Inspection Pictures / Inspection: Stormwater Inspection

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Line 1	**Mossman Community**	**26/04/2012**	**7**	

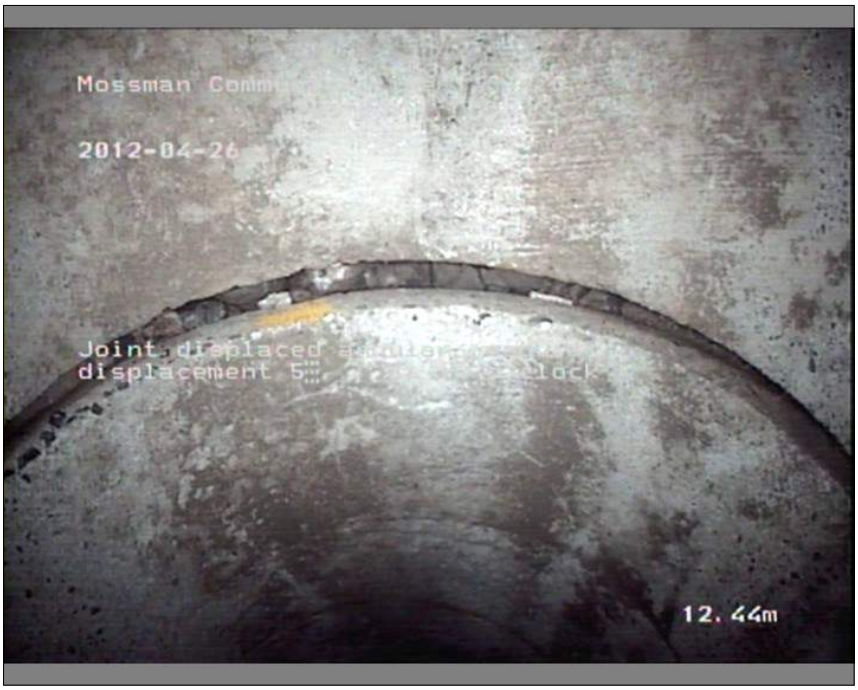
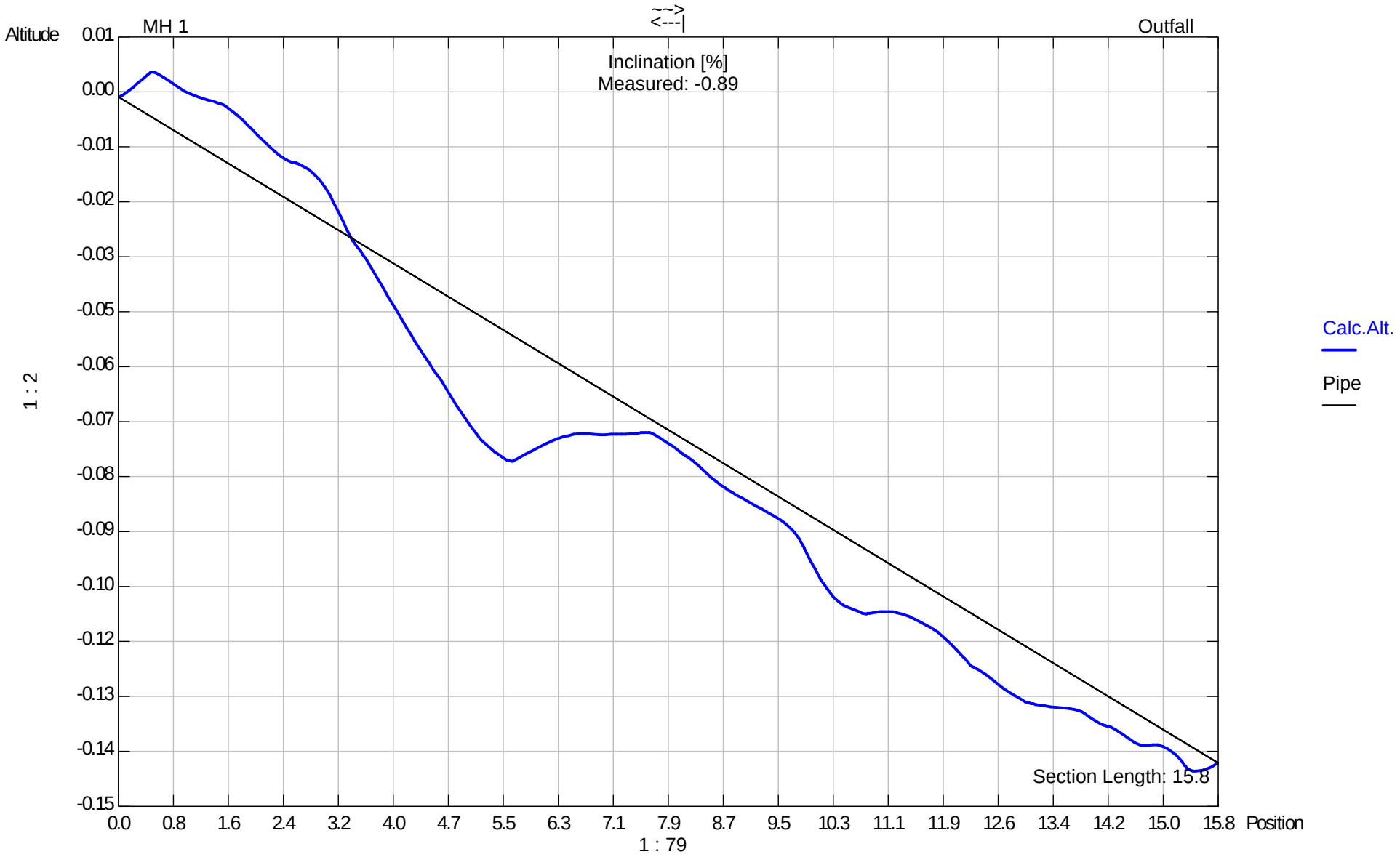


Photo: 7_8_30_A.JPG
12.44m, Joint displaced angular, angular displacement 5° , at 12 o'clock

Photo: 7_8_32_A.JPG
15.8m, Finish node, maintenance hole, Nodename: MH 1

Location: **C.R.C.** Street: **Line 1** Date: **26/04/2012** Visa: **Alan Nicholson**



Pipe shape: **Circular** Pipe height: **0.00** Pipe width: **375.00**

Street :
Tel:
Fax:
Email:

Inspection report / Inspection: Stormwater Inspection

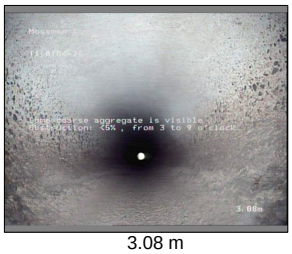
Date:	Asset owner's job ref.:	Precipitation:	Operator :	Section number:	Sewer reference :
26/04/2012		**No**	**Alan Nicholson**	**8**	
Method of inspection:	Cleaning:	Criticality:			
Television Camera	**cleaned**				

Town/suburb:	**Mossman Community**	Sewername:		Upstream MH.:	**G.I.P. 1**
Location:	**Line 2**	Asset Owner:		Downstream MH.:	**Outfall**
Location type:		Tape No.:		Section length :	**11.79 m**
		Flow control	**No measures**	Pipe length :	

Purpose of inspection :	**Operational exam**	Shape :	**Circular**
Use of sewer:	**Drain**	Dia/Height:	
Land ownership:		Width:	**375 mm**
Type of sewer:	**Gravity sewer**	Lining Material:	

Remarks :

1:105	Position	Observation
Outfall	0.00	Start node, outfall, Nodename: Outfall
	0.00	Water level, clear flow (the invert is visible), depth 0%
	3.08	Some coarse aggregate is visible , Obstruction: <5% , from 3 to 9 o'clock
	8.99	Joint displaced radially, radial displacement 10-20mm , at 12 o'clock
	11.79	Finish node, grated inlet pit, Nodename: G.I.P. 1
G.I.P. 1		



3.08 m

8.99 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
2	**2**	**0.34**	**4**	**1**	**0**	**0**	**0**	**0**	**1**

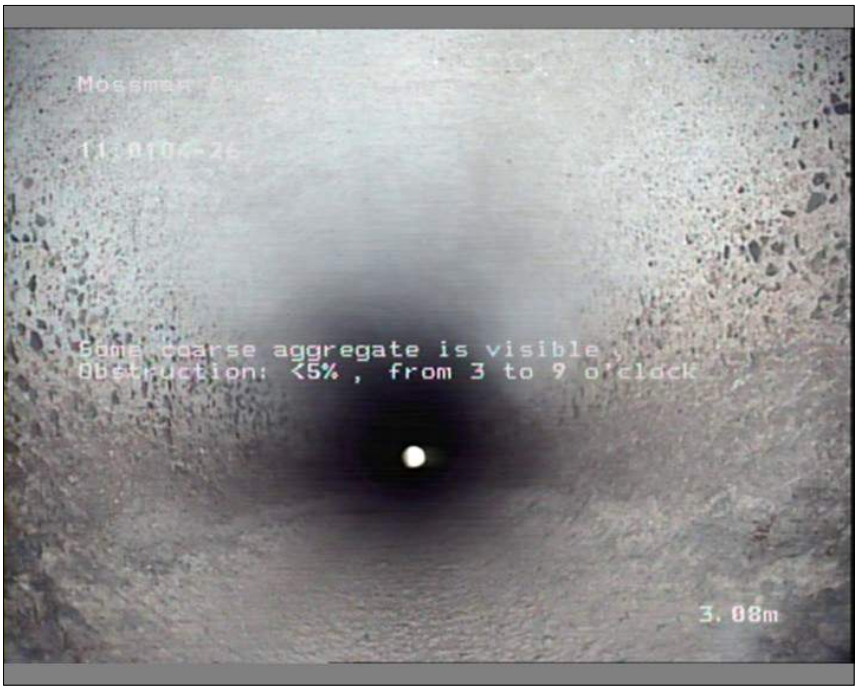
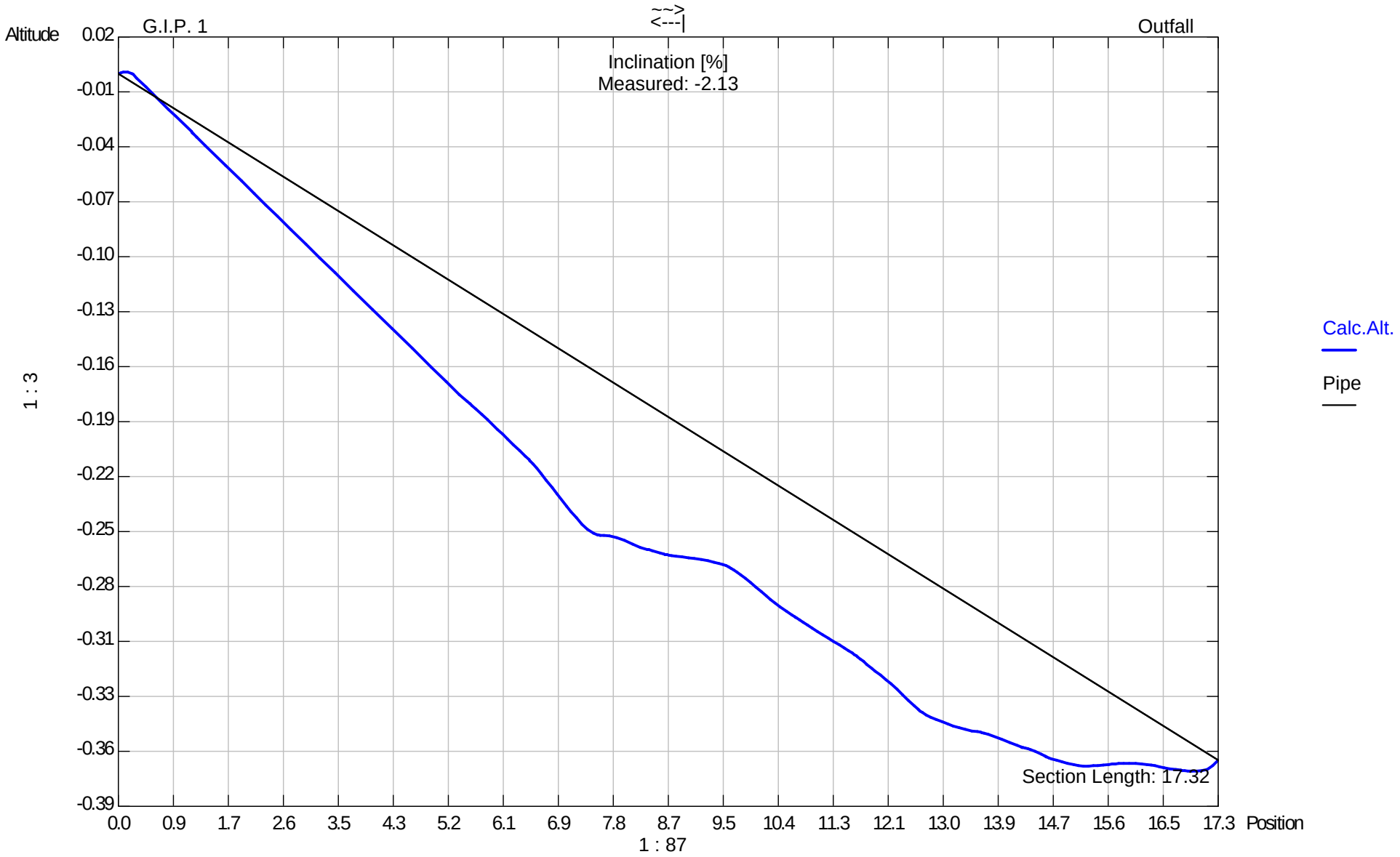


Photo: 8_9_35_A.JPG
3.08m, Some coarse aggregate is visible , Obstruction: <5% , from 3 to 9 o'clock

Photo: 8_9_36_A.JPG
8.99m, Joint displaced radially, radial displacement 10-20mm , at 12 o'clock

Location: **C.R.C.** Street: **Line 2** Date: **26/04/2012** Visa: **Alan Nicholson**



Pipe shape: **Circular** Pipe height: **0.00** Pipe width: **375.00**

Street :
Tel:
Fax:
Email:

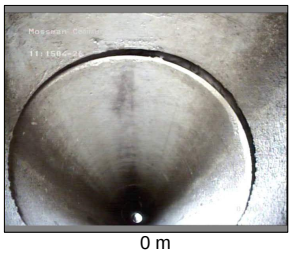
Inspection report / Inspection: Stormwater Inspection

Date:	Asset owner's job ref.:	Precipitation:	Operator :	Section number:	Sewer reference :
26/04/2012		**No**	**Alan Nicholson**	**9**	
Method of inspection: **Television Camera**	Cleaning: **cleaned**	Criticality:			

Town/suburb:	**Mossman Community**	Sewername:		Upstream MH.:	**G.I.P. 1**
Location:	**Line 3**	Asset Owner:		Downstream MH.:	**Outfall**
Location type:		Tape No.:		Section length :	**7.02 m**
		Flow control	**No measures**	Pipe length :	

Purpose of inspection :	**Operational exam**	Shape :	**Circular**
Use of sewer:	**Drain**	Dia/Height:	
Land ownership:		Width:	**450 mm**
Type of sewer:	**Gravity sewer**	Lining Material:	

Remarks :

1:60	Position	Observation	
Outfall	0.00	Start node, outfall, Nodename: Outfall	 0 m
	0.00	Water level, clear flow (the invert is visible), depth 0%	
	0.00	Joint displaced angular, angular displacement 10° , at 2 o'clock	 2.23 m
	2.23	Breaking, some pieces are missing, length of break 200 , from 11 to 3 o'clock	 4.96 m
	4.96	Breaking, some pieces are missing, length of break 200 , from 11 to 2 o'clock	 6.93 m
	6.93	Point repair, localised lining , length: 500mm , from 12 to 6 o'clock	 7.02 m
G.I.P. 1	7.02	Finish node, grated inlet pit, Nodename: G.I.P. 1	

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
2	**60**	**17.09**	**120**	**5**	**0**	**0**	**0**	**0**	**1**

Photo: 9_10_40_A.JPG
0m, Joint displaced angular, angular displacement 10° , at 2 o'clock

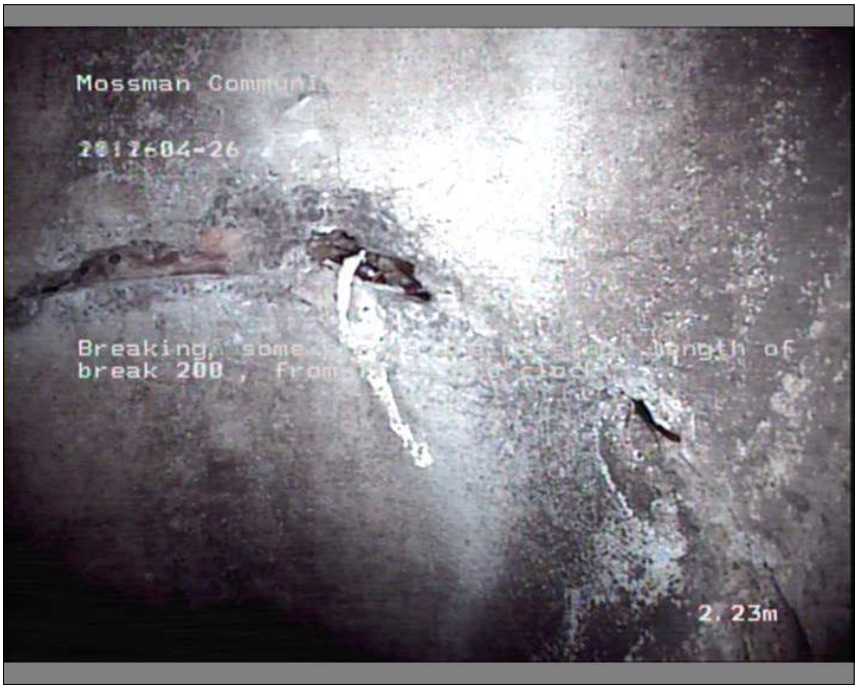


Photo: 9_10_41_A.JPG
2.23m, Breaking, some pieces are missing, length of break 200 , from 11 to 3 o'clock

Photo: 9_10_42_A.JPG
4.96m, Breaking, some pieces are missing, length of break 200 , from 11 to 2 o'clock

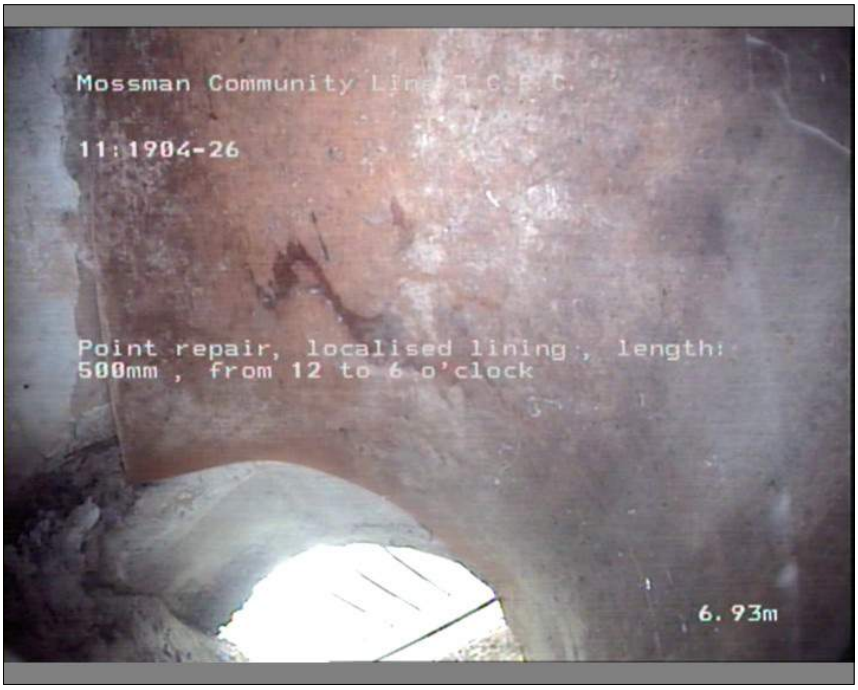


Photo: 9_10_43_A.JPG
6.93m, Point repair, localised lining , length: 500mm , from 12 to 6 o'clock

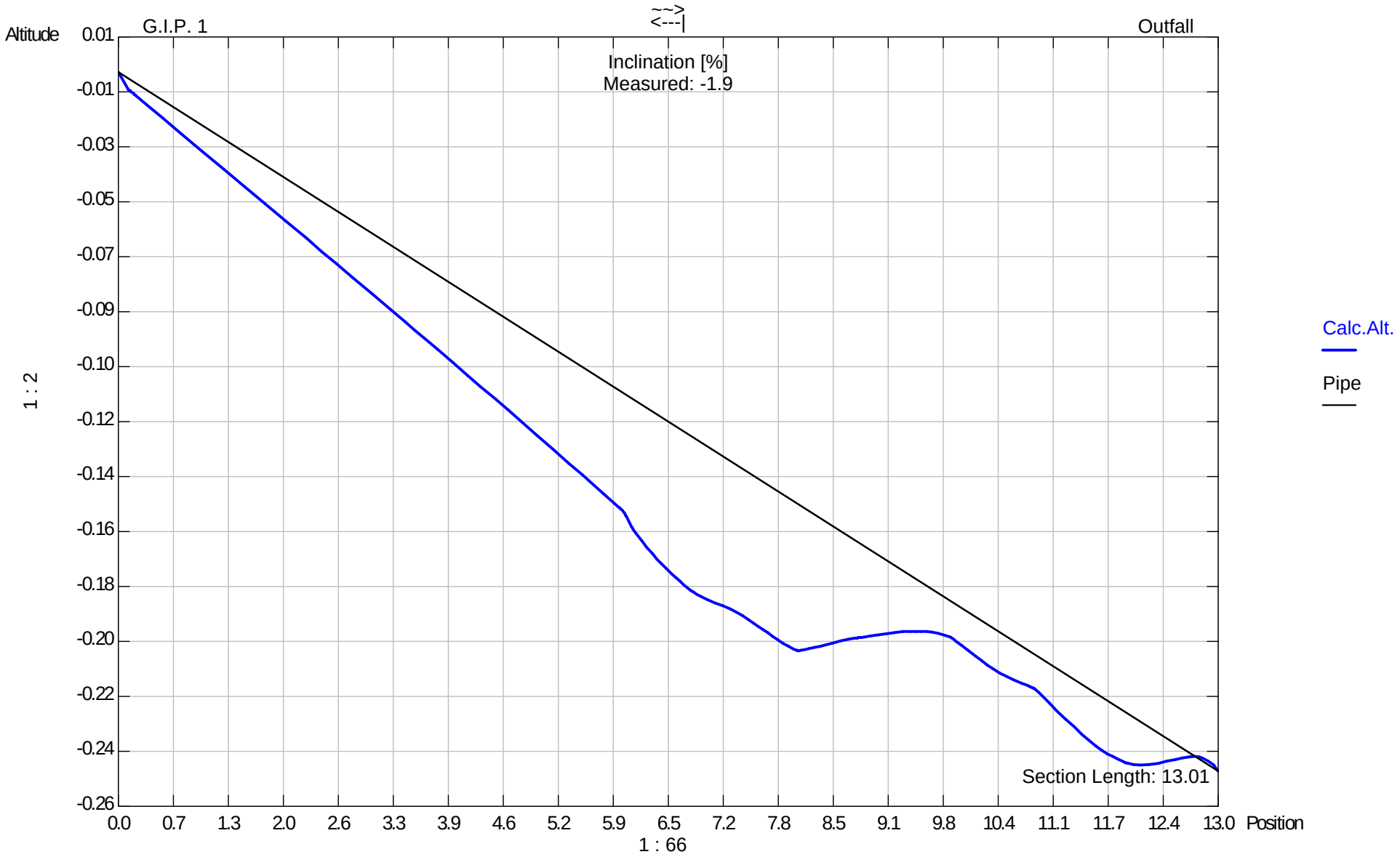
Tel:
Fax:
Email:

Inspection Pictures / Inspection: Stormwater Inspection

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Line 3	**Mossman Community**	**26/04/2012**	**9**	

Photo: 9_10_44_A.JPG
7.02m, Finish node, grated inlet pit, Nodename: G.I.P. 1

Location: **C.R.C.** Street: **Line 3** Date: **26/04/2012** Visa: **Alan Nicholson**



Pipe shape: **Circular** Pipe height: **0.00** Pipe width: **450.00**

Street :
Tel:
Fax:
Email:

Inspection report / Inspection: Stormwater Inspection

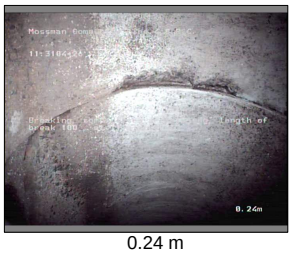
Date:	Asset owner's job ref.:	Precipitation:	Operator :	Section number:	Sewer reference :
26/04/2012		**No**	**Alan Nicholson**	**10**	
Method of inspection:	Cleaning:	Criticality:			
Television Camera	**cleaned**				

Town/suburb:	**Mossman Community**	Sewername:		Upstream MH.:	**G.I.P. 1**
Location:	**Line 4**	Asset Owner:		Downstream MH.:	**Outfall**
Location type:		Tape No.:		Section length :	**9.76 m**
		Flow control	**No measures**	Pipe length :	

Purpose of inspection :	**Operational exam**	Shape :	**Circular**
Use of sewer:	**Drain**	Dia/Height:	
Land ownership:		Width:	**375 mm**
Type of sewer:	**Gravity sewer**	Lining Material:	

Remarks :

1:90	Position	Observation
G.I.P. 1	0.00	Start node, grated inlet pit, Nodename: G.I.P. 1
	0.00	Water level, clear flow (the invert is visible), depth 0%
	0.24	Breaking, some pieces are missing, length of break 100 , at 11 o'clock
	2.70	Breaking, some pieces are missing, length of break 100 , at 12 o'clock
	9.76	Finish node, outfall or culvert headwall, Nodename: Outfall
Outfall		


0.24 m


2.7 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
2	**60**	**12.3**	**120**	**5**	**0**	**0**	**0**	**0**	**1**

