

Preferred Project Report (Revised) for

Major Project Application No. MP09-0166 for Altitude Aspire, Terranora

Submitted to
Newland Developers Pty Ltd
April 2013

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Major Project Application No. MP09-0166

Director General's Environmental Assessment Requirements

DOCUMENT CONTROL RECORD

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Report Details:

Title:	Revised Preferred Project Report
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Status:	Issue 1 – Revised PPR
Client:	Newland Developers Pty Ltd
Application No:	09_0166
Synopsis:	This Preferred Project Report (PPR) addresses the issues the Department of Planning (DoP) and Tweed Shire Council (TSC) have identified as requiring resolution, confirmation and/or clarification from the original Preferred Project Report (PPR) for a proposed development designated as 'Altitude Aspire' which forms part of the overall proposed development of land identified in TSC's Residential Development Strategy as 'Area E', located at Terranora NSW. The submissions made to the DoP during exhibition of the Environmental Assessment (EA) of the proposed 'Altitude Aspire' development with consideration to TSC Development Control Plan DCP B24, and the engineering criteria listed in A5 of the Tweed DCP have been specifically addressed within the report. The Revised PPR continues to establish the basis on which the development may be serviced with the relevant Civil Engineering infrastructure and defines the design procedure to be incorporated in general compliance of the Director General's EA requirements.

Attachment 1 Director General's Environmental Assessment Requirements (DGR) Section 75F of the Environmental Planning and Assessment Act 1979
Application Number
09_0166
Project
A residential subdivision (with 310 dwellings) at the southern end of Fraser Drive, Terranora (known as Altitude Aspire), and provision of infrastructure and dedication of open space areas. Key elements of the project include: • opening and construction of all proposed roads; • construction of a temporary intersection to Fraser Drive; • provision of underground services (water, sewer, stormwater, power and telephone); • bulk earthworks to establish final landforms.
Location
Lot 1 DP 304649, Lot 1 DP 175235, Lot 1 DP 781687, Lot 2 DP 778727, Lot 1 DP 781697, Lot 1 DP 169490, and Lots 40 and 43 DP 254416 at the southern end of Fraser Drive, Terranora, Tweed LGA
Proponent
Newland Developers Pty Ltd

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Executive Summary

Bradlees Civil Consulting has been commissioned by Newland Developers Pty Ltd to prepare a revised Preferred Project Report (PPR) for the proposed 'Altitude Aspire' development in Area E, Terranora in response to further advice from the Department of Planning and Tweed Shire Council subsequent to their review of the draft PPR submitted in April 2012.

The revised PPR considers these additional comments, submissions made by the Department of Planning, Tweed Shire Council and various State Agencies during the exhibition of the Environmental Assessment (EA) for the Part 3a Project Application, as well as the new TSC Development Control Plan (DCP) B24 adopted December 2011.

The report also updates and amends the previous response to the Department of Planning (NSW) Director General's Environmental Requirements (DGR) in May 2010 for the Civil Engineering component of the development and additional detail provided to the department in November 2010, (subsequent to their 'test of adequacy' response to this original submission).

The following tables summarise the submissions relevant to the Civil Engineering components of the report, provides a brief response and reference to the relevant section within the report that the item has been revised or addressed in more detail.

Project Element	Agency	Submission Item	Response	Reference in this report
Broadwater Parkway	DoP	Road alignment inconsistent with LEP. The alignment shown in DCP Section B24 is the preferred alignment.	Concept alignment complies with TSC DCP Section B24	Appendix 3- Road Hierarchy Plan
		Alignment must be consistent with whole of Area E.		
		Justification of preferred route is required.		
		Layout design must consider this road may never be constructed (due to local area contributions and land acquisitions).	Addressed with road hierarchy and development staging.	Appendix 1 & 3 Also refer to details within Bitzio's Consulting's (Traffic Engineers) Revised Transport for Preferred Project Report (PPR)
	Department of Climate Change and Water	A 50m vegetated buffer free of all infrastructure is recommended to protect the SEPP14 Wetland, Freshwater Wetland and Floodplain Rainforest EEC from modification and stormwater runoff.	Concept alignment provides 50m buffer as shown on Aerial Photo and Broadwater Parkway Proposed Alignment	Appendix 1 & 3

Project Element	Agency	Submission Item	Response	Reference in this report
Broadwater Parkway (cont.)	TSC	The current DCP alignment contains the road infrastructure within the urban zone, providing reduced environmental impacts.	Concept alignment has been revised to comply with TSC DCP Section B24	Section 2.1
		The Part 3A application alignment for Broadwater Parkway is not considered to be a desirable outcome due to environmental and topographic constraints.		
'Temporary' Fraser Drive Connection	DoP	Alternative access to Fraser Drive (than Broadwater Parkway) must be provided in accordance with TSCs requirements.	Access has been provided.	Section 2.2 & Appendix 1, 3 & 4
	TSC	Road and traffic objectives for the development must assume the Broadwater Parkway may not be constructed and the 'temporary' access must be considered as a permanent access and the road corridor is to be to the standards required by TSC DCP – A5.	Internal road hierarchy complies with the TSC DCP A5 should the Broadwater Parkway not be constructed. The 'temporary' access complies with DCP -A5.	Section 2.2 & Appendix 3 & 4
		The design of the internal T-intersection, where the connection road from Fraser Drive meets the main internal road in Stage 4 requires either: 1. A priority route realignment to minimise potential vehicle collision, or 2. A roundabout at the intersection of the connection road from Fraser Drive and the main internal road in Stage 4	The intersection of Road 1 and Road 3 has been revised to provide priority to vehicles travelling on Road 1	Section 2.2 & Appendix 3
	Roads and Traffic Authority	It is suggested that roundabout control be considered for the 'temporary' connection to Fraser Drive to reduce the extent of impact on existing properties opposite this intersection.	Intersection has been revised and remains a priority 'T' based on advice from Traffic Engineers	Section 2.2 & Appendix 4

Project Element	Agency	Submission Item	Response	Reference in this report
Traffic	DoP	Roads to be dedicated to Council must satisfy Council's specifications, except where Council has accepted a variation to those standards.	TSC minimum standards have been met or exceeded. Road 13 has been amended to 13.0m wide road with 6.0m carriageway.	Section 3 – DGR 2.6 & Appendix 3 – Road Hierarchy Plan Section 2.3
	TSC	<i>Internal and external connectivity</i> A second road connection stub to the north-east (from Road 5B) should be provided to adequately cater for appropriate development potential of adjoining lots.	Single connection is considered appropriate due to topographical constraints and future layout of adjacent subdivision.	Section 2.3
		Road 10 and 11 should be relocated to the west. Council encourages an extension to Parkes Lane that prolongates the existing road direction and generally follows the ridge line at the property boundary or a second road connection stub to the west (from Road 11).	Roads have been relocated to property boundary. These roads are now Road 10 & 12	Appendix 1 & 3 – Proposed Subdivision Plan and Road Hierarchy Plan
		A permanent pathway link from Road 5A to Fraser Drive, near to the Glen Ayr Drive intersection – somewhere in the NE area of Stage 1 is considered desirable.	Layout has been revised to include pedestrian pathway link.	Section 2.3 & Appendix 1 & 3 – Proposed Subdivision Plan and Road Hierarchy Plan
		<i>Road gradient</i> Road gradients are illegible and cannot be verified whether compliant or not. Plans with improved clarity are required prior to further comment being made in this regard.	Plans have been amended.	Appendix 3
		All proposed allotments on grades greater than 15% should be required to demonstrate that practical vehicular access from a constructed street from both cut and fill sides can be provided.	Complies	Section 3 – DGR 2.5

Project Element	Agency	Submission Item	Response	Reference in this report
Traffic (cont.)	TSC (cont.)	<i>Road Widths</i> The Transport Assessment Report by Bitzios must be compatible with the Preliminary Engineering Report by Bradlees regarding Neighbourhood Connector road width nominations.	Reports have been amended as necessary.	N/A
		Road 10 is nominated as a Neighbourhood Connector and should have an 11m carriageway.	Internal road layout has been amended and complies with TSC requirements	Appendix 3- Road Layout Plans
		The carriageway of Road 2 should be altered to 9m for the initial section coming off the existing end of Market Parade, to align with the existing carriageway width – and only to the intersection with Road 3.		
		All other roads, excluding Broadwater Parkway, are shown as having 7m carriageways, which is not compliant with Council's Standard Access Street width of 7.5m and should be widened accordingly.		
		Council requests all lots between Roads 2 and 5B be deleted and reduce fill within the gully line.	Lots have been deleted from this area.	Appendix 1 – Proposed Subdivision Plan
		The department does not support location of artificial wetland on existing natural wetland areas. An alternative site upstream of proposed location, or an alternative method for stormwater treatment must be provided.	Bio-retention basins now proposed – these basins will be sited on the upstream side of the Broadwater Parkway.	Section 3 – DGR 4.1 (c) & Appendix 6 – Stormwater Layout Plan
Stormwater	TSC	Stormwater catchments size must be consistent between SWMP and Engineering report.	Noted	N/A

Project Element	Agency	Submission Item	Response	Reference in this report
Stormwater (cont.)	TSC (cont.)	Maintenance access to the wetlands is via Broadwater Parkways, and alternative measures are required until this road is constructed.	No longer applicable as wetland has been removed.	N/A
		Provide major system flow paths from the street system to the central watercourse.	The Contours Plan and Road Long and Cross Section Plans show flow paths have been provided.	Section 2.4 & Appendix 3,5 & 6 – Earthworks Layout Plan Stormwater Layout Plan, Road Layout Plan and Road Long Sections
		Consider external stormwater catchment from Fraser Drive, noting there is a 3m high retaining wall proposed along this boundary;	Stormwater connections provided for external catchment	Section 2.4 & Appendix 5 & 6 – Earthworks Layout & Stormwater Layout Plan
		Consider inter-allotment drainage (IAD) along the western boundary, to control stormwater discharge to private land (Lot 1 DP 175234);	Roads now 'straddle' lot boundary - IAD is not required.	Section 2.4 & Appendix 3 – Road Layout Plan
		Provisions for (IAD) lines in general, have not been satisfactorily addressed. The generally narrow lots do not make appropriate allowance for future building areas (within the lots) where easements alongside boundaries will be required - for both IAD and sewer provisioning.	Layout and IAD has been revised and lot sizes revised to ensure adequate provision for IAD.	Section 2.4 & Appendix 6 – Stormwater Layout Plan
		Sag points in all roads will require provision of relief overland flow paths. Clarity of the submitted plans is insufficient to depict chainages at critical points to assess this issue.	Refer to revised drawings.	Section 2.4 & Appendix 3 – Road Layout Plan and Road Long Sections
		Water Sensitive Urban Design is not considered an appropriate design consideration for most of the site, due to gradients generally exceeding 5%; however the proposed Broadwater Parkway is an ideal thoroughfare where WSUD can be implemented.	Noted. Kerb and channel proposed for Broadwater Parkway	Appendix 3 – Road Layout Plan and Road Cross Sections

Project Element	Agency	Submission Item	Response	Reference in this report
Landforming	DoP	Investigate the use of stepped built form as opposed to traditional slab on ground. Reduce road constructed perpendicular to the dominant slope.	Development includes a mix of lot types on flat, moderate, steep and extreme slopes.	Section 2.5
		The layout is inconsistent with the DCP in regards to filling which specifies no more than 5m of filling over no more than 10% of the site (or 15% if demonstrated it is required to minimise adverse effects on the environment	Revised layout complies with DCP A5 - D6.05.3	Section 3 – DGR 7.1 & Appendix 5 – Earthworks Phasing Plan
		Produce a DTM of the finished subdivision landform, with particular attention on how the proposed landform relates to neighbouring properties and detailed justification on any departures from current policy.	Impact on neighbouring properties has been minimised.	Section 2.5, Section 4 – A5.4.5 & Appendix 5 – Earthworks Sections Layout and Earthworks Cross Sections
		Provide typical detail of 3m high retaining walls at Fraser Drive and south lots abutting Parkes Lane and wether fencing is likely to be used in those locations.	Retaining walls have been removed.	Appendix 5 – Earthworks Layout Plan
		Provide typical detail of retaining wall between lots (1.2 – 1.8m high).	Refer to plan.	Appendix 5 – Earthworks Cross Sections
		Focus should be given to the impacts of walls on stormwater flow.	Stormwater flow has been addressed.	Section 2.5, Appendix 5 – Earthworks Cross Sections & Appendix 7 – Retaining Wall Layout Plan
		Individual retaining wall design needs to be considered early including appropriate measures for drainage, piercing to bedrock, diverting water from infiltrating, and retaining or encouraging vegetation.	Retaining walls will be engineered with full consideration of site conditions, including provision of adequate surface and subsurface drainage.	Section 2.5
		Identify suitable machinery required to undertake earthworks noting the extent of cut/fill earthworks and as Morrisons have identified traction difficulties posed with clayey soil type and larger machines as well as the buried volcanic boulders	Standard earthworks machinery will be selected to address site conditions.	N/A
	TSC	This does not comply with Council's Development Design Specification D6 – Site Regrading, which restricts cut/fill depths > 5m to 10% of the site by area.	Revised layout complies with DCP A5 - D6.05.3	Section 3 – DGR 7.1 & Appendix 5 – Earthworks Phasing Plan

Project Element	Agency	Submission Item	Response	Reference in this report
Landforming (cont.)	TSC (Cont.)	The majority of this deep fill proposed in the existing watercourse (up to 13.5. deep), raises concerns about future flood risk and conveyance function of this watercourse in the post development scenario. Various clauses in both DCP-A5 Subdivision Manual and D6, aim to incorporate and preserve watercourses in the urban form. The proposal to fill the watercourse to reduce allotment grades elsewhere in the subdivision and to create new allotments on this fill within the watercourse is contrary to these clauses.	All lots have been removed from within the gully.	Appendix 1 - Proposed Subdivision Plan
		Further earthworks are proposed to reduce lot gradients to 5-15%. A network of inter-allotment retaining walls and batters is proposed, across the majority of lots, ranging from 1.2m – 1.8m in height. This does not comply with D6, which restricts inter-allotment retaining walls to a maximum height of 1.2m, and only in cases where the lot gradient will not be reduced below 10%.	Retaining walls are required in providing mix of allotment types.	Section 2.5, Section 4 – A5.4.5
		Perimeter retaining walls up to 3m high are proposed along the eastern boundary along Fraser Drive and the south-western boundary adjacent to Market Parade.	Earthworks have been revised removing retaining walls at this location.	Appendix 5 – Earthworks Layout Plan and Earthworks Sections
		2 x 3m high tiered walls are also proposed along the south-eastern boundary adjacent to residential lots off Parkes Lane. This does not comply with D6, which restricts perimeter subdivision walls to a maximum height of 1.2m.	Earthworks have been revised removing retaining walls at this location.	Appendix 5 – Earthworks Layout Plan and Earthworks Sections
		Councils' adopted policy is that subdivisions should be designed to fit the topography rather than altering the topography to fit the subdivision. The report does not provide any specific justification for (above) departures from Council's standards, and as such, variations are not supported	Development includes a mix of lot types on flat, moderate, steep and extreme slopes.	Section 2.5

Project Element	Agency	Submission Item	Response	Reference in this report
Water	TSC	A Water Supply Strategy is required to be developed in conjunction with and approved by Council to finalise connection to the Tweed District Water Supply. Alternatively, the proposal implements the essential water infrastructure as detailed within the DCP for Area E, when finalised.	An extensive period of consultation has already occurred with TSC. The proposed strategy is based on this consultation and the strategies outlined within DCP B24.	Section 2.6, Section 3 - DGR 4.1, 4.2 & 9.1.
		The proposal gives no guarantee that the LES detailed service reservoir, pump station and associated pumping and distribution mains will actually be built at any stage in the future nor does it provide any financial contribution towards the construction of these assets.	The construction of the LES service reservoir, pump station and distribution mains is not proposed for the development of Altitude Aspire.	Section 2.6 & Section3 DGR 4.1
		It is now established that there is no spare capacity within the water network in the vicinity of Fraser Drive.	Noted	
		The Water Unit will not agree to the proposed interim connection to the 600dia trunk main and a service reservoir is to be provided to service the entire development.	Revised strategy includes new service reservoir adjacent existing Chambers Reservoir	Section 2.6

Project Element	Agency	Submission Item	Response	Reference in this report
Sewer	TSC	Whilst sewerage is available for this proposal with connection at the Banora Point Wastewater Treatment Plant, large portions of existing transport infrastructure will require upgrading as a result.	Upgrades to infrastructure to be via s64 contributions.	Section 2.7 & Section 3 - DGR 4.1
		A sewerage strategy is required to be developed in conjunction with and approved by Council to identify the scope of improvement works, the provision of separate lots for the proposed sewerage pump station/s and finalise connection to Banora Point Wastewater Treatment Plant.	The proposed strategy is based on previous extensive consultation with TSC and the strategies outlined within DCP B24.	Section 2.7 & Section 3 - DGR 4.2
		Alternatively, the development could be developed as part of the broader Area E scheme that provides a regional pump station and associated mains to service the whole of Area E	Strategy considers broader Area E.	Section 2.7 & Section 3 - DGR 4.1 & 4.2
		It should also be noted that Council requires sewerage pump stations to be located in separate lots to be transferred to Council in fee simple, rather than the pump stations being located on road reserve, park land or other reserves.	Indicative location of the Regional Sewerage Pump Station is shown on Sewer Layout Plan. The exact location of this pump station and creation of appropriate separate lot can occur subsequent to detailed sewer design.	Section 2.7 & Appendix 8
		Detailed justification is required where construction of two (2) SPS's within the development is proposed.	A single 'regional' pump station is proposed.	N/A

1.0 Introduction

1.1 Background Information

Bradlees Civil Consulting were commissioned by Newland Developers Pty Ltd to prepare a response to Department of Planning (NSW) Director Generals Environmental Assessment Requirements (DGR) as required for the proposed development of land designated as Area E in the Tweed Shire's Residential Development Strategy.

Our original report dated May 2010, responded to the DGR specifically in regards to the civil works component of the development which incorporated the proposed earthworks, roadworks and services infrastructure for the Site.

In November 2010 the report was revised to address additional detail requested by the Department of Planning (DoP) subsequent to their "test of adequacy" of the Environmental Assessment (EA) submitted by the Proponent in May 2010.

A Preferred Project Report (PPR) was then prepared to address submissions made to the DoP by Tweed Shire Council (TSC) and other State agencies during exhibition of the EA for the proposed development with consideration to the TSC DCP B24.

This report is a revision of the PPR following its review and further comments made by the DoP and TSC.

Details in this Revised PPR has been prepared in consultation with TSC, the relevant statutory authorities and specialised consultants together with reports and documentation as follows:

- *Banora Point Sewerage Strategy Study – Vol.1 Study Report (Sept 1999)*; by Tweed Shire Council,
- *Tweed Area E Local Environmental Study (March 2004)*; by Parsons Brinckerhoff Aust Pty Ltd
- *The Tweed Shire Council Development Design Specifications D1 (v1.3), D5 (v1.2), D6 (v1.3), D9 (v1.2), D11 (v1.4), D12(v1.6) and D13 (v1.6)*
- *Tweed Shire Development Control Plan – Section A5 v1.1.1 (August 2008)*
- *Traffic Noise Assessment 'Altitude 1' Residential Subdivision, Fraser Dr, Terranora - Acoustic Report (February 2012)*; by TTM Consulting Pty Ltd.
- *Broad Geotechnical Assessment for Residential Subdivision – Altitude 1 Development, Fraser Drive. (February 2010)*; by Morrison Geotechnic Pty Ltd
- *Altitude Aspire Revised Transport Assessment for Preferred Project Report (PPR) (February 2013)*; by Bitzios Consulting.
- *Stormwater Assessment and Management Plan, Altitude Aspire, Terranora Road, Terranora, New South Wales (April 2013)*; by Gilbert and Sutherland.
- *Hydrologic and Hydraulic Assessment, Altitude Aspire, Terranora Road, Terranora, New South Wales (April 2013)*; by Gilbert and Sutherland.

Specific regard has been given to the recently adopted *Tweed Shire Development Control Plan – Section B24 – Area E (December 2011)*.

In addition to the above, the following key elements of the subdivision layout design were established as a result of several workshop meetings with the project consulting design team and TSC.

These key elements underpin the basis of the subdivision layout design as follows:

- a) TSC requirement that all access be provided via the proposed Collector Rd, Broadwater Parkway located to the north of the site.
- b) A 'temporary' access to the development from Fraser Drive is to be constructed and maintained until the construction of the Broadwater Parkway. This development layout is designed with the possibility the Broadwater Parkway may never be constructed.
- c) As a consequence of (a) above, all internal roads to the subdivision will ultimately access the site, from the lowest areas of the site.
- d) As a result of (a) and (c) above, to access the higher areas of the site, in particular the south-east areas, and provide connectivity throughout the subdivision, access across the existing gully is necessary.
- e) The subdivision layout design has adopted TSC's, "new urbanism" principles for connectivity throughout the development.
- f) The maximum road grade provided for Access Streets is 16% and Neighbourhood Connector Roads is 12% in accordance with TSC requirements. The majority of road grades are 12% or less.
- g) In accordance with good engineering practice, balance earthworks for the site and avoid the cost and traffic nuisance of importing fill material from off site along public roads.
- h) To provide a mix of lot grades and sizes to facilitate a variety of house design and residential product for marketing purposes in accordance with TSC DCP B24.
- i) The roads are aligned in an east/west direction which emphasises the north-south aspect for the allotments and maximises the visual aspect of the allotments with views towards the Terranora Broadwater.
- j) The primary (or long) streets of the subdivision follow the contours, whilst the secondary (or short) streets are perpendicular to the contour in accordance with TSC DCP B24.

1.2 Site – Area E: Altitude Aspire

The subject property is located at Fraser Drive Terranora, and is described as:

Lot 1 DP 304649, Lot 1 DP 175235, Lot 1 DP 781687, Lot 2 DP 778727, Lot 1 DP 781697, Lot 1 DP 169490, and Lots 40 and 43 DP 254416 at the southern end of Fraser Drive, Terranora, Tweed LGA .

The site has been designated as Area E in the Tweed Shire's Residential Development Strategy.

For the purpose of this report the subject Site is designated - 'Altitude Aspire', a section of the overall 'Area E' located to the north-eastern corner of 'Area E' with extensive frontage to Fraser Drive to the east and existing development at Parkes Lane to the South.

Appendix 1 includes the proposed Subdivision Plan 18779 B prepared by B & P Surveys Consulting Surveyors and the Existing Contours Plan.

1.3 Objectives of Report

The objective of this revised PPR is to address the issues the DoP and TSC have identified as requiring resolution, confirmation and/or clarification from the original PPR.

The submissions made to the DoP during exhibition of the Environmental Assessment (EA) of the proposed 'Altitude Aspire' development with consideration to TSC DCP B24, and the engineering criteria listed in A5 of the Tweed DCP have been specifically addressed within the report.

