

A technical drawing of a mechanical assembly, possibly a motor or pump, is shown on a grid background. The drawing is rendered in orange lines and includes various components such as a central shaft, bearings, and housing parts. Numerous dimensions and alphanumeric labels (e.g., 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100) are scattered throughout the drawing to indicate specific measurements and part locations. The drawing is oriented vertically on the page.

Appendix 10

Servicing Report

LOT 306 FIFTY ROAD, BALDIVIS
ENGINEERING SERVICES REPORT - REF BDVCAN30

1 General

This report has been prepared to outline the servicing proposals and constraints to support the Local Structure Plan on the above land as outlined in the DPS plan.

It is proposed to develop the land into 195 urban lots and one 4.6ha rural residual lot. The residual rural lot and the Proposed POS along the western edge of the development will contain the steep dunal land.

The investigations in this report has involved consultation with the various service authorities and Council and a desk top study of the available information over the site to establish the opportunities and constraints to development of the area.

2 Executive Summary

The land the subject of this report is located immediately north of Fifty Road and immediately west of McDonald Road. The basic land form is undulating sandy to hilly free draining sand. The developable area slopes from the west at an elevation of RL 22m AHD to a low point at RL 4m AHD in the southern part of the land.

Some 60% of the site is cleared and used for market gardening. The balance of the land is steep sand dune formation, mainly hosting residual trees, after being used as market gardens, residential and grazing land for many years. The Environmental Geology map of the Geological Survey of Western Australia classifies this site as “S7” on the development area, and “LS1” on the western section of steep residual sand dunes. Each soil type is classified as being suitable for urbanization.

The land can be connected to all services, either by extension from new neighbouring subdivision developments east of McDonald Rd, or by extension along Baldivis Road. Some upgrading and construction of existing sewer infrastructure will be required along the extension of McDonald Rd in order to provide for development further north of the site.

Access to the East Rockingham Waste Water treatment Plant (ERWWTP) has been approved by the Water Corporation.

Experience with this land form in developments north of the site shows the soils to be free draining, meaning that all storm water will be retained on site by soakage in swales in line with current best practice as outlined in the “Liveable Neighbourhoods” policy. The Ground Water Level (GWL) across the site is RL 2.0M AHD which is well below the site levels.

The western area of the site, being the POS and rural lot, is traversed by the Australian Pipeline Trust (APT) high pressure gas pipeline located within a large easement on the west side of the land. The easement land is available for use as POS, drainage and road construction along and across the easement under strict guidelines as set out in the report below. Road crossings will need special attention to clearances and protection.

3 Site

Lot 306 McDonald Rd is located on the west side of McDonald Rd, Baldivis, some 200 metres north of Baldivis Rd, and covers an area of 18.19 hectares. It is accessed from McDonald Rd. The south east corner of the site contains a residence and associated sheds, which is accessed from McDonald Rd. The residence has septic tank disposal of wastewater.

McDonald Rd has recently been upgraded to current urban standard as part of the new urban development on the east side of McDonald Rd by Peet Ltd.

The APT High Pressure Natural Gas pipeline traverses the western edge of the site within an easement.

Some 60% of the site is cleared and used for market gardening. The balance of the land is steep sand dune formation, mainly hosting residual trees, after being used as market gardens, residential and grazing land for many years. The Environmental Geology map of the Geological Survey of Western Australia classifies this site as “S7” on the development area, and “LS1” on the western section of steep residual sand dunes. Each soil type is classified as being suitable for urbanization.

The developable land is generally undulating, with elevation varying from RL 22m AHD on the western edge sloping down to RL 4m AHD in the south east corner.

The site has an AAMGL of RL 1.5m AHD according to the Department of Water Groundwater Atlas of 2004, thus the development will not require fill in the low area at RL 4m AHD in the south east corner of the site, but it does require fill to ensure that it can be connected to the sewer.

4 Development Proposal

It is proposed to develop the land as a residential subdivision of around 195 urban residential lots, with all normal services being; wastewater, water, power, roads, gas and telecommunications service. The rural lot will not have connection to the sewer.