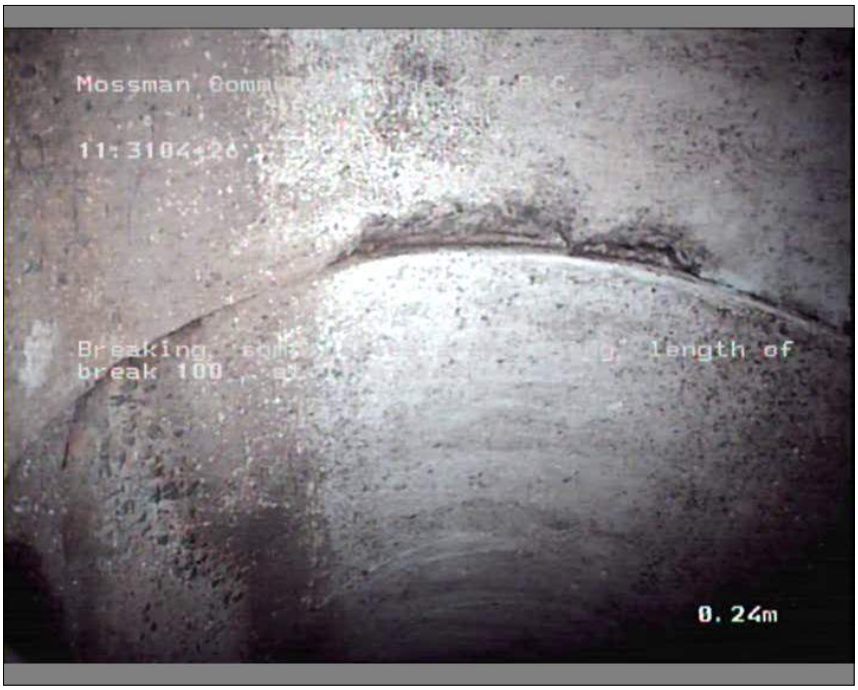
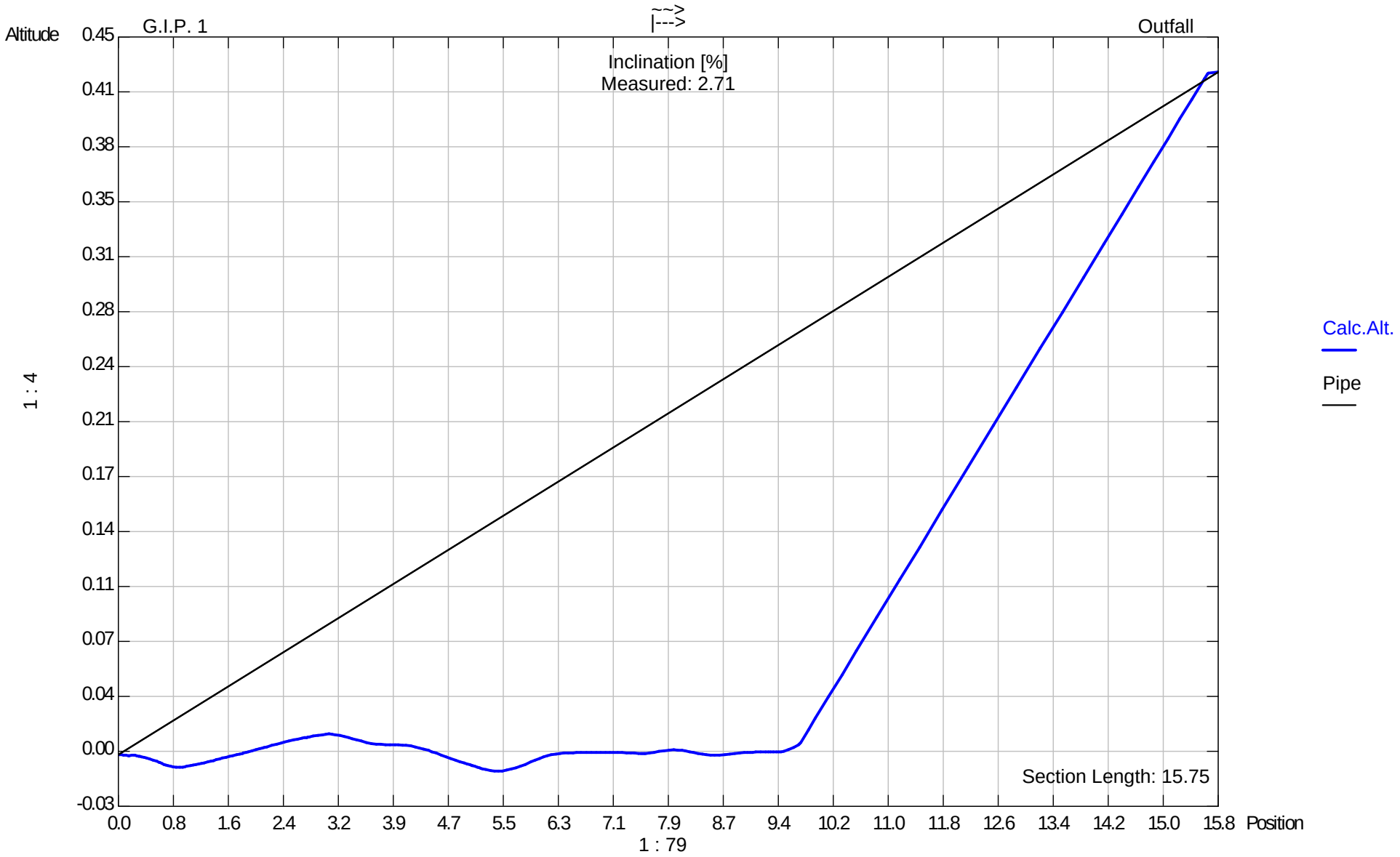


Photo: 10_11_47_A.JPG
0.24m, Breaking, some pieces are missing, length of break 100 , at 11 o'clock

Photo: 10_11_48_A.JPG
2.7m, Breaking, some pieces are missing, length of break 100 , at 12 o'clock

Location: **C.R.C.** Street: **Line 4** Date: **26/04/2012** Visa: **Alan Nicholson**



Pipe shape: **Circular** Pipe height: **0.00** Pipe width: **375.00**

Street :
Tel:
Fax:
Email:

Inspection report / Inspection: Stormwater Inspection

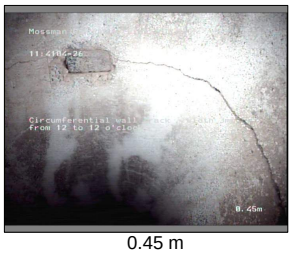
Date:	Asset owner's job ref.:	Precipitation:	Operator :	Section number:	Sewer reference :
26/04/2012		**No**	**Alan Nicholson**	**11**	
Method of inspection:	Cleaning:	Criticality:			
Television Camera	**cleaned**				

Town/suburb:	**Mossman Community**	Sewername:		Upstream MH.:	**G.I.P. 2**
Location:	**Line 4 G2 - G1**	Asset Owner:		Downstream MH.:	**G.I.P. 1**
Location type:		Tape No.:		Section length :	**45.27 m**
		Flow control	**No measures**	Pipe length :	

Purpose of inspection :	**Operational exam**	Shape :	**Circular**
Use of sewer:	**Drain**	Dia/Height:	
Land ownership:		Width:	**375 mm**
Type of sewer:	**Gravity sewer**	Lining Material:	

Remarks :

1:306 Position	Observation
0.00	Start node, grated inlet pit, Nodename: G.I.P. 1
G.I.P. 1 0.00	Water level, clear flow (the invert is visible), depth 0%
0.45	Circumferential wall crack , width 3mm , from 12 to 12 o'clock
1.76	Some coarse aggregate is visible , Obstruction: <5% , from 3 to 9 o'clock
6.66	Joint displaced longitudinaly, longitudinal displacement <10mm
14.04	Joint displaced longitudinaly, longitudinal displacement <10mm
16.44	Breaking, some pieces are missing, length of break 200 , at 12 o'clock
19.07	Joint displaced radially, radial displacement 10-20mm , at 6 o'clock
21.37	Joint displaced radially, radial displacement 10-20mm , at 4 o'clock
26.29	Joint displaced radially, radial displacement 21-30mm , at 12 o'clock
27.40	Circumferential wall crack , width 5mm , from 12 to 12 o'clock
28.90	Joint displaced angular, angular displacement 10° , at 12 o'clock
31.27	Breaking, all pieces are present but some of them are visibly displaced from position, length of break 200 , at 12 o'clock
33.79	Joint displaced angular, angular displacement 10° , at 10 o'clock
38.74	Breaking, some pieces are missing, length of break 100 , at 12 o'clock


0.45 m


1.76 m


6.66 m

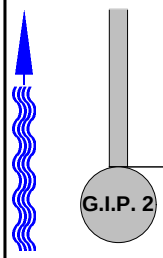

14.04 m


16.44 m

City :
Tel:
Fax:
Email:

Inspection Report / Inspection: Stormwater Inspection

Date :	Job number :	Weather : **No**	Operator : **Alan Nicholson**	Counter : **11**	Section name :
Present :	Vehicle :	Camera :	Preset :	Cleaned : **cleaned**	Rate :

1:306	Position	Observation
	45.27	Finish node, grated inlet pit, Nodename: G.I.P. 2

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
9	**60**	**4.04**	**183**	**5**	**0**	**0**	**0**	**0**	**1**

Photo: 11_12_52_A.JPG
0.45m, Circumferential wall crack , width 3mm , from 12 to 12 o'clock

Photo: 11_12_53_A.JPG
1.76m, Some coarse aggregate is visible , Obstruction: <5% , from 3 to 9 o'clock

Inspection Pictures / Inspection: Stormwater Inspection

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Line 4 G2 - G1	**Mossman Community**	**26/04/2012**	**11**	

Photo: 11_12_54_A.JPG
6.66m, Joint displaced longitudinaly, longitudinal displacement <10mm

Photo: 11_12_55_A.JPG
14.04m, Joint displaced longitudinaly, longitudinal displacement <10mm

Tel:
Fax:
Email:

Inspection Pictures / Inspection: Stormwater Inspection

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Line 4 G2 - G1	**Mossman Community**	**26/04/2012**	**11**	

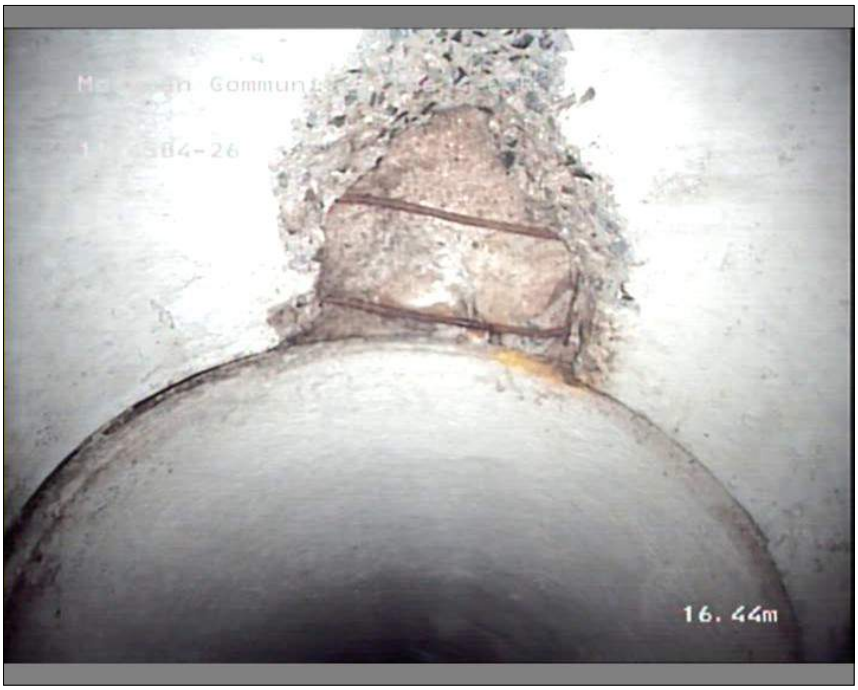


Photo: 11_12_56_A.JPG
16.44m, Breaking, some pieces are missing, length of break 200 , at 12 o'clock

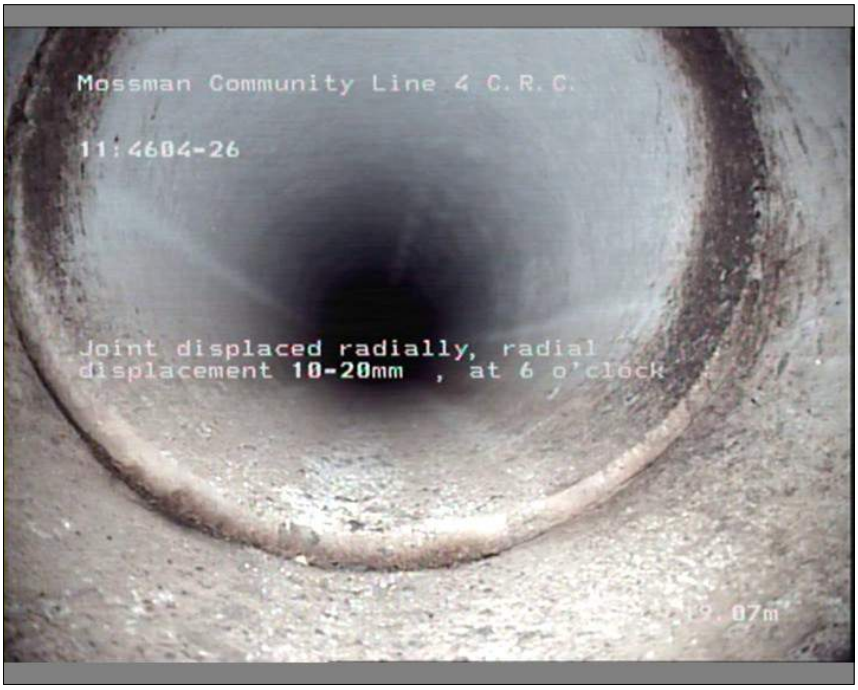


Photo: 11_12_57_A.JPG
19.07m, Joint displaced radially, radial displacement 10-20mm , at 6 o'clock

Inspection Pictures / Inspection: Stormwater Inspection

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Line 4 G2 - G1	**Mossman Community**	**26/04/2012**	**11**	

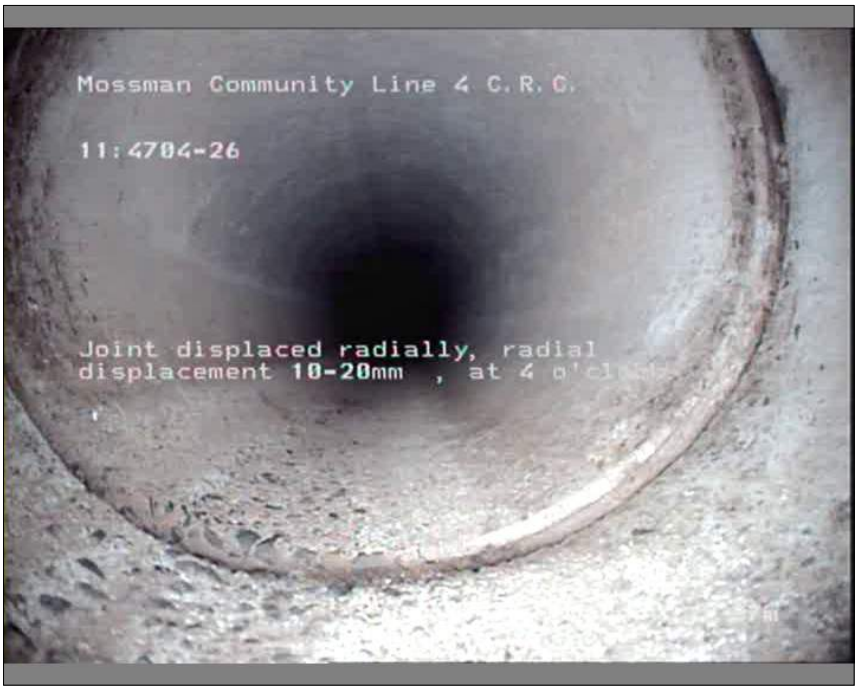


Photo: 11_12_58_A.JPG
21.37m, Joint displaced radially, radial displacement 10-20mm , at 4 o'clock

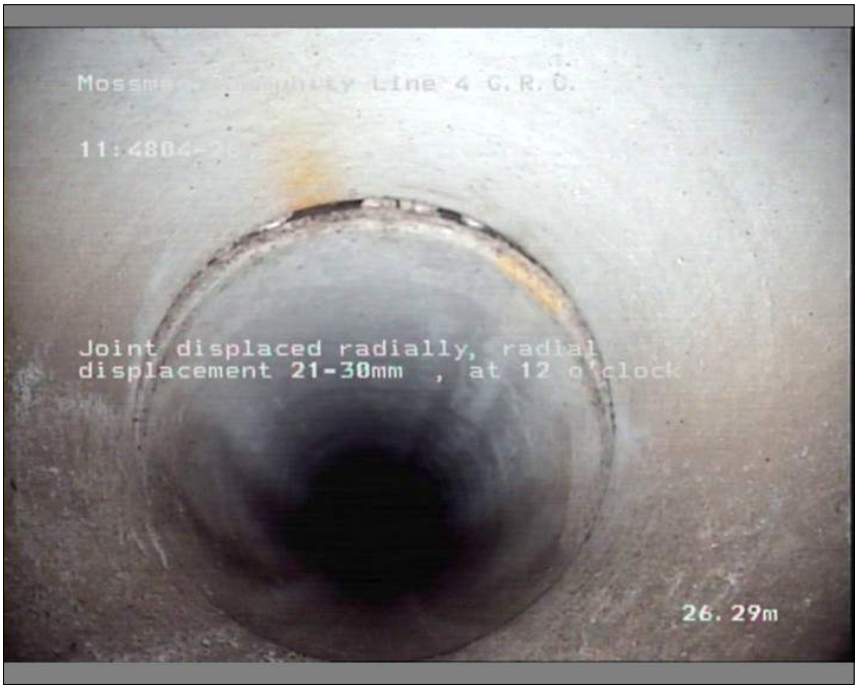


Photo: 11_12_59_A.JPG
26.29m, Joint displaced radially, radial displacement 21-30mm , at 12 o'clock

Inspection Pictures / Inspection: Stormwater Inspection

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Line 4 G2 - G1	**Mossman Community**	**26/04/2012**	**11**	

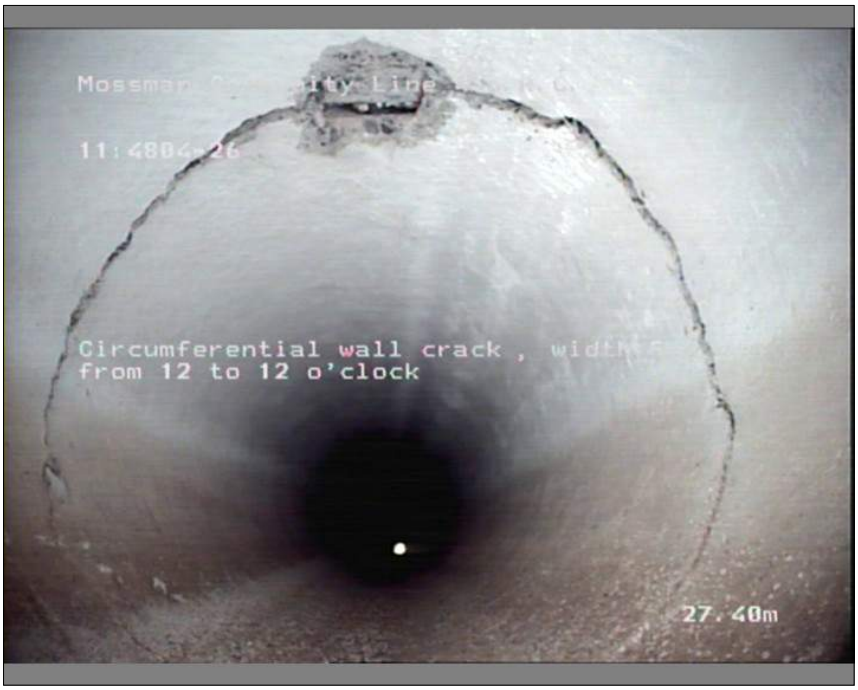


Photo: 11_12_60_A.JPG
27.4m, Circumferential wall crack , width 5mm , from 12 to 12 o'clock

Photo: 11_12_61_A.JPG
28.9m, Joint displaced angular, angular displacement 10° , at 12 o'clock

Tel:
Fax:
Email:

Inspection Pictures / Inspection: Stormwater Inspection

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Line 4 G2 - G1	**Mossman Community**	**26/04/2012**	**11**	

Photo: 11_12_62_A.JPG
31.27m, Breaking, all pieces are present but some of them are visibly displaced from position, length of break 200 , at 12 o'clock

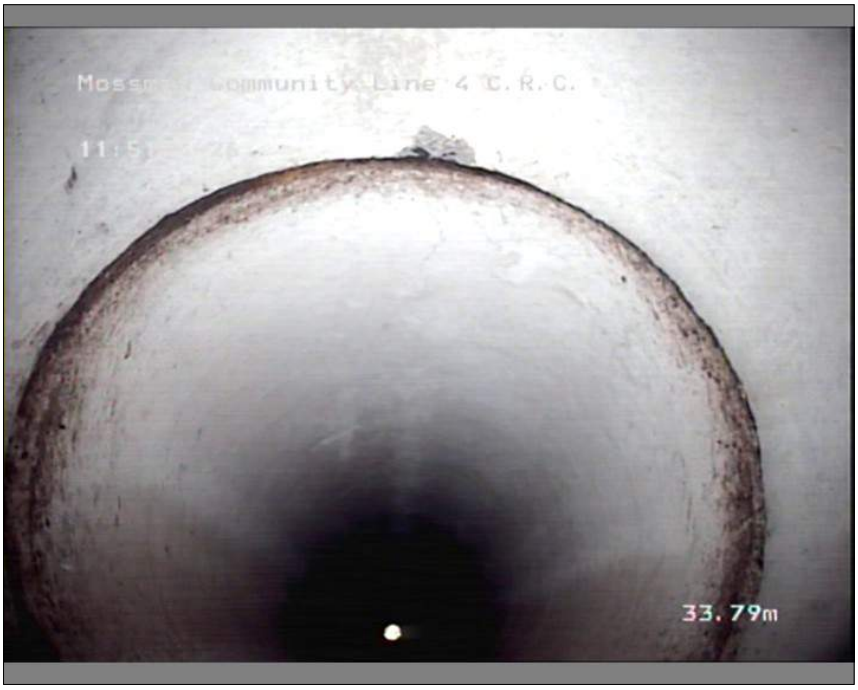


Photo: 11_12_63_A.JPG
33.79m, Joint displaced angular, angular displacement 10° , at 10 o'clock

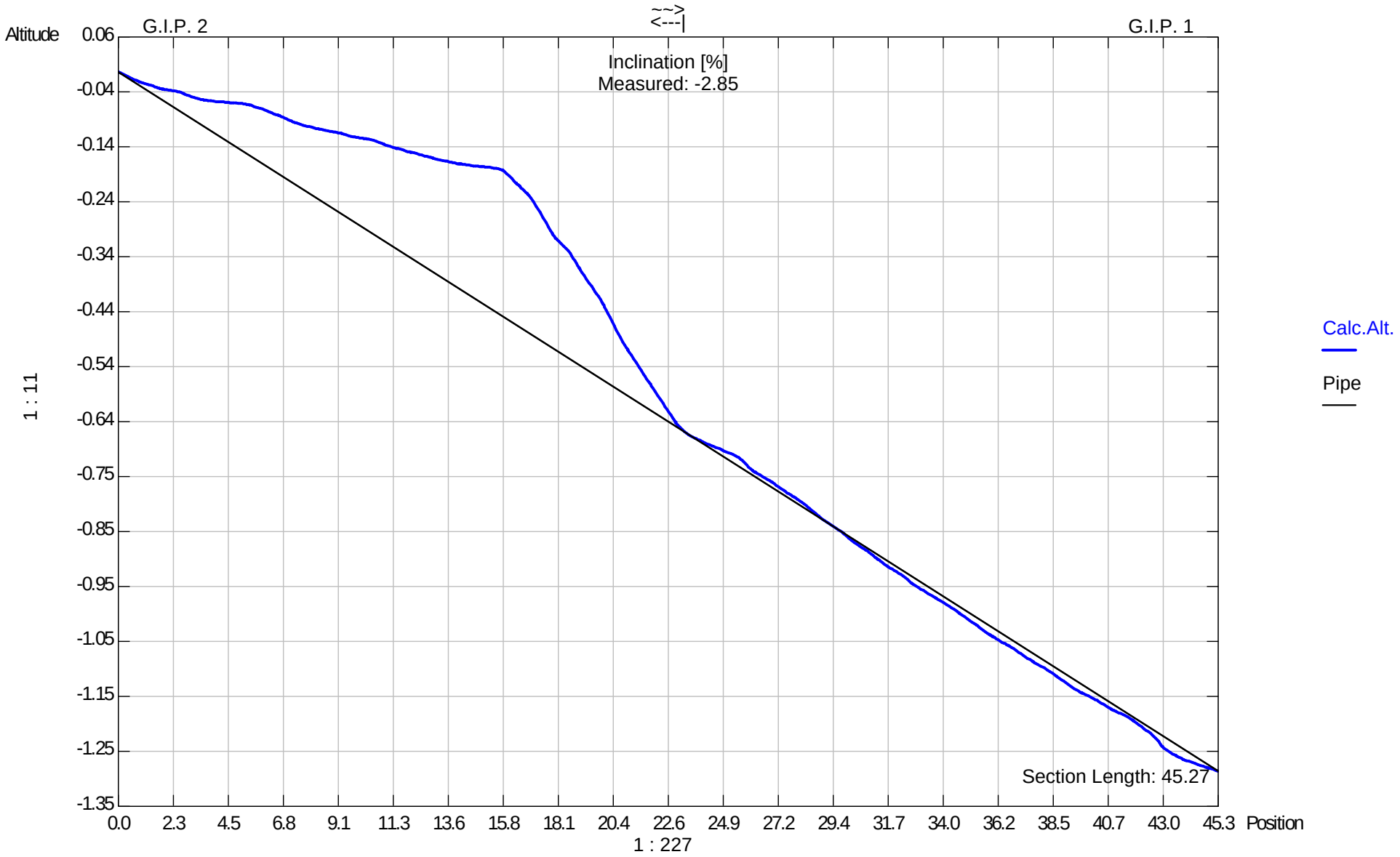
Tel:
Fax:
Email:

Inspection Pictures / Inspection: Stormwater Inspection

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Line 4 G2 - G1	**Mossman Community**	**26/04/2012**	**11**	

Photo: 11_12_64_A.JPG
38.74m, Breaking, some pieces are missing, length of break 100 , at 12 o'clock

Location: **C.R.C.** Street: **Line 4** Date: **26/04/2012** Visa: **Alan Nicholson**



Pipe shape: **Rectangular** Pipe height: **0.00** Pipe width: **375.00**

Street :
Tel:
Fax:
Email:

Inspection report / Inspection: Stormwater Inspection

Date:	Asset owner's job ref.:	Precipitation:	Operator :	Section number:	Sewer reference :
26/04/2012		**No**	**Alan Nicholson**	**6**	
Method of inspection:	Cleaning:	Criticality:			
Television Camera	**cleaned**				

Town/suburb:	**Mossman Community**	Sewername:		Upstream MH.:	**West Headwall**
Location:	**Line 5A**	Asset Owner:		Downstream MH.:	**East Headwall**
Location type:		Tape No.:		Section length :	**4.56 m**
		Flow control	**No measures**	Pipe length :	

