CIVIL ENGINEERING MATTERS
LOTS 2 & 3 BILAMBIL ROAD BILAMBIL
PROPOSED SUBDIVISIONAL DEVELOPMENT

REVISION G
OUR REF: O8418

REVISION	DATE	AMENDMENTS
A	4/08/08	-
B	4/08/08	Final Report for Submission
C	19/09/08	Effluent Disposal Proposal Amended
D	2/12/08	General Revision
E	15/03/09	Revised Layout
F	20/05/09	Amended Council Requirements
G	25/11/09	Final Submission

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Lots 2 & 3
Bilambil Road
Bilambil

Civil Engineering
Response to Director General's Environmental Assessment Requirements

Note that Item Numbers reflect the requirement summary.

General

This report has been prepared in order to provide response to DGEARs in relation to civil engineering aspects of the project.

The site is located at the corner of Hogans Road, Bilambil Road and Urliup Road in Bilambil (Lots 2 & 3 on DP244652). The site is approximately 4.6Ha in area.

The site is to be developed as a residential subdivision comprising 49 allotments. Details of the proposed development are contained on CLA Drawing Nos 08418 – 001 to 009 inclusive.

The report also includes, as attachments correspondence prepared in response to a number of queries raised by the Department of Planning, together with confirmation by Tweed Shire Council of those responses.

This documentation is provided at Attachment 7.

Site Grading

The site is characterised by an isolated rock outcropping rising to a maximum of 20m above the adjacent plain. The outcropping is essentially contained within the confines of the subject sites. There is significant evidence of quarrying in the past, and it is obvious that such quarrying operations were undertaken without regard to practice that would be the norm today. In it's current state, the site not only provides an unsightly appearance, it also comprises a significant threat to the integrity of the receiving environment as a result of uncontrolled runoff from the significantly disturbed surface and is regarded as a potential danger to those who might trespass on account of the unprotected sheer faces left on cessation of the quarrying operations.

The design of the site grading has been undertaken with the following aims in mind:

a) Limitation of surface discontinuity at property boundary
b) Limitation of the general nature of the more rounded topography in the adjacent areas
c) Limitation in the use of earth retaining structures
d) Efficient control of stormwater runoff

The proposed earthworks are described in the CLA Consultant Drawings 08418-003,004 and 005 attached.

These drawings indicate that, with the exception of the boundary between the proposed commercial area and the existing hall finished surface matches existing surface at the boundaries of the development.

The finished landform presents a surface more in keeping with the general topography of the area.

It will be noted that in one particular area, the depth of the required excavation exceeds 5m. This is required to achieve an acceptable grading of the site. The area of such excavation represents approximately 10% of the site as a whole.

The use of retaining walls has been limited to three locations, as follows:

a) The area bounded by the new roads, where the wall height is limited to a maximum of 1m along the property frontage boundary, and
b) A larger retaining wall at the rear of the proposed commercial site. It will be understood that this wall has been proposed as a generality in order to create a level building pad over the whole of the site. This wall is not a pre requisite to the development proposal. In fact it is recommended that the earthworks in this area not be finalised until finalisation of the building approval of the commercial premises per se.
c) Adjacent to the existing flow path in lot 2, where the height of the wall is less than 1m.

The maximum grade of the finished allotments is approximately 20%. In the main, batter slopes are significantly less than this. The Applicant advises us that the allotments exhibiting higher grades will be the subject of individual house design to ensure attractive and practical use of these lots. No access grades to all allotments exceed 25%.

Generally, the grading of the site is such that the water table will not be intercepted either in association with the earthworks (including the detention pond), or in the construction of the proposed engineering services.

Services Generally

4.1 We are advised that the site is readily serviced with potable water, power and telecommunication facilities. Council has advised the provision of a suitable sewer outlet is problematic. The capacity of the Bilambil Heights sewer system is currently under review by Tweed Shire Council. The outfall requirements for this development are dependant on the results of this investigation. In order to provide surety to the development proposal, the Developer and Council have agreed a draft statement of commitments, specifying the worst case solution to the problem. A copy of the draft Statement of Commitments is given at Attachment 5.

A proposed solution to this issue has been prepared, and has been provided to Council directly for review and concurrence. Details of the proposed solution are provided below.

It is not proposed to stage any of the external infrastructure provision.

It is proposed to provide sewerage services to a number of allotments by means of a low pressure pump system, such as the E one system or Mono PCC Eco 1-60 system. Details of the Mono system, including WSAA review, are given at Attachment 6.

Effluent Disposal

The provision of sewerage services to the site will entail the construction of a pumping station, to be located approximately where shown on CLA Drawing 08418-002. The nearest point of connection available in the reticulation system is pump station SPS2038 in Peninsula Drive.

Council has advised however that, due to capacity issues, they are not able to approve connection to the reticulation system upstream of this pumping station.

Council has confirmed however that the nominated point of sewage disposal for the development is Pump Station SPS2018 Gollan Drive. The anticipated route of the required rising main is shown on CLA Drawing 08418-010.

Flood Assessment

Council has nominated the design flood level consistent with the level of the 100-year ARI event. In this instance, that level has been nominated as RL3.500. Note that this level has been based on the historical flood level in the area. Calculated flood level, based upon the 36 hour duration flood in the Tweed Valley is approximately RL2.500.

It will be understood that the site is generally well above this level. A small area of the site (approximately 1,350m2) lies to a maximum depth of 0.700m below the design flood level. The area is generally constrained within the site, however it does extend to the Bilambil Road Reserve. The area is currently drained via the Bilambil Road table drain.

In accordance with accepted practice, the potential flood storage volume lost as a result of the filling is replaced by compensatory excavation associated with the construction of the detention pond. It is anticipated that the volume of flood storage lost as a result of the development is approximately 470m3. It is anticipated that this volume will be compensated for by the orderly regarding of Lot 5 and 55.

Filling this area will not impact on any adjacent property.

It is noted that the NSW Floodplain Development Manual 2005 refers to the appropriate Flood Planning Level as that defined by the Local Authority. As previously stated, this is the Q100 level. It is felt that the marginal quantity of filling required to achieve the proposed earthworks levels is not sufficient to warrant detailed investigation of potential impacts, particularly in the light of the compensatory earthworks proposed.

The final minimum level of the allotments has been set at RL4.400m AHD, 900mm above the nominated Q100 flood level.

The proposal satisfies the requirement for the provision of a high level evacuation route to land above the level of the probable maximum flood level (PMF). We are advised by Council that the PMF level has been assessed at RL5.5mAHD.

The Planning Scheme defines the High Level Evacuation Routs is a road or footway whose entire length has a level of not less than the design flood level (ie the Q100 Flood Level) and which provides a route to enable people to evacuate to land above the PMF. Not only is the bulk of the development site above the PMF level, the stated requirements for an evacuation route are provided by the vehicular and pedestrian access to Carool Road, at the intersection of Bilambil and Urliup Roads at a level approximately 2m above the Q100 level.

Climate Change

The DECC Guidelines – “Practical Consideration of Climate Change” (Oct 2007) recommend that development proposals consider the impact of climate change on the particular development.

The Tweed Shire Council is currently in the process of investigating these impacts, including a "high" impact case with 0.91m sea level rise and 30% increase in rainfall intensity. Draft results of that study, specifically related to the 36 hour duration event indicate an impact of the order of 1.5m increase in the flood level at the Q100 event.

It is not considered appropriate to apply this impact to the historical flood level. Rather, the calculated impact should be superimposed on the calculated flood level. Thus in considering the impact of climate change , the anticipated flood level would increase from RL3.500 (historically based) to RL4.00 (Design Based). In this instance, the development is provided with a minimum freeboard of 0.40m.

Legal Point of Discharge

Tweed Shire Council requires that stormwater runoff be discharged to a legal point of discharge, defined as a point on or adjacent to the development site, and (amongst other definitions) "a natural watercourse or waterway to which the site naturally drains". Accordingly, Bilambil Creek is nominated as the appropriate legal point of discharge. This has been confirmed by Council.

Spoil Disposal

The preliminary earthworks plans indicate a potential 19,060m3 of spoil to be removed from the site. Spoil is to be removed from site in trucks for disposal at an approved location.

Filling Impacts

Earthworks for the site have been designed so that the there is no filling at any external boundary, with the exception of a maximum of 900mm at the boundary of the site with the existing village hall. This height is consistent with the Tweed Planning Scheme.

Some additional earthworks may be required at the road frontages once detailed design in these areas takes place, however we would expect the requirement for filling to be only sufficient to achieve a free draining surface in the existing road verges.

Review of the pre development and post development contours confirms that the proposed earthworks do not serve to concentrate flows on to adjacent property, and that there is no impact on upstream properties.

Water Cycle Management

Tweed Shire Council has advised that the development does not trigger requirements for water quality improvement devices, in that the development does not have more than 50 allotments in a contributing catchment.

Roadworks

Adopted Cross Section - Internal

The adopted cross section for the internal roads is in accordance with the TSC requirements for a road designed to service less than 3,000 vehicles per day. The peak traffic load for the development, assuming only one access point, would be 342 vehicles per day, based upon anticipated traffic loading of 6 trips per allotment per day.

The adopted road cross section is indicated on the drawings.

Adopted Cross Section – External

Tweed Shire Council have specified their requirements in respect of works required in Hogans Road, Urliup Road and Bilambil Roads. These requirements have been included on the drawings.

Intersections

Road #1/Urliup Road

Urliup Road is an existing sealed road with a sealed width of approximately 6m. The road crest exhibits a substandard level of sight distance. The proposal anticipates the lowering of the existing crest by approximately 800mm in order to achieve the TSC sight distance standards. The orderly lowering of the road profile adjacent to the proposed intersection, coupled with the construction of the swales, and the reduction of the existing cut batter slope ensures that intersection sight distance standards are achieved.

Road #1/Hogans Road

Hogans Road is an existing sealed road with a seal width of approximately 6m. The road is essentially flat, although it does grade gently down to the causeway crossing Bilambil Creek. Survey reveals sight distance available of approximately 90m, in excess of the required standard. No other issues are anticipated in respect of this intersection.

ATTACHMENTS

ATTACHMENT 1 – Perspective Images Pre and Post Development
ATTACHMENT 2 – CLA Consultant Drawings 08418-001 to 009 inclusive
ATTACHMENT 3 – Site Based Stormwater Management Report
ATTACHMENT 4 - Rising Main Alignment
ATTACHMENT 5 - Outfall Sewer Draft Statement of Commitment
ATTACHMENT 6 - Mono PSS Eco 1-60 Low Pressure Sewer System
ATTACHMENT 7 - Response to Department of Planning Queries

ATTACHMENT 1
Perspective Images Pre and Post Development

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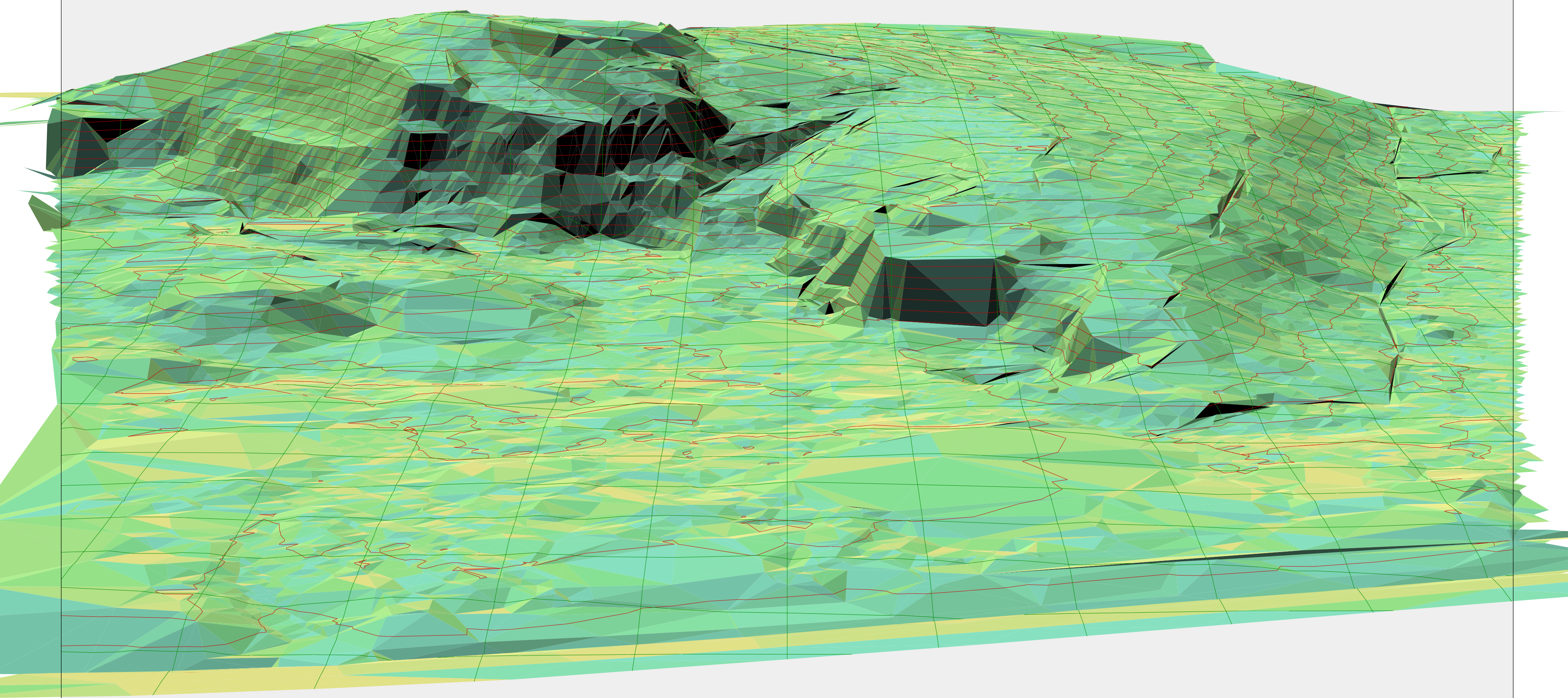
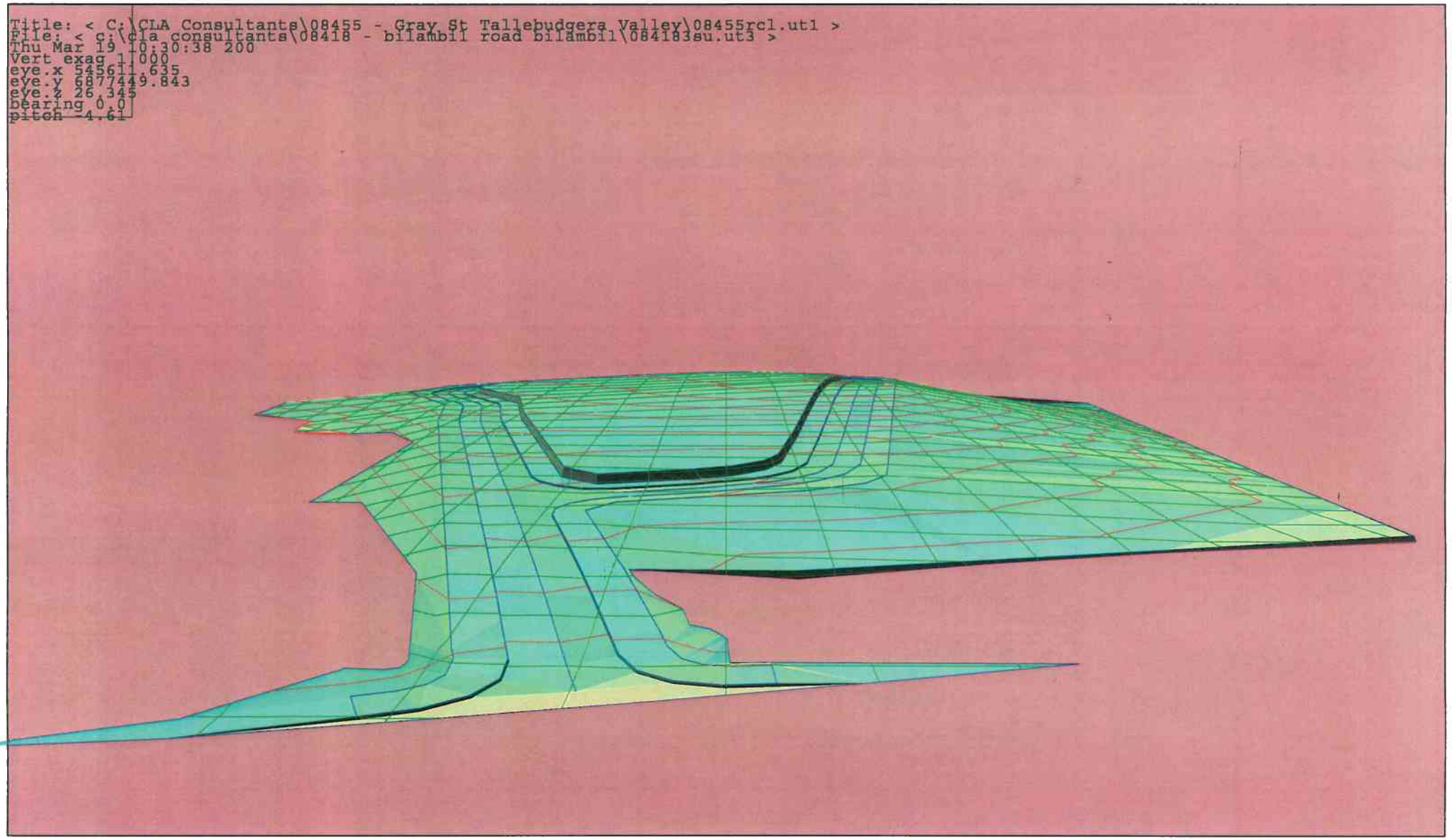
PRE DEVELOPMENT

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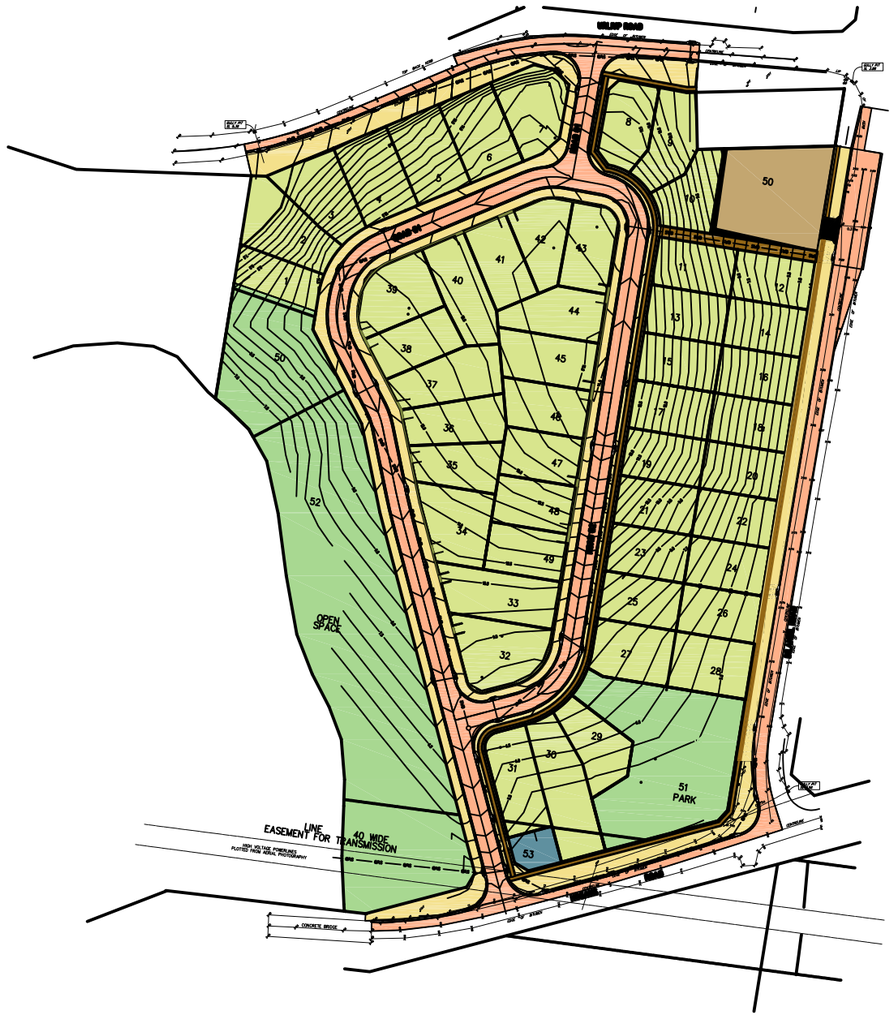
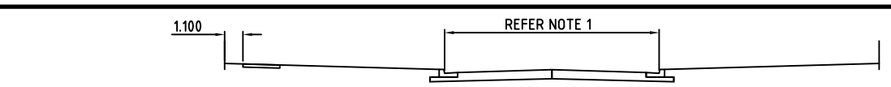
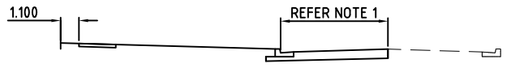
ATTACHMENT 2
CLA Consultant Drawings 08418-001 to 009 inclusive