The report also updates details previously submitted to the DOP "test of adequacy" response for the EA and the engineering response to the original DGR in accordance with the following:

1. Review and evaluate the development with respect to existing and proposed ground levels, and strategies necessary to accommodate earthworks (including conceptual earthworks plans);
2. Review and evaluate the development with respect to roads (internal and external), access to the subject land and road/street criteria and standards;
3. Review and evaluate the development with respect to existing and proposed external infrastructure and strategies; (Water, Sewerage & Stormwater Drainage);
4. Prepare conceptual schematics for internal reticulation; (Water, Sewerage and Stormwater Drainage);
5. Review and evaluate the development with respect to stormwater drainage internal and external to the site, including flooding considerations and legal discharge.

2.0 Revised Preferred Project Report

This section responds to the issues raised in the submissions made to the DoP during exhibition of the EA for the proposed 'Altitude Aspire' development. These have been further revised subsequent to the review of the 'Draft' PPR by the DoP and TSC. The report also considers additional information provided to, and meetings that have taken place, with the DoP and TSC since that initial review.

Submissions were made by DoP, TSC and various State Agencies, as well as some submissions from local residents. The submissions submitted by TSC and the State agencies have been addressed in detail within this report.

Where the submission item has not been directly addressed in other sections of the report, by way of amendments due to changes subsequent to the EA, a detailed response has been provided in this section.

2.1 Broadwater Parkway

A preliminary concept design of the Broadwater Parkway has been provided that follows that outlined in Figure 2.9 (a) and (b) of the TSC DCP B24. The alignment provides a buffer to the SEPP 14 Wetland, Freshwater Wetland and Floodplain Rainforest Endangered Ecological Communities located within Area E.

It should be noted that although this concept design demonstrates that road construction is feasible from Fraser Drive to Mahers Lane, the actual location shown for this road is only applicable for the extent of the subject site.

Subsequent to advice from TSC (via email dated 8/2/2012 – Appendix 2) the footpath has been removed and the verge width reduced from 3.5m to 2.4m narrowing the overall road reserve width to 19.8m.

The construction of the Broadwater Parkway is in part included in the TSC Tweed Road Contribution Plan (TRCP) and the proponent will pay S94 contributions that will go toward this road construction. The remainder of Broadwater Parkway not covered by TRCP will be included in a VPA yet to be endorsed by Council.

Appendix 3 includes the following concept plans for the Broadwater Parkway:

- Road Hierarchy Plan;
- Broadwater Parkway Long Section Plan;
- Broadwater Parkway Cross Section Plan; and
- Broadwater Parkway Road Layout Plan.

Appendix 3 also includes Road Long Section Plans and Road Cross Section Plans for all proposed roads within the Altitude Aspire development.

The 'temporary' access off Fraser Drive will remain until the Broadwater Parkway has been constructed. Funding and timing of the Broadwater Parkway is dependent on S94 contributions across all of Area E (including Altitude Aspire), and as such, TSC do not expect this road to be constructed in the 'short' to 'medium' term.

In the event that the Broadwater Parkway is never constructed, the internal road hierarchy and development staging for Altitude Aspire ensures connectivity and linkage is maintained within the development. Access to the Site is provided off Parkes Lane and Market Parade. Bitzios Consulting have shown in their Revised Transport Assessment for Preferred Project Report (PPR) (February 2013), that the temporary access off Fraser Drive is sufficient for full development of Altitude Aspire, should the construction of the Broadwater Parkway not occur.

2.2 'Temporary' Fraser Drive Connection

A 'temporary' site access has been provided in the south east corner of the site off Fraser Drive (via Road 1). This road has been designed as a Neighbourhood Connector (as specified within the TSC DCP A5 – Subdivision Manual) to allow the Altitude Aspire development to proceed if the Broadwater Parkway is not constructed.

Road 1 provides access for the first four (4) stages of the development and has been designed as a Collector Street with sufficient width for a bus route (9 metre carriageway) and to provide priority over Road 3, Road 5 and other connecting roads for traffic travelling along this road.

The Fraser Drive temporary site access intersection (intersection of Road 1 and Fraser Drive) has been designed as a priority 'T' intersection in accordance with the recommendations of Bitzios Consulting (Traffic Engineers) Altitude Aspire Revised Transport Assessment for Preferred Project report (PPR) (February 2013), section 5.1.

Roundabout control of this temporary intersection was also given consideration, however, this option was not deemed feasible as it would require resumption of land from existing properties on the east of Fraser Drive. In addition, the disruption and cost of reinstating this section of Fraser Drive when permanent access is provided from Broadwater Parkway was not considered practicable.

The priority 'T' intersection will include acceleration and turning lanes with linemarking (including chevron markings) used to delineate allowable traffic movements. This outcome reflects the existing situation along Fraser Drive, where right-turn-in and -out movements to/from properties traversing a double unbroken line are currently tolerated.

A painted intersection will also reduce works to both construct and remove the 'temporary' intersection when required.

A preliminary Road 1 – Fraser Drive Intersection Layout has been provided in Appendix 4.

As stated previously, Bitzios Consulting have shown in their Revised Transport Assessment for Preferred Project Report (PPR) (February 2013), that the temporary access off Fraser Drive is sufficient for full development of Altitude Aspire, should the construction of the Broadwater Parkway not occur.

2.3 Traffic – Vehicles/Pedestrians/Bicycles

The revised road network will ensure internal and external connectivity through the Altitude Aspire site using road hierarchy and road alignments that will clearly guide drivers through the development and limit traffic volumes in line with TSC limits for each road category proposed.

The road layout provides integration with adjoining properties and facilitates improved connectivity and accessibility to existing and future development.

The following matrix read in conjunction with the Road Hierarchy Plan (Appendix 3) high-light this integration.

Adjacent Property / Road	Internal Road	Connection
Lot 1 DP175234	Road 12	Along length
Lot 1 DP175234	Road 10	Along length
Lot 1 DP 798632	Road 5	Future Road
Parkes Lane	Road 10	Existing stub
Market Parade	Road 9	New Intersection
Fraser Drive	Road 1 – ‘temporary’ site access	New Intersection
Broadwater Parkway	Road 2	Intersection

An additional stub to Lot 1 DP798634 is not considered feasible due to topographical constraints (steep slopes) in that area. In addition, a second stub may limit potential lot yield on this allotment due to the location of the proposed Broadwater Parkway and future possible land resumption.

Road 13 is to be a 13.0m wide road with a 6.0m carriageway. This is considered adequate as access from this road is likely to be limited to single access into Lot 925 (medium density site) and access to Lot 926 (medium density site) is available from Road 12.

Pedestrian connectivity has been provided between the Altitude Aspire development and Fraser Drive. A series of footpaths and bikeways ensure all lots have convenient pedestrian access to internal Open Space areas including local pedestrian access between Road 9 and Road 2.

The proposed layout of internal roads and their connection with existing and future developed areas encourages pedestrian and bicycle movement through Area E which would be further enhanced with the ultimate construction of the Broadwater Parkway.

2.4 Stormwater

Stormwater hydrology and water quality resulting from this development will be addressed utilising the existing central gully and a series of Bio-retention basins (Bio-basins) located within this gully. Refer to Gilbert and Sutherland Conceptual Stormwater Assessment and Management Plan for quantity and quality calculations.

An existing upstream catchment will be conveyed via a bypass channel through the central gully. This gully will ultimately require earthworks to limit stormwater velocities, provide sufficient areas and access for the bio-basins and to enable diversion of stormwater from existing upstream catchments away from the bio-basins. Earthworks in this gully have been limited to that required to facilitate stormwater quality treatment during civil, building and operational development phases for Phase 1, Phase 2 and finally Phase 3 earthworks areas. This ensures minimal and planned disturbance of the whole site. The central gully will essentially continue to function in its current capacity until Phase 3 Earthworks occurs.

A 'Bebo Arch' system is proposed to enable road connection between the east and west side of the development over the central gully. Appendix 6 shows detail and sections for the proposed Bebo Culvert.

Major flows from the development are to be contained within the proposed road reserves and discharge into the central gully. All road 'sags' will have relief overflow points and overland flow paths to provide for major stormwater flow.

A culvert structure is proposed for the Broadwater Parkway to allow storm flow to continue into Stage 10 and ultimately discharge off site. The Broadwater Parkway and all allotments with Altitude Aspire are above the 100 ARI level of 2.6 AHD.

A series of inter-allotment drainage (IAD) lines will convey stormwater from those lots which are unable to discharge stormwater directly to the street. Where required, at the rear of upstream external allotments, a catch drain will be constructed over the IAD lines to divert overland flow from those allotments directly into the IAD pits and out to the street.

Appendix 7 includes 'typical sections' that show the location of catch drains and IAD lines.

An allowance has been made in the layout for piped connections from the external catchment on Fraser Drive to the internal stormwater system. (Refer to the Stormwater Layout Plan in Appendix 6).

2.5 Landforming

Earthworks phasing has been outlined with a view to ensuring water quality treatment can occur (during construction, building and operational phases of development), to facilitate civil construction staging and to ensure sufficient earthworks volumes are available during construction. The earthworks volumes provided on the Earthworks Phasing Plans (Appendix 5) are approximate solid volumes only and are subject to detail final design. Morrison Geotechnic (2010) have also identified that some 'unsuitable' soils are likely to be encountered in the low lying areas of the site.

When the solid volumes are adjusted for bulking/loss factors, there is a balanced earthwork operation on the site. There is no intention for material to be removed from the site.

The proposed development will include a mix of allotment types on 'flat', 'moderate', 'steep' and 'extreme' slopes to ensure a range of housing types, sizes and choice can be provided. Well planned and coordinated earthworks during this stage of development will avoid a piecemeal approach that may occur during the building phase. Issues such as appropriate wall siting and location, stormwater drainage and wall certification can be addressed efficiently and effectively using this holistic methodology.

Appendix 5 includes:

- Earthworks Phasing Plan – showing cut and fill
- Earthworks Layout Plans
- Earthworks Sections

To achieve this allotment 'mix', retaining structures designed by appropriately qualified and experienced geotechnical and structural engineers are required to be constructed on suitable allotments. Retaining walls are proposed only for side boundaries with grade separation at rear boundaries of allotments being achieved predominantly with 25% or less gradients.

The height of retaining walls will vary across the boundary as they 'taper' to suit allotment grades. Side retaining walls/batters do not exceed 1.2m in 'combined height' and will be designed in accordance with TSC design specification D6. Appendix 7 includes a Retaining Wall Plan which identifies the approximate maximum heights of retaining walls on side boundaries.

Catch drains will be located at the top of walls in order to 'divert' overland flow from the upstream allotment and convey stormwater directly to the IAD lines. Rear of wall drainage will also be connected to the IAD lines or to the street.

Levels at Site boundaries will be transitioned utilising batters and include provision for adequate drainage including IAD, swales and catch drains will be provided.

The Earthworks Section Layout and Earthworks Cross Sections in Appendix 5 show the interface between the proposed development and adjacent properties.

Perimeter levels will be preserved except in the location where Road 10 & 12 straddle the boundary to Lot 1 DP175234. Contours shown on the Earthworks Layout indicate cut batters into this site. The extent of works along this boundary is to be negotiated and agreed with the property owner.

2.6 Water

The proposed strategy for supply of water to Area E follows extensive studies completed by others (including Parson Brinckerhoff, (2004)) and extensive consultation between the proponent and TSC, details of which are provided in Section 3, DGR 4.2.

The preferred (LES) strategy for water supply within the TSC DCP B24, which involves construction of a 3ML reservoir adjoining Mahers Lane, is not considered practical or feasible for the development of Altitude Aspire primarily due to distances between the sites, but also due to the current availability of an appropriate site.

Therefore, the alternative strategy identified within DCP B24 is proposed, being construction of a new reservoir adjacent the existing Chambers Flat reservoir. The appropriate storage capacity for this reservoir still requires further investigation. Some areas of Altitude Aspire fed from this reservoir may require pressure boosting to achieve TSC service standards and fire flows.

It should be noted that this strategy would also benefit Council in providing additional supply to areas west of Altitude Aspire as well as areas adjoining Area E to the east of Fraser Drive.

Councils Developer Servicing Plans require amendment to include these works, OR such works be included in a VPA subject to endorsement by Council.

Section 3.0 DGR 4.1 (a) has been updated and provides additional information relating to water supply for the development.

An extract from DCP B24 has also been included in Appendix 8 that identifies the location of the Chambers Flat reservoir site and water main running along Fraser Drive. Appendix 8 also includes preliminary internal Water Layout Plans for the development that shows connections to this existing water reticulation system along Fraser Drive.

2.7 Sewerage

The proposed interim sewerage strategy to service Altitude Aspire follows advice provided by TSC on 19 October 2011 (refer to Appendix 10) and the TSC DCP B24 (December 2011).

Appendix 10 includes the abovementioned email with attached sketch showing the location of relevant pump stations (SPS3018, SPS 3033 and Area E Regional Sewer Pump Station) and proposed rising mains relative to the Altitude Aspire site.

TSC is required to amend their DSP to include these sewer infrastructure works, OR such works be included in a VPA subject to endorsement by Council.

Appendix 8 includes internal preliminary Sewer Layout Plans for the development that show gravity reticulation connected to an indicative location for the RSPS within the Altitude Aspire development site. A separate lot can be created for this infrastructure and transferred to TSC in Fee Simple once the exact location has been determined through detailed design.

3.0 Revised Details for the Department of Planning (DOP) 'Test of Adequacy' Response to the Environmental Assessment.

NOTE:

The following responses are in reference only to the Civil Engineering component of the exhaustive list of DGRs as provided.

Director General's Environmental Assessment Requirement (DGR)	Response
<u>DGR 2.5</u> <i>Demonstrate that slope sensitive building design initiatives have been considered in the subdivision design to ensure there is a suitable access gradient and minimal cut and fill.</i>	The existing topography of Area E is generally steep with slopes of 20% to over 25% grading into two defined gullies, one running south-north along the centre of Area E and a second gully within the Altitude Aspire Site also running south-north. Refer to Appendix 1 for Existing Contour Plan. Due to this steep topography the proposed development will require some movement of cut and fill material across the Altitude Aspire Site. The proposed cut/fill earthworks for Altitude Aspire will ensure material use is maintained within the Site and it is envisaged that external material movement will not be required. Preliminary earthworks volume calculations for the proposed works within the Altitude Aspire Site have indicated balanced cut to fill in material use is achievable. The cut/fill earthworks have been designed to minimise disturbance to the existing surrounding allotments outside the Site boundary whilst providing a mix of 'flat', 'moderate', 'steep' and 'extreme' sloping allotments. Refer to Appendix 5 for draft detail plans as follows: - Earthworks Phasing Plan: - Earthworks Layout Plans: and - Typical Earthworks Sections.

	Retaining walls are required on some allotments to achieve a design allotment grading of 1%. Where steeper sloping allotments (grades up to 25% or 1:4) are proposed, adequate provision will be made to ensure suitable access and useability of such allotments. Access gradients to allotments have been set to a maximum 1:4 grade. Further detail design and consultation with architectural consultants (MPS Architects P/L) will address the issue of allotment frontages steeper than 1:4 with site specific driveway and building designs proposed accordingly. In accordance to Council's design guidelines and specifications the proposed roads infrastructure has been designed to ensure compliance with the maximum grades specified for each road type in TSC DCP A5 D1.10. Refer to Appendix 3 for preliminary design plans as follows: - Road Layout Plans; - Road Long Section Plans; and - Typical Road Cross Section Plans.
DGR2.6 <i>Provide details of any staging (for the subject site and the overall Terranora E area) that demonstrates the lots will be released in an orderly and coordinated manner, including the release of allotments for sale, the installation of services and infrastructure.</i>	The overall macro staging of the Terranora E area is shown indicatively on the Preliminary Master Plan concept prepared by Cardno Pty Ltd for Metricon Qld P/L and Lanlex No.49 P/L in June 2007. A copy of this Master Plan is attached as Appendix 9 The proposed Subdivision Plans (18779 B) prepared by B & P Surveys Consulting Surveyors show the current staging plan for the Altitude Aspire site (refer to Appendix 1). The proposed staging for the development of the site incorporates the systematic installation of all services and infrastructure as required for each stage, allowing for accessibility and a practical release of allotments

	into the market. Refer to Appendix 8 for proposed services and infrastructure staging for the Altitude Aspire subject area. A 'temporary' access to service the development is proposed at the south eastern corner of the Site off Fraser Drive. Although this access is only considered temporary, it has been designed as a Neighbourhood Connector and complies with TSC's DCP A1 - D1. Funding and timing of the Broadwater Parkway is dependent on Section 94 contributions across all of Area E (including Altitude Aspire), and as such, TSC do not expect this road to be constructed in the short to medium term. Once a permanent access is provided via the Broadwater Parkway, the temporary access (through Stage 11) will be closed and redeveloped into lots.
DGR4.1 <i>Identify existing capacity of, and requirements for the provision of all appropriate services and infrastructure, including: sewerage, water, stormwater, electricity, waste disposal, telecommunications, gas, open space, roads and transport, pedestrian and cycle-friendly infrastructure, community facilities and social infrastructure, and State Infrastructure. Undertake consultation with relevant agencies and provide evidence of this consultation. Identify and describe staging, if any, of proposed infrastructure works.</i>	Extensive studies have been undertaken identifying the infrastructure requirements for the overall development of Area E and accordingly were referenced in the preparation of this response. TSC DCP B24 identifies the strategy adopted in the LES for Area E as the preferred strategy for water supply. Conceptual schematics have been prepared for both sewerage and water supply infrastructure to service the development proposal, consistent with the current regional planning provisions. Requirements in relation to both external services and internal reticulation have been addressed. Detailed design will be completed in accordance to TSC DCP – A5 and relevant development design specifications. a) Water Reticulation Parson Brinckerhoff (2004) identified the major sources of water supply to the Area E as being a

	600dia Duroby main to the north of the Site as fed from the North Tumblegum Reservoir, and a secondary 150mm main along Terranora Rd to the south. A study by GHD (GHD 1999) attributed the capacities of these two sources as 3000EP and 1000 EP respectively (Parson 2004). For the ultimate servicing of Area E, a new 3ML reservoir was proposed for construction as part of the Altitude 3 site development which would supply the internal reticulation of Area E. Supply to this 3ML reservoir would be via a pipe connection to the existing 600mm dia Duroby pipeline. A series of PRVs and pumps would ensure adequate service to the future Precincts of Area E. The Area E LES undertaken by Parsons Brinkerhoff (2004) proposes a temporary connection to the existing 600 dia Duroby pipeline for interim supply to Area E, however, Council has advised that the very high risks associated with the poor condition of this pipe makes this option unviable. The revised proposal for the interim supply for the development of the Altitude Aspire Site is to construct a new reservoir adjacent to the Chambers Flat reservoir as identified in the TSC DCP B24. Council's email dated 8 November 2011 (Appendix 10) suggests construction of this 3ML reservoir at Chambers reservoir as an alternative to the preferred strategy adopted in the LES. It is also suggested that this option could supply a total of 2150 EP within Altitude Aspire and the area east of Fraser Drive currently supplied by Chambers reservoir. Advice from Council regarding supply from the Chambers Reservoir site is that the topography of Altitude Aspire would require a booster pump station for the upper levels and several pressure reducing valves for the lower levels of the Site. Council also advised that a new reservoir is to be built as a priority with the first stage (of development) as
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	Chambers Reservoir is already fully committed with its current zone. Detailed water network analysis and documentation will be prepared at the construction certificate phase of the development to confirm the requirement for boosting pressure in the higher sections of Altitude Aspire in order to meet TSC service levels and fire flow requirements for the Site. Refer to Appendix 8 (Water Layout Plan) for proposed preliminary water reticulation servicing Altitude Aspire. b) Sewer Reticulation Reference is made to the Banora Point Sewerage Study Report (TSC Sept 1999) and TSC DCP B24 which identifies the requirement of a Terranora Regional Pump Station in the development of Area E. For the 'interim' proposal, the schematic design shown in Appendix 8 (Sewer Layout Plan) outlines the proposed internal sewerage reticulation servicing Altitude Aspire. This 'interim' proposal is for the sewer reticulation for Altitude Aspire to discharge into a Regional Sewer Pump Station (RSPS) located in the north-eastern corner of the site. Flows from the existing SPS3033 on Henry Lawson Drive may be diverted to the RSPS to promote turnover and reduce septicity during the initial stages of development. The pump well is to be sized to accommodate the 'ultimate' capacity of Area E (as well as SPS3033 and the existing Parkes Lane development). The 'interim' pumps installed will be sized to accommodate flows from the Altitude Aspire site and may include SPS3033 and the existing Parkes Lane development (where required). As more development occurs with Area E, these pumps can be upgraded to accommodate the
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	additional sewerage volumes generated. Further investigation of staging options (for pump sizing) should be undertaken with TSC to allow development of Altitude Aspire to proceed and ensure economical capital investment by both the Proponent and TSC. The remainder of the existing rising main from SPS3033 may be utilised in the 'interim' to discharge flows from the RSPS into the gravity sewer network along Fraser Drive which eventually discharges to pump station SPS3018 on Fraser Drive. A separate 375mm dia rising main (Stage 2) connecting the RSPS to SPS 3018 will eventually be required as Area E becomes more developed and the existing gravity system in Fraser Drive becomes overloaded. According to TSC, this would occur at a level of development approximately equal to the full development of Altitude Aspire. In addition to the above works, the TSC DCP B24 specifies that SPS3018 is currently overloaded (due to full development of Terranora Village, Flame Tree Park and other contributing areas to the catchment for this pumps station), and prior to additional loading, upgrade works will also be required to SPS3018 in conjunction with augmentation of the existing rising mains to the Banora Point WWTP including construction of a 375mm dia rising main (Stage 1). The 'ultimate' solution for provision of sewer to Area E is through the construction of additional local pump station(s) and rising main(s) within Area E. c) Stormwater Stormwater treatment and management systems are to be implemented in accordance with recommendations by Gilbert & Sutherland Pty Ltd (project Hydraulic Consultants). Stormwater conveyance, including roof water collection is proposed via a suitable piped network system with outlets to treatment basins in accordance with relevant stormwater management plans. A detailed hydraulics design and flood analysis will be
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	carried out as part of the construction certificate submission and will confirm the conveyance of the Q100 rainfall surface runoff within the proposed road reserve and overland flow paths. A preliminary stormwater network is shown in Appendix 6 (Stormwater Layout Plan). The required stormwater treatment and conveyance of upstream catchment is proposed via a Central Open Channel. Ultimate design for the open channel will be carried out in accordance with design and consultation by Gilbert & Sutherland. Preliminary proposal plans for the Central Open Channel are shown in Appendix 6 as follows: - Swale Plans - Swale Long Section Plans - Swale Cross Sections Plans In accordance with Council's Environmental requirements for waters discharged into the SEPP14 parcel, the proposed treatment basins and drains will ensure quality and quantity levels are measureable and maintained accordingly. Please refer to report by Gilbert & Sutherland Pty Ltd for detailed information and recommendations regarding stormwater quality and quantity. d) Gas, Electrical and Telecommunication Services Reference is made to the Tweed Area E Local Environmental Study (Parsons Brinckerhoff March 2004) which identifies the development requirements for Gas, Electrical and Telecommunications. All relevant service providers will determine existing capacity of respective networks and supply design proposals in accordance to Councils standards at construction certificate phase. It is envisaged preliminary services will be obtained from both Fraser Drive and via Terranora Road corridors.
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	e) Roadworks The concept plan for the development proposal provides for an integration of the development with the SEPP 14 - Environmental Protection Area to the north of the Site. The proposed road layout emphasises' the north-south aspect of the lots in accordance with recommendations by development and building guidelines. This layout also maximises the visual aspect of the allotments with views towards the Terranora Broadwater. Further detail regarding road network together with pedestrian and cycle network will be provided under separate cover by MPS Architects, FORM (landscape architects) and Bitzio's Consulting (Traffic Engineers). Refer to Appendix 3 for Road Hierarchy Plan including footpath layout.
DGR 4.2 <i>Provide an assessment of how the provision for services and infrastructure required at both a State and local level will be managed (refer to submissions from agencies at Attachment 4)</i> <i>Consult with relevant agencies and include an outline of the program of works for such services and infrastructure, and provide estimates of cost, timing of works, and sources of funding.</i>	Consultation with Tweed Shire Council has occurred on several occasions regarding the provision of services and infrastructure. (Refer Appendix 10). Consultation has occurred in the form of meetings and emails as follows: 17 March 2010 – Meeting Bradlees consulting and TSC Water Unit. The meeting discussed strategies for both ultimate and temporary servicing of water and sewer supply to the development. A copy of the minutes of the meeting is included in Appendix 10. 19 March 2010 – Email from TSC to Bradlees – Area E, 600mm Trunk Main Hydraulic Grade Line The email is a follow up to the meeting in (a) above and contains hydraulic grade line information. The email highlights some of the temporary servicing requirements for interim supply noting some temporary booster pump system. A copy of the email is included in Appendix 10.

