

PLANS AND DOCUMENTS
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Engineering Report

Woodlands Andergrove – Stages 4 & 5

August, 2011

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APPENDIX A

Figures

- Figure M00029-CSK001 – Overall Layout Plan
- Figure M00029-CSK002 – Layout Plan
- Figure M00029-CSK003 – Typical Road Cross Sections
- Figure M00029-CSK004 – Earthworks Layout Plan

Figure M00021-CSK005 – Bulk Earthworks Sections

Figure M00021-CSK006 – Stormwater Drainage Layout & Catchment Plan

Figure M00021-CSK007 – Water Reticulation Layout Plan

Figure M00021-CSK008 – Sewer Reticulation Layout Plan

DOCUMENT CONTROL SHEET

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Previous versions of this document are superseded by the most recent revision.

1. Introduction

This Engineering Report is in support of a development application to create Stages 4 and 5 of the ULDA's Woodlands Andergrove development project. The report provides engineering concept design information for internal and external infrastructure provisions such as roads and streets, stormwater drainage and water quality infrastructure, water reticulation, and sewer reticulation. This report does not discuss the provision of power and telecommunications utility services, but does provide a conceptual design identifying where such services should be located within the street network in context with other underground services.

Stage 4 will provide 22 residential lots adjoining the southern boundary of Stage 3. Stage 5 will provide 22 residential lots adjoining the southern boundary of Stage 4 but in 2 stages discussed further in this report.

2. Site Location

The Andergrove UDA measures some 22 hectares and is located at 271 Bedford Road, Andergrove, Mackay. The site is described as Lots 1 & 5 on SP237606 and Lots 503 & 504 on SP192790. **Figure 1** identifies the site location and environs. Only a part of the total site will be developed to provide housing.

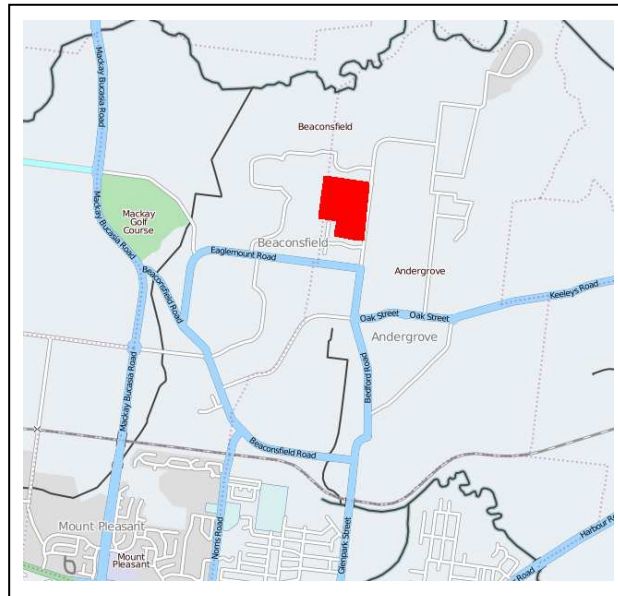


Figure 1 - UDA Andergrove – Site Location

StreetMap © Nearmap

Stages 1A and 1B are presently under construction to provide residential allotments. Stages 2 & 3 DAs have been approved to also provide residential allotments.

The existing land use of the overall UDA is mixed. The south-east corner of the site is currently used as the Mackay Regional Council Works Depot. It is intended that this Depot will be demolished in 2011 when new facilities at Paget are established and staff and equipment are relocated.

The north-east corner of the site is mostly used for periodic grazing and animal management. Remnants of old cattle yards and an old dog pound remain on site.

The western part of the site is a mixture of disturbed and undisturbed native forest. The major disturbance exists about a man made stormwater channel in the south and south-west, and clearing to the north of existing residential land adjoining the southern boundary of the development site.

Stage 4 encompasses the northern part of the Depot and the majority of the Depot car park.

Stage 5 encompasses the approximate middle part of the Depot.

Figure No M00029-CSK001 identifies these stages in context with previous stage development approvals and future stages.

3. Site Characteristics and Existing Infrastructure

3.1. Existing Land Form

The existing landform of the whole of the UDA Andergrove site has been described in previous reports. The site has an existing ridge running from north to south dividing the site into two separate catchments; one draining east and the other west. A large open drain is located in the natural gully on the western side of the site, while the eastern side falls to an open drain along Bedford Road. Site levels range approximately from RL 10m AHD to RL 4m AHD.

3.2. Road & Pedestrian Infrastructure

The UDA Andergrove development area is adjoined by existing residential development on the eastern northern and southern boundaries. On the western there exists remnant bush land with some wetland characteristics. This bushland in Lot 1 is being preserved as bushland. External road access is via Bedford Road extending along the full eastern frontage of the site. Bedford Road is classed as a Major Collector under the Mackay Regional Council Road Hierarchy Policy. Stage 1 and Stage 3 is and will be developing the road profile to a Major Collector formation with urban profile on the eastern side and rural profile on the western side. Adjoining Stages 4 and 5 the road profile is urban on the eastern side of the centreline and rural on the western (proposed development) side.