Purpose of inspection :	**Operational exam**	Shape :	**Circular**
Use of sewer:	**Drain**	Dia/Height:	
Land ownership:		Width:	**600 mm**
Type of sewer:	**Gravity sewer**	Lining Material:	

Remarks :

1:50	Position	Observation
West Headwall		
	0.00	Start node, outfall, Nodename: West Headwall
	0.00	Water level, clear flow (the invert is visible), depth 5%
	4.56	Inspection (survey) abandoned, obstruction , Large rocks

4.56 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**

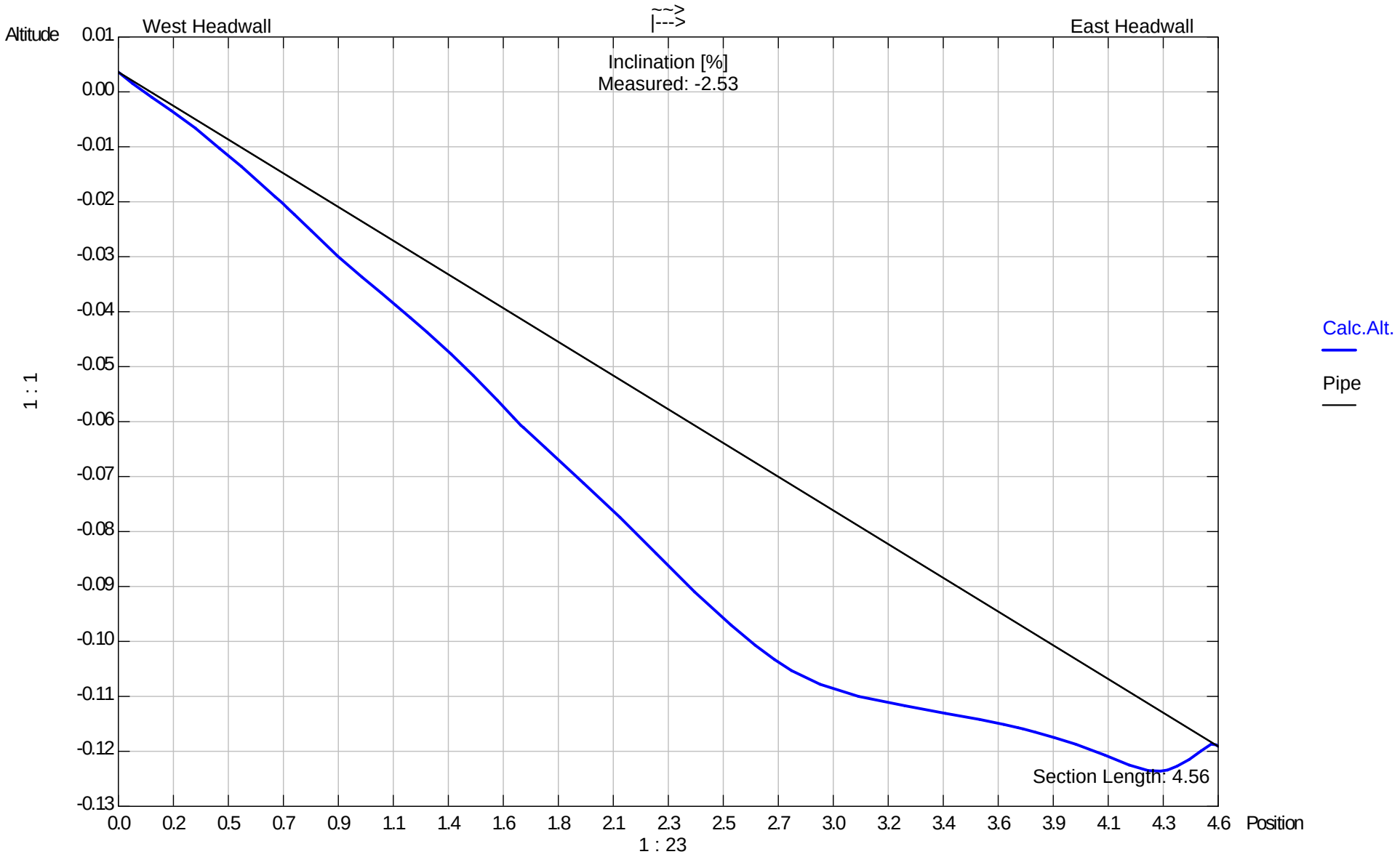
Tel:
Fax:
Email:

Inspection Pictures / Inspection: Stormwater Inspection

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Line 5A	**Mossman Community**	**26/04/2012**	**6**	

Photo: 6_7_25_A.JPG
4.56m, Inspection (survey) abandoned, obstruction , Large rocks

Location: **C.R.C.** Street: **Line 5A** Date: **26/04/2012** Visa: **Alan Nicholson**



Pipe shape: **Circular** Pipe height: **0.00** Pipe width: **600.00**

Street :
Tel:
Fax:
Email:

Inspection report / Inspection: Stormwater Inspection

Date:	Asset owner's job ref.:	Precipitation:	Operator :	Section number:	Sewer reference :
26/04/2012		**No**	**Alan Nicholson**	**5**	
Method of inspection:	Cleaning:	Criticality:			
Television Camera	**cleaned**				

Town/suburb:	**Mossman Community**	Sewername:		Upstream MH.:	**West Headwall**
Location:	**Line 5B**	Asset Owner:		Downstream MH.:	**East Headwall**
Location type:		Tape No.:		Section length :	**9.17 m**
		Flow control	**No measures**	Pipe length :	

Purpose of inspection :	**Operational exam**	Shape :	**Circular**
Use of sewer:	**Drain**	Dia/Height:	
Land ownership:		Width:	**600 mm**
Type of sewer:	**Gravity sewer**	Lining Material:	

Remarks :

1:75	Position	Observation
West Headwall		
	0.00	Start node, outfall, Nodename: West Headwall
	0.00	Water level, clear flow (the invert is visible), depth 5%
	4.36	Breaking, some pieces are missing, length of break 100 , at 12 o'clock
	4.36	Soil visible through defect
	9.17	Finish node, outfall or culvert headwall, Nodename: East Headwall
East Headwall		


4.36 m


9.17 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
2	**120**	**13.09**	**120**	**5**	**0**	**0**	**0**	**0**	**1**

Inspection Pictures / Inspection: Stormwater Inspection

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Line 5B	**Mossman Community**	**26/04/2012**	**5**	

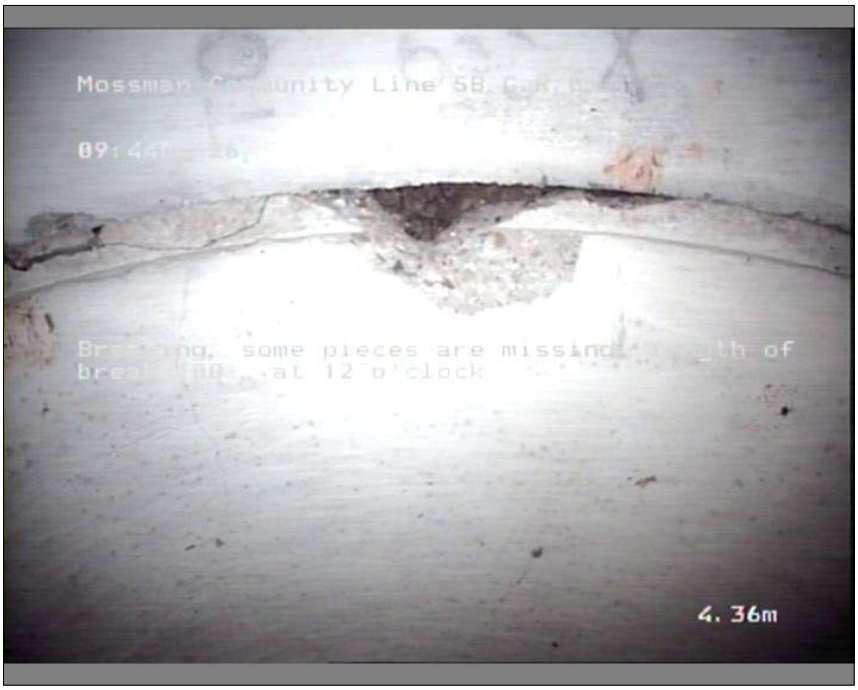
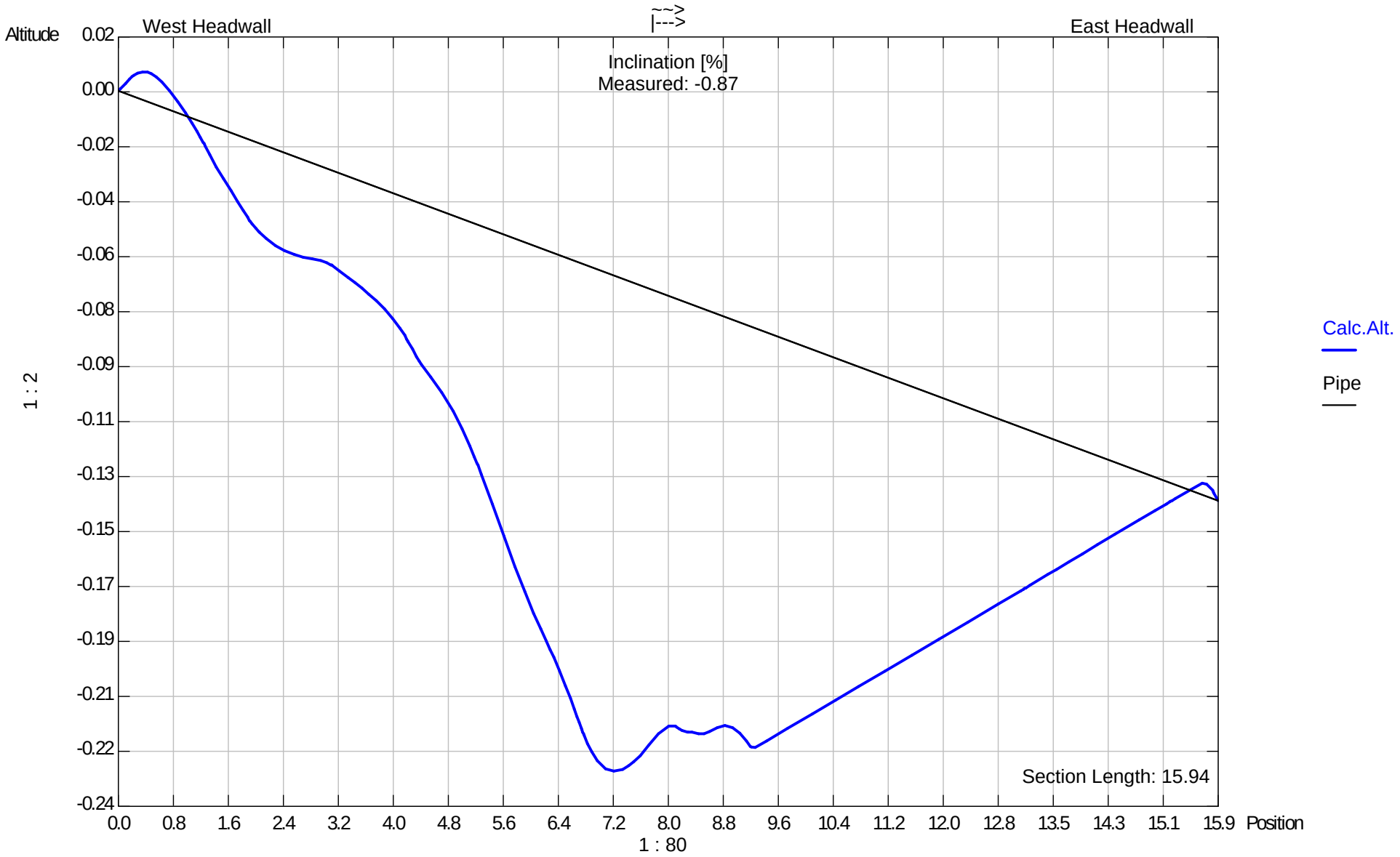


Photo: 5_6_20_A.JPG
4.36m, Breaking, some pieces are missing, length of break 100 , at 12 o'clock

Photo: 5_6_22_A.JPG
9.17m, Finish node, outfall or culvert headwall, Nodename: East Headwall

Location: **C.R.C.** Street: **Line 5B** Date: **26/04/2012** Visa: **Alan Nicholson**



Pipe shape: **Circular** Pipe height: **0.00** Pipe width: **600.00**

Attachment 9

Council Officer’s input and comments on conditional assessment tests required

MINUTES

MOSSMAN GORGE COMMUNITY INFRASTRUCTURE AUDIT					Meeting #:	5
Meeting Purpose:	Water & Sewer Infrastructure Work Scope	**Meeting Time:**	12.00 – 1.00	pm	**Meeting Date:**	26 April 2012
Attendees:	Jon Turner (CRC W&W) Denny Phillips (CRC W&W) Grahame Dunstan (CRC W&W) Ricky Hewitt (CRC W&W) Paul Steele (BM) Matt Di Maggio (BM)					
Circulation:	All					
Apologies:	Nil					

#	Agenda / Issues:	Decisions / Action:	Action By:
1	**Water**	1. Individual metering of each of residency is required. This includes location of existing connections and ensuring that existing connections are suitable for installation of water meters; 2. Council confirmed that 25mm diameter loop mains are to be increased in size. 40mm diameter loops mains are considered acceptable and do not have to be replaced; 3. Scouring and swabbing of water mains is required prior to hand over; 4. Council requires that all valve/hydrant surrounds are reset and cleaned prior to hand over; 5. Council confirm additional valves identified in capacity phase are required for network operation/management; 6. Additional connection in Bama Bubu Street (eastern end of community) is required to unsure reliability of supply to the community. This connection will include a water meter; 7. Location of mains in Mossman Gorge Road (particularly at western end of community) is to be determined to ensure that Council has the appropriate land tenure; 8. It is noted that the conditional assessment identified that a number of residencies have water connections which are not to CRC standards. These will require works which are not included in this scope of works. 9. As-cons to be transferred to current standards.	
2	**Sewer**	1. Council is willing to accept gravity sewers flatter than 1:150; 2. Council advised that the gravity sewer efficiencies identified (in the CCTV) are not detrimental to the sewers operation. Therefore the cost of rectification is not justified; 3. Council confirm the extension of sewer (on Lund St) to connect with un-sewered properties (church and health clinic) is appropriate; 4. It is noted that the conditional assessment revealed that a number residencies have sewer connections that have defects. These will require works which are not included in this scope of works; 5. As-cons to be transferred to current standards. 6. Sewers on non standard alignments will require easements;	
3	**Sewage Pump Station**	1. Pumps are in reasonable condition but are approaching the end of their design life. New pumps are therefore required; 2. Switchboard is in reasonable condition but is not to CRC standards and do not have provisions for emergency power. New switchboards are required;	

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		3. SCADA is considered acceptable and can be re-used 4. Structural integrity of pump well appears to be in good condition but requires lining;	

MINUTES

MOSSMAN GORGE COMMUNITY INFRASTRUCTURE AUDIT					Meeting #:	4
Meeting Purpose:	Roads, Intersections & Drainage Work Scope	**Meeting Time:**	10.30 -12.30	am-pm	**Meeting Date:**	24 April 2012
Attendees:	Steve Tyter (CRC) Murray Langdale (CRC) Michael Ringer (CRC) David Purkiss (CRC) Paul Steele (BM) Matt Di Maggio (BM)					
Circulation:	All					
Apologies:	Nil					

#	Agenda / Issues:	Decisions / Action:	Action By:
1	Roads	1. Council directed that the pavement surface on all roads have oxidised and require resealing. The use of AC rather than 2 coat seal is preferred. Costs for both AC and 2 coat seal were provided by Council; 2. Line marking at selected intersections is required; 3. Signage is required in accordance with regulations; 4. Pavement and seal widening at intersections at Lund Street loop and Mossman Gorge Road is not required; 5. Council desires that Barrier (tubular hand rail), line marking and tree removal is required at Junkurrji St culvert crossing. Provisions for pedestrians at this culvert crossing are also required; 6. Clearing of vegetation is required to provide adequate sight distance at the intersection of Junkurrji and Mossman Gorge Rd; 7. Council instructed that structures encroaching on turning heads (Kankarr and Lund Streets) need to be removed to return these intersections to their original function; 8. The northern extent of Junkurrji St (between Lund St and eastern side of flats) is to be road reserve to enable public access to Mossman River. The remainder of the access (in front of flats) is to be contained within future Lot 6; 9. As-cons are required to be transferred to current standards; 10. Off street pedestrian infrastructure is required including installation of new footpaths and ensuring the existing bus shelter is compliant with the relevant safety guidelines; 11. Provision to replace existing infrastructure, depreciation compensation will be required.	
2	Drainage	1. Tree removal at inlet to culvert (Jankurji Street) is required. Liaison with the community regarding tree significance will be required. It may not be cost effective to leave the tree as is; 2. Scour protection on Lund Street at end of kerb is required. Concrete lining to the Lund St drain is also proposed; 3. Replacement of open drain with pipes along Lund Street is not desired by Council for maintenance reasons. A concrete invert lining is proposed to formalise this flow path; 4. Replacement of undersized pipes across Lund Street is required. The preferred minimum diameter of replaced pipes is 450mm; 5. Pipes which outlet along Lund St are to be extended and headwall to be moved away from Lund St for vehicle safety reasons; 6. A concrete lined invert along Lund St Drain is required to formalise the drain invert; 7. The Bama Bubu Street culvert crossing requires cleaning;	

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		8. Filling of low points/re-profiling of drains is required for drains adjacent Lund Street and Mossman Gorge Road (southern side of football field) to minimise ponding; 9. Formalisation of inlet to Junkurrji St culvert crossing is required; 10. B&M to discuss lot layout with community regarding inter-allotment drainage for western end community and lots in the Closes. All lots to drain to either road reserve or drainage easement; 11. As-cons to be transferred to current standards; 12. Inlet screening is desired to reduce pipe blockage from debris; 13. Planning process to determine if gross pollutant trap is required. Installing a gross pollutant trap may not be cost effective.	

Attachment 10

Telstra and Ergon input and comments

Matt DiMaggio

From: Matt DiMaggio
Sent: Tuesday, 15 May 2012 12:00 PM
To: Chris Souter (Ergon); Graham Lynes (graham.lynes@ergon.com)
Subject: FW: Mossman Gorge Community - Electrical Infrastructure

Categories: SYNERGISED

Gents,

Further to our discussions, Black & More need to report back to the various levels of government on the implications of normalising the municipal services for the Mossman Gorge community

As discussed, the conversion to individual metered power to each residence and a conventional retic system is required.

We urgently need Ergon's advice on the implications of this including upgrades (if any) to enable funding to be sourced

Kind Regards

Matthew Di Maggio
Project Engineer

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From: Matt DiMaggio
Sent: Monday, 23 April 2012 5:27 PM
To: Chris Souter (Ergon)
Cc: CAMPBELL Graeme (FN)
Subject: FW: Mossman Gorge Community - Electrical Infrastructure

Hi Graham and Chris,

Further to our discussions regarding electrical infrastructure in the Mossman Gorge Community, we wish to confirm that our instructions from the client is for the infrastructure audit to advise of electrical upgrades necessary to provide infrastructure typical to conventional subdivision.

The key outcome sought in the review is to understand what the implication is from an infrastructure perspective) for the move to conventional serviced land.
Ultimately the creation of individual title and conventional servicing is about the move to home ownership.

Another key element raised by the community was the need individual metering to each residency/tenancy.

Accordingly can you confirm the implication for servicing the community with reticulated power consistent with normal municipal supply.

Kind Regards

Matthew Di Maggio
Project Engineer

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From: Matt DiMaggio
Sent: Thursday, 19 April 2012 4:25 PM
To: Chris Souter (Ergon)
Cc: CAMPBELL Graeme (FN)
Subject: FW: Mossman Gorge Community - Electrical Infrastructure

Hi Chris,

With reference to earlier discussion and the email below, could you please confirm Black & More's understanding of ERGON's position.

I wish to advise Council and other stakeholders of ERGON's position in regards to accepting the existing electrical infrastrucutre within Mossman Gorge Community.

Assistance greatly appreciated.

Kind Regards

Matthew Di Maggio
Project Engineer

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From: Matt DiMaggio
Sent: Tuesday, 10 April 2012 3:40 PM
To: Chris Souter (Ergon)
Cc: CAMPBELL Graeme (FN); Paul Steele
Subject: Mossman Gorge Community - Electrical Infrastructure

Hi Chris and Graeme,

As discussed in our meeting on 28th March we understand that Ergon has concern with the residual useability of electrical infrastructure within the Mossman Gorge Community. There is particular concern with existing infrastructure located in the "older" section of the community. Noting this, Ergon officers advised that Ergon's

position is likely to be to require replacement of the existing infrastructure (both the electricity reticulation and the lighting).

We understand that the works required to achieve a “normal” standard of electrical supply are likely to include:

1. Installation of new electrical reticulation;
2. Property connections; and
3. Ensuring that wiring within properties are suitable for connection.

Can you please confirm this understanding is correct

Additionally could you advise on ERGON’s position on accepting electrical networks in Body Corporate type developments.

As discussed, ultimately we wish to determine what upgrades (if any) are required to move to conventional electrical reticulation system and the costs for these upgrades. We understand one alternative may be for Ergon to consider a "Green field" type application .

Your assistance with this infrastructure assessment is appreciated.

Kind Regards

Matthew Di Maggio
Project Engineer

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Matt DiMaggio

From: Matt DiMaggio
Sent: Tuesday, 10 April 2012 5:35 PM
To: Wayne Keevers (Wayne.C.Keevers@team.telstra.com)
Subject: FW: Mossman Gorge Community
Attachments: Mossman Gorge Aerial Photo.pdf; 24595410.dwf; Mossman Gorge DBYD Search.pdf

Hi Wayne,

I'm seeking to confirm my understanding of your earlier advice (below) in order to provide preliminary advice to my client on Telstra's Position regarding this matter.

Assistance greatly appreciated.

Kind Regards

Matthew Di Maggio
Project Engineer

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From: Matt DiMaggio
Sent: Friday, 23 March 2012 12:08 PM
To: Wayne Keevers (Wayne.C.Keevers@team.telstra.com)
Cc: Paul Steele
Subject: Mossman Gorge Community

Hi Wayne,

As discussed in our phone call yesterday,

Black & More have been engaged to undertake an audit of the existing services and provide advice on possible upgrades. The key infrastructure stakeholders are Telstra, Ergon and Council.

Background
The Mossman Gorge community consists of two separate parcels of land and is described as a body corporate property within the local government area.
Over thirty houses and approximately 150 people live at the Mossman Gorge Community. *Refer Aerial Photo attached*

Council has been approached to support proposed new arrangements for the Mossman Gorge Community and to discuss a process to move towards normalised municipal service delivery in that area.
It is understood that Council has indicated in-principle support to deliver municipal services at Mossman Gorge subject to:-

1. Subdivision of the community land into individual lots;

2. The existing municipal infrastructure being handed over in a condition that is acceptable to Council. By association, this also includes acceptance by Telstra and Ergon.

As part of item 3, Black & More have identified that existing infrastructure within the community includes a telecommunications network. From a site visit it appears that the majority of Telstra services for the community are located within the verge of existing roadways. Although, these services may not be located on a "typical" alignment (from proposed property boundaries).

Based on our discussion, we understand that Telstra's position is that any Telstra services located outside of the proposed road reserve will need to be relocated (to a reserve) at cost to the developer. In Addition, existing Telstra services located within the proposed road reserve can remain on their current alignment provided:

- There are no capacity issues with the existing service; and
- There are no "clashes" with the construction of other infrastructure.

Can you confirm our understanding is correct.

For your reference a DBYD search is attached. However we note that no detailed cable location has been performed to date.

Telstra's assistance as a key infrastructure provider is greatly appreciated.

Kind Regards

Matthew Di Maggio
Project Engineer

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Attachment 11

Copy of **Stage 1A Collation and Capacity Phase outcomes** (originally submitted to Council 30 March 2012)

March 2012

Our ref: Mossman Gorge Subdivision
File ref: 6960
Paul.steele@blackm.com
www.blackm.com

Cairns Regional Council
PO Box 359
Cairns QLD 4870

Attention: Ms Kelly Reaston

Dear Kelly

MOSSMAN GORGE COMMUNITY
STAGE 1A COLLATION AND CAPACITY PHASE OUTCOMES

Please find attached the deliverables from the Stage 1A commission, comprising;

ATTACHMENT NUMBER	DESCRIPTION	DRAWING NUMBER
1	Commentary on each service/infrastructure element	-
2	Infrastructure Audit Summary	-
3	Tabulated Identification of Roads and Intersections Assets and Audit findings	SKETCH 6990-3a Roads and Intersections Audit SKETCH 6990-3b Mossman Gorge Road & Junkurrji St Sight Distance Check SKETCH 6990-3c Turning Path Analysis
4	Tabulated Identification of Sewerage Infrastructure and Audit findings	SKETCH 6990-4 Sewer Audit
5	Tabulated Identification of Water Assets and Audit findings	SKETCH 6990-5 Water Audit
6	Tabulated Identification of Underground and Overland Drainage Assets and Audit findings	SKETCH 6990-6 Stormwater Audit
7	Identification of Telecommunication Assets	-
8	Identification of Electricity/Lighting Assets	-

Please be advised that the deliverables attached are to be considered working documents and will continue to be updated throughout the audit as additional condition and operational data becomes available.

This initial asset identification and infrastructure audit has been performed by collation of information from site inspections, discussions with Council Officers and additional sources.

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It is recommended that Stage 1B will include condition assessments of the infrastructure and more detailed investigations of operational matters. Meetings with Council, including key infrastructure officers, to re-confirm Stage 1B works have determined the following proposed investigations:

- Further as-constructed information;
- CCTV inspections of underground stormwater drainage;
- Operational data for water and sewerage infrastructure.

Sewer Condition - Water & Waste requirements

- CCTV for sewers;
- Fieldwork to review the sewer system, pump station, rising main;
- Pump run data and pump information ;

Water Condition - Water & Waste requirements

- Water leak detection for water supply network;
- Water main locations and survey pick up;
- Field crew to inspect the hydrants and valves, hydrant flow and flow pressure test;
- Flow logger and meter readings.

Road pavement condition – IM requirements

- Falling Weight Deflectometer (FWD) Test of pavement integrity (non-destructive testing);
- Ground Penetrating Radar of pavement depth;
- Site inspection by CRC maintenance/IM staff.

These investigations are proposed for the two weeks from the 2nd April to 13th April.

The community representatives have been advised of this proposed field work timeframe and have indicated approval for the timing.

Stage 1B reporting will be completed following the field work, notionally in the week 16th April to 20th April.

Costs for the further investigations (by the specialist sub-contractors) are being confirmed with the service providers and will be advised prior to works commencing.

Please do not hesitate to contact the undersigned on 4031 9944 or via email to paul.steele@blackm.com should you have any queries or require further information.

