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Project:	Baldivis East District Structure Plan Revised Transport Assessment – REVISED FINAL – V8
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1. INTRODUCTION

A Revised District Structure Plan has been prepared for the Baldivis East cell and lodged with the City of Rockingham in early 2014. The plan was considered by the Council at its Ordinary Meeting of 25th February 2014, following the completion of the public advertising period. A modified Transport Assessment was previously prepared by Uloth & Associates, supplemented by additional technical assessment prepared by Move Consultants in 2012 to reflect the outcomes of detailed discussions and negotiations with the City of Rockingham in relation to the future planning of the internal road network and external intersection configurations, with a focus on the Baldivis Road/Mundijong Road intersection as well as the extension of Mundijong Road west of the Kwinana Freeway. In particular, the Baldivis Road/Mundijong Road intersection has been designed and will be constructed as a staggered offset series of unsignalised T-intersections for the foreseeable future. A revised assessment was then prepared by Shawmac and submitted to the City of Rockingham for review in July 2013. The July 2013 revised assessment focussed particularly on maximising opportunities to utilise east-west connections within the part of the DSP area south of Mundijong Road to access Nairn Drive in order to accommodate critical peak hour turning movements into the future as Nairn Drive is proposed to have greater road capacity and operate at a higher function than Baldivis Road under future urban development within the broader locality. Subsequent extensive consultation with the City of Rockingham resulted in feedback being provided in the context of this modified assessment prepared by Shawmac in the context of the transport modelling and the overall road network for the cell. The updated modelling is reflective of the following:

- Consideration of future grade separation of Baldivis Road/Wellard Road at the existing freight railway line within the northern landholdings is required in order to establish the future ultimate function of Baldivis Road through this area and will include the warrants associated with a modification to this connection;
- Consideration of the future function of Mundijong Road west of the Kwinana Freeway and forward planning of the ultimate intersection configurations between the freeway and broadly the Rockingham City Centre and coastal activity nodes. As part of the ongoing roadworks in the area, the Baldivis/Mundijong intersection would be constructed in the first instance as a staggered offset T-arrangement, it was likely to ultimately be configured as a grade separated node due to clearance issues over the gas pipeline as well as significant traffic demands in an east-west

direction. Nairn Drive would also be likely constructed as a grade separated interchange along this section of road at the same time. These are key issues which may be considered as part of the wider referral agency review process. The reason for this additional level of scrutiny is that there is potential for additional delays to be introduced as this is an option which is being considered as part of the Sub-Regional Structure Planning Process.

- Review of internal local road volumes to be reflective of updated approved/constructed/planned urban cells within the broader Baldivis Area south of Mundijong Road to the west of the DSP area and based upon information provided by the City of Rockingham.

Figure 1 shows an aerial photo of the District Structure Plan area with the Baldivis Road/Mundijong Road intersection indicated.

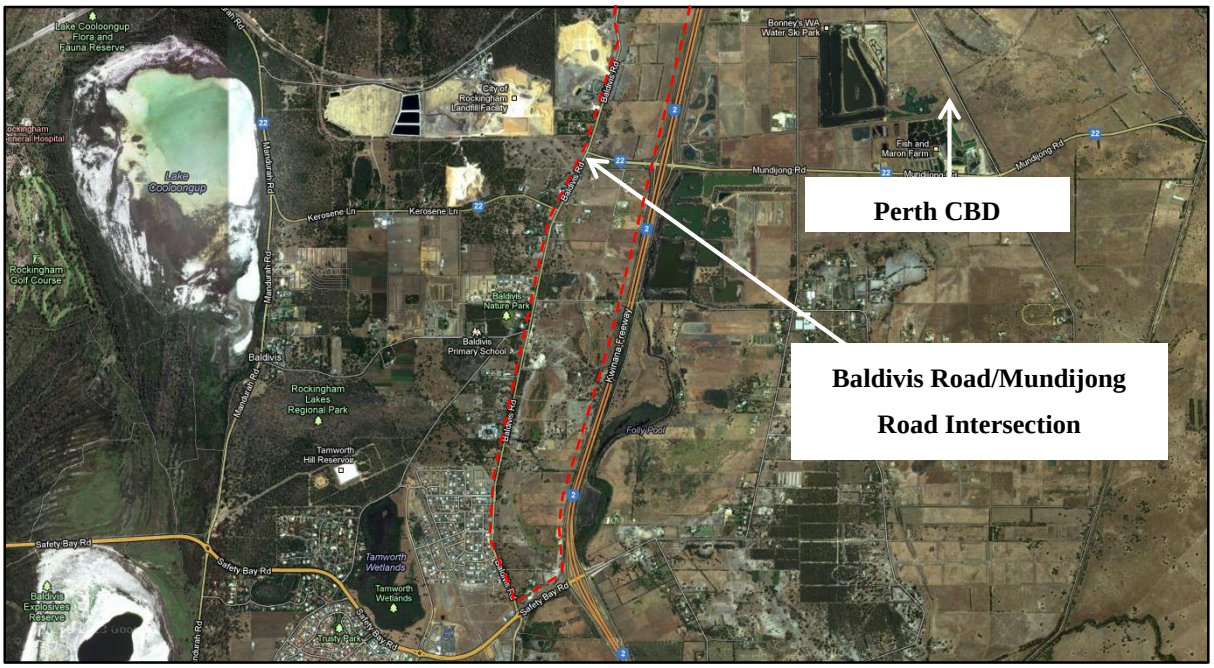


Figure 1 - Aerial Photo Structure Plan Area

Figure 2 shows the proposed District Structure Plan.