A concrete pathway catering for pedestrian and cyclist traffic will extend along Bedford Road to the northern boundary of Stage 4 as a result of the Stages 1 and 3 developments. The presence of the depot prevents the extension of the pathway further south. It extends west from Bedford Road at the Fernleigh Avenue intersection through to the north-west corner of the development land. As a result of the Stages 1 and 3 developments a north-south minor collector road will extend to the north-west corner of the Stage 4 development. The road formation also includes a pedestrian pathway.

3.3. Stormwater Drainage

Existing stormwater infrastructure within the Stages 4 and 5 development area is minor only and caters for car park drainage and drainage within the Depot area. This drainage generally directs stormwater to the existing drain in the bushland to the west of the Depot. This drainage will not be retained.

3.4. Water Supply

A trunk 300mm dia main extends for the full frontage of the UDA land. This main is not impacted on nor is it relied upon by the Stages 4 & 5 development. An old 150mm dia AC water main also extends along the frontage. This main is being replaced by the development infrastructure. Stage 1 will have extended the new 150mm dia main along the majority of the Stage 4 frontage. Stage 3 will have extended a 150mm to the north-west corner of Stage 4.

3.5. Sewerage Reticulation

Existing gravity sewer mains exist within the Stages 4 and 5 development site. These mains are not relied upon for the proposed development. The existing sewer within Stage 4 will be taken up and disposed of as part of the Depot demolition project.

An existing gravity sewer main along the Bedford Road frontage provides connections points for the Stages 4 and 5 developments.

3.6. Utility Services

Telstra and Ergon services extend along the Bedford Road frontage.

4. Proposed Infrastructure – Stage 4

4.1. Development Plan

Figure M000029-CSK002 in **Appendix A** shows the proposed plan of development for Stage 4. For ease of reference, the figure descriptor **M00029-** will not be mentioned further in this report dialogue when identifying conceptual design figures located within **Appendix A** of this report.

4.2. Bulk Earthworks

Figures CSK004 and **CSK005** in **Appendix A** identify the changes to the existing landform required to create Stage 4. **Figure CSK004** contains both existing and proposed development contours, and identifies areas of proposed cut and fill. Relative cut and fill depths and boundary interface designs are shown on **Figure CSK005**.

4.3. Roadworks

4.3.1. Internal Works

Figures CSK002 and **CSK003** describe the internal road network and profiles. Proposed road reserve widths and pavement formations are derived from Mackay Regional Council standards and Residential 30 Guidelines.

- **Road No 2** is the extension of the north-south minor collector from Stage 3. This road comprises a 7.5m carriageway, a 5.0m eastern urban verge profile, and a 4.5m western rural verge profile, all within a 17.0m road reserve. The western verge will contain a verge drain carrying surface and surcharge discharge to the south.
- **Road No 7** is a designated Access Place profile off Road No 2.
- **Road No 9** is a designated Access Place connecting Stages 4 and 5 and Roads 7 and 8.
- **Laneway 6** is extended from Stage 3 and connects to Road No 7.
- **Laneway 7** is effectively an off-street public car park and access aisle.

Pedestrian pathways are located as follows:

- Eastern side of Road 2.
- Northern side of Road 7.
- Eastern side of Road 9.
- Pedestrian access is also available via the carriageway of Laneway 7 connecting to the Bedford Road pathway.
- The Bedford Road pathway is a combined walkway and cycleway.

4.3.2. External Works

No external works are proposed for Stage 4.

4.4. Stormwater Drainage Internal & External

Figure CSK006 in **Appendix A** identifies a conceptual stormwater drainage network proposed to service Stage 4 together with proposed sub-catchments. The proposed network and sub-catchments

have been determined in conjunction with the proposed landform so as to be consistent with the drainage strategy in the WRM Stormwater Management Plan for the overall development.

Drainage design parameters to be adopted will be:

- Minor Flow Design - the underground drainage system capacity will cater for the ARI 5 year event
- Major Flow Design - the combined underground drainage system and surcharge flow paths will cater for the ARI 100 year event.

Underground stormwater drainage connections to Bedford Road are minimised. Extensive connections to suit the required WRM catchment modifications are not possible as these are constrained by the reconstructed drainage under Bedford Road constructed under Stage 1. Drainage from Stage 4 to the east can only effectively comprise surface flows that will traverse the Bedford Road western verge drain and enter the southern bio-retention basin at the main development intersection constructed under Stage 1.

The underground drainage system for Stage 4 is directed to the west extending under Road No 2 and then is directed south to outlet into the new wetland detention basin to be developed under Stage 3 once the Depot is moved.

4.5. Water Supply

As shown in **Figure No CSK007** in **Appendix A** the proposed development will be serviced by the extension of the reticulation provided under Stage 3. A loop main will extend from the existing Road No 2 water main constructed under Stage 3.