Yours sincerely
BLACK & MORE

Paul Steele
Partner

Encl:

Attachment 1

Commentary on Each Service/infrastructure Element

Attachment 1

Commentary on Each Service/Infrastructure Elements

An audit of existing infrastructure was previously undertaken by the Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA). That audit, Titled "National Audit of Municipal and Essential Services" has been made available to Council.

This new audit adopts the same general subject headings for reporting purposes; however, the numbering has been rearranged into two general categories, (Infrastructure/Services).

This reflects that the audited elements can be generally categorised into physical infrastructure (roads, pipes, drains) and municipal services to be provided, (regular waste service, animal control, maintenance and operation).

For the physical infrastructure it is possible to review against industry standards. The service elements will be generally proposed levels of service advised by Council in accordance with its operational practices.

This desk top review has primarily focussed on the physical infrastructure elements and the various attachments include tables of assets, advice on current standard industry guidelines and plans/sketches of the investigated elements.

The Stage 1a audit outcomes are provided in the tables and sketches attached. A general commentary is provided for each service or infrastructure element per the sections below. **Attachment 2** provides a very brief summary of all the elements with more detailed tables in the later attachments.

Municipal Infrastructure

1. Roads and Intersections

Capacity, alignments and general compliance of the infrastructure for the roads and intersections within the community have been assessed with the results presented in **Attachment 3.** The results include tabulated audit findings and sketches of key elements assessed.

Civil infrastructure for the roads and intersections was audited to assess consistency with the standards set out in the current FNQROC guidelines.

In order to do this the following considerations were taken into account:

- Mossman Gorge Road level of service is intended to be reduced to a Local Traffic Only road and as such may not warrant an upgrade of the intersection entry/egress roads to the Mossman Gorge community as these warrants are usually based on traffic volumes and design speed;
- Intersections with Mossman Gorge Road are signed as 40km/hr, however, despite being a low speed environment the intersections currently have no line marking, limited signage, sub-standard or no lighting and do not provide the desired sight distance requirements on at least one of the intersections;
- Lund Street has speed control devices (speed humps) along its length. The remainder of the streets in the community are relatively short and hence traffic speeds are limited by road geometry. Within the community is a low speed environment so it is expected that the departures from standard geometry parameters may not have an adverse effect on traffic movements;
- Garbage pick-up currently occurs on the Junkurrji-Lund-Bama Bubu-Mossman Gorge Road loop. Consequently it is desirable for this road to comply with design vehicle requirements as set out in the FNQROC Development Manual;
- There are six turning heads on the community road network, all of which do not meet the normal geometry requirements. It is noted that these turning heads have been in place for some time and the community is accustomed to the current level of service. The turning heads do not readily facilitate larger vehicles. Cairns Regional Council will be required to review their acceptance of this layout;

Each intersection and road section was reviewed independently and assessed based on the minimum criteria set out in Table D1.1 for an Access Place. The results were tabulated and a number of recommendations listed for Council's consideration.

With a design vehicle adopted as a 12.5m Single Unit Truck, generally the roads and intersections do not meet the criteria set out in the FNQROC Development Manual.

However, applying a smaller design vehicle (the B99 vehicle) shows the majority of streets will generally accommodate the turning movements. Note the B99 vehicle is the 99.8th percentile vehicle for sales of sedans, station wagons and utilities. Example given in the Australian Standards includes the Ford Falcon and the Toyota Landcruiser 100 series.

Given that the larger vehicle (12.5m truck) is likely to only be regularly traversing the Junkurrji-Lund-Mossman Gorge Road loop, the existing roads are acceptable for their level of service. Should Council decide that these roads need to comply with the required standard the resulting construction works would have a significant impact on the community.

On-road drainage structures and cross drainage were also considered and images taken from a site visit show most road drainage, although not to standard, is working adequately, with some areas requiring minor earthworks to improve drainage paths or flows, or kerb and channel work to improve alignment.

Despite the shortfalls in geometry the community road network generally provides a level of service that is acceptable to the community. The following recommendations have been made taking into account all the considerations above:

a) Both intersections on Mossman Gorge Road should be upgraded to comply with the standards. Specifically the kerb returns require enlarging, line marking and signage, clearing of vegetation within the sight distance clear zones and installation of lighting of the intersections. Consideration for an Auxiliary Right Turn Layout may also be appropriate.
b) Minor earthworks to realign open lined drain on LHS of Junkurrji St into the inlet of the cross culvert to prevent ponding at the existing Fig Tree. Additionally, consideration must be given to immediate removal of the Fig Tree based on future damage to the road pavement, kerb and channel and the integrity of the cross culvert.
c) Intersection upgrades of all intersections on the Junkurrji-Lund-Mossman Gorge to cater for the 12.5m garbage truck along this section of the network. The design vehicle for the balance of the road network has been assumed to be a car. It should be noted that the garbage pick-up service currently uses this route even though the geometry is substandard. The consequence is that trucks will be currently be utilising the majority of the intersection to negotiate the turns. It will ultimately be up to Council to decide on level of service and/or potential conflicts with current operating conditions at intersections.
d) all road sections require line marking and signage to the current standards;
e) Street lighting will need to be assessed to determine if it meets pedestrian safety requirements;
f) Road reserves to be clearly delineated on proposed town plan layouts. Site inspection has indicated that Lund Street generally has a 3m verge width between fence and invert of kerb.
g) Easements to be established over drainage (and other services) that traverse across lots. In this instance, the concrete lined drains through Lots 11, 21, 22 & 23.

2. Sewerage

Capacity, alignments and general compliance of the infrastructure for the Sewerage Reticulation system within the community has been assessed. **Attachment 4** presents the tabulated audit findings and provides the sketch of the layout and key elements assessed.

Sewerage infrastructure generally follows the alignment of existing fence lines. This is consistent with "back-log' sewerage systems undertaken to accommodate the existing house layout and constraints with the existing surface at the time of construction.

Council will need to consider if any easements will be required for sewers on non-standard alignments.

The other items for consideration are branch lines connecting to manholes at an acute angle, property connection branches that connect into manholes (not at the end of lines) and flat sections of sewer.

The condition assessment phase proposes further investigations on the condition of the sewers. This includes CCTV footage and assessment of the system.

3. Water

Assessment of the Water supply reticulation system within the community included reviews of capacity, alignment and general compliance of the supply network.
Attachment 5 presents the tabulated audit findings and provides the sketch of the layout and key elements assessed.

The desktop review of the as-constructed data reveals that the water reticulation network is generally in accordance with FNQROC Development manual guidelines. Locations of mains generally follow the existing roads and are offset from the road carriageway. This reflects the absence of formal property boundaries.
Location of valves and hydrants appear to be generally consistent with the design guidelines. However, there may be some additional valves considered to improve the operation and maintenance of the Network. By constructing new valves at the locations shown will allow for sections of pipe to be isolated more sufficiently.
Council should also consider a second connection to the system at the eastern end of the community, (currently the need for metering has a single point of supply to the community). The proposed new 100mm diameter eastern connection in Bama Bubu Street has been shown to allow for a loop main.

4. Drainage

The community is serviced with minor underground drainage and a large extent of overland drainage. The overland drainage consists of natural drain lines, on road drainage, kerb and channel, and man-made roadside table drains.

Assessment of the drainage infrastructure considered capacity, catchment serviced, alignment and general compliance of the infrastructure. The results are presented in **Attachment 6.**

The drainage appeared to generally be performing well, although there was no rain during the inspection. Community members advised that the level of operation had improved significantly with the recent drain cleaning works.

The community representatives were of the opinion that the operation was of a good standard.

It was noted that the large Fig tree adjacent the upstream headwall to Jankurrji Street culvert was preventing the culvert from operating as designed. The stormwater flows were ponding upstream from the Fig tree and flows were directed onto the roadway.
There are concerns of the impact of this regular inundation on the pavement and seal.

The system had recently experienced and rainfall. There was no evidence of major capacity constraints on the system (other than the issues at the Fig tree as noted above).

There does appear to be excessive ponding adjacent Mossman Gorge Road. The ponding appears to be generally within the current Mossman Gorge Road Reserve.

It may be that additional drainage improvement works particular, maintenance, is required within the road reserve. Levels at the culverts under the downstream Bama Bubu Road crossing were confirmed from As-constructed records. From the levels, it does appear that the drainage at the eastern end of the community is constrained by limited fall.
The drainage at this point will need further investigation to determine if it impacts on the operation and drainage of the community.

5. Telecommunications

The site inspection confirmed the presence of a number of Telstra pits located along the road verges within the community.

The services plans provided through the Dial Before You Dig service confirm the location for the Telstra Network within the community. The plans are included in the Stage 1a findings as **Attachment 7.**

It is understood that access to the Telstra network is available to the residents as individual customers of Telstra. This is consistent with the proposal to create normalised services to the individual properties.

The presence of existing reticulation throughout the community suggests that there may not be the need for significant improvements.

It is understood that Telstra recently did major improvements to its network to increase capacity in the Mossman Gorge Community to facilitate connection of the BBN infrastructure within the reserve lot. Given these recent system upgrades it may be that Telstra has limited requirements for further improvements. It was also noted that access to the mobile phone network has significantly reduced the demand for land line services.

Based on initial discussions with Telstra's Network integrity division, Telstra's position is likely to be as follows:

Any existing Telstra services located outside the future road reserves will need to be relocated (to within the reserve) at no cost to Telstra. Existing Telstra services located within the proposed road corridors can remain on their current alignment provided:

1. There are no capacity issues with the existing service; and
2. There are no "clashes" with the construction of other infrastructure.

Given the Telstra services were observed to be within the verges between existing property fences and the road carriageway, it appears likely that the services will be contained within the future proposed road reserve.

There will be a need to further assess alignments if upgrades to other services (most notably electrical reticulation) are required.

Discussions with Telstra are ongoing and formal advice is being sought from this service provider. Further confirmation of Telstra's requirements will be provided in later phases of the Audit.

6. Power/Electricity

The community is serviced with reticulated power.

The services plans provided through the Dial before you Dig service confirm the points of Supply from the external Ergon Energy electricity network. The plans are included in the Stage 1a findings as **Attachment 8.**

Currently the community is serviced from metered points of supply (one for each lot) and the body corporate is responsible for all costs for power. The body corporate then has to separately recover these costs from the tenants.

The body corporate see the opportunity for this situation to be resolved as a significant positive step with customers being directly responsible for their power use. Electricity meters have also been difficult to source and the body corporate has been constricted in its ability to measure and recover costs according to usage.

Costs for community power usage (including street lighting) are currently met by the body corporate.

A pad mount sub-station and switchboard are located near the eastern access to the community, (Bama Bubu Street). A second point of supply is provided from a pole mounted transformer to the west from the Well Being Centre.

Ergon Energy Officers advised that the alignment of this western most supply point will need to be considered in the future lot layout. It was recommended that a corridor be preserved to facilitate this supply route.

The current private power reticulation elements within the community will need to be assessed by Ergon energy to determine existing services condition and future use. Preliminary discussions with Ergon Officers indicate that the infrastructure in the original reserve lot is considered to have significant capacity constraints and will almost certainly require full replacement.

Services in the newer areas are expected to be in better condition and to more recent standards; however concern was expressed with the costs to investigate and assess acceptability of the infrastructure. Ergon officers advised that problems had been experienced in other privately installed systems at palm Cove. It was likely that Ergon would require full replacement of the system within the road reserves.

Ergon officers also advised that the upgrading of the electricity would not necessarily stop at the proposed property boundaries. Other communities that Ergon has been involved with have required major upgrades to the individual houses. This has included new switchboards with appropriate safety switches and upgrades to supply to these switchboards.

In reviewing other services under this audit potential services clashes in the event an upgraded power reticulation network have been considered. It would appear that individual services corridors have generally been adopted within the notional verge areas.

Any upgrades would need to consider how the existing services would be maintained until the new services were made operational.

Formal confirmation of Ergon's requirements will be provided in later phases of the audit once more detailed advice is available.

7. Lighting

The community is currently served with a street lighting system.

The services plans provided through the Dial before you Dig service confirm the location of poles with the community, (Ergon Officers confirmed that these poles shown on the plans are the streetlights). The plans are included in the Stage 1a findings as **Attachment 8** (on the electrical plans)

From initial inspection the system appears to use poles and luminaires that are not the current Council/Ergon preferred standard. The current preference is for 7.5m high galvanised steel poles.

Street lighting will need to be provided in accordance with the road lighting standards, (AS/NZS 1158). Typically street lighting is required at intersections, road ends/cul-de-sacs, and at regular spacing along the road (generally of the order of 40 to 50m).

Council and its service provider (Ergon) will need to determine the acceptability or otherwise of the existing infrastructure for street lighting. This will be a key outcome from the Stage 1b audit investigations now underway.

Current tariff arrangements for lighting will also need to be reviewed.

Municipal Services

1. Animal Management

During the site visit it was advised that the community has a two pet policy in place and this has been having a positive effect on animal management. It was also advised that the community has arrangements for a local vet to come and visit the community and educate residents on animal ownership.

The Mossman Gorge community is within the Cairns Regional Council local government area and accordingly Council's local laws and policies are applicable to the community in regards to animal control.

With the greater emphasis on the Council services to the community, animal management will be by Council in accordance with Council's local laws and policies. It is noted that ongoing education of Council's local laws and policies will be beneficial.

Council offciers for the Mossman area indicated that Council is supoortive of continued eductaion and encourages management initiatives including desexing/recording of pets through microchipping and other management measures.

2. Community Centres and Facilities

There are a number of community centres and facilities within the Mossman Gorge community. These include health services, state and federal government facilities, the church, and BBN run offices. There is also the workshop facility.

The indicative town plan has made provision for these "community use" areas to be reflected in the land use designations proposed for the community. With the imminent opening of the new Gateway Tourism Centre the community will have additional community facilities accommodated in the new purpose-built centre.

Cairns Regional Council is not responsible for running these facilities and will provide normal municipal services only.

3. Environmental Health Services

Environmental Health services to the Mossman Gorge community are not well defined. This is partly attributed to the broad scope that can come under the banner of Environmental Health and hence lack of clarity from service providers for this item. The previous audit also reflected similar findings.

In the context of municipal environmental health, Council Officers for the Mossman area advised that they typically get involved in environmental health services to the community on an as required basis. This includes such activities as vector control for mosquitos.

The provision of effective municipal services is a key environmental health outcome and the community is generally well serviced in this respect. The provision of reticulated sewerage, sealed roads and drainage, reticulated potable water and waste disposal services are all key elements in environmental health from a municipal perspective.

The condition phase (Stage 1b) of this audit proposes to further review the operation of the drainage system at the eastern end of town where some ponding was evident during the initial site visit. The reviews will include Officers from Council's maintenance team for this area.

Expectations for environmental health services (by the community and Council) are to be confirmed to ensure that there is an understanding of the levels of services proposed.

4. Landscaping and Dust Control

The community is well landscaped and has recently had significant landscaping improvements through a landscaping program. At the time of the site visit dust control was not a significant issue.

Generally the Mossman Gorge area receives regular rainfall and is in a wet Tropics area. Accordingly the community remains well vegetated from regular rain and is lush and verdant.

Dust control is therefore not a significant issue within the Mossman Gorge community.

Under the current arrangements, the community has a regular maintenance program including mowing and landscaping. The state of the community witnessed during the site visit suggests significant investment of energies within the community to maintain a high standard of presentation.

It is understood that the community will seek to determine how the current high standard of care for the landscaping would be maintained under a Council serviced arrangement. This may include opportunities for local employment for this service.

5. Management of infrastructure and municipal services

Current management of infrastructure and municipal services is generally provided by the body corporate through government funding.

For those services that the community manages a schedule of works has been provided to Black & More as part of this audit. Based on that schedule the management of the services can be determined. The standard of presentation observed during the site visits suggests a degree of effort in community management.

Discussions with Council Officers have revealed that Council operated water and sewer systems are subject to establishment and meeting of customer service levels.

Council will need to determine these levels of service and implement the appropriate systems to underpin these within its current operations.

Other services are already provided, most notably waste disposal, and these operations will be essentially unchanged.

Council Field Officers from each of the key disciplines have been invited to attend the site investigation work during the condition assessment phase of the audit (Stage 1b) to enable input into the future management of the infrastructure and municipal services.

6. Waste

Council currently operates waste services within the Mossman Gorge community. Community representatives advised that the residents take the bins down to Lund Street for collection. The garbage pickup does not enter the smaller cul-de-sac streets.

The route for the refuse collection vehicle is understood to be as shown on SKETCH 6990-8 Turning Path Analysis, (refer path shown on lower half of plan).

This was confirmed in subsequent discussions with Council Officers. It was advised that the current waste collection schedule for the Mossman Gorge Community is that all refuse (general waste) is collected once weekly. There is currently no recycling schedule as contamination has been an issue. Other than the recycling contamination, there are no other reported servicing issues.

Council will need to consider what additional public infrastructure is proposed to service the Park and public use areas.

7. Air & Sea Infrastructure

There is no Sea infrastructure provided specific to the Mossman Gorge community. Port Douglas is some 15 minutes drive away with infrastructure for marine purposes. It is understood that this is sufficient the needs of the surrounding area inclusive of the Mossman community.

There is no air infrastructure provided specific to Mossman Gorge community. There are open spaces within the community that could facilitate access via helicopter if needed on an ad-hoc basis for emergencies. It is not known whether the emergency services have a particular area that they prefer.

The major airport for the region is the Cairns International Airport located in North Cairns.

8. Cemeteries

There is a private cemetery to the east of the community. Access to the cemetery in times of high rainfall is problematic.

The land use for the plot of land containing the cemetery has not been formalised for this use. A key outcome of Council formalising municipal services and the town plan will include formalising the tenure of the private cemetery.

A draft survey plan was prepared some time ago proposing the bounds of the cemetery. It is not known whether that plan had regard to flooding, growth to the cemetery or other issues.

It is understood Council would need some further detail to formalise its position. It is also understood that due to practicalities of the limited size the private cemetery may need to be managed to limit those eligble for burial at this site.

The Mossman Town Cemetery provides an alternative to the private cemetery.

9. Town Planning

This audit of the municipal infrastructure will inform the subsequent town planning process; In particular, with regards to potential constraints on the layout.

Examples include provision for drainage easements where outlets are through future lots. Similarly preservation of corridors for power services has been identified as a desirable outcome.

It is understood that the attached town plan document **Attachment 9** has been prepared for discussion with the community. Whilst it is acknowledged that the layout is not finalised, the general intent has been considered in providing advice on infrastructure with the community.

Road Reserves
The current verge widths and therefore overall road reserve widths are generally less than the current guidelines propose. A key outcome that reserve widths seek to achive is the accommodation of the various services within an achievable corridor. This applies both at a construction level and at an ongoing maintenance/accessability level.

The current verges along Lund Street are defined by existing fences and the road kerbing. The verges are 3m wide and this is considered the minimum practical. In the lesser Streets (the three Closes) verge widths vary and are as low as 2.25m between existing fence and invert of kerb.

Drainage Reserves
The proposed layout has generally reflected the existing drainage paths. This is reflected in the proposed reserves adjacent the Mossman Gorge Road and the layout for the lots to the South from the Mossman Gorge Road.

Easements
The need for easements may need consideration as part of the formalisation of the Town plan. This could include for some assets on non-standard alignments. It is not critical at this stage and will continue to be informed by the audit outcomes.

Provision of Services
Theaudit results have confirmed that the majority of the proposed lots have access to all services. There has been a small number of lots identified that are not currently connected to sewer. This will be something that the lot layout needs to consider as it will be a performance criterion that Council will assess against.

Other elements of town planning including lot sizes and shapes have not been considered as part of this audit.

Attachment 2

Infrastructure Audit Summary

MOSSMAN GORGE COMMUNITY

INFRASTRUCTURE AUDIT SUMMARY

This page is a summary of some of the key elements of the infrastructure assessment. Refer to individual audit sheets for detailed audit information.

SEWERAGE

Pipe Type/Size	Grade	Depth	Manhole Spacing	Manhole Type (Drop)	Comments
FNQROC Requirements					
PVC 150mm	1:100 at ends	450mm minimum under lots	80	Std Drg 3000	
	1:150 everywhere else	700mm minimum under roads			
Existing Infrastructure					
PVC 150mm	Generally Compliant	All compliant	Compliant	Compliant	Two pipes in Lines A1 and A4 too flat
					No Trunk Sewers
					Catchment of 40 lots

WATER

Pipe types/sizes	Alignment (from boundary)	Hydrant Spacing	Locale valves, tees and meters	Minimum & Maximum Pressure	Comments
FNQROC Requirements					
50mm MDPE loop	2.8	80	No more than 20 houses to be inconvenienced	22m minimum	
100mm uPVC elsewhere			Located opposite property boundaries	60m maximum	
Existing Infrastructure					
Ø25 loop	Offsets to kerbs not property Boundaries	N/A	Mostly compliant	To Be Determined	Additional valves recommended to allow adequate servicing
Ø100 main		Generally compliant	Mostly compliant	To Be Determined	of mains;
Ø150 main		Generally compliant	Mostly compliant	To Be Determined	Additional Ø100 main to improve service level.

ROADS AND INTERSECTIONS

Description	Reserve Width	Verge Width	Seal Width	Footpath	Design Speed	Catchment Size
FNQROC Requirements from Table D1.1						
Access Place	14.5	4.5	5.5	None	30	0 - 19 dwellings
Access Street	15.5	4.5	6.5	One side	30	20 - 74
Existing Infrastructure						
No Through Roads/Closes	15	2.2 to 3	6	None	30	Under 10
Junkurrji St-Lund St-Bama Bubu St Loop	15	3	6	None	30	40

INFRASTRUCTURE AUDIT SUMMARY

This page is a summary of some of the key elements of the infrastructure assessment. Refer to individual audit sheets for detailed audit information.

STORMWATER DRAINAGE - UNDERGROUND

Pipe/Box Culvert Description	Size	Grade	Pipe Cover	Pipe Velocities (m/s)	Comments
FNQROC and QUDM Requirements					
Reinforced Concrete Pipes	Ø375 minimum	0.2% - 7.5%	400mm minimum under lots	0.7 - 6.0	
Box Culverts	450x300 minimum	0.1% - 20%	N/A	0.7 - 3.0	
Existing Infrastructure					
Reinforced Concrete Pipes	3 pipes below min. size	Compliant	Compliant	Compliant	Insufficient detail on headwalls in as con data
Box Culverts	1 culvert undersize	Generally compliant	Less than minimum	Compliant	

STORMWATER DRAINAGE - OVERLAND

Drain Description	Grade	Minor Storm Event	Major Storm Event	Comments
FNQROC and QUDM Requirements				
Open Channels	0.5% minimum	10 ARI	50 or 100 ARI	
Minor Road Surface Drainage		10 ARI	50 or 100 ARI	
Minor Road Cross Culverts		50 ARI	50 or 100 ARI	
Existing Infrastructure				
Earth Drain	Generally compliant	**	**	**Insufficient information to determine capture and conveyance of minor and major events.
Concrete Spoon Drain	Compliant	**	**	**Proximity of drain to road edge of Lund st to be considered
Road Drainage	Compliant	**	**	**Unlined drains potential conveyance issues

Attachment 3

Tabulated Identification of Roads and Intersections Assets and Audit Findings
SKETCH 6990-3a Roads and Intersections Audit
SKETCH 6990-3b Mossman Gorge Road & Junkurrji St Sight Distance Check
SKETCH 6990-3c Turning Path Analysis

ROADS AND INTERSECTIONS INFRASTRUCTURE AUDIT

Description	Reserve Width (m)	Verge Width (m)	Seal Width (m)	Kerb Returns (m)	Linemarking / Signage	Geometry	Sight Distance	Drainage	Notes	Recommendation	References
Intersection No.1 (Mossman Gorge Road & Junkurrji St)	40	-	5.5m - MGR 7m Junkurrji St	7	None; Minimal signage	2m widening with 16m tapers	Requires 30-36m; intersection non-compliant due to vegetation	Layback K&C back to culvert on Junkurrji St	Verges heavily vegetated impacting sight distance;	Consider: Upgrading intersection to AUR or CHR(S) Increase kerb returns to R10 Provision of lighting over intersection; Clear vegetation as minimum so sight distance complies.	Austroads Pt 4A: Pg 40; Pt 3: Pg106
Road Section No.1 (Junkurrji St)	15	1.5 - 3.5	7 - 10	-	None	Alignment not central to reserve	-	Poor drainage at cross culvert due to existing fig tree and poorly aligned open drain	Verge widths constrained for service alignments	Minor earthworks to realign open drain on LHS to drain to inlet of culvert;	FNQROC Table D1.1 Std Dwg S1005
Intersection No.2 (Junkurrji St & Kankarr St)	15	4.3 - 4.5	6 - 8	5 & 8	None	4 Way Intersection	Acceptable (Intersection Clear)	Longitudinal Concrete Spoon Drains		Consider: Linemarking at the intersection; Upgrade kerb returns; Signage upgrade	
Road Section No.2 (Kankarr St)	15	4.2 - 4.5	5.5 - 6	-	None	-	-	Longitudinal Concrete Spoon Drains			
Intersection No.4 (Kankarr St West T-Head)	No Reserve Defined	-	7m on Kankarr St Left leg: 4m Right leg: 4m	RHS: 10 Between turning legs: 3	None	Leg lengths 4.5 - 6.3	Acceptable (Intersection Clear)				QLD STS Figure.2.12.M
Road Section No.3 (Kankarr St East)	15	4.3 - 4.5	6	-	None	Alignment not central to reserve	-	Open drain traverses Lot 11	Road verge at street end not consistent	Consider: Realigning open drain; Signage for dead end street; Linemarking	
Road Section No.4 (Junkurrji St)	15	4.5 - 3.8	6	-	None	Alignment not central to reserve	-	Open lined drain		Consider: Linemarking & signage	
Intersection No.3 (Junkurrji St & Lund St)	LHS: 15 RHS: unclear (varies from 18-29)	Left Leg: 3.1-5.5 Right Leg: 3m; varies	Left Leg: 6 Right Leg: 6 Access: 3.3	10	None	T-intersection; Alignments converge at angles	Acceptable (Intersection Clear)	Left Leg: Concrete spoon drain; Right Leg: Kerb and Channel	Private driveway to the north	Consider: Clearly defined road reserve; Linemarking & signage; Upgrade kerb returns to design vehicle.	
Road Section No.5 (Lund St West)	15	LHS = 5.7 RHS = 3.0	6	-	None	Alignment not central to reserve	-	Concrete spoon drain			
Intersection No.5 (Lund St West T-Head)	No Reserve Defined	-	6 - 4	8.6 - 22	None	Generally complies with QLD Streets	-	Barrier Kerb and Channel	Existing T-Head intersection.	Consider: Signage for dead end street; Linemarking	QLD STS Figure.2.12.M
Intersection No.6 & Road Section No.6 (Private Access & Turning Head)	No Reserve Defined	-	Varies but generally complies with 3m minimum	-	-	Acceptable	-	-			
Road Section No.7 (Private Access)	No Reserve Defined	5.6	1.3	3	-	-	-	-	Bitumen private access	Consider: Community have requested this to be a public laneway	
Road Section No.8 (Lund St)	18 - 29	Varies	6	-	None	Alignment not central to reserve	-	-	-	Consider: Clearly defined road reserve; Linemarking & signage; Streetlighting	
Road Section No.9 (Lund St)	No Reserve Defined	-	5.8	-	None	-	-	Layback Kerb and Channel	-	Consider: Clearly defined road reserve; Linemarking & signage; Streetlighting	
Intersection No.7 & Intersection No.8 & Road Section No.10 (Kanjaji Cl)	No Reserve Defined	-	5	5	None	T-Head dimensions acceptable	-	Layback Kerb and Channel	Why an easement to the North?	Consider: Linemarking at the intersection; Lighting at the intersection; Clearly defined road reserve	QLD STS Figure.2.12.M
Road Section No.11 & Road Section No.12 (Lund St)	No Reserve Defined	-	6	-	None	-	-	Layback Kerb and Channel on road; Open drain adjacent road	Why an easement to the North?	Consider: Linemarking at the intersection; Lighting at the intersection; Clearly defined road reserve; Impact of table drain proximity to carriageway and if barrier is required	
Intersection No.9 & Intersection No.10 & Road Section No.14 (Manjal Cl)	No Reserve Defined	-	6	5	None	T-Head dimensions acceptable	-	Drainage outlets to 300Ø RCP into open drain.	Why an easement to the North?	Consider: Linemarking at the intersection; Lighting at the intersection; Clearly defined road reserve;	

ROADS AND INTERSECTIONS INFRASTRUCTURE AUDIT

Description	Reserve Width (m)	Verge Width (m)	Seal Width (m)	Kerb Returns (m)	Linemarking / Signage	Geometry	Sight Distance	Drainage	Notes	Recommendation	References
Intersection No.11 & T-Head No.12 & Road Section No.15 (Walkarr St)	No Reserve Defined	-	6	5	None	T-Head dimensions acceptable	-	Drainage outlets to 300Ø RCP into open drain.	Why an easement to the North?	Consider: Linemarking at the intersection; Lighting at the intersection; Clearly defined road reserve;	
Intersection No.14 (Lund St & Bama Bubu St)	No Reserve Defined	-	6	7	None	-	-			Consider: Linemarking at the intersection; Lighting at the intersection; Clearly defined road reserve; Upgrade kerb returns to design vehicle	
Intersection No.15 & Road Section No.16 (Mossman Gorge Rd & Bama Bubu St)	40	-	6	6.5	None		Acceptable (Intersection Clear)	Cross drainage culvert at intersection	Why is concrete slab behind culvert? Scour issues?	Consider: Linemarking at the intersection; Lighting at the intersection; Clearly defined road reserve; Culvert capacity and possible upgrade requirement Upgrade kerb returns to design vehicle.	
Intersection No.13 & Road Section No.13 (Lund St)	No Reserve Defined	-	6	4	None	Geometry generally complies	-	Drainage outlet via concrete spoon drain to open drain.		Consider: Easement over concrete spoon drain on Western side	

Considerations:

Mossman Gorge Road

Design speed 40km/hr;
Future use reduced to Local Traffic Only therefore traffic load may not warrant intersection upgrade;
Consider lighting intersections on Mossman Gorge Raod and upgrading lighting, linemarking and signage;
Are coaches going to use this road or only shuttles?