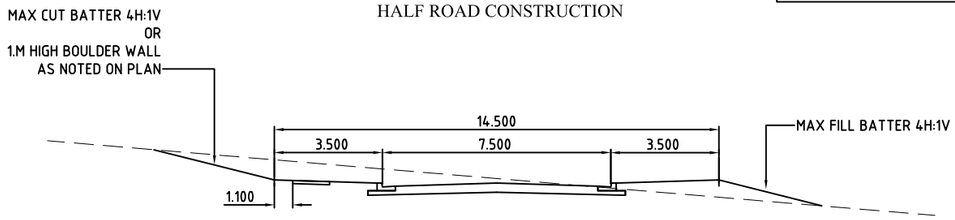


URLIUP ROAD
HOGANS ROAD

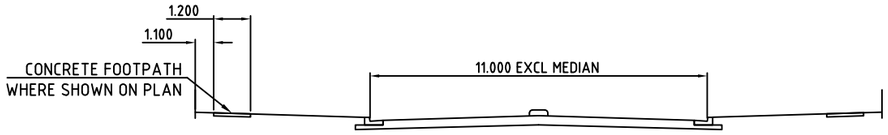


URLIUP ROAD
HOGANS ROAD
HALF ROAD CONSTRUCTION

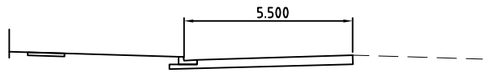
NOTE 1
PAVEMENT WIDTHS
URLIUP ROAD
FULL WIDTH 7.0M
HALF WIDTH 3.5M
HOGANS ROAD
HALF WIDTH 3.1M



INTERNAL ROADS



BILAMBIL ROAD



BILAMBIL ROAD
HALF ROAD CONSTRUCTION

DRAWING SCHEDULE

NUMBER	DESCRIPTION
08418 - 001	SITE PLAN, DRAWING SCHEDULE & NOTES
08418 - 002	GENERAL ARRANGEMENT
08418 - 003	EARTHWORKS PLAN
08418 - 003A	EARTHWORKS - ISOPACHE DETAILS
08418 - 004	EARTHWORKS - INDICATIVE SECTIONS
08418 - 005	ROAD LONG SECTIONS - SHEET 1 OF 2
08418 - 006	ROAD LONG SECTIONS - SHEET 2 OF 2
08418 - 007	SEWER LAYOUT - GENERAL ARRANGEMENT
08418 - 008	SEDIMENT & EROSION CONTROL PLAN
08418 - 009	CONSTRUCTION MANAGEMENT PLAN
08418 - 011	EXTERNAL SEWER RISING MAIN ALIGNMENT

SEWER RETICULATION
STORMWATER DRAINAGE
ROOFWATER DRAINAGE

PROPOSED ALLOTMENTS
ROAD PAVEMENTS
ROAD VERGE
PUBLIC OPEN SPACE
SEWAGE PUMP STATION

LOCALITY PLAN

1:500 @ A1 0 10 20 30 40 50M

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PROJECT
LOTS 2 & 3
BILAMBIL ROAD
BILAMBIL

ASSOCIATED CONSULTANTS
-

PROPERTY DESCRIPTION	LOTS 2 & 3 DP244652
UBD REF.	
DESIGNED	CBL
DRAWN	ACAD
REVIEWED	CBL
DATE	15 JUNE 2008
APPROVED	FIEAust CPEng RPEQ 4293

REV.	DESCRIPTION	BY	DATE	APPR'D
F	REV SUB	CBL	25/11/09	CBL
E	TSC REQ'S	CBL	26/06/09	CBL
D	TSC REQ'S	CBL	15/03/09	CBL
C	REV LAYOUT	CBL	15/03/09	CBL
B	DA SUBMISSION	CBL	4/08/08	CBL
A	DA PROPOSAL	CBL	14/06/08	CBL

NAME
SITE PLAN, DRAWING SCHEDULE & NOTES

PROJECT REF.	DRAWING NO.	REVISION
08418	001	F

CLEAR VEGETATION AS REQUIRED, RELOCATE CAIRN, TO ACHIEVE SIGHT DISTANCE

80M SIGHT DISTANCE

DISCHARGE STORMWATER DRAINAGE TO BILAMBIL CREEK. ENERGY DISSIPATION AS REQUIRED

BILAMBIL CREEK

REGRADE PUBLIC OPEN SPACE APPROX AS SHOWN TO ACHIEVE 8% GENERAL GRADE

BOULDER RETAINING WALL 1.0M HEIGHT

STORMWATER FLOW RATES
Q5 - 0.165M3/S
Q100 - 0.357M3/S

LOTS 1 TO 11 SEWERED VIA E-ONE SYSTEM OR MONO PSS ECO 1-60 OR SIMILAR TO LOW PRESSURE MAIN IN ROAD

HIGH VOLTAGE POWERLINES PLOTTED FROM AERIAL PHOTOGRAPHY

STORMWATER FLOW RATES
Q5 - 0.85M3/S
Q100 - 1.84M3/S

OPEN SPACE

EASEMENT FOR TRANSMISSION LINE 40 WIDE

PROPRIETARY GPT DEVICE HUMECEPTOR OR SIMILAR PROVIDE SEALED ACCESS FOR MAINTENANCE PURPOSES

STORMWATER FLOW RATES
Q5 - 0.47M3/S
Q100 - 1.02M3/S

BOULDER RETAINING WALL HEIGHT 1.0M

ROAD #1

ROAD #2

PLACE GULLY PITS TO SUIT SAG CURVE

STORMWATER FLOW RATES
Q5 - 0.37M3/S
Q100 - 0.72M3/S

SEWAGE STORAGE TANK AND PUMP STATION

51 PARK

HOGANS ROAD

HALF ROAD CONSTRUCTION

BILAMBIL ROAD

STORMWATER FLOW RATES
Q5 - 0.19M3/S
Q100 - 0.41M3/S

INTERSECTION UPGRADE TO INCLUDE CHANNELISATION LINEMARKING AS REQUIRED

HALF ROAD CONSTRUCTION

30.000 TRANSITION

FULL WIDTH CONSTRUCTION

NO STANDING ZONE

STORMWATER FLOW RATES
Q5 - 0.33M3/S
Q100 - 0.78M3/S

DISCHARGE NEW PIPE DRAINAGE TO EXISTING CULVERT.
DUPLICATE EX CULVERT TO ACHIEVE 2/375ø RCP

BOULDER RETAINING WALL HEIGHT 1.0M

URLIUP ROAD

FULL WIDTH CONSTRUCTION

REFER DRG 08418-004 FOR URLIUP ROAD PROFILE AT INTERSECTION

SISD - 80M AT DESIGN SPEED 50KM/H

MAINTAIN ACCESS TO HALL

NEW CONSTRUCTION TO MATCH NEATLY WITH EXISTING ROUNDABOUT

JOIN NEW BARRIER KERB NEATLY TO EXISTING

SEWER RETICULATION
STORMWATER DRAINAGE
ROOFWATER DRAINAGE

PROPOSED ALLOTMENTS
ROAD PAVEMENTS
ROAD VERGE
PUBLIC OPEN SPACE
SEWAGE PUMP STATION

1:500 @ A1 0 10 20 30 40 50M

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C	GEN REV	CBL	4/12/08	CBL
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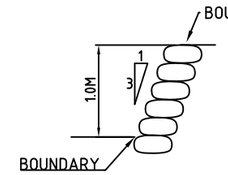
A	DA PROPOSAL	CBL	14/06/08	CBL

NAME
GENERAL ARRANGEMENT

PROJECT REF.	DRAWING NO.	REVISION
08418	002	G

CUT VOLUME 58,000M3
FILL VOLUME 39,000M3
BALANCE 19,000M3



RETAINING WALL DETAIL

BILAMBIL CREEK

LIMIT OF FILL

LIMIT OF CUT

BOULDER WALL

HIGH VOLTAGE POWERLINES PLOTTED FROM AERIAL PHOTOGRAPHY

EASEMENT FOR TRANSMISSION LINE 40 WIDE

CONCRETE BRIDGE

ROAD #1

ROAD #2

HOGANS ROAD

BILAMBIL ROAD

URLUP ROAD

SECTION 1

SECTION 2

SECTION 3

SECTION 4

SECTION 5

SECTION 6

SECTION 7

1:500 @ A1 0 10 20 30 40 50M

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B	DA SUBMISSION	CBL	4/08/08	CBL
A	DA PROPOSAL	CBL	14/06/08	CBL

NAME
EARTHWORKS PLAN

PROJECT REF.	DRAWING NO.	REVISION
08418	003	F

ISOPACHE INTERVAL 1.0M

CUT/FILL INTERFACE

ISOPACHE TYPICAL INTERVAL 1M

CUT/FILL INTERFACE

AREA CUT GREATER THAN 5M

AREA FILL GREATER THAN 5M

CUT/FILL INTERFACE

HIGH VOLTAGE POWERLINES PLOTTED FROM AERIAL PHOTOGRAPHY

CONCRETE BRIDGE

ROAD #1

ROAD #2

HOGANS ROAD

BILAMBIL ROAD

URLIUP ROAD

EDGE OF BITUMEN

CENTRELINE

TOP BACK KERB

HYDRANT NOT FOUND AT PEGGED LOCATION AS PER PLANS SUPPLIED BY GOLD COAST CITY COUNCIL

STORMWATER MANHOLE

TELSTRA PIT

SEWER MH

1:500 @ A1 0 10 20 30 40 50M

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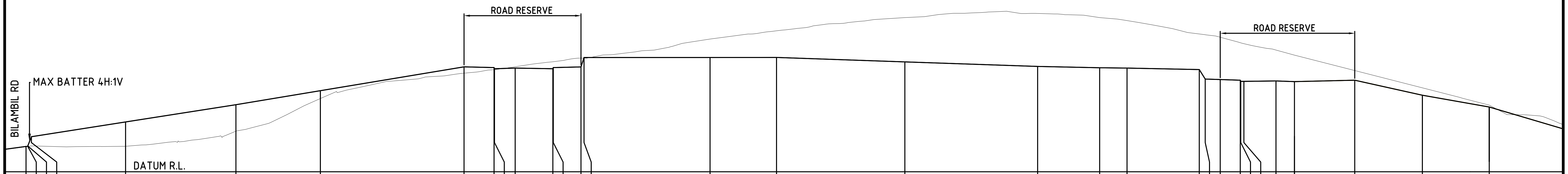
A	TSC REQ'S	CBL	20/05/09	CBL

NAME
EARTHWORKS - ISOPACHE DETAILS

PROJECT REF.	DRAWING NO.	REVISION
08418	003A	B



PEGGED CHAINAGE	NATURAL SURFACE LEVELS	FINISHED SURFACE LEVELS
12.229		3.252
12.436		3.273
12.447		3.306
12.911		4.500
25.000	3.270	6.387
39.159		8.598
50.000	9.399	10.399
68.436		13.462
72.286		13.366
72.336		13.216
75.000	13.466	13.297
79.836		13.216
79.886		13.366
83.436		13.455
83.836		14.655
100.000	17.023	14.662
108.531		14.665
125.000	19.779	14.099
142.039		13.513
150.000	19.782	13.347
153.515		13.303
162.784		13.115
163.545		11.897
165.477		11.826
168.042		11.745
168.110		11.594
168.505		11.596
172.626		11.649
175.000	14.964	11.565
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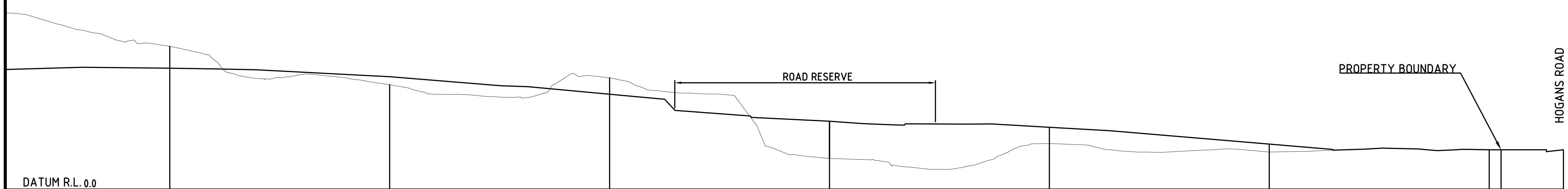
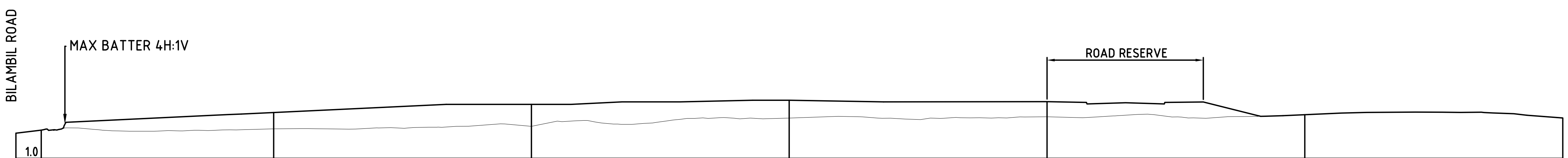
200.000	8.554	8.303

SECTION #1



PEGGED CHAINAGE	NATURAL SURFACE LEVELS	FINISHED SURFACE LEVELS
6.297	20.259	13.555
25.000	16.188	13.707
50.000	11.831	12.741
75.000	12.618	10.757
100.000	3.473	7.694
125.000	5.167	7.012
150.000	4.204	5.102
175.000	4.453	4.453
188.500	3.800	3.800

SECTION #2



PEGGED CHAINAGE	NATURAL SURFACE LEVELS	FINISHED SURFACE LEVELS
0.000	3.445	3.444
2.457	3.739	3.739
25.000	3.866	5.454
50.000	4.105	6.248
75.000	4.915	6.645
100.000	5.037	6.512
125.000	5.243	5.243
150.017	4.887	4.925

SECTION #3

VERTICAL 1:250 @ A1 0 5 10 15 20 25M
HORIZONTAL 1:250 @ A1 0 5 10 15 20 25M

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CLIENT
JACKSON INTERNATIONAL PTY LTD

PROJECT
LOTS 2 & 3
BILAMBIL ROAD
BILAMBIL

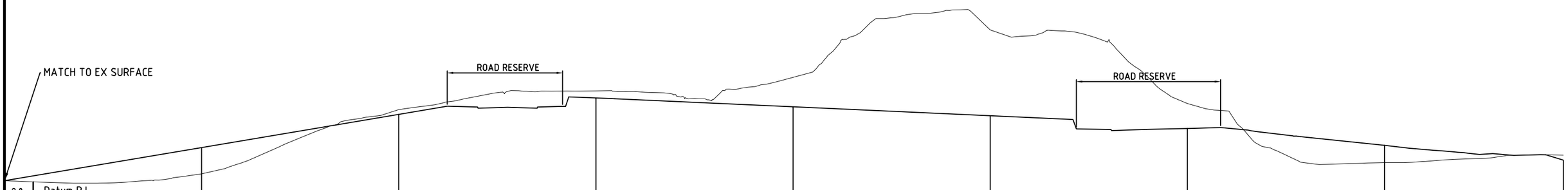
ASSOCIATED CONSULTANTS
-

PROPERTY DESCRIPTION	LOTS 2 & 3 DP244652
UBD REF.	
DESIGNED	CBL
DRAWN	ACAD
REVIEWED	CBL
DATE	15 JUNE 2008
APPROVED	FIEAust CPEng RPEQ 4293

REV.	DESCRIPTION	BY	DATE	APPR'D
E	TSC REQ'S	CBL	29/06/09	CBL
D	TSC REQ'S	CBL	20/05/09	CBL
C	REV LAYOUT	CBL	15/03/09	CBL
B	DA SUBMISSION	CBL	4/08/08	CBL
A	DA PROPOSAL	CBL	14/06/08	CBL

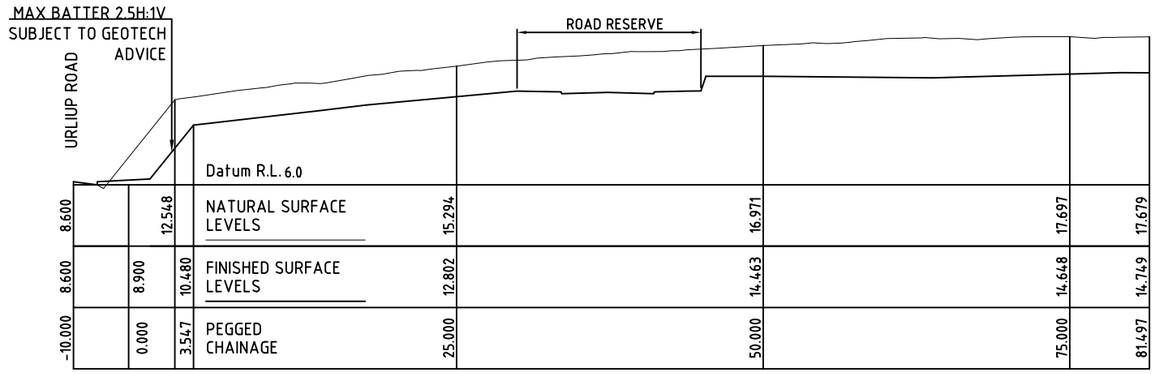
NAME
EARTHWORKS
CROSS SECTIONS
SHEET 1 OF 2

PROJECT REF.	DRAWING NO.	REVISION
08418	004	E



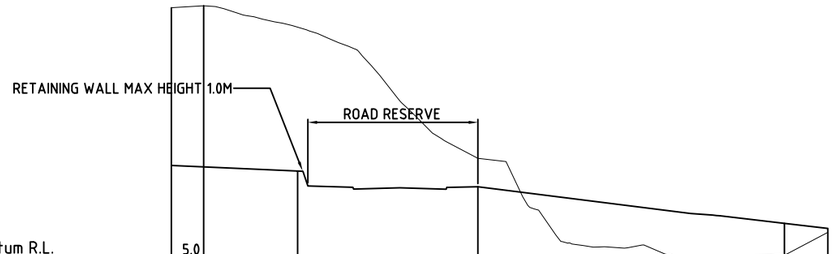
2.0	Datum R.L.								
4.028 3.884	NATURAL SURFACE LEVELS	4.900	13.030	15.397	17.107	23.115	13.804	6.316	7.264
4.028	FINISHED SURFACE LEVELS	8.219	12.421	14.511	13.384	12.254	10.635	8.507	6.635
0.000 3.637	PEGGED CHAINAGE	25.000	50.000	75.000	100.000	125.000	150.000	175.000	197.666

SECTION #4



Datum R.L. 6.0						
8.600	12.548	NATURAL SURFACE LEVELS	15.294	16.971	17.697	17.679
8.600 8.900	10.480	FINISHED SURFACE LEVELS	12.802	14.463	14.648	14.749
-10.000 0.000	3.547	PEGGED CHAINAGE	25.000	50.000	75.000	81.497

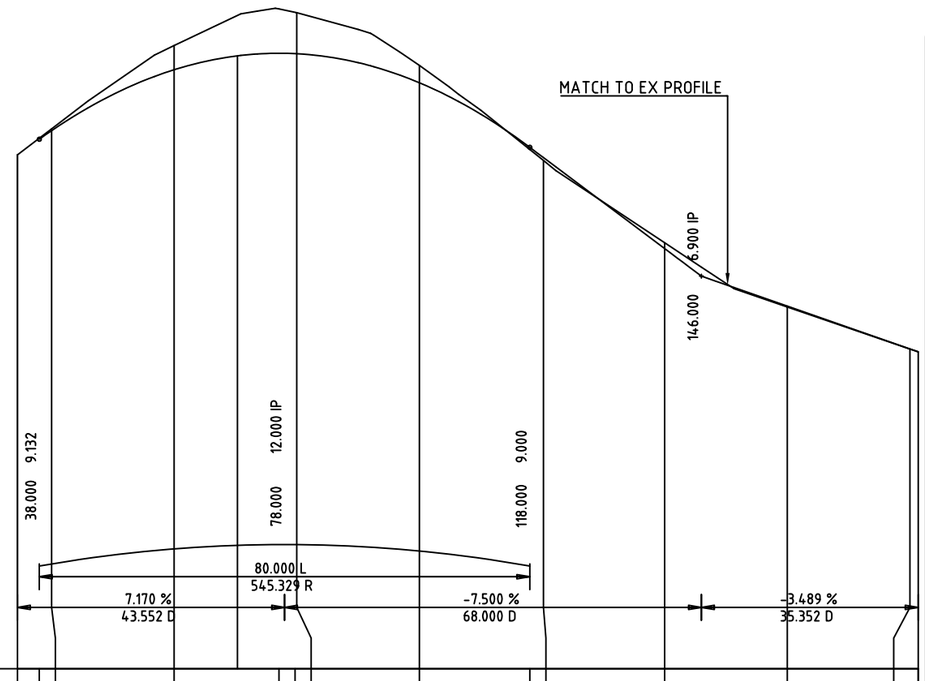
SECTION #5



Datum R.L. 5.0					
NATURAL SURFACE LEVELS	25.343 25.498		13.061	5.159	7.035
FINISHED SURFACE LEVELS	12.478	12.031	10.744	7.764	7.351
PEGGED CHAINAGE	0.000 2.634	10.303	25.000	50.000	53.545