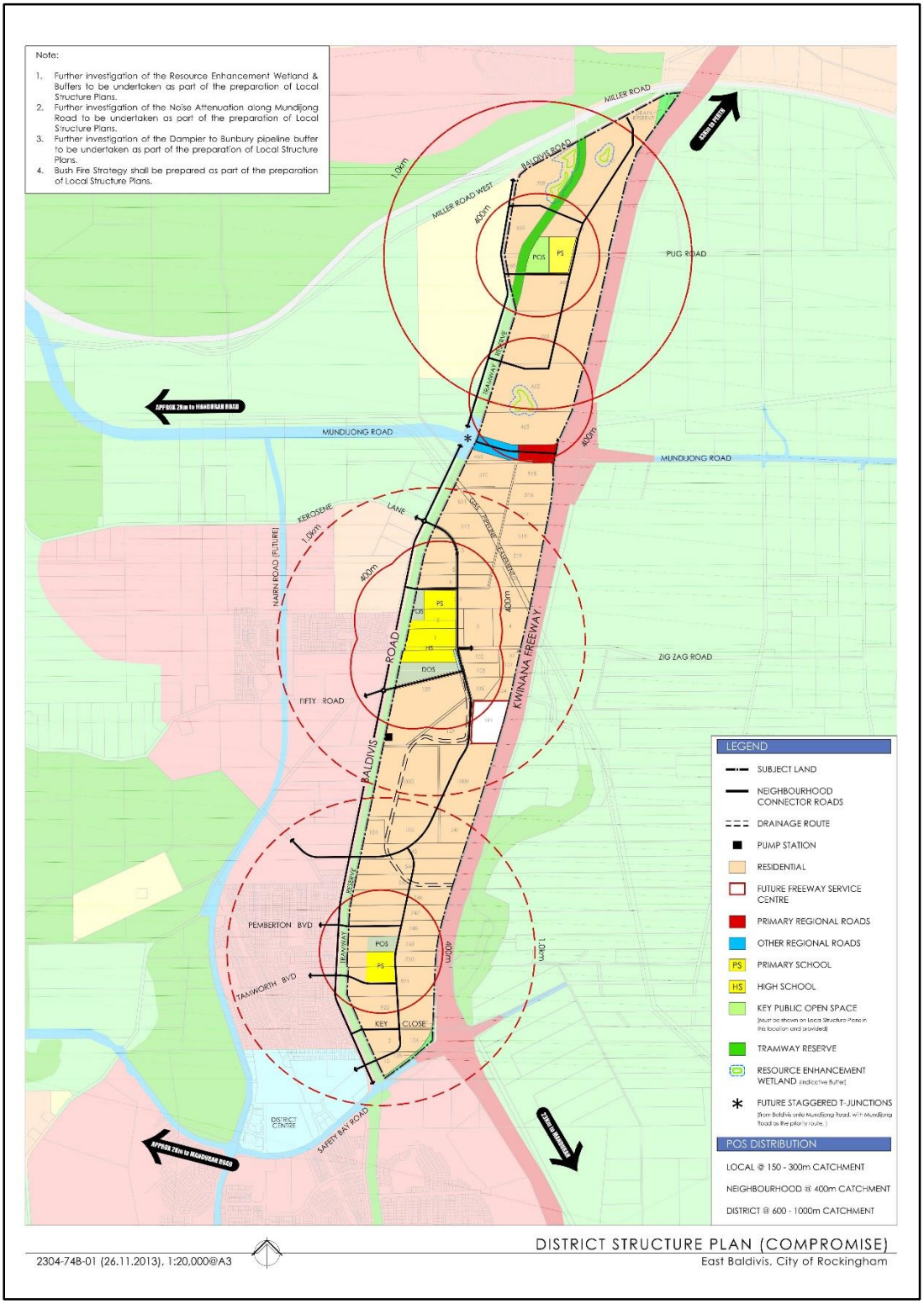


Figure 2 – Endorsed East Baldivis DSP

2. BACKGROUND

The existing section of Baldivis Road, north of Mundijong Road has been proposed to be classified as a *District Distributor B* into the future and to carry no more than 8,000 to 10,000 vpd between Mundijong Road and Millar Road due to the staggered T-intersection configuration, which is currently proposed to be constructed as part of the broader Mundijong Road extension roadworks in 2013 with completion in 2014.

The approved and soon-to-be-constructed modified Baldivis Road/Mundijong Road intersection, consists of two staggered T-intersections which will connect with Mundijong Road in a right-left arrangement with the westernmost T-intersection connecting with the north side of Mundijong Road and the easternmost T-intersection connecting with the south side of Mundijong Road. Both intersections are proposed to operate under full movement unsignalised control allowing for right-turns into and out of these locations for the foreseeable future (<15 years).

One of the key issues which had been addressed as part of the initial review by the City of Rockingham related to the ultimate configuration and associated operation of the Baldivis Road/Mundijong Road intersection which is located within the northern half of the DSP cell. It is understood that the landowner group (BEST) had liaised extensively with the City of Rockingham in relation to this matter, following the submission of the original detailed Transport Assessment, prepared by Uloth & Associates in 2011, for the Baldivis East District Structure Plan and that the City identified at that time potential queuing and adverse traffic operations issues associated with the northbound right-turn movement during the a.m. peak period as obstructive to constructing this intersection as a 4-way signalised intersection instead preferring to progress a design which has now resulted in the double T-stagger priority controlled intersection proposal. Based upon these discussions, Move Consultants updated its preliminary traffic engineering advice (dated February 2012) and undertook the following tasks:

- Review of the updated Baldivis East District Structure Plan Transport Assessment (Uloth & Associates, November 2012);
- Review of the Baldivis Road Needs Study (2005, WorleyParsons) and the subsequent draft update released in preliminary format in February 2012;
- Review of preliminary traffic operations assessment at the intersection of Baldivis Road/Mundijong Road and Mundijong Road/Nairn Drive under a revised road network scenario, including consideration of the interim and ultimate build-out with the DSP area and a

threshold/sensitivity analysis associated with the triggers for potential signalisation of the Mundijong Road/Nairn Drive intersection;

- Preparation of a revised series of broader traffic modelling outputs for the DSP area and the boundary road network in the area.
- Confirmation that internal trip making (which was not accounted for in previous modelling) would account for up to 20% of total trips associated with build-out within the DSP area;
- A review of the *Baldivis Road Needs Study* (2005) and subsequent update indicate that previous modelling has been based upon an assumption that Baldivis Road would provide protected direct access to Mundijong Road (i.e. signalised or roundabout access);
- Maximising permeability via the proposed internal east-west road links into the urban cell to the west of the DSP area, in the context of practical road capacity and assumed road classification/hierarchy;
- Recognition that Nairn Drive has been designated as a higher order road within the broader urban development area east of Mandurah Road and has been designated as a *District Distributor A* with a potential daily road carrying capacity of up to 35,000 vpd;
- Confirmation that the forward planning for the urban cell west of the DSP area indicates that there is anticipated to be a significant level of mixed-use, including employment generators, within the cell to the west, resulting in an opportunity to maximise permeability between adjacent urban cells as well as efficient use of future road infrastructure; how much will this 'pull' traffic west with a number of cells/areas already approved as part of the tertiary planning process;
- Maximising opportunities to implement at least one protected connection to Mundijong Road between Baldivis Road and the future Nairn Drive to allow for direct and safe access to Mundijong Road via both a direct connection and grade separated full movements interchange(s) at both Baldivis Road and Nairn Drive;
- Recognition of the reduced opportunities for northbound traffic to access Mundijong Road eastbound from the lands to the south of Mundijong Road via Baldivis Road due to the downgrading of the intersection to an unsignalised configuration in the short-term scenario (Option 1);
- Recognition of the potential need to grade separate Baldivis Road/Wellard Road over the railway line at the northern boundary of the DSP area and the grade separation of both Baldivis Road and Nairn Drive at Mundijong Road (Option 2);

- Review of MRWA 2021 and 2031 modelling outputs as noted in the 2012 update to the Baldivis Road Needs Study and that these outputs are conservative and do not account for detailed area specific traffic movements at a more fine grained level of assessment including proposed spatial arrangement of land uses which would be more appropriately addressed at the Local Structure Planning and subdivision stages of urban development; and
- Consideration of the ultimate function of roads internal to the DSP area in the context of proposed activity generators such as schools and mixed-uses as well as the potential trip making associated with these uses and practical road capacities consistent with Liveable Neighbourhoods guidelines.

The above tasks were undertaken and addressed in the July 2013 assessment issued to the City for consideration.

Further consultation with the City of Rockingham following endorsement of the DSP in February 2014 indicated that the additional clarification which would be required including consideration of the following elements:

- Inclusion of additional information relating to the site-specific traffic to be generated by the endorsed DSP;
- Removal of the mid-block connection to Mundijong Road between Baldivis Road and Nairn Drive;
- Modification of modelling to accommodate for the connection to Pemberton Boulevard;
- Consideration of changes to urban development within the North Baldivis cell;
- Clarification of the impacts of the future Stakehill Railway Station in the context of the State Government's *Public Transport Plan for Perth 2031;* and
- Modification of the assessment to include updated connections to the future cycling network external to the DSP.

3. REVISED TRAFFIC MODELLING AND FINDINGS

3.1. Existing Situation

Baldivis Road south of Millar Road has been constructed as a two-lane undivided rural road and currently operates under an 80 kph speed limit which reduces to 70 kph 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 road with kerbs and street lighting and a partial service road to coincide with the expanding residential development in the area.

