

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:40:16 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:28:45 PM

Insp ID: 647Group 3 - Tennant Creek, ElliottElliott South Camp

What Category are you capturing: Overhead Poles

What is Pole Material type:

Welded

What is the condition of pole:

2

How is the pole planted:

Concrete

What is the Condition of plant:

2

Is street light fitted:

No

Street Light Power Supply:

Street Light Type

Street Light Watts

Street Light Condition

Street Light Height

What is the type of service:

What is the HV voltage level:

What is the arrangement of connected cables:

Are there isolators on the pole:

No

What is the Condition:

2

How many Lots are connected to this pole:

0

Overhead Pole Comments:

Surface rusted. Not connected.

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:28:45 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:26:29 PM

Insp ID: 648

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Concrete

What is the Condition of plant: 3

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type SD30

Street Light Watts 30

Street Light Condition 1

Street Light Height

What is the type of service: Three

What is the HV voltage level: 400

What is the arrangement of connected cables: Twisted

Are there isolators on the pole: No

What is the Condition: 3

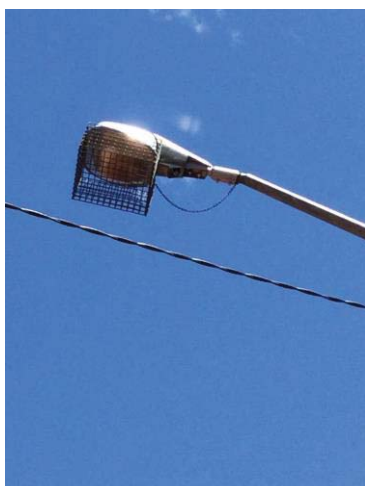
How many Lots are connected to this pole: 1

Overhead Pole Comments: Surface rusted

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:26:29 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:22:14 PM

Insp ID: 649

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Concrete

What is the Condition of plant: 3

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type M80D 05

Street Light Watts 80

Street Light Condition 3

Street Light Height

What is the type of service: Three

What is the HV voltage level: 400

What is the arrangement of connected cables: Twisted

Are there isolators on the pole: No

What is the Condition: 3

How many Lots are connected to this pole: 1

Overhead Pole Comments: Surface rusted

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:22:14 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:08:05 PM

Insp ID: 650

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Concrete

What is the Condition of plant: 3

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type SD50

Street Light Watts 50

Street Light Condition 3

Street Light Height

What is the type of service: Three

What is the HV voltage level: 400

What is the arrangement of connected cables: Twisted

Are there isolators on the pole: No

What is the Condition: 3

How many Lots are connected to this pole: 1

Overhead Pole Comments: Surface rusted

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:08:05 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:05:00 PM

Insp ID: 651 **Group 3 - Tennant Creek, Elliott** **Elliott South Camp**

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Concrete

What is the Condition of plant: 3

Is street light fitted: No

Street Light Power Supply:

Street Light Type

Street Light Watts

Street Light Condition

Street Light Height

What is the type of service: Three

What is the HV voltage level: 400

What is the arrangement of connected cables: Twisted

Are there isolators on the pole: No

What is the Condition: 3

How many Lots are connected to this pole: 1

Overhead Pole Comments: Surface rusted

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:05:00 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:00:30 PM

Insp ID: 653

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Concrete

What is the Condition of plant: 3

Is street light fitted: No

Street Light Power Supply:

Street Light Type

Street Light Watts

Street Light Condition

Street Light Height

What is the type of service: Three

What is the HV voltage level: 400

What is the arrangement of connected cables: Twisted

Are there isolators on the pole: No

What is the Condition: 3

How many Lots are connected to this pole: 0

Overhead Pole Comments: Surface rusted

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:00:30 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 1:56:58 PM

Insp ID: 655

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Concrete

What is the Condition of plant: 3

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type M80D 07

Street Light Watts 80

Street Light Condition 3

Street Light Height

What is the type of service: Three

What is the HV voltage level: 400

What is the arrangement of connected cables: Twisted

Are there isolators on the pole: No

What is the Condition: 3

How many Lots are connected to this pole: 0

Overhead Pole Comments: Surface rusted

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 1:56:58 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 9:15:16 AM

Insp ID: 704 **Group 3 - Tennant Creek, Elliott** **Elliott South Camp**

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Direct

What is the Condition of plant: 3

Is street light fitted: No

Street Light Power Supply:

Street Light Type

Street Light Watts

Street Light Condition

Street Light Height

What is the type of service: Single

What is the HV voltage level: 400

What is the arrangement of connected cables: Twisted

Are there isolators on the pole: No

What is the Condition: 3

How many Lots are connected to this pole: 0

Overhead Pole Comments: Surface rusted

Northern Territory Town Camps

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Inspection Date 29/11/2016 9:15:16 AM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:55:18 PM

Insp ID: 641

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type M80d 06

Street Light Watts 80

Street Light Condition 2

Street Light Height



Northern Territory Town Camps

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Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:51:12 PM

Insp ID: 643

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type S50D 08

Street Light Watts 50

Street Light Condition 3

Street Light Height



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:44:05 PM

Insp ID: 645

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type Unknown

Street Light Watts

Street Light Condition 3

Street Light Height



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:44:05 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:40:16 PM

Insp ID: 646

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type S70D 11

Street Light Watts 70

Street Light Condition 3

Street Light Height



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Insp ID: 648

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type SD30

Street Light Watts 30

Street Light Condition 1

Street Light Height



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Insp ID: 649

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type M80D 05

Street Light Watts 80

Street Light Condition 3

Street Light Height



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Inspection Date 29/11/2016 2:08:05 PM

Insp ID: 650

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type SD50

Street Light Watts 50

Street Light Condition 3

Street Light Height



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Inspection Date 29/11/2016 1:56:58 PM

Insp ID: 655

Group 3 - Tennant Creek, Elliott

Elliott South Camp

What Category are you capturing: Overhead Poles

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type M80D 07

Street Light Watts 80

Street Light Condition 3

Street Light Height



Northern Territory Town Camps

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Inspection Date 29/11/2016 1:56:58 PM



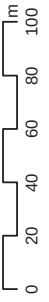
Road map



Legend

- Start of road
- Road Condition**
 - 1-Very poor
 - 2-Poor
 - 3-Good
 - 4-Very good
 - 5-Excellent
- Town Camp boundary

A3 scale: 1:2,000



Existing drawings

LEGEND:

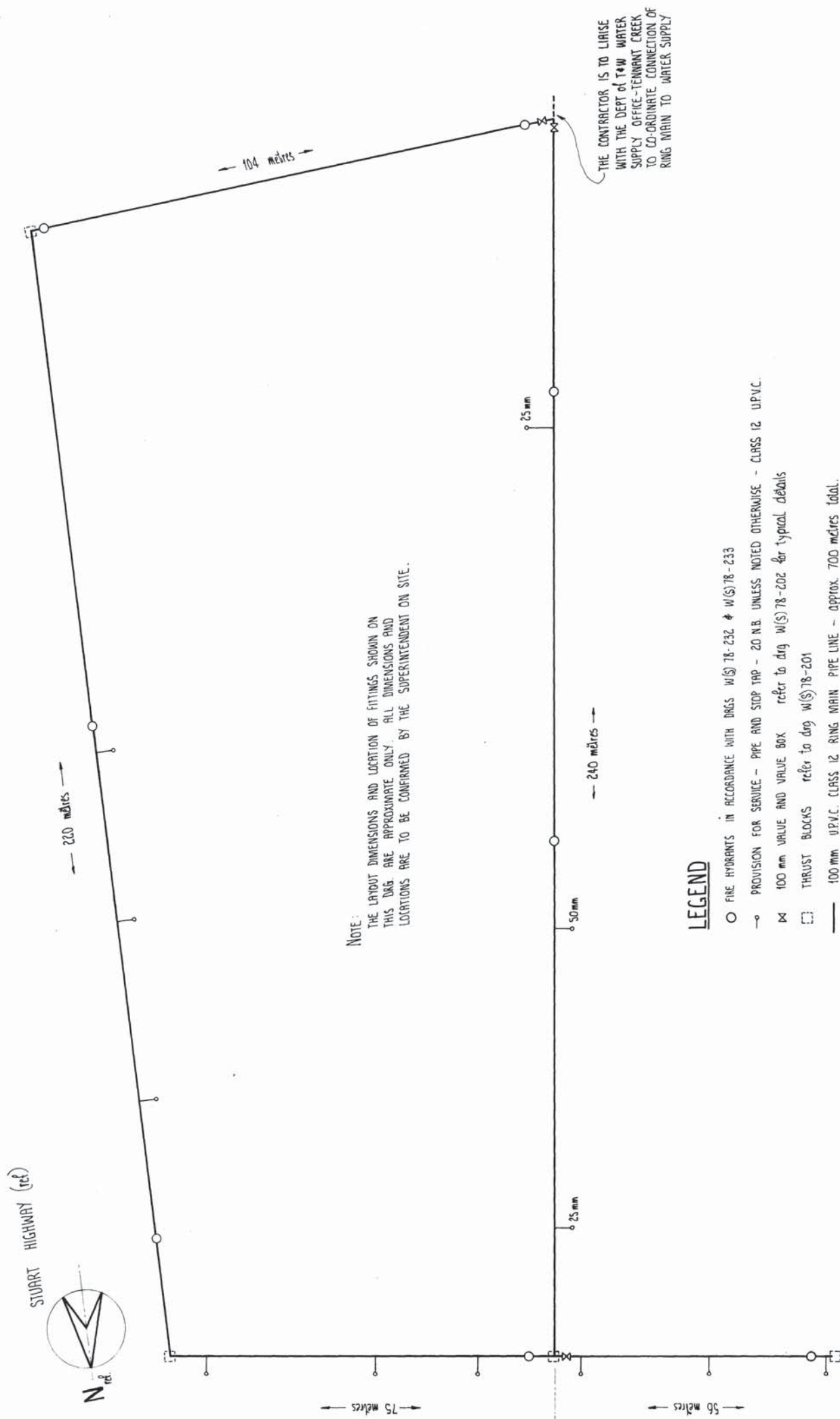
	NEW WATER LINE
	NEW WATER RISING MAIN
	EXISTING WATER LINE
	EXISTING WATER RISING MAIN
	NEW SEWER LINE
	NEW SEWER RISING MAIN
	EXISTING SEWER LINE
	EXISTING SEWER RISING MAIN
	NEW LOW VOLTAGE
	NEW HIGH VOLTAGE
	EXISTING LOW VOLTAGE
	EXISTING HIGH VOLTAGE

H Existing Residential Development (or as highlighted by building sketch layout).

V Forecast Residential Lots for Development (up to 2014). Utility Reticulation Services Compliance has been costed for Existing and Forecast Development up to 2014 only.

F Future Residential Lots Forecast for Development beyond 2014. Utility Reticulation Services shown for future planning only





LEGEND

- FINE HYDRANTS IN ACCORDANCE WITH DNGS W(S) 78-232 & W(S) 78-233
- PROVISION FOR SERVICE — PIPE AND STOP TAP — 20 N.B. UNLESS NOTED OTHERWISE — CLASS 12 UPVC.
- ⊗ 100 mm VALVE AND VALVE BOX refer to dng W(S) 78-202 for typical details
- ⊞ THRUST BLOCKS refer to dng W(S) 78-201
- 100 mm UPVC CLASS 12 RING MAIN PIPE LINE — APPROX. 700 metres total

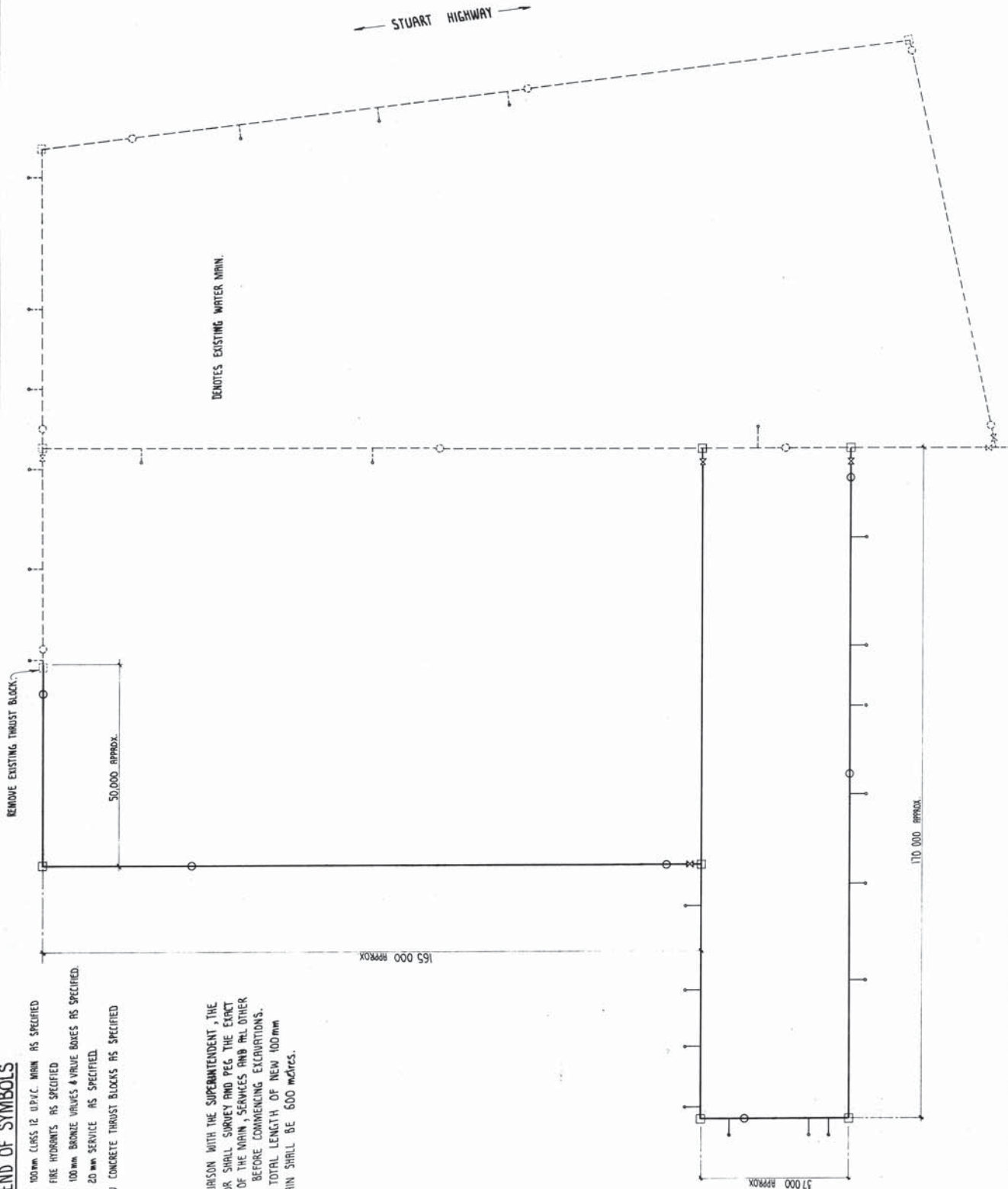
[illegible]