26 March 2010 – DAP Meeting with TSC Officers

Briefly the meeting discussed a range of Town Planning issues, Broadwater Parkway, Access and other matters.

In relation to the provisions of services, the DAP meeting canvassed the strategy for supply of water for Area E which includes the provision of a 3ML reservoir in the south west corner of Area E near Mahers Lane and Terranora Road.

Contrary to previous advice from TSC on 17 March 2010, the offer of temporary water supply was withdrawn on the basis that some sections of the 600mm trunk water main were vulnerable to failure.

The meeting advised the only satisfactory option was to consider the construction of the reservoir and pump station in the first instance.

With regard to the provision of sewer supply, again strategies for Area E were discussed which included a regional pump station to be located in the low area where sewerage would be pumped to Banora Point Wastewater Treatment Plant.

Several interim solutions were proposed including a local temporary pump station that would pump to an existing gravity sewer manhole into which the existing Terranora SRM discharges.

This latter option would require further analysis. A copy of the DAP Meeting Minutes are included with Appendix 10.

8 April 2010 – Meeting at TSC with Council Officers

This meeting discussed several matters related mainly to Broadwater Parkway alignment and land acquisition.

Discussion in relation to water and sewer servicing was very limited and confirmed Council's position as advised in DAP Meeting on 26 March 2010.

A copy of Darryl Anderson's "Notes of Meeting" via email (dated 8 April) are included in Appendix 10.

4 May 2010 – Email to TSC to Bradlees – Sewer Connection

This email from TSC is a follow up to the meeting with Council Officers on 8 April 2010 and provides a preliminary analysis of the receiving sewer system for a proposed interim sewer supply.

Council advises it would be reluctant to give an approval for a temporary sewer connection to the existing gravity in Fraser Drive.

A copy of Council's email dated 4 May 2010 is included in Appendix 10.

7 June 2010 – Email from Bradlees to TSC - Water and Sewer Servicing

This email is a follow up to Council's email dated 4 May 2010 (item (e) above) and seeks to obtain clarification and further detail of information provided. A copy of this email is included on Appendix 10.

14 October 2010 – Email from TSC to Bradlees - Water and Sewer Servicing

This email is a response to Bradlees email dated 7th June 2010 and advises of Council's current investigations to find suitable interim service solutions for water and sewer.

A copy of Council's email dated 14 October 2010 is included in Appendix 10.

19 October 2011 – Email from TSC to Bradlees - Area E Sewer Strategy

Email includes draft plan and text regarding sewerage strategy for Area E.

No funding options could be provided as the Manager for Water and Sewerage was on leave.

A copy of these attachments is included in Appendix 10.

8 November 2011 – Email from TSC to Bradlees - Area E Water Strategy

	This email outlines two options that will be included in the TSC DCP B24 for water supply. Option 1 – 3ML reservoir on Mahers Lane Option 2 – 3ML at Chambers Reservoir site for which TSC would contribute 'marginal' difference. A copy of this email is located in Appendix 10. 27 June 2012 – Email from Bradlees to TSC - calculation of sewer flows This email included preliminary calculated Ultimate Sewerage Peak Wet Weather Flows (PWWF) for the Area E RSPS catchment using the WSA method of flow calculation. 18 July 2012 – Email from TSC to Bradlees - calculation of sewer flows This email confirmed that the PWWF calculated using the WSA method is a reasonable estimation of future flows. 20 July 2012 – Email from TSC to Bradlees - flows to SPS3018 This email advises TSC's expectation in regards to the sewerage flow through SPS3018. 11 January 2013 – Email from Bradlees to TSC – Bradlees summary of phone conversation (11/1/13) regarding Chambers reservoir. 16 January 2013 – Email from TSC to Bradlees – TSC summary of phone conversation (11/1/13) regarding Chambers reservoir. 8 March 2013 – Concept Layout for Chambers Reservoir Site Concept layouts were provided following meeting held at TSC offices on 7/2/13. These concepts show existing site with 2.3ML and 3.0ML reservoir with same top and bottom water level as existing 3.0ML reservoir. In relation to State services and infrastructure we advise that there are no services or infrastructure to be provided by the State.
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	With regard to a program of works, the Proponent anticipates development to commence within six (6) months of receiving approval. Ongoing development will then be dictated by market demands. An estimate of Preliminary Project Development Costs in the amount of \$22,122,684.00 (excluding GST) is provided in Appendix 12. The Proponent advises that sources of funding will be a combination of commercial funding arrangements with the Proponent via various lending institutions, as well as S94 and S64 Contributions and the negotiation of Voluntary Planning Agreements.
DGR 5.11 <i>Provide an assessment of how the future permanent alignment of Broadwater Parkway and Fraser Drive is anticipated to work in terms of timing, payment and constraints (refer to Tweed Shire Council's comments on Infrastructure, Roads and Access in Attachment 4).</i>	Designated as a Neighbourhood Connector, the Broadwater Parkway provides the primary access to the northern section of the Area E development and connects Mahers Lane (western boundary) to Fraser Drive (eastern boundary) weaving along the northern boundary of Area E. The Broadwater Parkway will ultimately provide the principal access into Area E and the direct access to proposed Altitude 1 (Altitude Aspire) & Altitude 2. Refer to Appendix 3 for the draft Broadwater Parkway details as follows: - Road Layout Plans - Road Long Sections Plans - Road Cross Sections Plans Preliminary discussions regarding the intersection of the Broadwater Parkway with Fraser Drive designated a signalised intersection in accordance with the traffic study report carried out by Parson Brinckerhoff (2004). Recent discussion with TSC indicates a roundabout intersection is their preferred option. Funding of Broadwater Parkway is provided in part by way of developer contributions under Section 94 Contribution Plan No. 4 – Tweed Road Contribution Plan and remaining sections of Broadwater Parkway

	by VPA yet to be endorsed by Council. Funding and timing of the Broadwater Parkway is dependent on S94 contributions across all of Area E (including Altitude Aspire), and as such, TSC do not expect this road to be constructed in the short to medium term. Altitude Aspire has also been designed giving consideration that the Broadwater Parkway may never be built. Bitzios Consulting have shown in their Revised Transport Assessment for Preferred Project Report (PPR) (February 2013), that the temporary access off Fraser Drive is sufficient for full development of Altitude Aspire, should the construction of the Broadwater Parkway not occur. Funding of Broadwater Parkway is provided, in part by way of developer contributions under Section 94 Contribution Plan No. 4 – Tweed Road Contribution Plan, and remaining sections will be the subject of a VPA yet to be endorsed by Council. Concept designs have been prepared for Broadwater Parkway based on the proposed alignment shown on Tweed Development Control Plan 2008, Section B24 – Area E Urban Release Development Code. The proposed alignment has due regard to the biophysical and geophysical constraints applicable to the potential corridor. The profile of the Broadwater Parkway concept design is in accordance with the required 60kph design speed environment and endeavours to integrate with the existing topography while minimising its impact on the Environmental Protected Zone to the north of the site. The concept design alignment and profile also promote the reduced speed environment consequent to the existing school zones within Mahers Lane.
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DGR 5.13

Investigate the opportunity for road alignments to follow existing land contours. The objective is to minimise cut and fill, preserve the integrity of the existing topography, and take advantage of existing overland drainage opportunities.

Various allotment and road layouts have been investigated by Newland Developers Pty Ltd to determine a suitable yet functional road network within the steep site.

The key elements which underpin the basis of the subdivision layout design are as follows:

- a) Tweed Shire Council (TSC) requirement that all access be provided via the proposed Collector Rd, Broadwater Parkway located to the north of the site.
- b) A 'temporary' access to the development from Fraser Drive is to be constructed and maintained until the construction of the Broadwater Parkway. This development layout is designed with the possibility the Broadwater Parkway may never be constructed.
- c) As a consequence of (a) above, all internal roads to the subdivision will ultimately access the site, from the lowest areas of the site.
- d) As a result of (a) and (c) above, to access the higher areas of the site, in particular the south-east areas, and provide connectivity throughout the subdivision, access across the existing gully is necessary.
- e) The subdivision layout design has adopted Tweed Shire Council's, "new urbanism" principles for connectivity throughout the development.
- f) The maximum road grade provided for Access Streets is 16% and Neighbourhood Connector Roads is 12% in accordance with TSC requirements. The majority of road grades are 12% or less.
- g) In accordance with good engineering practice, balance earthworks for the site and avoid the cost and traffic nuisance of importing fill material from off site along public roads. Preliminary earthworks volumes indicate cut approximately 408600 cubic metres, fill approximately 355100 cubic metres. (These are approximate solid volumes only and are subject to final detail design). Refer to Earthworks Phasing Plan in Appendix 5.

	When the solid volumes are adjusted for bulking/loss factors, there is a balance earthworks operation onsite. There is no intention for material to be removed from the site. h) To provide a mix of lot grades and sizes to facilitate a variety of house design and residential product for marketing purposes in accordance with TSC DCP B24. i) The roads are aligned in an east/west direction which emphasises the north-south aspect for the allotments and maximises the visual aspect of the allotments with views towards the Terranora Broadwater. j) The primary (or long) streets of the subdivision follow the contours, whilst the secondary (or short) streets are perpendicular to the contours in accordance with TSC DCP B24. Cross contour road design has been minimised where possible whilst maintaining practical design guidelines for maximum grades and lot access requirements. The final road layout better facilitates the conveyance of stormwater runoff to the central drainage channel by providing constructed overland flow paths (road reserves) that do not intersect allotments. Any four (4) way intersections can also be avoided through the implementation of this road layout. The road alignments as proposed emphasise the north-south aspect for the allotments and maximises the visual aspect of the allotments with views towards the Terranora Broadwater. On the 10 November 2011 TSC confirmed to Newland Developers Pty Ltd by email (refer to Appendix 10) that roads aligned in an east/west direction was appropriate for this development.
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DGR 5.14 <i>Ensure public access to and along the adjacent SEPP 14 wetland and Terranora Broadwater is not compromised, and provide new opportunities for controlled public access and disabled access where appropriate.</i>	The proposal for the Broadwater Parkway is to incorporate various opportunities for public access and connectivity to the SEPP 14 Wetland Area. Reference is made to plans prepared by project landscape architects FORM showing proposed parking, cycle paths and pedestrian pathways. Ultimate layout subject to further investigation and consultation with Council and relevant authorities at detail design stage.
DGR 7.1 <i>Provide a detailed site survey showing existing and proposed contours, levels and quantities of cut and fill earthworks, and provide details of the source of fill including types of material and soils.</i>	A detailed Site Survey Plan showing existing contours over an aerial photograph is provided in Appendix 1. Appendix 5 includes Earthworks Layout Plans showing both existing and proposed contours, and the Earthworks Phasing Plan indicating various depth ranges for cut and fill extents. All earthworks fill is to be generated from site. Earthworks volume calculations for the preliminary design indicate an earthworks balance with a cut volume of approximately 408600 cubic metres and a fill volume of approximately 355100 cubic metres (These are approximate solid volumes only and are subject to final detail design). Refer to Earthworks Phasing Plan in Appendix 5. When the solid volumes are adjusted for bulking/loss factors, there is a balanced earthwork operation on the site. There is no intention for material to be removed from the site. Notwithstanding the steep topography of the Site, 9.43% of the Site area has cut or fill finished surface levels that depart from the natural surface contours by more than 5m. This is in accordance with TSC DCP A5 – D6.05.3 (which specifies a mass landform criteria limit of 10%). Filling is predominantly within the central open channel where the natural gully has been raised. Refer to Appendix 5 for Earthworks Phasing Plan and details.

The regional geology of the site comprises the Neranleigh Fernvale Beds, which are capped by the Lamington Volcanics.

Generally, the local geology within the western ridge area and eastern slopes adjacent to Fraser Drive together with the steeper slopes adjoining the existing central drainage gully comprise red brown volcanic clay soil of typically high plasticity. The red brown volcanic clay soil contains varying amounts of weathered to fresh basalt cobbles and boulders, which have been formed by spheroidal weathering and are most common within the areas adjacent to the existing central drainage gully.

A sparse covering of basalt boulders and cobbles are evident strewn across the surface in most areas of the site.

Underlying the volcanic clay soils, are soil and rock materials derived from the Neranleigh – Fernvale Group. The silty clay soils derived from the Neranleigh Fernvale Group are observed to be overlain by a thin layer of red brown volcanic clay approx. 1.0m to 2.0m thick) adjacent to the banks of the central drainage channel. However the red brown volcanic clay soil is considerably thicker (greater than 7.5m) within the upslope, elevated areas of the western ridge line and eastern slopes adjacent to Fraser Drive.

The lower central area of the site adjacent to the northern boundary consists of alluvium materials. Such materials are predominantly moist, stiff and very stiff, silty clay of high plasticity, extending to depths of approximately 1.0m to 2.0m. Acid Sulfate soils are present within this lower central floodplain area below RL 5m AHD and an Acid Sulfate Soil Management Plan will be required prior to earthworks commencing in accordance with the NSW ASSMAC Guidelines.

Generally the stability of the western portion of the site and the upper eastern portion of the site are assessed to be satisfactory. However, the main drainage channel and lower sloping topography adjacent to the drainage channel show evidence of slope instability.

	The proposed earthworks designs, which include filling the lower portions of the Site and cutting the upper portions of the Site, will reduce the slope gradients and therefore reduce the risk of slope instability. Significant earthworks and remediation works will be required prior to the placement of fill materials. This includes removing areas displaying instability and implementing appropriate drainage prior to placement of fill. From the results of the broad geotechnical assessment, it is assessed by the geotechnical consultants, Morrison Geotechnic Pty Ltd that the site is considered to be suitable and feasible for the proposed development providing the recommendations of their report, including repairs to the landslip areas and the guidelines for hillside construction are followed.
DGR9.1 <i>Address the issue of provision of a sustainable water supply for the development site. Ensure there is adequate water supply for the development. If an alternative other than town water supply is proposed then provide an assessment of the water requirements.</i> <i>The assessment should include Water Management Plans detailing how a sustainable and efficient water supply can be sourced and implemented with minimal reliance on accessing valuable surface and groundwater resources.</i>	The Tweed Area E Local Environmental Study (LES) by Parsons Brinkerhoff– Section 3.14.1 Water Supply (March 2004), identifies the availability of water to the Area E Region and quantifies the provision of water to the proposed development. The Parsons Brinckerhoff Report outlines Tweed Shire Council's strategy for providing bulk water supply for up to 160,000 population in the Shire, with connections provided to approximately 65,000 population. Council's strategy includes options for raising Clarrie Hall Dam to increase storage capacity and the construction of an additional dam at Byrrill Creek where council has already purchased 80% or more of the land required. The PB report notes <i>"With recent legislative changes and drought events in the Shire, Tweed Shire Council is re-examining options for providing bulk water supply. A critical aim of this review is to ensure that bulk water supply for future population will be sustainable. Council has currently commissioned a study to prepare and integrated water cycle plan and it is likely that as a result of this study that estimates</i>

for population able to be supplied with bulk waters will be revised down. This study will examine Council's current strategy for bulk water supply and investigate the impacts of introducing new measures for water conservation and control (D Oxenham, pers.comm., 2004)."

The PB report also states that "This should not effect development with a short time horizon such as Area E but may have impacts on development in the shire with a longer time horizon.

Based on the various discussions to date with TSC officers (refer DGR 4.2) we are not aware of any Council plans or strategies for alternative water supply options other than town water supply.

The PB report advises details for supply of water to Area E as follows:-

Quote: *"The water supplied in the vicinity of Area E comes from Clarrie Hall Dam via the Bray Park filtration plant thorough to the North Tumbulgum reservoir (Martin Findlater & Assoiciates Pty Ltd, 1995).*

A Water Conveyancing Master Plan prepared by GHD in 1999 based on developments scheduled to have taken place by 2011, which are in addition to the general increase in population, included a 4,000 EP development on Area E. This study indicated a number of capital works in the water supply system required to service the 2011 population but none specifically for Area E.

GHD's conveyancing study was conducted based on a peak day demand of 850L/person/day and an average day demand of 450L/person/day (GHD 1999).

The Duroby main is a 600mm water main that traverses the northern boundary of Area E and is supplied from the North Tumbulgum reservoir (Alex Abedrabbo, pers. Comm., 2003). In addition to the Durboy main there is a second 150mm (pers comm..

	Alex Anedrabbo, 26th June 2003) water main that runs along the southern boundary of Area E along Terranora Road, with two reservoirs at Rayles Lane (GHD 1999). The GHD analysis was undertaken assuming that the Duroby main would supply 3,000 EP while the Terranora Road main would supply 1,000 EP (GHD 1999). The GHD report was based on trunk mains and although it shows that there is generally sufficient pressure to supply the future water demand in the distribution system after required capital works, it did not extend to the minor reticulation system. Hence, it did not identify the areas of low or high pressure in the Area E. There is no requirement for a reservoir on Area E identified in the GHD report (GHD 1999), however the Draft Interim Strategic Plan – Cobalki/Bilambil Heights/ Terranora (TSC, 1995) stated that a site of sufficient size for a 5ML reservoir was required on site to service the area (TSC, 1995). The requirement for a reservoir has been confirmed by Council staff however it has been advised that only a 3ML reservoir will be required within the site (Alex Abedrabbo pers comm. June 2003). Discussions with TSC identified that the 600mm Duroby main is the preferred water supply for Area E and a pipeline connecting the proposed 3ML reservoir with the 600mm Duroby main will be required (Alexandra Abedrabbo pers comm. June 2003). There is sufficient capacity from the North Tumbulgum reservoir to service Area E, provided a reservoir is constructed (Alexandra Abedrabbo pers comm. June 2003). The North Tumbulgum is at approximately 115m AHD. The recommended elevation within Area E for a reservoir is 130m AHD. While the majority of the site is lower than the North Tumbulgum reservoir, a booster pump from the 600mm Duroby main to the reservoir may be required. A network analysis including main and booster pump (if required) sizing will therefore be necessary. The footprint required for a 3ML reservoir, which is
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	<i>approximately 30m in diameter involve 1000m². The land required for the 3 ML reservoir must be provided by the proponents for rezoning of the land at no cost to the community (TSC, 1995).</i> <i>The footprint for the reservoir including some allowance for construction on slope and access requirements is 0.25 ha. The preferred location for this reservoir is in the vicinity of the intersection of Terranorra Road and Mahers Lane. The approximate cost for a 3 ML reservoir is \$665,000 (Land & Water Conservation, 1999). This cost does not include land acquisition and power supply. Costs for the provision of the reservoir, pipeline and booster pumps will be required to be met by the Developers with Area E. Internal reticulation of water will also be required to be constructed by developers.</i> <i>Developers will also be required to pay Tweed Shire Council's 2003/2004 developer charges of \$4110.00 per single equivalent tenement (TSC, 2003)." End Quote</i> An extract of the Parsons Brinkerhoff Report – section 3.14.1 is attached as Appendix 11 as supporting information. The TSC DCP B24 (December 2011) outlines an alternative strategy to permit development to begin at the eastern end of Area E. This strategy includes the construction of a 3ML reservoir adjacent to the Chambers Reservoir. This reservoir would supply 2150EP which would include the entire Altitude Aspire as well as adjoining areas of Area E to the west to a level of about 65m AHD. In addition, this reservoir would provide additional capacity for infill in the area east of Fraser Drive currently serviced by the Chambers Reservoir. The topography is likely to require a booster pump station for the upper levels and several pressure reducing valves for the lower levels. Council have advised that it would be necessary for the reservoir to be built as a priority with the first stage (of
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	development) as Chambers Reservoir is already fully committed with its current zone. A copy of Council's email to Bradlees Civil Consulting dated 8 November 2011 provides additional detail to the DCP, and is included in Appendix 10.
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4.0 Extract of the Tweed Development Control Plan 2007, Part 5 – Subdivisional Manual Requirements.

In accordance to Section A5.3 of Council's Development Control Plan, the following table addresses the specific Civil Engineering component of the DCP and is in reference to this report/proposal only.

SUBDIVISION REQUIREMENTS	
PROVISION	COMMENTS
A5.3.1 – Master Plans	
The subject site is located within the coastal zone and involves more than 25 lots and therefore a Development Control Plan would normally be required under the provisions of State Environmental Planning Policy No. 71. However, as this is a Major Project to which Part 3A applies a Development Control Plan is not required under State Environmental Planning Policy No. 71. However, this Section of the Development Control Plan provides that a Master Plan is still required for more than 25 lots and, where the urban pattern (street and open space network, neighbourhood structure, etc.) is not determined by: • Development and street/neighbourhood development patterns; or • An existing site specific section that determines the general street and neighbourhood layout.	<i>Not relevant to Engineering matters.</i>
A5.3.4 – Subdivision Design	
Site investigation, survey and analysis	<i>Not relevant to Engineering matters</i>
Statutory and Council requirements	<i>Not relevant to Engineering matters</i>
Subdivision design trial layouts and optimisation	<i>Not relevant to Engineering matters</i>
Pre-application consultation	<i>Not relevant to Engineering matters</i>

Urban Design Guidelines and Development Standards

The following table summarises the key guidelines contained in this Section. In this regard it should be noted that Section A5.4.2 provides that in respect of infill subdivisions, they may be constrained by an existing urban structure that may make it difficult to comply with some of the urban design objectives and criteria in this Manual. Infill subdivisions will therefore be exempt from these requirements where their application is so constrained. This development proposal is an "infill subdivision" and there are constraints imposed by existing biophysical and cultural features which limit compliance in some cases.