Mundijong Road has been constructed as a two-lane undivided road running in the east-west direction between Baldivis Road and Wright Road with an interchange at Kwinana Freeway. Safety Bay Road is a four-lane dual carriageway arterial road with a two-lane roundabout intersection with Baldivis Road and a signalised diamond interchange at Kwinana Freeway.

Kerosene Lane, Eighty Road and Fifty Road are also constructed as two-lane undivided rural roads which extend west from Baldivis Road. Several new access roads to residential developments have also been constructed to extend west from Baldivis Road.

Mundijong Road and Baldivis Road currently perform similarly to a *District Distributor A* road function and Kerosene Lane, Eighty Road and Fifty Road perform similarly to a *District Distributor B* road. It is expected that Nairn Drive will be upgraded to a *District Distributor A* road, together with the extension of Mundijong Road west of Baldivis Road, and that Baldivis Road, Kerosene Lane, Eighty Road and Fifty Road will all be modified to function at an appropriate standard by the time the DSP area has been fully developed. Figure 3 shows the existing assigned functional road hierarchy as per Main Roads Western Australia.

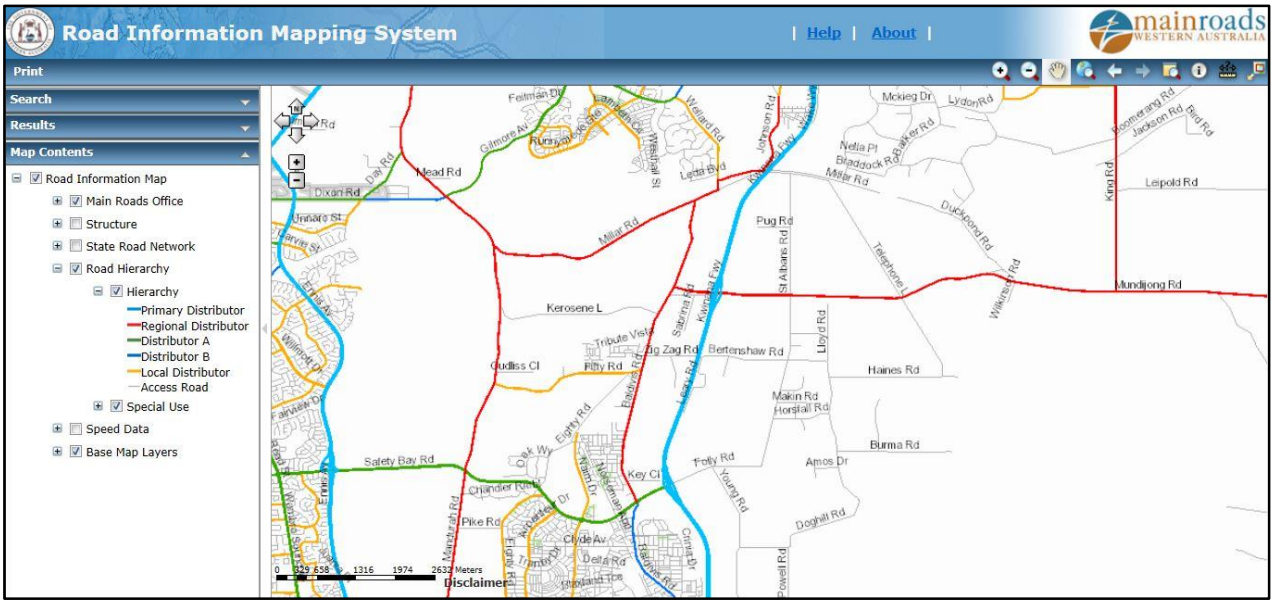


Figure 3 - Functional Road Hierarchy - Main Roads Western Australia

3.2. Detailed Traffic Modelling and Future Traffic Flows

3.2.1. Land Use and Traffic Generation

The projected lot yields for the District Structure Plan are proposed to be in the order of 4,200 residential lots with approximately 1,300 lots north of Mundijong Road and approximately 2,900 lots south of Mundijong Road as well as three Primary Schools and one Secondary School. Based upon an assumed 8 trips per dwelling, it has been estimated that the development of the DSP area could generate a in the order of 34,000 vehicle trips per day. Review of the existing approved Local Structure Planning in the area to the immediate west, south and north of the DSP lands indicates that the potential traffic generated by this background traffic is expected to be in the order of 83,000 vehicle trips per day. It is expected that the internal trips made to the Primary Schools will approximately balance the trips to the Secondary School from locations external to the DSP area and as there are no retail, businesses or recreational land uses proposed, it is estimated that a total of approximately 28,000 vehicular trips per day will be added to the external road network from the DSP area assuming that internal trip making could account for up to 20% of vehicle trips within the cell. It should be noted that endorsed planning in the area.

3.2.2. Future Traffic Flows

The anticipated traffic generated by the primarily residential development within the endorsed DSP area has been assigned to the surrounding road network based upon assumed traffic distribution patterns. The traffic distribution was derived from the location of the surrounding spatial distribution of existing major land uses and also based upon future urban development in the area. Figure 4 illustrates a consolidated spatial layout of the existing approved/proposed Local Structure plans and subdivisions for the areas to the west of Baldivis Road, provided by the City of Rockingham.