SECTION #6

VERTICAL 1:250 @ A1 0 5 10 15 20 25M
HORIZONTAL 1:250 @ A1 0 5 10 15 20 25M



Datum R.L. 0.5											
PAVEMENT LEVELS	8.877	9.132 9.272	10.266	10.534	10.533 10.526	10.053	9.000	8.833	7.350	6.412	5.714 5.667
SURFACE LEVELS	8.877	9.148 9.301	10.660	11.256	11.196	10.337	8.965	8.786	7.444	6.397	5.712 5.667
PEGGED CHAINAGE	34.448	38.000 40.000	60.000	77.100	78.000 80.000	100.000	118.000	120.231	140.000	160.000	180.000 181.352
SHIFT HORIZONTAL				73.557	46.675 L 100 R			120.232			

URLIUP ROAD LONG SECTION AT ROAD #1 INTERSECTION

VERTICAL 1:50 @ A1 0 1 2 3 4 5M
HORIZONTAL 1:500 @ A1 0 10 20 30 40 50M

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CLIENT
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PROJECT
LOTS 2 & 3
BILAMBIL ROAD
BILAMBIL

ASSOCIATED CONSULTANTS
-

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UBD REF.	
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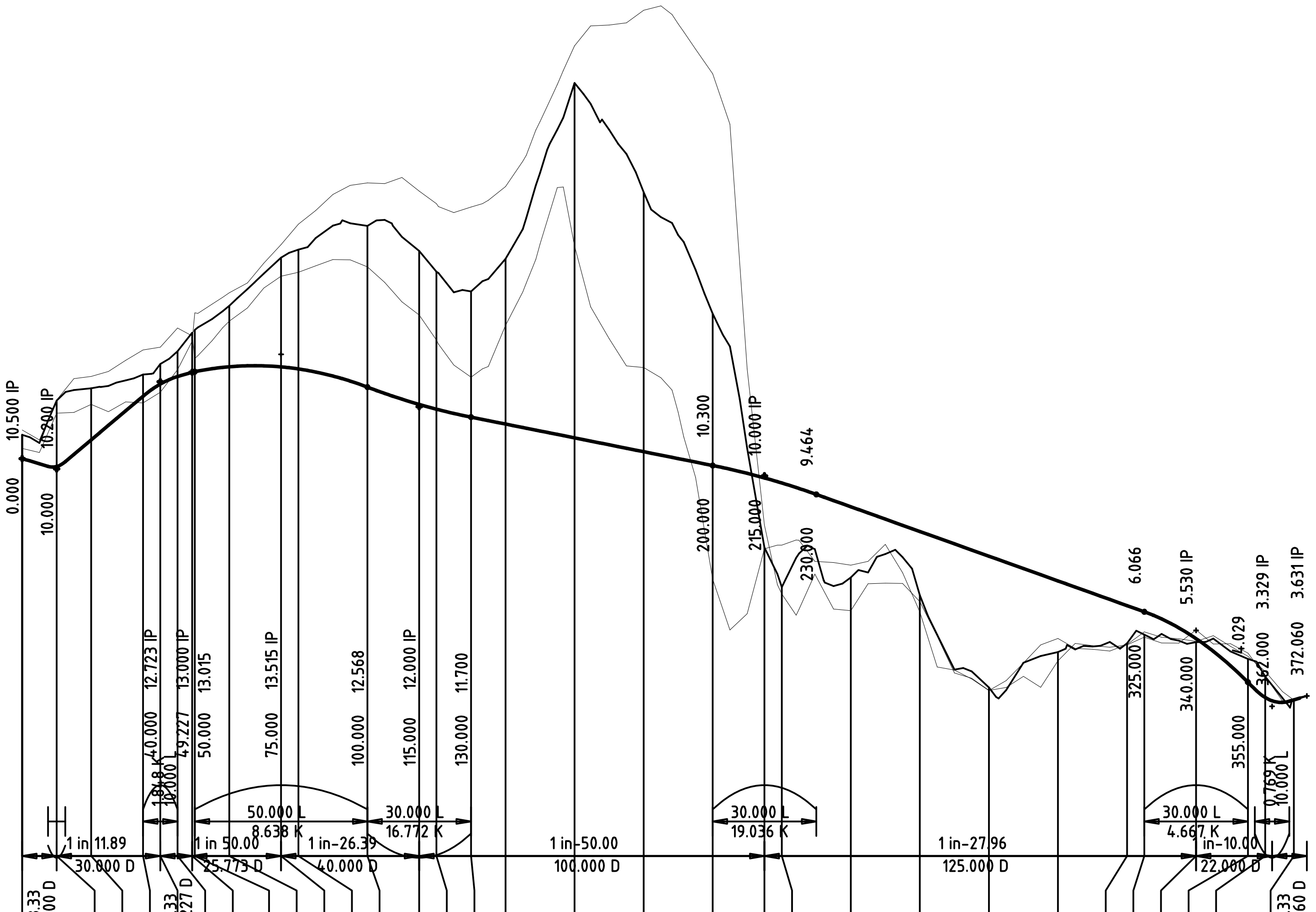
NAME
EARTHWORKS
CROSS SECTIONS
SHEET 2 OF 2

PROJECT REF.	DRAWING NO.	REVISION
08418	005	E



DATUM R.L. -3.0

EARTHWORKS QUANTITIES

Interval	CUT	FILL
1	159	0
2	358	0
3	307	0
4	62	6
5	67	3
6	71	0
7	16	0
8	302	0
9	865	0
10	451	0
11	3129	0
12	3465	0
13	334	0
14	563	0
15	2248	0
16	8535	1
17	8877	0
18	9292	314
19	5989	849
20	0	280
21	0	1357
22	0	953
23	0	2091
24	0	1653
25	0	676
26	0	86
27	6	105
28	110	0
29	61	0
30	44	2
31	0	0

PEGGED CHAINAGE	FRONT OF KERB LEVELS LHS	FRONT OF KERB LEVELS RHS	CUT	FILL	PAVEMENT LEVELS	SURFACE LEVELS
0.000	10.401	10.401	0.687		10.500	11.187
7.500	12.177	12.177	1.326		10.275	11.600
8.815	12.177	12.177	1.648		10.255	11.904
10.000	10.172	10.172	1.906		10.271	12.177
20.000	10.942	10.942	1.492		11.041	12.533
35.000	12.204	12.204	0.631		12.303	12.934
40.000	12.557	12.557	0.581		12.656	13.236
45.000	12.774	12.774	0.731		12.873	13.605
49.226	12.901	12.901	1.142		13.000	14.141
49.227					13.000	
50.000	12.916	12.916	1.208		13.015	14.224
60.000	13.059	13.059	1.765		13.158	14.923
75.000	13.055	13.055	3.163		13.154	16.316
80.000	12.995	12.995	3.452		13.094	16.547
100.000	12.469	12.469	4.667		12.568	17.235
115.000	11.968	11.968	4.443		12.067	16.511
120.000	11.831	11.831	3.979		11.930	15.909
130.000	11.601	11.601	3.635		11.700	15.336
140.000	11.401	11.401	4.780		11.500	16.281
160.000	11.001	11.001	10.270		11.100	21.370
180.000	10.601	10.601	7.508		10.700	18.209
200.000	10.201	10.201	4.395		10.300	14.695
215.000	9.842	9.842		2.014	9.941	7.927
220.000	9.696	9.696		3.011	9.795	6.783
240.000	9.007	9.007		2.044	9.106	7.063
260.000	8.292	8.292		1.843	8.391	6.548
280.000	7.577	7.577		3.797	7.676	3.878
300.000	6.861	6.861		2.061	6.960	4.900
320.000	6.146	6.146		1.088	6.245	5.157
325.000	5.967	5.967		0.662	6.066	5.404
340.000	5.190	5.190		0.098	5.289	5.190
355.000	3.930	3.930	0.672		4.029	4.702
360.000	3.489	3.489	0.601		3.588	4.189
362.000					3.492	
364.693	3.572	3.572	0.165		3.445	3.610
368.294	3.419	3.419		0.012	3.518	3.507
370.000					3.569	3.591
372.060						3.631

SHIFT HORIZONTAL: 0.000 · 49.227 L · 49.227 · 50.891 · 1.664 L · 25 R · 14.366 L · 65.257 · 55.337 L · 120.594 · 25.423 L · 25 R · [illegible] · 25 R · [illegible] · 164.661 · 23.543 L · 188.204 · 25 R · 6.828 L · 195.032 · 23.736 L · 218.768 · 200 R · 10.800 L · 229.568 · 142.492 L · 372.060

VERTICAL 1:100 @ A1 — 0.0 2.0 4.0 6.0 8.0 10.0M

HORIZONTAL 1:1,000 @ A1 — 0 20 40 60 80 100M

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mail@claconsultants.com.au

CLIENT: JACKSON INTERNATIONAL PTY LTD

PROJECT: LOTS 2 & 3 BILAMBIL ROAD BILAMBIL

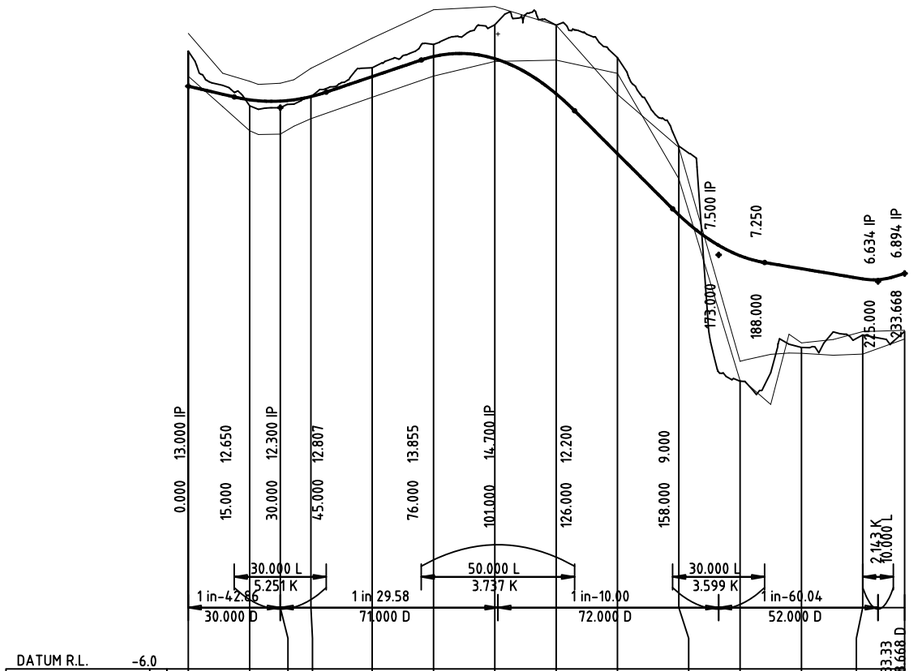
ASSOCIATED CONSULTANTS: -

PROPERTY DESCRIPTION	LOTS 2 & 3 DP244652
UBD REF.	
DESIGNED	CBL
DRAWN	ACAD
REVIEWED	CBL
DATE	15 JUNE 2008
APPROVED	FIEAust CPEng RPEQ 4293

REV.	DESCRIPTION	BY	DATE	APPR'D
C	REV LAYOUT	CBL	15/03/09	CBL
B	DA SUBMISSION	CBL	4/08/08	CBL
A	DA PROPOSAL	CBL	14/06/08	CBL

NAME: ROAD #1 LONGITUDINAL SECTION

PROJECT REF.	DRAWING NO.	REVISION
08418	006	C



DATUM R.L. -6.0

EARTHWORKS QUANTITIES	CUT		181	19	36	168	267	372	585	901	939	88	0	0		
	FILL		49	101	67	97	96	46	0	0	0	385	1627	1178	710	
FRONT OF KERB LEVELS	LHS	12.901		12.458	12.296	12.563	13.215	13.870	13.796	12.653	10.701	11.049	8.707	7.373	3.655	6.951	6.618	5.005
	RHS	12.901		12.458	12.296	12.415	12.563	13.215	13.870	13.796	12.653	10.701	11.049	8.707	7.373	3.655	6.951	6.618	5.005
CUT		1.141						0.285	0.393	1.105	2.236	3.132	2.515	2.243					
FILL				0.196	0.211	0.218	0.009								4.090	3.993	2.570	1.827	2.100
PAVEMENT LEVELS		13.000		12.557	12.507	12.514	12.662	13.314	13.969	13.895	13.864	12.752	10.800	9.000	8.806	7.813	7.472	7.250	7.050	6.717	6.692	6.784
SURFACE LEVELS		14.141		12.361	12.297	12.296	12.653	13.600	14.362	15.001		14.988	13.931	11.515	11.049		3.383	3.257	4.480	4.890		4.683	5.005
PEGGED CHAINAGE		0.000	11.211 L	20.000	27.251	30.000	40.000	60.000	80.000	100.000	101.000	120.000	140.000	158.000	160.000	173.000	180.000	188.000	200.000	220.000	225.000	230.000	233.668
SHIFT HORIZONTAL		0.000	11.211	11.211 L	23.263 L 15 R		34.474	147.087 L								181.561	28.821 L 25 R		210.382	3.286 L			233.668

VERTICAL 1:100 @ A1

HORIZONTAL 1:1,000 @ A1

0.0 2.0 4.0 6.0 8.0 10.0M

0 20 40 60 80 100M

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PROJECT
LOTS 2 & 3
BILAMBIL ROAD
BILAMBIL

ASSOCIATED CONSULTANTS
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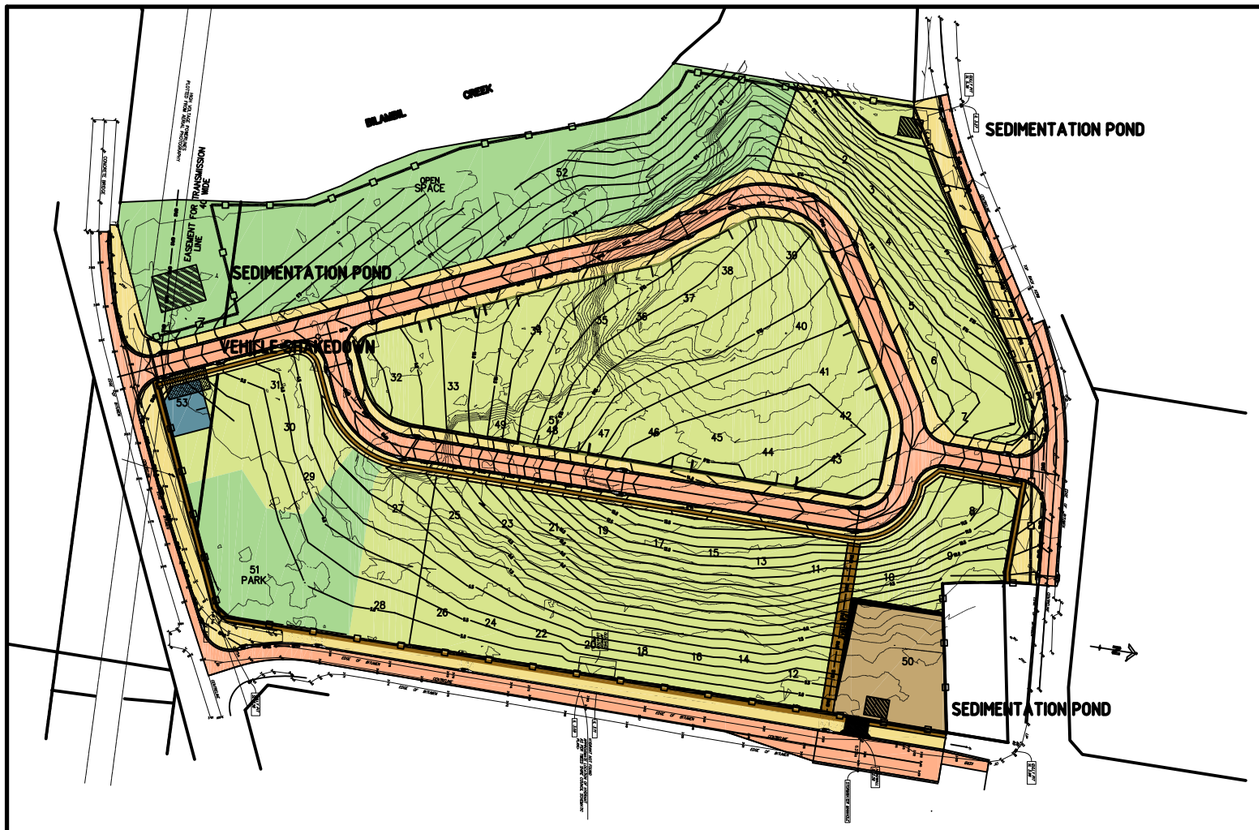
A	DA PROPOSAL	CBL	14/06/08	CBL

NAME
ROAD #2
LONGITUDINAL SECTIONS

PROJECT REF.	DRAWING NO.	REVISION
08418	007	C



LEGEND

SILT FENCING

VEHICLE SHAKEDOWN

SEDIMENTATION POND

Sedimentation and Erosion Control

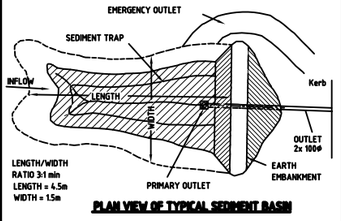
1. Sedimentation and erosion control implementation and maintenance shall be in accordance with Byron Shire Council's Development Manual as read in conjunction with the document titles "Environmental Best Management Practices". The Contractor shall make himself aware of the prevailing weather conditions and shall take all necessary precautions to secure the site at the completion of each day's work, and whenever else is considered necessary.
2. Sediment and erosion control measures shall be provided as required to prevent the movement of dust and/or silt from the site.
3. Sediment and erosion control measures shall be installed downstream of any work area prior to the commencement of work in that area.
4. Erosion and sedimentation control measures shall be installed prior to the disturbance of the site and as required during the course of the works.
5. Topsoil shall be stripped in accordance with the specification and stockpiles at locations as agreed by the superintendent and Council's designated representative.
6. All disturbed areas shall be stabilised with the provision of 75mm minimum topsoil and grass seeded, mulched, re-vegetated etc within 7 days of the completion of final allotment earthworks.
7. All sediment control measures and devices shall be inspected for structural damage after each rainfall event and at the completion of each days work. All trapped sediment shall be removed to an approved location on site for re-use on site or for subsequent removal from the site. Site disposal will only be approved when it can be established that no additional erosion can occur.
8. Sediment and erosion control measures around stockpiles shall include but not necessarily be limited to:–

a) Provision of a silt fence below the stockpile, as indicated by the natural slopes of the land,
b) Provision of grass cover if stockpile is to remain in place for more that 30 days,
c) Provision of a surface emulsion or approved equivalent to prevent wind erosion.
d) Diversion of runoff around stockpiles.

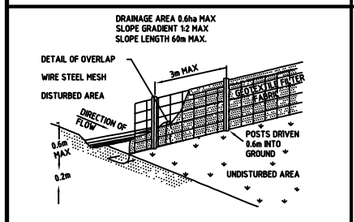
9. Place 600mm width turf at both top and toes of retaining walls and tops of new kerb.
10. Water areas of construction regularly as required to obviate potential for dust nuisance to adjoining properties and the site generally.
11. Contractor to be responsible for removal of silt that is washed onto Council or private property. from subject site.
12. Contractor to make provision for containment of waste materials on site including waste oils etc from machinery servicing.
13. Contractor to be responsible for tyhe control of dust at all times including weekends and holidays.

Construction Traffic Shakedown

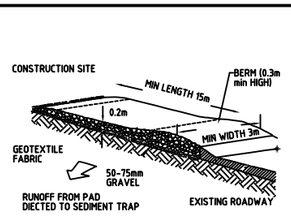
Provide construction traffic shake down device at all relevant site exit points. Clean out and maintain shake down device regularly to ensure efficient operation.