DESIGN GUIDELINES	
PROVISION	COMMENTS
A5.4.3 – Physical Constraints	
In summary, this section provides that prior to detail Master Planning of a site, the physical constraints of the site must be identified, mapped and constraint issues resolved.	<i>Not relevant to Engineering matters</i>
Contaminated land.	<i>Not Applicable</i>

DESIGN GUIDELINES	
PROVISION	COMMENTS
Landslip or subsidence.	<i>Extensive earthworks and regrading to be carried out on Site – Refer to Geotechnical Report by Morrison Geotechnic Pty Ltd</i>
Bushfire risk.	<i>Not relevant to Engineering matters</i>
Threatened species, population or ecological communities or their habitats.	<i>Not relevant to Engineering matters</i>
Koala habitat.	<i>Not relevant to Engineering matters</i>
Significant vegetation.	<i>Not relevant to Engineering matters</i>
Landscape visual character.	<i>Not relevant to Engineering matters</i>
Acid Sulphate Soils.	<i>Refer to Report by Gilbert & Sutherland P/L</i>
Heritage or cultural items of Aboriginal or European origin.	<i>Not relevant to Engineering matters</i>

LAND FORMING	
PROVISION	COMMENTS
A5.4.5 – Land Forming	
A. General Criteria	
1. Significant Natural Features Site regrading is not to take place on: ♦ topographical features that are significant to the character of the site or locality. ♦ existing or natural watercourses with catchment areas of 100ha or more. ♦ riparian zones (see Table A5-5) associated with above.	<i>Site regrading does not disturb any significant topographical features or existing watercourses with catchment greater than 100ha and does not take place on riparian zones.</i>
2. External & Perimeter Issues (a) Cross Boundary Drainage; ♦ Runoff from the subject land to other land shall not be significantly increased; ♦ Runoff from upstream or upslope of the subject land shall be conveyed unimpeded across the land; ♦ Public infrastructure in land to be regraded shall be preserved and if necessary for its continued viability be reconstructed to suit the new landform. Public infrastructure continuity shall be preserved at external boundaries. ♦ Alteration of the locations of cross boundary stormwater drainage/watercourse discharge should be avoided. If alterations are proposed, then the written agreement of all effected downstream landowners is required. (b) Perimeter levels; Pre development levels must be preserved at external (perimeter) boundaries of a subdivision, preferably without the use of boundary (or within 3m of the boundary) retaining walls exceeding 1.2m in height. The application of this criteria may be varied in infill subdivisions in flood liable areas where there is general filling to provide flood immunity.	<i>Runoff from the subject land to other land is controlled by the use of detention basins to match pre and post development flows and is conveyed across the land in a manner to restrict velocities to minimise scour and erosion. There is no public infrastructure located within the land and accordingly no impacts associated with regrading.</i> <i>Site regrading complies with perimeter levels and matches existing levels at neighbouring boundaries except for Western boundary where consent from adjoining owner is required</i>

LAND FORMING	
PROVISION	COMMENTS
A5.4.5 – Land Forming	
B. Mass Landform Change Criteria	
1. Residential, includes residential subdivisions in Village, Urban Expansion and Rural Living zones. The proportion of a subdivision site (plan area) that contains cut or fill areas with finished surface levels that depart from natural surface levels by more than 5m shall not exceed 10%. Variations up to 15% of site area may be considered if such variations have a demonstrated environmental benefit (eg. avoidance of importing borrowed fill off site).	<i>Cut/ fill earthworks provides a balance of earthworks over the site and where cut/ fill levels depart from existing natural surface levels by more than 5m does not exceed 10% (approx. 9.4%). Refer drawing SK3562.</i>
2. Industrial, Business and Mixed Use Subdivision, includes industrial, business and mixed use subdivisions in Village and Urban Expansion zones. The proportion of a subdivision site (plan area) that contains cut or fill areas with finished surface levels that depart from natural surface levels by more than 8m shall not exceed 20%. For the purpose of this Section "subdivision site" includes the parcels of land created for private sale and formal parks, and does not include undeveloped areas, areas retained for environmental purposes, roads, or residual allotments. If a subdivision contains a mix of urban and rural/rural residential uses, the rural/rural residential areas must be excluded from the urban areas for the purposes of complying with this Clause.	<i>Not Applicable</i>
C. Shape/Surface Criteria	
1. Residential and Rural Living Subdivision, includes residential subdivisions in Village and Urban Expansion zones: ♦ The finished landform shape (concave/convex, rolling, stepped etc) of the subdivision site should mimic existing and local surrounding natural topography. ♦ Except as provided in Note 1 below, no sharp changes of gradient (eg associated with batters or retaining walls) are permitted at or near inter lot boundaries or within lots. ♦ Batters and retaining walls are not permitted for the purpose of creating terraced lots. ♦ Sharp changes of gradient are permitted at road and public land boundaries. See Figure 4.2.2. Note 1: A retaining wall or batter of maximum "combined height" (as defined in Section E) of 1.2m at or adjacent to inter lot boundaries may be permitted to ease lot gradients, where lot longitudinal or cross gradient would exceed 10% in the absence of such retaining wall or batter.	<i>The finished landform mimics the existing topography and there are no sharp changes of gradients. Combined heights of retaining walls and/ or batters at site boundaries comply with maximum height of 1.2m and provide for a mix of housing types. Lots which require 1.2m maximum height retaining walls account for approximately 30% of allotments.</i> <i>Appendix 7 includes the Retaining Wall Layout Plan for the development.</i>

LAND FORMING	
PROVISION	COMMENTS
A5.4.5 – Land Forming	
2. Industrial, Business and Mixed Use Subdivision, includes industrial, business and mixed use subdivisions in Village and Urban Expansion zones: ♦ Terraced lots with sharp changes of gradient associated with retaining walls or batters are permitted. Sharp changes of gradient (ie. associated with batters or retaining walls) are permitted at or near lot, road and public land boundaries. Sharp changes of gradient are permitted within lots.	<i>Not Applicable</i>
D. Plans Criteria	
Site re-grading proposals must be accompanied by the plans specified in Development Design Specification D13 – Engineering Plans (Subdivisions) clause D13.03 5(a)	<i>Refer Appendix 1, & 5 for relevant plans.</i> <i>Site regrading proposals are shown on drawings SK3562, SK3507, SK3508, SK3527, SK3529, SK3635 and SK3636 to SK3643.</i>
E. Retaining Walls and Batters Criteria	
1. Definitions: “retaining wall” is defined as a structure required to retain soil, rock and other materials. It includes retaining and revetment structures as defined in clause 1.1 of AS 4078 - 2002. “batter” is defined as the sloping surface of artificial cuttings and embankments that have a gradient exceeding 25%. It excludes natural slopes. “Combined height” is defined as the vertical height difference at or adjacent to the boundary between top of batter or retaining wall and bottom of batter or retaining wall. Adjacent to a boundary includes any batters or retaining walls that lie either wholly or partly within a distance of 5m measured horizontally from the allotment boundary. 2. Criteria (a) The combined height of retaining walls or cut/fill batters on an allotment boundary shall not exceed the following	<i>The maximum permissible combined height of retaining walls or batters complies as shown on drawing SK3617 and earthworks drawings nominated in A5.4.5D above.</i>

LAND FORMING					
PROVISION					COMMENTS
A5.4.5 – Land Forming					
MAXIMUM PERMISSIBLE COMBINED HEIGHT OF RETAINING WALLS OR BATTERS					
Type of Subdivision	Perimeter boundary of subdivision	Boundaries of lots created within subdivision			
		Side and Rear Boundaries	Street Boundary		
			Above Street Level	Below Street Level	
Residential	1.2	1.2 see Note 1 of Table A5-3(C)(1)	1.8	2.4	
Industrial	1.2	5	2.5	5	
Business	1.2	5	1.2	2.4	
Rural Living	1.2	Nil	1.2	2.4	
(b) Where retaining walls or batters are utilised to create a level difference between adjacent allotments or an allotment and a road and the retaining wall is located in the lower allotment, the top of batter or top of retaining wall shall be located a minimum 0.5m horizontally from the boundary					

STORMWATER MANAGEMENT	
A5.4.6 – Stormwater Runoff, Drainage, Waterways and Flooding	
PROVISION	COMMENTS
Water Sensitive Urban Design	<i>Refer to SMP Report by Gilbert & Sutherland P/L</i>
Erosion and Sedimentation Control	<i>Refer to SMP Report by Gilbert & Sutherland P/L</i>
Permanent Stormwater Quality Facilities	<i>Refer to SMP Report by Gilbert & Sutherland P/L. Treatment basins and ponds are proposed to ensure minimal impact to receiving waters within the environmental protection Zone (SEPP14)</i>
Drainage (lawful point of discharge)	<i>Lawful point of discharge is to be an existing open channel drain along the northern boundary prior to flowing into the wetlands within the SEPP14 zone to the North of the site.</i> <i>Ultimate discharge is the Terranora Broadwater.</i>
Riparian Buffer Widths	

The following table summarises the key principles applicable to urban structure.

SECTION A5.4.7 – URBAN STRUCTURE	
Requirement	Compliance
No more than 15% of lots fronting cul-de-sac.	<i>Complies</i>
Maximum cul-de-sac length 100m serving no more than 12 dwellings with clear view for full length of cul-de-sac.	<i>Complies. Refer to Appendix 1 and 3 for proposed layout plans. There is only one cul-de-sac proposed within the development. The cul-de-sac is approximately 75m long and services seven (7) allotments.</i>
Linking access for pedestrians and cyclists.	<i>Refer to Report by Landscape Architects – FORM</i>

SECTION A5.4.7 – URBAN STRUCTURE	
Requirement	Compliance
Bus route/stops should be located at an average spacing of 300 – 400m.	<i>Refer to Traffic report by Bitzios Consulting.</i>
Street design to achieve target street speeds.	<i>Internal road network is designed for a design speed of 50kph. .</i>
Cycleway network required.	<i>Refer to Report by Landscape Architects – FORM</i>
Dedication of environmentally sensitive areas.	<i>Existing environmentally sensitive areas as identified by Council ie Wetland Zone (SEPP14) are external to the site.</i>
Casual parks – 1.13 hectares/1000 population (11.3m ² /person). Desirable minimum area 2500m ² – 4000m ² .	<i>Designated Park areas are proposed within stages 4, 6 & 8 of the development. Furthermore, the Central Open Channel will be graded and will incorporate pathways to allow pedestrian access and useability</i>
95% of residences within 400m walking distance of casual parks.	<i>A network of pathways and cycleways are proposed, linking all stages to the central open channel and adjacent park land. Refer to report by Landscape Architect – FORM for details</i>
Land form of casual park – slopes less than 8%.	<i>Proposed park at grading less than 8%</i>
Access from more than one local road.	<i>Park accessed from Road 2, Road 8 and Broadwater Parkway.</i>
Road frontage – 50% of perimeter.	<i>Proposal complies with condition</i>
Embellishment.	<i>Not relevant to Engineering matters</i>
Sports playing field – 1.7 hectares/1000 persons (structured or active open space).	<i>Not relevant to Engineering matters</i>
Minimum residential lot size of 450m ² and 10 x 15m building envelopes for dwellings.	<i>Not relevant to Engineering matters</i>
Dual occupancy lots minimum 900m ² or 1000m ² for corner lots.	<i>Not relevant to Engineering matters</i>
Solar access – 70% of lots oriented from 340° to 20° or 70° to 120°.	<i>Not relevant to Engineering matters</i>
Generally rectangular shaped lots.	<i>Refer to Appendix 1</i>
East – west lots must have a minimum width of 14m.	<i>Refer plans by B&P Surveys (Appendix 1) for details</i>

SECTION A5-10 – SUBDIVISION INFRASTRUCTURE REQUIREMENTS			
Infrastructure Required	Where Required	Standard Infrastructure of	Comments
Sealed road frontage with kerb and gutter both sides	All lots for private occupation, community facilities lots and public open space lots	See Development Design Specification D1	<i>Complies</i>
Landform			
Water Supply	All lots for private occupation, community facilities lots, sports fields,	See Development Design Specification D11	<i>Complies</i>

SECTION A5-10 – SUBDIVISION INFRASTRUCTURE REQUIREMENTS			
Infrastructure Required	Where Required	Standard of Infrastructure	Comments
	parks, play areas, other utility facilities (pump stations etc.)		
Sewerage	As above	See Development Design Specification D12	<i>Complies</i>
Electricity	As above	Must be underground and provided in accordance with suppliers and Australian standards. Verge service location is to comply with Development Design Specification D1	<i>Complies</i>
Telecommunications	All lots for private occupation, community facilities lots and sports fields. As required for other utility facilities).	As above, service must be such that standard connection is available to local/national/overseas networks	<i>Complies</i>
Gas	Optional	As above	
Drainage system	Must provide Q100 local flooding immunity for all lots for private occupation and community facilities. Major/minor system required, roads public open space may (subject to other development standards) be used for Q100 overland flow paths. Must be equipped with stormwater treatment facilities to meet Chapter 3, PC7.15 standards	See Development Design Specifications D5 and D7.	<i>An extensive pipe network for both roof-water and surface runoff rain events is proposed.</i> <i>The Design road grades and proposed layout will ensure that expected Q100 flows will remain within the road reserve.</i>
Flood Immunity	All lots for private occupation must have surface levels above the Q100 level for regional creek/river flooding. See section 4.26 of this chapter for public open space standards.	See Section A3 - Development of Flood Liable Land for detailed requirements.	<i>All lots are above the Q100 flood level 2.6m AHD.</i>
External Connections and/or upgrades	The subdivider must provide all external connections required to connect subdivision infrastructure and upgrade external infrastructure to cater for the additional subdivision load. See also D1, D5, D7, D11, D12		<i>All required infrastructure services will be provided to the development via connections to existing services.</i> <i>It is noted that additional studies will be required to determine upgrade works of existing services to cater for the ultimate capacity of the development. This is primarily for the water supply and sewer services.</i>

The following table summarises the development design specifications and requirements for site regrading included in or required as a consequence of the proposed subdivision works.

LAND FORMING																	
PROVISION	COMMENTS																
D6.05 Site Regrading Acceptance Criteria																	
D6.05.1 Limits to Site Regrading																	
Site regrading must comply with the principles in D6.02 and in this regard must not exceed the criteria in this section.	<i>Site regrading complies with the principles in D6.02. Site regrading mimics the shape of the existing landform, matches existing levels at neighbouring boundaries (except for Western boundary where consent from adjoining owner is required), does not divert stormwater catchments, geotechnically sound, cut and fill earthworks are balanced, adopts stormwater quality/ water sensitive design principles and provides a mix of housing types.</i>																
D6.05.2 General Criteria																	
1. Significant Natural Features Site regrading is not to take place on: - Topographical features that are significant to the character of the site or locality; - Existing or natural watercourses with catchment areas of 100 ha or more; - Riparian zones (see table) associated with the above. Table Riparian Zone Widths <table border="1"> <thead> <tr> <th>Upstream Catchment Area (ha) of streams or drains</th><th>Riparian Zone Width (m) (either side of high bank)</th></tr> </thead> <tbody> <tr> <td><100ha</td><td>Nil</td></tr> <tr> <td>>100ha and <500ha</td><td>10m</td></tr> <tr> <td>>500ha and <1,000ha</td><td>20m</td></tr> <tr> <td>>1,000ha and <5,000ha</td><td>30m</td></tr> <tr> <td><5,000ha and <10,000ha</td><td>40m</td></tr> <tr> <td>>10,000ha</td><td>50m</td></tr> <tr> <td>Environmentally sensitive*</td><td>50m</td></tr> </tbody> </table> * >75% of the catchment and >1,000ha is land zoned "Environmental Protection" 7a, 7f or 7l or "National Parks & Nature Reserves" 8.	Upstream Catchment Area (ha) of streams or drains	Riparian Zone Width (m) (either side of high bank)	<100ha	Nil	>100ha and <500ha	10m	>500ha and <1,000ha	20m	>1,000ha and <5,000ha	30m	<5,000ha and <10,000ha	40m	>10,000ha	50m	Environmentally sensitive*	50m	<i>Site regrading does not disturb any significant topographical features or existing watercourses with catchment greater than 100ha and does not take place on riparian zones.</i>
Upstream Catchment Area (ha) of streams or drains	Riparian Zone Width (m) (either side of high bank)																
<100ha	Nil																
>100ha and <500ha	10m																
>500ha and <1,000ha	20m																
>1,000ha and <5,000ha	30m																
<5,000ha and <10,000ha	40m																
>10,000ha	50m																
Environmentally sensitive*	50m																
2. External & Perimeter Issues (a) Cross Boundary Drainage: - Runoff from the subject land to other land shall not be significantly increased; - Runoff from upstream or upslope of the subject land shall be conveyed unimpeded across the land; - Public infrastructure in land to be regraded	<i>Runoff from the subject land to other land is controlled by the use of detention basins to match pre and post development flows and is conveyed across the land in a manner to restrict velocities to minimise scour and erosion. There is no public infrastructure located</i>																

shall be preserved and if necessary for its continued viability be reconstructed to suit the new landform. Public infrastructure continuity shall be preserved at external boundaries. Alteration of the locations of cross boundary stormwater drainage/watercourse discharge should be avoided. If alterations are proposed, then the written agreement of all effected downstream landowners is required. (b) Perimeter levels: Pre development levels must be preserved at external (perimeter) boundaries of a subdivision, preferably without the use of boundary (or within 3m of the boundary) retaining walls exceeding 1.2m in height. The application of this criteria may be varied in infill subdivisions in flood liable areas where there is general filling to provide flood immunity.	<i>within the land and accordingly no impacts associated with regrading.</i> <i>Site regrading complies with perimeter levels and matches existing levels at neighbouring boundaries except for Western boundary where consent from adjoining owner is required.</i>
D6.05.3 Mass Landform Change Criteria	
1. Residential, includes residential subdivisions in Village, Urban Expansion and Rural Living zones. The proportion of a subdivision site (plan area) that contains cut or fill areas with finished surface levels that depart from natural surface levels by more than 5m shall not exceed 10%. Variations up to 15% of site area may be considered if such variations have a demonstrated environmental benefit (e.g. avoidance of importing borrowed fill off site).	<i>Cut/ fill earthworks provides a balance of earthworks over the site and where cut/ fill levels depart from existing natural surface levels by more than 5m does not exceed 10% (approx. 9.4%). Refer drawing SK3562.</i>
2. Industrial, Business and Mixed Use Subdivision, includes industrial, business and mixed use subdivisions in Village and Urban Expansion zones. The proportion of a subdivision (plan area) that contains cut or fill areas with finished surface levels that depart from natural surface levels by more than 8m shall not exceed 20%. For the purpose of this section “subdivision site” includes the parcels of land created for private sale and formal parks, and does not include undeveloped areas, areas retained for environmental purposes, roads, or residual allotments. If a subdivision contains a mix of urban and rural/rural residential uses, the rural/rural residential areas must be excluded from the urban areas for the purposes of complying with this clause.	<i>Not relevant.</i>

D6.05.4 Shape/Surface Criteria	
1. Residential and Rural Living Subdivision, includes residential subdivisions in Village and Urban Expansion zones. - The finished landform shape (concave/convex, rolling, stepped etc) of the subdivision site should mimic existing and local surrounding natural topography. - Except as provided in Note 1. below, no sharp changes of gradient (e.g. associated with batters or retaining walls) are permitted at or near inter lot boundaries or within lots. - Batters and retaining walls are not permitted for the purpose of creating terraced lots. - Sharp changes of gradient are permitted at road and public land boundaries (e.g. Drainage reserves, parks). See Figure 1. Note 1: A retaining wall or batter of maximum “combined height” (as defined in clause D6.05.6) of 1.2m at or adjacent to inter lot boundaries may be permitted to ease lot gradients, where lot longitudinal or cross gradient would exceed 10% in the absence of such retaining wall or batter.	<i>The finished landform mimics the existing topography and there are no sharp changes of gradients. Combined heights of retaining walls and/ or batters at site boundaries comply with maximum height of 1.2m and provide for a mix of housing types. Lots which require 1.2m maximum height retaining walls account for approximately 30% of allotments.</i>
2. Industrial, Business and Mixed Use Subdivision, includes industrial, business and mixed use subdivisions in Village and Urban Expansion zones. - Terraced lots with sharp changes of gradient associated with retaining walls or batters are permitted. - Sharp changes of gradient (i.e. associated with batters or retaining walls) are permitted at or near lot, road and public land boundaries. Sharp changes of gradient are permitted within lots.	<i>Not relevant.</i>
D6.05.5 Plans Criteria	
Site regrading proposals must be accompanied by the plans specified in Development Design Specification D13 – Engineering Plans (Subdivisions) clause D13.03 5(a).	<i>Site regrading proposals are shown on drawings SK3562, SK3507, SK3508, SK3527, SK3529, SK3635 and SK3636 to SK3643.</i>
D6.05.6 Retaining Walls and Batters	
(a) Definitions: “Retaining wall” is defined as a structure required to retain soil, rock and other materials. It includes retaining and revetment structures as defined in clause 1.1 of AS 4078 - 2002. “Batter” is defined as the sloping surface of artificial cuttings and embankments that have a gradient exceeding 25%. It excludes natural slopes. “Combined height” is defined as the vertical height	<i>The maximum permissible combined height of retaining walls or batters complies with Table D6.1 as shown on drawing SK3617 and earthworks drawings nominated in 6.05.5 above.</i>

difference at or adjacent to the boundary between top of batter or retaining wall and bottom of batter or retaining wall. Adjacent to a boundary includes any batters or retaining walls that lie either wholly or partly within a distance of 5m measured horizontally from the allotment boundary.

(b) Criteria:

The combined height of retaining walls or cut/fill batters on an allotment boundary shall conform with Table D6.1.

TABLE D6.1 MAXIMUM PERMISSIBLE COMBINED HEIGHT OF RETAINING WALLS OR BATTERS				
Type of Subdivision	Perimeter boundary of subdivision	Boundaries of lots created within subdivision		
		Side and Rear Boundaries	Street Boundary	
			Above Street Level	Below Street Level
Residential	1.2	1.2 see Note 1. Of D6.04.4(1)	1.8	2.4
Industrial	1.2	5	2.5	5
Business	1.2	5	1.2	2.4
Rural Living	1.2	Nil	1.2	2.4

(c) Where retaining walls or batters are utilised to create a level difference between adjacent allotments or an allotment and a road and the retaining wall is located in the lower allotment, the top of batter or top of retaining wall shall be located a minimum 0.9m horizontally from the boundary.

(d) Where batters or retaining walls are constructed they shall be equipped with necessary barriers to ensure compliance with occupational health and safety requirements. Road safety barriers shall be provided where warranted by RTA or Austroads standards.

D6.05.7 Care shall be taken to provide depressions for overland flow from low points and over major drainage lines, to direct stormwater for storms up to a 100 year average recurrence interval.

The subdivision layout has been designed with due care and consideration to allow for stormwater overland flow. Overland flow paths (not easements) have been provided either between allotments opposite low points in roads, or opposite open space areas away from allotments.

