borrowings	(3,170,480)	(3,170,480)
Provisions - Current	(4,101,552)	(4,101,552)
	(8,359,489)	(13,919,182)
Net Current Asset Position (Prior to Adjustment)	52,059,272	43,249,402
Less:		
Cash Restricted - (Unspent Loan Funds)	(74,391)	(94,435)
Cash Restricted - (Restricted Creditors)	(3,458,925)	(5,628,468)
Cash Restricted - (Reserves)	(42,551,530)	(41,880,825)
	(46,084,846)	(47,603,728)
Add Back:		
Cash Backed Leave Reserve - Current	4,101,552	4,101,552
Current Loan Liability	3,170,480	3,170,480
	7,272,032	7,272,032
	\$ 13,246,458	\$ 2,917,706

8. RATING INFORMATION

RATE TYPE	Rate in \$	Number of	Rateable Value	2015/16 Actual Rate	2015/16 Actual Interim	2015/16 Back	2015/16 Total	2015/16 Total
	•	Properties	\$	Revenue	Rates	Rates	Revenue	Budget
Differential General Rate		-		\$	\$	\$	\$	\$
Gross Rental Value (GRV)								
Improved Residential	0.07090	9,505	164,440,828	11,658,854	1,046,598	-	12,705,452	12,658,855
Vacant Residential	0.17450	582	8,342,505	1,455,767	283,549	-	1,739,316	1,455,767
Improved Special Rural	0.06199	712	16,742,680	1,037,879	7,310	-	1,045,189	1,037,879
Light Industrial and Commercial	0.08817	151	22,840,315	2,013,831	(35,791)	-	1,978,040	2,013,831
General Industry and Service Commercial	0.07510	311	33,179,469	2,491,778	20,866		2,512,644	2,491,778
Large Scale General Industry and Service Commercial	0.07792	47	50,218,935	3,913,059	164,462		4,077,521	3,913,059
Improved Value (UV)								
General Industrial	0.03464	3	121,200,000	4,198,368	-	-	4,198,368	4,198,368
Rural	0.00450	188	182,787,000	822,542	(24,210)		798,332	822,542
Mining	0.00770	13	27,291,000	210,141	11,757	-	221,898	210,141
Urban/Urban Deferred	0.00594	294	229,856,000	1,365,345	(428,260)	-	937,085	1,365,345
		11,806	856,898,732	29,167,564	1,046,281	-	30,213,845	30,167,565

.. RATING INFORMATION (Continued)

	Minimum \$	Number of Properties	Rateable Value \$	2015/16 Actual Rate Revenue	2015/16 Actual Interim Rates	2015/16 Back Rates	2015/16 Total Revenue	2015/16 Total Budget
Minimum Payments		roperaes	¥	\$	\$	\$	\$	\$
Gross Rental Value (GRV)								
Improved Residential	916	2,655	31,262,248	2,431,980	-	-	2,431,980	2,431,980
Vacant Residential	916	1,117	5,038,102	1,023,172	-	-	1,023,172	1,023,172
Improved Special Rural	916	5	68,260	4,580			4,580	4,580
Light Industrial and Commercial	1190	19	168,058	22,610	-	-	22,610	22,610
General Industry and Service Commercial	1190	36	287,043	42,840	-	-	42,840	42,840
Large Scale General Industry and Service Commercial	1190	0	-	-			-	-
Improved Value (UV)								
General Industrial	1190	0	-	-	-		-	-
Rural	916	11	1,453,000	10,076			10,076	10,076
Mining	1190	1	15,000	1,190	-		1,190	1,190
Urban/Urban Deferred	1190	72	13,589,600	85,680	-	-	85,680	85,680
Sub-Totals		3,916	51,881,311	3,622,128	-	-	3,622,128	3,622,128
							22 925 072	33,789,693
Specified Area Dates							33,835,973	33,109,093
Specified Area Rates							-	-
Totals		15,722	908,780,043	32,789,692	1,046,281	-	33,835,973	33,789,693

The City of Kwinana raises rates on all land within it's boundaries, except exempt land, using a combination of dual rating and differential rating. Generally land within the urban area is rated at Gross Rental Value (GRV) and land within the rural area being rated with Unimproved Valuations (UV). Certain Town Planning zonings have attracted different rates so as to achieve greater equity within the urban and rural sectors.

The general rates detailed above for the 2015/16 financial year have been determined by Council on the basis of raising the revenue required to meet the deficiency between the total estimated expenditure proposed in the budget and the estimated revenue to be received from all sources other than rates and also bearing considering the extent of any increase in rating over the level adopted in the previous year.

