ERCEG DEVELOPMENTS
LOT 81 SOUTHWESTERN HIGHWAY, DAVENPORT
ENGINEERING SERVICING REPORT

General
The above land is proposed to be developed into 6 general industrial lots. This report covers existing and proposed services plus proposals for roads, drainage, water supply, power and telecommunications.

Executive Summary
The land the subject of this report is located on the north western corner of the Southwestern Highway and the Bunbury Outer Ring road, in the Davenport industrial area of the City of Bunbury. The land is bounded by the Preston River on the north, and by land owned by the city of Bunbury on the west, which lies under the airport flight path. The land area to be developed is approximately 42 hectares.

Access to the site is from the Southwestern Highway, which is a sealed road of good standard.

The Preston River located along the northern boundary of the land will have some influence on drainage and the minimum level of fill for the development because of the 1 in 100 year flood levels.

The existing land ranges in height from RL 15 metres AHD along the southern boundary falling uniformly to RL 12 metres AHD along the Preston River frontage, with a small section of the north western corner falling to RL 11 metres AHD. The land has previously been used for grazing purposes, and is generally cleared, fenced, and vacant. The land is not connected to any services, but three phase high voltage overhead power lines do traverse the property.

The soil type, according to the Environmental Geology Series plans of the Geological Survey of WA is Guildford Formation comprising sandy clays and silt. A preliminary geotechnical site investigation has shown approximately 1 metre of Bassendean sand and / or silty sand over clay across the land, with a greater depth of sand along the southern boundary.

The required services are either of very limited capacity or currently not available adjacent to the site, and will need to be extended / upgraded at the developer’s cost from west of the site via Southwestern Highway.

Storm water discharging from the 1 in 100 year Design Storm from the development road will be detained in on site in drainage swales. Each developed site will be responsible for detaining its own stormwater for each design storm.

A LWMS report has been prepared for the proposed development by DEC.

Site
The site, located on the north side of the Southwestern Highway at the junction with the Bunbury Outer ring Road, opposite the Bunbury airport and some 3.2 km east of the South West Highway bypass Road.

The site is proposed to be subdivided into 6 large industrial lots of various sizes. These lots will be fully serviced as required by the WAPC and as specified by the City of Bunbury and the relevant servicing authorities.
The site is vacant semi-cleared land used for rural purposes.

The geology of the land is described by the Environmental Geology Map of the Geological Survey of WA, as being “Guildford Formation” of sandy clays and silts. A preliminary site investigation has found that the soil is sand and silty sand over clay, with an average depth of sandy material of one metre.

Groundwater investigations indicate that the depth to groundwater range between 0.01m & 2.10m as measured from several bores installed over the site. It is therefore assumed that the groundwater is perched on top of the clay interface, requiring some sand fill over this level to comply with WAPC and City of Bunbury development and building approval.

The Southwestern Highway along the southern boundary of the site is a single sealed carriageway of 7.2m with 1.2m wide sealed shoulders in good condition with informal drainage. Drainage is contained in the roadside verges. The only service located within the road reserve alongside the development is a water main servicing the Bunbury Regional prison, and Telstra underground telephone cables.

**Development Proposal**

It is proposed to develop the land as an industrial subdivision, with all normal services, with drainage to be detained on site for the design storm, using best management practices, as set out in the LWMS report to reduce nutrients and maintain pre-development flow conditions. Controlled stormwater discharge from the development will enter the Preston River via existing minor watercourses.

The initial development will entail roadworks and associated drainage and services. It is envisaged that each lot owner will develop his lot with buildings, parking, on-site wastewater disposal system and drainage detention. Some fill will be required to provide suitable foundation conditions for buildings, allow installation of site wastewater disposal and general drainage.

A preliminary site geotechnical investigation has shown the land to be typical Guildford formation soils with generally one metre of sand/silty sand over the clay base. Further Geotechnical work will be required to determine building foundation requirements.

Fill will be required along the majority of the eastern portion of the site if building development is desired along this eastern boundary, as this area is affected by the 1 in 100 year Preston River floodway.

Drainage of stormwater will be managed using roadside drainage swales and minimum piped drainage. Three designated drainage basin sites will be required to detain extreme event from the proposed road reserve. Overflow from these detention basins will be directed into designated overflow channels within easements from the road eastwards to meet up with three existing minor drainage channels entering the Preston River.

These basins will cater for design storms up to the 1 in 100 year event, being attenuated on site to pre-development flows.

All subdivision roads and required services will be designed and constructed to current Council and other service authority standards. There is no intention to upgrade the Southwestern Highway, other than the entry into the development.

**Earthworks**

The site slopes west away from the Southwestern Highway towards the Preston River. Initially earthworks will only be required for the construction of the subdivisional road and drainage swales.

Ground level varies generally from RL 14m AHD along Southwestern Highway falling to RL 12m AHD along the river boundary along the northern boundary.

Earthworks on site will entail removal of topsoil, stockpiling of the sandy layer, and where required, cut and fill of the underlying clay material to facilitate drainage, and replacement of all suitable sandy material under the proposed road pavement.

Fill for buildings and wastewater disposal areas will be the responsibility of the individual lot owner(s).
**Roads**

The subdivisional road will be designed and constructed to City of Bunbury industrial standards, and will be a substantial pavement in width and depth. It is expected that this road will be fully kerbed, with stormwater being collected in roadside swales using suitably designed / constructed “kerb breaks”.