LEGEND OF SYMBOLS

- NEW 100mm CLRS 12 U.P.C. MAIN AS SPECIFIED
- NEW FINE HYDRANTS AS SPECIFIED
- NEW 100mm BRONZE VALVES & VOLUME BOXES AS SPECIFIED
- NEW 20mm SERVICE AS SPECIFIED
- NEW CONCRETE THRUST BLOCKS AS SPECIFIED

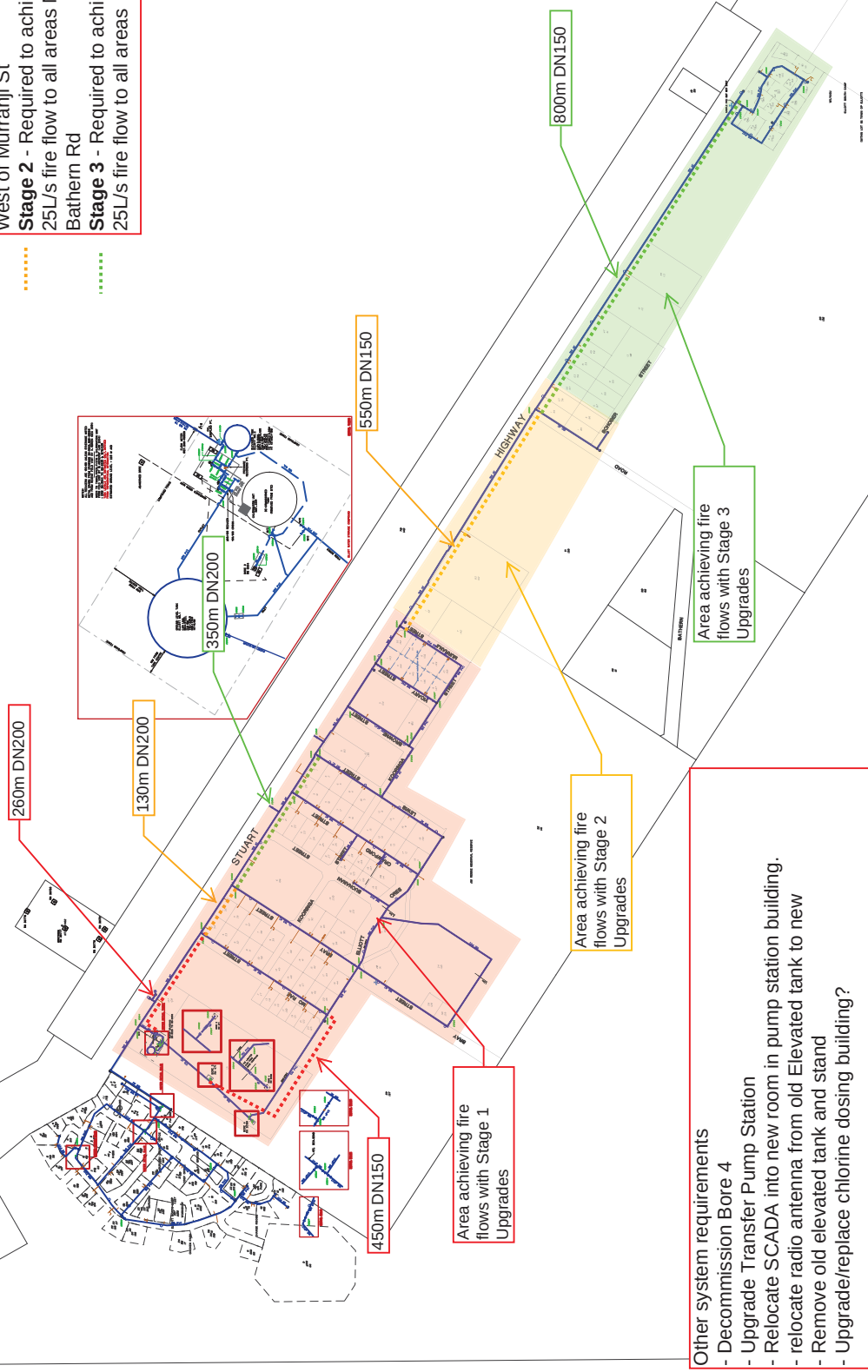
NOTE:

IN LIAISON WITH THE SUPERINTENDENT, THE CONTRACTOR SHALL SURVEY AND PEG THE EXACT LOCATION OF THE MAIN, SERVICES AND ALL OTHER FITTINGS BEFORE COMMENCING EXCAVATIONS. THE TOTAL LENGTH OF NEW 100mm WATER MAIN SHALL BE 600 metres.



NORTHERN TERRITORY OF AUSTRALIA DEPARTMENT OF TRANSPORT AND WORKS		TITLE PLAN ON WATER RETIC EXTENSION AT NORTH CAMP ELLIOTT		SCALE 1:500	
DESIGNER [Signature]		CHECKED [Signature]		DATE 19/94	
DESIGN PROJECT LON		SHEET NO.		CODE	
DRAWN		DRAWING NO.		PROJECT NO.	
ASSOCIATED DOCUMENTS		TCB-84-1227		A1	

- Stage 1** - Required to achieve 25L/s fire flow to all areas North West of Murrant St
- Stage 2** - Required to achieve 25L/s fire flow to all areas NW of Bathern Rd
- Stage 3** - Required to achieve 25L/s fire flow to all areas