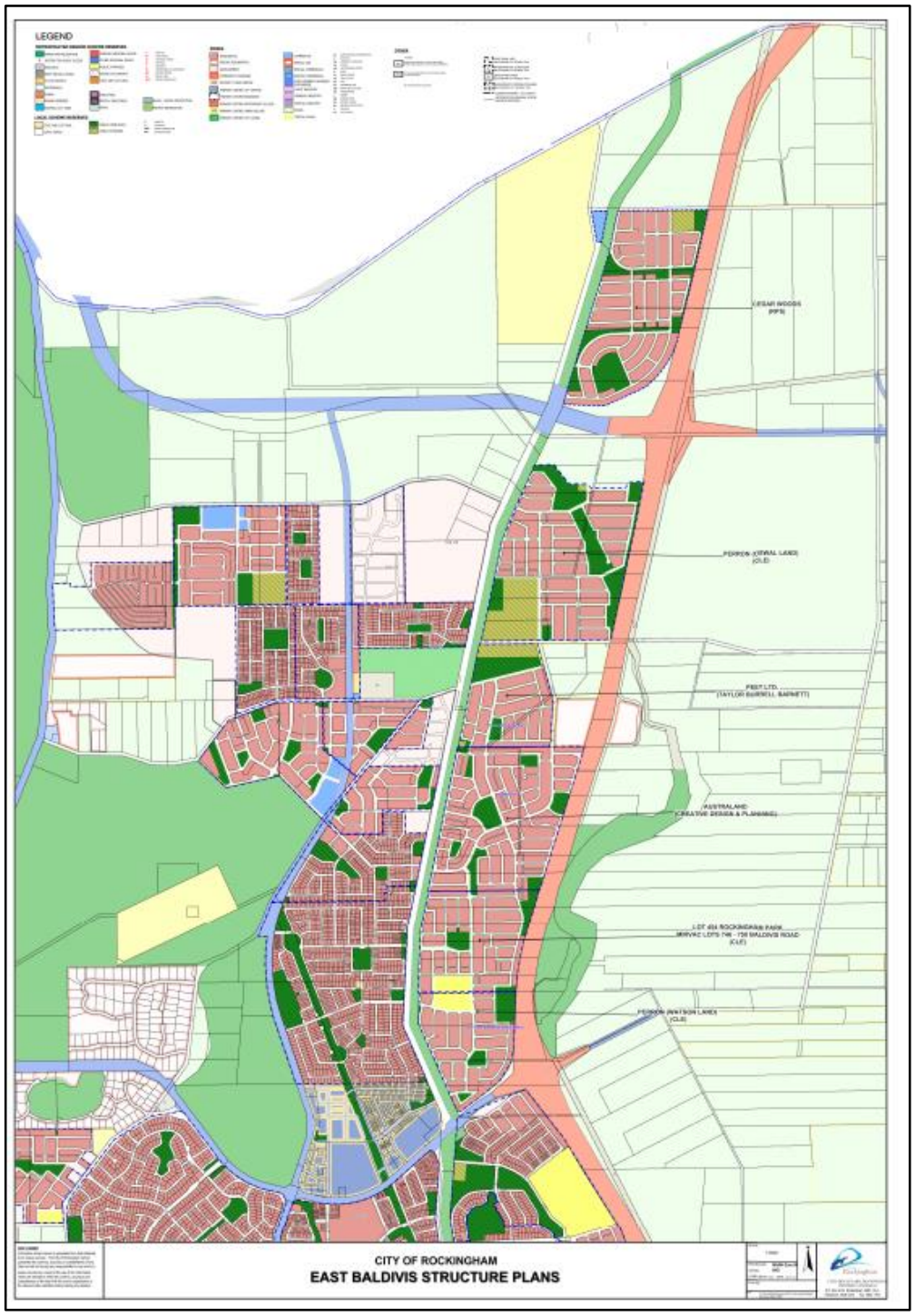


Figure 4 - Approved/Proposed Urban Development External to DSP (as sourced from City of Rockingham – 2014

The future traffic volumes generated by the endorsed DSP and the total future volumes (including the existing traffic volumes generated by surrounding areas and the additional vehicular trips generated by the DSP plus adjacent LSP's are shown) for the surrounding road network are shown in Figure 5. This modelling is reflective of discussions with the City and based upon feedback received in July 2014 and further engagement with the City's Technical Services branch, a review of existing approved/proposed Local Structure Plans and subdivisions spatially located to the west of the DSP area (as shown in Figure 4); base existing traffic volumes, a review of existing background traffic studies and issued outlined in correspondence issued by the City following endorsement of the DSP.

For the purposes of this assessment, only the long-term scenario (referred to as Option 2 or grade-separation scenario in the July 2013 assessment) has been considered with both Baldivis Road and Nairn Drive constructed as grade separated interchanges at Mundijong Road (underpasses) and a grade separation of Baldivis Road/Wellard Road at the railway line at the northern end of the cell.

The assessment of these two options is critical with regard to circulation of the proposed District Structure Plan to relevant referral agencies involved in the ongoing Sub-Regional Structure Planning exercise currently being undertaken by the Department of Planning and the future alignment and function of Baldivis Road north of Mundijong Road and the thresholds associated with the future needs to grade separate the Baldivis Road/Wellard Road railway crossing and the potential to grade separate the Baldivis Road/Mundijong Road and Nairn Drive/Mundijong Road intersections.

3.3. Key Assumptions Used in Modified Traffic Modelling

A subsequent preliminary review has yielded the following results:

- **Internal trip making within the DSP may account for up to 20% of total trips associated with the ultimate build-out within the cell.** Typically, movement will generally be destined to and originating from major infrastructure nodes/corridors during typical weekday peak periods (i.e. railway stations such as Wellard, Rockingham and Warnbro. It has been assumed that internal trip making within the area north of Mundijong Road is in the order of 10% locally and up to 10% destined to and originating from the DSP area south of Mundijong Road (i.e. Baldivis Town Centre, school precincts, etc.). It has been assumed in terms of external trip making that approximately 20% of the balance of trips generated by the lands to the north of Mundijong Road will be destined to and originating from the north via Baldivis Road through to Kwinana and other points north and the balance to and from the west (Rockingham, adjacent industrial

areas, etc.) and to and from the east (i.e. Kwinana Freeway, etc.).

- **A review of the Baldivis Needs Study (2005) and subsequent update indicate that previous modelling has been based upon an assumption that Baldivis Road would provide protected direct access to Mundijong Road (i.e. signalised or roundabout access).** The original 2005 study was premised on a direct connection via a 4-way signalised intersection; however, recent planning for the Mundijong Road extension indicates that the current proposal which will be implemented in 2013 consists of a staggered T-intersection arrangement (with Stop Control on the Baldivis Road approaches to Mundijong Road), with the potential to downgrade the northern leg (i.e. into the Cedar Woods landholdings) to a left-in/left-out in the future. The study was subsequently updated and issued in draft in early 2012, based upon revised traffic modelling but still showing a 4-way signalised arrangement. The City of Rockingham has since advised that this study is now considered to be redundant and has referred to Move Consultant's February 2012 advice and attached revised preliminary modelling results as well as updated '2013 base case' traffic data to guide road planning through the area to be used as a basis from which to develop forward traffic projections for the grade-separated option (Option 2 as outlined in Shawmac's 2013 assessment) to form the basis of the modified assessment documented in this report.
- **Maximised permeability via the proposed internal east-west road links into the urban cell to the west of the DSP area, in the context of practical road capacity and assumed road classification/hierarchy. Nairn Drive designated as a higher order road within the broader urban development area east of Mandurah Road and has been designated as a District Distributor A with a potential daily road carrying capacity of up to 35,000 vpd.** The City of Rockingham has recognised that Nairn Drive will play a critical role in relation to not only accommodating locally generated traffic within the mixed-use precinct in which it is located but also to provide critical north-south road capacity to accommodate east-west permeability from adjacent cells including the Baldivis East DSP area due to constraints associated with the Baldivis Road/Mundijong Road connections. The City has also indicated that the construction of Mundijong Road west of the Kwinana Freeway through the DSP area will commence in early 2013 with the road opened in August 2014 and while there are no seriously entertained planning proposals to modify the approved intersection configurations along Mundijong Road with Baldivis Road to accommodate a grade separation or 'flyover' in the short-term however, any such proposal would have to consider a long-term proposition with no current commitment made

to planning, programming or funding of this change to the approved design and would be reviewed in detail as part of the Sub-Regional Structure Planning process as well as the detailed Local Structure Planning processes .

- **The forward planning for the urban cell west of the DSP area indicates that there is anticipated to be a significant level of mixed-use, including employment generators, within the cell to the west, resulting in an opportunity to maximise permeability between adjacent urban cells as well as efficient use of future road infrastructure.** Based upon preliminary modelling, the estimated traffic to and from the west and north via Nairn Drive could be as high as 40 to 50% of locally generated traffic. This quantum of traffic can be accommodated within the practical capacity and functional road classification of Nairn Drive under the long-term grade separation scenario.
- **Opportunities to implement at least one protected connection to Mundijong Road between Baldivis Road and the future Nairn Drive to allow for direct and safe access to Mundijong Road.** However, it should be noted that this potential future connection lies outside the boundaries of the DSP area and the City of Rockingham has advised that this proposed connection is to be removed from the plans for the area and is no longer to be considered in the context of the updated transport modelling assessment. A review of the road and network capacity opportunities along this section of Mundijong Road indicates residual capacity within the 20 to 25-year timeframe of 10,000 to 15,000 vpd which will allow for build-out within the endorsed DSP plus the adjacent approved LSP's and the resultant traffic generated by these areas to be accommodated within this residual capacity.
- **Recognition of the reduced opportunities for northbound traffic to access Mundijong Road eastbound from the lands to the south of Mundijong Road via Baldivis Road due to the downgrading of the intersection to an unsignalised configuration.** This has been addressed above in relation to the higher order road classification and excess practical capacity of Nairn Drive and was been considered as part of the development of future traffic modelling for Option 1 documented in the July 2013 assessment.
- **Review of MRWA 2021 and 2031 modelling outputs as noted in the draft update to the Baldivis Road Needs Study and that these outputs are conservative and do not account for detailed area specific traffic movements at a more fine grained level of assessment including proposed spatial arrangement of land uses.** This model should be considered only to be used as a 'coarsely grained' traffic operations model. The City of Rockingham concurs that