PLAN VIEW OF TYPICAL SEDIMENT BASIN



SEDIMENT FENCE



TEMPORARY CONSTRUCTION EXIT

	Prior to the Commencement of Works		
a	Submission of a copy of the Contractor's Program for the Works.	Contractor	Prior to the Pre-Start Meeting
b	Submit program for the implementation and monitoring (inspection type) of the specified sedimentation control measures for approval.	Contractor	Prior to the Pre-Start Meeting
c	Approve submitted program	Superintendent /Council	Pre-Start Meeting
	During Construction		
a	Install sedimentation and control measures (measures)	Contractor	Prior to the commencement of works necessitating the measures
b	Approval of the Measures as constructed	Superintendent	Prior to the commencement of works necessitating the measures
c	Periodic inspection of the measures	Contractor	Daily and after rainfall event
		Superintendent	At least weekly and/or in conjunction with other required inspections
d	Rectification of issues identified by periodic inspection	Contractor	Immediately
e	Inspection of adjacent roads and drains	Contractor	Daily and after rainfall event
	On Maintenance		
a	Submit program for the continued maintenance of the works during the "On Maintenance" period.	Contractor	Prior to On Maintenance inspection.
b	Approve submitted program	Superintendent in conjunction with Council	Prior to On Maintenance inspection.
c	Install/maintain sedimentation and erosion control measures	Contractor	Prior to On Maintenance inspection.
	Installation	Contractor	During On Maintenance Period
	Off Maintenance	Superintendent in conjunction with Council	At On Maintenance Inspection
d	Approval of Measures as implemented	Contractor	Weekly, and after each rainfall event
e	Routine inspection of implemented measures (including adjacent road network)	Superintendent	As requested by the Contractor
f	Rectification/Reinstatement of sediment and erosion control measures	Contractor	As soon as practicably possibly (24 hours max)
	Off Maintenance		
g	Removal of Erosion and sedimentation Control Measures	Contractor	As directed by the Superintendent

SEWER RETICULATION

STORMWATER DRAINAGE

ROOFWATER DRAINAGE

PROPOSED ALLOTMENTS

ROAD PAVEMENTS

ROAD VERGE

PUBLIC OPEN SPACE

SEWAGE PUMP STATION

1:1,000 @ A1

0 20 40 60 80 100M

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PROJECT
LOTS 2 & 3
BILAMBIL ROAD
BILAMBIL

ASSOCIATED CONSULTANTS
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REV.	DESCRIPTION	BY	DATE	APPR'D
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C	REV LAYOUT	CBL	15/03/09	CBL
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NAME
WATER QUALITY MANAGEMENT CONSTRUCTION PHASE

PROJECT REF.	DRAWING NO.	REVISION
08418	008	E

CONSTRUCTION MANAGEMENT PLAN

1. TEMPORARY LOCKABLE 1.8M CHAIN MESH FENCE TO BE ERECTED AS SHOWN.
2. NOTICEBOARD SHOWING CONTACT DETAILS OF CONTRACTOR TO BE ERECTED NEAR CONSTRUCTION ENTRANCE. MUST BE VISIBLE FROM STREET.
3. ALL WORKERS TO PARK VEHICLES ON SITE WHERE POSSIBLE.
4. WATER SPRAYING OF DUST TO BE UNDERTAKEN AS REQUIRED.
5. INSTALL CONSTRUCTION ENTRANCE/EXITS ON SITE AS SHOWN ABOVE AND ON SEDIMENT AND EROSION CONTROL PLAN.
6. ALL WORKS TO BE CARRIED OUT BETWEEN 6:00AM AND 6:00PM MONDAY TO SATURDAY.
7. ALL SUITABLE EXCAVATED MATERIAL TO BE REUSED ON SITE.
8. CONSTRUCTION SKIPS TO BE PROVIDED ON SITE FOR BUILDERS' RUBBISH. TO BE EMPTIED AS REQUIRED.
9. NO HAZARDOUS OR DANGEROUS MATERIALS TO BE KEPT ON SITE.
10. ALL DELIVERIES TO BE STAGED TO AVOID CONGESTION ON PUBLIC ROADS.
11. PEDESTRIAN DETOUR TO TAKE PLACE AT ALL TIMES WHEN WORKS ARE BEING UNDERTAKEN ON PUBLIC ROAD. ARRANGE PRE-START MEETING WITH COUNCIL TO ENSURE COMPLIANCE WITH COUNCIL REQUIREMENTS.

BILAMBIL CREEK

OPEN SPACE

HIGH VOLTAGE POWERLINES PLOTTED FROM AERIAL PHOTOGRAPHY

EASEMENT FOR TRANSMISSION LINE 40 WIDE

SITE ENTRANCE TO BE LOCATED AS SHOWN
PROVIDE SITE OFFICES AND STORAGE AREAS ADJACENT TO ENTRANCE

ROAD #1

ROAD #2

HOGANS ROAD

URLUP ROAD

BILAMBIL ROAD

51 PARK

INSTALL 1.8 HIGH CONSTRUCTION BARRIER TO PERIMETER AS SHOWN FOR DURATION OF WORKS

PROVIDE SIGNAGE DIVERTING PEDESTRIANS TO OTHER SIDE OF ROAD AS REQUIRED WHEN WORKING ON ROAD RESERVE

PEDESTRIAN DETOUR

1. DIRECTION OF DETOUR TO BE CLEARLY MARKED TO PEDESTRIANS.
2. DETOUR TO BE MINIMUM 1.5M WIDE, 2.0M PREFERABLE.
3. CLEAR ALL DEBRIS FROM PEDESTRAIN PATH, MAKE GROUND FIRM AND LEVEL, ADD GRAVEL AND WHEEL ROLL AS REQUIRED.
4. ERECT CONSTRUCTION FENCING TO BOTH SIDES OF DETOUR WITHIN SUBJECT SITE.
5. ARRANGE INSPECTION WITH PARKS DEPARTMENT OF COUNCIL PRIOR TO DIVERSION OF PEDESTRIAN FLOW.
6. RESTORE ALL AREAS OUTSIDE SUBJECT SITE TO PREDEVELOPMENT CONDITION TO THE SATISFACTION OF COUNCIL.

1:500 @ A1 0 10 20 30 40 50M

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8/43 Tallebudgera Creek Road
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Fax: 07 5520 1077
mail@claconsultants.com.au

CLIENT
JACKSON INTERNATIONAL PTY LTD

PROJECT
LOTS 2 & 3
BILAMBIL ROAD
BILAMBIL

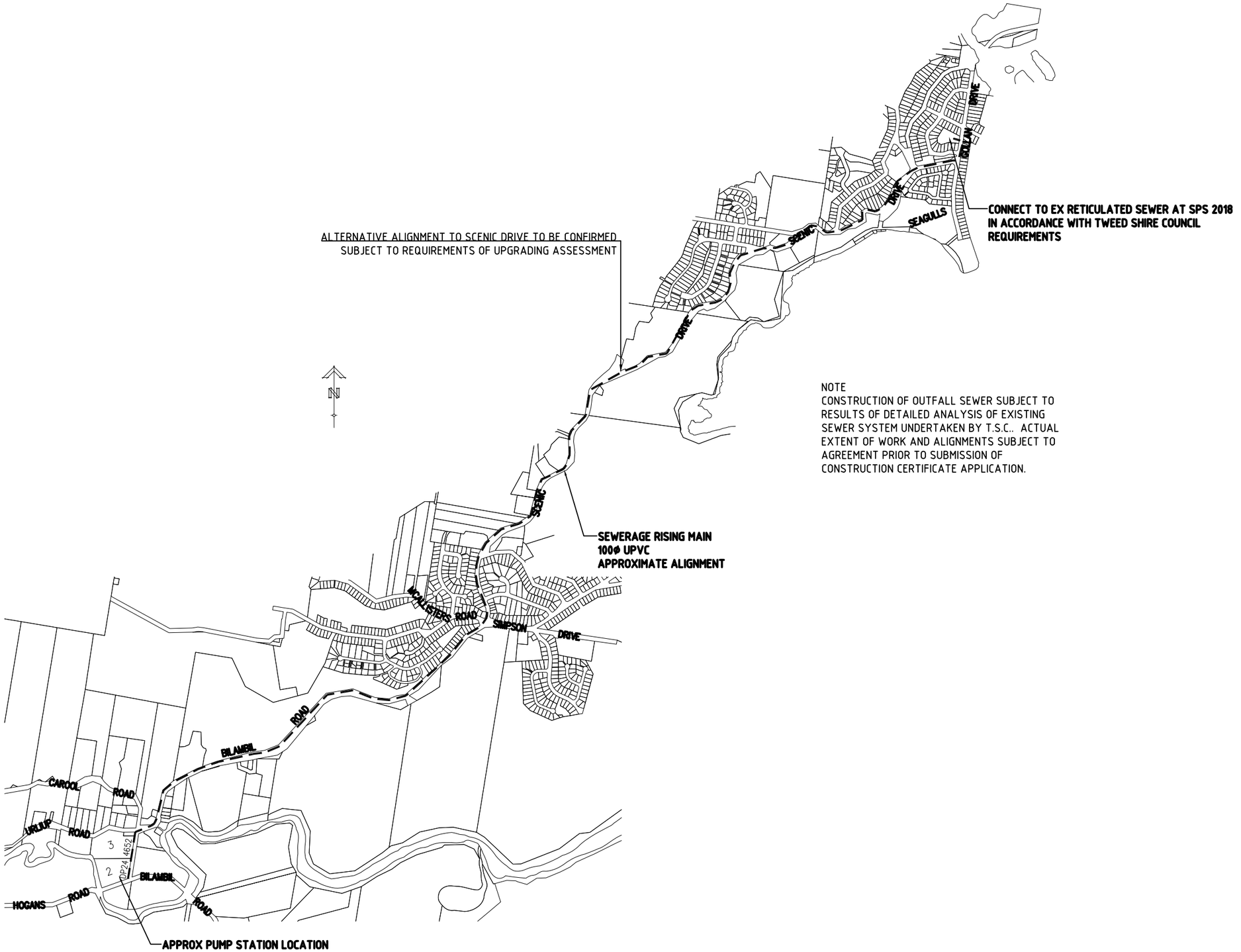
ASSOCIATED CONSULTANTS
-

PROPERTY DESCRIPTION	LOTS 2 & 3 DP244652
UBD REF.	
DESIGNED	CBL
DRAWN	ACAD
REVIEWED	CBL
DATE	15 JUNE 2008
APPROVED	FIEAust CPEng RPEQ 4293

REV.	DESCRIPTION	BY	DATE	APPR'D
D	REV SUB	CBL	25/11/09	CBL
C	REV LAYOUT	CBL	15/03/09	CBL
B	DA SUBMISSION	CBL	4/08/08	CBL
A	DA PROPOSAL	CBL	14/06/08	CBL

NAME
CONSTRUCTION MANAGEMENT PLAN

PROJECT REF.	DRAWING NO.	REVISION
08418	009	D



NOTE
CONSTRUCTION OF OUTFALL SEWER SUBJECT TO RESULTS OF DETAILED ANALYSIS OF EXISTING SEWER SYSTEM UNDERTAKEN BY T.S.C.. ACTUAL EXTENT OF WORK AND ALIGNMENTS SUBJECT TO AGREEMENT PRIOR TO SUBMISSION OF CONSTRUCTION CERTIFICATE APPLICATION.

1:10,000 @ A1 0 200 400 600 800 1,000

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NAME
EXTERNAL SEWER
RISING MAIN ALIGNMENT

PROJECT REF.	DRAWING NO.	REVISION
08418	010	E

ATTACHMENT 3
Site Based Stormwater Management Report

C L A C O N S U L T A N T S
Consulting Civil/Structural Engineers, Project Managers

STORMWATER MANAGEMENT PLAN
LOTS 2 & 3 BILAMBIL ROAD BILAMBIL
PROPOSED SUBDIVISIONAL DEVELOPMENT

REVISION C
OUR REF: O8418

REVISION	DATE	AMENDMENTS
A	4/08/08	-
B	15/03/09	Revised Subdivision Layout
C	20/05/09	Revised Council Requirements

Suite 8/43 Tallebudgera Creek Road West Burleigh
PO Box 403 West Burleigh Qld 4219
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Brisbane · Gold Coast
ABN 55 079 641 286

Contents

1. Introduction

The Stormwater Management Plan has been prepared in order to address the requirements of Tweed Shire Council's Stormwater Quantity and Quality objectives, in association with the application for Subdivisional Approval.

There are two objectives for this Stormwater Management Plan.

The first is to ensure that the peak flows from the site during localised design storms will not result in any material adverse impact on the adjacent properties, both upstream and downstream. Thus the proposal is to demonstrate that the required works will not cause ponding on the upstream properties, nor will they result in an increase in peak flow rates. This objective is to be achieved for all rainfall events up to and including the Q100.

The second is to ensure that all runoff from the proposed site will comply with the Water Quality Objectives of Council, through proposing methodologies whereby stormwater runoff from the site may be treated to achieve those water quality objectives.

2. Site Information

The site is located at the corner of Hogans Road, Bilambil Road and Urliup Road in Bilambil (Lots 2 & 3 on DP244652). The site is approximately 4.6Ha in area.

The site is to be developed as a residential subdivision comprising 57 allotments. Details of the proposed development are contained on CLA Drawing Nos 08418 - 002.

It will be noted that the site can be generally divided in to 3 separate catchments. The earthworks associated with the development will generally maintain this division, however the construction of the internal street will significantly alter the relative sizes of the original catchments.

Legal Point of Discharge

Tweed Shire Council requires that stormwater runoff be discharged to a legal point of discharge, defined as a point on or adjacent to the development site, and (amongst other definitions) "a natural watercourse or waterway to which the site naturally drains". Accordingly, Bilambil Creek is nominated as the appropriate legal point of discharge. This has been confirmed by Council.

3. Stormwater Quantity

tweed Shire Council has advised that there are no apparent issues related to the conveyance capacity of Bilambil Creek. Accordingly, it is not required to attenuate post development flow rates.

4. Stormwater Quality

Tweed Shire Council has advised that the development does not trigger requirements for water quality improvement devices, in that the development does not have more than 50 allotments in a contributing catchment.

4.1 Construction Phase

During the course of the construction, the following processes are expected:

- Bulk earthworks
- Detailed trim to final levels
- Haulage of fill to the site
- Underground Services construction

Management of stormwater runoff from the exposed earthwork surfaces will be based on containment, diversion and retention. At all stages of construction, current standards of building practices will be adhered to. These include:

- Placement of sediment fences where appropriate
- Vehicle shakedown to prevent suspended solids being exported from site and consequently into surrounding stormwater infrastructure
- Construction of temporary sediment ponds as required.

It will be the responsibility of the contractor to ensure that these and any other sedimentation and erosion controls are carried out in accordance with the TSC approved Sediment & Erosion Control Plan. This plan is included in Figures (see 08418-008).

5. Conclusion

This report set out to propose measures through which the requirements of the Tweed Shire Council could be met in terms of Stormwater Quality and Quantity.

The installation of on site stormwater detention would mitigate any increase in peak flows generated as a result of the proposed development.

Through addressing stormwater quality at both the construction and operational phases of the development, deemed to comply water quality objectives will be met.

6. References

- Tweed Shire Council Development Design Specifications D5 – Stormwater Drainage Design v1.2
- Tweed Shire Council Development Design Specifications D7 – Stormwater Quality v1.3
- "Design Guidelines for Stormwater Quality Improvement Devices", Final Draft, BCC 4 November 1999
- "Guideline on Identifying and Applying Water Quality Objectives in Brisbane City", Version 1, BCC March 2000
- "Guidelines for Pollutant Export Modelling in Brisbane", Version 7 – Draft, BCC Oct 2003
- Bureau of Meteorology Website, www.bom.gov.au
- "Subdivision & Development Guidelines, 2000" Brisbane City Council
- Brisbane City Council Stormwater Outlets, Parks and Waterways Guidelines (Version 2, 2003)
- Brisbane City Council Natural Channel Design Guidelines (November 2003);
- Water Sensitive Urban Design – Melbourne Water

Figures

CLA Consultants Drawing 08418 - 002
CLA Consultants Drawing 08418 - 008

CLEAR VEGETATION AS REQUIRED, RELOCATE CAIRN, TO ACHIEVE SIGHT DISTANCE

80M SIGHT DISTANCE

DISCHARGE STORMWATER DRAINAGE TO BILAMBIL CREEK. ENERGY DISSIPATION AS REQUIRED

BILAMBIL CREEK

REGRADE PUBLIC OPEN SPACE APPROX AS SHOWN TO ACHIEVE 8% GENERAL GRADE

BOULDER RETAINING WALL 1.0M HEIGHT

STORMWATER FLOW RATES
Q5 - 0.165M3/S
Q100 - 0.357M3/S

LOTS 1 TO 11 SEWERED VIA E-ONE SYSTEM OR MONO PSS ECO 1-60 OR SIMILAR TO LOW PRESSURE MAIN IN ROAD

HIGH VOLTAGE POWERLINES PLOTTED FROM AERIAL PHOTOGRAPHY

STORMWATER FLOW RATES
Q5 - 0.85M3/S
Q100 - 1.84M3/S

OPEN SPACE

EASEMENT FOR TRANSMISSION LINE 40 WIDE

PROPRIETARY GPT DEVICE HUMECEPTOR OR SIMILAR PROVIDE SEALED ACCESS FOR MAINTENANCE PURPOSES

STORMWATER FLOW RATES
Q5 - 0.47M3/S
Q100 - 1.02M3/S

BOULDER RETAINING WALL HEIGHT 1.0M

ROAD #1

ROAD #2

PLACE GULLY PITS TO SUIT SAG CURVE

STORMWATER FLOW RATES
Q5 - 0.37M3/S
Q100 - 0.72M3/S

SEWAGE STORAGE TANK AND PUMP STATION

51 PARK

HOGANS ROAD

HALF ROAD CONSTRUCTION

BILAMBIL ROAD

STORMWATER FLOW RATES
Q5 - 0.19M3/S
Q100 - 0.41M3/S

INTERSECTION UPGRADE TO INCLUDE CHANNELISATION LINEMARKING AS REQUIRED

HALF ROAD CONSTRUCTION

30.000 TRANSITION

FULL WIDTH CONSTRUCTION

NO STANDING ZONE

STORMWATER FLOW RATES
Q5 - 0.33M3/S
Q100 - 0.78M3/S

DISCHARGE NEW PIPE DRAINAGE TO EXISTING CULVERT.
DUPLICATE EX CULVERT TO ACHIEVE 2/375ø RCP

BOULDER RETAINING WALL HEIGHT 1.0M

URLIUP ROAD

FULL WIDTH CONSTRUCTION

REFER DRG 08418-004 FOR URLIUP ROAD PROFILE AT INTERSECTION

SISD - 80M AT DESIGN SPEED 50KM/H

MAINTAIN ACCESS TO HALL

NEW CONSTRUCTION TO MATCH NEATLY WITH EXISTING ROUNDABOUT

JOIN NEW BARRIER KERB NEATLY TO EXISTING

SEWER RETICULATION
STORMWATER DRAINAGE
ROOFWATER DRAINAGE

PROPOSED ALLOTMENTS
ROAD PAVEMENTS
ROAD VERGE
PUBLIC OPEN SPACE
SEWAGE PUMP STATION

1:500 @ A1 0 10 20 30 40 50M

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PROJECT
LOTS 2 & 3
BILAMBIL ROAD
BILAMBIL

ASSOCIATED CONSULTANTS
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C	GEN REV	CBL	4/12/08	CBL
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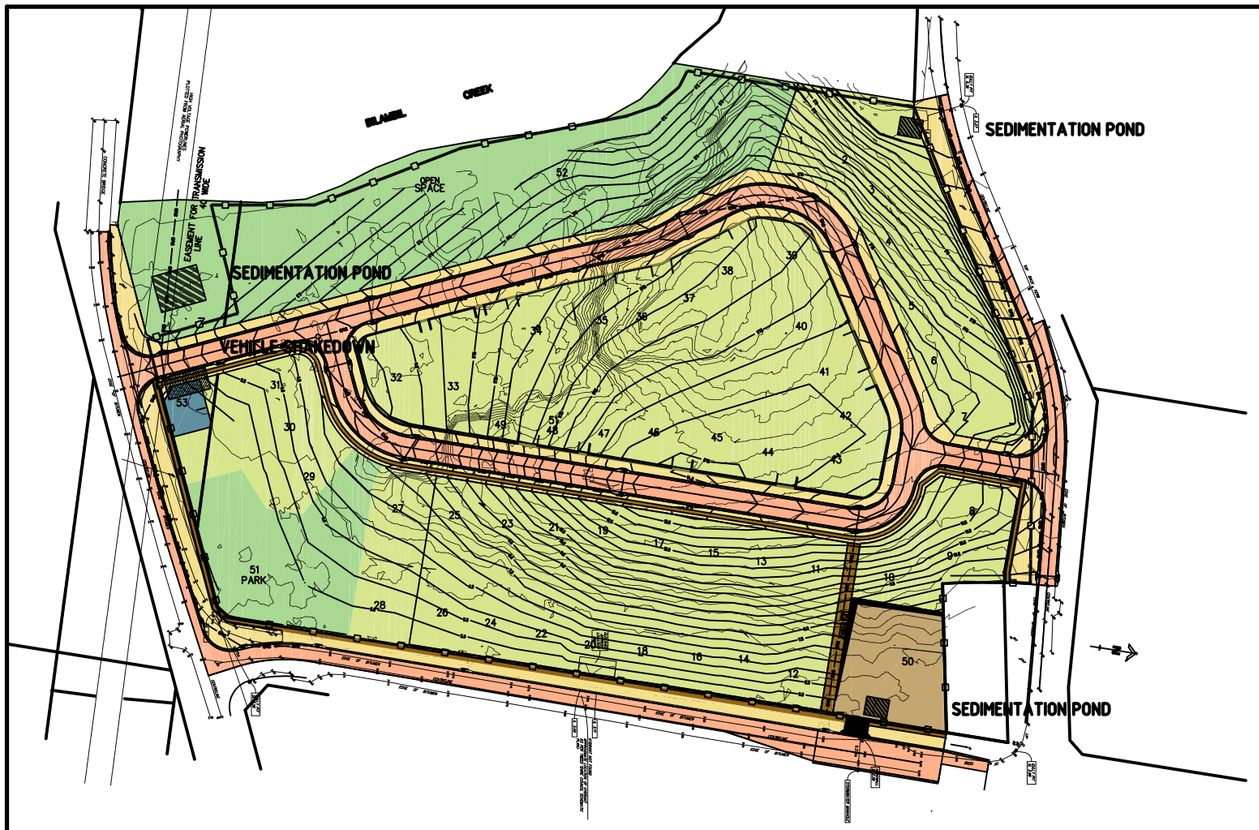
A	DA PROPOSAL	CBL	14/06/08	CBL