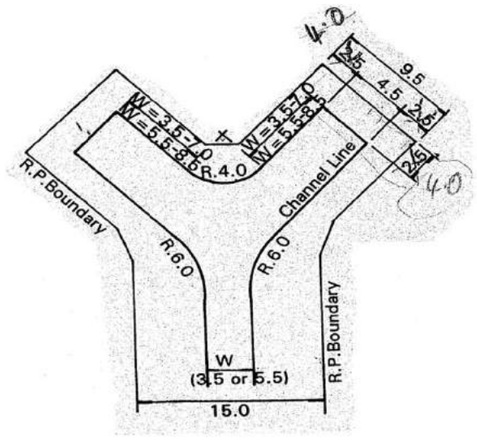
Community

Low speed environment so non-compliant geometry won't have a huge impact;
Garbage pick-up will be from the loop road Junkurrji-Lund-Mossman Gorge Road, therefore these streets should comply with 12.5m single unit truck design vehicle criteria as a minimum. FNQROC says no turning heads -> CRC to decide to accept or upgrade (if upgrading then suggest kerb and channel be constructed rather than open lined drains)
Coucil to consider pedestrian traffic and option of footpaths to provide connectivity

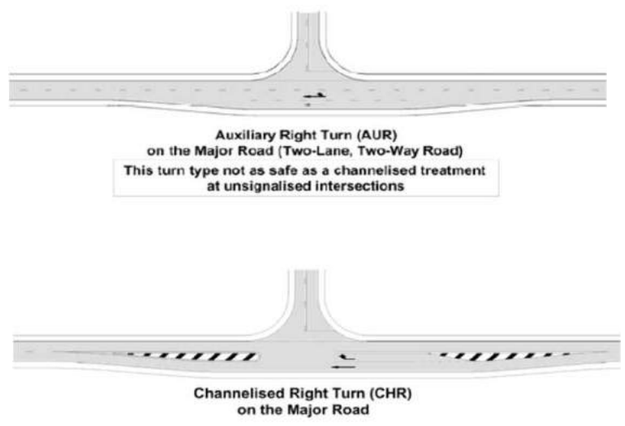
Requirements:
D1.1
Access Place
Reserve Width - 14.5m Seal Width - 5.5m
Verge Width - 4.5m Design Speed - 30km/h
Lighting P4
Min R9.0 on Kerb Returns
Design Vehicle - Single Unit/Truck

T - Heads not permitted under FNQROC
Provision for on street parking in turning head

QLD ST's FIGURE 2.12m



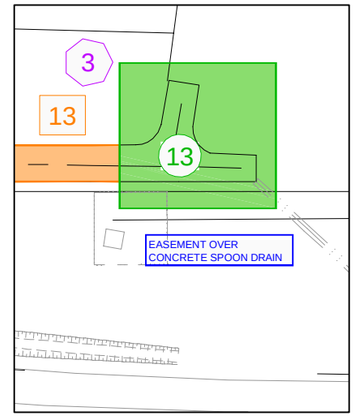
AUSTROADS INTERSECTION LAYOUTS



N

LEGEND

- 6 — NUMBER OF LOTS SERVICED
- 9 — INTERSECTION NUMBER
- 10 — ROAD SECTION NUMBER
- 1. REALIGN OPEN DRAIN 2. SIGNAGE FOR DEAD END STREET 3. LINEMARK STREET — RECOMMENDATION



INSET

LUND STREET

KANKARR STREET

JUNKURRJI STREET

JANKAJI CLOSE

MANJAL CLOSE

WALKARR CLOSE

BAMA BUBU STREET

MOSSMAN GORGE ROAD

1. COMMUNITY REQUEST FOR THIS TO BE A PUBLIC LANEWAY

1. SIGNAGE FOR DEAD END STREET 2. LINEMARKING

1. CLEARLY DEFINE ROAD RESERVE 2. LINEMARKING & SIGNAGE 3. UPGRADE KERB RETURNS TO 9m MIN.

LINEMARKING

1. CLEARLY DEFINE ROAD RESERVE 2. LINEMARKING & SIGNAGE AT THE INTERSECTION 3. STREETLIGHTING

1. CLEARLY DEFINE ROAD RESERVE 2. LINEMARKING & SIGNAGE AT THE INTERSECTION 3. STREETLIGHTING

1. LINEMARK THE INTERSECTION 2. UPGRADE KERB RETURNS TO MIN. 9m 3. UPGRADE SIGNAGE

1. REALIGN OPEN DRAIN 2. SIGNAGE FOR DEAD END STREET 3. LINEMARK STREET

REALIGN OPEN DRAIN TO INLET OF CULVERT

1. CLEARLY DEFINE ROAD RESERVE 2. LINEMARKING & SIGNAGE AT THE INTERSECTION 3. STREETLIGHTING 4. PROXIMITY OF TABLE DRAIN TO ROAD - BARRIER REQUIRED

1. CLEARLY DEFINE ROAD RESERVE 2. LINEMARKING & SIGNAGE AT THE INTERSECTION 3. STREETLIGHTING 4. UPGRADE KERB RETURNS TO 9m MIN.

1. UPGRADE INTERSECTION TO AUR OR CHR(S) INTERSECTION LAYOUT (REFER AUSTROADS, PART 4A) 2. PROVIDE LIGHTING OVER INTERSECTION 3. CLEAR VEGETATION FROM ENCROACHING INTO SIGHT DISTANCE AREAS

1. LINEMARKING & SIGNAGE AT THE INTERSECTION 2. LIGHTING AT THE INTERSECTION 3. CLEARLY DEFINE ROAD RESERVE 4. UPGRADE KERB RETURNS TO 9m MIN. 5. CONFIRM CULVERT CAPACITY-POSSIBLY

To Mossman Gorge

To Mossmar

REFER TO INSET

0 10 20 30 40 50m

SCALE 1:1000 (A1 SIZE)

PRELIMINARY ONLY

Black & More
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CAIRNS REGIONAL COUNCIL
MOSSMAN GORGE SUBDIVISION

ROADS AND INTERSECTIONS AUDIT

SKETCH 6990-3a

Date	Project Number
MARCH 2012	6990
Drawing Size	Scale (A1 size)	Revision
A1	1:1000	A

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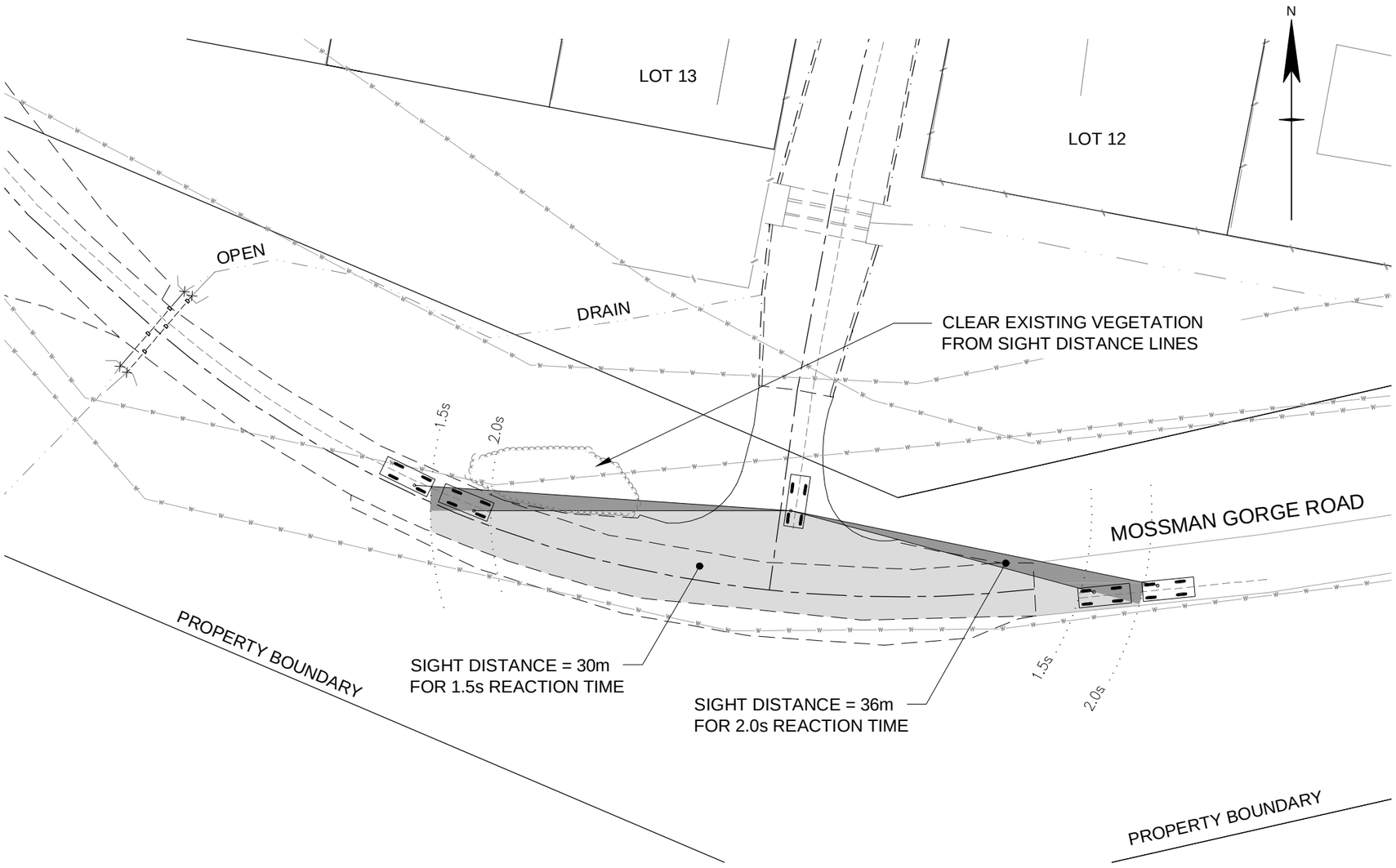
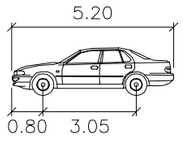


PLAN
SCALE 1:500

MOSSMAN GORGE ROAD LOOKING EAST

MOSSMAN GORGE ROAD LOOKING WEST

FROM MOSSMAN GORGE ROAD LOOKING ONTO JUNKURRJI STREET



B99 Car	meters
Width	: 1.94
Track	: 1.55
Lock to Lock Time	: 6.0
Steering Angle	: 29.0

0 5 10 15 20m
SCALE 1:500 (A3 SIZE)

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CAIRNS REGIONAL COUNCIL
MOSSMAN GORGE COMMUNITY

INTERSECTION MOSSMAN GORGE ROAD & JUNKURRJI ST
SIGHT DISTANCE CHECK

SKETCH 6990-3b

Date	Project Number
MAR 2012	6990
Drawing Size	Scale (A3 size)	Revision
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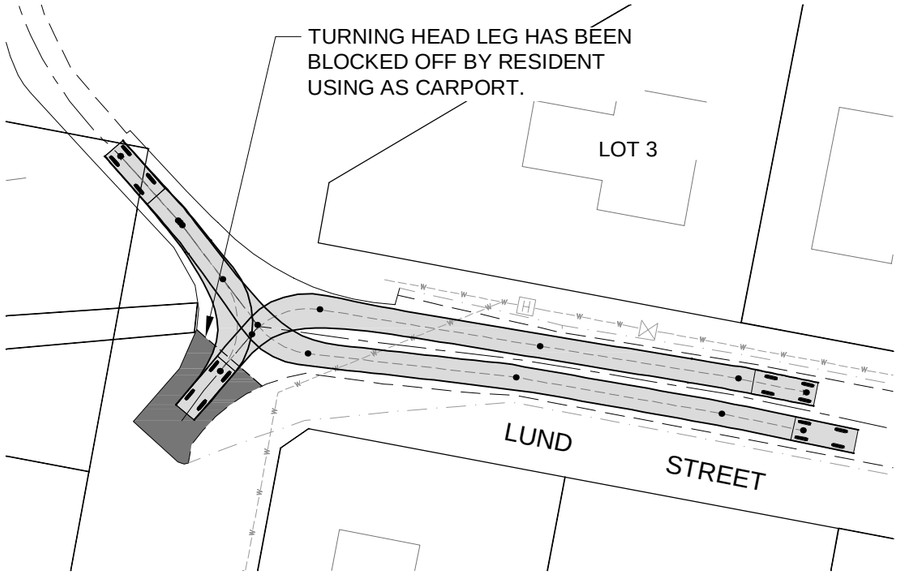
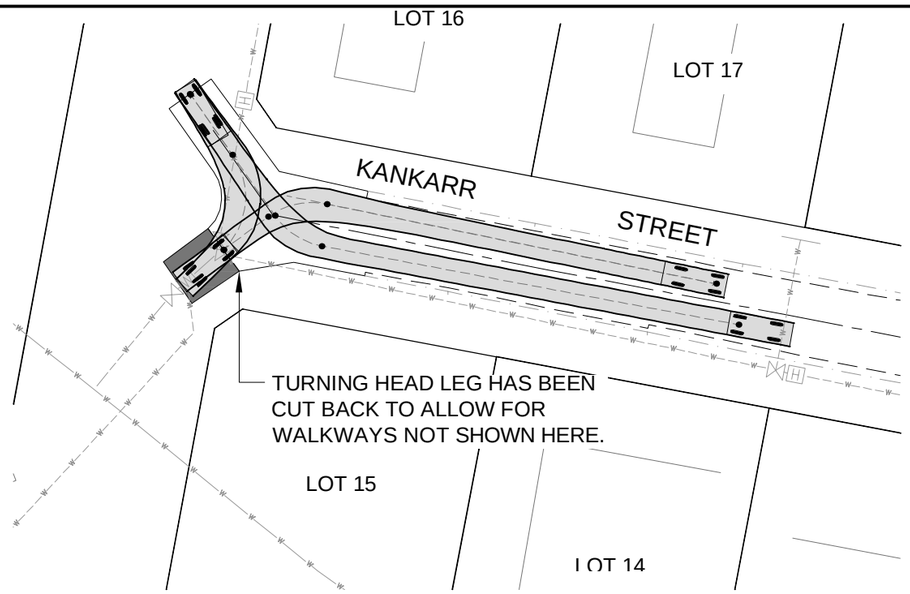
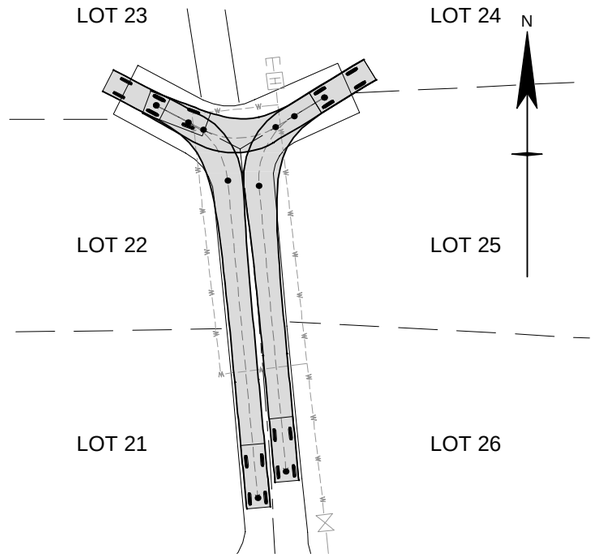


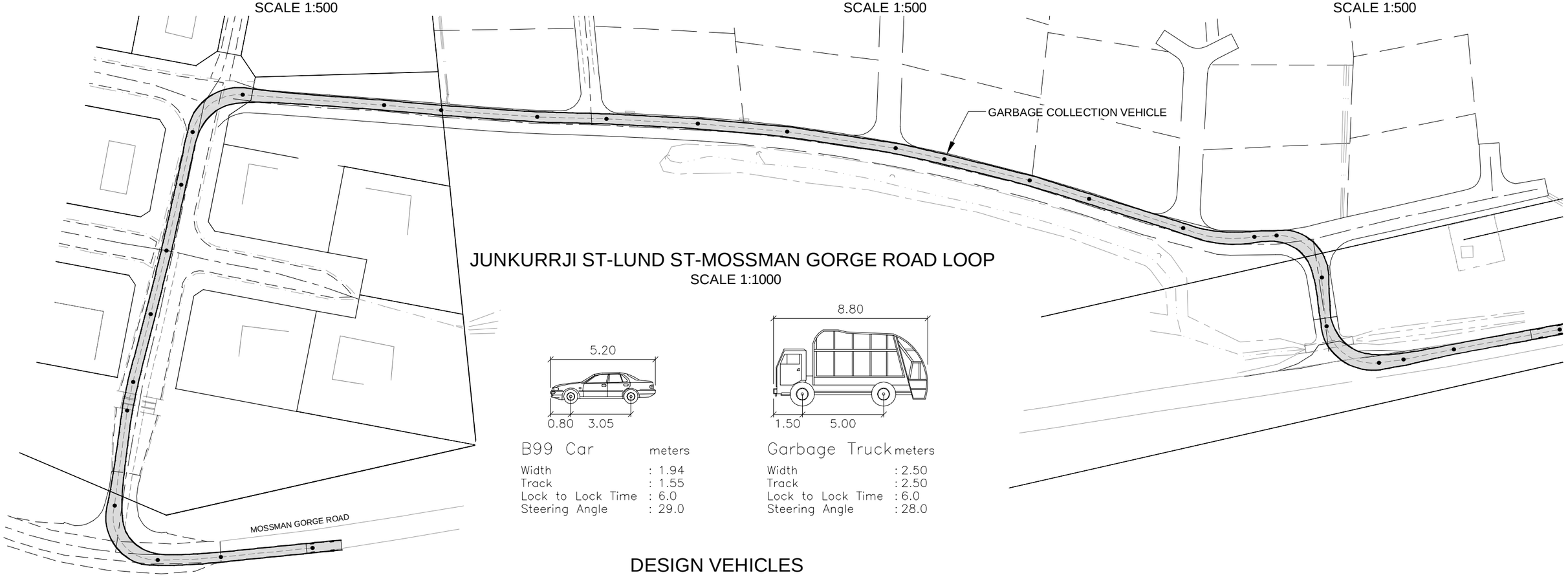
LUND ST TURNING HEAD
SCALE 1:500



KANKARR ST TURNING HEAD
SCALE 1:500



JANKAJI CL TURNING HEAD
SCALE 1:500



JUNKURRJI ST-LUND ST-MOSSMAN GORGE ROAD LOOP
SCALE 1:1000

B99 Car	meters
Width	: 1.94
Track	: 1.55
Lock to Lock Time	: 6.0
Steering Angle	: 29.0

Garbage Truck	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 28.0

DESIGN VEHICLES

0 5 10 15 20m
SCALE 1:500 (A3 SIZE)

0 10 20 30 40m
SCALE 1:1000 (A3 SIZE)

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CAIRNS REGIONAL COUNCIL
MOSSMAN GORGE COMMUNITY

TURNING PATH ANALYSIS

SKETCH 6990-3c

Date	Project Number
MAR 2012	6990
Drawing Size	Scale (A3 size)	Revision
A3	AS NOTED	A

File: G:\Synergy\Projects\C1206990 Mossman Gorge Subdivison\Drawings\ SKETCH 6990-003c.dwg
Printed: 30 March 2012, 10:40 AM
External References: B&M-TITLE-SKETCH-A3_e.dwg

Attachment 4

Tabulated Identification of Sewerage Infrastructure and Audit Findings

SKETCH 6990-4 Sewer Audit

SEWERAGE INFRASTRUCTURE AUDIT

Line Name	Manhole numbers	Manhole Alignment 1.5m from front boundary and 0.8m from side/rear boundary		Grade Minimum grade is 1:100 for start of lines and 1:150 elsewhere		Pipe Type/Size Pipe type to be PVC pipe size to be 150mm dia.	Manhole Drop Types per FNQROC Std drawing S3000		HCB Location per FNQROC manual 0.5m to 1.5m from property boundary		HCB Type per FNQROC std drgs S3005		Depth per WSA 02-2002-2.3 Min. cover 450mm under lots & other, Min. cover 700mm under roads	
		Finding	Recommendation	Finding	Recommendation	Finding	Finding	Recommendation	Finding	Recommendation	Finding	Recommendation	Finding	Recommendation
A1	MH 9/A1 to MH 8/A1	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
	MH 8/A1 to MH 7A/A1	non-standard, offsets from fences	easement	1:178 inadequate	ask for any system failures within this vicinity	yes	adequate	nil	non-standard	nil	MH 8/A1 has HCB connecting in (non-standard)	Review of CCTV footage to determine if there's any infiltration	✓	nil
	MH 7A/A1 to MH 7/A1	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	MH 7/A1 has HCB connecting in (non-standard)	Review of CCTV footage to determine if there's any infiltration	✓	nil
	MH 7/A1 to MH 6/A1	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
	MH 6/A1 to MH 5/A1	non-standard, offsets from fences	easement	adequate	nil	yes	MH 5/A1 branch greater than 90° has drop of 44mm - less than standard. MH 5/A1 branch with acute angle has drop of 80mm.	Review of CCTV footage to determine if benching in manhole is sufficient.	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
	MH 5/A1 to MH 4/A1	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
	MH 4/A1 to MH 3/A1	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
	MH 3/A1 to MH 2/A1	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
	MH 2/A1 to MH 1/A1	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
A1 STUB	MH 4a/A1 to MH 4/A1	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
	MH 2a/A1 to MH 2/A1	non-standard, offsets from fences	easement	adequate	nil	yes	MH 2/A1 has branch with acute angle and drop of 30mm - less than standard.	Review of CCTV footage to determine if benching in manhole is sufficient.	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
A2	MH 2/A2 to MH 1/A2	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
	MH 1/A2 to MH 5/A1	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	MH 1/A2 has HCB connecting in (non-standard)	Review of CCTV footage to determine if there's any infiltration	✓	nil
A3	MH 4/A3 to MH 3/A3	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
	MH 3/A3 to MH 2/A3	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
	MH 2/A3 to MH 1/A3	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	MH 1/A3 has HCB connecting in (non-standard)	Review of CCTV footage to determine if there's any infiltration	✓	nil
	MH 1/A3 to MH 5/A1	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	unidentifiable	nil	✓	nil
A4	MH 2/A4 to MH 1/A4	non-standard, offsets from fences	easement	adequate	nil	yes	adequate	nil	non-standard	nil	not shown on as-con data, unidentifiable	nil	✓	nil
	MH 1/A4 to MH 1/A1	non-standard, offsets from fences	easement	1:171 inadequate	pt	yes	adequate	nil	non-standard	nil	not shown on as-con data, unidentifiable		✓	nil

Pump Station	
Finding	Recommendation
located in Mossman Gorge Road reserve, infrastructure already owned by CRC.	none required unless advised otherwise by CRC