more detailed modelling is required, particularly in the context of Local Structure Planning in the area and to forward plan long-term road connections, including the potential to modify the proposed staggered T-arrangement of Baldivis Road at Mundijong Road to a grade separated partial diamond interchange and that a potential extension of Nairn Drive north of Mundijong Road should be further explored in the context of the sub-regional structure planning exercise currently being undertaken by the Department of Planning. However, it should be noted that the City has also indicated that the construction of Mundijong Road west of the Kwinana Freeway will proceed as planned with the staggered T-intersection unlikely to be modified within the short- to medium-term (5 to 15 years hence).

3.4. Results of Revised Traffic Modelling

The results of revised traffic modelling for the DSP cell are shown in Based upon the assumptions as noted above, the results of the revised updated traffic modelling assessment undertaken for the DSP area based upon the potential long-term changes to the primary boundary road network as well as consideration of permeability options to lands located to the west of the cell with a focus on maximising opportunities to access the higher order road network reflect the following:

- Internal trip making (which was not accounted for in previous modelling) may account for up to 20% of total trips associated with build-out within the DSP area which takes into consideration non-residential generated traffic associated with proposed schools in the area;

- Nairn Drive has been designated as a higher order road within the broader urban development area east of Mandurah Road and as a *District Distributor A* road with a potential daily road carrying capacity of up to 35,000 vpd. This practical capacity and functional road classification has been assumed as constant the road network scenario assessed in this updated report;
- The forward planning for the urban cell west of the DSP area indicates that there is anticipated to be a significant level of mixed-use, including employment generators, within the cell to the west, resulting in an opportunity to maximise permeability between adjacent urban cells as well as efficient use of future road infrastructure under both scenarios;
- Opportunities to implement at least one protected connection to Mundijong Road between Baldivis Road and the future Nairn Drive to allow for direct and safe access to Mundijong Road has been removed in the updated modelling outputs;
- The revised road network incorporating the potential grade separation of Baldivis Road and

Nairn Drive at Mundijong Road to allow for full protected movements via a grade separation indicates that land will be required within the north-east quadrant of the Baldivis Road/Mundijong Road intersection to allow for a grade separation. Traffic volumes on Baldivis Road under this option as shown in the attached figure with resultant increases expected to increase by 50% along the section south of Mundijong Road. As a result, the functional road classification of Baldivis Road north of Mundijong Road to Millar Road is likely to be of a *District Distributor A* road with the section south of Mundijong Road maintained as a *District Distributor B* road.

- A review of the potential need to grade separate Baldivis Road/Wellard Road at the existing railway line north of Millar Road will need to be addressed during the Local Structure Planning stages of the planning process. A review of the potential 'spillover' effect and 'worst case scenario' of the full protected grade separation of Baldivis Road at Mundijong Road is likely to result in a warrant being met for grade separation of Baldivis Road/Wellard Road at the existing freight railway located along the northern boundary of the DSP based upon a review of MRWA exposure index warrant;
- A number of critical higher order road planning issues such as the potential connections to and from future industrial development to the east of the freeway north of Mundijong Road, to and from the Rockingham City Centre via Mundijong Road and the potential closure of Millar Road have yet to be resolved and will be addressed as part of the overall tertiary planning for the area;
- The proposed internal road network and external road network connections associated with the District Structure Plan are consistent with the aims of the current planning being progressed as part of the preparation of the South-West Corridor Regional Structure Plan being undertaken by the Department of Planning as well as standard traffic engineering principles;
- The future functions of both Amazon Drive, Pemberton Boulevard and Ingram Road are consistent with approved and proposed Local Structure Planning area for the area;
- Maximising the efficient and effective use of the future Nairn Drive to be consistent with a *District Distributor A* classification and with sound traffic planning principles under the 'worst case' scenario has yielded consistent modelling results in comparison to previous assessments;
- The downgrading the future Baldivis Road between Safety Bay Road and Mundijong Road to a *District Distributor B* will still allow for effective and efficient connectivity to the primary boundary road network through maximising the use of higher order roads and recognition of long-term travel patterns within the broader urban area, including access to the Kwinana Freeway at

Mundijong Road and Safety Bay Road under both Options 1 and 2; and

- Recognition of the constraints associated with providing additional connection to Mundijong Road between Baldivis Road and the Kwinana Freeway by identifying the opportunity for an additional connection to Mundijong Road between Baldivis Road and Nairn Drive was addressed in the July 2013 assessment. The City has concluded that this interim connection is will not be implemented with 'worst case scenario' and as a consequence, it has been removed as part of the updated assessment specific to the endorsed DSP. Modifications to the higher order boundary road network external to the endorsed DSP will be addressed in more detailed during the Sub-Regional Structure Planning Process, indicating that the combined impact of full grade separating Baldivis Road and Nairn Drive at Mundijong Road to provide for full protected access and the effective elimination of an interim direct connection will result in significant increases in traffic volumes both to the north and south of Mundijong Road with an expected 100% increase in traffic volumes north of Mundijong Road and 50% increase south of Mundijong Road. This would likely result in a requirement to consider a grade separation of Baldivis Road/Wellard Road at the existing freight railway line along the northern boundary of the cell. The details associated with this change to the road network would require detailed nodal assessment during the Local Structure Planning process.

- The traffic volumes have been based upon full 'build-out' in adjacent areas, including the North Baldivis area, and have taken into consideration the fact that the Stakehill Railway Station is unlikely to be delivered in the short- to medium-term. As a consequence, the modelling is reflective of a revised distribution pattern associated with the attraction of the Wellard, Warnbro and Rockingham Railway Station with the 'worst case' scenario of a 10% public transport modal split assumed.

