

ULDA Ref. No: DEV2010/055

26 November 2010

Urban Land Development Authority
C/- Jensen Bowers Group Consultants
Attn Gemma Greenhalgh
PO Box 799
SPRING HILL QLD 4004

Dear Gemma

RE: UDA DEVELOPMENT APPROVAL FOR RECONFIGURING A LOT (1 LOT INTO 32 RESIDENTIAL LOTS, 2 OPEN SPACE LOTS AND NEW ROAD) WITH PLAN OF DEVELOPMENT AT2 HARVEY ROAD, CLINTON DESCRIBED AS LOT 193 ON CTN1861

I am pleased to inform you that your application was approved on 25 November 2010 in accordance with the attached UDA Development Approval Package.

This application and its decision can also be viewed in the ULDA Development Approvals Register via our website www.ulda.qld.gov.au.

If you have any further questions with regard to the matter, please contact me on 3024 4166.

Yours sincerely



Matt Toon
PRINCIPAL PLANNER

UDA Development Approval Package

Site address	2 Harvey Rd, Clinton
Real property description	Lot 193 on CTN1861
Type of application	Reconfiguring a Lot
Description of proposal	Subdivision of 1 into 32 residential lots, new road and park
ULDA reference number	DEV2010/055
Decision	APPROVED
Decision date	25 November 2010

Drawing or Document	Number	Plan or Document Date
Proposed Layout Stage 1	102361 – 25 Rev A	27 Oct 2010
Plan of Development Stage 1	102361 – 26 Rev E	09 November 2010
WRM Water + Environment Pty Ltd Clinton, Gladstone Stage1 Development, Revised Bioretention and Detention Basin Design	0697-01-D	18 October 2010
Gamble McKinnon Green's Stage 1 Plan	SD-110(C)	2010-07-13
Gamble McKinnon Green's Main Entry Plan	SD-113(C)	2010-07-13
Gamble McKinnon Green's Frontage Visualisations and Section 01	SD-114(C)	2010-07-13

PROJECT TEAM

Matt Toon Principal Planner Development Assessment Urban Land Development Authority	Marcus Bloor Environmental Planner Urban Land Development Authority
Con de Groot Principal Engineer Development Assessment Urban Land Development Authority	Malcolm Holz Planning Manager Urban Land Development Authority

CONDITIONS		TIMING
1	Carry out the approved development Carry out the approved development generally in accordance with the approved plans/drawing and/or documents.	Prior to survey plan endorsement
2	Complete all Operational Works Complete all operational work associated with this development approval, including work required by any of the following conditions. Such operational work is to be carried out generally in accordance with the approved plans.	Prior to survey plan endorsement
3	Construction Management Plan a) Prepare and submit to the ULDA a site based construction management plan that will include but not be limited to: - the management of traffic around and through the site during and outside of construction work hours; - parking and materials delivery during and outside of construction hours of work; - the management of sedimentation, erosion and dust	a) Prior to commencement of site works

CONDITIONS	TIMING
generated from the site during and outside construction work hours; ▪ management of groundwater and surface water collection, treatment and disposal to accepted environmental standards; ▪ management of contaminated soils, including removal, treatment and replacement in accordance with site remediation plans prepared and approved specifically for this site, if needed. The construction management plan shall be prepared in consultation with the professionals responsible for individual site related management plans to ensure that all aspects of the construction and environmental management are included. The construction management plan shall be reviewed and approved by the principal consultant overseeing and certifying the construction works. b) All work shall be undertaken in accordance with the construction management plan which must be current and available on site at all times during the construction period.	b) At all times during site works
4 Water Supply Reticulation a) Submit to the ULDA engineering drawings for the water reticulation system designed in accordance with <i>Gladstone City Council – Water Supply Standard - 2006</i> and certified by a Registered Professional Engineer of Queensland (RPEQ). b) Upon completion of the works prepare and provide to the ULDA "As Constructed" plans including an asset register, checked by a Registered Professional Engineer Queensland (RPEQ-Civil), certifying that the works have been completed in accordance with <i>Gladstone City Council – Water Supply Standard – 2006</i>. c) Connected to Gladstone Regional Council's reticulated water system, and at no cost to Council. Private water reticulation works within the newly created lots must be designed and constructed in accordance with the requirements of the <i>Plumbing and Drainage Act 2002</i>.	a) Prior to the commencement of site works b) Prior to survey plan endorsement c) Prior to the commencement of use
5 Service, meter assembly & meter box Provide a water service, approved meter assembly and meter box to the boundary of all proposed lots in accordance with the Gladstone Regional Council's <i>Engineering Design Guidelines</i>.	Prior to survey plan endorsement
6 Sewerage reticulation a) Submit to the ULDA engineering drawings for the sewer reticulation system designed in accordance with <i>Gladstone City Council - Sewerage Design Standards - 2003</i> and certified by a Registered Professional Engineer of Queensland (RPEQ). b) Upon completion of the works prepare and provide to the ULDA "As Constructed" plans including an asset register, checked by a Registered Professional Engineer Queensland (RPEQ-Civil), certifying that the works have been completed in accordance with <i>Gladstone City Council - Sewerage Design Standards -</i>	a) Prior to the commencement of site works b) Prior to survey plan endorsement