NAME
GENERAL ARRANGEMENT

PROJECT REF.	DRAWING NO.	REVISION
08418	002	G



LEGEND

SILT FENCING

VEHICLE SHAKEDOWN

SEDIMENTATION POND

Sedimentation and Erosion Control

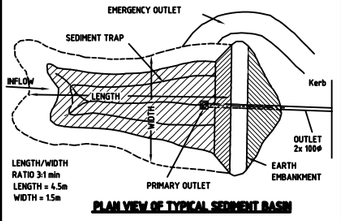
1. Sedimentation and erosion control implementation and maintenance shall be in accordance with Byron Shire Council's Development Manual as read in conjunction with the document titles "Environmental Best Management Practices". The Contractor shall make himself aware of the prevailing weather conditions and shall take all necessary precautions to secure the site at the completion of each day's work, and whenever else is considered necessary.
2. Sediment and erosion control measures shall be provided as required to prevent the movement of dust and/or silt from the site.
3. Sediment and erosion control measures shall be installed downstream of any work area prior to the commencement of work in that area.
4. Erosion and sedimentation control measures shall be installed prior to the disturbance of the site and as required during the course of the works.
5. Topsoil shall be stripped in accordance with the specification and stockpiles at locations as agreed by the superintendent and Council's designated representative.
6. All disturbed areas shall be stabilised with the provision of 75mm minimum topsoil and grass seeded, mulched, re-vegetated etc within 7 days of the completion of final allotment earthworks.
7. All sediment control measures and devices shall be inspected for structural damage after each rainfall event and at the completion of each days work. All trapped sediment shall be removed to an approved location on site for re-use on site or for subsequent removal from the site. Site disposal will only be approved when it can be established that no additional erosion can occur.
8. Sediment and erosion control measures around stockpiles shall include but not necessarily be limited to:–

a) Provision of a silt fence below the stockpile, as indicated by the natural slopes of the land,
b) Provision of grass cover if stockpile is to remain in place for more that 30 days,
c) Provision of a surface emulsion or approved equivalent to prevent wind erosion.
d) Diversion of runoff around stockpiles.

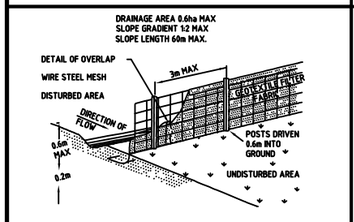
9. Place 600mm width turf at both top and toes of retaining walls and tops of new kerb.
10. Water areas of construction regularly as required to obviate potential for dust nuisance to adjoining properties and the site generally.
11. Contractor to be responsible for removal of silt that is washed onto Council or private property. from subject site.
12. Contractor to make provision for containment of waste materials on site including waste oils etc from machinery servicing.
13. Contractor to be responsible for tyhe control of dust at all times including weekends and holidays.

Construction Traffic Shakedown

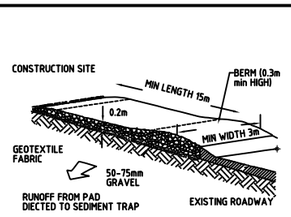
Provide construction traffic shake down device at all relevant site exit points. Clean out and maintain shake down device regularly to ensure efficient operation.



PLAN VIEW OF TYPICAL SEDIMENT BASIN



SEDIMENT FENCE



TEMPORARY CONSTRUCTION EXIT

	Prior to the Commencement of Works		
a	Submission of a copy of the Contractor's Program for the Works.	Contractor	Prior to the Pre-Start Meeting
b	Submit program for the implementation and monitoring (inspection type) of the specified sedimentation control measures for approval.	Contractor	Prior to the Pre-Start Meeting
c	Approve submitted program	Superintendent /Council	Pre-Start Meeting
	During Construction		
a	Install sedimentation and control measures (measures)	Contractor	Prior to the commencement of works necessitating the measures
b	Approval of the Measures as constructed	Superintendent	Prior to the commencement of works necessitating the measures
c	Periodic inspection of the measures	Contractor	Daily and after rainfall event
		Superintendent	At least weekly and/or in conjunction with other required inspections
d	Rectification of issues identified by periodic inspection	Contractor	Immediately
e	Inspection of adjacent roads and drains	Contractor	Daily and after rainfall event
	On Maintenance		
a	Submit program for the continued maintenance of the works during the "On Maintenance" period.	Contractor	Prior to On Maintenance inspection.
b	Approve submitted program	Superintendent in conjunction with Council	Prior to On Maintenance inspection.
c	Install/maintain sedimentation and erosion control measures	Contractor	Prior to On Maintenance inspection.
	Installation	Contractor	During On Maintenance Period
	Off Maintenance	Superintendent in conjunction with Council	At On Maintenance Inspection
d	Approval of Measures as implemented	Contractor	Weekly, and after each rainfall event
e	Routine inspection of implemented measures (including adjacent road network)	Superintendent	As requested by the Contractor
f	Rectification/Reinstatement of sediment and erosion control measures	Contractor	As soon as practicably possibly (24 hours max)
	Off Maintenance		
g	Removal of Erosion and sedimentation Control Measures	Contractor	As directed by the Superintendent

SEWER RETICULATION

STORMWATER DRAINAGE

ROOFWATER DRAINAGE

PROPOSED ALLOTMENTS

ROAD PAVEMENTS

ROAD VERGE

PUBLIC OPEN SPACE

SEWAGE PUMP STATION

1:1,000 @ A1

0 20 40 60 80 100M

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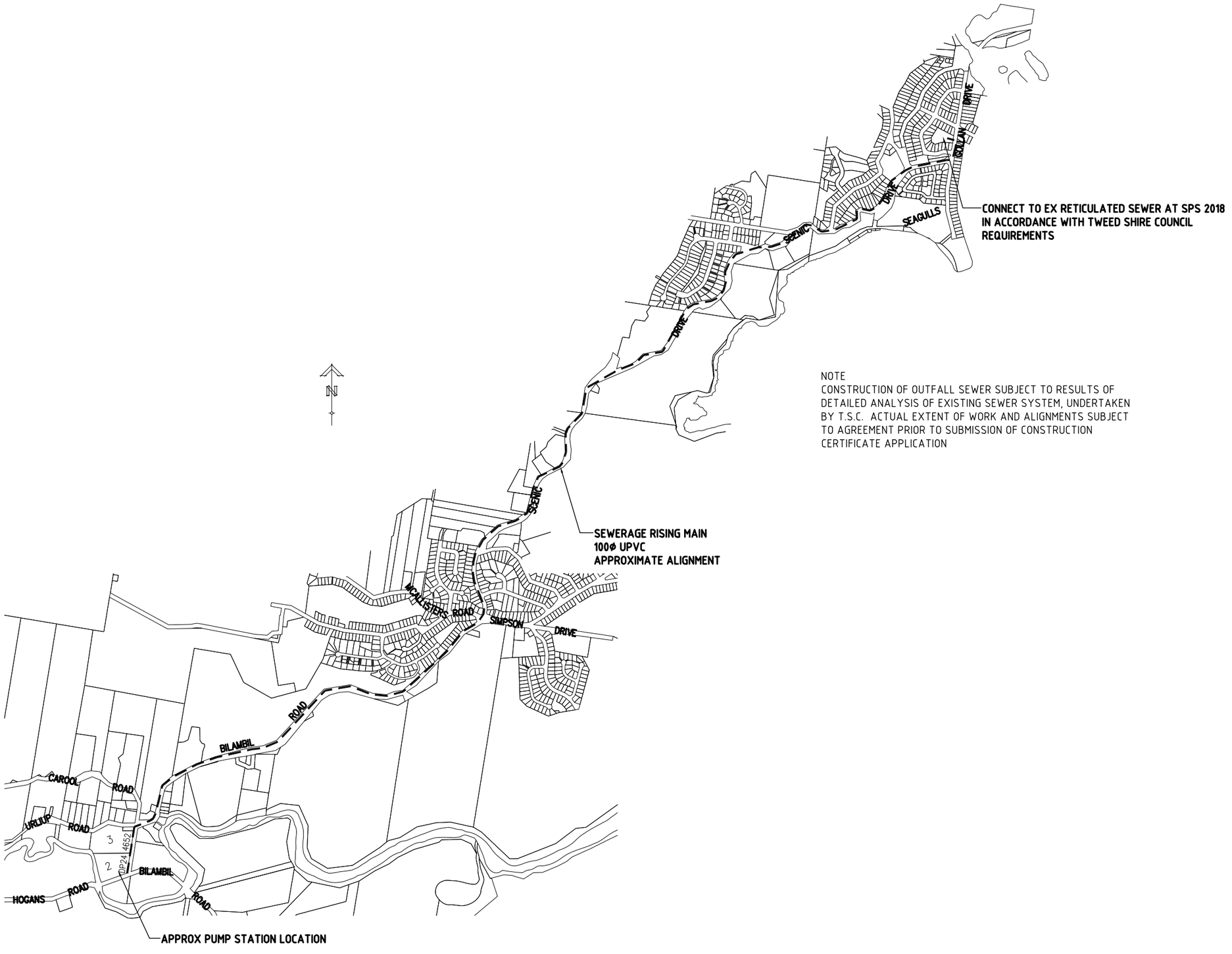
NAME
WATER QUALITY MANAGEMENT CONSTRUCTION PHASE

PROJECT REF.	DRAWING NO.	REVISION
08418	008	E

ATTACHMENT 4
Rising Main Alignment



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NAME
EXTERNAL SEWER
RISING MAIN ALIGNMENT

PROJECT REF.	DRAWING NO.	REVISION
08418	010	C

ATTACHMENT 5
Outfall Sewer
Draft Statement of Commitment

MAJOR PROJECT APPLICATION NO. 08-0034 – PROPOSED 62 LOT SUBDIVISION AT BILAMBIL VILLAGE

DRAFT STATEMENT OF COMMITMENTS

1. The developer will construct a sewer pump station on the development site to the satisfaction of the Director of Community Services and Natural Resources.

2. The developer will construct a Sewer Rising Main (SRM) from the new pump station to Sewer Pump Station (SPS) 2018 at Gollan Drive, including necessary odour control and septicity control facilities.

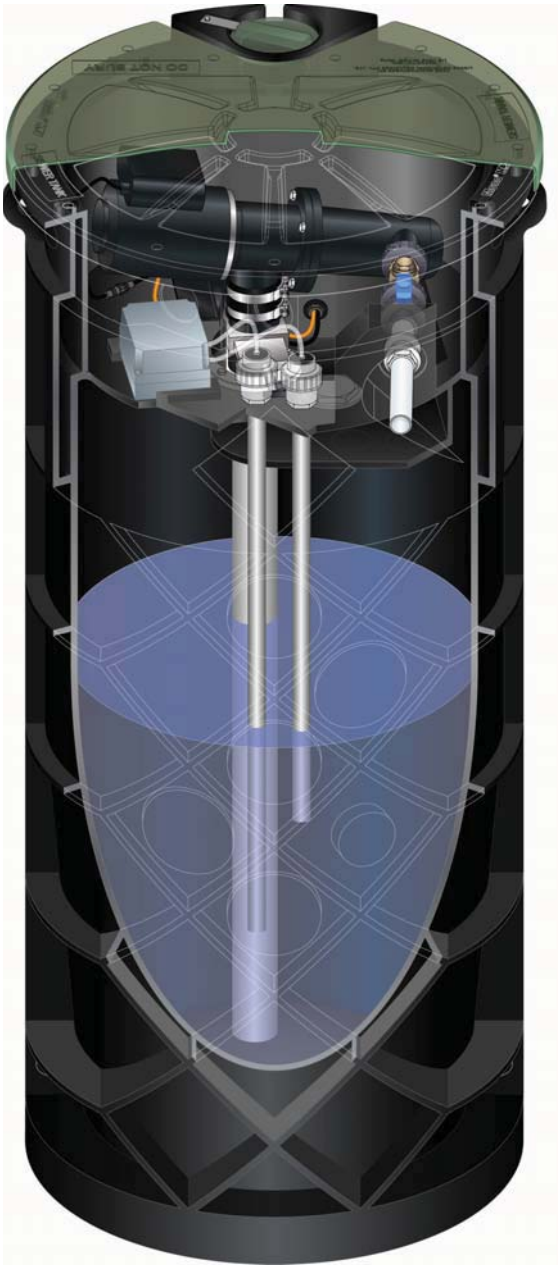
3. In the event that the Sewer Network Analysis currently being undertaken by Tweed Shire Council determines that a connection point south west of Sewer Pump Station 2018 (closer to the development site) is feasible, the sewer rising main shall be connected to that point, to the satisfaction of the Director of Community Services and Natural Resources.

4. On completion of the Sewer Network Analysis, and the subsequent identification of the appropriate connection point, the Developer shall provide to Tweed Shire Council for approval the proposed route for the construction of the required pipework. The alignment of the sewer rising main shall be located either in the road reserve or in easements on adjacent private land along the Bilambil Road section. The rising main may only be located in sections of the road reserve if the Director of Engineering and Operations determines that such location will not adversely impact on the stability, functionality and operation of the road. The Developer shall address such issues to the satisfaction of the Tweed Shire Council in association with the application for the issue of a Construction Certificate. The remaining sections to Gollan Drive SPS 2018 will not be via Scenic Drive but rather through a route to be agreed with Tweed Shire Council prior to the issue of a Construction Certificate to Councils SPS 2038 at the north eastern end of Peninsula Drive. Then via the foreshore of Terranora Broadwater parallel to Council's existing 300mm SRM to the northern end of Scenic Drive. Then finally to Gollan Drive SPS 2018 via road reserve to the satisfaction of the Director of Engineering and Operations.

5. Detailed plans shall be provided with the Construction Certificate Application addressing slope stability within Bilambil Road and other areas as may be necessary, together with a Detailed Traffic Management Plan and the alignment of other future services in relation to construction of the sewer rising main.

6. The developer will provide detailed plans as part of the Construction Certificate which will incorporate Reduced Inflow / Infiltration Gravity Sewers (RIGS) to Councils requirements.

ATTACHMENT 6
Mono PSS Eco 1-60
Low Pressure Sewer System



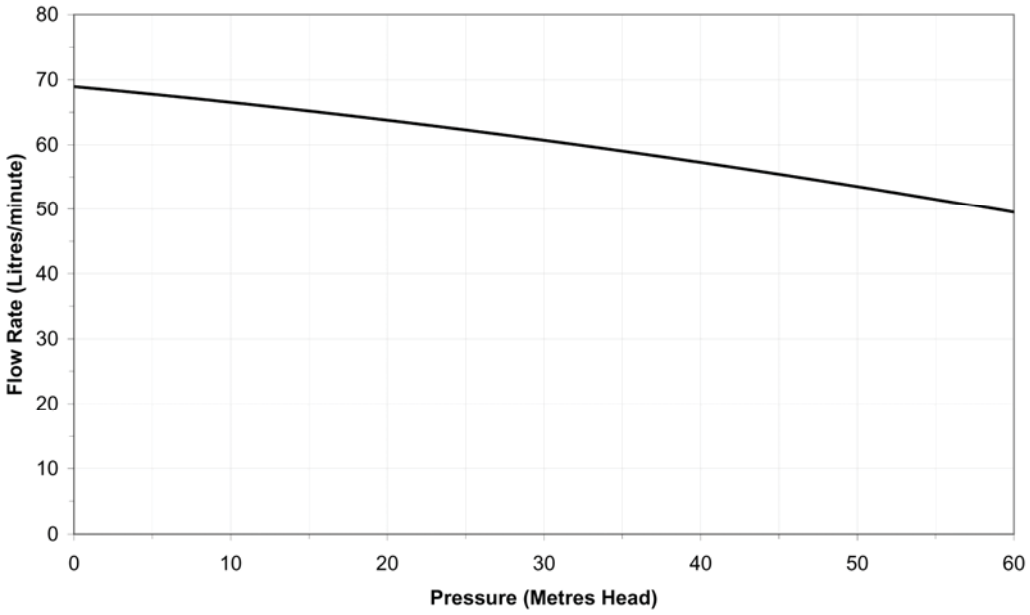
Mono Pumps PSS Eco 1-60

Pump Unit Specification

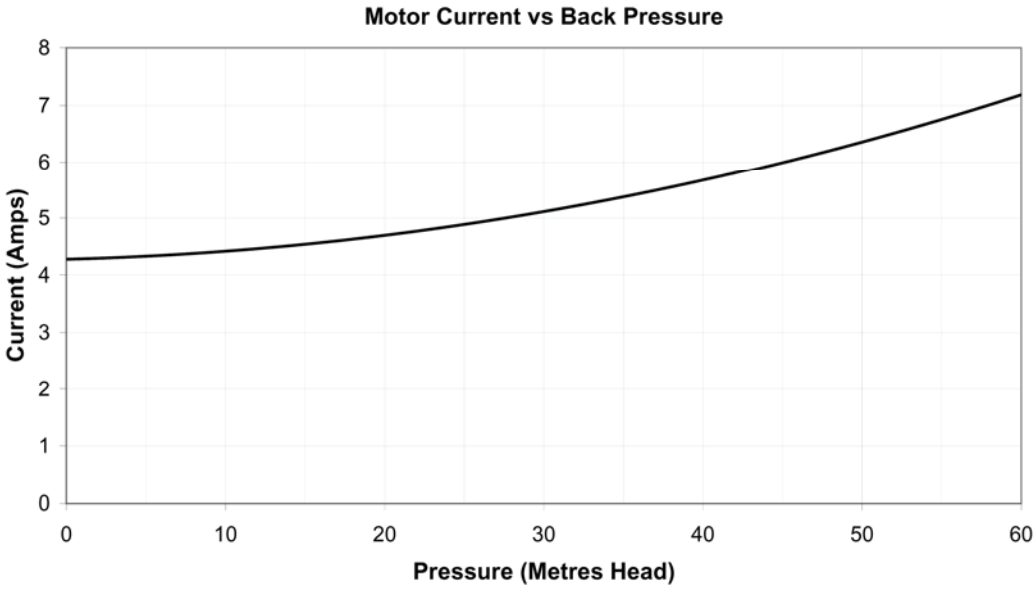
G60 Grifter (grinder pump) Specification

Specification Topic	Specification
Manufacturer	Mono Pumps (Australia) Pty. Ltd.
Model	G60
Nominal flow rate	1 litre per second
Maximum Head capability	60 metres (continuous operation)
Flow at Max. Head	0.83 litres per second
Slip at 60m discharge	27%
Type	Progressive Cavity – Helical Rotor
Inlet	80mm DWV
Outlet	32mm (pump discharge, not tank discharge – refer to tank specification detail)
Materials of construction	
Pump Body	Cast Iron
Motor Shaft	316 Stainless steel
Helical Rotor	316 Stainless steel, Hard Chrome Plated
Stator	Nitrile Synthetic Rubber
Macerating Cutter	Hardened tool steel
Cutting Ring	Hardened tool steel
Hardware	316 Stainless steel
Oil Bath (mechanical seal)	Shell Tellus Oil 100 Anti Wear hydraulic oil
Mechanical Seal	Carbon Vs. Ceramic faces, 316 SS spring & body, nitrile elastomer
Unit Weight*	32 Kg

***There are design projects in place that will further improve on this specification and reduce unit weight. Details quoted are as available today.