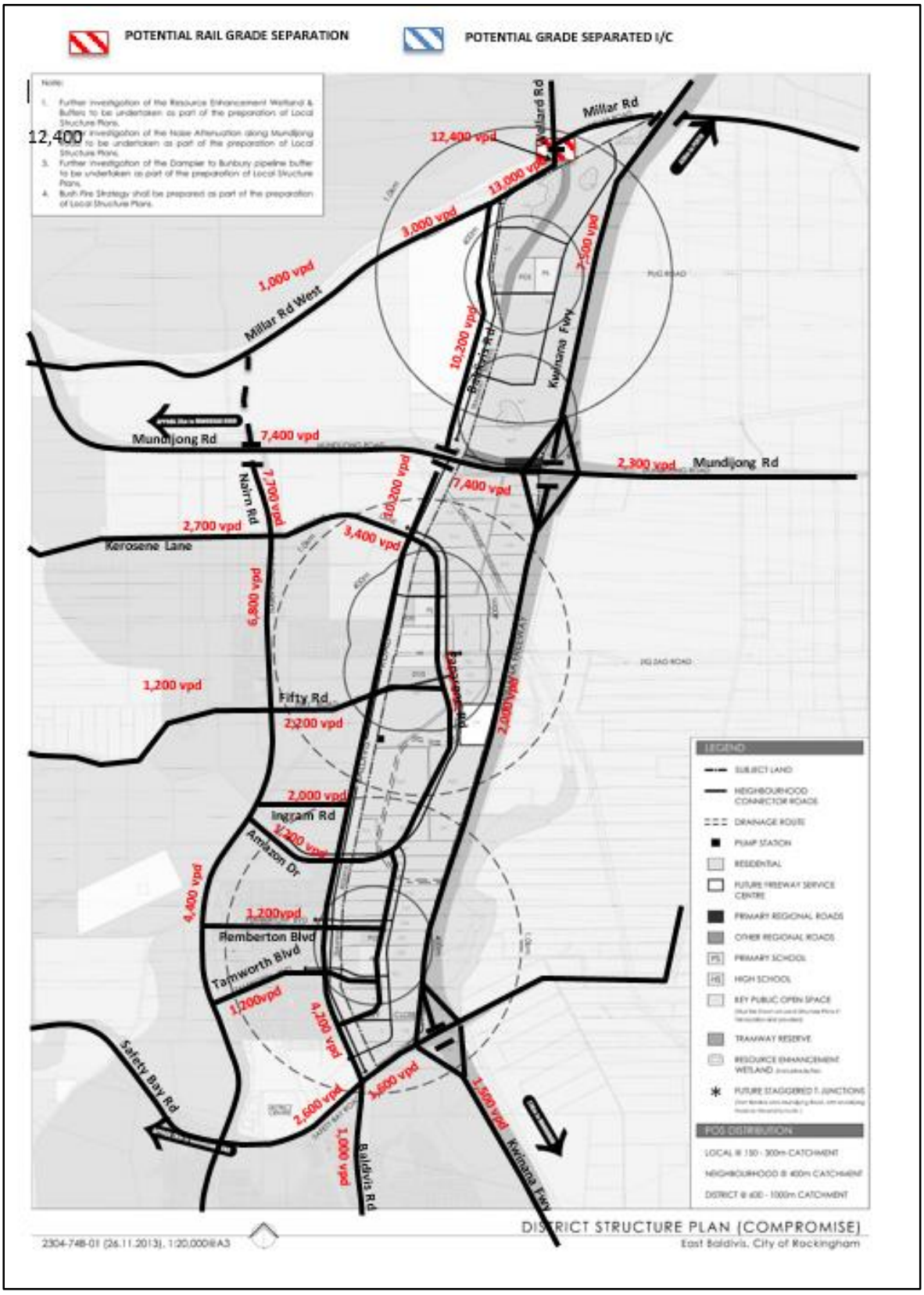


Figure 5 – East Baldivis DSP Volumes – Grade Separation Option Grade Separations at Mundijong Road + Baldivis Road/Wellard Road Grade Separation at Railway Line

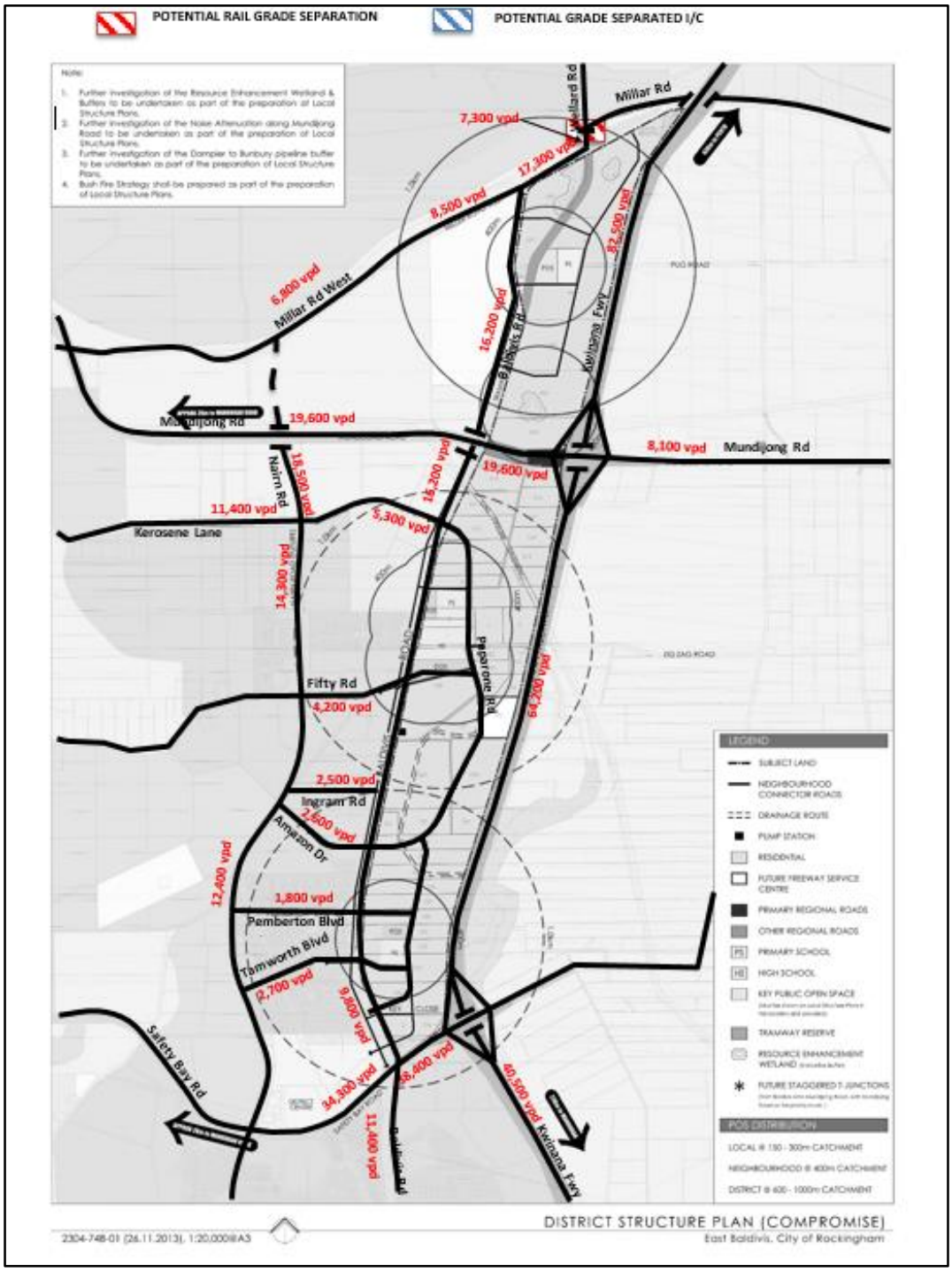


Figure 6 - Future Total Traffic Volumes – Grade Separation Option Grade Separations at Mundijong Road + Baldivis Road/Wellard Road Grade Separation at Railway Line

3.5. Public Transport Facilities

There is only one public transport service currently available within the District Structure Plan Area. Transperth Bus Route 568 operates services approximately every 20-30 minutes and travels between Warnbro and Baldivis making stops on Baldivis Road between Tamworth Boulevard and Safety Bay Road. Proposed public transport services will consist of a combination of high frequency minimal stop routes connecting between major attractors and activity nodes and local line haul routes servicing the area and connecting adjacent urban communities. Figure 7 illustrates indicatively the proposed bus routes within the DSP area. The projected traffic volumes are reflective of the distribution patterns associated with the attraction of the Wellard, Warnbro and Rockingham Railway Stations to the north, south-west and west, respectively, and has taken into consideration that the delivery of the Stakehill Railway station is not considered a priority and has not been included in forward planning by the State Government.