CONDITIONS		TIMING
	2003. c) The development must be connected to Gladstone Regional Council's reticulated sewerage system at no cost to Council. Private sewerage reticulation works within the newly created lots must be designed and constructed in accordance with the requirements of the <i>Plumbing and Drainage Act 2002</i>.	c) Prior to the commencement of use
7	Stormwater Management a) Submit to the ULDA detailed designs and hydraulic calculations checked and certified by a Registered Professional Engineer Queensland (RPEQ- Civil) in accordance with the approved <i>WRM Water + Environment Pty Ltd Clinton, Gladstone Stage1 Development, Revised Bioretention and Detention Basin Design 0697-01-D dated 18 October 2010</i>. b) Submit to the ULDA certification from a RPEQ –Civil that the works have been inspected and constructed in accordance with part a) of this condition. c) Connected the development to Gladstone Regional Council's stormwater system at no cost to Council. Upon completion of the works provide to the Gladstone Regional Council "As Constructed" plans including an asset register, checked by a Registered Professional Engineer Queensland (RPEQ-Civil), certifying that the works have been completed in accordance with part b) of this condition.	a) Prior to the commencement of site works b) Prior to endorsement of survey plan c) Prior to endorsement of survey plan
8	Easements over infrastructure – water supply, sewerage, drainage Public utility easements must be provided, in favour of and at no cost to Gladstone Regional Council, over Council infrastructure (ie. Drainage, infrastructure that becomes contributed assets) located in private land. The terms of the easements must be to the satisfaction of the Chief Executive Officer, and the easement documents must be executed prior to endorsement of survey plan.	Prior to survey plan endorsement
9	Filling and Excavation a) Submit to the ULDA a detail earthworks plan and cross sections, checked and certified by a Registered Professional Engineer of Queensland (RPEQ-Civil). b) Submit to the ULDA certification from an RPEQ specialising in geotechnical engineering stating that all constructed cut/fill batters and/or retaining structures achieve adequate stability with a factor of safety greater than 1.5.	a) Prior to the commencement of works b) Prior to survey plan endorsement
10	Road works a) Submit to the ULDA engineering design/ construction drawings in accordance with Gladstone Regional Council's <i>Roads and Transport Standard – 2005</i> certified by a Registered Professional Engineer of Queensland (RPEQ-Civil). b) Submit to the ULDA certification from an RPEQ (Civil) that all roads and associated works (e.g. stormwater drainage, kerb and channel, concrete footpaths, signage, traffic islands) have been constructed in accordance with part a) of this condition.	a) Prior to the commencement of works b) Prior to survey plan endorsement

	CONDITIONS	TIMING
11	Footpaths a) Construct 1.2m footpaths in the locations shown on approved Proposed Layout Stage 1 plan no 102361 – 25 Rev A dated 27 Oct 2010 and submit engineering plans to the ULDA Principal Engineer checked by a RPEQ showing the design of the pathways including any signs and traffic safety signs, markings and devices. b) Upon completion of the works submit to the ULDA Principal Engineer "As Constructed" plans including an asset register certified by a Registered Professional Engineer Queensland (RPEQ-Civil), in accordance with part a) of this condition.	a) Prior to survey plan endorsement b) Prior to survey plan endorsement the relevant stage of the subdivision
12	Street lighting Design and install a street lighting system (including connections and energising) to all roads within and bounding the subdivision and to all footpaths/bikeways within park and road reserves associated with the subdivision, at no cost to Council. The design and construction of the street lighting system must: ▪ be in accordance with Chapter 7 of <i>Gladstone City Council – Roads and Transport Standard - 2005</i>; ▪ meet the relevant requirements of the electricity supplier (where the supplier is Ergon, this includes Ergon's Public Lighting Construction Manual); and ▪ be acceptable to the electricity supplier (eg. Ergon) as 'Rate 2 Public Lighting' (refer Ergon's Rate 2 Public Lighting Design Parameters).	Prior to survey plan endorsement
13	Electricity Submit to the ULDA either written evidence : • demonstrating that existing underground low-voltage electricity supply is available to the newly created lots; or • that the applicant has entered into an agreement with an authorised electricity supplier (e.g. Ergon) to provide underground electricity services to the newly created lots.	Prior to survey plan endorsement
14	Telecommunications Submit to ULDA documentation from an authorised telecommunications service provider to confirm that satisfactory arrangements have been made for the provision of underground telecommunications services to the newly created lots.	Prior to survey plan endorsement
15	Acoustic Requirements Submit to the ULDA Principal Engineer written confirmation that any sleeping rooms of dwellings on proposed Lots 115 and 116 will be constructed to be in accordance with <i>Australian Standard 2107:2000, Acoustics—Recommended design sound levels and reverberation times for building interiors</i>.	Prior to survey plan endorsement

CONDITIONS	TIMING
16 Infrastructure Contributions Pay to the Urban Land Development Authority a monetary contribution towards the cost of the provision of essential infrastructure. The contribution will be calculated at the time of payment as follows: The contribution will be equivalent to the charge that would have applied to the development under the <i>Gladstone Regional Council's Infrastructure Policies</i> in place and at the time of declaration of the Urban Development Area (UDA), reviewed on 1 July each year and increased by the amount calculated by multiplying the Infrastructure Contribution applying immediately preceding the relevant Review Date by the annual compounding average for the Queensland Roads and Bridges Construction Index.	Prior to survey plan endorsement
17 Parkland, Streetscape and Open Space (Lots 2001 and 2002) a) Submit for approval a detailed Landscape Plan certified by a suitably qualified landscape architect for improvement works within the proposed footpaths and open space areas of Lots 2001 and 2002. The plan is to be generally in accordance with approved ▪ Gamble McKinnon Green's Stage 1 Plan SD-110(C) ▪ Gamble McKinnon Green's Main Entry Plan SD-113(C) ▪ Gamble McKinnon Green's Main Entry Plan SD-114(C) dated 2010-07-13 and is to document the following: Existing Site Conditions Existing contours or site levels. ▪ Location of existing under- and above-ground services within the proposed parkland (eg. drainage, water reticulation, sewerage, electricity, gas, telecommunications etc.). ▪ Removal of weed species, barbed wire, building materials, rubbish, debris and other obstacles which may present a public liability risk. ▪ Location and description of existing fencing and retaining walls within and abutting the open space. Site Preparation ▪ Proposed finished levels, including sections across and through the open space at critical points (eg. Interface with roads or waterbodies, retaining walls or batters). New Works ▪ Location of proposed drainage and stormwater works within the open space including cross-sections and descriptions. ▪ Provision of electricity and water connections. ▪ Construction of vehicle barriers/bollards along frontages to prevent unauthorised vehicular access. ▪ Provision of a lock-rail access point (positioned at a level and logical point) and associated vehicular crossover to each road frontage ▪ Details and locations of any proposed building works or planting, including: bridges, park furniture, picnic facilities and play equipment. ▪ Surface treatments, including the preparation of all open ground within the proposed parkland to ensure that it is topsoiled, grassed and suitable for mowing. Grassing is to achieve 80% coverage at the time of On Maintenance	a) Prior to commencement of works