Access to the site will primarily be from McDonald Rd, but connections to the abutting existing and future developments will provide permeability.

The existing residence, sheds, septic etc which is located at the south east corner of the site on McDonald Rd will be demolished as part of the development.

All drainage is proposed to be retained on site using best management practices. The drainage is proposed to be contained in the south eastern corner of the site within an easement in the rural lot.

One road crossing of the APT pipeline easement plus a road within the easement along its eastern boundary is proposed. This boundary road will be in cut to 4 metres to allow the adjacent lots to meet the minimum side wall height as above to be maintained. It is proposed to stabilize the cut slope with limestone batters.

The urban development area will entail substantial earthworks to provide level building blocks from the undulating land form, with all lots having retaining walls to allow this. The low areas west of McDonald Rd will need to be filled to facilitate sewerage grades.

5 Earthworks & Retaining Walls

The site requires filling in the south western area of the site to facilitate sewer connection into the existing infrastructure in McDonald Rd. The fill levels vary, depending on the proximity of the site to the pumping station, but in general the western portion of the site will be filled to approximately RL 5m AHD to 6m AHD, some 3.0 metres above the AAMGL of 2.0m AHD.

Each lot will be finished level, with installation of retaining walls to suit. The retaining wall height is proposed to be restricted to 5m in height on side boundaries along the western road adjacent to the steep dunal ridge, and generally to 2m elsewhere, with a maximum of 5m heights to rear boundaries in order to provide the maximum amenity to lots without shading. Retaining walls will be constructed using reconstituted limestone blocks.

The earthworks are proposed to be designed to be on a “cut to fill” balance, meaning that cut areas will need to be resolved to make up the shortfall of filling required for the filing shown

Where roads join between land holdings with separate ownership, levels on the roads and lot boundaries will be either matched to existing level or co-ordinated to ensure that a staged development approach can be accommodated.

6 Roads

All roads will be constructed to City of Rockingham standards.

McDonald Rd has been extended north by the adjacent Peet development along the eastern boundary of the site in a 12 metre wide road reserve, which will be widened to 18 metres with a 6 metre road reserve widening on the west from this site. The 7.4m wide carriageway is currently contained within the 12 metre wide reserve.

Where roadways cross the pipeline easement, the profile of the road will be lifted to ensure that the required minimum cover over the pipeline is maintained at 1.5m as required. Previous experience in constructing roads across this easement has given us the background to forecast required levels of protection.

7 Drainage

As outlined above, the sandy soil characteristics of the site are conducive to soakage. Therefore all stormwater drainage will be retained on the site via soakage swales, including the 1 in 100 year event.

Drainage flow paths have been established based on topography and minimum road grades to ensure optimization of basin areas and minimization of impact on POS.

The low point in the catchment has been designated as infiltration swales for the 1 in 5 year design storm, with additional capacity either in the swale itself or in the abutting land and POS area to contain the 1 in 100 year ARI storm.

A separate Local Water Management Strategy (LWMS) will be provided to Council for the area.

The proposed drainage system for the subdivision does not include accommodating drainage flows from McDonald Rd as stormwater drainage from these has already been incorporated in adjacent developments.

All basins will have the maximum depth of water of 1.5m for the 1 in 100 year ARI storm, with the base of the basins a minimum of 0.5m above the AAMGL.

8 Groundwater

Extrapolation from the Perth Ground Water Atlas 2004 indicates that the AAMGL for the area is at around RL1.50m AHD through the middle of the site. The groundwater contour runs approximately north – south.

The lowest ground level on the site is a swale tending north east/ south west at approximately RL4.0m AHD at the south east corner of the site, which will contain both the proposed drainage reserve site located at the western end of the southern entry road from McDonald Rd and also the proposed basin at the southern end of the POS, where a landscaped drainage swale will be incorporated into the POS at the southern corner of the site. Base of the basin level the same location is at around RL4.0m AHD being which at least 2.0m above AAMGL.