PSS Eco 1-60 Hydraulic Performance Curve



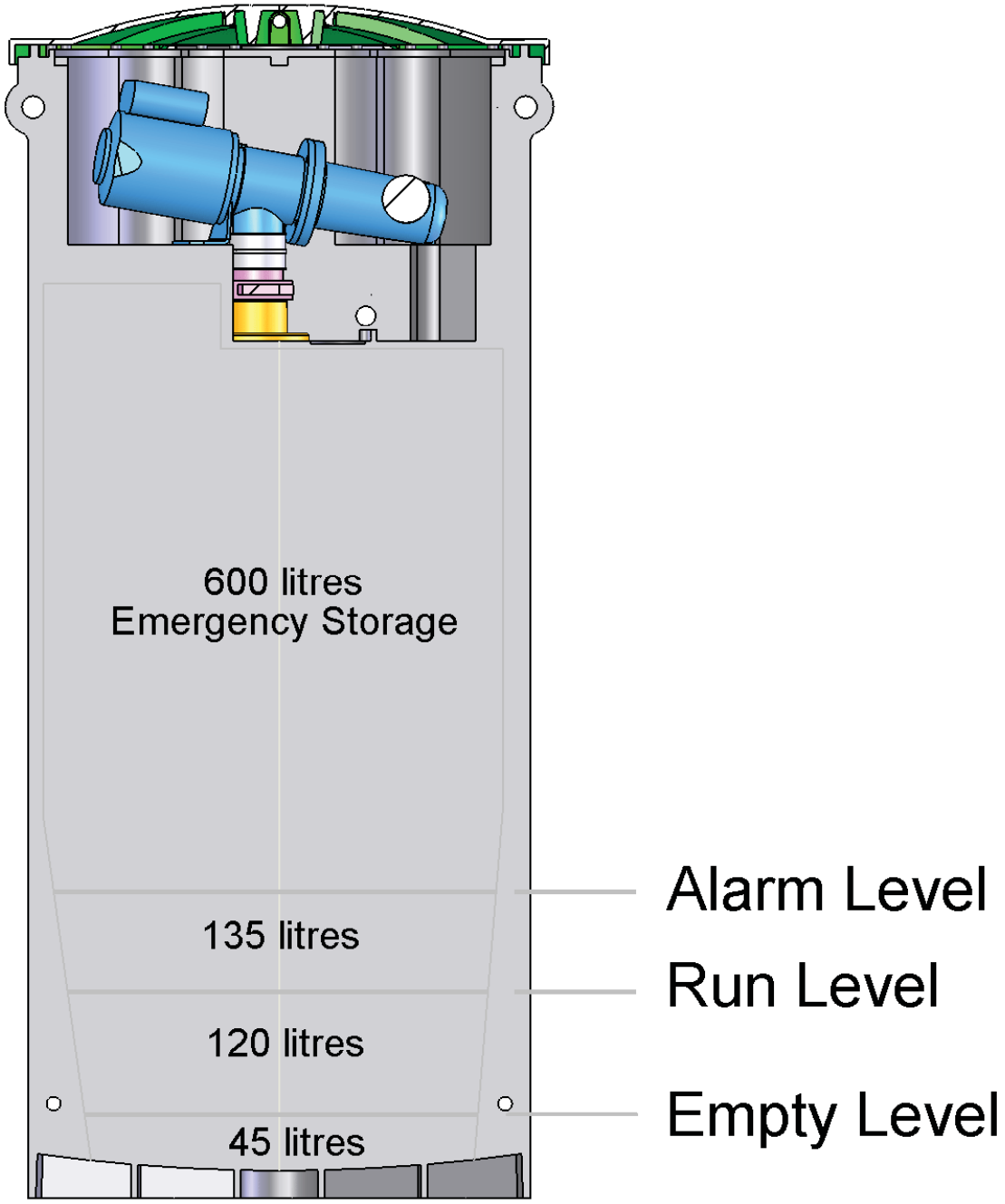
PSS Eco 1-60 Power Curve

AC Motor Specification

Specification Topic	Specification Topic
Power	0.93 kW
Voltage / Phase / Frequency	240 / 1 / 50
Full Load Current	8 Amps
Locked Rotor Current	31.3 Amps
Motor Duty	S2 – 30 minutes
Maximum Starts per Hour	10
Thermal Overload	Automatic reset
Motor Speed	1450 RPM
Humidity Rating	95 %
Rating	IP55
Cable Included	15m of 15 Amp 3 core flex 15m of 3 core control cable
Relevant Standards	C-tick AS/NZ CISPR 14.1

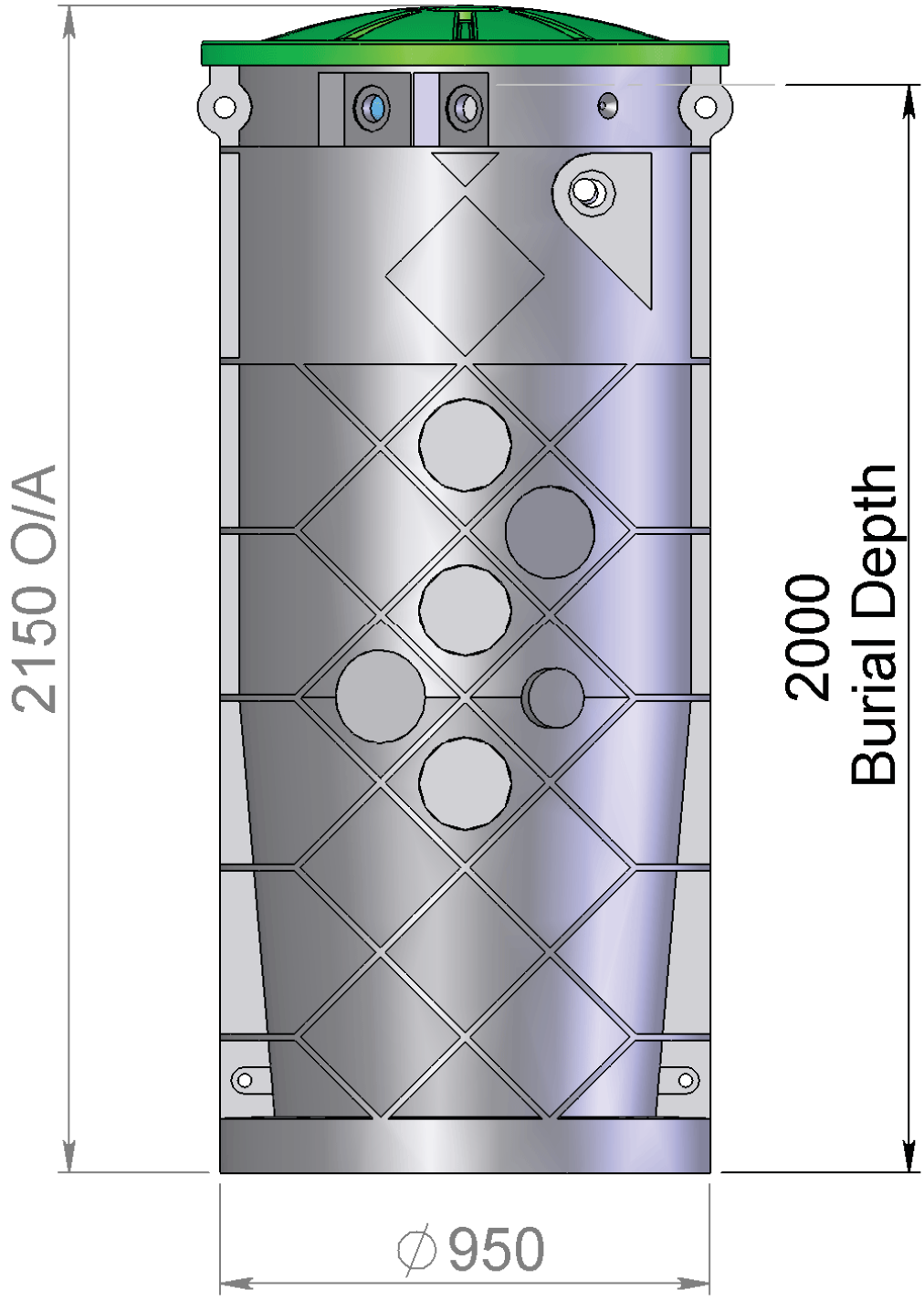
Collection Well (Tank) Specification

Specification Topic	Specification
Well and Lid Material	Heavy Duty Polyethylene, UV Stabilised
Manufacturer	Linpac Rotational Mouldings Pty. Ltd. Tooling owned by Mono Pumps
Type	Rotationally Moulded – one piece tank
Format	Circular, single piece tank Pump mounted in “Dry Well” recess Sealed sewerage collection well
Lid Rating (Hydraulic)	Dry well flood proof to 1 metre above lid
Lid Loading (Max. Static load)	500 kg
Lid Security	Tamper-proof fasteners in lid or pad-lockable lid
Well Volume – Total	900 litres
Active Storage Volume – Pump on to pump off (litres)	120 litres standard Customised settings available on request
Well Volume – Above High Level	600 litres
Retained Storage Volume – volume remaining when pump turned off (litres)	45 litres standard Customised settings available on request
Other Storage Volume options (litres)	Fully customised options available
Tank Inlet	100mm Uniseal
Minimum and Maximum depths of inlet connection below cover level	750mm to 1300mm below ground level
Tank Outlet	32mm BSP PVC fitting standard Optional Electrofusion HDPE ‘Plasson’ fitting
Relevant Standards	AS/NZ 1546.1



PSS Eco 1-60 Tank Levels*

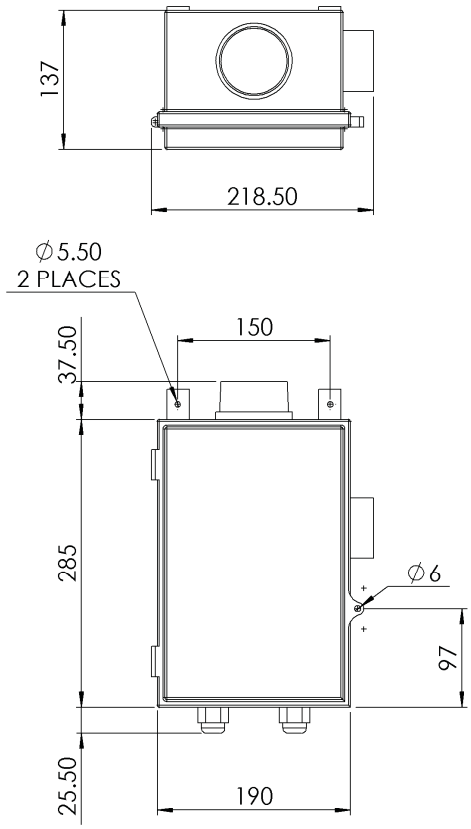
*Tank levels indicated are standard however these can be adjusted at the time of manufacture if necessary.



PSS Eco 1-60 Tank Overall Dimensions

Controller Specification

Specification Topic	Specification
Input Voltage	240 +6% /-10% VAC
Max. Continuous Current	8 Amps
Max. Current – Motor Start	20 Amps (peak)
Circuit Breaker	15 Amps
Control Circuit fuse	0.5 Amps
Max. Output (motor)	1 kW max
Motor Over current protection	8 Amps
Brownout Protection	Automatic electronic sensing
Level Control Methodology	Pressure sensor mounted in the 'dry-well' connected to tube partially immersed in the sewerage monitor sewerage level and control pump operation.
Alarm Level Methodology	Alarm tube inlet is set above the normal operating level to remain clear and free of blockages during regular operation.
Rating of Enclosure	IP66 – Lockable enclosure
Default Protection Settings	
Pump motor current trip (over pressure)	8 Amps
Pump reset time from trip	5 minutes
Number of current trips per hour till alarm activates	10
Maximum continuous pump run time	20 minutes
Maximum pump starts per hour	10
Pump cool down time	10 minutes
Relevant Standards	AS3100 C-tick AS/NZ CISPR 14.1



PSS Eco 1-60 Controller Dimensions

PSS Eco 1-60 Controller (shown connected to Hand Held Display / Diagnostics Unit)

Controller Alarms

Alarm	Detail
Over Pressure or Over Current	Trips when pressure / current exceeds programmed maximum current level
Maximum Pressure/Current Trips	Trips when number of pressure trips exceed programmed value
Exceed maximum run time	Trips when pump/motor has continuously run greater than the programmed maximum time
Exceed maximum Starts per Hour	Trips when maximum starts per hour have been exceeded
High Level	Trips when high level probe is active

All alarms are fully programmable and alarm trip points can be tailored to meet specific requirements. This can be done either at the time of manufacture, or via telemetry at a later date.

Limits with respect to motor run time, maximum starts per hour and maximum motor current are all set per the recommendations of the motor manufacturer.

Standard Alarm Outputs

1. **External Strobe**
2. **Internal Siren**
3. **Communication Port / Telemetry Interface**

All alarm outputs are fully programmable and can be tailored to meet specific requirements or time delays. For example, on-site outputs can be de-activated or delayed in order to provide a 'head start' or system check via the telemetry system.

All alarm outputs are accessible through the telemetry system and the controller can be programmed to 'dial-out' via telemetry to a dedicated monitoring system to alert network supervisors of any alarms.

Alarm outputs are also accessible though the standard 'Handheld Display Unit' which can be used in the field to diagnose and troubleshoot system alarms.

Telemetry Data

Specification Topic	Specification
Remote Monitoring Capability	Via RS232 modem interface
Communications Protocols	SCADA Modbus & ASCII as standard
UHF Data Radio	GME Electrophone TX 3600D (or equivalent)
GSM Modem	'AT' Command Set compatible
Alarm Initiated and Polled Messaging	Yes

Controller Logged Data

Data Log	Detail
Number of Starts	Number of motor starts since installation
Hours Run	Number of hours run since installation
Number of Resets	Number of times the mains power has been disconnected
Number of Pressure / Current trips	Number of pressure/motor current trips since installation
Motor Current	Current motor running current
Starts per Hour	Number of starts in the last hour
High level trips	Number of high level trips
Serial and DOM	Serial Number and date of manufacture
Unit Type	Unit type and software level
Last Fault	Last fault condition and last running current
Last Motor Current	Logged value of the last motor current
Current System State	Detail of present operating state of the unit. On / Off / High level alarm / etc.

All logged data is stored in controller memory. Logged data can be accessed on demand via 'dial-in' telemetry and can be used to remotely monitor system performance and if necessary, troubleshooting without going to site. Logged data can also be accessed while on-site via the standard 'Handheld Display Unit'.

Mono Eco 1-60 PSS – Frequently Asked Questions

1. What happens when solid objects get into the tank?

The unique elutriation pipe design of the Mono Eco 1-60 system ensures that objects such as cutlery, solid plastics and metal items fall to the bottom of the tank and will not be drawn into the grinder and pump mechanism.

All pressure sewer grinder pumps have been designed to grind and transfer a wide variety of items that can be found in domestic sewage. The Mono Eco 1-60 has undergone extensive testing and will efficiently grind and transfer items such as condoms, disposable nappies, plastic bags, tampons and sanitary pads.

As with any sewage system; septic tank, modified gravity or vacuum, users of pressure sewer systems need to be aware that the toilet is not for disposal of general household waste.

2. What is a brownout?

A "brownout" is when the supply voltage falls more than 10% below the standard single-phase voltage of 240V.

3. What will happen to the Mono Eco 1-60 PSS system in a brownout?

As the voltage to the motor decreases, motor run current will increase and may exceed the maximum rated current and overheat the motor. To protect against this, the motor controller is programmed to shut the motor down if the supply voltage falls to 190V. Once the voltage returns to normal, the motor will start again.

4. Will the Mono Eco 1-60 PSS system over-pressurise a 600 kPA (60m) pipe?

No. The controller features over-pressure protection and will shut down the motor before the backpressure reaches 600Kpa.

5. Will the life of the G60 grinder pump be compromised operating at full discharge pressure?

No. The Mono G60 grinder pump has undergone extensive testing and has clocked up over 5000 hours of both continuous and intermittent operation at the maximum discharge pressure of 600KPa (60m) without any significant loss of performance or efficiency.

6. How does the over-pressure protection work?

The Controller continually monitors the motor current. As the Mono Eco 1-60 pump is a Progressive Cavity pump, motor current is directly proportional to the backpressure of the system. When the motor run current exceeds 8 amps this indicates a pressure of over 60m, the pump will shut down and then try to start again after 5 minutes.

7. How big is the Mono Eco 1-60 tank?

The standard* Eco 1-60 tank is 950mm in diameter and 2m deep.

The dry well is sized to accommodate the pump, pressure control box and fittings. This dictates the footprint of its visible component, the tank lid

The 900 litre capacity wet well is sized as follows**:

- 45 litres will always remain in the bottom of the tank.
- The operating level between pump start and pump stop is set at 120 litres or 2 minutes of run time.
- Above the pump on level there is an additional 135 litres capacity before activation of the high level alarm.
- The remaining 600 litres ensures there is at least a day's emergency storage should there be a power failure.

* Non-standard tanks are available, please contact Mono to discuss requirements

** On / off and alarm levels can be adjusted at time of manufacture if required

8. What is the loading of the Eco 1-60 lid?

500kgs.

9. How is a Mono Eco 1-60 PSS tank installed?

A 3 tonne mini-excavator with bucket and teeth is adequate to excavate the hole and lift the tank into position. The small excavator is able to enter and operate in tight, difficult locations with minimal damage to the existing landscape. Mono can arrange installation and commissioning. Alternatively a larger excavator with a suitable auger attachment (Ø1m) can be used.

10. What depth of hole is required for the install?

2000mm.

11. Why the need for a boundary kit? What is in it?

A boundary kit allows isolation of the on-site Mono Eco 1-60 PSS tank and discharge line from a Pressure Sewer System. When the pressure sewer system is in place before the block is built on, a kit is installed on the property's boundary. On development, the Eco 1-60 PSS unit is installed and connected to the boundary kit and the pressure sewer main.

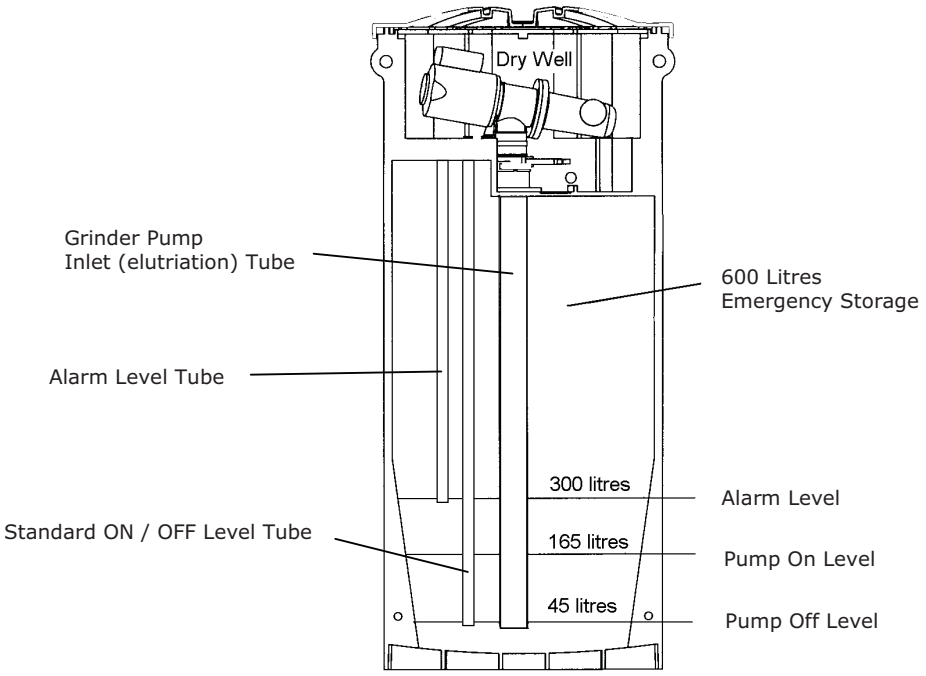
The standard* kit consists of:

- LDPE box and lid
- 1 ¼ inch BSP fittings
- 32mm 316 stainless steel lockable ball valve
- 316 stainless steel check valve
- 316 stainless steel hex nipple.

* Fully customised boundary kits are available on request

12. How does Mono's system monitor sewage levels in the tank?

As the sewage rises in the tank it rises up the two level tubes and increases the air pressure within the tube, the increasing or decreasing air pressure acts against pressure switches located in the dry well level control box. The pressure switches turn on or off and signal the Controller to perform the appropriate action.



13. What advantages does the dry well offer over conventional submersibles?

The dry well ensures that the Mono Eco 1-60 pump, pipes and fittings are situated close to the surface and not immersed in sewage. Easy and safe one-man access is achieved and there is minimal sewage contamination of the environment, tools or the service vehicle.

14. Being a 'Dry Well' pump, is any priming ever required?

No. Being a high quality progressive cavity pump, the Mono G60 has been designed to self prime. In normal operation; when the pump stops, the pump inlet tube will remain full of sewage. If the pump remains off for a significant period of time the inlet tube will drain however upon re-starting the pump will self-prime without any user intervention.