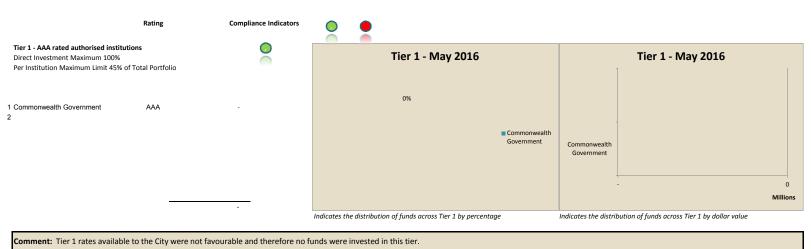
The minimum rates have been determined by Council on the basis that all ratepayers must make a reasonable contribution to the cost of the Local Government services/facilities.

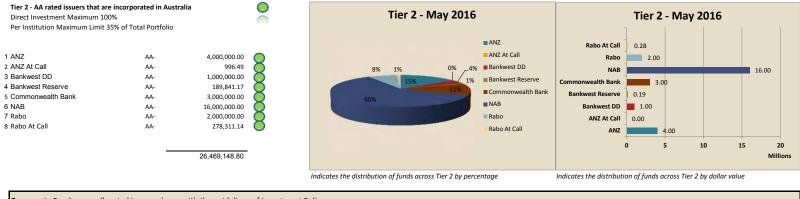
9. TRUST FUNDS

Funds held at balance date over which the Municipality has no control and which are not included in this financial statements are as follows:

	Balance 1-Jul-15 \$	Amounts Received \$	Amounts Paid \$	Balance 2015/16 \$
Apex - Kwinana Carols by Candlelight	1,403	-	(1,403)	-
Kwinana Basketball Courts	1,813	-	(1,813)	-
	3,216	-	(3,216)	

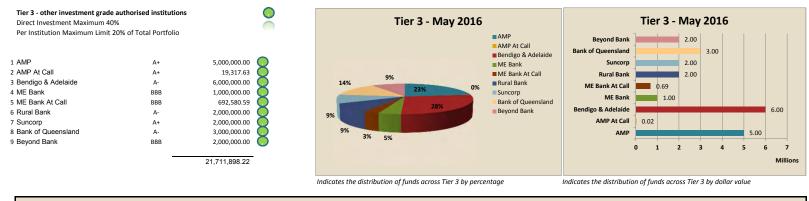
Kwinana



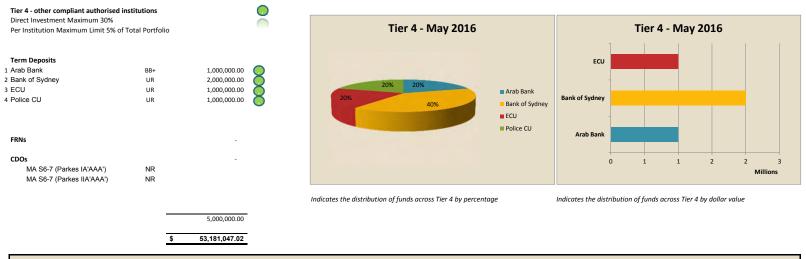


Comment: Funds were allocated in accordance with the guidelines of Investment Policy.





Comment: Funds were allocated in accordance with the guidelines of Investment Policy.



Comment: Funds were allocated in accordance with the guidelines of Investment Policy.

Legend

- FRNs Floating Rate Notes
- CDOs Collateralised Debt Obligations

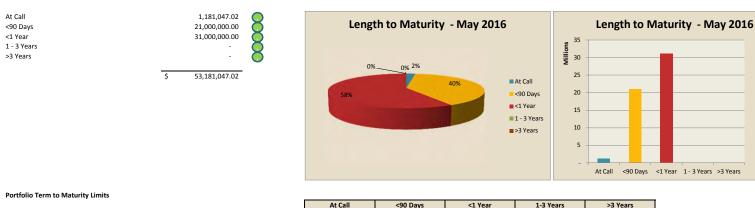


At Call

≤<90 Days</p>≤<1 Year</p>

1 - 3 Years

>3 Years



At Call investment 1,181,047.02 Ś 2.22% 1 Compliance Indicator Funds invested for 90 days or less \$ 21,000,000.00 39.49% 100% (with 10% minimum) of Total Portfolio Compliance Indicator . Funds invested for between 90 days and up to 1 year \$ 31,000,000.00 100% (with 40% minimum) of Total Portfolio 58.29% Compliance Indicator 1 Funds invested for between 1 and 3 years \$ 60% (Bonds Only) of Total Portfolio 0.00% Compliance Indicator 1 Funds invested for greater than 3 years Ś 0% of Total Portfolio 0.00% Compliance Indicator 1