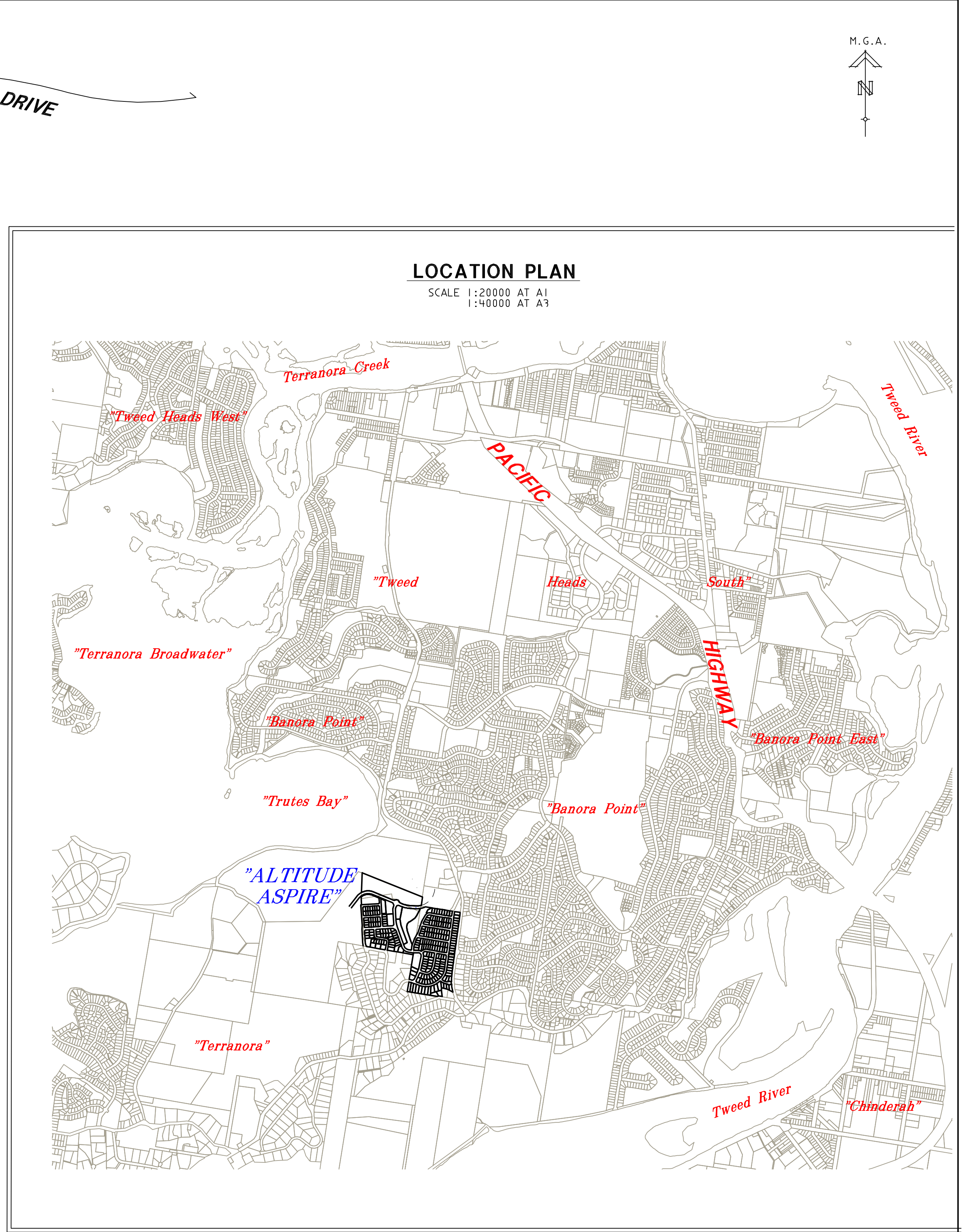
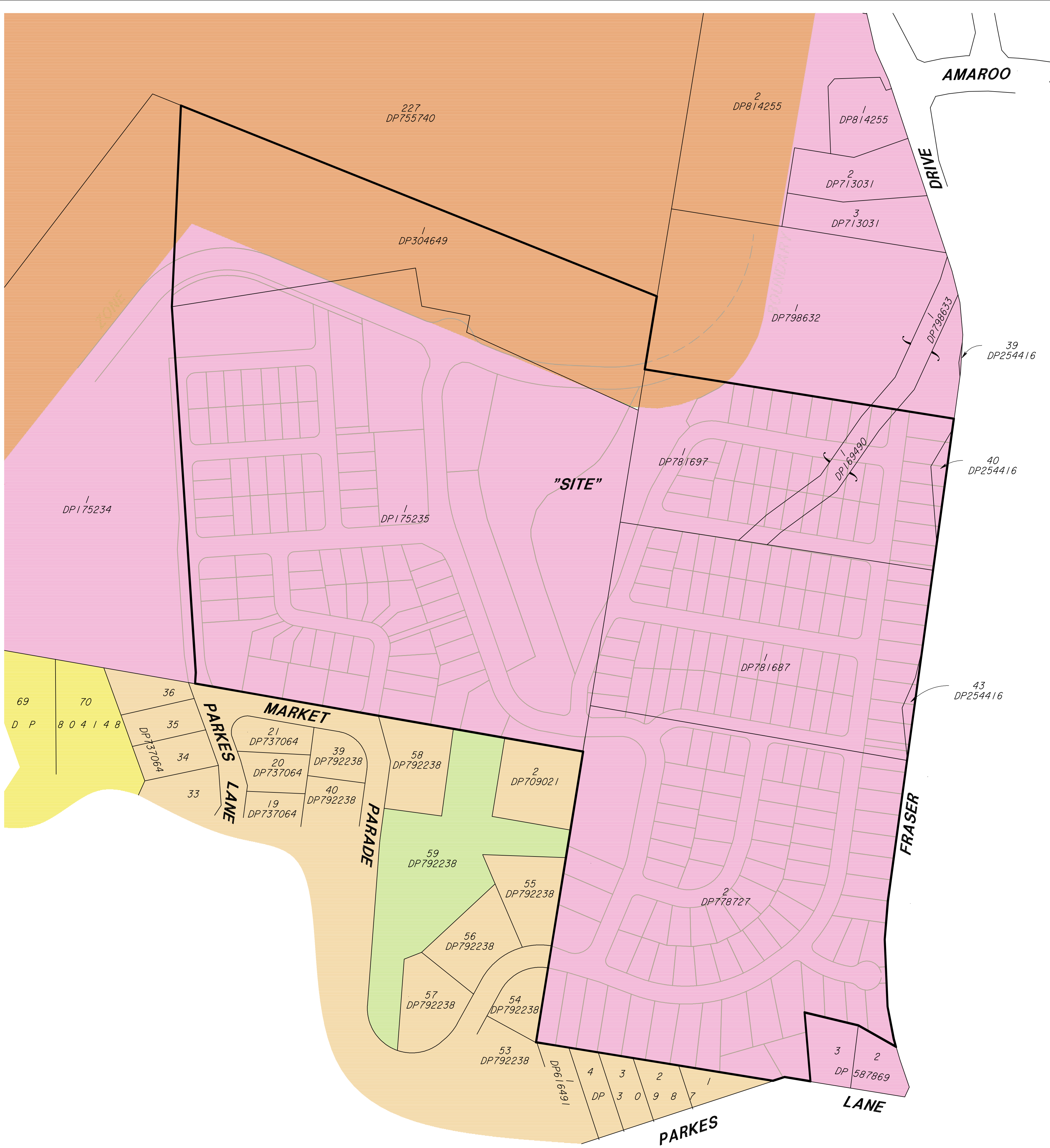
D6.05.8 Where constrained by landform alteration limits, use of the absolute maximum (longitudinal road) grades in Table D1.6 of Development Design Specification D1 – Road Design may be justified.

Absolute maximum longitudinal road grades used for the proposed road layout comply with Table D1.6 of Development Design Specification D1- Road Design. Refer drawings SK3563 to SK3616 inclusive and SK3936 to SK3968.

APPENDIX 1

- 18779-B-Sheet 1-8
- 09-374 – SK3627

Subdivision Plan – B & P Surveys Consulting Surveyors
Existing Contours Plan



ZONE 1(b) RURAL - AGRICULTURAL PROTECTION ZONE

ZONE 1(c) RURAL - RURAL LIVING

ZONE 2(c) RESIDENTIAL - URBAN EXPANSION

ZONE 6(a) OPEN SPACE

ZONE 7(a) ENVIRONMENTAL PROTECTION (WETLANDS AND LITTORAL RAINFORESTS)

PLAN SHOWING EXISTING PROPERTY DESCRIPTIONS & TWEED LOCAL ENVIRONMENTAL PLAN 2000 - ZONINGS

0m20406080100120140160180200

Scale in Metres - 1:2000 AT A1

Rev. A 22-1-13 Layout amended

Revision

Associate Consultant:

BRADLEES CONSULTING ENGINEERS

IMPORTANT NOTES :

THE ZONE INFORMATION SHOWN HEREON HAS BEEN COMPILED FROM TWEED SHIRE COUNCIL ZONE MAP NO. 14.

Rev. A 22-1-13 Layout amended

Revision

Associate Consultant:

BRADLEES CONSULTING ENGINEERS

PROPOSED STAGING

STAGE 1 LOTS 101 - 136

STAGE 2 LOTS 201 - 241

STAGE 3 LOTS 301 - 511

STAGE 4 LOTS 401 - 451 (INCLUDES 1 PUBLIC RESERVE)

STAGE 5 LOTS 501 - 524

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STAGE 7 LOTS 701 - 713 (INCLUDES 2 MEDIUM DENSITY SITES, 1 PUBLIC RESERVE & 1 RESIDENTS LOT)

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STAGE 9 LOTS 901 - 927 (INCLUDES 2 MEDIUM DENSITY LOTS & 1 PUBLIC RESERVE)

STAGE 10 LOT 1001 (PUBLIC RESERVE)

STAGE 11 LOTS 1101 - 1107

TOTALS - 251 RESIDENTIAL LOTS 4 MEDIUM DENSITY LOTS 6 PUBLIC RESERVES 1 DRAINAGE RESERVE 1 RESIDENTS LOT (COMMUNITY ASSOCIATION)

PROPOSED SUBDIVISION

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Parish of TERRANORA County of ROUS

C:\jobs-surfers\15263\18779B-A lotals Altitude I Aspire.pro

SCALE 1:2000 AT A1 1:4000 AT A3

Level DATUM F.BK L.BK Drawn BDR/BSP Chk'd BDR

REF. No. DATE DRAWING No./Size Sheet of Rev. T15263 19.1.2012 18779 B 1 8 A

B & P SURVEYS CONSULTING SURVEYORS

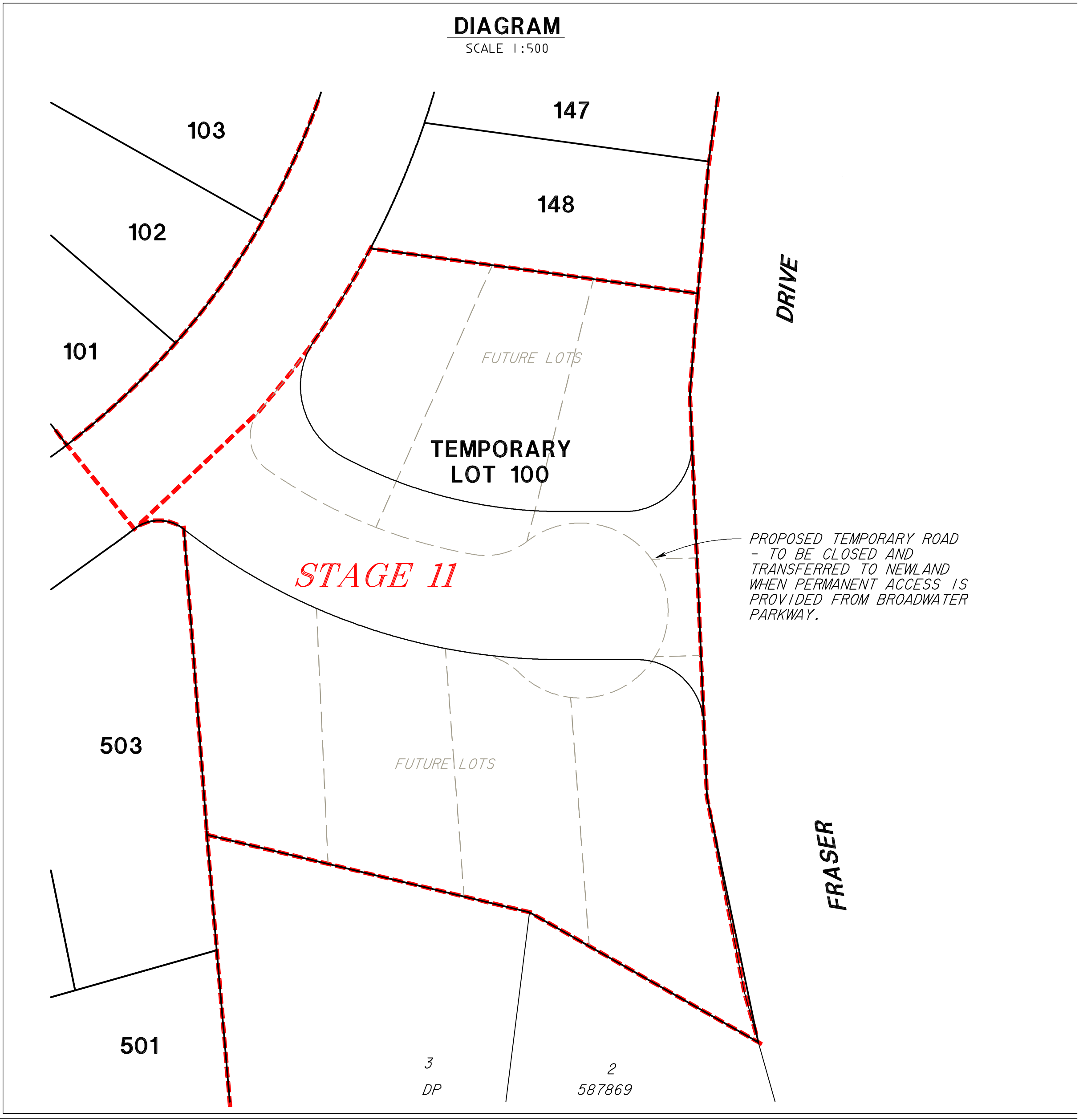
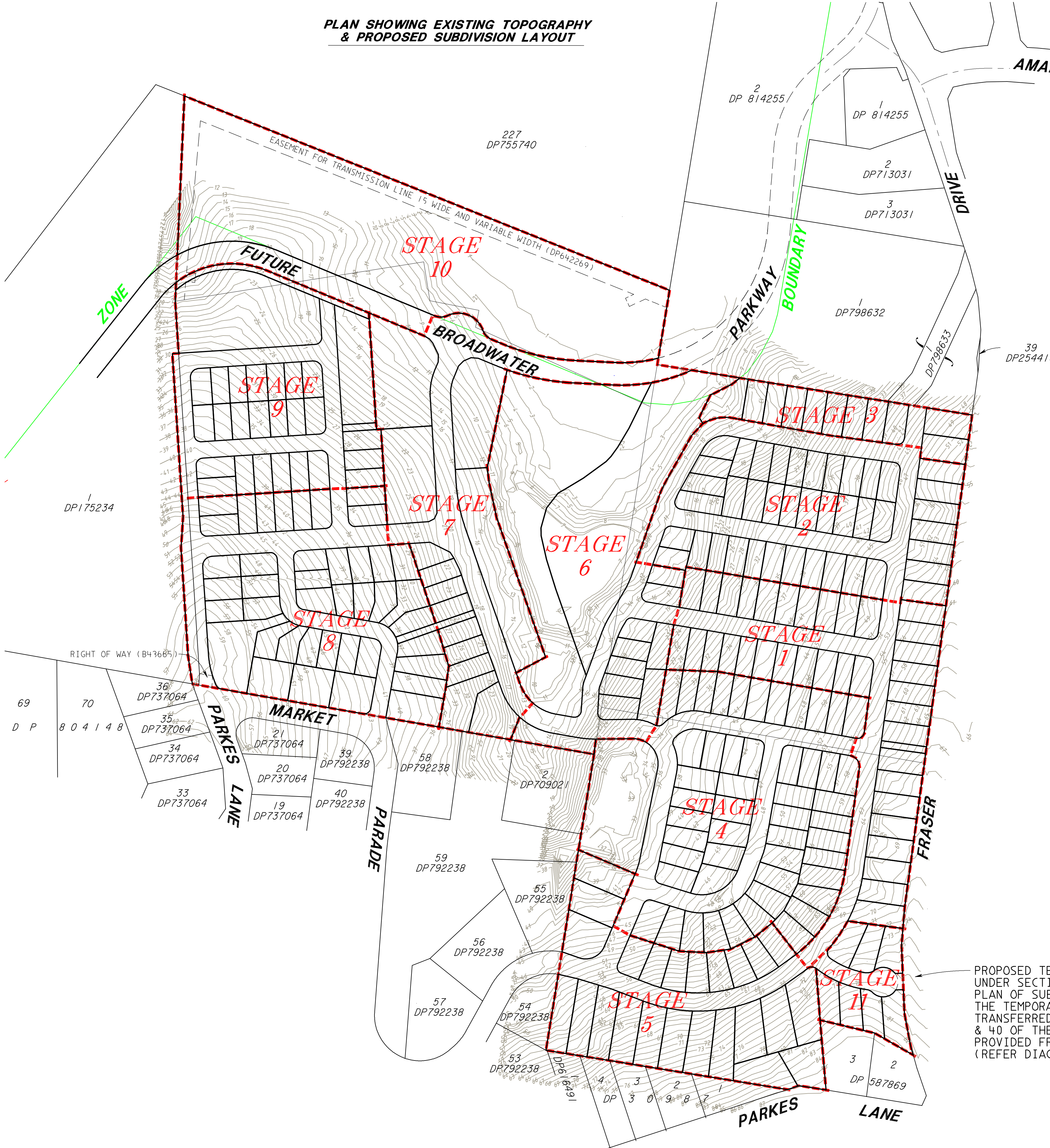
142 MURWILLUMBAH STREET MURWILLUMBAH NSW 2484 Australia

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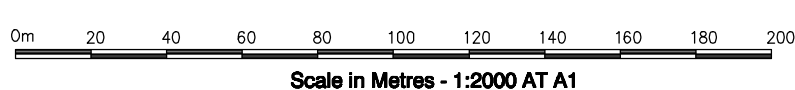
Offices Also At : Nerang Ph: (07) 55960370 Tweed Heads Ph: (07) 55363611

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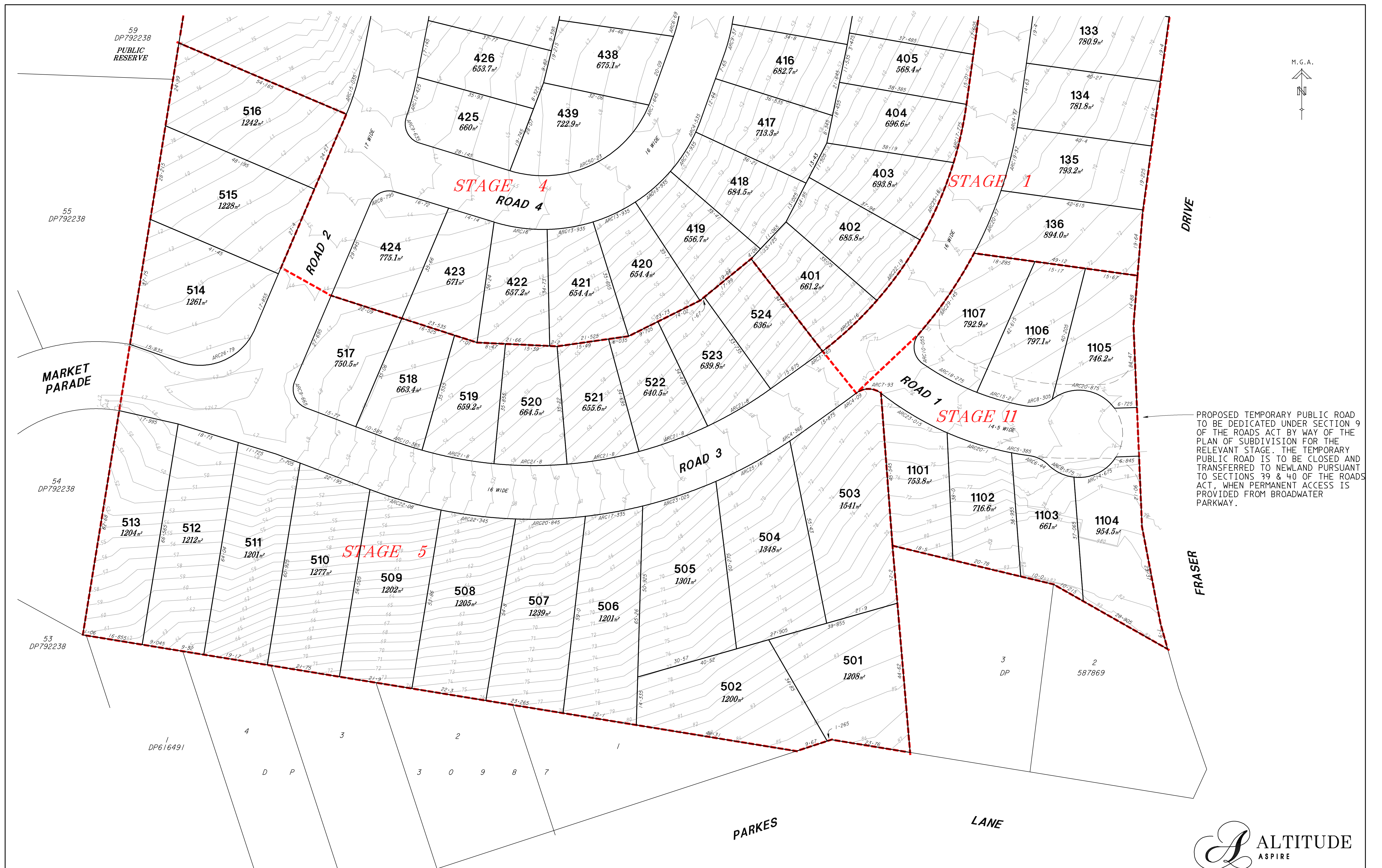
PLAN SHOWING EXISTING TOPOGRAPHY
& PROPOSED SUBDIVISION LAYOUT



PROPOSED TEMPORARY PUBLIC ROAD TO BE DEDICATED UNDER SECTION 9 OF THE ROADS ACT BY WAY OF THE PLAN OF SUBDIVISION FOR THE RELEVANT STAGE. THE TEMPORARY PUBLIC ROAD IS TO BE CLOSED AND TRANSFERRED TO NEWLAND PURSUANT TO SECTIONS 39 & 40 OF THE ROADS ACT, WHEN PERMANENT ACCESS IS PROVIDED FROM BROADWATER PARKWAY. (REFER DIAGRAM)