4.6. Sewerage Reticulation

Figure CSK008 in **Appendix A** provides a conceptual design for the sewer reticulation required to service Stage 4. Reticulation provided for Stage 4 will be extended to service all proposed lots from the existing sewer extending along the Bedford Road frontage.

4.7. Utility Services

Others will provide advice on the requirements to service this development. Services will be extended from the networks established by Ergon and NBN Co under Stages 1 and 3.

5. Proposed Infrastructure – Stage 5

5.1. Development Plan

Figure M000029-CSK002 in **Appendix A** shows the proposed plan of development for Stage 5. The plan shows Stage 5 being developed in 2 stages as follows:

- Stage 5A – Lots 100 to 112 including associated roads and necessary infrastructure.
- Stage 5B – Lots 113 to 121.

Development of Stage 5B may be deferred depending upon the requirements for lifting the EMR. Design and infrastructure construction however cannot exclude development of the Stage 5B lots. It is likely they will be developed but survey plans deferred until the land is off the EMR.

5.2. Bulk Earthworks

Figures CSK004 and **CSK005** in **Appendix A** identify the changes to the existing landform required to create Stage 5. **Figure CSK004** contains both existing and proposed development contours, and identifies areas of proposed cut and fill. Relative cut and fill depths and boundary interface designs are shown on **Figure CSK005**.

5.3. Roadworks

5.3.1. Internal Works

Figures CSK002 and **CSK003** describe the internal road network and profiles. Proposed road reserve widths and pavement formations are derived from Mackay Regional Council standards and Residential 30 Guidelines.

- **Road No 2** is the extension of the north-south minor collector from Stage 4. This road comprises a 7.5m carriageway, a 5.0m eastern urban verge profile, and a 4.5m western rural verge profile, all within a 17.0m road reserve. The western verge will contain a verge drain carrying surface and surcharge discharge to the south.
- **Road No 8** is a designated Access Place profile off Road No 2.
- **Road No 9** is a designated Access Place connecting Stages 4 and 5 and Roads 7 and 8.
- **Laneway 8** is effectively an off-street public car park and access aisle.
- **Laneway 9** is a small section of laneway extending south from the eastern end of Road No 8 and will provide access to lots within proposed Stage 6.

Pedestrian pathways are located as follows:

- Eastern side of Road 2.
- Northern side of Road 8.
- Eastern side of Road 9.
- Pedestrian access is also available via the carriageway of Laneway 8 connecting to the Bedford Road pathway.
- The Bedford Road pathway is a combined walkway and cycleway.

5.3.2. External Works

No external works are proposed for Stage 5.

5.4. Stormwater Drainage Internal & External

Figure CSK006 in **Appendix A** identifies a conceptual stormwater drainage network proposed to service Stage 5 together with proposed sub-catchments. The proposed network and sub-catchments have been determined in conjunction with the proposed landform so as to be consistent with the drainage strategy in the WRM Stormwater Management Plan for the overall development.

Drainage design parameters to be adopted will be:

- Minor Flow Design - the underground drainage system capacity will cater for the ARI 5 year event
- Major Flow Design - the combined underground drainage system and surcharge flow paths will cater for the ARI 100 year event.

Underground stormwater drainage connections to Bedford Road are also minimised. Extensive connections to suit the required WRM catchment modifications are not possible as these are constrained by the reconstructed drainage under Bedford Road constructed under Stage 1. Drainage from Stage 5 to the east can only effectively comprise surface flows that will traverse the Bedford Road western verge drain and enter the southern bio-retention basin at the main development intersection constructed under Stage 1.

The underground drainage system for Stage 5 is directed to the west extending under Road No 2 and then is directed south to outlet into the new wetland detention basin to be developed under Stage 3 once the Depot is moved.

5.5. Water Supply

As shown in **Figure No CSK007** in **Appendix A** the proposed development will be serviced by the extension of the reticulation provided under Stages 3 and 4. A main will extend from the Road No 2 and Road No 9 water mains constructed under Stage 4 closing the loop.

5.6. Sewerage Reticulation

Figure CSK008 in **Appendix A** provides a conceptual design for the sewer reticulation required to service Stage 5. Reticulation provided for Stage 45 will be extended to service all proposed lots from the existing sewer extending along the Bedford Road frontage.

5.7. Utility Services

Others will provide advice on the requirements to service this development. Services will be extended from the networks established by Ergon and NBN Co under Stage 4.

6. Conclusion

Stages 4 & 5 of the UDA at Bedford Road, Andergrove, Mackay will be developed following Stage 3. Stage 5 will be undertaken in 2 stages reflecting the requirements for EMR clearance. These stages can only proceed upon completion of the Mackay Regional Council depot relocation project.

Civil engineering infrastructure can be established to create Stages 4 and 5 without detriment.

Appendix A

Concept Civil Infrastructure Drawings

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