Comment: Portfolio compliant with the Policy



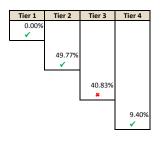
Portfolio Credit Framework

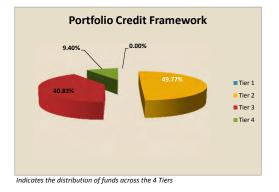
Direct Investment Maximum 100% Per Institution Maximum Limit 45% of Total Portfolio

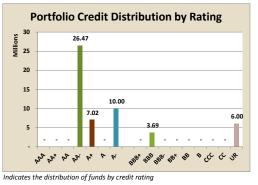
Direct Investment Maximum 100% Per Institution Maximum Limit 35% of Total Portfolio

Direct Investment Maximum 40% Per Institution Maximum Limit 20% of Total Portfolio

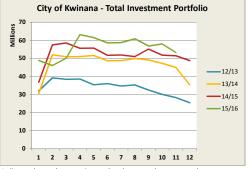
Direct Investment Maximum 30% Per Institution Maximum Limit 5% of Total Portfolio



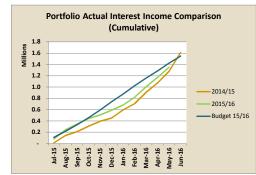




Comment: Funds held in this tier exceeded allowable amounts at month end partially due to the allocation of interest and cash requirements. This will be recitifed during the month of June 2016.



Indicates the total amount invested at the report date compared to prior years



Indicates the amount of interest earnt on investments for the period to report date

16.2 Budget Variations

SUMMARY:

To amend the 2016/2017 budget to reflect various adjustments to the General Ledger with nil effect to the overall budget as detailed below. Due to the nature of these variations, they fall outside the annual budget review.

OFFICER RECOMMENDATION:

That the required budget variations to the Adopted Budget for 2016/2017 as outlined in the report be approved.

NOTE: AN ABSOLUTE MAJORITY OF COUNCIL IS REQUIRED

DISCUSSION:

ITEM #	LEDGER ACCOUNT	DESCRIPTION	OPERATING BUDGET	INCREASE/ DECREASE	REVISED BUDGET
1	400567.1600	Project Expense	(316,636)	(30,000)	(346,636)
	300130.1600	Project Expense	46,000	30,000	76,000
			ent – revenue in ex		
	Reason:	NRM funding for F	Fauna Survey & Fer	al Animal Contro	ol for key
		Reserves in the C	ity of Kwinana.		
2	400099.1600	Project Expense	(212,237)	2,000	(210,237)
	300129.1600	Project Expense	48,550	(2,000)	46,550
	Reason:		venue less than ad s contribution to Y		

LEGAL/POLICY IMPLICATIONS:

The Local Government Act 1995 Part 6 Division 4 s 6.8 (1) requires the local government not to incur expenditure from its municipal fund for an additional purpose except where the expenditure-

(b) is authorised in advance by resolution*

"additional purpose" means a purpose for which no expenditure estimate is included in the local government's annual budget.

*requires an absolute majority of Council.

FINANCIAL/BUDGET IMPLICATIONS:

Budget Item Name:	Various items as listed above.
Budgeted Amount:	
Expenditure to Date:	
Proposed Cost:	Nil effect.
Balance:	

*NOTE: All figures are exclusive of GST

16.2 BUDGET VARIATIONS

ASSET MANAGEMENT IMPLICATIONS:

No asset management implications have been identifies as a result of this report or recommendation.

ENVIRONMENTAL IMPLICATIONS:

No environmental implications have been identified as a result of this report or recommendation.

STRATEGIC/SOCIAL IMPLICATIONS:

Council's Strategic Community Plan for the period 2015 to 2025 provides that Council will ensure the future sustainability of the City of Kwinana through the implementation of sound revenue and expenditure policies, and seeking additional revenue sources.

RISK IMPLICATIONS:

Refer to Legal/Policy comments for risk implications.

<u>COUNCIL DECISION</u> 265 MOVED CR D WOOD

SECONDED CR S MILLS

That the required budget variations to the Adopted Budget for 2016/2017 as outlined in the report be approved.

CARRIED BY AN ABSOLUTE MAJORITY OF COUNCIL 6/0

16.3 Exemption of the hire of certain local government property from the requirements of obtaining a permit – City of Kwinana Local Government Property Local Law.

