

APPENDIX 3

ENGINEERING SERVICING REPORT



DEVELOPMENT
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Our Ref:
Servicing Report Lot 53
September 2016
October 12, 2016

TERRANOVIS PTY LTD
LOT 53 KEROSENE LANE, BALDIVIS
ENGINEERING SERVICES REPORT

1. General

The above land is to be developed into an urban subdivision containing some 133 residential lots. This report covers existing and proposed services plus proposals for earthworks, retaining walls, roads, drainage, water supply, power supply, gas, telecommunications and sewerage as required for current urban development standards.

2. Executive Summary

The land the subject of this report is located on the south side of Kerosene Lane in the northern area of Baldivis, in the city of Rockingham. The land is approximately 1.0km west of Baldivis Rd and 1.6km east of Mandurah Rd. The future Nairn Drive is located within and along the eastern boundary of the land. The land area is approximately 11 hectares.

The land is fully cleared and was previously utilised as a market garden, with shed, water tank, water supply bore and irrigation pipes. The site has a power connection to an aerial line in Kerosene Lane. It is not connected to Water Corporation water or sewer services. The land on the western and southern boundaries is fully developed into housing estates, whilst the land on the east is vacant rural land. A Water Corporation main sewer pressure main is located within the site along and within the future Nairn Drive road reserve.

Kerosene Lane is a sealed rural road in fair condition with centerline marking. It lacks kerbing and formal drainage. Site access is via Kerosene Lane.

The basic land form is free draining sand over limestone. The Environmental Geology map of the Geological Survey of Western Australia classifies this site as "LS1" Tamala Limestone, with covering Safety Bay sand. The current process is listed as "ground water recharge."

The land can be connected to all services, either by extension and upgrading from existing infrastructure immediately west and south of the site, or by provision of new infrastructure as set out below. Power and telephone services already pass along the site frontage.

An LWMS for the area is being prepared. All stormwater from the development for storms up to the 1 in 100 year storm will be contained on site in a single swale drainage basin located in the low area near the middle of the site. Houses will discharge roof

stormwater to on site soakwells. The land is a minimum of 11 metres above the water table at its lowest point on the western boundary. According to the 1997 Ground Water Atlas, the groundwater level is around RL 6.0m AHD.

The site is undulating, which will require construction of low to medium height retaining walls to provide level building blocks and to ensure the site is properly drained. Some high retaining will be required in order to reconcile surrounding lot and road levels; both existing and proposed.

3. Site

Lot 53 is located on the south side of Kerosene Lane, some 1,000 metres west of Baldivis Rd. The land is currently cleared and has been historically used for market gardening with associated irrigation infrastructure and sheds. There is no residence on site.

Kerosene Lane abutting the site is a rural sealed road acting as a local distributor between Baldivis Rd and Mandurah Rd. It has central line marking, but no kerbing or formal drainage.

Generally the land falls to a low area at RL 17.5m AHD along the northern half of the western boundary of the site. It falls from RL 29.0m AHD from the north-eastern corner and RL 28.0m AHD from the south-eastern corner of the site at an average grade of 4%. The site levels at the north-western and south-western corners are RL 18.5m AHD and RL 24.0m AHD, respectively. The low east-west swale area lies approximately 200m south of Kerosene Lane at RL 17.5m AHD on the west and RL 24m AHD on the east.

The geology of the land is described by the Environmental Geology Map of the Geological Survey of WA, as “LS1” Tamala Limestone with covering of Safety Bay sand, and is described as being suitable for urbanisation. Experience in this area shows the limestone to be in pinnacle form with varying depths of sand cover.

The site is adjacent, on its western and southern sides, to recent fully built up residential development subdivision, from which services will be extended. This development will extend all services through to the site, including provision of Nairn Drive as set out below with required service crossings.

The existing sheds and irrigation infrastructure will be removed as part of the development.

Power and telephone services are located in Kerosene Lane and will be connected to the development.

4. Development Proposal

It is proposed to develop the land as a 133 lot residential subdivision. The development will be provided with all normal services, with links to abutting developments for sewer, water, power, roads, gas and telephone services, with all drainage to be retained on site using best management practices. The development will have four road connections to the abutting residential areas on the west and south.

One road connection, as an “in – out” junction, is to be made to Nairn Drive along the eastern extension of Dunning St through this development, but no road connection is to

be made to Kerosene Lane. Nairn Drive within the site will be constructed by the developer to the normal standard of full earthworks, one sealed carriageway with required kerbing and piped drainage and street lighting. Kerosene Lane will also be upgraded along the site frontage as required to the same standard as recently done immediately west of the site.

Water Corporation sewer and water services exist in the abutting new development on the western and southern boundaries of the site, and connection will be made to them where convenient and as approved by the Water Corporation. There does not appear to be any height restriction to the supply of water. The Water Corporation has previously advised that land to a level of RL 28.0m AHD in this area can be served from its existing system.

The development will entail extensive earthworks to provide level, free draining building blocks with low to high height retaining walls, given the undulating site, drainage catchment requirements and the constraints imposed by the existing development and proposed Nairn Drive levels.