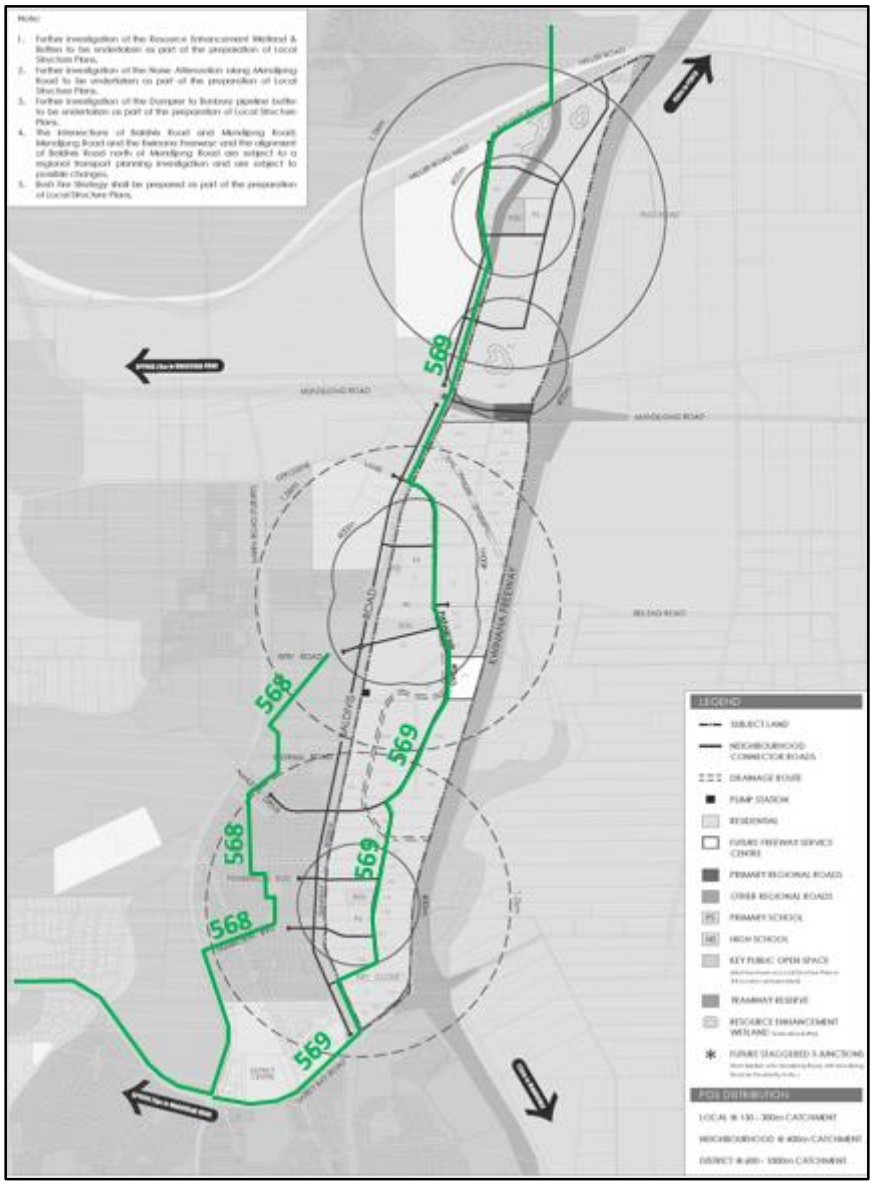


Figure 7 – Proposed Future Transperth Bus Services

3.6. Pedestrian/Cyclist Network

The proposed internal pedestrian and cycling routes will connect directly the existing infrastructure external to the area with a focus on maintaining connections between adjacent urban areas and co-locating higher order walking and cycling infrastructure proximate to major attractors and activity nodes such as schools, mixed-use precincts and retail/service nodes. Figure 8 shows the indicative cycling network links for the DSP area including suggested links into the PSP network along the Kwinana Freeway to the east. Detailed infrastructure planning in relation to the pedestrian and cycling network will be undertaken during the Local Structure Planning stages of development within the DSP area for each respective cell to refine these routes and will include consideration of appropriate planning and

delivery of the shared path/Principal Shared Path network within the DSP to connect with existing and planned future infrastructure along the Kwinana Freeway and adjacent to the local schools and neighbourhood centres.

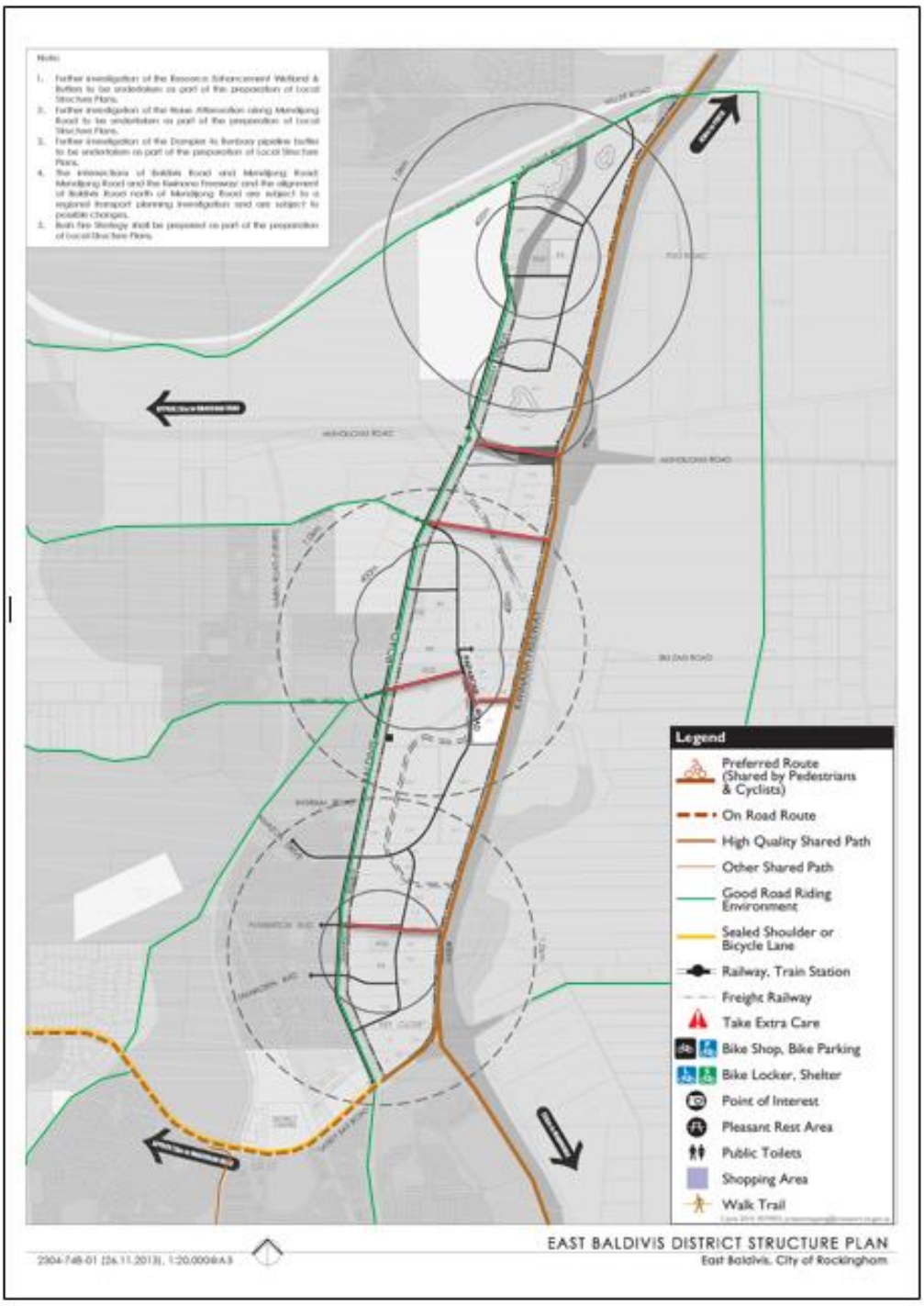


Figure 8 – Proposed Bicycle Network (Inclusive of the Extension of the Principal Shared Path Network)