Transformer data

Group	Com Id	Location	Community Name	Dwellings No. (Funded Dwellings)	Dwellings No. (Bennett Design)	New Houses ** (Future Demand)	Primary Voltage Level (KV)	PWC Substation ID	PWC Test Number	Transformer size (KVA)	KVA Total dwellings @ 4.5KVA	KVA Total dwellings @ 7KVA	Comments
1	290	Darwin	Bagot	55	55		11	1924	1735	300	247.5	385	
	344	Darwin	Knuckey Lagoons	18	19	2	11	1771	2163	100	85.5	133	
	347	Darwin	Kulujuk	19	19		11	1092	10607	50	85.5	133	
	403	Darwin	Palmerston Town Camp	20	16		22	10196	10245	100	90	140	Two transformers for this Town Camp. Transformers are not in boundary of Town Camp [The nearest transformers data to Town Camp are highlighted in yellow].
	412	Darwin	Railway Dam (One Mile Dam)	5	6	2	22	265	11645	25	27	42	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	427	Adelaide River	Amangel	9	9		22	216	12187	100	40.5	63	Two transformers for this Town Camp.
	687	Jabiru	Manabadurna	10	12		22	184	5646	63	54	84	
	825	Darwin	Minmarana Park	24	24		11	5650	11107	200	108	168	
	606	Katherine	Warlpiri Transient Camp	9	9		22	6416	4886	100	40.5	63	Two transformers for this Town Camp.
	621	Katherine	Miall Brumby (Kelano)	47	31		22	6133	12417	315	211.5	329	
2	640	Pine Creek	Pine Creek Compound	4	4		22	6666	3147	25	18	28	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	971	Mataranka	Mulgagan	12	9	4	22	6818	5297	16	54	84	
	215	Tennant Creek	Blueberry Hill (Munji-Maria)	2	2		22	7079	1968	200	9	14	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	223	Tennant Creek	Dump Camp (Maria-Maria)	7	7		22	7181	11088	200	31.5	49	
	224	Elliott	Elliott South Camp	12	12		11	7504	4718	200	54	84	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	225	Elliott	Elliott North Camp	36	25		11	7505	4715	100	162	252	
	238	Tennant Creek	Karganu (East Side Camp)	12	12	1	22	7572		200	54	84	
	246	Tennant Creek	Ngalpa Ngajpa	18	21		22	7179		200	94.5	147	Two transformers for this Town Camp.
	271	Tennant Creek	Village Camp	12	12	1	22	7183	11107	200	54	84	
	681	Tennant Creek	Tingkarli	12	12		22	7180		200	54	84	
3	684	Tennant Creek	Wuppa	15	15	1	22	7141	11092	100	67.5	105	Two transformers for this Town Camp.
	3	Alice Springs	Angwertwaere (Morris Soak)	11	15		11	8596	11386	300	67.5	105	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	16	Alice Springs	Anthellk Empaye (Charles Creek)	17	10		11	8599	315	315	76.5	119	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	17	Alice Springs	Anthepe	15	15		22	8598	5874	200	67.5	105	Data extracted from PWC asset information. There was not access to this Town Camp due to ceremony on inspection day.
	19	Alice Springs	Aper Alwerkinge (Palmer's)	7	6		11	8405	2939	200	31.5	49	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	35	Alice Springs	Ewyenper Atwaive (Hidden Valley)	47	47		11	8622	11202	100	211.5	329	
	47	Alice Springs	Iparpa	13	13		22	8611	11702	200	58.5	91	
	48	Alice Springs	Iperte Iyathe (Walpiri)	10	9		11	8001	11209	315	45	70	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	50	Alice Springs	Iyperenye (Old Timers)	10	10		22	8145	3323	100	45	70	
	64	Alice Springs	Bassos	2	2		11	8002	10946	50	9	14	
4	69	Alice Springs	Karnte	19	19		22	8282	2345	100	85.5	133	
	87	Alice Springs	Yarrenty Altere (Larapinta Valley)	34	34		11	8619	11335	100	153	238	
	90	Alice Springs	Inarlenge (Little Sisters)	16	22		22	8137	2925	100	99	154	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	108	Alice Springs	Mpwetyerre (Abbotts)	6	6		11	8093	11703	315	27	42	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	113	Alice Springs	Mount Nancy (Nyeuwente)	11	12		11	8405	2939	200	54	84	
	129	Alice Springs	Nyeuwente (Trucking Yards)	26	26		11	8629	11312	300	117	182	
	675	Alice Springs	Hoppys	15	19		11	8314	369	50	85.5	133	There is not any Transformer in boundary of Town Camp. Also it's not shown in PWC asset information.
	676	Alice Springs	Ipive Ipive (Golders Camp)	15	14		11	8569	315	100	67.5	105	
	1029	Alice Springs	Kunoth	4	4		11	8569	315	100	18	28	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	222	Borrooloola	Mara	28	29	2	11	6187	12610	100	130.5	203	Two transformers for this Town Camp.
5	229	Borrooloola	Garawa 1	16	14		11	6546	10166	100	72	112	Two transformers for this Town Camp.
	278	Borrooloola	Yanyula	29	29		11	6162	10496	200	130.5	203	Data extracted from PWC asset information. It's outside of Town Camp shown only Transformer to this Town Camp.
	992	Borrooloola	Garawa 2	11	11		11	6189	2669	25	49.5	77	This transformer is not shown in PWC asset information. It's installed in Boat Ramp Road near to Town Camp and connected to Electrical reticulation of Town Camp.

** For New house's demand calculation see section 13.4 "Future Demand".

Blueberry Hill

Blueberry Hill

1 Design

The infrastructure reviews have been undertaken against current relevant standards for typical sub-divisions. The following standards have been used in undertaking the reviews.

Sewerage and water supply

- Water Services Association of Australia – Sewerage Code – WSA 02 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 02
- Water Services Association of Australia – Sewerage Pumping Station Code – WSA 04 -2005 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 04
- Water Services Association of Australia – Water Supply Code – WSA 03 2002 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 03
- Power and Water Corporation Indigenous Community Engineering Guidelines (2008)
- Department of Housing and Community Development Indigenous Community Engineering Guidelines (ICEG 2014, updated September 2016)
- Power and Water Corporation Essential Services Infrastructure Assessment and Upgrade Guidelines (for Town Camps in Urban Communities, 2009)
- Power and Water Corporation Standard Drawings
- Australian Standards

Electrical services

Electrical infrastructure has been assessed against AS/NZS3000 Wiring Rules and against PWC Service, Installation and Metering Rules and Urban Residential Development (URD) Design Standards where possible.

With one exception, town camps are each a single lot and compliance with AS/NZS3000 is sufficient to address potential safety concerns.

As such application of PWC URD Design Standards will mainly apply to the incoming supply and bulk or initial multi-metering panels if provided.

URD Design Standards for internal reticulation and street lighting appear to have been applied in many cases for convenience rather than compliance.

For the purposes of this report, the demand per dwelling allowances of URD Design Standards have been used to estimate incoming supply and overall distribution capacity requirements.

The following standards apply:

- Australian Standards
- Power Networks Design and Construction Guidelines, Power and Water Corporation
 - NP001.1_Design and Construction of Network Assets – General Requirements
 - NP001.3_General Specification for Overhead Electrical Reticulation
 - NP001.6_General Specification for URD Subdivisions
 - NP003_Installation Rules_V3
 - NP007_Service Rules
 - NP027_Capture of Newly Installed Street Lighting Information
 - NP041_Guidelines for Electrical Design Consultants

Further referral to the guidelines in this report will be designated by the guidelines number, NP001.1.