CONDITIONS	TIMING
inspection. ▪ Provision of a sub-tropical plant schedule listing all proposed plants by botanical name, quantity and size at time of planting. b) Construct landscape works Construct the works in accordance with the approved Landscape Plan c) On Maintenance Provide 12 months maintenance to the foot path vegetation and open space (2001 and 2002) commencing on receipt of written confirmation from the ULDA Development Assessment that works are satisfactory. d) Off Maintenance Inspection On completion of the 12 months maintenance period, contact the ULDA, Development Assessment to arrange an Off Maintenance inspection. e) Transfer and surrender to the Crown Transfer and surrender to the Crown as "park for public use" Lot 2001 f) Transfer and surrender to the Crown Transfer and surrender to the Crown as "detention basin" Lot 2002	b) Prior to endorsement of survey plan c) As indicated d) As indicated e) Prior to commencement of use f) Prior to commencement of use

ADVICE

Gladstone Regional Council

For any conditions in this package that require the consideration of Gladstone Regional Council (GRC), you will need to submit the relevant forms, plans and/or reports and fee to the entity nominated in the condition/s. When satisfied that the condition has been met, GRC will issue a response in the manner required by the condition/s (eg a letter of endorsement or authorisation, an approval or a permit).

Noise and Dust Emissions

You are advised that all development involving the emission of noise and dust from building/construction activities requires that such emissions be in accordance with the requirements of the *Environmental Protection Act 1994*.

Pursuant to Division 3 Section 440R of the Act, a builder or building contractor must not carry out building work on a building site in a way that makes or causes audible noise to be made from the building work:

- (a) on a Sunday or public holiday, at any time or
- (b) on a Saturday or business day, before 6.30 a.m. or after 6.30 p.m.

Please note: The above information has been provided to the applicant as an advice only, and does not form part of the development approval conditions. This advice has been provided to the applicant to inform them of other obligations they may have to comply with (under state legislation or local laws) prior to their activity commencing.

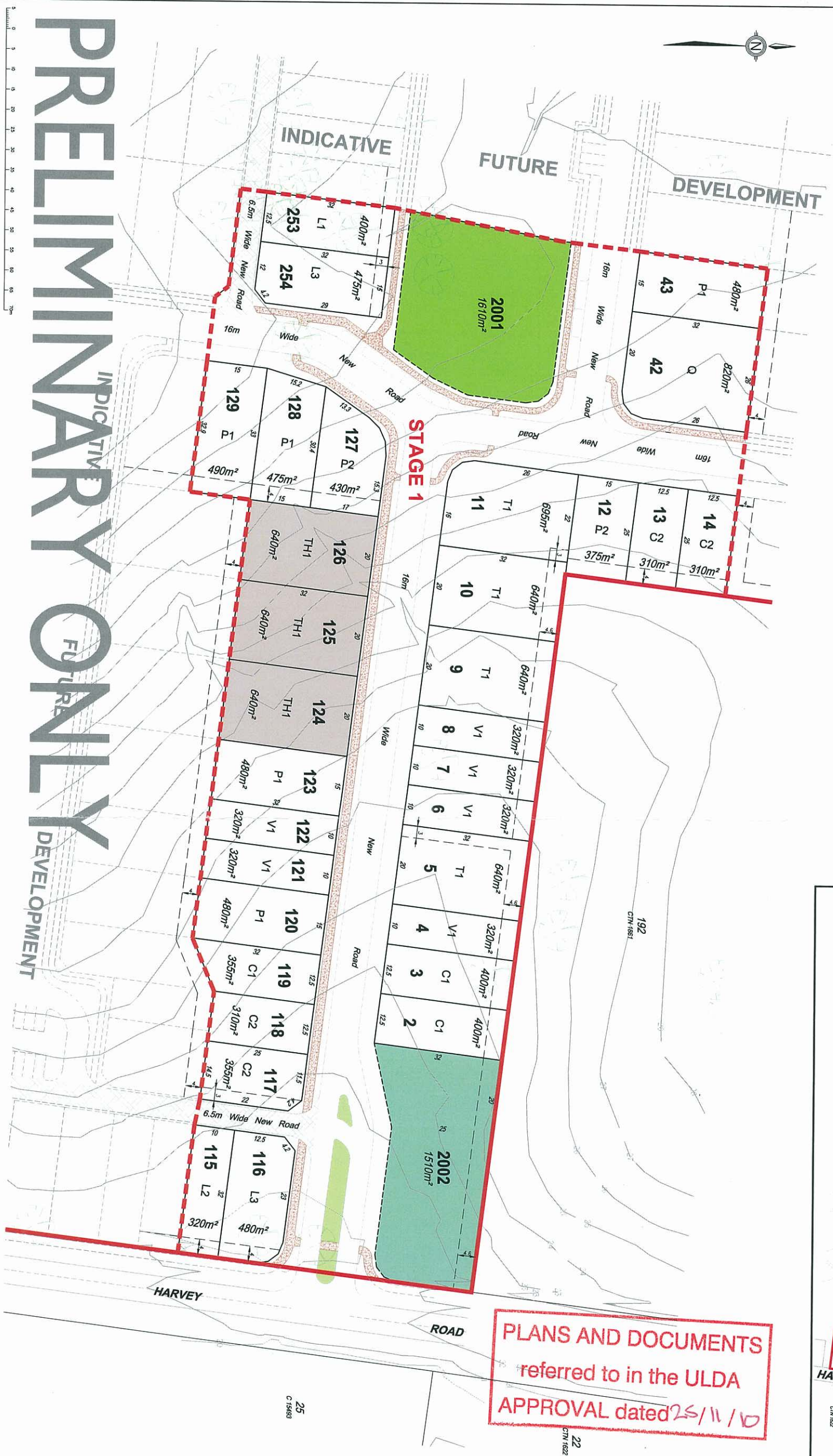
**** End of Package ****

LAND BUDGET		
	Area (ha)	Percentage
Area of Stage 1	2.495	100%
Open Space Area		
Park / Active Open Space	0.161	6%
Detention / Open Space	0.151	6%
Total Area of Open Space	0.312	13%
Total Area of Saleable Land	1.463	59%
Total Area of New Road	0.72	29%
Road Type		
Total Length of New Road	470	
4.0m Wide Pedestrian Lane	35	
6.5m Wide Laneway	50	
16m Wide New Road	385	