Rev. A 22-1-13 Layout amended Revision Associate Consultant: BRADLEES CONSULTING ENGINEERS		IMPORTANT NOTES : THE EXISTING TOPOGRAPHY SHOWN HEREON IS PER INFORMATION RECEIVED FROM BRADLEES CONSULTING ENGINEERS. THE PROPOSED BOUNDARIES AS SHOWN HEREON ARE PRELIMINARY ONLY AND ARE SUBJECT TO FINAL DESIGN, LOCAL AUTHORITY APPROVAL AND REGISTRATION IN THE DEPARTMENT OF LANDS. BDR Chk		PROPOSED STAGING STAGE 1 LOTS 101 - 136 STAGE 2 LOTS 201 - 241 STAGE 3 LOTS 301 - 311 STAGE 4 LOTS 401 - 451 (INCLUDES 1 PUBLIC RESERVE) STAGE 5 LOTS 501 - 524 STAGE 6 LOTS 601 - 611 (INCLUDES 1 PUBLIC RESERVE & 1 DRAINAGE RESERVE) STAGE 7 LOTS 701 - 713 (INCLUDES 2 MEDIUM DENSITY SITES, 1 PUBLIC RESERVE & 1 RESIDENTS LOT) STAGE 8 LOTS 801 - 841 (INCLUDES 1 PUBLIC RESERVE) STAGE 9 LOTS 901 - 927 (INCLUDES 2 MEDIUM DENSITY LOTS & 1 PUBLIC RESERVE) STAGE 10 LOT 1001 (PUBLIC RESERVE) STAGE 11 LOTS 1101 - 1107 TOTALS - 251 RESIDENTIAL LOTS 4 MEDIUM DENSITY LOTS 6 PUBLIC RESERVES 1 DRAINAGE RESERVE 1 RESIDENTS LOT (COMMUNITY ASSOCIATION)		PROPOSED SUBDIVISION LOT 1 IN DP304649, LOT 1 IN DP175235, LOT 2 IN DP778727, LOT 1 IN DP781687, LOT 1 IN DP781697, LOT 1 IN DP169490, LOTS 40 & 43 IN DP254416 FOR NEWLAND DEVELOPERS PTY LTD Parish of TERRANORA County of ROUS C:\jobs-surfers\15263\18779B-A lotcales Altitude I Aspire.pro SCALE 1:2000 AT A1 1:4000 AT A3 Level DATUM F.BK L.BK Drawn BDR/PSK Chk'd BDR		B & P SURVEYS CONSULTING SURVEYORS 142 MURWILLUMBAH STREET MURWILLUMBAH NSW 2484 Australia Telephone: (02) 66721924 Facsimile: (02) 66722618 Email: mbah@bpsurveys.com.au Homepage: www.bpsurveys.com.au Offices Also At : Tweed Heads Ph.(07) 55960370 Ph.(07) 55363611 ALTITUDE ASPIRE		REF. No. DATE DRAWING No./Size Sheet of Rev. T15263 19.1.2012 18779 B 2 8 A	
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PLAN SHOWING
PROPOSED SUBDIVISION LAYOUT
& DESIGN CONTOURS



8	
7	5
6	4
	3

Rev. A 22-1-13 Layout amended
Revision
Associate Consultant:
BRADLEES CONSULTING ENGINEERS

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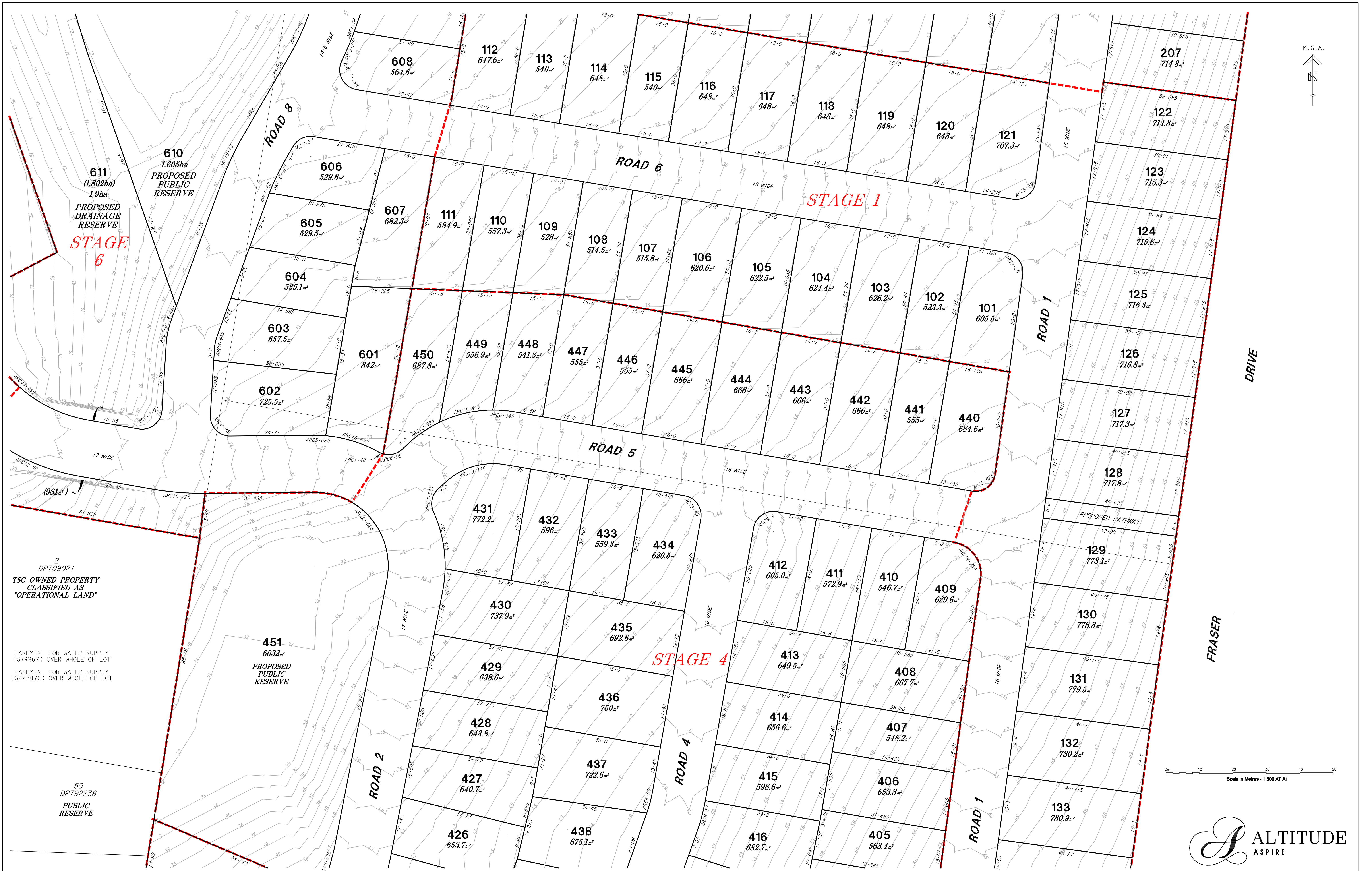
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Office: Also At :
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2
DP709021
TSC OWNED PROPERTY
CLASSIFIED AS
"OPERATIONAL LAND"

EASEMENT FOR WATER SUPPLY
(G79367) OVER WHOLE OF LOT
EASEMENT FOR WATER SUPPLY
(G227070) OVER WHOLE OF LOT

59
DP792238
PUBLIC
RESERVE

PLAN SHOWING
PROPOSED SUBDIVISION LAYOUT
& DESIGN CONTOURS

8	
7	5
6	4
	3

Rev. A 22-1-13 Layout amended
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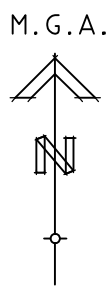
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SCALE	Level	DATUM	F.BK	L.BK	Drawn	Check'd	Rev.
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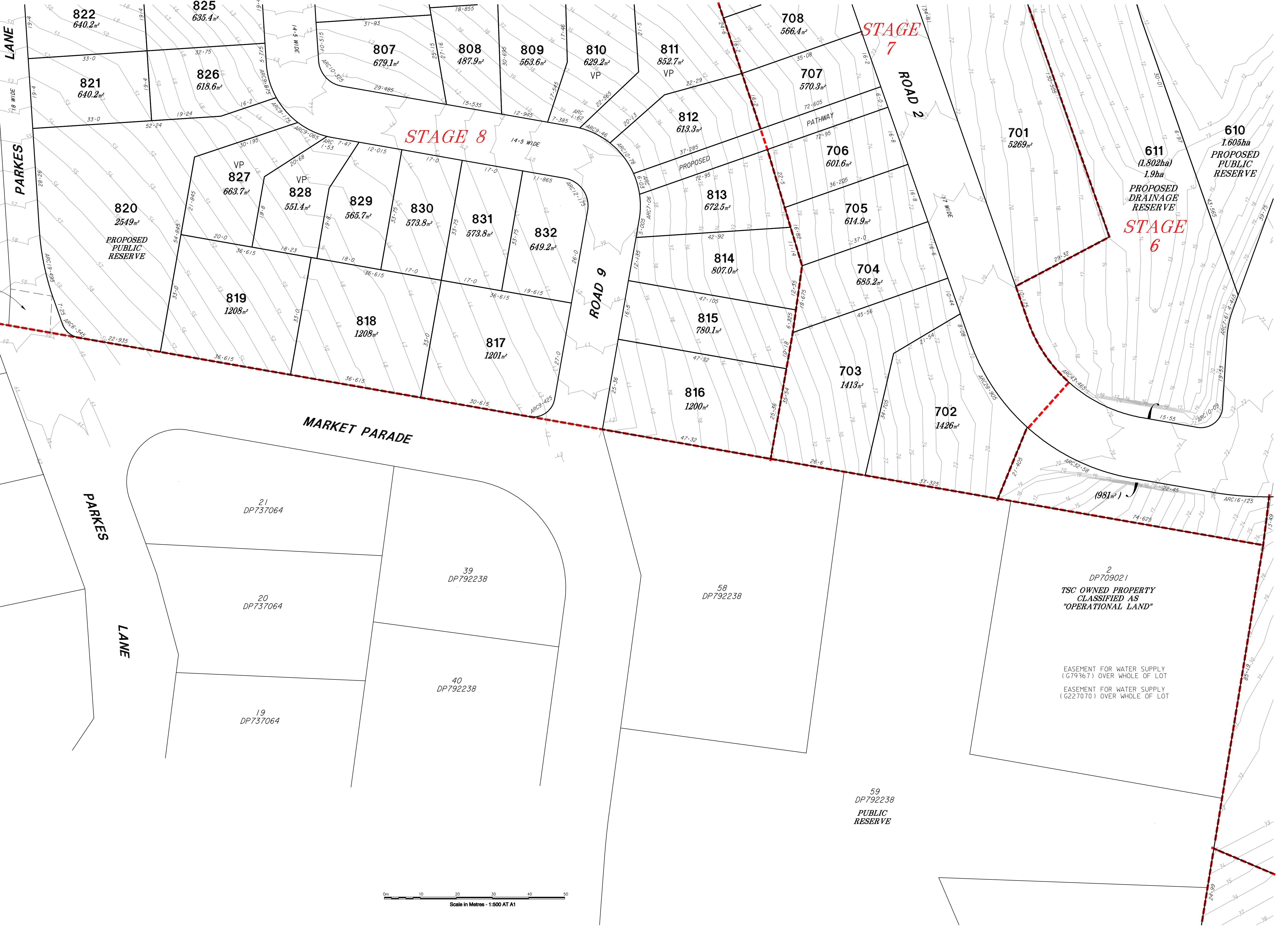
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**PLAN SHOWING
PROPOSED SUBDIVISION LAYOUT
& DESIGN CONTOURS**

8	
7	5
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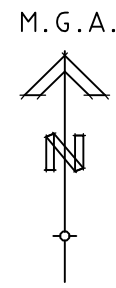
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PLAN SHOWING
PROPOSED SUBDIVISION LAYOUT
& DESIGN CONTOURS

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7	5
6	4
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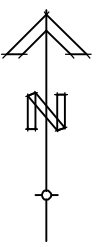
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STAGE 10

PROPOSED
PUBLIC
RESERVE

1001
4.29ha

ZONE

FUTURE

927
911m²

PROPOSED
PUBLIC
RESERVE

926
7729m²

BROADWATER

ROAD 13
13 WIDE

STAGE 9

ROAD 12

14.5 WIDE

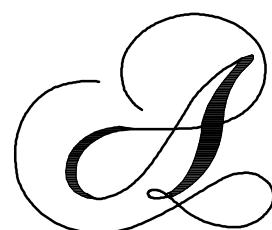
925
2938m²

712
PROPOSED
PUBLIC
RESERVE

STAGE 7

PARKWAY

713



ALTITUDE
ASPIRE

**PLAN SHOWING
PROPOSED SUBDIVISION LAYOUT
& DESIGN CONTOURS**

8	5
7	4
6	3

Rev. A 22-1-13 Layout amended
Revision

Associate Consultant:

BRADLEES CONSULTING ENGINEERS

BDR

Chk

IMPORTANT NOTES :

THE PROPOSED BOUNDARIES AS SHOWN HEREON ARE PRELIMINARY ONLY AND ARE SUBJECT TO FINAL DESIGN, LOCAL AUTHORITY APPROVAL AND REGISTRATION IN THE DEPARTMENT OF LANDS.

DESIGN CONTOURS SHOWN HEREON ARE PER INFORMATION SUPPLIED BY BRADLEES CONSULTING ENGINEERS.

VP - DENOTES PROPOSED RESTRICTION ON USE OVER THE LOT, REQUIRING ONE OFFSTREET CARPARK IS TO BE PROVIDED.

PROPOSED STAGING

STAGE 1 LOTS 101 - 136
STAGE 2 LOTS 201 - 241
STAGE 3 LOTS 301 - 341
STAGE 4 LOTS 401 - 451 (INCLUDES 1 PUBLIC RESERVE)
STAGE 5 LOTS 501 - 524
STAGE 6 LOTS 601 - 611 (INCLUDES 1 PUBLIC RESERVE & 1 DRAINAGE RESERVE)
STAGE 7 LOTS 701 - 713 (INCLUDES 2 MEDIUM DENSITY SITES)
STAGE 8 LOTS 801 - 841 (INCLUDES 1 PUBLIC RESERVE & 1 RESIDENTS LOT)
STAGE 9 LOTS 901 - 927 (INCLUDES 2 MEDIUM DENSITY LOTS & 1 PUBLIC RESERVE)
STAGE 10 LOT 1001 (PUBLIC RESERVE)
STAGE 11 LOTS 1101 - 1107
TOTALS - 251 RESIDENTIAL LOTS 4 MEDIUM DENSITY LOTS
6 PUBLIC RESERVES 1 DRAINAGE RESERVE
1 RESIDENTS LOT (COMMUNITY ASSOCIATION)

PROPOSED SUBDIVISION

LOT 1 IN DP304649, LOT 1 IN DP175235,
LOT 2 IN DP778727, LOT 1 IN DP781687,
LOT 1 IN DP781697, LOT 1 IN DP169490,
LOTS 40 & 43 IN DP254416
FOR NEWLAND DEVELOPERS PTY LTD

Parish of TERRANORA County of ROUS
C:\jobs-surfers\1526\187798-A lotcales Altitude I Aspire.pro

SCALE
1:500 AT A1
1:1000 AT A3

B & P SURVEYS

CONSULTING SURVEYORS
142 MURWILLUMBAH STREET
MURWILLUMBAH
NSW 2484 Australia
Telephone: (02) 66721924
Facsimile: (02) 66722618
Email: mbah@bpsurveys.com.au
Offices Also At :
Nerang Ph.(07) 55960370
Tweed Heads Ph.(07) 55363611



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REF. No. DATE DRAWING No./Size Sheet of Rev.
T15263 19.1.2012 18779 B 8 8 A



LEGEND

- 12 — EXISTING SURFACE CONTOURS
- — — STAGE BOUNDARY

NEWLAND DEVELOPERS PTY LTD

09-374
23-02-2012

TERRANORA PRECINCT 1
EXISTING CONTOURS PLAN

SK3627
REVISION A

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Sunshine Coast Ph 07 5451 1994 Tweed Coast Ph 02 6674 8133

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APPENDIX 2

- Tweed Shire Council email dated 18-2-12 – Broadwater Parkway

Subject: FW: Area E - Broadwater Parkway

From: Danny Rose [<mailto:DRose@tweed.nsw.gov.au>]
Sent: Wednesday, 8 February 2012 10:46 AM
To: Brian Lees
Subject: Area E

Brian,

In response to your enquiries, I provide the following advice:

1) Broadwater Parkway cross section.

In the draft Area E s94 plan it was determined that the "Normal Neighbourhood Connector Road" cross section from D1 should be applied to Broadwater Parkway east of the town centre. This standard requires a 13.4m wide carriageway within a 20.9m wide road reserve. An offroad shared user path is required on the southern road verge. In our preliminary design work we have recommended a variation to the standard cross section on the northern (wetland) side, to delete the requirement for a footpath, and narrow the verge width from 3.5m to 2.4m. This would reduce the overall road reserve width to 19.8m minimum. This would need to be addressed in the PPR.

2) Fraser Drive

Council's s94 Plan CP22 – Cycleways nominates north and south bound on-road cycleway facilities for the section of Fraser Drive adjacent to Altitude Aspire. South of Amaroo, the ultimate road cross section remains 2-lane, under CP4 TRCP/Tweed Road Development Strategy. At this stage, an appropriate cross section to consider would consist of a 13m wide seal from the existing eastern edge, to provide 3m wide parking/cycleway sealed shoulders plus 3.5m traffic lanes. While this will likely require carriageway widening, the existing 20m wide road reserve remains sufficient.

I trust this addresses your questions.

Regards
Danny Rose

Danny Rose BE (Civil Hons) | Planning and Infrastructure Engineer
Engineering and Operations



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Civic and Cultural Centre Tumbulgum Road Murwillumbah NSW 2484 | PO Box 816 Murwillumbah NSW 2484

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Please consider the environment before printing this email. One tonne of paper is equivalent to 13 trees and 30 kL of water

All official correspondence requiring a formal written response should be addressed to the General Manager, PO Box 816, Murwillumbah, 2484; or emailed to tsc@tweed.nsw.gov.au; or faxed to 02 6670 2429.

This email (including any attachments) is confidential and must only be used by the intended recipient(s) for the purpose(s) for which it has been sent. It may also be legally privileged and/or subject to copyright.

APPENDIX 3

• 09-374 – SK3628	Road Hierarchy Plan
• 09-374 – SK3645	Aerial Photo and Broadwater Parkway Proposed Alignment
• 09-374 – SK3563 – SK3566	Broadwater Parkway Long Sections
• 09-374 – SK3567 – SK3584	Broadwater Parkway Cross Sections
• 09-374 – SK3584 & SK3586	Road 1 Longitudinal Section
• 09-374 – SK3587 – SK3589	Road 1 Cross Sections
• 09-374 – SK3590	Road 2 Longitudinal Section
• 09-374 – SK3591 – SK3594 & SK3963	Road 2 Cross Sections
• 09-374 – SK3595	Road 3 Long Section
• 09-374 – SK3596 – SK 3597	Road 3 Cross Sections
• 09-374 – SK3598	Road 4 Long Section
• 09-374 – SK3599	Road 4 Cross Sections
• 09-374 – SK3600	Road 5 Long Section
• 09-374 – SK3601 & SK3964	Road 5 Cross Sections
• 09-374 – SK3602 & SK3965	Road 6 Long Section and Road 6 Cross Sections
• 09-374 – SK3603 & SK3966	Road 7 Long Section and Road 7 Cross Sections
• 09-374 – SK3604	Road 8 Long Section
• 09-374 – SK3605 – SK3607 & SK3967	Road 8 Cross Sections
• 09-374 – SK3608 & SK3968	Road 9 Long Section and Road 9 Cross Sections
• 09-374 – SK3609	Road 10 Long Section
• 09-374 – SK3610 – SK3611	Road 10 Cross Sections
• 09-374 – SK3612	Road 11 Long Section and Road 11 Cross Sections
• 09-374 – SK3613	Road 12 Long Section
• 09-374 – SK3614 – SK 3615	Road 12 Cross Sections
• 09-374 – SK3616	Road 13 Long Section and Road 13 Cross Sections



LEGEND

COLLECTOR ROAD	11.0m KERB - KERB	18.0m ROAD RESERVE
COLLECTOR STREET	9.0m KERB - KERB	17.0m ROAD RESERVE
COLLECTOR STREET	9.0m KERB - KERB	16.0m ROAD RESERVE
ACCESS STREET	7.5m KERB - KERB	16m ROAD RESERVE
ACCESS STREET	7.5m KERB - KERB	14.5m ROAD RESERVE
TEMPORARY ACCESS STREET	15.0m KERB - KERB	22.0m ROAD RESERVE
ACCESS STREET	6.0m KERB - KERB	13.0m ROAD RESERVE

PLAN LAYOUT
SCALE NTS

NEWLAND DEVELOPERS PTY LTD

TERRANORA PRECINCT 1
ROAD HIERARCHY PLAN

09-374
09-04-2012

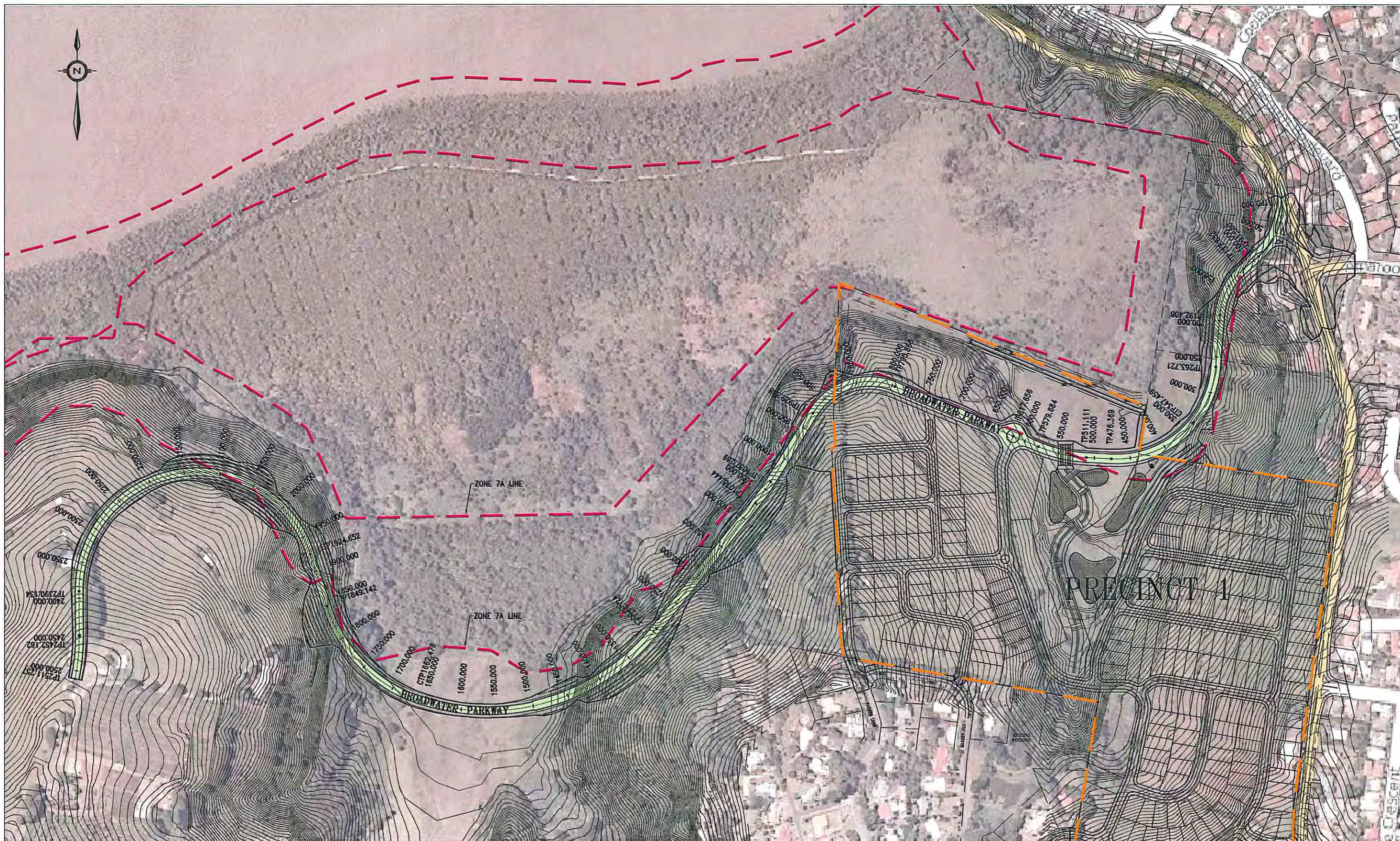
SK3628
REVISION D

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LEGEND

- ZONE 7A LINE
- PRECINCT 1 BOUNDARY
- 23 EXISTING SURFACE CONTOURS

50 0 50 100m
1 : 2500 (FULL SIZE)