Extensive testing conducted by Mono on the G60, in conjunction with over 70 years of experience in progressive cavity pump design ensures that once installed, no regular user intervention will be required.

15. Why are there 2 tubes for the level probes?

The longer tube located is the normal operating tube. At the high level (165 litres) it starts the pump and stops it at the low level (45 litres). If the sewage continues to rise it enters a second tube and at the 300 litre level the high level visual and audible alarms will operate. If the pump has failed to start on the low-level tube, it will now start and operate on the alarm tube, thus a level of redundancy has been built into the design.

16. What happens if the operating tube blocks?

If the operating tube is blocked and the pump does not start, the sewage will rise up the second tube and trigger the high-level alarms-warning lamp on front panel, strobe light on top of panel and audible siren alarm. At that point the controller will recognise that the pump is not operating and will start it. It will then stop when the sewage level clears this tube.

If the strobe continues flashing after 30 minutes, the householder should contact the service authority to remove and unblock the two tubes. This is a relatively simple task and does not require removal of the pump from the system.

17. What can be done if the tank fills with product that cannot be pumped out?

There is a 110mm port in the top of the tank external to the dry well that can be quickly accessed via unscrewing a lockable cap to accommodate up to a 100mm hose as would be found on a vacuum sucker truck.

18. What can be done if water pools in the bottom of the dry well during installation?

There is a 80mm drain plug in the bottom of the dry well.

19. What will happen when the pump fails or stops for a period of time such as a power outage?

If the pump stops, the 600 litres of emergency storage in the tank is usually more than sufficient to accommodate inflowing sewage for at least 24 hours.

If the power outage continues and the tank fills up, the sewage will back up and escape through the overflow that we recommend be installed in the gravity feed line and through the breather that is incorporated into the removable 100mm cap. Sewage will spill onto the ground but it is preferable to it backing up the inlet line and entering the premises.

20. How would a network of Mono Eco 1-60 units recover from an extended power outage?

After an extended power outage, pressure sewer networks need to operate at their peak capacity to clear the retained sewage. Upon power being re-established, all units within the network will attempt to start however due to the pressure cut-out system employed by Mono, only the units closest to the network discharge point that see the lowest friction losses will operate. By utilising the electronic over-pressure protection, you can be assured that the rising main pressure will not exceed the design limits which can lead to rising main failure. All units that failed to start on the first attempt, we automatically re-attempt a second start after a pre-set five minute delay, because some

of the first units would have now finished their run cycle, the friction loss in the rising main will be reduced and the second series of pumps will operate. This process will continue until the network fully recovers. Utilising this technique of network recovery, the network will recover as fast as possible within the design constraints of the rising main design.
If there were specific units that were identified as requiring a higher priority to start on the first attempt - such as nursing homes and hotels due to their relatively smaller storage capacities - the network can be biased to ensure that these units take priority and clear first.

21. Is there a breather? Why?

There is a Millipore vent breather in the lid of dry well, this allows air to pass however it is impervious to water and water vapour. It is necessary to equalize the pressure in the dry well to that outside to ensure better sealing as well as ensuring atmospheric pressure is applied to the level sensors.

22. Is odour an issue? How are odour problems prevented?

Sewage will emit an odour when it becomes septic after about 24 hours. In occupied premises, sewage will not be retained in the tank long enough for this to occur. If the premises are being vacated for longer than about 3 days, a small amount of fresh or grey water should be sent to the tank rather than toilet waste, until the pump starts. When the pump stops at the low level, only 45 litres of fresh or grey water will be retained rather than raw sewage which would go septic and create an odour.
The Mono Eco 1-60 PSS tank is completely sealed so if raw sewage is allowed to go septic in the tank, foul air will be displaced through the breather as fresh sewage enters. However, after one cycle it will be eliminated and no odour will remain.

23. Is there recommended maintenance? What and when?

There is no recommended periodic maintenance schedule.

24. How does the controller work and what does it do?

The Mono pressure sewer system controller has been developed as an integral part of the Eco range of pressure sewer products and has been designed to provide a variety of features to protect and control both the grinder pump and the wider reticulation network.

Functions performed by the Mono PSS Controller include:

- Monitoring the standard sewage level in the tank via air pressure in level tube and control pump operation
- Monitoring the high level sewage level in the tank via air pressure in level tube and control visual and audible alarms
- Regulate grinder pump operating times to limits within motor manufacturers recommendations
- Regulate the maximum discharge pressure delivered by the pumps via motor current
- Protect the grinder pump from events such as rising-main blockages and ‘brown-outs’
- Provide data storage of key events such as total number of starts and hours run
- Provide an interface to enable accurate data to be used for troubleshooting
- Provide a platform for telemetry options

25. What telemetry options are available?

Telemetry allows data on the pump operation to be easily collected for data-logging, detailed analysis or network manipulation. The standard communication options available are low power radio or GSM mobile connection.
All data is transferred according to standard SCADA ASCII protocols.
There are further customised telemetry options that can be discussed with Mono.

26. What are the basic principles of network design?

The basic principles involve:

- Determining the path of the sewage
- Determining the length and elevation change within each section.
- Predicting how many units will be operating at any one time.
- Sizing of the pipe diameters in each branch to keep the pressure in the system below the maximum allowable.
- Keeping sewage velocity high enough to enable scouring of the pipes.

27. What is the maximum and minimum operating times of the system per day or per cycle?

The pump motor is rated for maximum continuous running of 20 minutes and 10 starts per hour. The controller will stop the pump after 20 minutes continuous running or after 10 starts in the one hour. The motor will be allowed to cool for 10 minutes and then be started again. Under full loading, the Eco 1-60 can transfer 1200 litres every half hour however utilising the 600 litre emergency storage capacity could handle a single 1800 litre event without overflow.

28. How far from the house can you install the unit?

The unit should be as close to the house as possible but in an area where there is good drainage away from the lid, the inlet pipe can be laid at a minimum of 1:1.6 grade to enter the tank in the designated area. Identification of a suitable tank location is a process requiring a balance of land owner expectations and hydraulic requirements and as such forms a key step in the detailed design and homeowner consultation process.

29. How is the system electrically connected to the household power supply?

Power to the controller must come from a dedicated circuit from the meter / fuse box with its own 20-amp type D circuit breaker. It is important to consider that in some cases, household electrical audits and circuit upgrades may be necessary prior to commissioning of the pressure sewer equipment.

30. What happens when the householder goes on holidays?

If the householder goes away for a period of the time, they should ensure that the sewage is totally pumped out so it does not go septic and only 45 litres of fresh or grey water is retained in it. Allowing fresh or grey water to enter a basin until the pump turns on will achieve this.

31. What happens when there is a need for a duplex or larger unit?

The Mono Eco 1-60 PSS unit can continuously transfer nominally 2400 litres / hour so compared to competitive units the need for a multiplex system is reduced. For larger flows and head, custom designed Mono pumping stations can be offered using either multiple G60 Grinder pumps in duty / standby configuration, conventional PC pumps and macerators or submersible grinder pumps.

32. What do you recommend to prevent the tank popping out the ground in water charged areas?

The Mono Eco 1-60 PSS O&M specifies that 700kgs of concrete needs to be installed around the base of the tank, assuming the worst ground conditions. Steel reinforcing bar can also be inserted through holes under the tank.

33. Is the Mono Eco 1-60 noisy?

Measurements taken 1 metre above then tank lid during pump operation recorded a noise level of 55 dBA.

34. What sort of installation times and costs are typical, broken down by trade (eg labourer, electrician)?

Typically, using a mini excavator, the hole for the tank can be dug, tank lowered into position and hole filled in less than 2 hours. Allow another hour for plumber to connect external pipe work and 1 hour or less for electrician to position and wire up control box.

35. What is the electrical power consumption per cubic metre of sewage pumped?

The G60 Grifter uses a 0.93kW 240 volt electric motor. The motor has a full load current rating of 6.6 amps. The flow of the pump is 0.833 litres per second at the maximum head of 60 metres. The theoretical power maximum consumption at this duty would be about 0.528kW per cubic metre, this will be proportionally less if the discharge head is reduced.

36. Why doesn't the Mono Eco 1-60 PSS package have an anti-siphon device similar to others?

Due to the high quality of the rotor / stator combination in the Mono G60, the use of an anti-siphon device is not necessary. This feature is not desirable as each time the pump stops air is introduced into the system pipe work, once into the reticulation network, the entrapped air will negatively impact the overall system efficiency. This is often used where pumps are not able to start when subjected to system back-pressure. The Mono pump has been endurance tested starting against full system pressure (6 bar) without any problems.

37. What happens to the liquid in the suction pipe when the pump stops? If it empties how can the pump work when it starts up again?

The liquid stays in the pipe. However this is not a concern as even if the pipe drained the pump is designed for, and capable of self priming. Tests have been carried out continuously stopping and starting the pumps on the test rigs for an equivalent of 25 years of normal operation without any problems.

38. Can Mono Pumps provide a complete system design?

Yes. Mono can assist with complete pressure sewer network design and project delivery; we are firmly committed to making the entire process of selecting, designing and operating a pressure sewer system as easy and successful as possible.

Mono Pumps (Australia) Pty Ltd
Eco 1-60 Pressure Sewer Unit

Product Appraisal – PA 07/02

January 2008

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PO Box A812, Sydney South, NSW, 1235, Australia
Telephone (02) 9290 3655, Facsimile (02) 9299 0298, Email: grant.leslie@wsaa.asn.au

Note 1
This appraisal applies to the product(s) as submitted. Any changes to the product(s) either minor or major shall void this appraisal.

To maintain the recommendations of this appraisal any such changes shall be detailed and notified to the Product Appraisal Manager for consideration and review of the appraisal report and appropriate action. Appraisals and their recommendations will be the subject of continuous review dependent upon the satisfactory performance of products.

WSAA reserves the right to undertake random audits of product manufacture and installation. Where products fail to maintain appraised performance requirements the appraisal and its recommendations may be modified and reissued. Appraisal reports will be reviewed and reissued at regular intervals not exceeding five (5) years.

Note 2 Disclaimer

The Disclaimer on page 10 explains a number of very important limits on your ability to rely on the information in this Product Appraisal Report.

Please read it carefully and take it into account when considering the contents of this Product Appraisal Report.

The report was peer reviewed by Russell Jennings, Michael Hordern and Bruce Douglas.
Any technical inquiries regarding this report should be directed to the Appraisal Project Manager,
Grant Leslie, Phone: 02 9290 3655 - E-mail grant.leslie@wsaa.asn.au

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CONTENTS

1. Executive Summary

This Product Appraisal Report (PA07/02) covers the Mono Pumps Eco 1-60 Pressure Sewer Unit The product is designed for collecting and transporting black water to a pressure sewerage system.

The Eco 1-60 is available in a nominal 900lt capacity with 3 models, the standard unit, with telemetry enabled control panel and a standard unit with telemetry and an auto reversing motor. All products have a boundary kit as an optional accessory.

Mono Pumps (Australia) Pty Ltd is quality assured to ISO 9001:2000 by Lloyd's Register Quality Assurance Ltd for both its manufacturing plant and business operations.
The tank is supplied by Linpac Rotational Mouldings Pty Ltd which is StandardsMark licenced to AS/NZS 1546.1 – On-Site domestic waste water treatment units – Septic Tanks.

Assessment and review of this information using guidance set by the WSAA infrastructure products and materials network has concluded that the quality assurance requirements have been satisfied for the purpose of this appraisal.

1.1. Recommendation

It is recommended that WSAA Members and Associates accept/authorise the Mono Pumps Eco 1-60 Pressure Sewer Unit product range as listed in the Product Schedule (Table 1) that are relevant to pressure sewerage pipeline design, installation, acceptance testing and commissioning and are in accordance with applicable WSAA Codes and the manufacturer's requirements where specified.

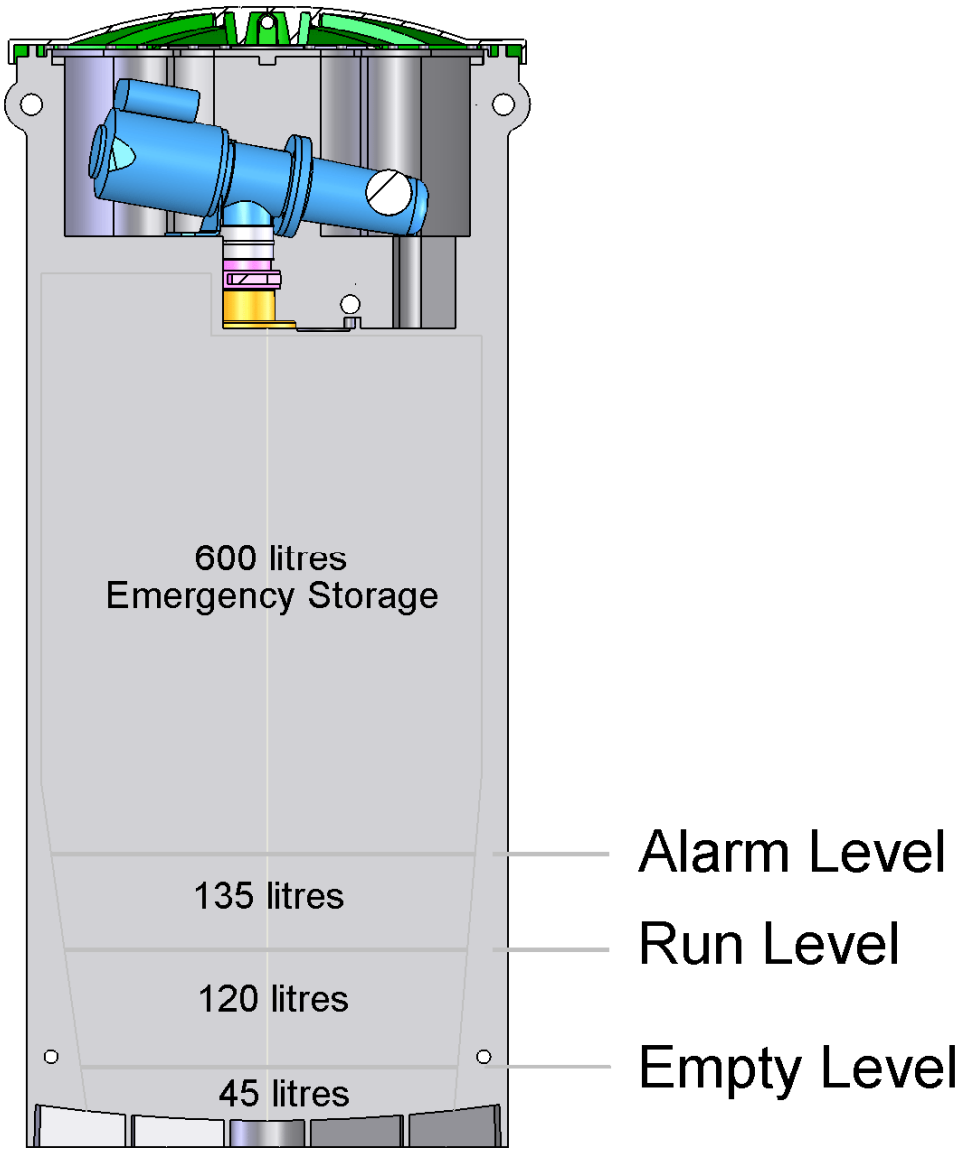
2. The Company

Mono Pumps (Australia) Pty Ltd is part of a world wide network of companies with offices located in New Zealand, China, England, and the USA. The company has specialisation in pumping systems for Mining, Waste Water and Agricultural markets.

3. The Product

The Mono Pumps Eco 1-60 Pressure Sewer Unit comprises of a Collection vessel, Grinder pump, AC Motor, Control Panel and a Boundary Kit as an optional extra in the standard design. The boundary kit has been excluded from this appraisal.

The total well volume is 900lt with 600lt of that capacity designated as emergency storage. 45lt is retained storage, an active storage volume of 120lt (pump on to pump off) and 135lt to alarm level. The tank has a burial depth of 2m allowing 150mm above ground



Mono provides a comprehensive set of Installation, Operation and Maintenance instructions with each unit sold and also provides a householders guide for the unit.

The product is assembled mechanically and hydraulically tested at the companies Mordialloc site in Victoria.

4. Scope of the Appraisal

This Product Appraisal Report covers the Eco1-60 and its derivative products as listed in the product schedule below:

Table 1 – Product Schedule

Items	Part Numbers	Size / Capacity	Packaging	Shipping Volume
Eco 1-60	PSS-Eco160	900lt	Individual	1.53 cubic meters
Eco 1-60-RTST	PSS-Eco160-RTST	900lt	Individual	1.53 cubic meters
Eco 1-60-RTRV	PSS-Eco160-RTRV	900lt	Individual	1.53 cubic meters
Boundary Kit	PSS-BK2		Carton	
Control Panel	PSS Control	219x323x190mm	Carton	0.02 cubic meters
Control Panel - RTST	PSS-CONT-RTST	219x323x190mm	Carton	0.02 cubic meters
Control Panel - RTRV	PSS-CONT-RTRV	219x323x190mm	Carton	0.02 cubic meters
Hand Held Controller	PSS DISP UNIT	180x100x25mm	Carton	0.01 cubic meters

5. Appraisal Criteria

5.1 Quality Assurance Requirements

The WSAA product appraisal network accepts system (ISO 9001) and product certification by a Certification Body at the manufacturing site of strategic products to appropriate Australian or internationally recognised standards. The Certification Body shall have relevant accreditation by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) or by an equivalent international accreditation system recognised by JAS-ANZ.

5.2 Performance Requirements

The Eco1-60 Pressure Sewer Unit has been appraised for manufacturing and performance compliance with AS/NZS 1546.1 – On-Site domestic waste water treatment units – Septic Tanks and relevant WSAA Codes.
A number of internal test results were supplied, supporting the application.

6 Compliance with Appraisal Criteria

6.1 Compliance with Quality Requirements

Mono Pumps (Australia) Pty Ltd is quality assured to ISO 9001:2000 by Lloyd's Register Quality Assurance Ltd for both its manufacturing plant and business operations.

The tank is supplied by Linpac Rotational Mouldings Pty Ltd which is StandardsMark licenced to AS/NZS 1546.1 – On-Site domestic waste water treatment units – Septic Tanks.
.

Assessment and review of this information using guidance set by the WSAA Infrastructure Products and Materials Network has concluded that the quality assurance requirements have been satisfied for the purpose of this appraisal.

6.2 Compliance with Appraisal Requirements

Assessment and review of the information provided using guidance set by the WSAA Infrastructure Products and Materials Network has concluded that the appraisal requirements have been satisfied for the purpose of this report.

7 WSAA Agency Network Requests

The WSAA Infrastructure and Materials Network questions were deemed to be 'commercial in confidence' and have not been included in this report, but will be made available upon request to WSAA members.

8 Fitting Instructions, Training and Installation

No specific training is offered by Mono. However Installation, Operation and Maintenance Instructions, and a Home Owners Guide have been provided.

9. Product Marking

The product does not carry any quality system markings

10. Traceability

The supplier of the tank is compliant with AS/NZS 1546.1 – On-Site domestic waste water treatment units – Septic Tanks.

Mono Pumps (Australia) Pty Ltd is fully certified to ISO 9001:2001 by Lloyd's Register Quality Assurance Limited.

These certifications are noted and it is assumed that as long as these certifications remain current then the traceability of batch numbers, test reports, transport, etc, will be acceptable.

11. Packaging and Delivery

The Eco 1-60 products are individually packed or supplied in cartons as described in Table 1.

12. WATER AGENCIES EXPERIENCE/FIELD REPORT

Water agencies have experience with the product range. A number of utilities have individually approved the products for use in their jurisdictions.

13. PRODUCT WARRANTY

No product warranties were supplied with the Application.

14. DISCUSSION

The Eco1-60 range of pressure sewer units comply with the appraisal quality requirements by providing evidence of their Lloyd's Register Quality Assurance Limited quality systems certification for and ISO9001:2001, and WaterMark certification of the tanks to AS/NZ 1546.1. A number of internal test reports were supplied supporting the accreditation.

WSAA Infrastructure and Materials Network questions have been answered satisfactorily.

A number of WSAA members have individually approved the product range for use in their jurisdiction.

15. SUMMARY

Examination of all of the submitted documented material provides an expectation that the Eco1-60 range of pressure sewer units products are 'fit for purpose' in pressure sewerage pipeline networks.

16. LIFE EXPECTANCY RATING

The Eco1-60 range of pressure sewer units has the following life expectances which are based on domestic sewage applications where the system has been installed in accordance with Mono Pumps recommendations;

a) Collection vessel, 50 years
b) G60 Grinder Pump, 25 years
c) Control Panel, 25 years
d) Boundary Kit, 25 years
e) Hand Held Controller, 25 years

17. FUTURE WORK

No future works items have been identified. However an agency has suggested that it would be useful for Mono to self assess the product against the WSAA pressure Sewerage Code and report to the Product Appraisal Manager.