DEVELOPMENT STATISTICS						
Code	Dwelling Description	Minimum Dimension	Allotment Number	Allotment %	Dwelling Per Allotment	Dwelling Yield
T1	Traditional - 600m²	20m x 32m	3	9.38%	1	3
TH1	Traditional Hillside - 600m²	20m x 32m	3	9.38%	1	3
T2	Traditional - 500m²	20m x 25m	1	3.13%	1	1
P1	Premium Courtyard - 480m²	15m x 32m	5	15.63%	1	5
P2	Premium Courtyard - 375m²	15m x 25m	2	6.25%	1	2
L1	Laneway Courtyard - 400m²	12.5m x 32m	1	3.13%	2	2
C1	Courtyard - 400m²	12.5m x 25m	3	9.38%	1	3
C2	Courtyard - 310m²	10m x 25m	4	12.50%	1	4
L2	Laneway Villa - 320m²	10m x 32m	1	3.13%	1	1
V1	Villa - 320m²	10m x 32m	6	18.75%	1	6
L3	Laneway Duplex - 480m²	15m x 32m	2	6.25%	2	4
Q	Quadruplex 750m²	24m x 32m	1	3.13%	4	4
Total			32	100.00%		38
Density Calculation						100.00%
Net Residential Density					dw/ha	16



PLANS AND DOCUMENTS referred to in the ULDA APPROVAL dated 25/11/10



REVISION A. Add Easement & New Pathways	
Note All dimensions and areas are approximate only, and are subject to survey and Council approval. Dimensions have been rounded to the nearest 0.1 metres. The boundaries shown on this plan should not be used for final detailed engineering design. Boundaries and contour details supplied by Capricorn survey group. Trees supplied by supplied by Capricorn survey group.	
Legend - Stage Boundary - Slope Affected Lots - Laneways - Indicative 1.5m Footpath - Park / Open Space - Proposed Detention / Open Space - Pedestrian Linkage / Road Reserve	
CLIENT URBAN LAND DEVELOPMENT AUTHORITY	
PROJECT HARVEY ROAD GLADSTONE	
PROPOSED LAYOUT STAGE 1 OVER LOT 193 ON CTN1961 ALLOTMENT LAYOUT	
Local Authority DEVELOPMENT AUTHORITY	
Locality CLINTON	
Scale 1 : 500	
Plan Ref 102361 - 25	
Rev A	



RPS Australia East Pty Ltd
270 North Street
Brisbane QLD 4000
PO Box 1599 QLD 4008
T 07 3237 8333
F 07 3237 8333
W rpsgroup.com.au

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PRELIMINARY INDICATIVE FUTURE DEVELOPMENT

Plan of Development Table	Villa Allotments 10m		Courtyard Allotments 12.5m		Premium Courtyard Allotments 15m		Traditional Allotments		Multi Family Allotments	
	Ground Floor	First Floor	Ground Floor	First Floor	Ground Floor	First Floor	Ground Floor	First Floor	Ground Floor	First Floor
Front/Primary Frontage	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	3.0	3.0
Garage	4.5	n/a	4.5	n/a	4.5	n/a	5.5	n/a	4.5	n/a
Rear	1.2	1.2	1.2	2.0	1.2	2.0	1.2	2.0	1.2	2.0
Side - General Lots										
Built to Boundary	0.0	1.0	0.0	1.0	0.0	1.0	n/a	n/a	0.0	1.0
Non Built to Boundary	0.9	0.9	1.0	1.0	1.0	1.5	1.2	2.0	1.0	1.0
Corner Lots - Secondary Frontage	1.5	1.5	1.5	1.5	2.0	2.0	3.0	3.0	3.0	3.0
Laneway Lots										
Rear of Lot (from laneway boundary)	0.5	0.5	0.5	0.5	0.5	0.5	n/a	n/a	0.5	0.5
On site parking requirements (minimum)	1 space to be covered and enclosed	1 space per dwelling to be covered and enclosed	1 space to be covered and enclosed	1 space per dwelling to be covered and enclosed	1 space to be covered and enclosed	1 space per dwelling to be covered and enclosed	1 space to be covered and enclosed	1 space to be covered and enclosed	1 space per dwelling to be covered and enclosed	1 space per dwelling to be covered and enclosed
Garage location	Single or tandem garage acceptable.	Single or tandem garage acceptable.	Single or tandem garage acceptable.	Single or tandem garage acceptable.	Single or tandem garage acceptable.	Single or tandem garage acceptable.	Single or tandem garage acceptable.	Single or tandem garage acceptable.	Single or tandem garage acceptable.	Single or tandem garage acceptable.
Garage location	Double garages are only permitted on laneway allotments.	Double garages are only permitted on laneway allotments.	Double garages are only permitted on laneway allotments.	Double garages are only permitted on laneway allotments.	Double garages are only permitted on laneway allotments.	Double garages are only permitted on laneway allotments.	Double garages are only permitted on laneway allotments.	Double garages are only permitted on laneway allotments.	Double garages are only permitted on laneway allotments.	Double garages are only permitted on laneway allotments.
Garage location	Garages are to be located along the built to boundary wall.	Garages are to be located along the built to boundary wall.	Garages are to be located along the built to boundary wall.	Garages are to be located along the built to boundary wall.	Garages are to be located along the built to boundary wall.	Garages are to be located along the built to boundary wall.	Garages are to be located along the built to boundary wall.	Garages are to be located along the built to boundary wall.	Garages are to be located along the built to boundary wall.	Garages are to be located along the built to boundary wall.
Site Cover (maximum)	70%	70%	70%	70%	70%	70%	60%	60%	70%	70%

Notes:

- General
- All development is to be undertaken in accordance with the Development Approval.
- Lot Homes are permissible over garages where noted.
- The maximum height of buildings shall not exceed two (2) storeys.