LEGEND

- EDGE OF SEALED ROAD
- SEWER PIPE
- SEWER PIPE & HCB
- OPEN LINED DRAIN
- TOP OF BANK
- TOE OF BANK
- SEWER MANHOLE

N

Mossman River

REQUIRES ON SITE INFRASTRUCTURE (PUMPING) TO CONNECT TO SEWER

WORKSHOP

MH 3/A3
RL TOP 44.66

MH 4/A3
RL TOP 45.39

MH 2/A3
RL TOP 42.84

MH 1/A3
RL TOP 41.43

MH 4a/A1
RL TOP 41.56

MH 4/A1
RL TOP 39.93

MH 3/A1
RL TOP 39.67

MH 1/A1
SEE DIAGRAM
RL TOP 38.44

MH 2a/A1
RL TOP 38.81

MH 2/A4
RL TOP 38.29

MH 1/A4
RL TOP 38.37

MH 2/A2
RL TOP 44.69

MH 1/A2
RL TOP 43.41

MH 5/A1
RL TOP 41.75

MH 2/A1
RL TOP 38.63

PUMP STATION
RL TOP 38.47

MH 8/A1
RL TOP 45.55

MH 7A/A1
RL TOP 43.90

MH 7/A1
RL TOP 42.58

MH 6/A1
RL TOP 41.45

MH 9/A1
RL TOP 46.01

TO MOSSMAN GORGE

SUITABLE FOR CONNECTION TO SEWER

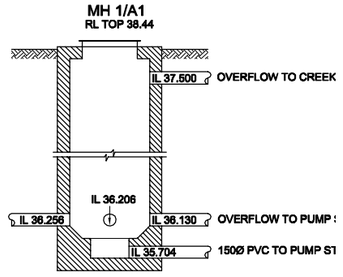
TO MOSSMAN

CHURCH
SHED
SHOP
SHED
SHELTER
HOUSE
FLATS

LUND
STREET
KANKARR
STREET
JUNKURRJI
STREET
JANKAJI CLOSE
MANUAL CLOSE
WALKARR CLOSE
LUND
STREET
BAMA BUBU STREET

Connection for future toilets CH 34.2 IL 43.62

MOSSMAN GORGE ROAD



SEWER MANHOLE
SCALE 1:500

0 10 20 30 40 50m
SCALE 1:1000 (A1 SIZE)

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CAIRNS REGIONAL COUNCIL
MOSSMAN GORGE SUBDIVISION

SEWER AUDIT

SKETCH 6990-4

Date	Project Number
MARCH 2012	6990
Drawing Size: A1	Scale (A1 size): 1:1000
	Revision: A

Printed: 30 March 2012, 10:43 AM File: G:\Synergy\Projects\C1206990 Mossman Gorge Subdivison\Drawings\ SKETCH 6990-004.dwg
External References: B&M-TITLE-SKETCH-A1_e.dwg ; X-BASEPLAN.dwg

Attachment 5

Tabulated Identification of Water Assets and Audit Findings
SKETCH 6990-5 Water Audit

WATER INFRASTRUCTURE AUDIT

Location	Pipe types/sizes as per FNQROC manual (PVC)		Alignment in accordance with FNQROC manual 2.8m from Property Boundary		Hydrant Spacing to be 80m max. per FNQROC manual		Location of valves, tees & meters as per FNQROC manual. No greater than 20 houses should be inconvenienced for maintenance	
	Finding	Recommendation	Finding	Recommendation	Finding	Recommendation	Finding	Recommendation
Mossman Gorge Rd main	Ø100 type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		adequate	nil	adequate	nil
Kankarr St (west)	Ø100 type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		adequate	nil	adequate	nil
	Ø100 road crossing type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		nil	nil	adequate	nil
Kankarr St (east)	Ø100 type unspecified	assumed pipe type would be PVC based on age of infrastructure.	adequate		adequate	nil	adequate	nil
	Ø25 PVC loop	assumed pipe type would be PVC based on age of infrastructure.	not specified		adequate	nil	adequate	nil
Junkurrji St (north)	Ø100 type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		nil	nil	adequate	nil
Junkurrji St (south)	Ø150 type PVC(not shown on as-con). Based on information from B&M previous project knowledge.	pot hole to confirm exact location.	not specified			nil	adequate	nil
Lund St (west)	Ø150 type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		adequate	nil	inadequate	additional valve to be installed at tee on Ø150 main so Lund St (east) can be serviced.
Lund St (east)	Ø100 type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		adequate	nil	inadequate	new Ø100 main connected to existing to allow for more sufficient system
Lund St (a)	Ø150 type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		adequate	nil	inadequate	additional valve to be installed at tee on Ø150 main so Lund St (a) can be isolated.
	Ø100 road crossing type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		adequate	nil	adequate	nil
Lund St (b)	Ø100 type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		adequate	nil	inadequate	additional valve to be installed at tee on Ø150 main so Lund St (b) can be isolated.
Lund St (c)	Ø100 type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		adequate	nil	inadequate	additional valve to be installed at tee on Ø150 main so Lund St (c) can be isolated.
Road stub 1	Ø100 type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		adequate	nil	adequate	nil
	Ø25 PVC loop	assumed pipe type would be PVC based on age of infrastructure.	non-standard		adequate	nil	adequate	nil
Road stub 2	Ø100 stub for future connection type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		nil	nil	nil	nil
Road stub 3	Ø100 stub for future connection type unspecified	assumed pipe type would be PVC based on age of infrastructure.	non-standard		nil	nil	nil	nil

N

Mossman River

TO MOSSMAN GORGE

DECOMMISSIONED MAIN

SEE DIAGRAM A

STOP VALVE FOR SHOP & OFFICE, PLOTTED FROM DESIGN ONLY

LUND STREET

KANKARR STREET

JUNKURRJI STREET

JANKAJI CLOSE

MANJAL CLOSE

WALKARR CLOSE

BAMA BUBU STREET

MOSSMAN GORGE ROAD

TO MOSSMAN

PROPOSED VALVE

25Ø NB.PVC LOOP

SEE DIAGRAM B

150x100 TEE

150x100 TAPER

FUTURE 100x100 TEE

PROPOSED 100Ø WATER MAIN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

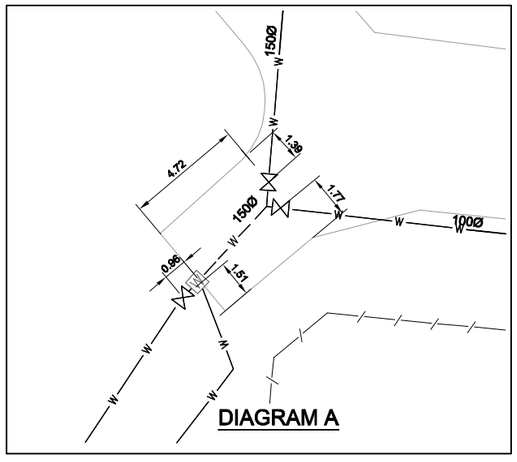

DIAGRAM A

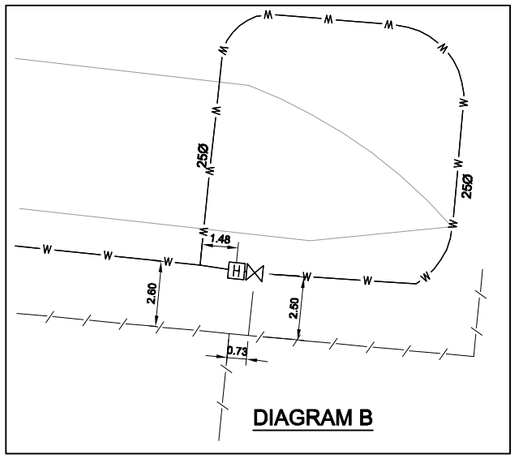

DIAGRAM B

LEGEND

- PROPOSED WATER MAIN
- EXISTING WATER MAIN AND PROPOSED VALVE
- EXISTING WATER MAIN AND DIAMETER
- DECOMMISSIONED WATER MAIN
- TOE OF BATTER
- TOP OF BATTER
- DECOMMISSIONED WATER MAIN
- JUNKURRJI ST (NORTH)
- JUNKURRJI ST (SOUTH)
- KANKARR ST (EAST)
- KANKARR ST (WEST)
- LUND ST (A)
- LUND ST (B)
- LUND ST (C)
- LUND ST (EAST)
- LUND ST (WEST)
- MOSSMAN GORGE RD MAIN
- ROAD STUB 1
- ROAD STUB 2
- ROAD STUB 3

0 10 20 30 40 50m

SCALE 1:1000 (A1 SIZE)

PRELIMINARY ONLY

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CAIRNS REGIONAL COUNCIL
MOSSMAN GORGE SUBDIVISION

WATER AUDIT

SKETCH 6990-5

Date	Project Number
MARCH 2012	6990
Drawing Size	Scale (A1 size)	Revision
A1	1:1000	A

File: G:\Synergy\Projects\C1206990 Mossman Gorge Subdivison\Drawings\ SKETCH 6990-005.dwg

Printed: 30 March 2012, 10:46 AM

External References: B&M-TITLE-SKETCH-A1_e.dwg ; X-BASEPLAN.dwg

Attachment 6

Tabulated Identification of Underground and Overland Drainage Assets and Audit Findings

SKETCH 6990-6 Stormwater Audit

STORMWATER INFRASTRUCTURE AUDIT - UNDERGROUND DRAINAGE

Line Name	Structure Name/no.	Pipe/Box Culvert Size per FNQROC Section D4.09		Grade per QUDM Pipe Grade Limits Section 7.12		Kerb Inlets and Manholes per FNQROC Section D4.08		Pipe Cover per QUDM minimum limits Section 7.10		Pipe Velocities per QUDM Section 7.11		Headwalls per FNQROC D4.16	
		Finding	Recommendation	Finding	Recommendation	Finding	Recommendation	Finding	Recommendation	Finding	Recommendation	Finding	Recommendation
	Junkurrji St culverts	3/1200 X 450 RCBC	NIL	0.47% less than allowable	NIL	Structures shown on as-con are consistent with what's on site	NIL	no cover, causeway road crossing		Self cleansing provided for 1 in 1 year ARI storm event. Maximum allowable velocities not exceeded for 1 in 100 year ARI storm event	NIL	insufficient details on as-con, site visit confirmed precast units	NIL
1	HW 1/1 to KIP 1/2	375mm RCP	NIL	0.59%	NIL	Structures shown on as-con are consistent with what's on site KIP 1/2 = on grade	NIL	KIP 1/2 = Approx. 665m HW 1/1 = Approx. 275mm		Self cleansing provided for 1 in 1 year ARI storm event. Maximum allowable velocities not exceeded for 1 in 100 year ARI storm event	NIL	insufficient details on as-con, site visit confirmed precast units	NIL
1	KIP 1/2 to KIP 1/3	300mm RCP less than allowable size per FNQROC manual	NIL	3.00%	NIL	Structures shown on as-con are consistent with what's on site KIP 1/3 = on grade	NIL	KIP 1/3 = approx. 800mm		self cleansing provided for 1 in 1 year ARI storm event. Maximum allowable velocities not exceeded for 1 in 100 year ARI storm event	NIL	insufficient details on as-con, site visit confirmed precast units	NIL
1	KIP 1/3 to HW 1/4	300 X 225 RCBC less than allowable size per FNQROC manual	NIL	1.60%	NIL	Structures shown on as-con are consistent with what's on site	NIL	HW 1/4 = approx. 165mm		Self cleansing provided for 1 in 1 year ARI storm event. Maximum allowable velocities not exceeded for 1 in 100 year ARI storm event	NIL	insufficient details on as-con, site visit confirmed precast units	NIL
2	HW 2/1 to KIP 2/2	375mm RCP	NIL	1.82%	NIL	Structures shown on as-con are consistent with what's on site KIP 2/2 = on grade	NIL	HW 2/1 = Approx. 285mm KIP 2/2 = Approx. 325mm (reduced cover)		Self cleansing provided for 1 in 1 year ARI storm event. Maximum allowable velocities not exceeded for 1 in 100 year ARI storm event	NIL	insufficient details on as-con, site visit confirmed precast units	NIL
3	HW 3/1	300mm RCP less than allowable size per FNQROC manual	NIL	insufficient details on as-con	-	insufficient details on as-con	NIL	HW 3/1 = Approx. 270mm		Self cleansing provided for 1 in 1 year ARI storm event. Maximum allowable velocities not exceeded for 1 in 100 year ARI storm event	NIL	insufficient details on as-con, site visit confirmed precast units	NIL
4	HW 4/1	300mm RCP less than allowable size per FNQROC manual	NIL	insufficient details on as-con	-	insufficient details on as-con	NIL	HW 4/1 = Approx. 270mm		Self cleansing provided for 1 in 1 year ARI storm event. Maximum allowable velocities not exceeded for 1 in 100 year ARI storm event	NIL	insufficient details on as-con, site visit confirmed precast units	NIL
	Mossman Gorge Rd culvert	2/600 RCP's	NIL	2.80%	NIL	Structures shown on as-con are consistent with what's on site	NIL	US = approx. 500mm DS = approx. 270mm		Self cleansing provided for 1 in 1 year ARI storm event. Maximum allowable velocities not exceeded for 1 in 100 year ARI storm event	NIL	insufficient details on as-con, site visit confirmed non-standard headwall	NIL
	Bama Bubu Rd culvert	1800 X 750 RCBC	NIL	0.72%	NIL	Structures shown on as-con are consistent with what's on site	NIL	US = approx. 440mm DS = approx. 430mm		Self cleansing provided for 1 in 1 year ARI storm event. Maximum allowable velocities not exceeded for 1 in 100 year ARI storm event	NIL	insufficient details on as-con, site visit confirmed non-standard headwall	NIL

7.12 Pipe grade limits

To conform with the requirements of Section 7.11, and construction limitations the following maximum and minimum grades are recommended for design purposes:

Table 7.12.1 Acceptable pipe grades for pipes flowing full

Pipe Diameter (mm)	Maximum Grade (%)	Minimum Grade (%)
300	20.0	0.50
375	15.0	0.40
450	11.0	0.30
525	9.0	0.25
600	7.5	0.20
675	6.5	0.18
750	5.5	0.15
900	4.5	0.12
1050	3.5	0.10
1200	3.0	0.10
1350	2.5	0.10
1500	2.2	0.10
1650	2.0	0.10
1800	1.7	0.10
1950	1.5	0.10
2100	1.4	0.10
2250	1.3	0.10
2400	1.2	0.10

Notes:

1. Based on maximum velocity for pipe flowing full of 6.0m/s.
2. Based on minimum velocity for pipe flowing full of 1.0m/s except where Note 4 is applicable.
3. Manning's $n = 0.013$ for all cases (concrete pipes).
4. The minimum grade of 0.10% (1:1000) is based on construction tolerance requirements.
5. The **Maximum Grade** requirement applies to both the pipe grade and the hydraulic grade.
6. The **Minimum Grades** apply to the pipe grade only.
7. Where a pipe is flowing less than half full for the design flow being considered, it is permissible to exceed the above maximum grades provided that the velocity limits specified in Table 7.11.1 are not exceeded.

7.10 Minimum cover over pipes

The minimum cover over pipes to be adopted for pipe grading purposes should be:

Table 7.10.1 Recommended minimum cover over pipes

Location	Minimum Cover (mm)	
	Rigid Type Pipes e.g. Concrete, F.R.C.	Flexible Type Pipes e.g. Plastic or Thin Metal
Residential private property, and parks not subject to traffic	300	450
Private property and parks subject to occasional traffic	450	450
Footpaths	450	600
Road pavements and under kerb and channel	600	600

Notes:

1. For special cases, and with the agreement of the local authority, cover can be reduced by using a higher-class pipe, special bedding, concrete protection or a combination of these.
2. Where pipes are to be laid under the footpath consideration should be given to the possibility of future road widening, both in respect of the reduced cover that might result from the widening and vehicle loading.

7.11 Flow velocity limits

The velocity of stormwater in pipes and box sections should be maintained within acceptable limits to ensure that:

(i) self cleaning of the pipe or box section is maintained;

(ii) scouring and erosion of the conduit, (particularly the invert) does not occur.

The range of acceptable flow velocities are as detailed in Table 7.11.1.

Table 7.11.1 Acceptable flow velocities for pipes and box sections

Flow Condition	Absolute Minimum [1] (m/s)	Desirable Minimum [1] (m/s)	Desirable Maximum [2] (m/s)	Absolute Maximum [2] (m/s)
Partially full	0.7	1.2	4.7	7.0
Full	0.6	1.0	4.0	6.0

Notes:

[1] Minimum flow velocities apply to 1 in 1 year ARI design storm, and apply to all pipe materials.

[2] Maximum flow velocities apply to concrete pipes. For other pipe materials, refer to manufacturer's advice.

Part-full flow characteristics of pipes may be determined from the appropriate Design Chart contained in Volume 2.

In steep terrain the velocity of flow should not be greater than the absolute maximum velocity of 6.0 m/s under "pipe full" conditions. To achieve this requirement, it may be necessary to construct access chambers with drops to dissipate some of the kinetic energy of the flow, or to limit the pipe diameter.

Reference should be made to Tables 9.05.1 and 9.05.3 for details of velocity limits for vegetated and grassed/unlined channels.

Notwithstanding the above suggested velocity limits, hydraulic considerations may require the velocity be controlled to well below the "Desirable Maximum" and/or the pipe size increased to minimise structure losses and the slope of the hydraulic grade line.

D4.09 PIPES / BOX CULVERTS

1. Stormwater drainage pipes and boxes shall be generally be of reinforced concrete (including FRC) construction and in accordance with the following:
   - Minimum pipe size 375mm dia, minimum box culvert size 450mm x 300mm.
   - Minimum clear cover shall be 600mm in general or in accordance with manufacturers specification, otherwise approved by the Council.
   - The minimum vertical and horizontal clearances between a stormwater pipe and any other pipe or service conduit shall be 150mm.
   - In areas of high water table, the designer must consider buoyancy uplift in relation to pipe/culvert joints.
   - In aggressive environments or where any part of the pipe / box culvert is below the Highest Astronomical Tide (RL 1.80m AHD), pipes / box culverts will have cover to reinforcement in accordance with the exposure classification requirements of AS 3600.

STORMWATER INFRASTRUCTURE AUDIT - OVERLAND DRAINAGE

Drain Name	Open Channel Type, Profile, Safety per FNQROC Section D4.12		Grade Minimum 0.5% fall		Minor Storm Event per QUDM Section 7.02		Major Storm Event per QUDM Section 7.02	
	Finding	Recommendation	Finding	Recommendation	Finding	Recommendation	Finding	Recommendation
Drain 1	earth drain (unlined) sides of drain vary 1 in 4 is average.	NIL	120m @ 2.44%	NIL	More detailed information required to assess capture and conveyance of minor event		More detailed information required to assess capture and conveyance of minor event	
Drain 2 (A)	earth drain (unlined), slopes vary but are approx. 1 in 5 most places	Partially fill drain and install low flow pipe.	177m @ 1.11%	NIL	More detailed information required to assess capture and conveyance of minor event		More detailed information required to assess capture and conveyance of major event	
Drain 2 (B)	earth drain (unlined), sides are rock lined and approx. 1 in 1	NIL	45m @ 0%	Re-grade to ensure free draining	More detailed information required to assess capture and conveyance of minor event		More detailed information required to assess capture and conveyance of major event	
Drain 3 (A)	earth drain (unlined) shallow & mowable sides, insufficient details to determine slope of sides	NIL	31m @ 2.38%	NIL	More detailed information required to assess capture and conveyance of minor event		More detailed information required to assess capture and conveyance of major event	
Drain 3 (B)	earth drain (unlined) shallow & mowable sides, insufficient details to determine slope of sides	NIL	70m @ 1.90%	NIL	More detailed information required to assess capture and conveyance of minor event		More detailed information required to assess capture and conveyance of major event	
Drain 3 (C)	earth drain (unlined) shallow & mowable sides, insufficient details to determine slope of sides	NIL	61m @ 1.80%	NIL	More detailed information required to assess capture and conveyance of minor event		More detailed information required to assess capture and conveyance of major event	
Drain 4	concrete spoon drain (lined) non-standard kerb used approx. 1m wide	NIL	38m @ 0.63%	NIL	More detailed information required to assess capture and conveyance of minor event		More detailed information required to assess capture and conveyance of major event	
Drain 5	concrete spoon drain (lined) non-standard kerb used approx. 1m wide	NIL	37m @ 1.2%	NIL	More detailed information required to assess capture and conveyance of minor event		More detailed information required to assess capture and conveyance of major event	
Drain 6	concrete spoon drain (lined) non-standard kerb used approx. 2m wide	NIL	40m @ 0.75%	NIL	More detailed information required to assess capture and conveyance of minor event		More detailed information required to assess capture and conveyance of major event	
Drain 7	concrete spoon drain (lined) non-standard kerb used approx. 2m wide	NIL	25m @ 3.32%	NIL	More detailed information required to assess capture and conveyance of minor event		More detailed information required to assess capture and conveyance of major event	
Lund Street	Road drainage provided by road crown and kerb & Channel or concrete spon drains.	NIL	Free draining, 0.5%	NIL	More detailed information required to assess capture and conveyance of minor event		More detailed information required to assess capture and conveyance of major event	
Kankarr, Junkurrji, Jankaji, Manjal, Walkarr, Bama Bubu Street	Road drainage provided by road crown and kerb & Channel or concrete spon drains.	NIL	Free draining, 0.5%	NIL	More detailed information required to assess capture and conveyance of minor event		More detailed information required to assess capture and conveyance of major event	

D4.12 OPEN CHANNELS

1. Generally, open channels will only be permitted where they form part of the trunk drainage system and shall be designed to have smooth transitions with adequate access provisions for maintenance and cleaning. Where Council permits the use of an open channel to convey flows from a development site to the receiving water, such a channel shall be designed in accordance with QUDM.

2. Maximum side slopes on grass lined open channels shall be 1 in 4, with a preference given to 1 in 6 side slopes, channel inverts shall generally have minimum cross slopes of 1 in 10.

3. Low flow provisions in open channels to prevent scouring from trickle flows shall be provided to all grass lined channels. Trickle flow protection shall be contained within a pipe or hard lined channel and shall be designed to cater for the 3 month ARI storm event (60 per cent of the 1 Year ARI storm event flow).

4. Subsurface drainage shall be provided in grass-lined channels to prevent waterlogging of the channel bed.

5. Profiles of all grass lined channels shall such that mowing may be undertaken by a tractor and slasher to the satisfaction of Council.

6. Where the flow velocity and / or depth within an open channel pose a safety hazard, barrier fencing and / or appropriate hazard warning signs shall be provided to discourage access to the channel. The extent of precautions should be determined following consultation with Council.

7. The depth velocity product and the gutter flow widths are to be included in the submitted drainage calculations

Table 7.02.1 Recommended design average recurrence intervals

(i) MAJOR SYSTEM DESIGN ARI (years)		50 or 100 [1]
(ii) MINOR SYSTEM DESIGN ARI (years)		
Development Category		
Central Business and Commercial		10
Industrial		2
Urban Residential High Density – greater than 20 dwelling units/ha		10
Urban Residential High Density – greater than 5 & up to 20 dwelling units/ha		2
Rural Residential – 2 to 5 dwelling units/ha		2
Open Space – Parks, etc.		1
Major Road	Kerb & Channel Flow	10 [2]
	Cross Drainage (Culverts)	50 [3]
Minor Road	Kerb & Channel Flow	Refer to relevant development category
	Cross Drainage (Culverts)	10 [3]

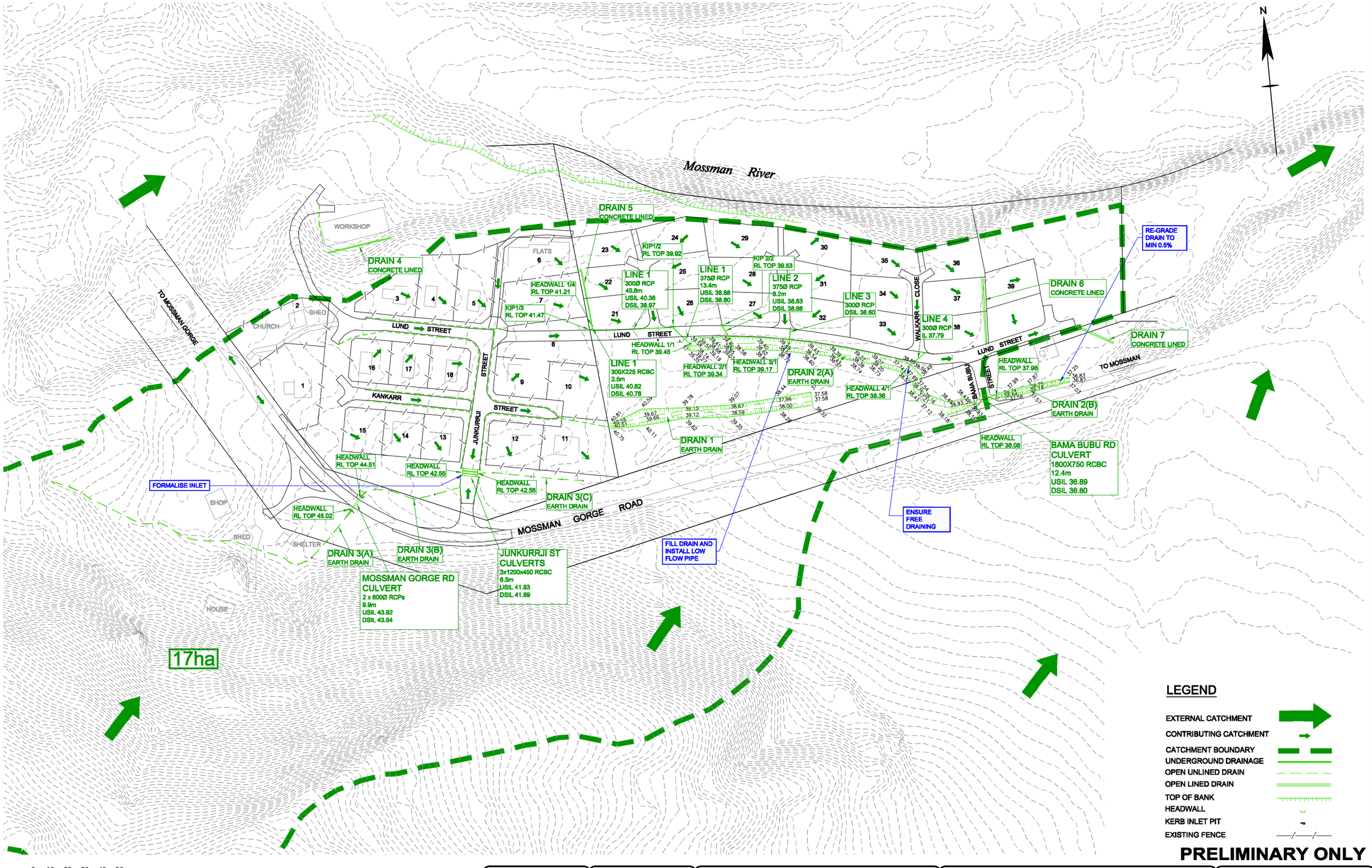
Notes:

[1] Refer to relevant local authority for confirmation of required Design Storm ARI. The 50 year ARI is adopted by some local governments for drainage paths where there is expected to be good control of surface roughness (e.g. roadways and well-maintained grass channels). The 100 year ARI is commonly adopted for the design of major waterways and drainage paths where it is difficult to predict actual flow conditions (e.g. channels subject to complicated 3D hydraulics, or drainage paths likely to be subject to significant physical change) or where the surface roughness can be highly variable (e.g. vegetated channels). *State Planning Policy 1/03* recommends adoption of the 100 year ARI flood frequency for waterway flood management planning.

[2] The design ARI for the minor drainage system in a major road shall be that indicated for the major road, not that for the Development Category of the adjacent area.