4. REVISED CONCLUSIONS

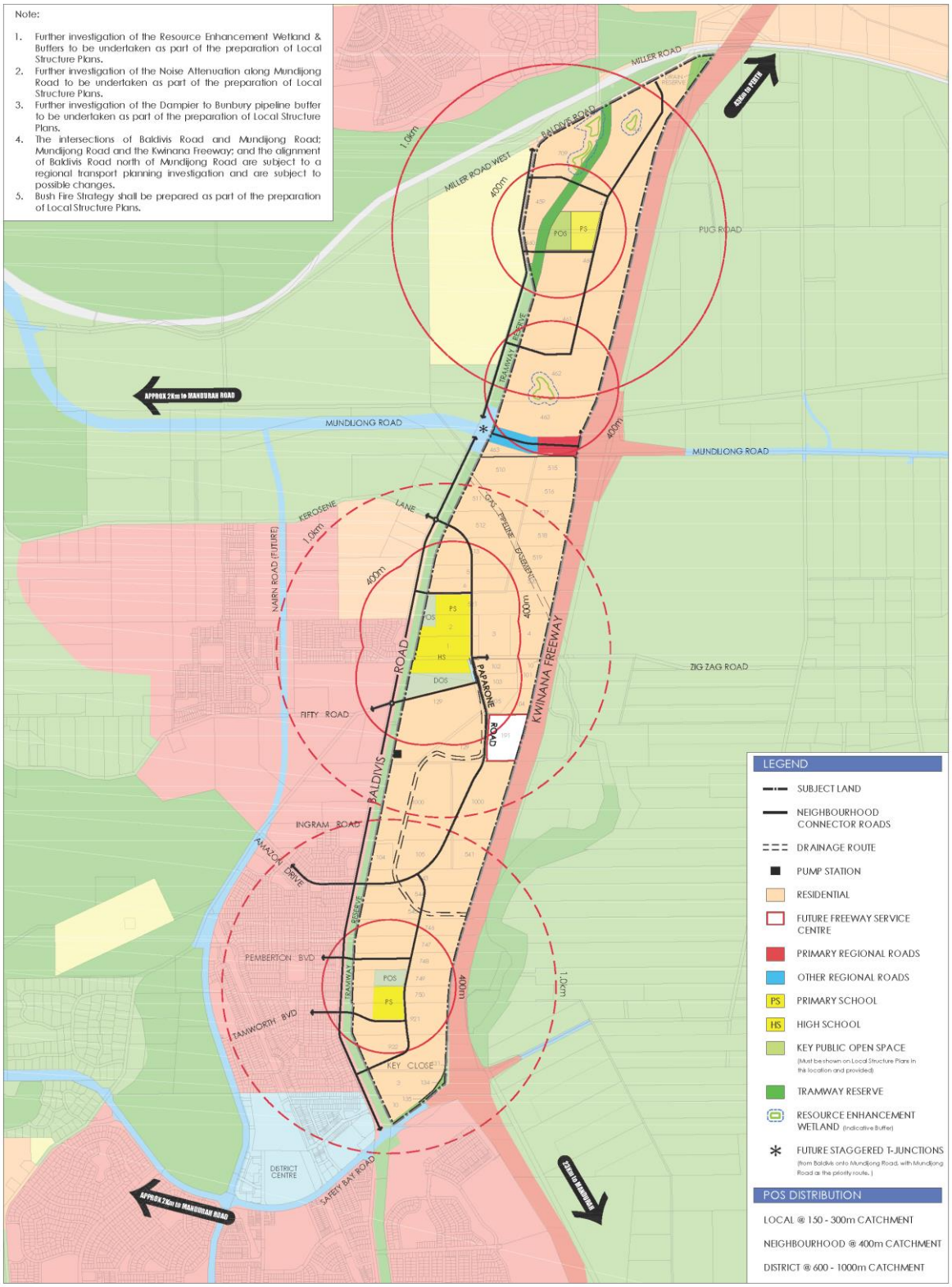
The results of the revised traffic modelling for the Baldivis East District Structure Plan area indicates that the proposed internal road network within the DSP area is appropriate and can accommodate the level of anticipated daily and peak hour within and external to the area and the approved and planned external boundary road network can accommodate the area-generated traffic.

Details relating to the specific nodal traffic operations along Mundijong Road will be addressed during the Local Structure Planning stages of urban development; however, a review of opportunities to provide an additional connection to Mundijong Road between Baldivis Road and Nairn Drive indicates that there is residual capacity of between 10,000 and 15,000 vpd to accommodate demand along this section of road and at this potential location, based upon the modelling assumptions noted as part of the modelling for the revised infrastructure scenario. Generally, the results of the traffic modelling undertaken for the endorsed DSP are generally consistent with previous modelling engagements undertaken in 2012 and 2013 and the projected internal daily traffic volumes for the local road network are consistent with the proposed functional road classifications and background traffic studies. The 'worst case' scenario option which considers the confluence of the fully protected grade separation of both Baldivis Road and Nairn Drive at Mundijong Road with the elimination of an at-grade fully protected interim connection at Mundijong Road, the resulting traffic projections indicate that expected daily volumes on Baldivis Road will increase by approximately 50% south of Mundijong Road and 100% north of Mundijong Road. This could potentially result in an upgrading of the road classification assigned to Baldivis Road under Option 1 as a *District Distributor B* to a *District Distributor A* along this section of road as well as potentially triggering a grade separation of Baldivis Road/Wellard Road at the existing freight railway line along the northern boundary of the DSP area. However, it should also be noted that there is reasonable scope for the Department of Planning, in conjunction with the City of Rockingham, to consider expanding the range of traffic modelling and transport/road options through the area as part of the ongoing South-West Corridor Sub-Regional Structure Planning process with the details relating to specific nodal operations, including grade separation of intersections along Mundijong Road and of the Baldivis Road/Wellard Road/freight railway node being addressed during the Local Structure Planning stages of urban development. Based upon discussions with Main Roads WA, the Department of Planning and the City of Rockingham, it is concluded that that detailed modelling, including detailed nodal assessment (i.e. intersection operations assessment as well as consideration of grade separation thresholds) and a more detailed level of technical rigour is appropriate to be undertaken, prior to the finalisation of the Sub-

Regional Structure Planning process, in consultation with relevant State and Local Government agencies and Local Structure Planning for individual cells and in detailed consultation with affected landowners.

In conclusion, the results of the revised modelling for the endorsed DSP indicate that the proposed road network internal to the area is appropriate and can accommodate the projected traffic demands associated with development within the cell.

5. APPENDIX A – ENDORSED DISTRICT STRUCTURE PLAN



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EAST BALDIVIS DISTRICT STRUCTURE PLAN
East Baldivis, City of Rockingham