Setbacks

- Setbacks are as per the Plan of Development Table unless otherwise specified.
- Built to boundary walls are optional. The location of the built to boundary walls are indicated on the Plan of Development. Where built to boundary walls are not adopted side setbacks shall be in accordance with the Plan of Development Table.
- Built to boundary walls are to have a maximum length of 15 metres and a maximum height of 3.5 metres.
- Boundary setbacks are measured to the outermost projection.
- First floor setbacks on single and multi family allotments must not exceed the minimum ground floor setbacks.
- Garages must not project forward of the front building setback.

Parking

- A minimum of one (1) off street car park is required per dwelling.
- Double garages are not permitted on single storey dwellings on a lot less than 12.5m wide.
- Double garages are not permitted on any lot less than 10m wide.
- All double garages should be setback behind the main face of the dwelling with doors articulated, comprising a mix of materials and colours, or staggered.
- Maximum width of any garage shall be no more than 40% of the lot frontage on any lot more than 12.5m wide.
- Garages and carports served off a Laneway must be built to 0.5m rear setback.

Site Cover and Amenity

- All double garages should be setback behind the main face of the dwelling with doors articulated, comprising a mix of materials and colours, or staggered.
- The maximum width of any garage shall be no more than 40% of the lot frontage on any lot more than 12.5m wide.
- The maximum width of a driveway at the lot boundary shall be 4.8 metres for a lot with a double garage and 3 metres for a lot with a single garage.
- Site cover for each lot is not to exceed 70% of the lot except for traditional lots where the maximum is 60%.
- Dwellings with their main living area located at ground level should have a minimum area of private open space consisting of at least 12m² with a minimum width of 2.4 metres, preferably accessible from a living room.
- Dwellings with their main living area above ground floor level should have a minimum area of private open space consisting of a balcony or roof area open to the sky, with a minimum area of 5m², and a minimum dimension of 1.2 metres, directly accessible from a living room.

Multi Family Dwellings

- Multi Family Dwelling Allotments are not permitted to be developed with only one single dwelling.
- Multi Family Dwellings have the following number of dwellings:
 - Duplex - 450-590m² - 2 dwellings
 - Triplex - 600-740m² - 3 dwellings
 - Quadruplex - 750m² - 4 dwellings
- Where Multi Family Allotments encompass more than one frontage they are to be designed to address (entirely) each street frontage.

Fencing

- Fencing on all Primary Street Frontages, if containing openings that make it more than 50% transparent, the maximum fence height should be 1.5 metres, and be sold to a maximum height of 1.2 metres.

Building Articulation

- All detached dwellings must have a porch, alcove or verandah providing an entry to the building which is visible from the street.
- All buildings must incorporate two or more of the following design elements which provide diversity in building form as well as respond to the climate:
 - Verandahs
 - Roof Overhangs
 - Window Hood/Screens
 - Awnings and Shade Structures

Buildings facing a park of more than one street

- For buildings that have more than one street frontage or adjoin park, the building design must ensure an attractive appearance is presented to the street frontage and, if applicable, the park.
- Buildings must address each street frontage or park frontage through the inclusion of, but not necessarily limited to, the following design elements:
 - Verandahs
 - Porches
 - Awning and Shade Structures
 - Variation to Roof and Building Lines
 - Inclusion of Window Openings

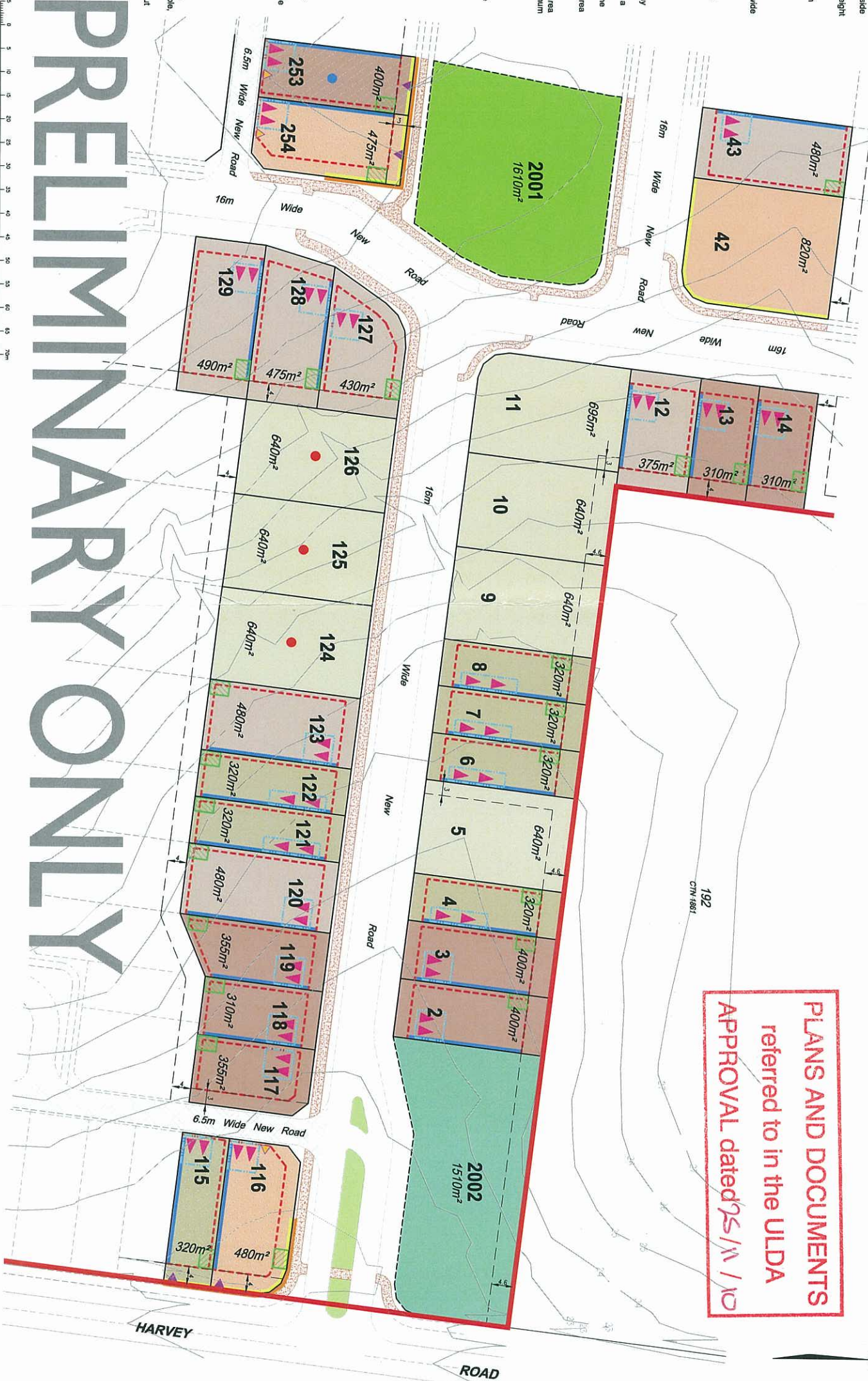
Definitions:

- Lot Homes - A dwelling built above a garage with its own entry door at ground level.
- Laneway Allotment - Allotments serviced by a laneway.
- Hillside Homes - Allotments with a maximum side boundary retaining wall of 1.0 metre

Legend

- Stage Boundary
- Park / Open Space
- Proposed Park / Open Space
- Proposed Detention / Open Space
- Pedestrian Linkage / Road Reserve
- Allotment Details
- Laneway Allotments
- Preferred Primary Open Space Location (min 12m²)
- Letterbox Location for Primary Dwelling (on a laneway)
- Letterbox Location for Secondary Dwelling (on a laneway)
- Potential Lot Homes
- Hillside Homes
- Maximum Building Envelope
- Optional Built to Boundary Wall
- No Vehicle Access
- Primary Frontage
- Preferred Garage Location

37. Where there is a direct view between private open space and habitable rooms of another dwelling the windows are screened or obscured.



PLANS AND DOCUMENTS referred to in the ULDA APPROVAL dated 25/11/10

REVISION

A: Amend notes, info and lot details
B: Amend Development Table
C: Add Ems, New Pathways, Swap STB & Garages
D: Amend notes
E: Amend Lots 117, 121 - 129

Note: All dimensions and areas are approximate only, and are subject to survey and Council approval. Dimensions have been rounded to the nearest 0.1 metres.

The boundaries shown on this plan should not be used for final detailed engineers design.

Boundaries and contour details supplied by Capricorn survey group.

Trees supplied by supplied by Capricorn survey group.

CLIENT
URBAN LAND DEVELOPMENT AUTHORITY

PROJECT
HARVEY ROAD GLADSTONE

PLAN OF DEVELOPMENT
STAGE 1

Level Datum	Origin
08 November 2010	WWV ICH
Comp By:	102361-PROP2-STAGE 1
DWG Name:	URBAN LAND DEVELOPMENT AUTHORITY
Local Authority:	CLINTON
Job Reference:	102361
Scale:	1:500
Sheet:	A1
Plan Ref:	102361 - 26
Rev:	E

RPS

RPS Australia East Pty Ltd
ACN 140 202 702
7/ANZ 40 202 702
PO Box 1559
Ferntree Gully VIC 3156
T +61 7 3237 8888
F +61 7 3237 8833
W rpsgroup.com.au

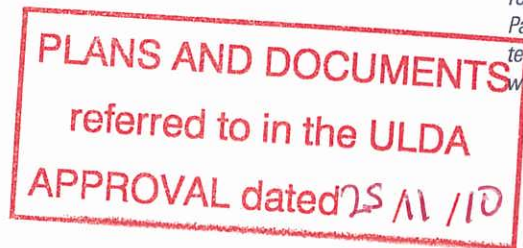
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0697-01-D
18 October 2010



WRM Water & Environment Pty Ltd
ABN: 96 107 404 544 ACN: 107 404 544
Level 5, Paddington Central,
107 Latrobe Terrace, PO Box 809,
Paddington Qld 4064 Australia
tel +61 7 3367 1279 fax +61 7 3367 1679
www.wrmwater.com.au

Marek Krynski
Senior Development Manager
Urban Land Development Authority
GPO Box 2202
Brisbane QLD 4001



Dear Marek,

**SUBJECT: CLINTON, GLADSTONE STAGE 1 DEVELOPMENT, REVISED
BIORETENTION AND DETENTION BASIN DESIGN**

1 INTRODUCTION

In response to your request, we have revised the concept design for the proposed bioretention area and detention basin at the Harvey Road entrance to Stage 1 of the above development. The revised design takes into account additional detail on the proposed stormwater drainage network for Stage 1 and revised catchment areas as advised by the project civil engineers. The design parameters for the bioretention and detention basin provided in the following sections supersede the concept designs provided in our previous report (WRM, 2010). The revised concept designs have been developed using the methodology and models described in our previous report (WRM, 2010).

2 REVISED CATCHMENT AREA

Figure 1 shows the adopted catchment area draining to the location of the proposed bioretention and detention basins (referred to as Catchment A in our previous report). The total catchment area is 3.1 ha (compared to 1.94 ha in our previous report). Additional catchment area of 1.05 ha, external to the site will be collected within a diversion drain along the northern property boundary and diverted around the detention basin, as assumed in our previous report.