[3] Culverts under roads should be designed to accept the full flow for the minor system ARI shown. In addition the designer must ensure adequate public safety controls (e.g. d*V product) exist and that the nominated Major Storm flow does not cause unacceptable damage to adjacent properties, or adversely affect the use of the land. If upstream properties are at a relatively low elevation, it may be necessary to install culverts of capacity greater than that for the minor system ARI design storm to ensure unacceptable flooding of upstream properties does not occur. In addition, the downstream face of causeway embankments may need protection where overtopping is likely to occur.

[4] The terms used in this table are described in the Glossary and Table 7.02.2.



LEGEND

- EXTERNAL CATCHMENT
- CONTRIBUTING CATCHMENT
- CATCHMENT BOUNDARY
- UNDERGROUND DRAINAGE
- OPEN UNLINED DRAIN
- OPEN LINED DRAIN
- TOP OF BANK
- HEADWALL
- KERB INLET PIT
- EXISTING FENCE

PRELIMINARY ONLY

0 10 20 30 40 50m
SCALE 1:1000 (A1 SIZE)

Black & More
ABN 24 845 447 493
93 Digger St Cairns North QLD 4870
PO Box 999N Cairns North QLD 4870
Telephone (07) 4031 9944
Fax (07) 4031 9914
Email black.more@blackm.com
Internet www.blackm.com

CAIRNS REGIONAL COUNCIL
MOSSMAN GORGE SUBDIVISION

STORMWATER AUDIT

SKETCH 6990-6

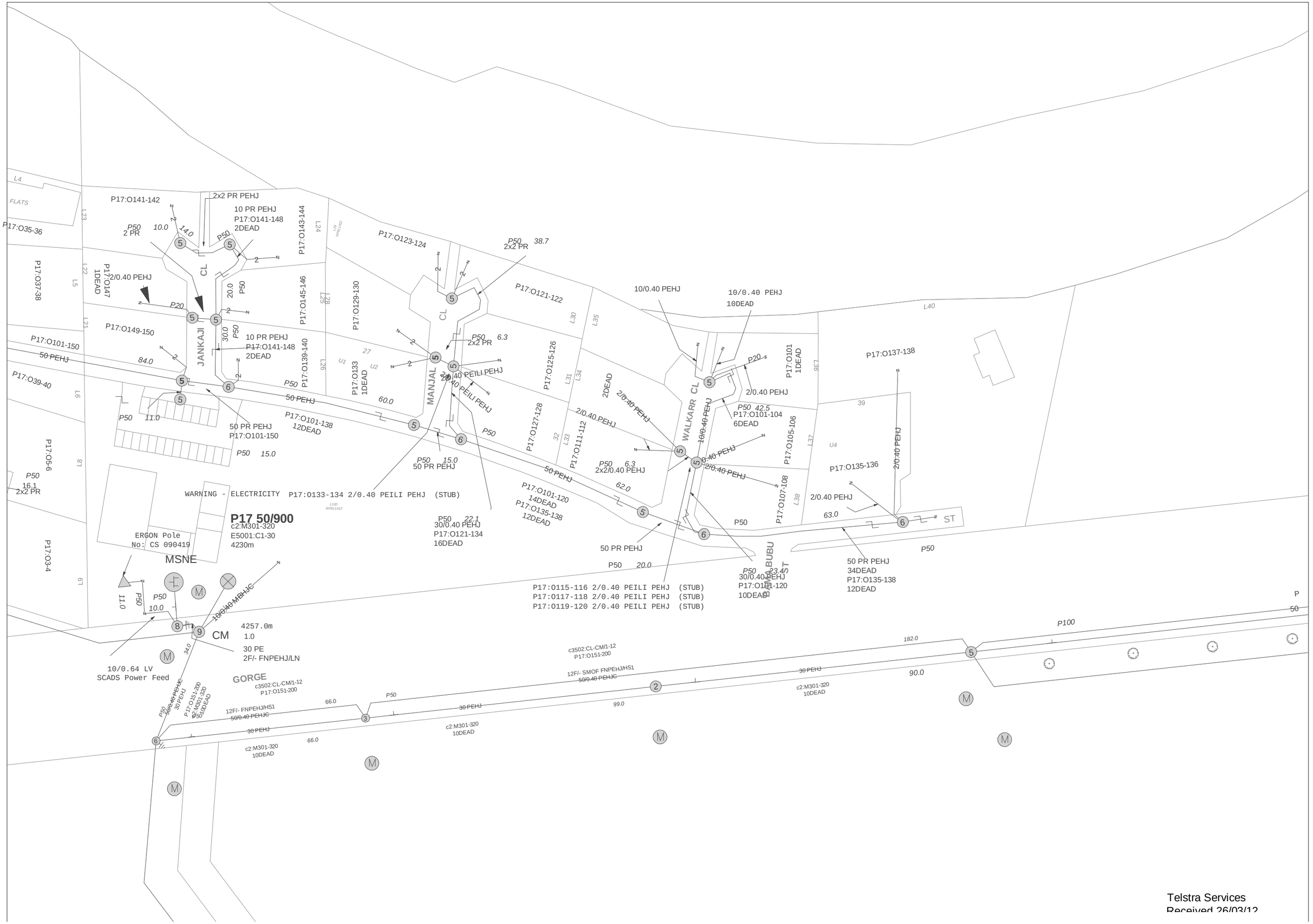
Date	Project Number
MARCH 2012	6990
Drawing Size	Scale (A1 size)	Revision
A1	1:1000	A

File: G:\Synergy\Projects\C1206990 Mossman Gorge Subdivison\Drawings\ SKETCH 6990-006.dwg
Printed: 30 March 2012, 10:53 AM
External References: B&M-TITLE-SKETCH-A1_e.dwg ; X-BASEPLAN.dwg

Attachment 7

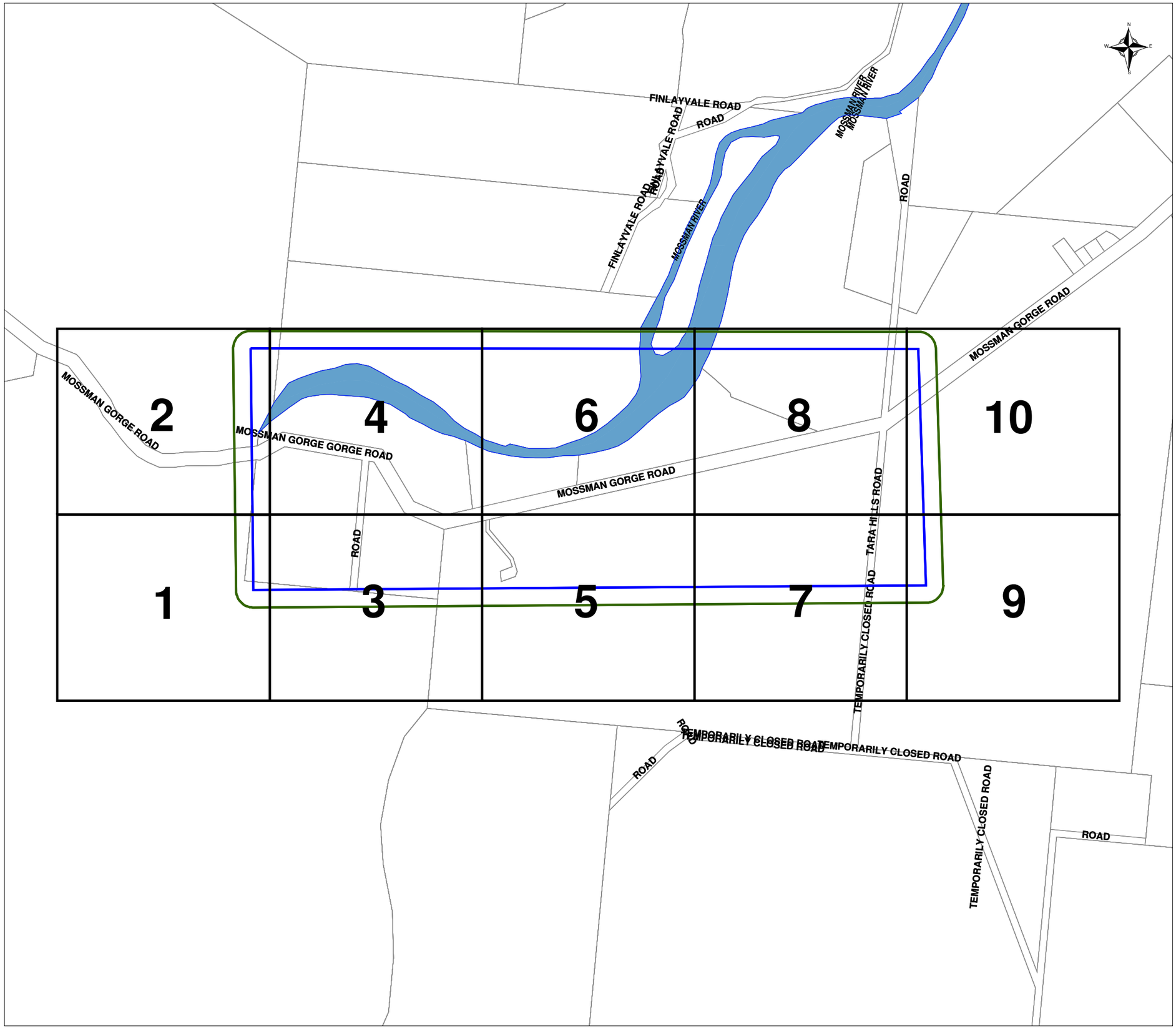
Identification of Telecommunication Assets

WORKSHOP
CHURCH
FLATS
RD
LUND
KANKARR
JUNKURRJI
MUJANJIA
CL
JANKAJI
ST
GORGE
MSNE
CM
WARNING
UNDERGROUND ELECTRICITY
WARNING - ELECTRICITY
P17:O133-134 2/0.40 PEILI
P17 50/900
c2:M301-320
E5001:C1-30
4230m
ERGON Pole
No: CS 090419
4257.0m
30 PE
2F/- FNPEHJ/LN
10/0.64 LV
SCADS Power Feed
BG1
ART CENTRE & KIOSK
BG2
LOCAL PROGRAMME OFFICE
P50 36.4
30/0.40 PEHJC
P17:O41-60
P17:O81-85
5DEAD
P50 65.6
30/0.40 PEHJC
30 PEHJ
2x2 PR
P17:O41-60
P17:O67-70
P17:O81-85
1DEAD
10DEAD
P17:O61-66
4DEAD
P17:O71-80
P50 36.2
30/0.40 PEHJC
30 PEHJ
P17:O41-60
P17:O67-70
P17:O81-85
1DEAD
10DEAD
P17:O61-66
4DEAD
P17:O71-80
P20 10.0
10/0.40 MBHJC
P20 4.6
2x10/0.40 PEHJC
10DEAD
10DEAD
P50 21.8
50 PEHJ
100 PEHJ
P17:O1-100
Telstra Services
Received 26/03/12


P17:O141-142
2x2 PR PEHJ
10 PR PEHJ
P17:O141-148
2DEAD
P17:O143-144
P17:O123-124
P17:O35-36
P50
2 PR
10.0
14.0
P50
2/0.40 PEHJ
P17:O147
1DEAD
CL
20.0
P50
P17:O145-146
P17:O129-130
P17:O121-122
P50
2x2 PR
38.7
10/0.40 PEHJ
10/0.40 PEHJ
10DEAD
P17:O37-38
P20
P17:O149-150
30.0
P50
10 PR PEHJ
P17:O141-148
2DEAD
P17:O139-140
P17:O133
1DEAD
JANKAJI
P50
6.3
2x2 PR
P17:O125-126
P17:O101-150
50 PEHJ
84.0
P17:O39-40
P50
50 PEHJ
P17:O101-138
12DEAD
60.0
MANJAL
2/0.40 PEILI PEHJ
2/0.40 PEILI PEHJ
P17:O127-128
2DEAD
2/0.40 PEHJ
2/0.40 PEHJ
WALKARR
CL
10/0.40 PEHJ
P50 42.5
P17:O101-104
6DEAD
2/0.40 PEHJ
P17:O101
1DEAD
P17:O137-138
P17:O5-6
P50
16.1
2x2 PR
P50
11.0
50 PR PEHJ
P17:O101-150
P50
15.0
P50
15.0
50 PR PEHJ
P17:O111-112
P50
6.3
2x2/0.40 PEHJ
50 PEHJ
62.0
P17:O101-120
14DEAD
P17:O135-138
12DEAD
P17:O105-106
P17:O135-136
2/0.40 PEHJ
P17:O107-108
2/0.40 PEHJ
63.0
2/0.40 PEHJ
WARNING - ELECTRICITY P17:O133-134 2/0.40 PEILI PEHJ (STUB)
P17 50/900
c2:M301-320
E5001:C1-30
4230m
ERGON Pole
No: CS 090419
MSNE
P50
22.1
30/0.40 PEHJ
P17:O121-134
16DEAD
50 PR PEHJ
P50
20.0
P17:O115-116 2/0.40 PEILI PEHJ (STUB)
P17:O117-118 2/0.40 PEILI PEHJ (STUB)
P17:O119-120 2/0.40 PEILI PEHJ (STUB)
P50
63.4
30/0.40 PEHJ
P17:O121-120
10DEAD
50 PR PEHJ
34DEAD
P17:O135-138
12DEAD
P50
ST
BABUBU
ST
P50
11.0
P50
10.0
10/0.40 MBHJC
4257.0m
CM
1.0
30 PE
2F/- FNPEHJ/LN
10/0.64 LV
SCADS Power Feed
34.0
GORGE
c3502:CL-CM/1-12
P17:O151-200
c3502:CL-CM/1-12
P17:O151-200
12F/- SMOF FNPEHJ/HS1
50/0.40 PEHJC
182.0
P100
30 PEHJ
90.0
c2:M301-320
10DEAD
P50
50/0.40 PEHJC
30 PEHJ
P17:O151-200
c2:M301-320
10DEAD
12F/- FNPEHJ/HS1
50/0.40 PEHJC
66.0
P50
30 PEHJ
99.0
c2:M301-320
10DEAD
30 PEHJ
c2:M301-320
10DEAD
66.0
P
50
Telstra Services
Received 26/03/12

Attachment 8

Identification of Electricity/Lighting Assets



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LEGEND

DBYD

DBYD Request

- DBYD Request (Area)
- DBYD Request (Ergon Search Area)

DCDB

Land Parcel

- Land Parcel (Area Geom)

Land Parcel Large

- Land Parcel Large (Area Geom)

Land Parcel Medium

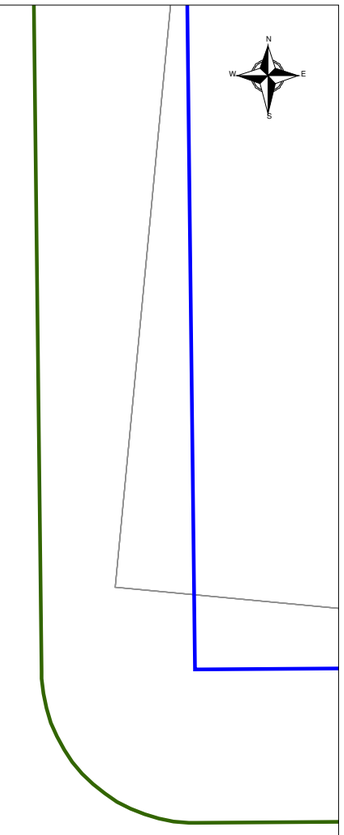
- Land Parcel Medium (Area Geom)

Water Boundary

- Water Boundary (Line Geom)

Water Coverage

- Water Coverage (Area Geom)



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LEGEND

DBYD

DBYD Request

DBYD Request (Area)

DBYD Request (Ergon Search Area)

DCDB

Land Parcel

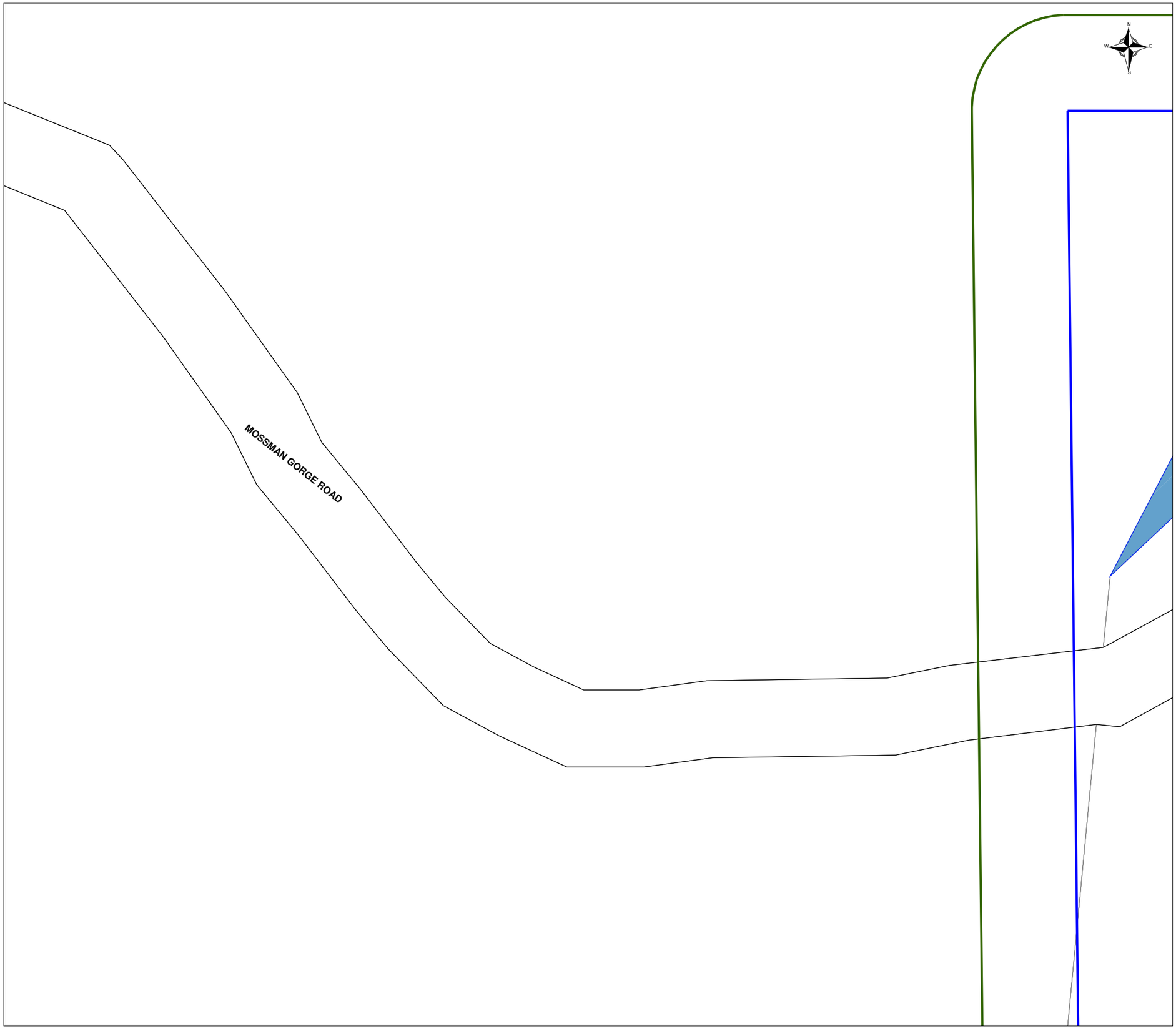
Land Parcel (Area Geom)

Land Parcel Large

Land Parcel Large (Area Geom)

Land Parcel Medium

Land Parcel Medium (Area Geom)



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LEGEND

DBYD

DBYD Request

- DBYD Request (Area)
- DBYD Request (Ergon Search Area)

DCDB

Land Parcel

- Land Parcel (Area Geom)

Land Parcel Large

- Land Parcel Large (Area Geom)

Land Parcel Medium

- Land Parcel Medium (Area Geom)

Road Boundary

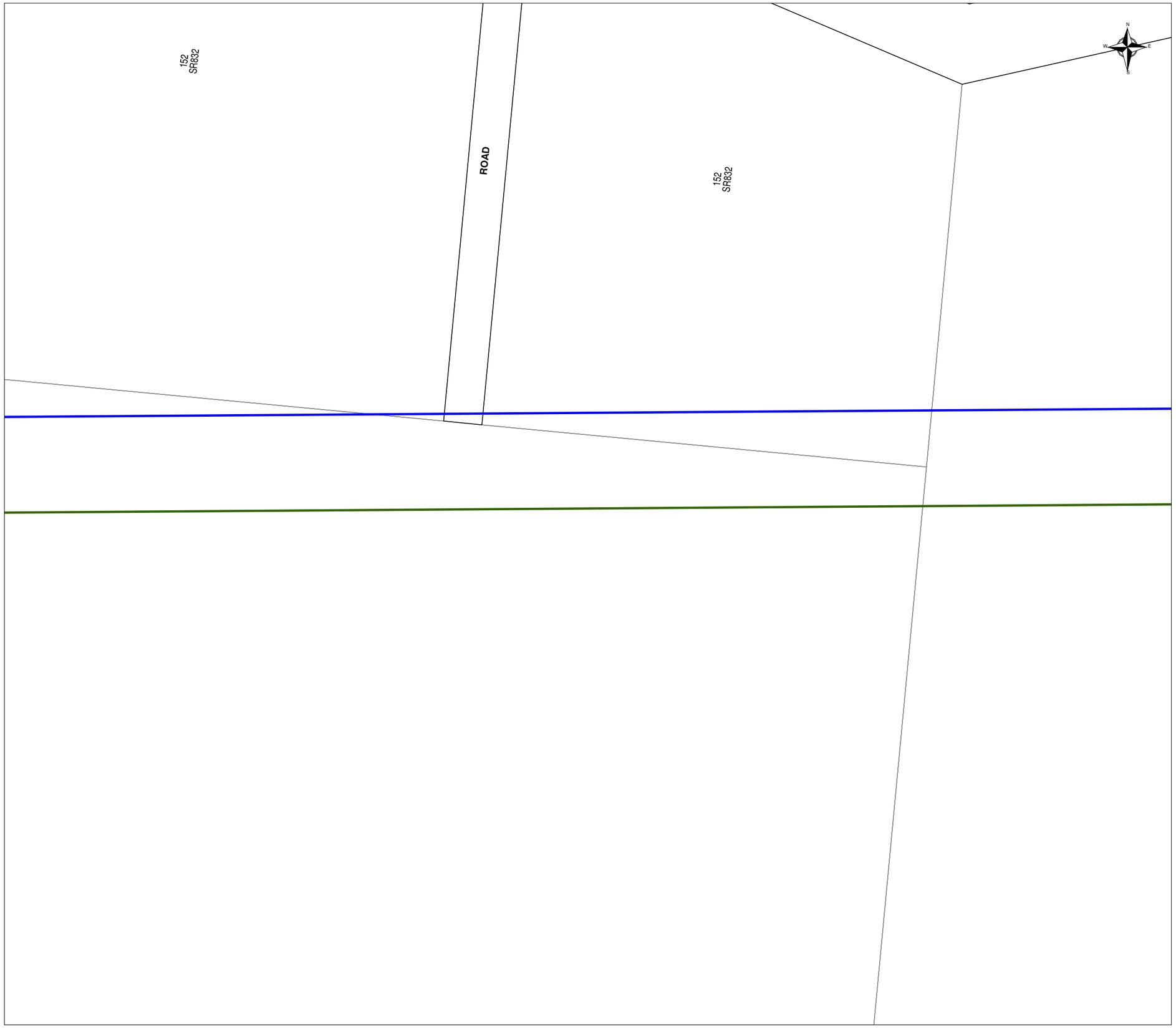
- Road Boundary (Line Geom)

Water Boundary

- Water Boundary (Line Geom)

Water Coverage

- Water Coverage (Area Geom)



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LEGEND

DBYD

DBYD Request

DBYD Request (Area)

DBYD Request (Ergon Search Area)

DCDB

Land Parcel

Land Parcel (Area Geom)

Land Parcel Large

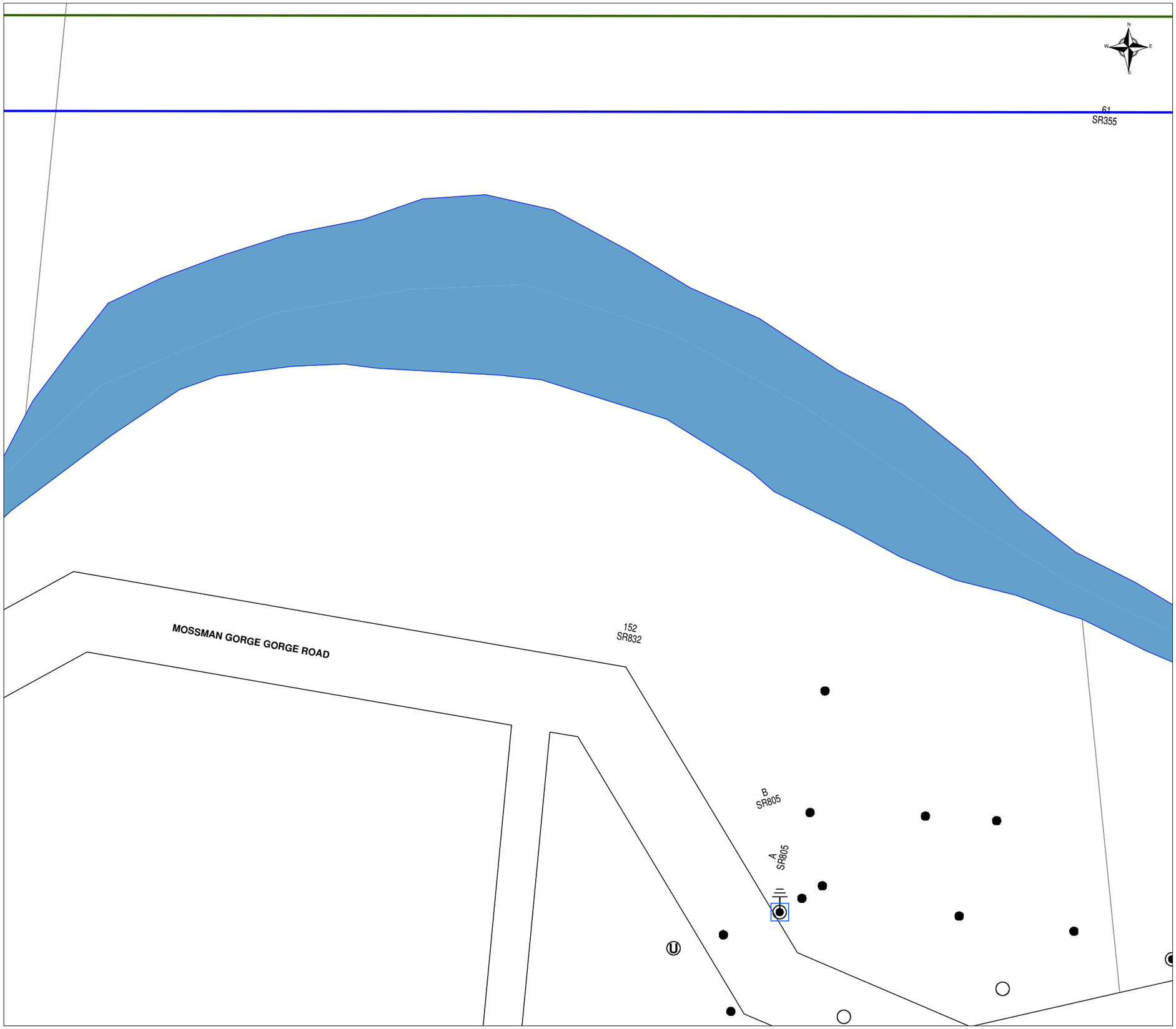
Land Parcel Large (Area Geom)