Communications

- National Broadband Network Website viewed 21 January 2017 (<http://www.nbnco.com.au/>) – NBN rollout maps

General

It should be noted that if the town camps are proposed to be subdivided and services assets gifted to Power and Water Corporation (PWC) for operation and maintenance, all of these services will need to fully meet PWC standards. With the exception of a few town camps that have recently been upgraded, this will require the full replacement and/or realignment of most services.

2 Condition assessment

2.1 Rating assessment matrix

A condition rating matrix was developed and used to assess all municipal infrastructure. The same rating was used for all services to maintain consistency in assessments. Table 1 below shows the condition rating and operability.

Table 1 Condition rating

Condition rating		Operability
1	Very Poor	Not operational
2	Poor	Not fully operational or requires immediate maintenance to keep operational
3	Good	Fully operational, may require routine maintenance
4	Very Good	Fully operational, may require maintenance in the next six months
5	Excellent	New, fully operational

2.2 Civil assessment limitations

The civil infrastructure condition investigations were subject to a number of limitations. These include:

- Only accessible services have been investigated. This includes inspecting the top of sewer manholes, side entry pits, etc., however, does not include opening pits to inspect infrastructure below ground.
- No physical testing of the sewer, water or stormwater network was undertaken.
- No survey or service locating was undertaken.

As there was no survey, potholing or CCTV undertaken on the underground infrastructure there is insufficient information to make determinations on the asset condition. The condition assessments discussed in this report are only for the accessible services and do not necessarily represent the condition of the underground infrastructure. For the majority of the town camps, other than a few that have recently been upgraded it was found that the underground services are generally undersized and it is likely, due to their age, that these services are in poor condition. Either factor would trigger the need for a complete replacement to meet current relevant standards.

2.3 Electrical assessment limitations

The electrical infrastructure condition investigations were subject to a number of limitations. These include:

- Inspections were carried out without the assistance of an electrical tradesman.
- Only accessible services were investigated. Assessments were of a visual nature and no pit covers were removed.
- Overhead equipment was assessed from ground level.
- Switchboards were not opened and no assessment of the internal connections or bus ratings was made.
- Electrical infrastructure was assessed down to the meter for multi-meter panels and down to the termination, overhead pole or distribution pillar, of the supply cable to a meter located at a dwelling.

3 Current infrastructure issues

Power and Water Corporation (PWC) have advised of the following concerns and issues in regard to the sewerage, water and electrical infrastructure at all town camps.

6.1 Ownership and maintenance

PWC stated there has always been confusion regarding the ownership and responsibilities of the internal sewer, water and electrical infrastructure. PWC have advised that they have no legal tenure on the majority of assets in any town camps and that the owner is essentially that of the land owner or leaseholder. This is further discussed for each type of infrastructure for each town camp.

The ownership and who is responsible for the maintenance of the sewage pump stations and street lighting is a major concern. In most town camps it was found that PWC have been maintaining the assets on an in-kind basis, although there are no maintenance or access agreements in place and the infrastructure is generally not compliant to PWC standards.

6.2 Access to infrastructure

PWC advised that due to the uncertainty surrounding ownership and responsibility of the sewerage, water and electrical infrastructure, each town camp is seen as a single lot with multiple houses on it. There are no formal road reserves or easements where the municipal infrastructure should be located. PWC therefore have no legal right to enter the town camps to work on the infrastructure, nor can PWC stop others from working on the infrastructure. There is a risk that the maintenance undertaken by others may be to a lower standard than PWC.

It should be noted that there are currently no legal services easements within the town camps, except for a few cases where a town service passes through the town camp. Therefore it is recommended that easements are created over any infrastructure owned by PWC and any future assets to be gifted to PWC, to allow the service providers access to the infrastructure.

6.3 Existing infrastructure

PWC have stated that although the existing sewerage and water infrastructure appears to comply with relevant standards in some locations, the capacity cannot be assumed to meet PWC requirements due to the potential for underground substandard condition and/or grading of pipework. It is likely that these assets will need to be fully replaced to PWC standards to ensure sufficient capacity.

The planning process currently allows construction within the town camps on Commonwealth land without requiring service authority (PWC) approvals. This means that there has been no opportunity for PWC to recover contributions towards required upgrades to headworks servicing the developments and these upgrades have been paid for by PWC in the past. This inconsistency needs to be addressed for future developments within the town camps to ensure PWC are able to continue to provide adequate services.

6.4 Safety concerns

PWC have expressed concerns with safety of PWC staff and contractors working within the camps. PWC have employed procedures such as multiple people / vehicles to attend the site, with police or housing safety officers as required. This generally leads to a delayed response time and increased cost to respond to and remediate emergency situations.

PWC have also raised the concern that if others work on water infrastructure within the town camps and do not apply the correct sanitation procedures they not only risk contaminating the entire water supply network within the town camp, at some town camps with direct connections to the town supply, they risk contaminating the entire town's water supply.

4 Available information

As the site investigations were limited to accessible / visible services, information on below ground services (such as electrical cables, sewer pipes, water supply pipes, etc.) were determined from available information. This information included:

- Serviced Land Availability Program (SLAP) maps,
- Department of Family & Community Services - Connecting Neighbours Program – Essential Services Scoping Study Report Volume 1 April 2005,
- Connecting Neighbours Project – Infrastructure Assessment and Recommendation Report - Arup Pty Ltd, April 2005,
- Drawings supplied by NT Department of Infrastructure - Technical Records,
- Drawings supplied by Power and Water Corporation,
- Bennett Design inspection reports and population data.

Aurecon undertook a site investigation of the Blueberry Hill community on 30 November 2016 to inspect roads, stormwater drainage, electrical services, sewerage and water supply, and community structures. The following sections detail the outcomes of this investigation and the assessments of the infrastructure.

The civil and electrical inspection reports can be found in the Appendices.

5 Sewerage

5.1 Ownership and boundaries

The sewer infrastructure inspected is assumed to be owned by Julalikari Housing Incorporated, but is the responsibility of Far North – T&J Contractors to maintain.

The sewer network at Blueberry Hill was recently upgraded as part of the SIHIP program. As-constructed drawings were made available and can be found in the Appendices.

It was noted during the inspection that a number of manholes are located within the property boundaries.

5.1.1 Connection methods and billing

PWC advised that they currently charge a single sewerage bill based on the number of houses, which for Blueberry Hill is two. The sewerage bill is charged to the Department of Housing and Community Development.

It is not known what contribution the residents make towards the sewerage bills.

5.2 Existing infrastructure condition assessment

The sewer infrastructure inspection was limited to inspecting the condition of manhole covers, as all other sewerage infrastructure is below ground. A comprehensive review of all available documentation, including reviewing as-constructed drawings and having discussions with Power and Water Corporation was conducted. The following table compares the assets that have been constructed, according to the as-constructed drawings, and the assets assessed during the inspections conducted by Aurecon.