SUMMARY:

To seek Council's approval to exempt certain local government property from the requirements of the issuing of a permit for the hiring of the local government property, as may be exempted by clause 3.13(3) of the City of Kwinana Local Government Property Local Law (local law).

OFFICER RECOMMENDATION:

That Council, exempt local government properties that appear in the City's Schedule of Fees and Charges from the requirements of the issue of a permit for hire, in accordance with clause 3.13(3) of the Local Government Property Local Law, if the hire is consistent with the normal hire arrangements for which the fees and charges are applicable and that the use is consistent with the normal use of the specific local government property.

DISCUSSION:

During the recent review of Delegations and Authorisations to Officers, it was found that the requirement to issue a permit for the hire of local government property could be better managed by exempting certain local government property from the requirement of applying for and being issued a permit. To require an application under the local law, then issue a permit and record the exercise of a delegation for every hire, would be an onerous task and require an extraordinary amount of officer resources required to manage each occasion on which a delegation was exercised. This hire includes anything from swimming pool hire, gym use, court hire, hall hire, etc.

The local law however, does provide an avenue whereby the process of hiring of the local government property could be better administered. Clause 3.13(3) allows the local government to exempt certain property from the requirements of needing a permit.

It is considered appropriate that those properties tabled in the City's Schedule of Fees and Charges, for which hire fees are listed, be exempted from the requirements of needing a permit. This exemption would only apply to the normal hire arrangements for which the fees and charges are applicable and that the use is consistent with the normal use of the specific local government property. All hire fees that would be exempt are detailed in Attachment A. Any changes or new property included in the adopted Annual Schedule of Fees and Charges that are available to hire will also be exempt and the resolution reflects this.

FINANCIAL/BUDGET IMPLICATIONS:

There are no direct financial/budget implications related to this report.

ASSET MANAGEMENT IMPLICATIONS:

There are no direct asset management implications related to this report.

16.3 EXEMPTION OF THE HIRE OF CERTAIN LOCAL GOVERNMENT PROPERTY FROM THE REQUIREMENTS OF OBTAINING A PERMIT – CITY OF KWINANA LOCAL GOVERNMENT PROPERTY LOCAL LAW.

LEGAL/POLICY IMPLICATIONS:

Local Government Property Local Law

3.13. Activities needing a permit

(1) A person shall not without a permit –

(a) subject to subclause 3, hire local government property;

(3) The local government may exempt specified local government property or a class of local government property from the application of subclause (1)(a).

ENVIRONMENTAL IMPLICATIONS:

There are no direct environmental implications related to this report.

STRATEGIC/SOCIAL IMPLICATIONS:

There are no direct strategic/social implications related to this report.

RISK IMPLICATIONS:

There are no direct risk implications related to this report.

COUNCIL DECISION 266 MOVED CR W COOPER

SECONDED CR S MILLS

That Council, exempt local government properties that appear in the City's Schedule of Fees and Charges from the requirements of the issue of a permit for hire, in accordance with clause 3.13(3) of the Local Government Property Local Law, if the hire is consistent with the normal hire arrangements for which the fees and charges are applicable and that the use is consistent with the normal use of the specific local government property.

CARRIED 6/0

Attachment A

List of exempted local government property from the requirement to obtain a permit - extracted from the City of Kwinana Schedule of Fees and Charges 2015/16"

Hire of:

- Community Bus
- All Community Halls and Centres
- Change Rooms
- Kiosk Hire
- Sport Grounds
- Public Open Spaces
- Storage Fees
- Flood Lights
- Youth Zone Centre
- Recquatic Centre

16.4 Amendment to Council Appointment of Officers – Local Government to Officers 2016

SUMMARY:

A local government is authorised to exercise powers and duties under various Acts and Regulations, whereby they must appoint particular officers to carry out the duties of the local government. These appointments are reflected in the 'Council Appointment of Officers - Local Government to Officers 2016'.

At its 10 February 2016 meeting, Council resolved to appoint officers as authorised officers to undertake functions of the Caravan and Camping Grounds Act 1995, as detailed in Attachment A.

It is recommended that the current Council Appointment of Officers – Local Government to Officers be amended as listed below with the changing of title of the Principal Building Surveyor to Manager Building Services and the inclusion of the Building Technician as detailed in the Attachment A:

1.3 Caravan Parks and Camping Grounds Act 1995 – Appointment of authorised persons

OFFICER RECOMMENDATION:

That Council amend the Appointment of Officers – Local Government to Officers 2016 by amending the title of the Principal Building Surveyor to Manager Building Services and include the officer position Building Technician as an authorised person, for the purposes of the Caravan Parks and Camping Grounds Act 1995, as detailed in Attachment A.