No works are envisaged to Southwestern Highway.

**Drainage**

The eastern boundary of the site is adjacent to the Preston River. The 1 in 100 year flood level of the Preston River will have an impact on the development drainage and minimum fill levels, as a minimum of 500mm height above the estimated 1 in 100 year floodway is required for all areas within developed lots that are to contain significant or critical infrastructure.

The development site will essentially be divided into three stormwater catchments, each directing extreme flow events towards three overflow channels as described in greater detail in the LWMS report.

Typically fill will need to be placed approximately 1.2 metres above the clay layer, with on-site detention & site soakage required for each industrial lot. Each industrial lot will be provided with an outlet overflow connection pipe which will similarly directed all appropriately detained extreme event overflows into the three “east-west” overflow channels that meet up with three existing natural channels that currently directs all flows into the Preston River.

All stormwater drainage design and construction will be done to the City of Bunbury specification and approval.

Three basin sites will detain the design storm runoff from the proposed road reserve and all lots within the estate will be required to detained flows within their lots to pre-development conditions as outlined in the LWMS report - by way of soak wells, rainwater tanks, underground storage devices &/or detention basins.

**Groundwater & Flood Levels**

According to the plans supplied by the Department of Water (DoW), site levels fall from RL 14m AHD along the southern boundary of the site to generally RL 12m AHD along the Preston River frontage.

The previous LWMS report has derived AAMGL’s over the site which falls from RL 14.5 on the western boundary to RL 10.0 along a major part of the eastern boundary, adjacent to the Preston River.

The DoW plan also shows the 1 in 100 year flood level for the Preston River adjacent to the development falls from approximately RL12.85 at the north-eastern (upstream) corner of the site to RL 12.18 at the north-western (downstream) corner of the site. At this point the floodway impinges some 25 to 30 metres into the north eastern corner of the site. No filling is allowed within the floodway area which only impacts upon a very small area on the far north-eastern corner of the site.

There is a requirement for any buildings to be sited at least 500mm above the 1 in 100 year flood level. Fill over and above this stipulation will be placed, where required, for this development to provide the required site building classification and allow site soak wells to function. The fill will need to consist of clean free draining sand.

**Power**

A north-south high voltage (HV) aerial line runs within the eastern portion of the site adjacent to the Preston River and has two spur lines near the central-eastern part of lot 81. One of the spur lines heads east over the Preston River and one that heads west to service the existing “dirt bike” track on the west side of Southwestern Highway. Underground HV cables run along the western portion of Bunbury Outer Ring Rd (where it abuts lot 80) and another short length runs along the west side of SW Hwy heading towards the airport. These underground cables are feed from two HV switchgear units on the north side of the Outer Ring Rd - one close to the NE corner of the SW Hwy/Outer Ring Rd intersection & another roughly mid-way between this intersection & the Preston River.
All internal power reticulation lines and transformer installations (& under-grounding / relocation of any existing infrastructure) will be completed at the cost of the developer – including the upgrading (as necessary) of any existing HV switchgear units and the maintenance of supply to all existing / surrounding properties.

The subdivision would best be serviced by a transformer at each lot - servicing to at least a WP minimum servicing requirement of 200kVA/ha. The location of each transformer site will be determined at the detailed subdivision design stage.

**Water Supply**

At present there is a 100mm water main along Southwestern Highway which appears to be a dedicated main serving the Bunbury Regional prison. This main is located on the southern verge of Southwestern Highway according to the plan supplied by Aqwest.

It is therefore proposed that a new 150mm water main be extended along Southwestern Highway to the development from Halifax Drive, some 1.5Km west of the site.

Water services are controlled by the Aqwest (Bunbury Water Board), and all design and construction will be to their approval. It is anticipated that a hydraulic study will be required at the cost of the developer to determine the specific requirements of supply of potable and fire-fighting water, street hydrants etc.

**Sewer**

The site is not currently connected to sewer. Water Corporation sewer infrastructure exists some 2 km west of the site at Dodson Road. Water Corporation sewer planning for this area shows a future main Type 90 Waste Water Pumping Station (WWPS Bunbury “G”) to be located north of the Preston River.

No planning or funding has been planned at this stage.

It is also advised that a temporary WWPS will not be approved, and that it would not be workable due to the 2km pumping distance in a small main, leading to problems with stale or septic discharge, paucity of flow needing topping up with scheme water for hydraulic reasons.

Therefore it is obvious that site disposal of wastewater should be effected by the use of ATU’s for each site sized to suit.

Discharge from ATU’s should be as per Health Department regulations, at least 100 metres from the Preston River, and at least 2 metres above the groundwater/ clay level.

This may require filling with suitable granular material (sand with a PRI greater than 10) for lots north of the subdivision road, and locations along the southern boundaries of the lots south of the subdivisional road where the land is higher and depth to clay is suitable.

**Telephone & NBN**

Telstra services exist in the area along Southwester Highway adjacent to the site. Some upgrading/ augmentation will be involved. If Telstra is to be the servicing authority, Telstra normally requires twelve months’ notice of the commencement of the development starting in order to ascertain any upgrading requirements.

NBN services are not available.

**Gas**

ATCO has advised that a 160mm diameter high pressure gas main is located along the southern verge of Southwestern Highway.