Table 2 Sewerage assets inspected

Asset type	Number of assets as per documentation	Number of assets assessed during inspection
Manholes	7	7

The condition ratings of the manholes inspected are as follows:

Table 3 Sewer condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Manholes			5	2		7



Figure 1 Sewer manhole, condition: *good*



Figure 2 Sewer manhole, condition: *very good*

5.3 Current performance and risks

5.3.1 Current sewer network performance

The current capacity of the sewer network was calculated based on the following design assumptions:

- The adopted minimum grade for the pipework is 1.0%, as advised by Power and Water Corporation.
- The Equivalent Population (EP) has been calculated assuming one household equates to 9 EP, based on discussions with Power and Water Corporation.
- The capacity has been assessed by calculating the current flow rate, and the maximum flow rate when the sewer pipe flows full. The result is then a percentage of how much of the pipe is currently being used.
- Manning's roughness coefficient of the pipework is 0.012, as recommended by PWC for PVC pipes.
- Where the sewer pipe grade, size or material is not known, it is assumed to be non-compliant to PWC standards.

The current number of houses in Blueberry Hill is two, however there are two new houses currently being built. Four houses multiplied by 9 EP per house gives a total current EP of 36. The capacity of the existing sewer was then calculated. The percentage shows how much of the pipe capacity is currently being used.

As-constructed drawings were available which showed that the pipework was DN150 PVC.

Table 4 Existing sewer capacity

Catchment	Current total EP	Diameter of connection (mm)	Adopted PWC minimum slope (%)	Q_{full} (L/s)	Current Q (L/s)	Current capacity (%)
Catchment 1	36	150	1.0	16.50	0.64	4%

Table 4 above shows that the capacity of the existing sewer network is adequate for the current peak population. As the current flow is relatively low, it is likely that self-cleansing velocities are not achieved.

5.4 Future demands

As no new developments are currently planned for the community, there are no additional upgrades required to cater for future demand.

5.5 Recommended works

All sewer infrastructure that was assessed during the site inspection is in good or very good condition and does not require any maintenance.

6 Water supply

6.1 Ownership and boundaries

The water supply infrastructure was upgraded to PWC standards as part of the SIHIP program. The existing network is understood to be a DN150 PVC ring main.

The water supply assets within Blueberry Hill are believed to be owned by Julalikari Housing Incorporated, but are the responsibility of Far North – T&J Contractors to maintain. The water is supplied from a water main outside of the community, which are the responsibility of PWC. Figure 3 below shows the DN150 PVC water main servicing Blueberry Hill, along with the PWC owned DN150 CICL main.

PWC have advised they currently maintain the water assets up the residential lot water meters, although there is no formal agreement covering this maintenance.

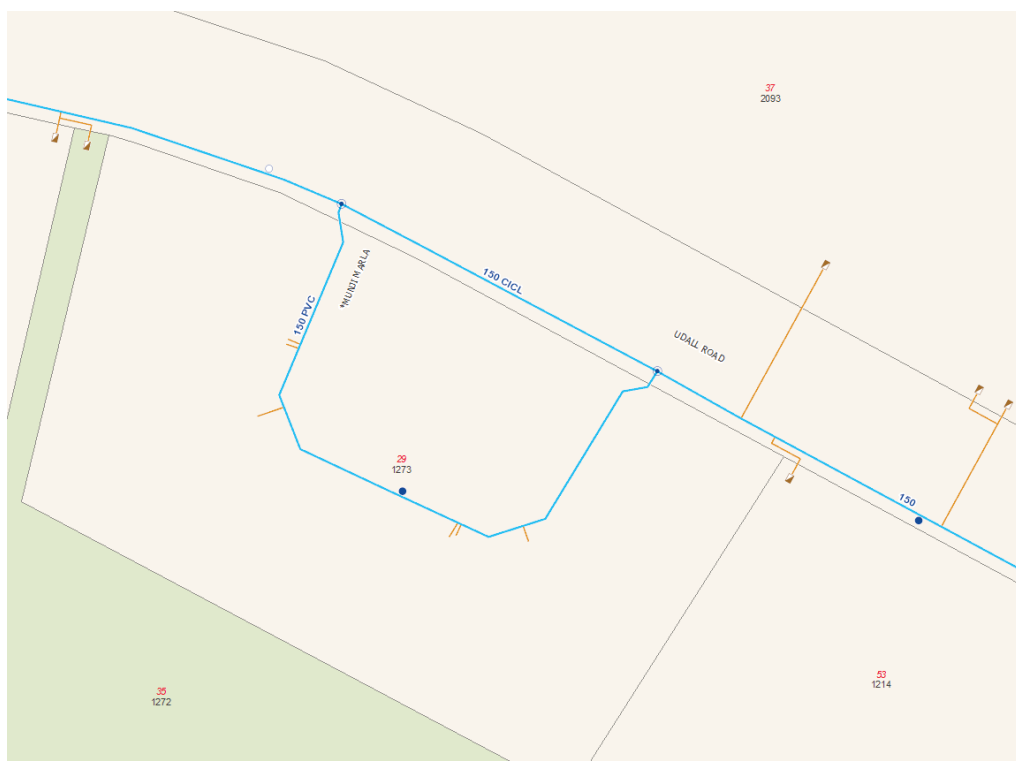


Figure 3 Munji-Marla water supply network

6.1.1 Connection methods and billing

Through consultation with PWC it has been determined that the water usage is currently charged as a fixed daily rate for 2 house water meters within Blueberry Hill. The bill is issued to the Department of Housing and Community Services. It is not known what contribution the residents make towards water bills.

It is proposed that PWC measures the water supply to the entire community, as opposed to individual lots within the community. This requires the installation of a bulk water meter on the water mains located at the community boundary. Under this scheme, the water bill for the entire community is the responsibility of the governing body, being Julalikari Housing Incorporated for Munji-Marla. It will be up to governing body to assign bills to residents accordingly.

It is recommended that the individual lot meters are maintained in addition to the proposed continuation of using bulk water meters. This will assist with the governing body distributing bills to residents, the identification of any leaks in the network, and meeting PWC standards should the town camp be subdivided in the future.

6.2 Existing infrastructure condition assessment

The site investigation for the water infrastructure included assessing the condition of any air valves, fire hydrants, tanks, taps, and water meters. The assessment was limited to services that could be assessed above ground; no below ground services were inspected. A comprehensive review of all available documentation, including reviewing as-constructed drawings and having discussions with Power and Water Corporation was conducted. The following table compares the assets that have been constructed, according to the as-constructed drawings, and the assets assessed during the inspections conducted by Aurecon.

Table 5 Water supply assets inspected

Asset type	Number of assets as per documentation	Number of assets assessed during inspection
Fire hydrants	1	1
Water meter (residential lots)	4	4

The condition of each asset is as follows:

Table 6 Water asset condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Fire hydrant			1			1
Water meter (residential lots)					4	



Figure 4 Fire hydrant, condition: *very good*



Figure 5 Water meter (lot), condition: *good*

6.3 Current performance and risks

The current demand of the community was calculated based on the following design assumptions:

- The nominal peak day flow is 1300 L/capita/day, based on PWC's supplement to WSA 03 2002. This value is for the southern region of NT. It was assumed that the nominal peak day flow of 1300 L/capita/day also applies to water usage within the community, although it is possible that this value could be higher in real life due to a lack of controls to reduce water usage.
- The Equivalent Population (EP) has been calculated assuming one household equates to 9 EP, based on discussions with Power and Water Corporation.
- The peak hour factors are listed in PWC's Supplement to WSA 03-2002, and they depend on the population range of the community. The peak hour factor of 3.0 has been adopted, for populations less than 500.