18. RECOMMENDATION

It is recommended that WSAA Members and Associates accept/authorise The Eco1-60 range of pressure sewer units product range as listed in the Product Schedule (Table 1) that are relevant to pressure sewerage pipeline design, installation, acceptance testing and commissioning and are in accordance with applicable WSAA Codes and the manufacturer's requirements where specified.

19. Disclaimer

19.1. Issue of Report

This Product Appraisal Report (Report) has been published and/or prepared by the Water Services Association of Australia, Inc and nominated Project Manager and peer group of technical specialists (the Publishers).

The Report has been prepared for use within Australia only by technical specialists that have expertise in the function of products such as those appraised in the Report (the Recipients).

By accepting this Report, the Recipient acknowledges and represents to the Publisher[s] and each person involved in the preparation of the Report that the Recipient has understood and accepted the terms of this Disclaimer.

19 Limits on Reliance on Information and Recommendations

19.2.1 Disclaimer of liability

Neither the Publisher[s] nor any person involved in the preparation of the Report accept[s] any liability for any loss or damage suffered by any person however caused (including negligence or the omission by any person to do any thing) relating in any way to the Report or the product appraisal criteria underlying it. This includes (without limitation) any liability for any recommendation or information in the Report or any errors or omissions.

19.2.2 Need for independent assessment

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APPENDIX A

Q A CERTIFICATES
Contains:
Mono Pumps (Australia) Pty Ltd
Lloyd's Register Quality Assurance Limited certificate MEL 0924555 for AS/NZS ISO 9001:2000, Quality Management System

Linpac Rotational Mouldings Pty Ltd
StandardsMark Licence SMKB20051 for AS/ANZS 1546.1 – On-site domestic wastewater treatment units – Septic tanks.

CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

Mono Pumps (Australia) Pty Ltd
Mordialloc, Victoria
Australia

has been approved by Lloyd's Register Quality Assurance Limited to the following Quality Management System Standards:

AS/NZS ISO 9001: 2000

The Quality Management System is applicable to:

Design, development, manufacture, assembly, repair and service of progressive cavity positive displacement pumps and spare parts. Design and supply of integrated drive arrangements and ancillary plant. Stockholding of pumps, spare parts, selected alternative pump types, disintegration and screening equipment.

This certificate is valid only in association with the certificate schedule bearing the same number on which the locations applicable to this approval are listed.

Approval Certificate No: MEL 0924555

Original Approval: 5 October 1993

Current Certificate: 1 March 2006

Certificate Expiry: 28 February 2009

Shane Worthington

Issued by: Lloyd's Register Quality Assurance Limited

UKAS QUALITY MANAGEMENT 001

This document is subject to the provision on the reverse
71 Fenchurch Street, London EC3M 4BS, United Kingdom. Registration number 1879370
This approval is carried out in accordance with the LRQA assessment and certification procedures and monitored by LRQA.
The use of the UKAS Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate Number 001
Macro Revision 12

LLOYD'S REGISTER QUALITY ASSURANCE

CERTIFICATE SCHEDULE

Mono Pumps (Australia) Pty Ltd
Mordialloc, Victoria
Australia

Locations	***Activities***
Mordialloc, Victoria	*Design, development, manufacture, assembly, repair and service of progressive cavity positive displacement pumps and spare parts. Design and supply of integrated drive arrangements and ancillary plant. Stockholding, hire and service of pumps, spare parts, selected alternative pump types, disintegration and screening equipment.*
Rural Products Mordialloc, Victoria	*Sales, stockholding and assembly.*
Sydney, New South Wales	*Sales, stockholding, hire, assembly, repair and service.*
Brisbane, Queensland	*Sales, stockholding, hire, assembly, repair and service.*

Approval
Certificate No: MEL 0924555

Original Approval: *5 October 1993*

Current Certificate: *1 March 2006*

Certificate Expiry: *28 February 2009*

Page 1 of 2

UKAS QUALITY MANAGEMENT
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Macro Revision 12

LLOYD'S REGISTER QUALITY ASSURANCE

CERTIFICATE SCHEDULE

Mono Pumps (Australia) Pty Ltd
Mordialloc, Victoria
Australia

Locations	*Activities*
Perth, Western Australia	*Sales, stockholding, hire, assembly, repair and service.*
Darwin, Northern Territory	*Sales, hire and stockholding.*
Claremont, Tasmania	*Sales and stockholding.*
Adelaide, South Australia	*Sales, hire and stockholding.*
Kalgoorlie, Western Australia	*Sales, stockholding, hire, assembly, repair and service.*

Approval
Certificate No: MEL 0924555

Original Approval: *5 October 1993*

Current Certificate: *1 March 2006*

Certificate Expiry: *28 February 2009*

Page 2 of 2

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LLOYD'S REGISTER QUALITY ASSURANCE

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Linpac Rotational Mouldings Pty Ltd

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81 Frankston Gardens Drive, CARRUM DOWNS 3201, VIC AUSTRALIA

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AS/NZS 1546.1 - On-site domestic wastewater treatment units - Septic tanks

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Alex Ezrakhovich - General Manager Certification
For and on behalf of SAI Global

Authorised Local Signatory, SAI Global

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ATTACHMENT 7
Response to Department of Planning Queries

5300/1077

Attachment 1 Department of Planning issues 08_0034

NB. Please note that Tweed Shire Council have been contracted to undertake the assessment of subdivision design and layout (including open space), stormwater management, wastewater management, transport (including roads), and earthworks/geotechnical issues.

1. **Subdivision density, design and layout**

a. Whilst allowable under the current zoning, the Department has concerns over the impact of the density of the proposed subdivision on the rural village character of Bilambil village. Land use in adjacent areas typically consists of larger lot areas providing more open space, variability of design and enhanced landscaping that add positively to the character of the existing village. Consideration should be given to the interface of the development with the surrounding village and how the proposed subdivision layout could provide a transition in density between the existing and proposed development. This could be achieved by reducing the density of allotments on the perimeter of the development with density building towards the centre of the subdivision.

b. Lots 12 – 29 on the western side of the site use a series of access easements that create the effect of 'battle axe' lots and reduce the attractiveness of the streetscape on the internal road. Consideration should be given to modify the design and layout of these lots (and dwellings proposed) to improve streetscape on both Bilambil Road and the internal road and to enhance the overall village character of Bilambil.

2. **Sewerage**

a. Provision (or commitment) should be made for the community hall and other dwellings or buildings in the village to connect to the sewerage system. This would contribute to the issue of septic tanks in the area potentially contributing to poor water quality, and allow for the village to develop to its full potential.

b. No assessment of the proposed route for sewerage has been provided. This should be provided in order for the Department to fully assess the impact of the entire proposal.

c. Will the proposed location of the sewer pump station increase the risk of septic spill during times of flood?

3. **Riparian Management Zone width**

a. In order to increase the effectiveness of the buffer proposed, consider removing the allocation of area for open space/playground equipment from the north-west corner of Riparian Management Zone (RMZ) (Lot 54) to achieve a consistently vegetated buffer width along the margins of the Creek. This will contribute to providing for better outcomes for water quality and habitat in the Bilambil Creek receiving environment.

4. **Flooding**

a. Provide a detailed flood study accounting for the effects of increased flooding due to climate change. Please also assess (and mitigate if necessary) the impacts the proposed development will have during flood conditions to properties downstream. As current flood conditions are prolonged (or otherwise affected) by tides, this flood study must also include an assessment of the impact of tides on flooding, and an assessment of the changes expected to flood behaviour within the catchment as a result of the proposed development.

5. **Stormwater**

a. Provide design detail of the stormwater outfall structure and the treatment devices proposed (not including a stormwater detention pond). Ensure that the outfall structure does not adversely impact upon the functioning of the Riparian Management Zone. An appropriately vegetated buffer and stormwater treatment devices will contribute positively to water quality resulting from any development.

b. Stormwater must be treated to sufficient quality before it is discharged directly to Bilambil Creek – an already stressed ecosystem. Provide an ecological assessment of the effects of the stormwater discharge into the Bilambil Creek receiving environment (including, but not limited, to impacts on Creek banks, water quality and flow, and impacts on the RMZ). This is particularly critical given the reduced buffer width proposed, and the inclusion of the road and open space within the RMZ.

6. Archaeological investigations

a. Field investigations and consultation with the Aboriginal community must be undertaken and results provided as part of the response to submissions (refer to submission from DECCW for further information regarding this).

Mail

From: "Mail" <mail@claconsultants.com.au>
To: "Mick Denny" <mdenny@tweed.nsw.gov.au>
Cc: "Darryl Anderson" <admin@daconsulting.com.au>; "John Sherwood" <johnasherwood@optusnet.com.au>
Sent: 09 November 2009 13:35
Attach: DoP Queries.pdf
Subject: Fw: Bilambil Road Bilambil

Mick,

The Department of Planning have requested additional information in respect of the proposed development at Bilambil Road Bilambil (refer attachment)

I have responded to the queries as detailed below.

I understand that the DoP are in the process of requesting Council to review the responses. I am of the opinion that all the requested information has been provided to you previously, and that Council has already accepted the provided information relevant to the queries as highlighted in the attachment.

It would be most appreciated if you would confirm that the responses are an accurate representation of the current situation.

It would also be appreciated if you would call me in the event that you are at odds with our assessment.

Thanks

Campbell Leonard
Director
----- Original Message -----
From: Mail
To: John Sherwood
Cc: Darryl Anderson
Sent: Thursday, November 05, 2009 3:09 PM
Subject: Bilambil Road Bilambil

CLA CONSULTANTS
Consulting Civil/Structural Engineers, Project Managers

Our Ref: 08418
5 November 2009

Mr J Sherwood
Director
Plateau Nominees Pty Ltd
PO Box 1461
Mona Vale NSW 1660

Dear John,

Lots 2 and 3 Bilambil Road Bilambil

Further to your query related to the issues raised by the NSW Department of Planning, we advise as follows:

a) Sewerage

i) Outfall

The proposal recognises the importance of the study currently being undertaken by Council in respect of the available capacity of the existing sewer system. The agreement referred to in Council's advice to the Department of Planning recognises the practicalities associated with the deferment of the detailed assessment of an outfall sewer until such time as the actual requirements are known. To that end, Council has agreed the Statement of Commitments.

Council does not require a detailed assessment of alternative routes until such time as an accurate assessment of the requirements can be made.

ii) Design Capacity

As to the sewering of the rest of Bilambil, the proposal was prepared on the basis of strict direction of Council that none of the rest of the township was to be connected.

The Council has requested that provision be made for the provision of a sewer connection to the Community Hall. This has been included on the plans.

The chief limiting factor in the ability of the facility to service the remainder of Bilambil will be the depth of the pumping station wet well, and, to an extent, the detail design of pump setup and rising main.

The depth of the wet well has to be sufficient to ensure that the reticulation sewers servicing the required area can be graded to the invert of the wet well. Thus the practicality of such a proposal is dependant on the selection of the area to be serviced. As a general rule, reticulation sewers can be graded at a minimum of 1/200. Thus, a wet well depth of say 6m will service a flat area of around 1km radius.

We are advised that the Applicant is prepared to arrange for the design and installation of the sewerage system so as to cater for the areas adjacent to the site on the bases that firstly additional costs incurred by this will be the subject of suitable reimbursement and that secondly spare capacity of the outfall sewer system is allocated to the proposed development in the first instance, and then to the adjacent areas external to the site.

iii) Septic Spill

The design and construction of sewer system is carried out on the basis that these systems are gas tight. Whilst the wet will be below flood level, the control mechanisms and the pump well access systems will be designed to be located above flood level. Likewise, manholes located in areas below anticipated flood level are routinely provided with bolt down lids to prevent the possibility of leakage from such manholes.

The added benefit of the proposed system is that the wet well is designed to

cater for at least 24 hours storage of peak wet weather flow, significantly greater than that normally allowed for in normal pump station facilities.

b) Flooding

i) Climate Change

It is noted that the proposal includes details of the impact of climate change on the immunity of the development. This commentary is based upon information provided by Council. And it is noted that the conclusions reached are supported by Council.

The analysis presented and accepted by Council is based upon boundary conditions specified by Council. Such boundary conditions are based on, among other peak tidal levels.

ii) Impact on Adjacent Properties

The impact of the development on downstream properties is negligible. Whilst there is an increase in peak flow rate caused by the development, the quantum of the increase in negligible when compared to the conveyance capacity of the adjacent creek The impact is further attenuated by the significant time step between the time of concentration of the development site, approximately 15minutes, and the creek itself, hours. This fact is recognised by Council.

iii) Additional Reporting

The preparation of a major flood study is not required by Council, who have agreed with our assessment of the situation. It is noted that under the terms of the NSW Guidelines for development of flood affected lands, the approval authority is nominated as the Tweed Shire Council, being the local authority.

iv) Loss of Flood Storage

Council also accepts our contention that the development does not result in a loss of net flood storage, again ensuring that the proposal does not adversely impact on the adjacent properties.

v) Outlet Device.

The proposal details a 750 Diameter pipe draining to a vegetated swale and thence to the creek. The final design will include energy dissipation prior to the discharge to the swale which will then act as overland flow. It will be understood that the detail design of the outlet will be dependant on the detail design of the upstream drainage system. It is regarded as premature to complete the detail design of the road and stormwater drainage systems at this point in time.

c) Water Quality

The responsible authority has advised that they do not require water quality treatment devices, such as constructed wetlands, in association with this project. The reasoning behind this is that the number of lots contributing to the different catchments is too small to make such devices feasible.

They have requested that a gross pollutant trap be installed at the downstream end of the pipe drainage system.

In order to maximise the effectiveness of the treatment train, it is proposed to install a propriety treatment device (Humeceptor or similar) at this location.

Technical details of the proposed system are attached for information.

It will be noted that testing of the efficiency of the proposed system indicates the following rates of treatment (Based on recommendations with respect to MUSIC modelling parameters):

i) Total Suspended Solids (10micron to 5,000 micron)	80%
ii) Total Nitrogen	30%
iii) Total Phosphorous	30%.

d) Park Location

We are advised that alternative locations for the proposed parkland have been suggested, viz:

i) Lots 9, 10, 11

The landform to be created in this locality will be much greater than the maximum allowed under the terms of the Local Environment Plan. It is proposed that crossfalls in this area will be of the order of 20%, comparing unfavourably with the specified maximum of 8%.

ii) Area around the existing macadamia tree.

Again, the finished landform will have crossfalls approximating 20%. It is noted also that the required earthworks will be such that it will be necessary to relocate the tree. It will not be possible to retain the tree in its current location. Note that the proposal allows for the tree to be relocated to the proposed park location.

We trust that you find the above satisfactory. Please contact the undersigned should you require additional information in relation to this matter.

Yours faithfully

...

Campbell Leonard
FIEAust CPEng NPER3 RPEQ
Director

8/43 Tallebudgera Creek Road West Burleigh QLD 4219
PO Box 403 West Burleigh QLD 4219
Ph: (07) 5520 1066 Fax: (07) 5520 1077

ABN 55 079 641 286

Mail

From: "Mail" <mail@claconsultants.com.au>
To: "John Sherwood" <johnasherwood@optusnet.com.au>
Sent: 20 November 2009 10:39
Subject: Fw: Bilambil Road Bilambil (file No PF0960/5)

John,

For your information.

Regards

Campbell
----- Original Message -----
From: Mick Denny
To: 'Mail'
Cc: 'thomas.fitzgerald@planning.nsw.gov.au' ; Seth Philbrook ; Kristin-Lee McIntyre
Sent: Friday, November 20, 2009 10:24 AM
Subject: RE: Bilambil Road Bilambil (file No PF0960/5)

Campbell

I refer to your email dated 9 November 2009 and provide the following response.

Note - This email has been c/c to the Department of Planning (DoP) with additional explanations, at their request.

Re - Sewerage

2(a) Council acknowledge that CLA's latest design makes provision for a sewer connection for the Community Hall (as requested).

In regards to providing a sewerage system that services Bilambil Village, Council makes the following comment;

- Council require the development to provide a sewerage system that services the development only, but would, prior to the issue of a Construction Certificate for the development, negotiate with the Developer to upgrade the proposed system to cater for the village (if the receiving system has capacity as determined by Council's current Sewer Network Analysis study). This could be as simple as providing a larger wet well and / or larger pumps at the pump station. Note, larger pipe diameters are generally not provided to cater for future loadings as these can lead to exacerbated septicity issues due to the great length of rising main required during early stages of development, when loadings are less.

  Council would propose to pay the marginal difference to upgrade this system to cater for the village (as required).

  Note, as in Council's comments provided for the Draft Director-General's Environmental Assessment Report, Council does not have any current plans to connect Bilambil Village to sewerage.

- The potential capacity of the receiving system and or the need for future upgrades of this system is the subject of Council's current Sewer Network Analysis study.

  Council advises that MWH (Council's Consultants) is currently finalising the wet weather calibration of the model. Once that is completed, the model can be assessed to determine what upgrade works (if any) are required to the existing network under existing loadings, as well as determining the impacts of additional development on the network and what works would be necessary. The study is currently on track for delivery of first draft of report in early December, 2009.

- Should Council decide in the future to sewer the remainder of the village, a pressure sewer system would most likely be adopted, but ultimately the adopted system would depend on how the village was developed. Much would also depend upon the density of development that would occur. If there was redevelopment of the existing larger allotments in a coordinated manner, a combination of gravity and another local pump stations might be an effective way in serving the area. It is noted that the presence of a reticulated sewer system

would enable much smaller subdivision of the existing larger parcels.

2(b) In regards to the Applicant not providing an "assessment of the proposed route for sewerage", Council provide the following comment.

- Council consider the question of whether an assessment of the proposed route is required to be more of a planning issue rather than engineering. Council assume that once the location of connection is settled (subject to Council's current Sewer Network Analysis study), a design can be prepared and the appropriate assessment carried out. The statement of commitments gives the Developer (and Council) a certainty of being able to service the development from an engineering point of view, but this has not considered any planning or environmental requirements. Council appreciates the Developer not wanting to go to that expense of undertaking such an assessment prior to the completion of Council's study as the outcome from the study could save them a lot of work.

2(c) Council nominates the Q100 Design Flood Level for the site at RL 3.5m AHD (based on historical flood levels in the area) with a Probable Maximum Flood (PMF) level at RL 5.5m AHD. The submitted contour information confirms that the proposed pump station will be located above the Q100 Design Flood Level.

For additional assurance, Council's Development Design Specification D12 "Sewerage System" has design provisions for where a pump station site is exposed to possible flooding by a Q100 flood event.

Re - Flooding

4(a) In general, Council is satisfied with the Applicant's engineering submissions in relation to potential impacts of flooding and stormwater quality and quantity, subject to appropriate conditions of consent being imposed.

Council also advise that the draft Tweed Valley Flood Study (TVFS) is yet to be finalised, however it is hoped that the modelling and mapping is close to being complete. In the TVFS Council have modelled a worst case 0.91m sea level rise and 30% increase in rainfall intensity due to climate change (for 2100 planning horizon). Previous analysis was based on the draft mapping and remains current with modelling predicting an increase of approximately 1.4m in Q100 levels, however given the elevated nature of the new lots (above 4.0m AHD) this should be adequately catered for. Council consider it too onerous for the site to be modelled separately by the Developer for climate change impacts.

With regard to modelling of flood impacts, such as loss of flood storage, increased velocities etc, Council does not require any detailed modelling as the site is already highly modified and the proposed earthworks will have little if any effect on local flood patterns. However Council would not oppose to the DoP requesting further modelling, if the DoP so desires.

Re - Stormwater

5(a) Council agrees with CLA's response and that a detailed assessment of the stormwater system is premature and onerous at this stage of the development. Council has recommended conditions of consent requiring the developer to comply with the Tweed Urban Stormwater Quality Management Plan and Development Design Specification D7 - Stormwater Quality. It is expected that the requirements of these documents will be met by the provision of proprietary treatment devices, WSUD or a combination in a treatment train. This is acceptable for the DA approval, with detailed design, including calculations, modelling results etc, to be provided with the Construction Certificate / s68 stormwater application.

Council anticipate that water sensitive design principles such as grass swales will suffice for the small catchment draining to Bilambil Creek off Urliup Road and again this can be assessed at Construction Certificate stage.

If the DoP or other State Agencies (e.g, Fisheries, DECCW, ecologists) have additional water quality requirements over and above Council's adopted subdivision standards, they should be conveyed to the applicant and assessed by those agencies accordingly.

A condition has also been recommended regarding the siting and design of stormwater outlets in

Bilambil Creek to minimise ecological impacts, scour, erosion etc. Again this can be dealt with at Construction Certificate stage, in light of any additional requirements of Fisheries/DECCW/DoP/ecologists.

If you have any questions in regards to this email, please contact me.

Regards

Mick Denny | Development Engineer
Planning and Regulation

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