NEWLAND DEVELOPERS PTY LTD

TERRANORA PRECINCT 1
AERIAL PHOTO AND BROADWATER
PARKWAY PROPOSED ALIGNMENT

09-374
07-01-2013

SK 3645
REVISION B

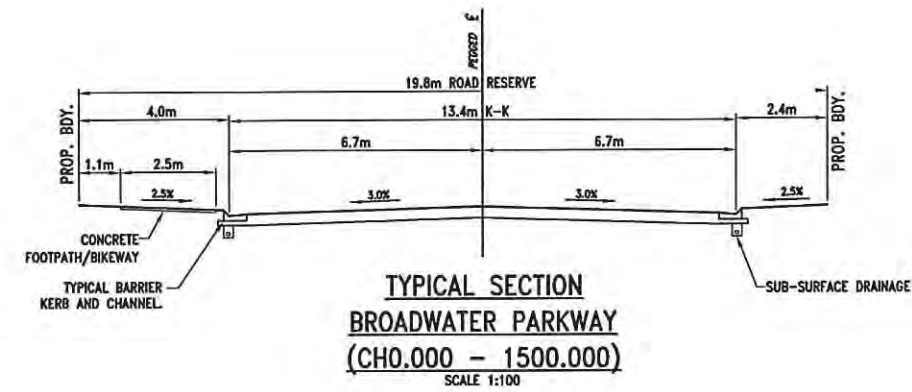
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I.P. 0
R.L. 34.014
ΔV.C. 35m
G. 10.17%
R. 344.0
I.P. 35
R.L. 33.247
I.P. 35
R.L. 33.384
I.P. 35
R.L. 32.558



DATUM	HEIGHT OF FILL	DEPTH OF CUT	PAVEMENT LEVEL ON PEGGED CENTRELINE	EXISTING SURFACE LEVEL	PEGGED CHAINAGE
R.L. -1.0					

HORIZONTAL
CURVE DATA

R90		R92.4		R137.6		R137.6		R200	
0	34.01	34.014	0.00	R.L. -1.0					
50	32.86	31.578	1.29						
91.590	29.85	26.608	3.25						
100	29.09	25.600	3.49						
117.832	27.96	23.464	4.49						
150	21.93	19.612	2.32						
192.408	14.09	14.534	0.44						
200	13.13	13.824	0.50						
250	3.16	7.913	4.75						
263.721	2.95	6.709	3.76						
300	2.92	4.514	1.60						
347.459	3.62	3.687	0.06						
350	3.46	3.674	0.21						
400	1.80	3.410	1.61						
450	1.08	3.145	2.07						
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500	1.15	2.890	1.74						
511.111	1.14	2.925	1.79						
550	1.42	3.823	2.40						
579.684	2.97	5.321	2.35						
600	4.62	6.569	1.95						
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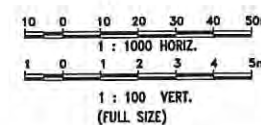
R90

R92.4

R137.6

R137.6

R200



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09-374
23-02-2012

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BROADWATER PARKWAY
LONG. SECTION - SHEET 1 OF 4**

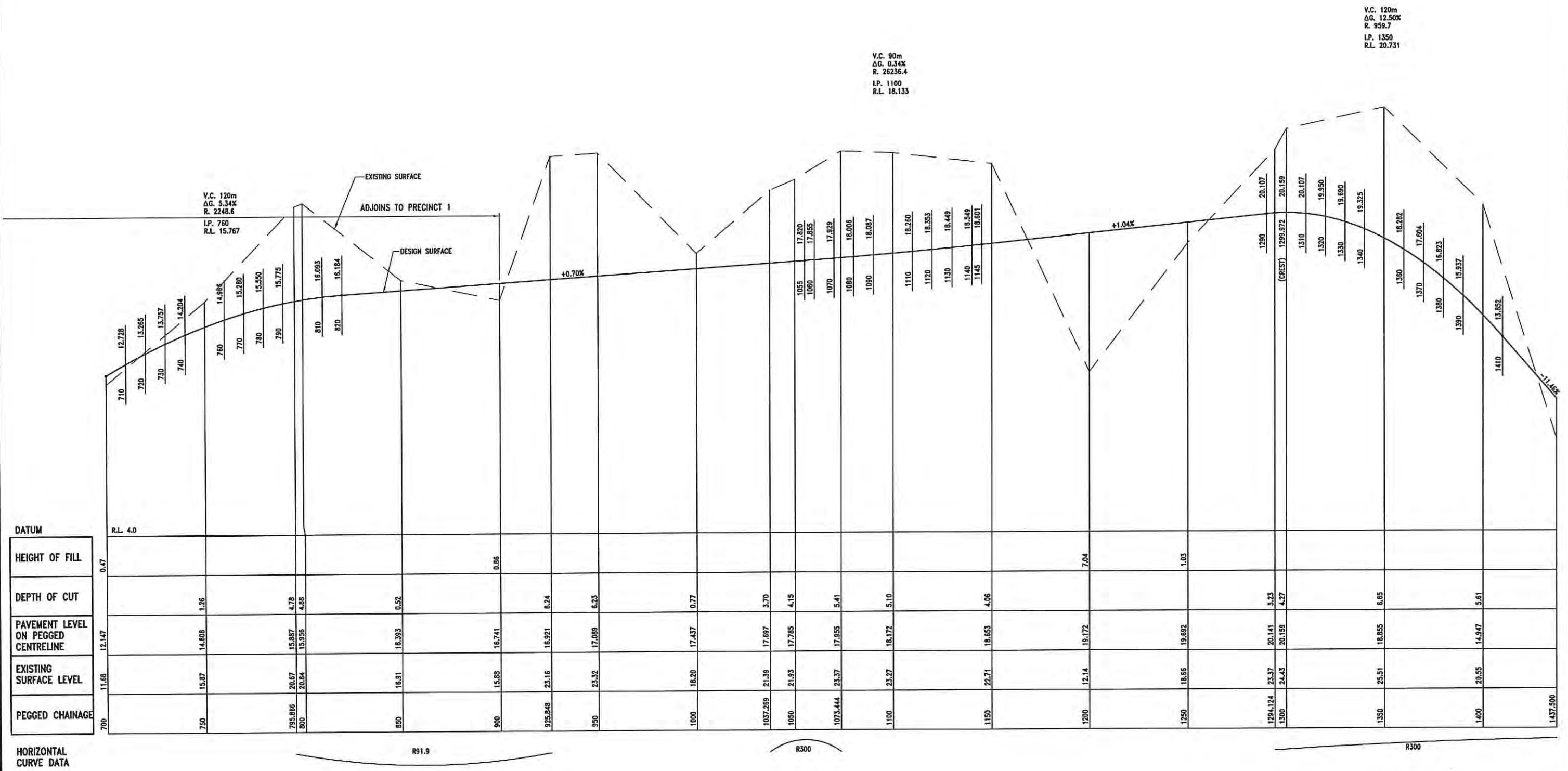
SK 3563
REVISION A

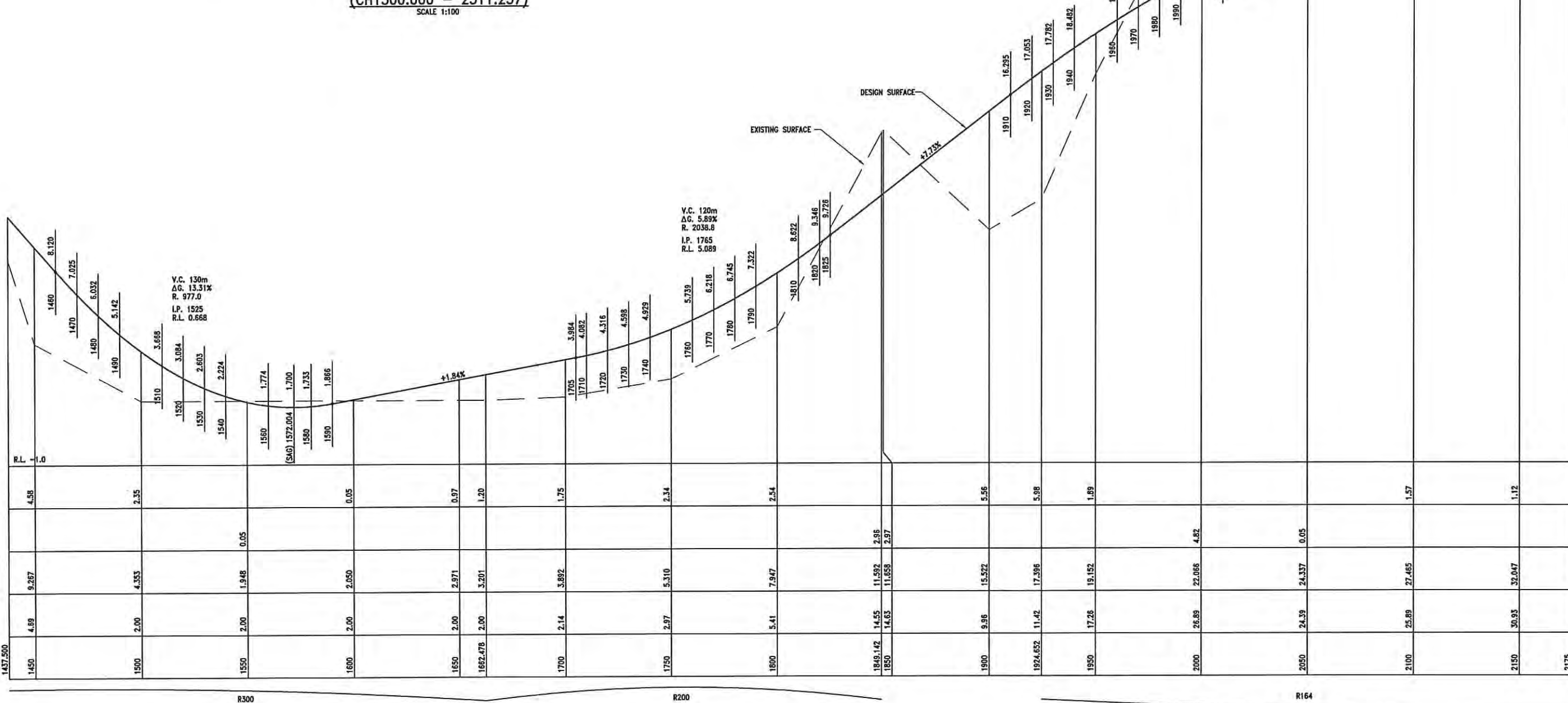
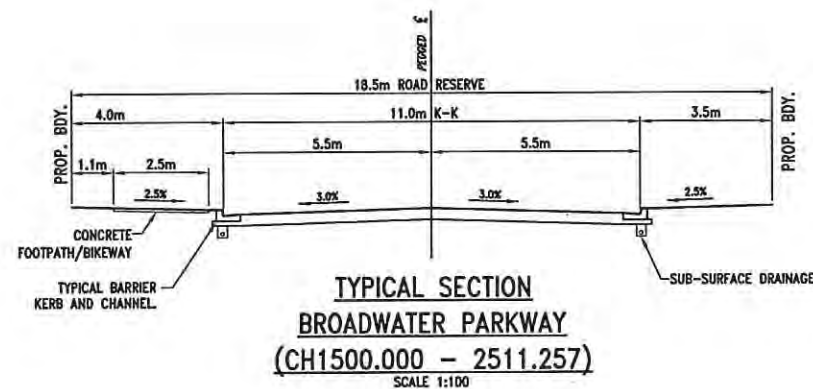
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Email mail@bradlees.com.au
Postal PO Box 2293, Southport QLD 4215
Gold Coast Office Level 1, 34 Thomas Drive, Chevron Island QLD 4217

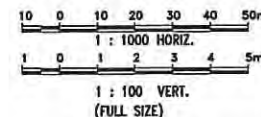
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DATUM	R.L. -1.0
HEIGHT OF FILL	4.38
DEPTH OF CUT	
PAVEMENT LEVEL ON PEGGED CENTRELINE	
EXISTING SURFACE LEVEL	4.89
PEGGED CHAINAGE	1450

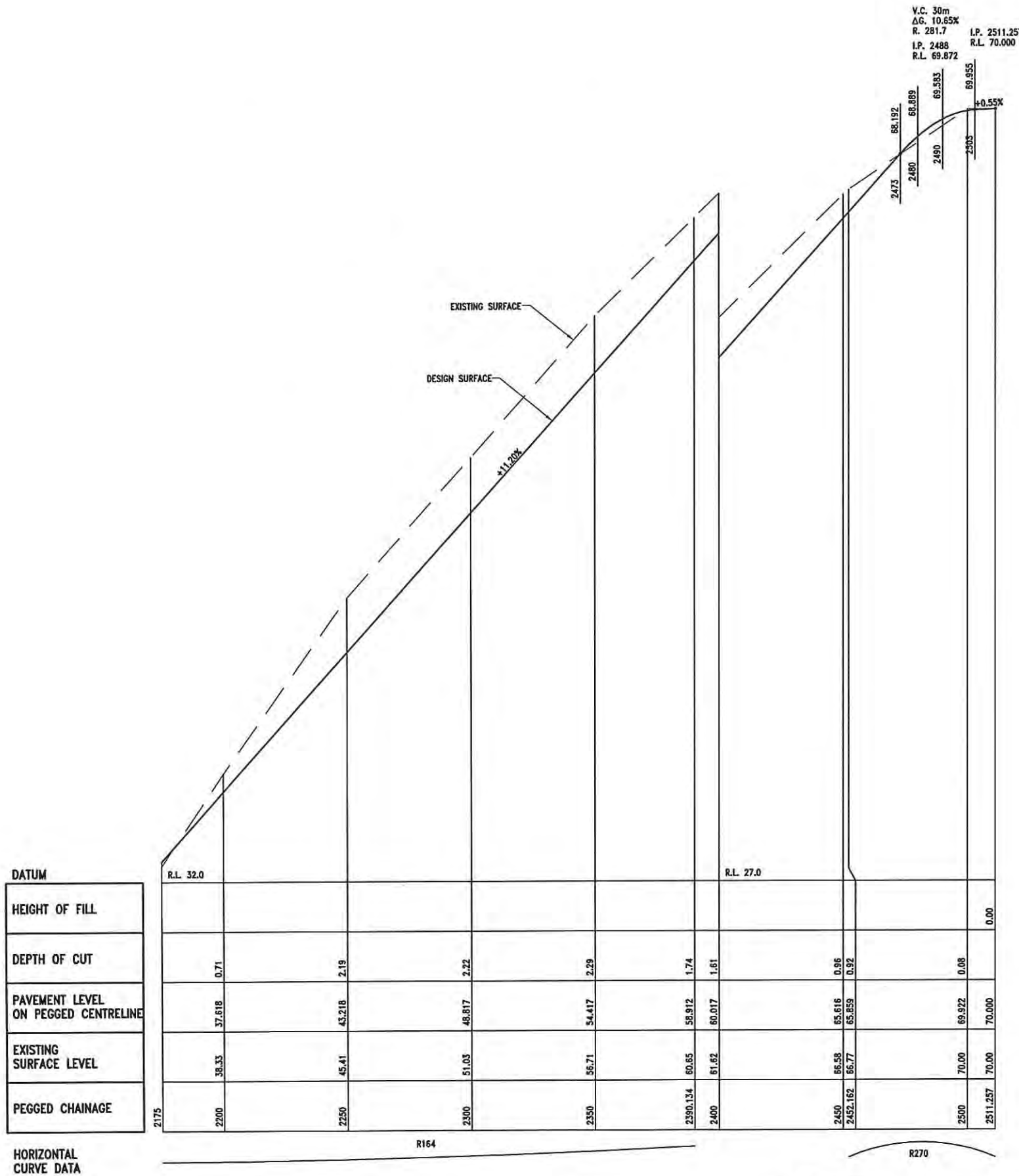


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BROADWATER PARKWAY
LONG. SECTION - SHEET 3 OF 4

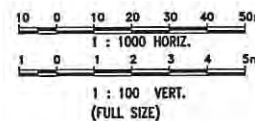
09-374
23-02-2012
SK 3565
REVISION A

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HORIZONTAL
CURVE DATA



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09-374
23-02-2012

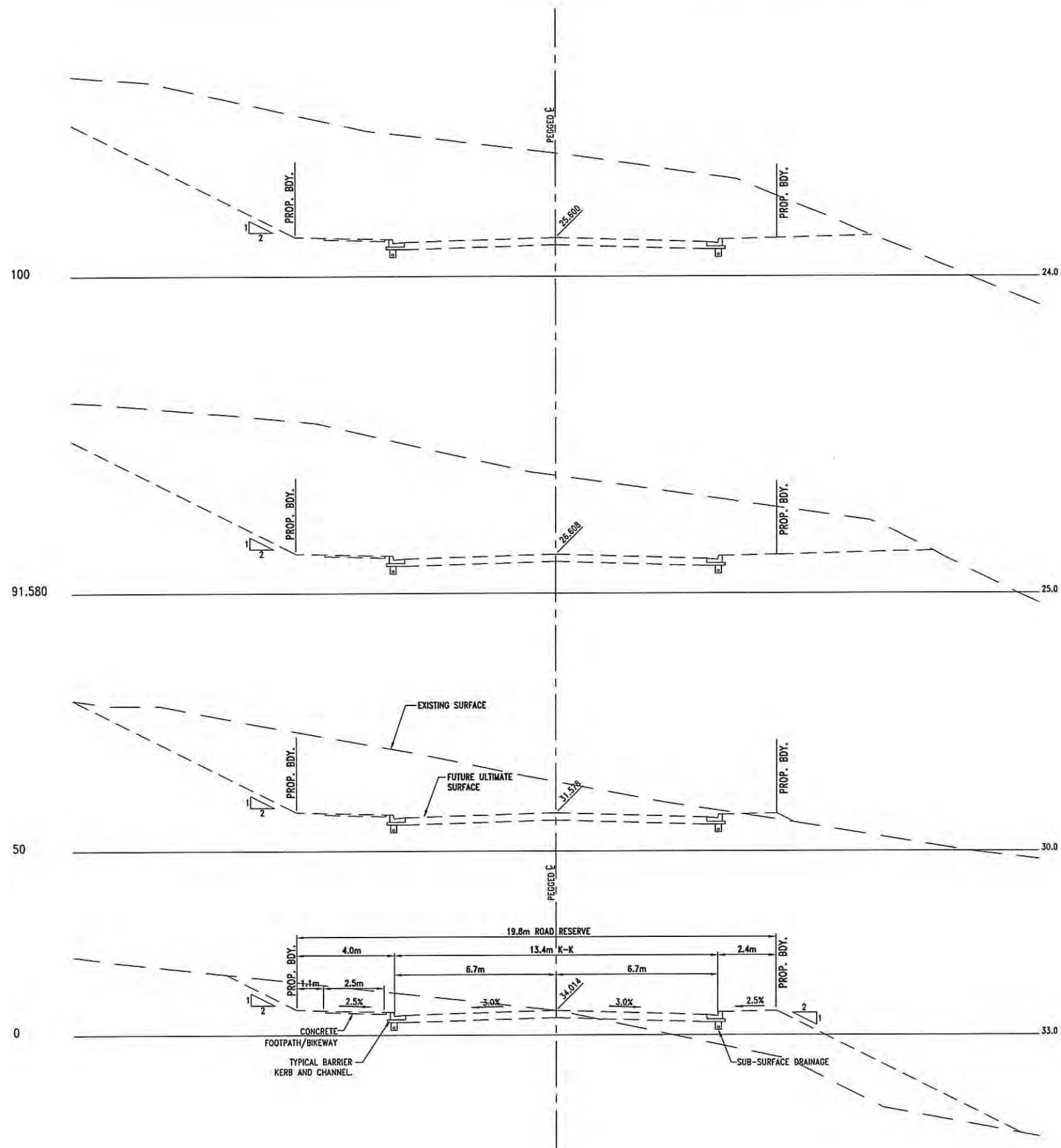
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 BROADWATER PARKWAY
 LONG. SECTION - SHEET 4 OF 4

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NOTE
FUTURE ULTIMATE
CONSTRUCTION BY OTHERS

1 0 1 2 3 4 5m
1 : 100 (FULL SIZE)