Table 7 shows the calculated demand.

Table 7 Current water demand

Total dwellings	EP	Demand (l/s)	Peak hour demand (l/s)
4	36	0.54	1.62

The system is expected to have sufficient capacity to meet peak hour demands.

The assessment of water supply for firefighting has been based on the size of the water mains and the condition of the accessible fire hydrants. Additional hydrants have been recommended where it appears

the existing number of hydrants are insufficient. In the case of Munji-Marla no additional hydrants were noted as being required at this stage.

The layout and pipe sizes are compliant with PWC standards.

6.4 Future demands

As no new developments are currently planned for the community, there are no additional upgrades required to cater for future demand.

6.5 Recommended works

The infrastructure that was assessed as very poor or poor is recommended to be upgraded to prevent failure in the future. The following maintenance works are recommended;

- Clear dirt and overgrown grass from four water meters
- Repaint one fire hydrant

The community is viewed overall as a large single lot and as previously detailed, proposed to have the water usage measured accordingly. In order to measure the water usage as a single lot, a bulk water meter should be installed. Since the existing network is a ring main, one of the supply points should be disconnected and reconnected to the network creating a loop. This allows the single remaining point to be metered. The cost estimates for upgrades at Blueberry Hill include;

- Disconnect secondary supply point and reconnect to water main creating a looped network.
- Install bulk water meter

7 Roadworks

7.1 Ownership and boundaries

The roads within Blueberry Hill community are owned by Julalikari Housing Incorporated, but are the responsibility of Far North – T&J Contractors.

7.2 Existing infrastructure condition assessment

The road network within Blueberry Hill community consists of one sealed road. There are also some tracks which appear to be used frequently which are not included in the inspection and report. Road furniture including signs, speed humps, footpaths and car parks were also inspected. Table 8 below summarise the condition of the road furniture as assessed during the site inspection.

Table 8 Roadworks condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Sign				2		2
Footpath			1			1



Figure 6 Sign, condition: *very good*



Figure 7 Footpath, condition: *good*

There were two give way signs at Blueberry Hill and both were in very good condition, although one sign was slightly on a lean, as shown in Figure 6.

The footpath in Blueberry Hill is generally in good condition, although a general tidy up is required to remove weeds and dirt on the path.



Figure 8 Blueberry Hill community road network

Table 9 below details the condition of the roads within Blueberry Hill community for specific segments. Figure 8 shows a map of the road network with the condition ratings, road name, and chainage direction. Note, the percentage refers to the percentage of that particular road segment which experiences the defect.

Table 9 Road network condition assessment

Road name	Chainage start (km)	Chainage end (km)	Condition (1 to 5)	Defects and associated condition
215_1	0.0	0.140	3	-30% of road has bleeding (3)



Figure 9 Road 215_1 with bitumen bleeding, condition: *good*



Figure 10 Road 215_1, condition: *good*

There are no maintenance works required for the near future, however the bleeding defect should be inspected regularly to determine when repair works are required.

7.3 Current performance and risks

The road network and signage is sufficient for the current number of houses.

The footpath is sufficient for community use.

7.4 Future demands

As no new developments are currently planned for the community, there are no additional upgrades required to cater for future demand.

7.5 Recommended works

The infrastructure that was assessed as Very Poor or Poor is recommended to be upgraded to prevent failure in the future. The following works are recommended to upgrade the current infrastructure;

- General tidy up of approximately 150 m of footpath

8 **Stormwater drainage**

8.1 Ownership and boundaries

The stormwater drainage assets within Blueberry Hill (Munji-Marla) are believed to be owned by Julalikari Housing Incorporated, but are the responsibility of Far North – T&J Contractors.

Stormwater drainage infrastructure outside of the community is owned by Barkly Regional Council.

8.2 Existing infrastructure condition assessment

The site investigation for the stormwater infrastructure included assessing the condition of swales, culverts, headwalls, and side entry pits (SEP). Only the above ground infrastructure was assessed. As the inspection was undertaken outside of a storm event and no CCTV of the pipes was undertaken, flooding due to blockages or damage to the underground infrastructure could not be assessed. Table 10 below summarises the condition of the stormwater assets as assessed during the inspection.

Table 10 Stormwater condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Side entry pit				3		3



Figure 11 Two bay side entry pit, condition: *very good*



Figure 12 One bay side entry pit, condition: *very good*



Figure 13 Two bay side entry pit, condition: *very good*

8.3 Current performance and risks

The detailed performance of the stormwater network cannot be fully analysed without significant hydraulic and hydrodynamic modelling, which is outside the scope of this project. However based on the condition of the stormwater infrastructure assessed it would appear to be operating adequately.

8.4 Future demands

As no new developments are currently planned for the community, there are no additional upgrades required to cater for future demand.

8.5 Recommended works

No immediate maintenance works or upgrades are required.

9 **Community structures**

9.1 **Ownership and boundaries**

There were no community structures found at Blueberry Hill.

9.2 **Future demands**

As no new houses will be constructed in Blueberry Hill (other than those that are currently being constructed), no community structures such as playgrounds need to be constructed.

10 Electrical services

10.1 Ownership and boundaries

The following points, from Network Policy NP003 Installation Rules Section 3, define the typical shared ownership of electrical infrastructure by Power and Water Corporation (PWC) and customers.

- The point of supply is defined as the point where PWC makes the electrical supply available. For domestic supply, this is normally one of the following:
- A point of attachment of an overhead service on to a building or pole on which a metering panel is fitted.
- A point of attachment of an overhead service on to a pole forming part of unmetered aerial consumer's mains.
- A nominated point on a distribution substation located on the customer's lot.
- A point of connection of an underground service in a metering panel, including underground services originating at an overhead line.
- A point of connection of an underground service in a pillar or junction box forming part of unmetered consumer's mains, located on the customer's lot.
- A point on a Power and Water pillar located on the customer's lot.

Typically, distribution infrastructure upstream of the Point Of Supply is owned and maintained by PWC and infrastructure below the point of supply is owned and maintained by the customer.

In many cases PWC have defined a Point Of Supply to ensure that they retain responsibility for aerial high voltage infrastructure, and aerial low voltage infrastructure where installed with aerial high voltage infrastructure, to minimise the possibility of the community or its contractors coming into contact, either deliberately or inadvertently, with aerial high voltage infrastructure.

In other cases isolation facilities are present or desired by PWC to define the Point of Supply at or near the boundary of the town camp.

The Blueberry Hill (Munji-Marla) community electrical reticulation systems is supplied by a transformer upstream to low voltage overhead system, that distributes to the individual houses. The overhead poles are of Weld Construction (Universal Pole construction).

All meters in this site are pre-paid digital meters.

PWC advise that most of Tennant Creek/Alice Springs Town Camps have undergone upgrades under the SIHIP program with the intent to normalise the services to look like an urban subdivision but have never been formally handed over to PWC for operations and maintenance.

PWC advise that the Point Of Supply is the LV isolators on overhead pole at the lot boundary where the power first enters and upstream infrastructure.