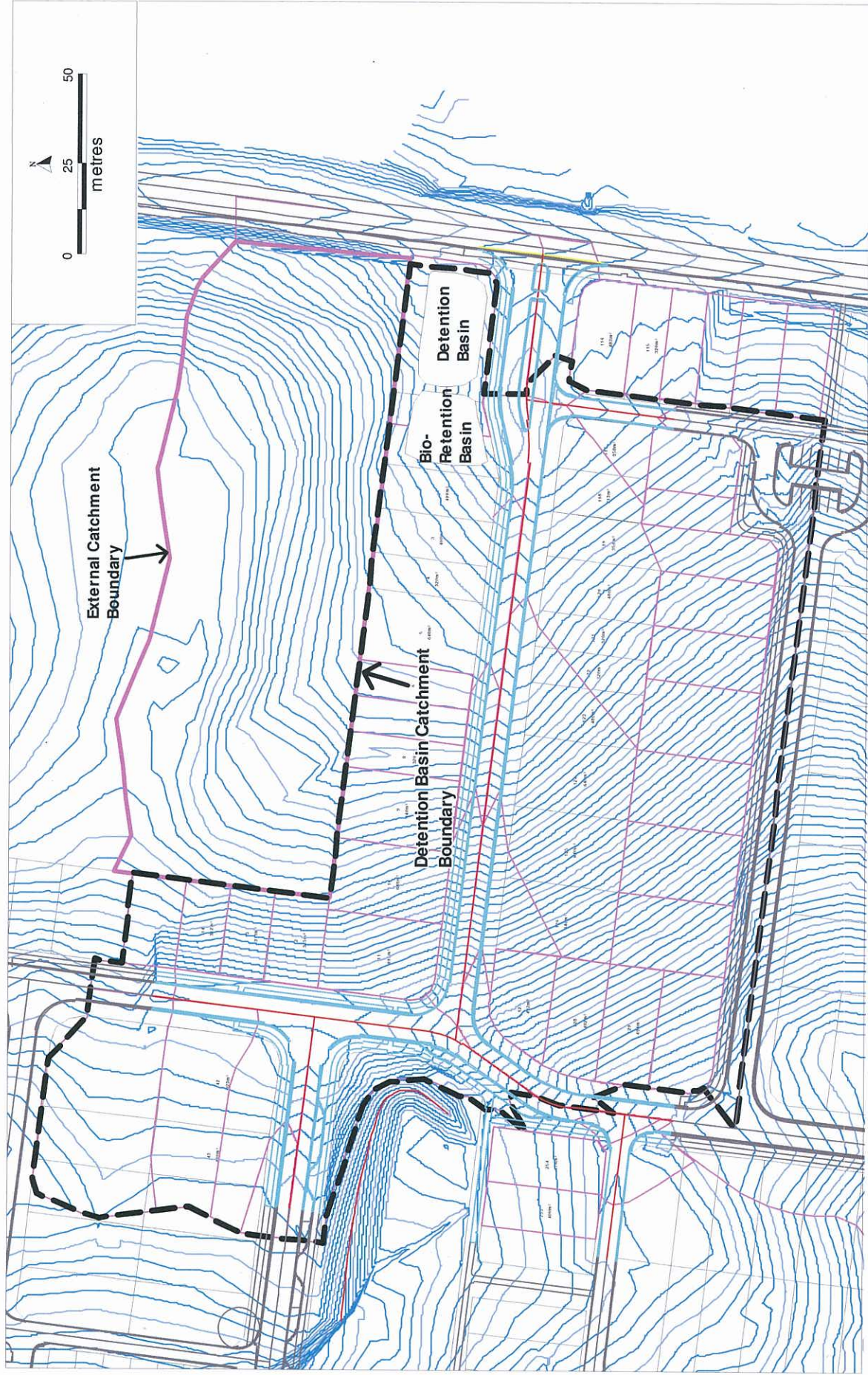


Figure 1 - Revised Catchment Area, Catchment A

3 REVISED BIORETENTION SIZING

The MUSIC model developed for our previous study was modified to reflect the increased catchment area draining to the proposed bioretention basin. Adopted parameters for the revised MUSIC model are summarised as follows:

- Total catchment area = 3.1 ha, including 23 allotments (see Table 1 for breakdown of adopted catchment types).
- Road reserve area = 0.85 ha, assumed 55% impervious (pavement area of 0.47 ha).
- Roof area = $23 \times 300 \text{ m}^2 = 0.69 \text{ ha}$.
- Assume 60% of roof area collected in rainwater tanks.
- Adopted total rainwater tank capacity = $23 \times 5 \text{ kL} = 115 \text{ kL}$.
- Adopted total demand from rainwater tanks = $23 \times 0.326 \text{ kL/d} = 7.5 \text{ kL/d}$.

Based on the above parameters, the results of the MUSIC model indicate that achieving the site water quality objectives will require bioretention with the following parameters:

- Bioretention filter surface area = 380 m^2 .
- Extended detention basin depth = 0.3 m.
- Filter depth = 0.6 m.

The reductions in pollutant concentrations are shown in Table 2.

Table 1 Adopted Source Node Area and Percent Impervious

Source Node	Area (ha)	Percent Impervious (%)
Roof to Tank	0.41	100
Roof bypass Tank	0.28	100
Other urban	1.45	25
Greenspace	0.11	10
Road Reserve	0.85	55
TOTAL	3.10	50

Table 2 Modelled Pollutant Export, Developed (Mitigated) Conditions

Pollutant	Percent Reduction (%)	WQO Percent Reduction (%)
Suspended Solids	90	80
Total Nitrogen	45	45
Total Phosphorus	73	60
Gross Pollutants	99	90

4 REVISED DETENTION BASIN CONFIGURATION

The XP-RAFS model developed for the previous study was used to re-design the detention basin based on the increased catchment area. The revised detention basin configuration is summarised below:

- Lower level pipe outlet = 1 x 375mm dia RCP @ IL 19.82 mAHD.
- Higher level pipe outlet = 3 x 450mm dia RCP @ IL 20.6 mAHD.
- Stage-storage relationship shown in Table 3.
- Peak inflows to and outflows from the basin are shown in Table 4.

It has been assumed that the detention basin storage area will include the bioretention area once water levels in the detention basin exceed the level of the weir between the bioretention and detention basins.

The impacts of the proposed detention basin on downstream discharges from Catchment A (including the adjacent catchment diverted around the detention basin) are shown in Table 5. The detention basin will ensure that peak discharges downstream of Harvey Road are not increased by the development for events from 2 to 100 years average recurrence interval (ARI).