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23-02-2012

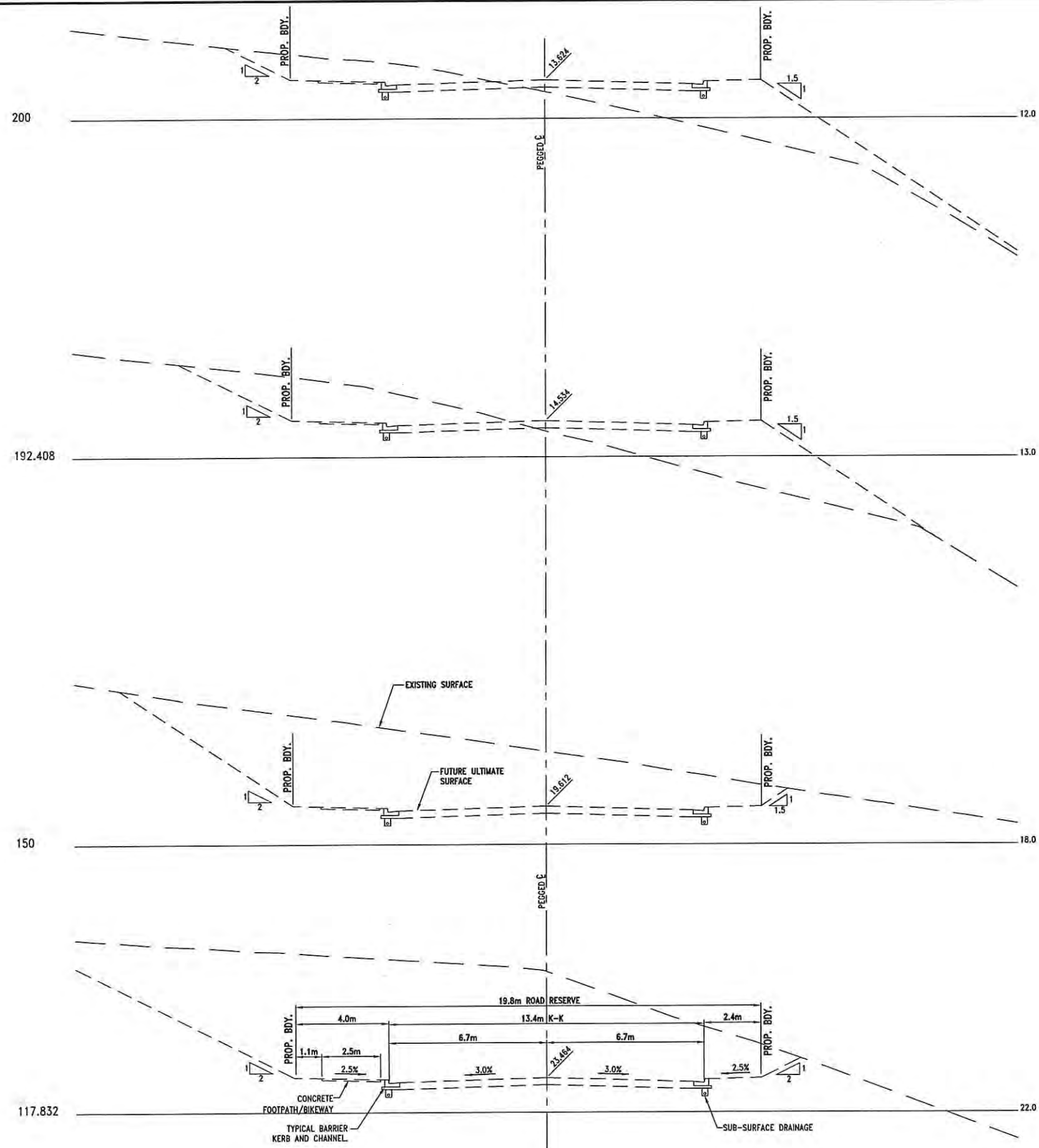
TERRANORA PRECINCT 1
BROADWATER PARKWAY
CROSS SECTIONS - SHEET 1 OF 18

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NOTE
FUTURE ULTIMATE
CONSTRUCTION BY OTHERS

1 0 1 2 3 4 5m
1 : 100 (FULL SIZE)

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TERRANORA PRECINCT 1
BROADWATER PARKWAY
CROSS SECTIONS - SHEET 2 OF 18

SK 3568
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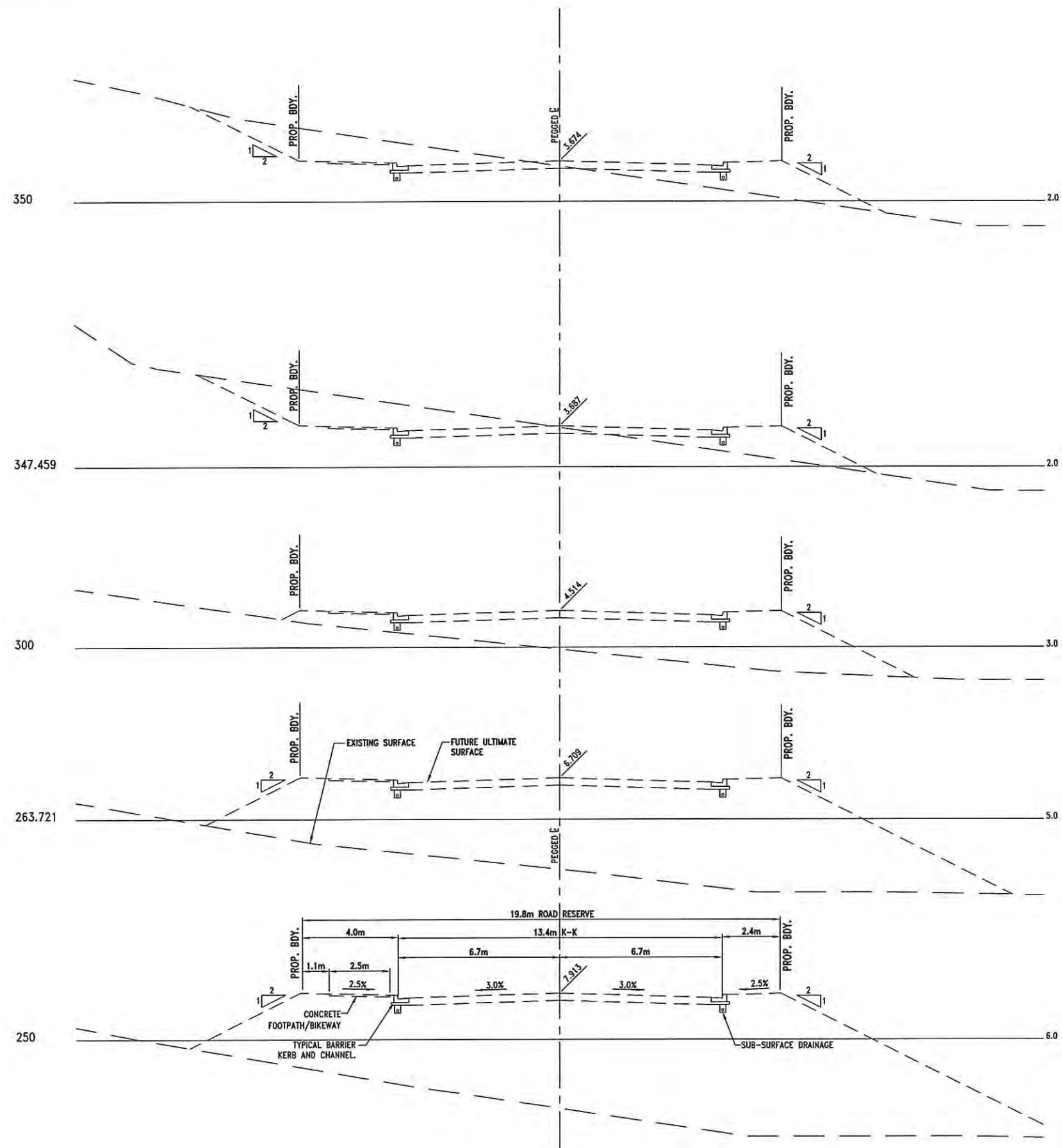
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NOTE
FUTURE ULTIMATE
CONSTRUCTION BY OTHERS

1 0 1 2 3 4 5m
1 : 100 (FULL SIZE)

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TERRANORA PRECINCT 1
BROADWATER PARKWAY
CROSS SECTIONS - SHEET 3 OF 18

09-374
23-02-2012

SK 3569
REVISION A

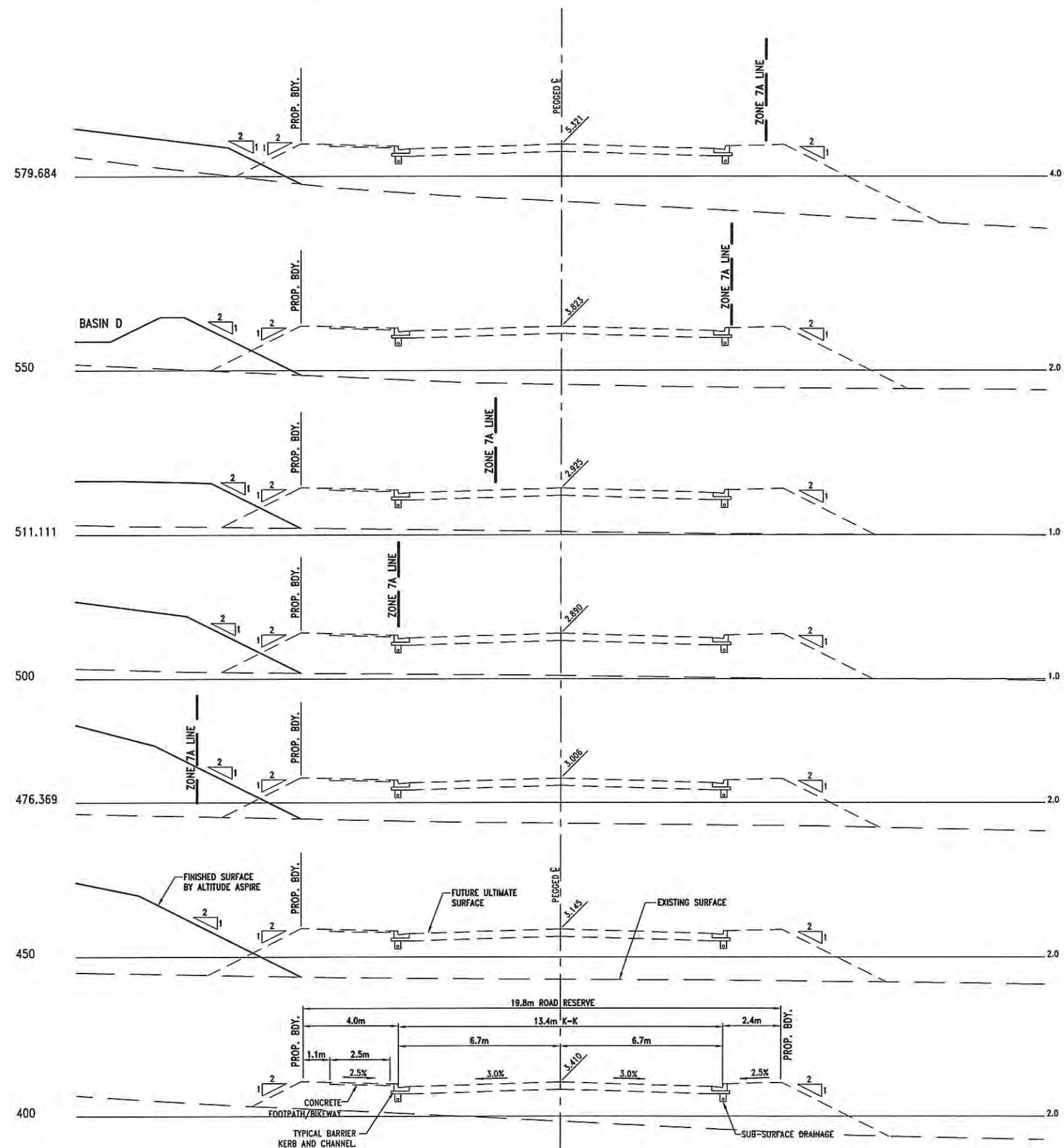
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ZONE 7A LINE

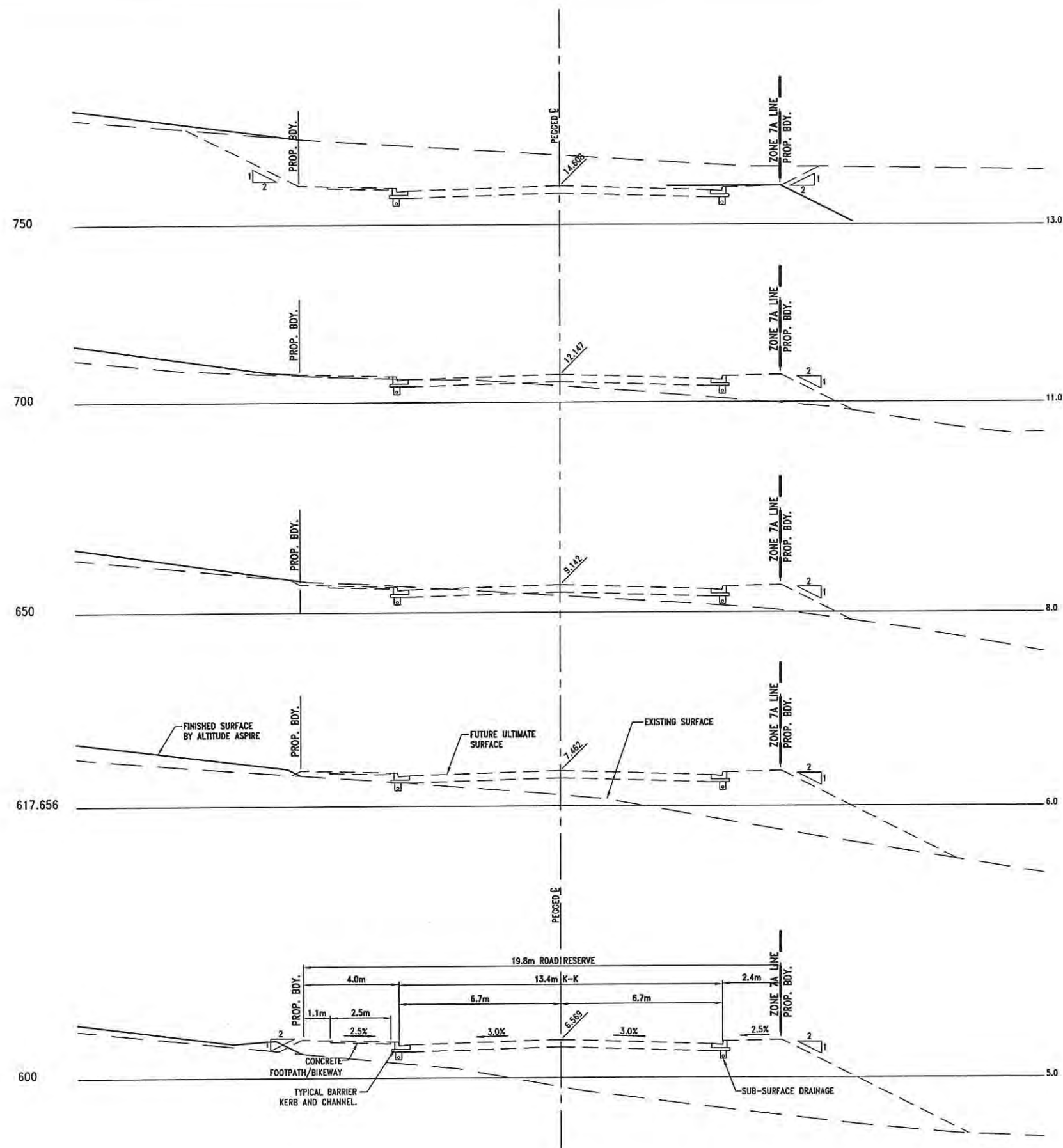


NOTE
FUTURE ULTIMATE
CONSTRUCTION BY OTHERS

1 0 1 2 3 4 5m
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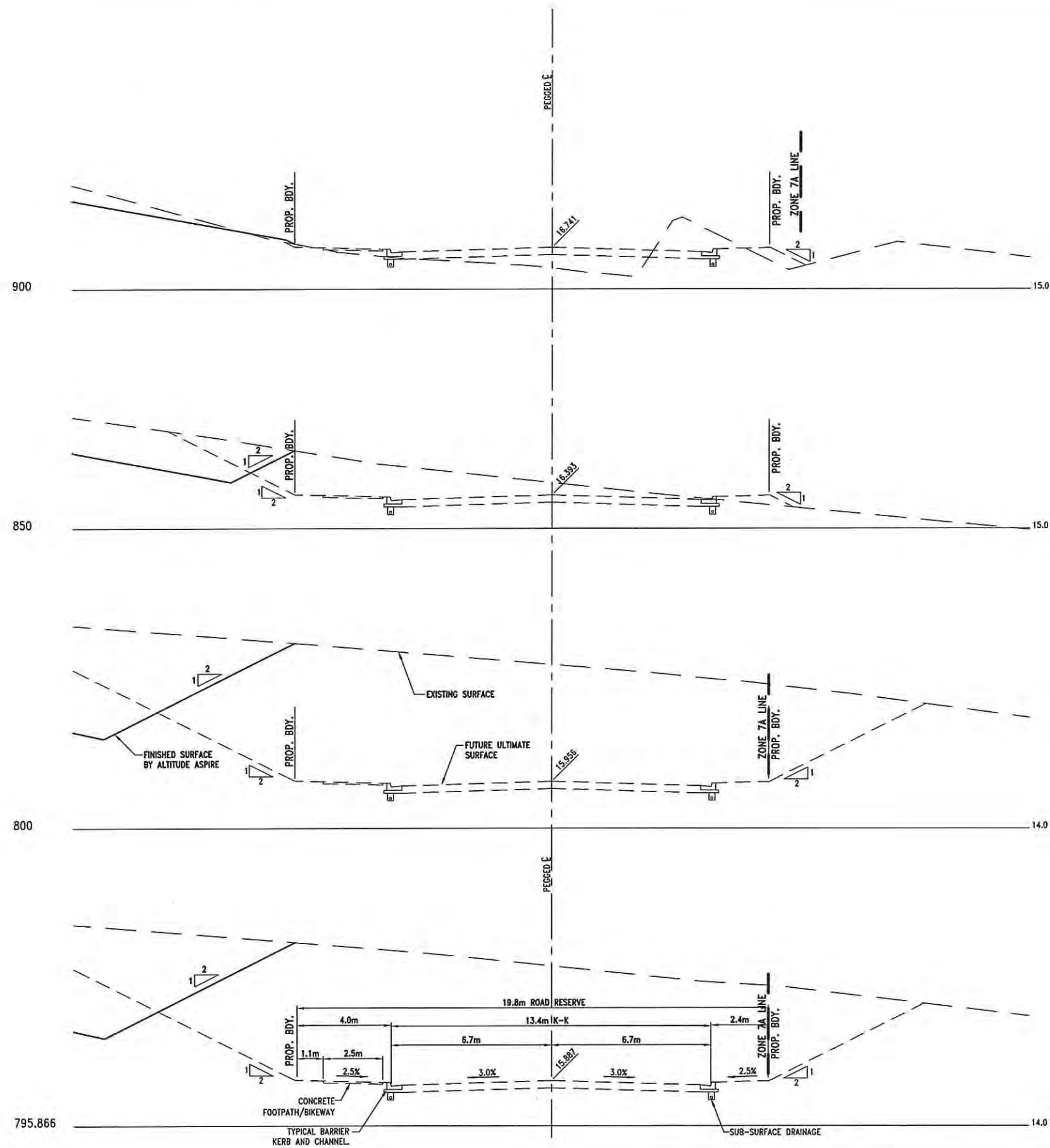
NOTE
FUTURE ULTIMATE
CONSTRUCTION BY OTHERS

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REG. NO. 233

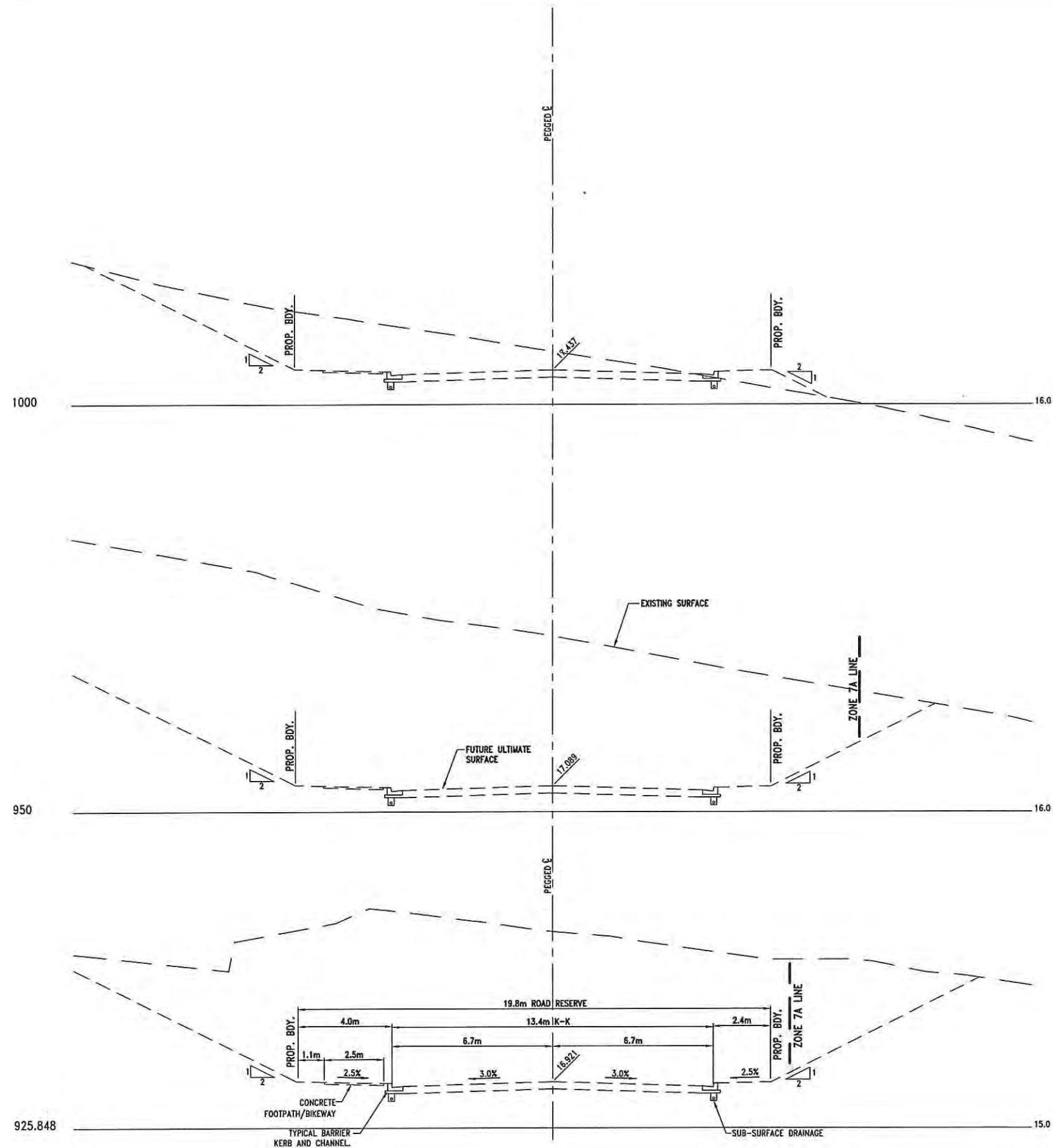


NOTE
FUTURE ULTIMATE
CONSTRUCTION BY OTHERS

1 0 1 2 3 4 5m
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NEWLAND DEVELOPERS PTY LTD	09-374 23-02-2012
TERRANORA PRECINCT 1 BROADWATER PARKWAY CROSS SECTIONS - SHEET 6 OF 18	SK 3572 REVISION A

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NOTE
FUTURE ULTIMATE
CONSTRUCTION BY OTHERS

1 0 1 2 3 4 5m
1 : 100 (FULL SIZE)

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TERRANORA PRECINCT 1 BROADWATER PARKWAY CROSS SECTIONS - SHEET 7 OF 18	SK 3573 REVISION A

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