Land Parcel Medium

Land Parcel Medium (Area Geom)

Road Boundary

Road Boundary (Line Geom)



ERGON ENERGY

24595408–5351631

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LEGEND

Electricity

Earth – as constructed

Pole – HV

Pole – Unknown

Pole – HV/LV

Pole – LV

Substation – Pole

DBYD

DBYD Request

DBYD Request (Area)

DBYD Request (Ergon Search Area)

DCDB

Land Parcel

Land Parcel (Area Geom)

Land Parcel Large

Land Parcel Large (Area Geom)

Land Parcel Medium

Land Parcel Medium (Area Geom)

Road Boundary

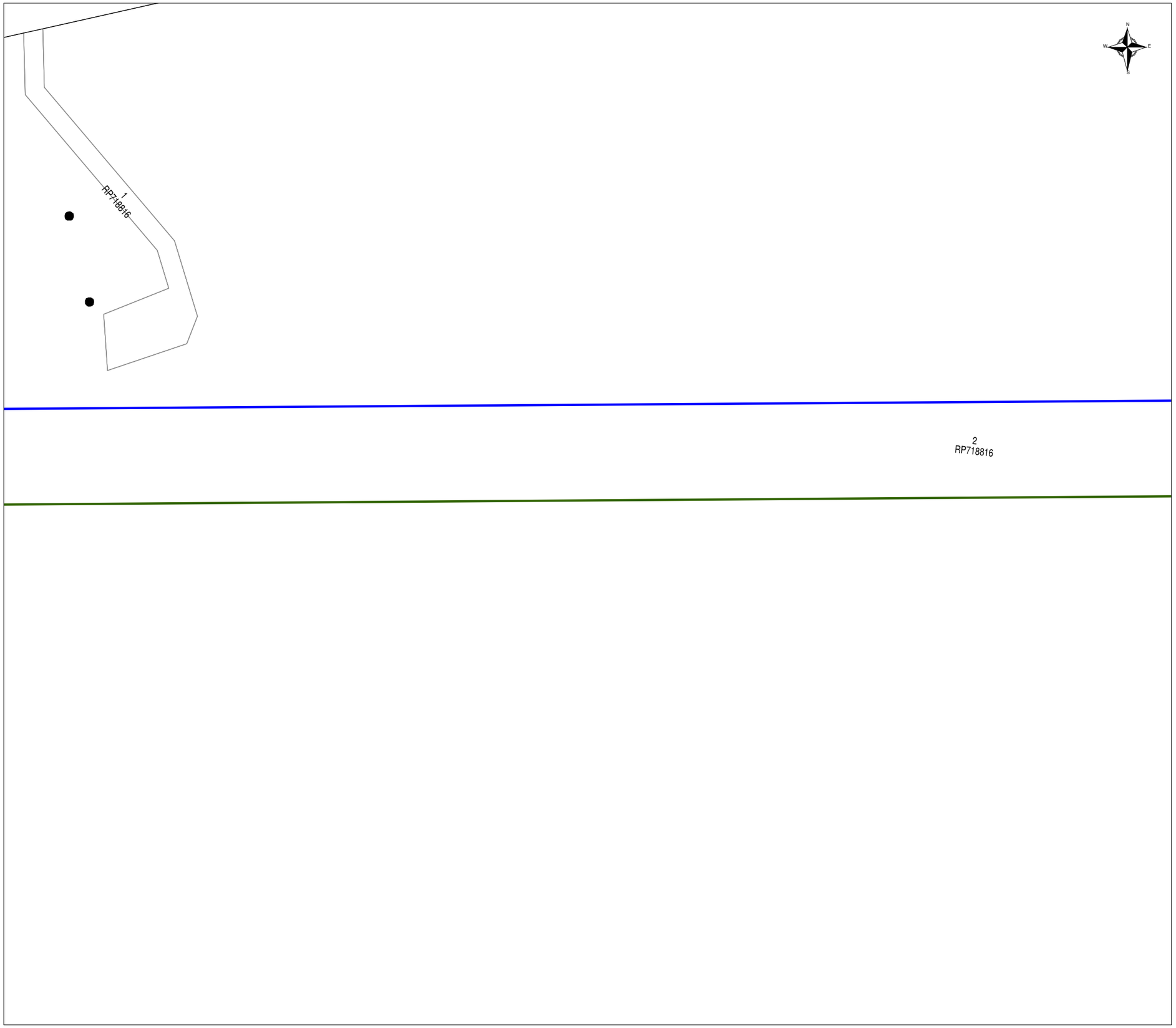
Road Boundary (Line Geom)

Water Boundary

Water Boundary (Line Geom)

Water Coverage

Water Coverage (Area Geom)



24595408–5351631

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LEGEND

Electricity

Pole – LV

DBYD

DBYD Request

DBYD Request (Area)

DBYD Request (Ergon Search Area)

DCDB

Land Parcel

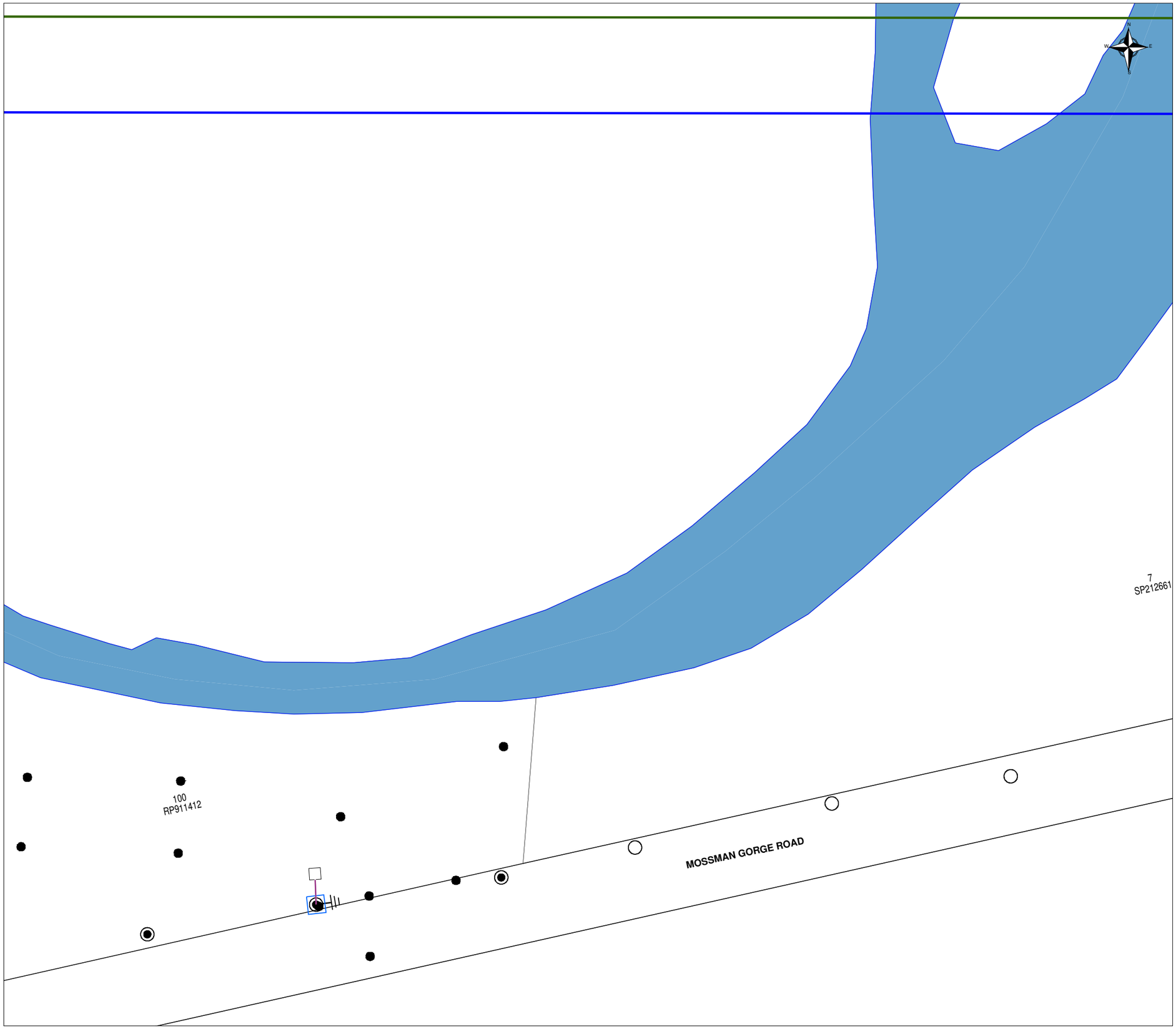
Land Parcel (Area Geom)

Land Parcel Large

Land Parcel Large (Area Geom)

Road Boundary

Road Boundary (Line Geom)



24595408–5351631

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LEGEND

Electricity

- Duct – as constructed
- Earth – as constructed
- Pillar – Normal Pillar
- Pole – HV
- Pole – HV/LV
- Pole – LV
- Substation – Pole

Low Voltage

- LV Cable – as constructed (415v)

DBYD

DBYD Request

- DBYD Request (Area)
- DBYD Request (Ergon Search Area)

DCDB

Land Parcel

- Land Parcel (Area Geom)

Land Parcel Large

- Land Parcel Large (Area Geom)

Land Parcel Medium

- Land Parcel Medium (Area Geom)

Road Boundary

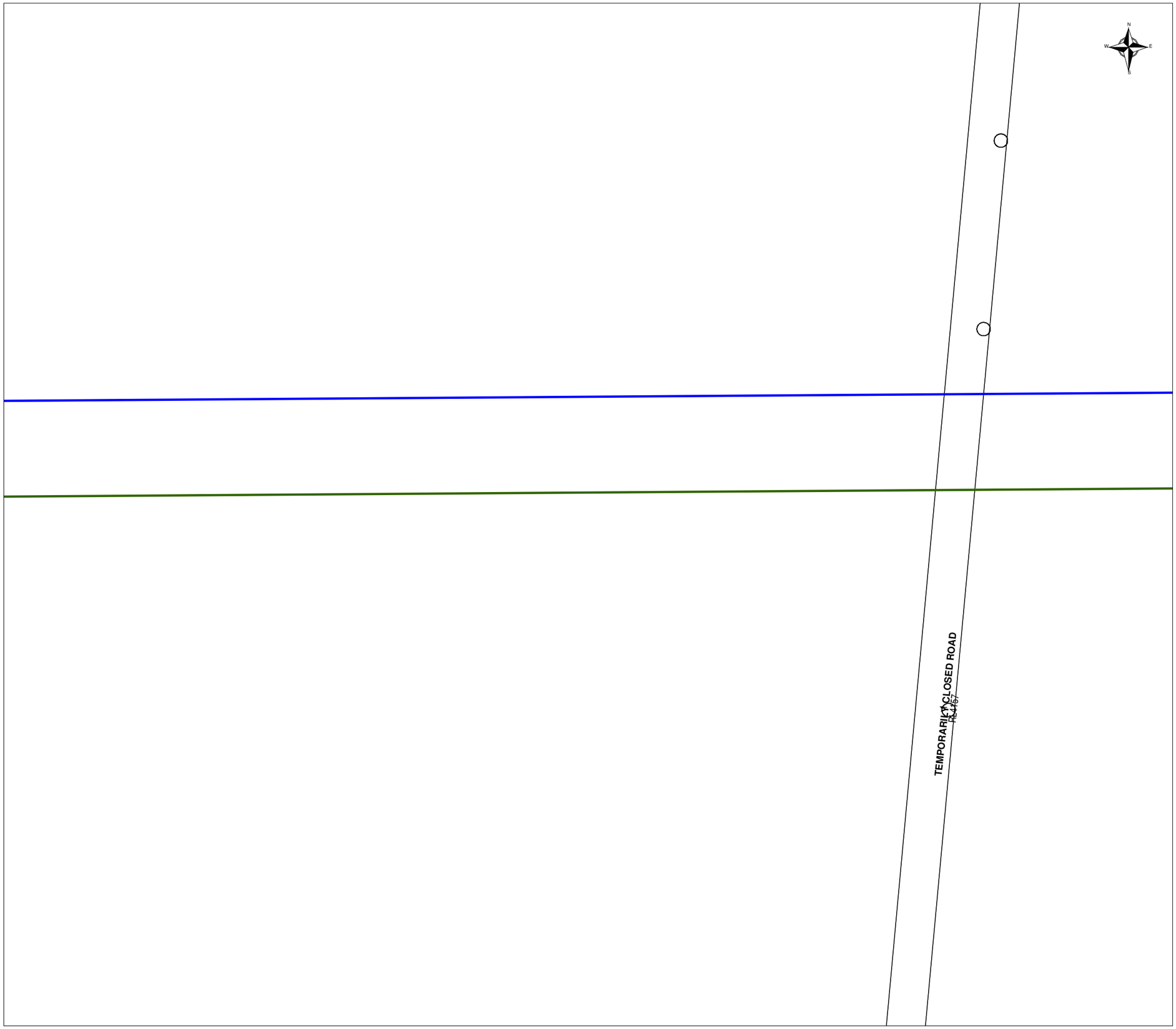
- Road Boundary (Line Geom)

Water Boundary

- Water Boundary (Line Geom)

Water Coverage

- Water Coverage (Area Geom)



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LEGEND

Electricity

Pole – HV

DBYD

DBYD Request

DBYD Request (Area)

DBYD Request (Ergon Search Area)

DCDB

Land Parcel

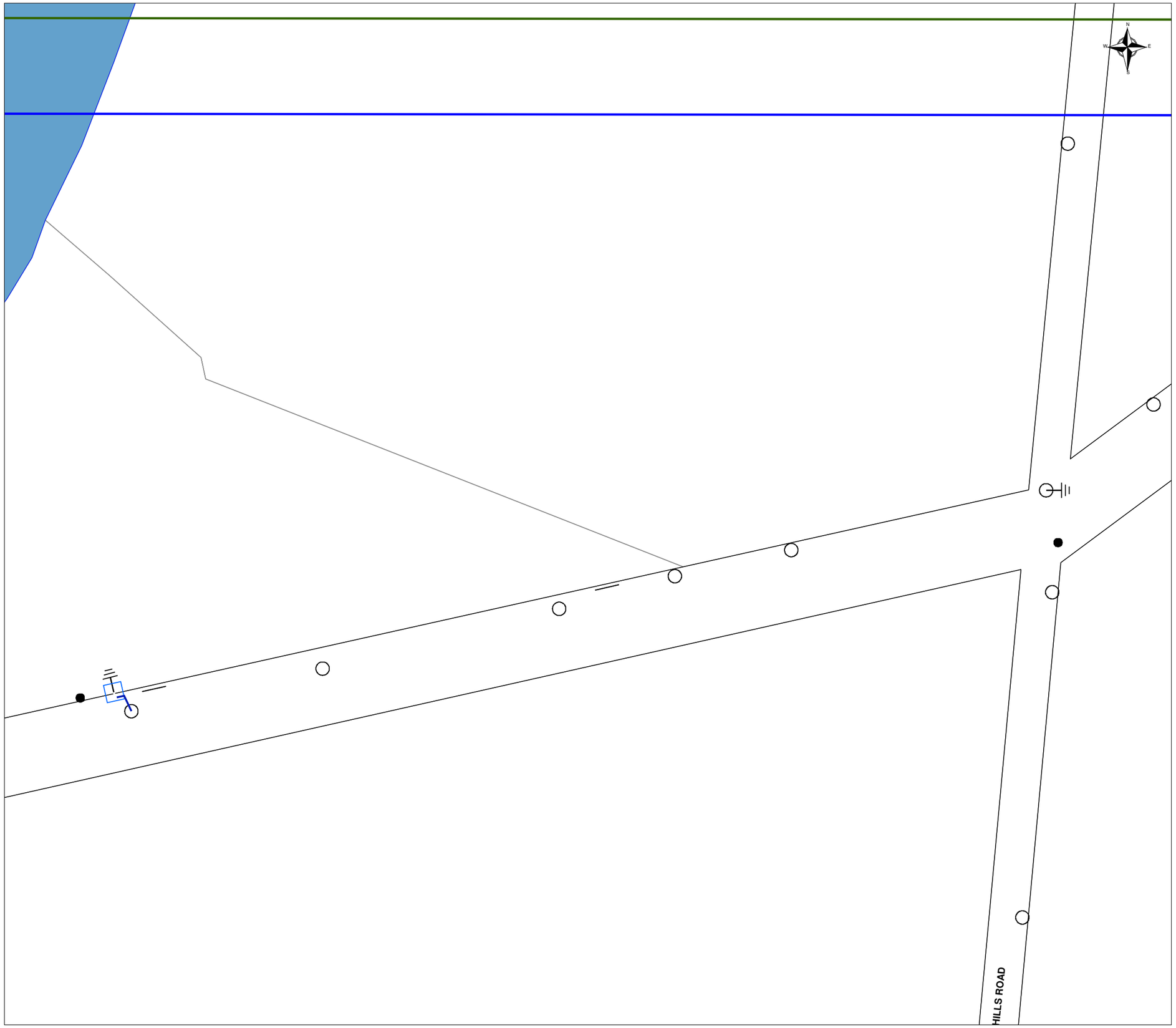
Land Parcel (Area Geom)

Land Parcel Large

Land Parcel Large (Area Geom)

Road Boundary

Road Boundary (Line Geom)



24595408–5351631

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LEGEND

Electricity

Duct – as constructed

Earth – as constructed

Pole – HV

Pole – LV

Substation –

High Voltage

HV Cable – as constructed (22kv)

DBYD

DBYD Request

DBYD Request (Area)

DBYD Request (Ergon Search Area)

DCDB

Land Parcel

Land Parcel (Area Geom)

Land Parcel Large

Land Parcel Large (Area Geom)

Land Parcel Medium

Land Parcel Medium (Area Geom)

Road Boundary

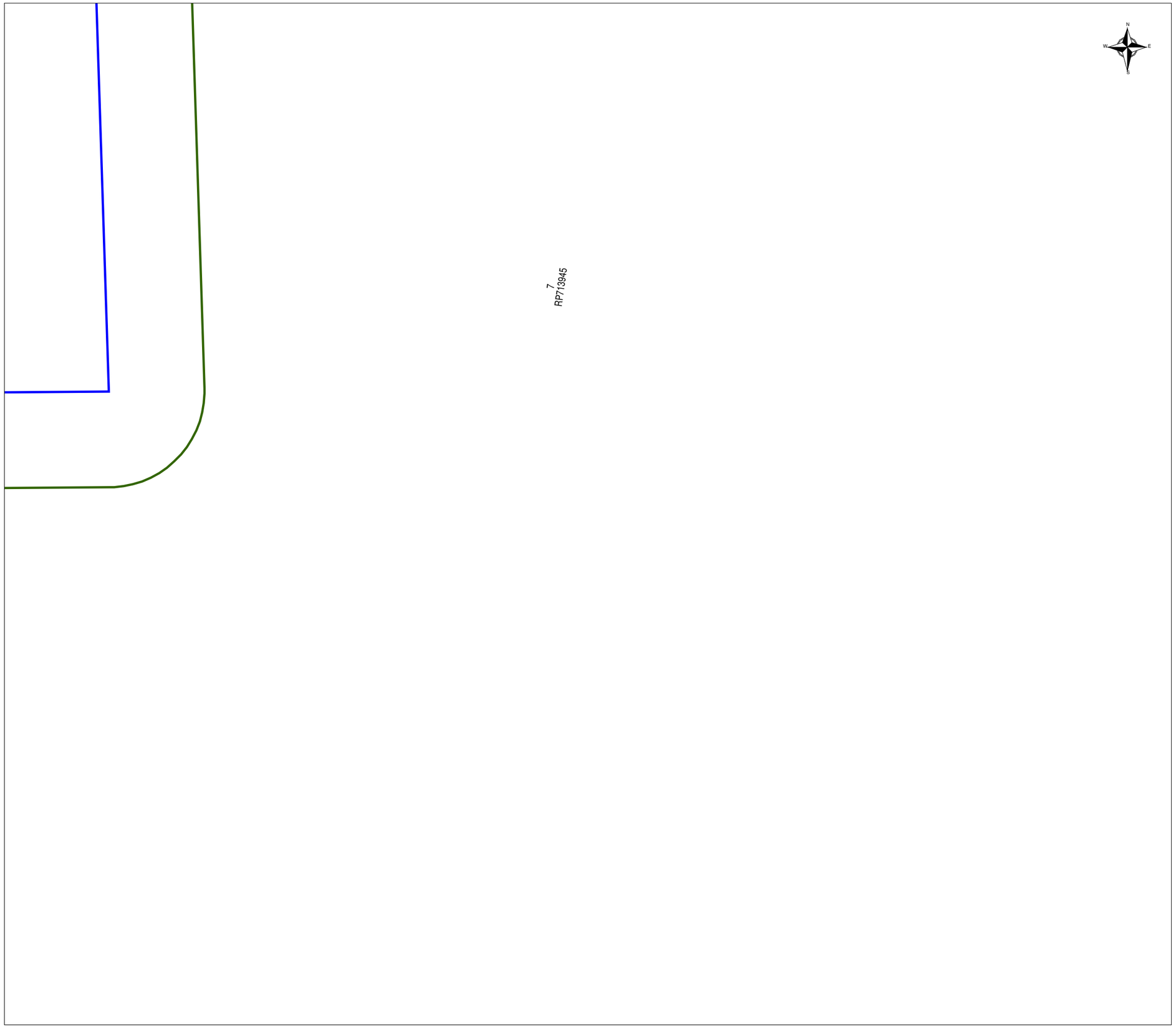
Road Boundary (Line Geom)

Water Boundary

Water Boundary (Line Geom)

Water Coverage

Water Coverage (Area Geom)



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LEGEND

DBYD

DBYD Request

DBYD Request (Area)

DBYD Request (Ergon Search Area)

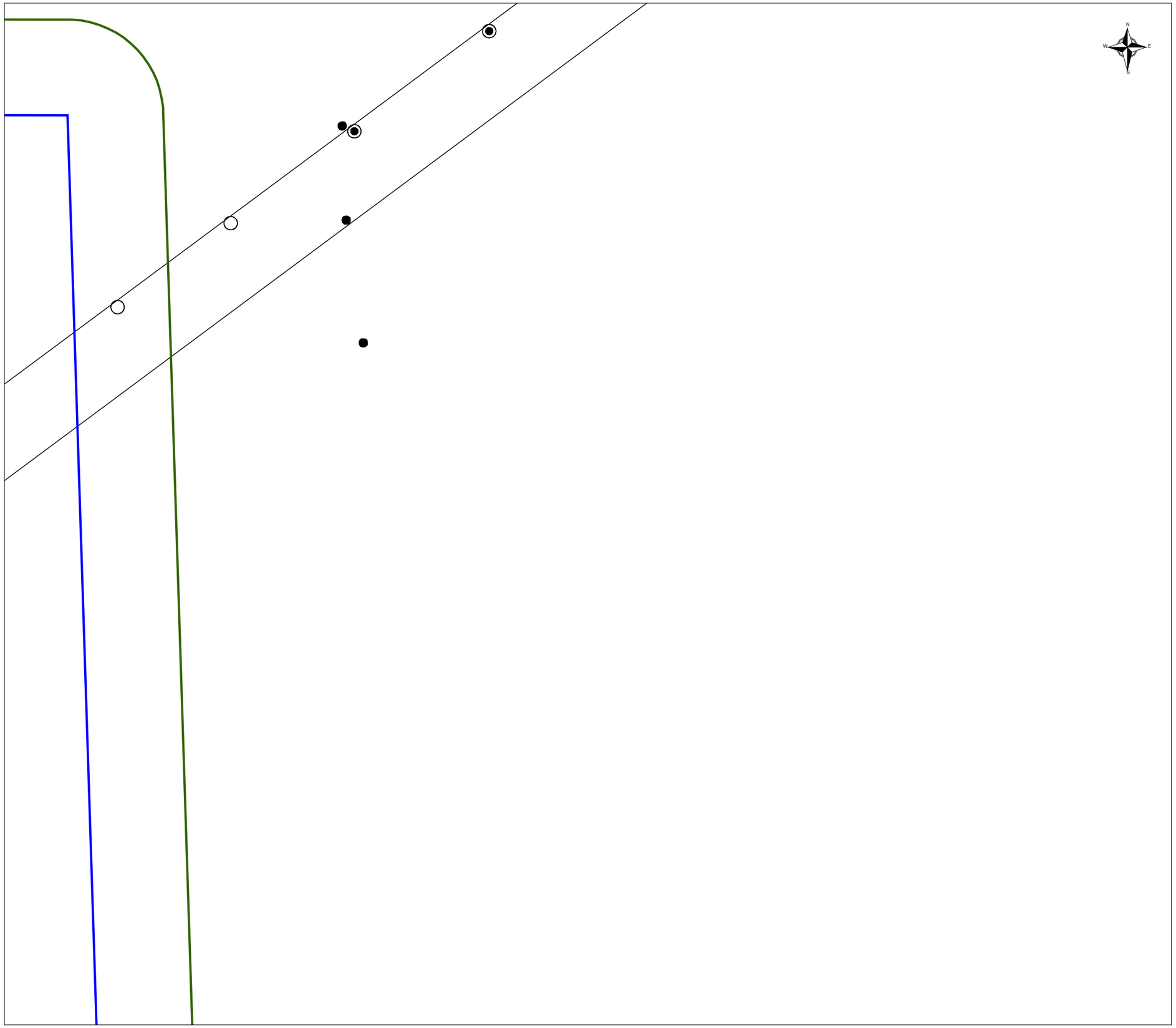
DCDB

Land Parcel

Land Parcel (Area Geom)

Land Parcel Large

Land Parcel Large (Area Geom)



24595408–5351631

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LEGEND

Electricity

- Pole – HV
- Pole – HV/LV
- Pole – LV

DBYD

DBYD Request

- DBYD Request (Area)
- DBYD Request (Ergon Search Area)

DCDB

Land Parcel

- Land Parcel (Area Geom)

Land Parcel Large

- Land Parcel Large (Area Geom)

Land Parcel Medium

- Land Parcel Medium (Area Geom)

Road Boundary

- Road Boundary (Line Geom)

Attachment 9

Indicative Community Layout

LAND USE MAP 30/3/2012