Drainage will be managed by a single on site drainage swale to be located near the lowest point of the site as detailed by the drainage catchment and LWMS. All residential lot stormwater runoff will be directed to individual lot site soakage. Half of the drainage of proposed Nairn Drive is to be included and incorporated with the subdivisional drainage in accordance with the LWMS. Part of Nairn Drive drainage is to be accommodated with the land east of the site. Kerosene Lane will accommodate its own stormwater drainage within its verges.

The development will allow provision for the implementation of the NBN network, communications and gas infrastructure as required.

5. Earthworks & Retaining Walls

Because of the undulating nature of the site, overall earthworks will be required to provide level building blocks, thus necessitating extensive low to high height retaining walls.

All retaining walls will be subject to Council building approval.

There is an earthworks embargo for this site during the months of November to March.

Earthworks on site will entail removal of topsoil, cut and fill, and stabilisation of finished land surfaces. Some 10,000m³ of imported fill is envisaged. Where pinnacle limestone is encountered within 600 mm of the finished surface, it will be removed and replaced with free draining sand.

6. Roads

All subdivisional roads will be constructed to City of Rockingham standards and approval, including kerbing and piped drainage plus provision of footpaths as required.

The existing Kerosene Lane is a rural road in good condition, with no kerbing or formal drainage. It will need to be upgraded as part of the development along the frontage of the land in a similar manner as done immediately west of the site, as a boulevard.

Nairn Drive is to be constructed as set out above, with full earthworks, one sealed carriageway, including kerbing, drainage and lighting as required. The Water Corporation major sewer pressure main located on the western verge of the Nairn Drive road reserve is quite shallow and will need to be protected during construction of the roadworks. This main is also located along the northern verge of Kerosene Lane at even shallower depth and will be similarly protected during the upgrading thereof.

7. Drainage

The site will be self-contained as far as stormwater drainage is concerned. The soil characteristics of the site will allow site soakage, based on the geology and the depth to groundwater.

The whole site is to be drained into a swale basin located within the proposed POS located along the northern boundary of the eastern extension of Dunning St to the Nairn Drive boundary. This POS will be developed to contain the necessary drainage swale as required by the LWMS. The swale will also accept stormwater from the northern half of Nairn Drive along the eastern boundary of the site. The southern half of Nairn Drive is to be drained to a future swale basin to be located in Lot 56 immediately east of the Nairn Drive boundary. The low point in Nairn Drive is located just south of the Dunning St extension and the POS.

Drainage for the upgraded Kerosene Lane will be via soakwells within the Kerosene lane verge, as there is no connection to the site from Kerosene Lane, and the road gradient is too steep to allow verge swales.

Stormwater design will be done to the standards of the City of Rockingham, with a storage facility to contain the 1 in 100 year storm runoff from roads located in the proposed POS within the site, as described above.

8. Groundwater

The groundwater level at the site is approximately RL 6.0m AHD across the middle of the site, some 11 metres below the lowest site ground level of RL 17m AHD at the western boundary, according to the 1997 Ground Water Atlas.

9. Power

It appears that sufficient power supply exists in the area to supply the development. A high and low voltage aerial power line is located along the southern verge of Kerosene Lane, with a pole-top transformer located centrally along the site boundary connected to a site switchboard. It is likely this line will be relocated underground along the frontage of the site as part of the development.

The old aerial service lines, site switchboard, poles and underground cables running along the eastern boundary inside the lot will be removed as part of the development. Maintenance of power to occupied homes west and south of the site will be a priority during subdivision construction and connection.

All subdivisional 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 not a public water supply to the site. The adjacent residential developments are fully reticulated with Water Corporation mains, and it is expected that these will be extended into this development.

The Corporation has previously advised that supply in this area may need to be boosted to supply any further development, and discussions will need to be held with the Corporation to determine the requirement for and the manner of boosting the supply. There is an interim proposal to extend mains along Baldivis Rd and Kerosene Lane, which if done, would boost supply to the required level. This proposal would be at the cost of the developers along Kerosene Lane.

11. Sewer

The site is not currently connected to sewer.

The site can be served from the Water Corporation's Baldivis North Pump Station "McDonald Rd" south of the site. Connection to existing gravity sewers in the abutting subdivisions will allow the site to be served by this pump station.

Water Corporation planning shows that the land east of Nairn Drive is also to be connected into this system, and provision will be made to extend a sewer connection across Nairn Drive to Lot 56.

12. Telephone & NBN

Telstra services exist in the area along Kerosene Lane and in the abutting subdivisions. These are most likely to be able to be extended to service this proposed development. Some upgrading may be required.

If Telstra is to be the servicing authority, Telstra normally requires twelve months' notice of development starting in order to ascertain any upgrading requirements.

In accordance with recent requirements, the developer is required to install NBN "pipe and pit" to allow for future installation of cables for the NBN. The design of the "pipe and pit" is the responsibility of the developer, and will be designed in conjunction with the underground power network, and installed during the construction phase of the development.

13. Gas

Gas mains are installed in this area in the abutting subdivision. Gas will be extended to this development by ATCO in the normal way, with trenching done by the developer.

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THIS REPORT IS DATED 21ST SEPTEMBER 2016