NOTE – AN ABSOLUTE MAJORITY OF COUNCIL IS REQUIRED

DISCUSSION:

Section 17(1) of the Caravan Parks and Camping Grounds Act 1995 allows a local government to appoint authorised persons for the purposes of that Act. The Register titled Council Appointment of Officers – Local Government to Officers 2016 details the Acts and Regulations that require Council to make a direct appointment to a person or class of persons.

It is recommended that the title of 'Principal Building Surveyor' be amended to 'Manager Building Services' and the inclusion of the officer position 'Building Technician' as detailed in the Attachment A be appointed as an authorised person to undertake functions in respect to the Caravan Parks and Camping Grounds Act 1995. *16.4 AMENDMENT TO COUNCIL APPOINTMENT OF OFFICERS – LOCAL GOVERNMENT TO OFFICERS 2016*

LEGAL/POLICY IMPLICATIONS:

Caravan Parks and Camping Grounds Act 1995

17. Appointment of authorised person

 The chief executive officer of the Department or a local government —

 (a) may appoint such persons to be authorised persons for the purposes of this Act as the chief executive officer or the local government considers necessary.

FINANCIAL/BUDGET IMPLICATIONS:

There are no direct financial implications related to this report.

ASSET MANAGEMENT IMPLICATIONS:

There are no direct asset management implications related to this report.

ENVIRONMENTAL IMPLICATIONS:

There are no direct environmental implications related to this report.

STRATEGIC/SOCIAL IMPLICATIONS:

The role of Council is to ensure that the Council's delegations are aligned with the key goals and aspirations as set out in our Plan for the Future.

RISK IMPLICATIONS:

There are no risk implications related to this report.

COUNCIL DECISION

267

MOVED CR B THOMPSON

SECONDED CR R ALEXANDER

That Council amend the Appointment of Officers – Local Government to Officers 2016 by amending the title of the Principal Building Surveyor to Manager Building Services and include the officer position Building Technician as an authorised person, for the purposes of the Caravan Parks and Camping Grounds Act 1995, as detailed in Attachment A.

CARRIED BY AN ABSOLUTE MAJORITY OF COUNCIL 6/0

1.3 Caravan Parks and Camping Grounds Act 1995 – Appointment of authorised persons						
Function to be performed:	Appointment of such persons to be Authorised Persons for the purposes of this Act.					
Power to appoint:	Caravan Parks and Camping Grounds Act 1995 s17(1) Appointment of Authorised Persons					
Date of Appointment:	25 February 2015 D15/8364[v2] 10 February 2016 D16/1305 July 2016					
Appointment of:	 For the purposes of Division 1 of Part 2 and Sections 22, 23(3), 23(5) and 23(7) of the Caravan Parks and Camping Grounds Act 1995: Director City Living Director Corporate and Engineering Services Principal Building Surveyor Manager Building Services Manager Environmental Health Services Manager Essential Services. For the purposes of section 23(2) of the Caravan Parks and Camping Grounds Act 1995: Coordinator Environmental Health and Waste Services All Environmental Health Officers Building Surveyors Building Technician Coordinator City Assist Senior City Assist Officer All City Assist Officers 					
Special Requirements:	 Caravan Parks and Camping Grounds Act 1995: s17(2) authorised person is to produce the identity card whenever required to do so. Caravan Parks and Camping Grounds Regulations 1997 Regulation 68 ; Schedule 1, Division 1 Identity Card to be in prescribed form - Form 5 					

16.5 Adoption of new Policy – Advocacy and Lobbying

SUMMARY:

This Policy identifies how Council can engage in advocacy and lobbying to assist in establishing partnerships, networking, pursuing and promoting opportunities for the City of Kwinana in line with the Strategic Community Plan and is recommended for Council endorsement.

OFFICER RECOMMENDATION:

That Council adopt the Policy – Advocacy and Lobbying contained within Attachment A.

DISCUSSION:

The purpose of this Policy is to formalise Council's engagement in advocacy and lobbying to assist in establishing partnerships, extensively networking, pursuing opportunities and promoting the interests of the City of Kwinana.

The City's Strategic Community Plan specifically details certain instances where it requires lobbying for the purposes of providing greater opportunities for the City of Kwinana. City of Kwinana Councillors are expected to lobby to ensure that those responsible for the provision of funding and support that may be available from both government and corporate entities, are made aware of the City of Kwinana's vision and requirements for its community.