Table 3 Detention Basin Stage-Storage Relationship

Elevation (mAHD)	Stored Volume (m ³)
19.82	0
20.0	44
20.2	119
20.4	198
20.6	279
20.8	418
21.0	594
21.11	690
21.2	778
21.4	966
21.51	1073

Table 4 Detention Basin Stage-Storage Relationship

Event ARI (Years)	Peak Inflow (m ³ /s)	Peak Outflow (m ³ /s)	Maximum Stored Volume (m ³)	Peak Water Level (mAHD)
2	0.724	0.431	410	20.79
5	0.971	0.638	542	20.94
10	1.111	0.768	607	21.01
20	1.601	0.945	696	21.11
50	2.010	1.180	819	21.24
100	2.259	1.386	911	21.34

Table 5 Impacts on Downstream Discharges, Catchment A

Event ARI (Years)	Pre-Development Discharge (m ³ /s)	Post-Development Discharge (m ³ /s)	Difference (m ³ /s)
2	0.60	0.59	-0.01
5	0.94	0.88	-0.06
10	1.14	1.05	-0.10
20	1.42	1.29	-0.12
50	1.67	1.60	-0.07
100	1.93	1.88	-0.05

5 CONCLUSIONS

The proposed configuration of the bioretention and detention basins will ensure that the proposed development meets best practice water quality objectives for stormwater quality and does not increase peak stormwater discharges downstream.

I trust that the above information is sufficient for your present requirements. Please do not hesitate to contact me if you have any queries.

For and on behalf of
WRM Water & Environment Pty Ltd



David Newton
Principal Engineer

References:

- WRM, 2010 *Clinton, Gladstone Stormwater Management Plan*, Report prepared by WRM Water & Environment Pty Ltd for the Urban Land Development Authority, 26 August 2010.

STAGE 1 PLAN

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 25/11/10

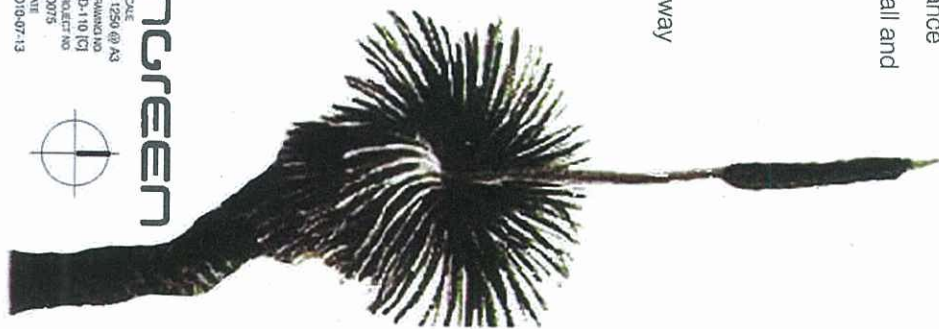


Harvey Road, Gladstone

Schematic Design

CamblemuckinonGreen

SCALE
1:1250 @ A3
DRAWING NO
SD-110 (C)
PROJECT NO
10075
DATE
2010-07-13



MAIN ENTRY PLAN



7.5m Carriageway (16m Road Reserve)

PLANS AND DOCUMENTS

referred to in the ULDA

APPROVAL dated 25/11/10

Lockable Bollards

Maintenance Ramp Access

Storm Water Detention and treatment (Refer SW Engineer

Planting Between Walls

Terraced Gabion Retaining Walls

1m Fall High Protection Fence On top Of Wall

2 x 5.5m Boulevard Carriageway

Tree Planting In Median

Entry Signage and Gabion Feature Wall

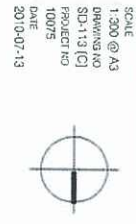
2m Shared Path

1m High Fall Protection Fence On Top Of Wall

Harvey Road, Gladstone

Schematic Design

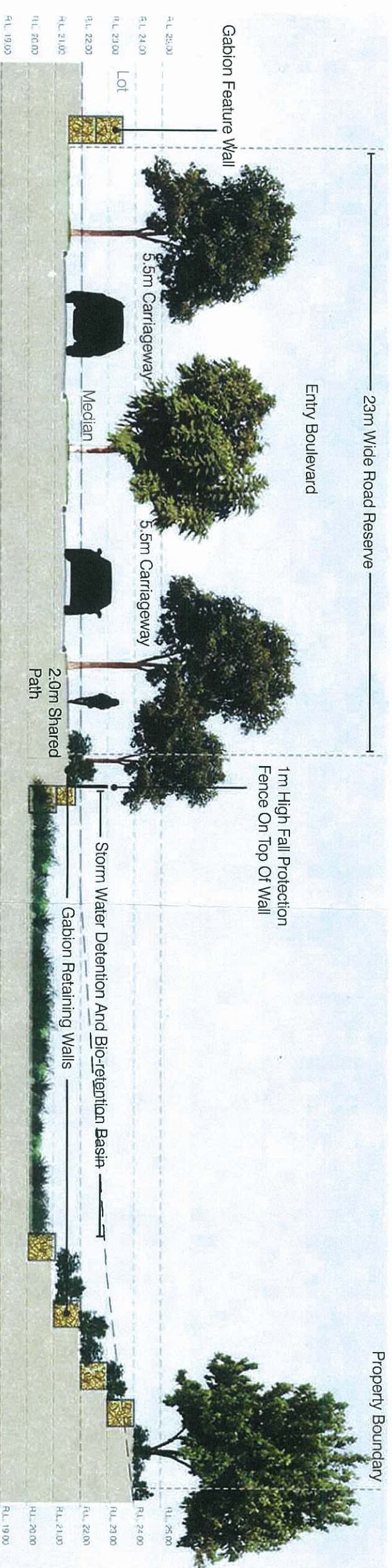
GAMBLE MCKINNON GREEN



1:300 @ A3
DRAWING NO
SD 1110
PROJECT NO
10075
DATE
20/10/13



FRONTAGE VISUALIZATIONS



Harvey Road, Gladstone

Schematic Design

Camblemckinnon Green

SCALE
As Shown @ A3
DRAWING NO
S0115 (6)
S0115 (6)
10075
DATE
2010-07-13