9 Power

It appears that sufficient power supply exists in the area to supply the development. A 22Kv aerial line is located in Fifty Rd and along McDonald Rd to the abutting Peet development on the east side of McDonald Rd. This development has reticulated underground power, with a transformer located in the

POS opposite the southern entry road into this proposed development. There is existing underground reticulation in McDonald Rd, which has been extended to the northern boundary of the site.

All aerial lines along the existing roads will be relocated underground in line with current WAPC approval policy at the cost of the developer. The existing aerial service lines inside the lot will be removed as part of the development.

All internal power reticulation lines and transformer installations will be constructed at the cost of the developer. Transformer sites will be determined at the detailed subdivision design stage.

10 Water Supply

At present there is reticulated water supply past the site in Fifty Rd. There is an existing 250mm water main along the north verge of Fifty Rd, and a connecting main in McDonald Rd to the adjacent Peet development.

The adjacent Peet development east of McDonald Rd has constructed a water main along the eastern verge of McDonald Rd from Fifty Rd to the northern boundary of the site. Connection to this development will therefore be made to the existing Water Corporation infrastructure.

11 Sewer

The site falls within the catchment of the existing Baldvis North wastewater pumping station (WWPS's) on McDonald Rd adjacent to the south east corner of the site.

Some fill will be required in the low areas to allow connection to the existing sewer. Connections can be made directly into existing sewers.

As part of an agreement between the adjacent developers east and north of the site, and this proponent, McDonald Rd is currently only 12 metres in width, but a six metre widening will be created on the eastern boundary of the site to make the future road reserve 18 metres in width. A 150mm sewer has been constructed within this road reserve widening by Peet a distance of 280 metres along the future sewer alignment from the Baldvis North WWPS to the central entry road into this development. From this point, the sewer is constructed as a 225mm sewer to the northern boundary of the site.

Connections have been provided as junctions only for the 150mm section, with "run ins" to be constructed by this developer. Along the 225mm section full connections and "run ins" have been constructed. If changes are made to the lot boundaries of this development, new "cut ins" will be made as required by this developer.

It is likely that two connections by way of access chambers will be required to service the whole of this development to the 150mm section of existing sewer.

Ultimately the McDonald Road WWPS will accept discharge from the Baldvis Rd WWPS, and will then pump directly to the new East Rockingham Waste Water Treatment Plant (ERWWTP), which is anticipated to be operational after 2015.

12 APT Pipeline Easement

This is a located along and within the western boundary of the site. This easement contains the 375mm Australian Pipeline Trust (APT, originally WANG) natural gas pipeline within the easement approximately. The easement skews across the proposed rural lot in the south west corner to the western boundary at a width of 65 metres with the pipeline located in the centre of it, and thence north as a 40 metre wide easement along the western boundary, with the pipeline located approximately 15 metres east of the boundary of the site.

The development setbacks from the pipeline must be in accord with the requirements of Planning Bulletin 87 – High pressure Gas Transmission Pipelines in the Perth Metropolitan Region (PB 87).

Prior to commencement of subdivision works, the subdivider will prepare and implement a Pipeline Management Plan detailing measures to ensure public safety and the protection of the high pressure natural gas pipeline, including completion of a risk assessment in accordance with AS2885 and implementation of measures required to ensure that the level of risk of future inhabitants of the subdivision is as low as is reasonable practicable.

This risk management assessment has been carried out for other developments in the area and it has been agreed with APT that higher risk land uses such as aged housing, schooling and neighbourhood centres will be removed from the higher risk locations. The planning for this development is cognisant of those requirements.

Although there are no concerns in this development from a planning perspective, at the time of construction the developers and their consultants will need to approach APT to resolve a further pipeline management plan to ensure that the construction of the works in close proximity to the pipeline are properly managed to ensure the safety of the construction personnel. It is at that time that the matter of the road crossing, the levels thereof and the required management measures for the job will be required to be resolved.

13 Telephone

The new urban development will be served by the NBN or another provider for broadband and telephony. Capacity exists off fifty Road and the adjacent development which may require minor extensions to facilitate connection.

14 Gas

Gas services are located in Fifty Road and the adjacent development and have sufficient capacity to serve the area with minimal augmentation.

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THIS REPORT IS DATED 5TH MARCH 2015.



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