Through the development of the City's Plans, including the Strategic Community Plan, Corporate Business Plan, Community Health and Wellbeing Plan and Sustainable Water Management Plan, a number of key priorities have been identified which are recognised as having particular strategic importance for the future of the City. Key priority areas for advocacy are:

- Affordable housing
- Integrated transport
- Health services
- Mental health services for young people
- Employment and economic development
- Provision of education and teaching facilities
- Managing urban consolidation
- Climate change and environmental sustainability
- Safety and security

Some of the activities that may be considered for advocacy and lobbying include, but are not limited to:

- 1. Breakfast/lunch/dinner with Member of Parliament (state or federal) or candidate that the City of Kwinana has an interest in networking with to achieve a priority advocacy action.
- 2. Attendance at an event where a key stakeholder will be present that the City of Kwinana can network with.
- 3. The preparation of advocacy materials that will assist in communicating the priority advocacy actions.

16.5 ADOPTION OF NEW POLICY - ADVOCACY AND LOBBYING

4. Attendance at an event or function where Council can show their support to stakeholders that are aligned to Council's position on issues.

The Policy also details roles of the Mayor, elected members and key staff and departments that would have some input into advocacy and lobbying and the application of these activities.

A copy of the new Policy as recommended for adoption is detailed in Attachment A.

LEGAL/POLICY IMPLICATIONS:

Local Government Act 1995

2.7. Role of council

- (1) The council
 - (a) governs the local government's affairs; and
 - (b) is responsible for the performance of the local government's functions.
- (2) Without limiting subsection (1), the council is to
 - (a) oversee the allocation of the local government's finances and resources; and
 - (b) determine the local government's policies.

FINANCIAL/BUDGET IMPLICATIONS:

Each financial year Council will set a budget to ensure there are sufficient funds to advocate and lobby for their priorities. During a financial year, where there are insufficient funds to proceed with an advocacy action, Council can approve a budget variation, through its Council Meeting process.

ASSET MANAGEMENT IMPLICATIONS:

There are no direct asset management implications related to this report.

ENVIRONMENTAL IMPLICATIONS:

There are no direct environmental implications related to this report.

STRATEGIC/SOCIAL IMPLICATIONS:

The role of Council is to ensure that the Council's Policies are aligned with the key goals and aspirations as set out in our Plan for the Future. This new Policy specifically addresses the following objectives and strategies within the Strategic Community Plan: 16.5 ADOPTION OF NEW POLICY - ADVOCACY AND LOBBYING

- Objective 2.1: Residents have access to a large and varied range of job opportunities that are available locally Strategy 2.1.1: Through use of strategic partnerships, identify and attract investment in key employment generating initiatives in order to create shifts in job markets to meet future needs
- Objective 2.2: The community has a choice of quality public and private facilities to meet their education and training needs throughout their life time.
 - Strategy 2.1.1: Lobby the State Government to improve the standard of existing schools and ensure the timely construction of new schools as well as work with private schools, university, TAFE and apprentice training bodies to encourage the provision of new facilities and expand the range of courses available locally.
- Objective 2.3: The City Centre is home to a thriving range of specialty shops, restaurant and family entertainment venues, and an active night-life while neighbourhood centres are revitalised.
 - Strategy 2.4.1: Actively work with partners to facilitate the coordinated development and improvement of the Kwinana Industrial Area and the prompt development of Latitude 32.
 - Strategy 2.4.2: Lobby for the upgrade, early design and construction of the Western Trade Coast transport network.
 - Strategy 2.4.3: Promote the development of new port and intermodal facilities to stimulate further industrial and bulk goods investment, business activity and employment opportunities.
- Objective 4.3: Ensure the Kwinana community is well serviced by government and nongovernment services.
 - Strategy 4.3.1: Lobby for the provision of Federal and State government services to Kwinana, including an increased police presence and improvements to the frequency and routes for public transport.
 Strategy 4.3.4: Advocate for improvements to the provision of underground power, broadband and mobile coverage across the community.
- Objective 4.6: To provide a safe and efficient integrated network of roads, footpaths and cycle routes supported by a good public transport system. Strategy 4.6.3: Advocate for continuous improvement of the
 - y 4.6.3: Advocate for continuous improvement of the State's public transport networks with increased frequency of bus services throughout the City and increased parking capacity at the train station.

16.5 ADOPTION OF NEW POLICY - ADVOCACY AND LOBBYING

RISK IMPLICATIONS:

Setting Policy positions that guide the operations of the City will play a valuable role in reducing risk to levels acceptable to Council.

COUNCIL DECISION

268 MOVED CR B THOMPSON

SECONDED CR R ALEXANDER

That Council adopt the Policy – Advocacy and Lobbying contained within Attachment A.

CARRIED 5/1



POLICY

ADVOCACY AND LOBBYING



Kwinana



Advocacy and Lobbying

Advocacy and Lobbying

To establish Council's engagement in advocacy and lobbying to assist in establishing partnerships, extensively networking, pursuing opportunities and promoting the interests of the City of Kwinana.

Adopted:	
Last reviewed:	Least Courses and Act 4005 Costion 0.7. Data of Courseil
Relevant Legislation	Local Government Act 1995 Section 2.7 – Role of Council
Strategic Community Plan:	Objective 2.1: Residents have access to a large and varied range of job opportunities that are available locally Strategy 2.1.1: Through use of strategic partnerships, identify and attract investment in key employment generating initiatives in order to create shifts in job markets to meet future needs
	 Objective 2.2: The community has a choice of quality public and private facilities to meet their education and training needs throughout their life time. Strategy 2.1.1: Lobby the State Government to improve the standard of existing schools and ensure the timely construction of new schools as well as work with private schools, university, TAFE and apprentice training bodies to encourage the provision of new facilities and expand the range of courses available locally.
	 Objective 2.3: The City Centre is home to a thriving range of specialt shops, restaurant and family entertainment venues an an active night-life while neighbourhood centres are revitalised. Strategy 2.4.1: Actively work with partners to facilitate the coordinated development and improvement of
	the Kwinana Industrial Area and the prompt development of Latitude 32. Strategy 2.4.2: Lobby for the upgrade, early design and
	construction of the Western Trade Coast transport network. Strategy 2.4.3: Promote the development of new port and intermodal facilities to stimulate further industria and bulk goods investment, business activity an employment opportunities.
	 Objective 4.3: Ensure the Kwinana community is well serviced by government and non-government services. Strategy 4.3.1: Lobby for the provision of Federal and State government services to Kwinana, including an increased police presence and improvements to the frequency and routes for public transport. Strategy 4.3.4: Advocate for improvements to the provision of underground power, broadband and mobile coverage across the community.

road	rovide a safe and efficient integrated network of s, footpaths and cycle routes supported by a good c transport system.
	Advocate for continuous improvement of the State's public transport networks with increased frequency of bus services throughout the City and increased parking capacity at the train station.

Scope:

This Policy identifies how Council can engage in advocacy and lobbying to assist in establishing partnerships, networking, pursuing and promoting opportunities for the City of Kwinana in line with the Strategic Community Plan.

Objective:

Work in partnerships across the municipality and the region by advocating, informing and partnering with national, state, regional and local stakeholders to meet the needs of our community.

Roles:

<u>Mayor</u>

The role of the Mayor includes being a key community leader and principal Council spokesperson. The Mayor is to establish partnerships, network and actively promote Council's interests where opportunities arise.

Elected members

The role of elected members is to represent their community and advocate on their behalf to various stakeholders and government bodies. Elected members are a valuable link between the community and the local government, and play a key role in communicating messages to the community. Their role is to represent the community, and work towards delivering the vision of the City of Kwinana.

Chief Executive Officer and Directors

The role of the Chief Executive Officer and Directors is to ensure the advocacy priorities have strong business cases, establish and facilitate partnerships with key stakeholders and work with the elected members to promote the opportunities within the City of Kwinana.

City of Kwinana Business Units/Departments

The role of the departments is to ensure the advocacy priority areas and implementation of the strategies are well communicated with the community, stakeholders, and the media, ensuring messages are reaching the audiences needed to create change as well as listening to the community and stakeholders around key issues.

Priority areas:

Through the development of the City's Plans, including the Strategic Community Plan, Corporate Business Plan, Community Health and Wellbeing Plan and Sustainable Water Management Plan, a number of key priorities have been identified which are recognised as having particular strategic importance for the future of the City. Key priority areas for advocacy are:

- Affordable housing
- Integrated transport
- Health services
- Mental health services for young people
- Employment and economic development
- Provision of education and teaching facilities

- Managing urban consolidation
- Climate change and environmental sustainability
- Safety and security

Budget:

Each financial year Council will set a budget to ensure there are sufficient funds to advocate and lobby for their priorities. During a financial year, where there are insufficient funds to proceed with an advocacy action, Council can approve a budget variation, through its Council Meeting process.

Advocacy and Lobbying Activities:

The following advocacy and lobbying activities could include, but not limited to, the following:

- 1. Breakfast/lunch/dinner with Member of Parliament (state or federal) or candidate that the City of Kwinana has an interest in networking with to achieve a priority advocacy action.
- 2. Any event where a key stakeholder will be present that the City of Kwinana can network with.
- 3. Stationery and advocacy materials that will assist in communicating the priority advocacy actions.
- 4. Attendance at an event or function where Council can show their support to stakeholders that are aligned to Council's position on issues.

Application:

Where there is a cost to attend such events, it is recommended that a maximum of two City of Kwinana representatives attend an activity. Given the role of the Mayor, it is expected that they will generally represent the City at such activities. There may be circumstances where there may be more than two City of Kwinana representatives at a fee paying function and this approval will be at the discretion of the Chief Executive Officer.

The following conditions apply:

- 1. The Mayor will receive requests from elected members, and the Chief Executive Officer will receive requests from officers, regarding whether the City of Kwinana should be present at an advocacy activity that provides an opportunity to promote a current priority that requires lobbying for support by local, state and/or federal stakeholders.
- 2. The Mayor and Chief Executive Officer will discuss the benefits of attending and discuss the most appropriate representatives to attend the activity with the Mayor, which in most cases will be the Chief Executive Officer. In the case where the Mayor and/or the Chief Executive Officer are not available to attend or believe another person should represent the City, the Mayor and the Chief Executive Officer will discuss the representatives who will represent the City of Kwinana.
- 3. Notification to all elected members of the intention to attend an advocacy and lobbying activity will be sent via email by either the Mayor or the Chief Executive Officer and will include:
 - a) Date of event;
 - b) Cost;
 - c) Who will be attending from the City of Kwinana;
 - d) Reason for attending and stakeholder/s that will be present; and
 - e) Priority area the activity will address
- 4. There may be a requirement from time to time to use some of the allocated budget to produce materials to assist with lobbying and advocacy. Where this is required, notification will be provided to all elected members of the intention to use funds for this purpose outlining the priority area and when the materials will be used.

17 Urgent Business

COUNCIL DECISION 269 MOVED CR W COOPER

SECONDED CR R ALEXANDER

That Council deal with the item of urgent business as presented in the Addendum to the Agenda, and that it be dealt with Behind Closed Doors due to its confidential nature as item 21.2.

CARRIED 6/0

18 Councillor Reports

Nil

19 Response to Previous Questions

Nil

20 Mayoral Announcements (without discussion)

Mayor Carol Adams reported that she had attended along with three other Councillors the Rotary change over. The Mayor congratulated the outgoing and now incoming President Max Bird on being re-nominated as president for another term.

The Mayor advised that she had attended the funeral for Aaron Pajich who was murdered in June, which was held at the Gary Holland Centre. The Mayor advised that there were a large number of people who paid their respects. One of Aaron's Medina Primary School teachers who taught him for four years gave a wonderful eulogy. The Mayor passed on her sympathies to the Pajich family.

The Mayor advised that she will be attending a panel session held by Squire Patton Boggs with Mayor Brad Pettitt and Mayor Russell Aubury to discuss the Perth Freight Link on Friday.

21 Matters Behind Closed Doors

<u>COUNCIL DECISION</u> 270 MOVED CR R ALEXANDER

SECONDED CR D WOOD

That in accordance with Section 5.23(2)(a) and 5.23(2)(d) of the Local Government Act 1995, Council move behind closed doors to allow discussion of the Matters Behind Closed Doors items.

CARRIED 6/0

The public left the Council Chambers at 7:57pm

21.1 Second Deed of Variation to a current Legal Agreement between the City of Kwinana and Mary Donald Nominees Pty Ltd to enable the clearance of a Subdivision Approval condition for the partial upgade of Millar Road adjacent to the Wellard Glen Estate (Lots 90 and 378 Millar Road), Wellard.

<u>COUNCIL DECISION</u> 271 MOVED CR W COOPER

SECONDED CR S MILLS

That Council:

- 1. Endorses Option 3 as detailed in this Council Report.
- 2. Authorise the Chief Executive Officer to advise the Western Australian Planning Commission that Condition 6 of Subdivision Approval 149571 for Lots 90 & 378 Millar Road, Wellard, has been satisfied for Stage 2 of the subdivision.
- 3. Authorises the Chief Executive Officer to undertake any of the actions under the Agreement, excluding any action that would vary the intent and purpose of the Agreement.

CARRIED BY AN ABSOLUTE MAJORITY OF COUNCIL 6/0

21.2 Legal Instructions and Council Update on Case Number 08-13555(SCC)

272 MOVED CR R ALEXANDER

SECONDED CR B THOMPSON

That Council adopt Option A within this report.

CARRIED 6/0

273 MOVED CR WOOD

SECONDED CR THOMPSON

That Council come out from behind closed doors.

CARRIED 6/0

The Council Chambers reopened at 8:01pm

22 Meeting Closure

The Mayor declared the Meeting closed 8:02pm.