PWC recommend that a GBS (Gas Break Switch) be provided upstream of the first transformer to establish a demarcation point.

PWC advise that street lighting is supplied from unmetered LV infrastructure and is the responsibility of the lot holder and not PWC.

All meters, whether pre- or post-paid are the property of PWC.

Blueberry Hill community are responsible for all unmetered and metered LV infrastructure including the main switchboard, metering panel (excluding meter), LV distribution feeders, consumers' mains and consumer switchboards and street lights.

10.2 Existing infrastructure condition assessment

Table 11 shows the condition rating given to the Overhead poles. The overhead poles have 100% operational rating from the visual inspection.

Table 11 Overhead pole condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Overhead pole			4			4

Table 12 shows the condition rating given to the street lights. The street light on the overhead pole was of overhead feed and mercury lamp M125. The street light on overhead pole had 25% operational rating and 75% Non-operational.

Table 12 Street light on O/H pole condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Street light on O/H pole		3	1			4

Table 13 shows the condition rating given to the metering panels. All assessed meters in this community are prepaid digital meters.

Table 13 Meter panel condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Pre-paid meter			2			2
Switchboard			1			1

Table 14 shows the condition rating given to the switchboards associated to dwellings.

Table 14 Switchboard condition assessment (housing footprint)

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Switchboard			2			2

The details of the individual inspections and photographs of each infrastructure item are included in the Appendices.

10.3 Current performance and risks

The electrical infrastructure evaluation was conducted against the following criteria

- Number of dwellings on tenure, the higher value of the funded dwelling and as quoted in the population report was utilised.
- Urban area, NP001.1, 4. Definitions.
- General Specification for URD Subdivisions, NP001.6, 4.3 Substation Size.
- Normal ADMD (After Diversity Maximum Demand) of 4.5 kVA and high cost subdivisions at 7 kVA.
- Transformer ratings were assumed to be correct in Dekho (PWC asset information system) and compared against photographs of test or transformer numbers collected.
- Substation loads were compared against transformer sizes only. No load flow analysis was conducted.
- No load calculations were performed or assessment conducted on overhead or underground cable, visual inspection from the ground only.
- Streetlighting loads were ignored as they are not significant.

The calculated maximum demand of the Blueberry Hill (Munji-Marla) community transformer is 5% of rated capacity based on 4.5kVA/dwelling.

Table 15 Blueberry Hill (Munji-Marla) current demand load vs transformer ratings

Community name	Dwellings	Transformer (kVA)	kVA Total @ 4.5kVA	kVA Total @ 7kVA	Comments
Blueberry Hill (Munji-Marla)	2	200	9	14	Transformer is not in boundary of Town Camp.

A tabulated summary of all community transformers is included in the appendices.

There is a risk of equipment not being maintained associated with the non-standard division of responsibilities between the customer and PWC.

The following points from the PWC Metering Rules should be noted:

- The routine maintenance of metering installations and the replacement of any faulty meters is the responsibility of PWC.
- The property owners are responsible for the maintenance and upkeep of meter rooms, boxes and panels (including lids, doors and locking mechanisms).
- The installation of pre-paid metering is a cost to the customer, refer NP010 Meter Manual-Maintenance of Metering Installations, Power and Water Corporation.

10.4 Future demands

As no new developments are currently planned for the community, there are no additional upgrades required to cater for future demand.

10.5 Recommended works

The following maintenance works and upgrades are recommended:

- Replace three 125W street lights.

11 Communications

11.1 Ownership and boundaries

Details of Telstra pit and conduit infrastructure within the town camp boundaries were sought but were not forthcoming.

11.2 Existing infrastructure condition assessment

The telecommunications infrastructure assessed included pits and telephone booths.

The Appendices contain the individual reports.

Table 16 Telecommunication pit condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Telecommunication pit						0

Table 17 Telephone booth condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Phone booth						0

11.3 Current performance and risks

No details of the performance of communications infrastructure were obtained.

11.4 Future demands

The current availability of broadband services at Blueberry Hill (Munji-Marla) is displayed in the Figure 14 below. NBN is available to residents via a fixed telecommunication line on application to an appropriate NBN access provider.

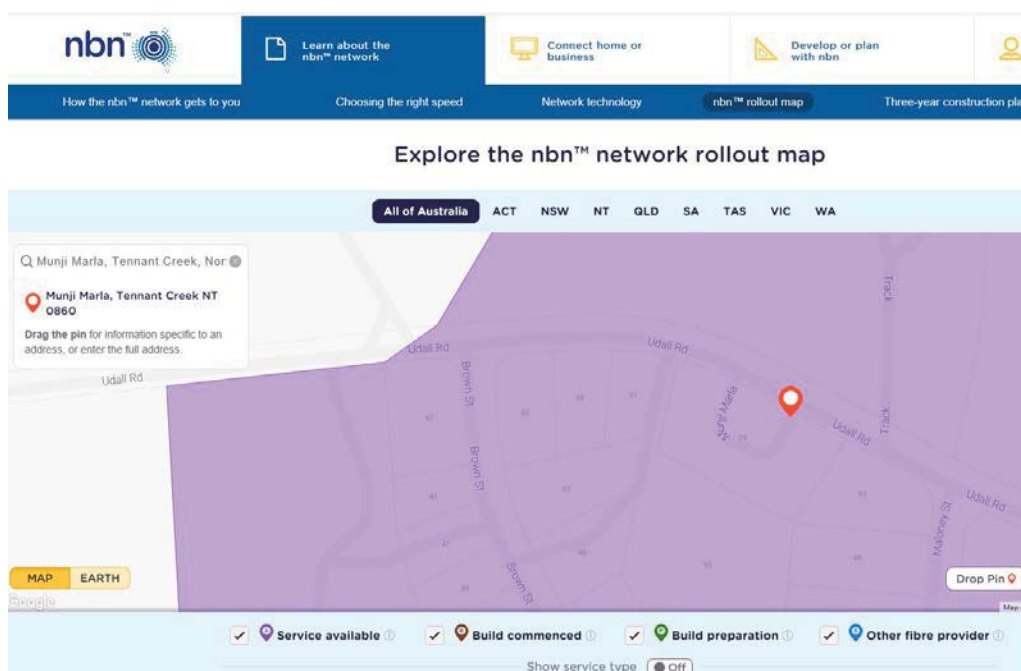


Figure 14 NBN network availability map

The NBN rollout map confirms that NBN is planned to be made available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

11.5 Recommended works

Representatives from NBN's Land Access and Stake Holder management teams are currently engaged with Yilli Housing and NT Housing to look at how camps will be serviced. It is expected that any existing premises in these camps will have some type of NBN service via the NBN brownfields rollout in the future.

No works are required at Blueberry Hill (Munji-Marla) because NBN is available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

12 Cost estimates

Table 18 below shows a summary of the cost estimates to undertake the maintenance required to fix the existing infrastructure and to upgrade the existing network to meet current design standards. There are no upgrades required for the future design. The estimates take into account a 30% contingency, are inclusive of GST, and a location factor has been applied to town camps outside of Darwin.

Table 18 Cost estimates

Infrastructure	Maintenance of existing infrastructure	Upgrades to meet current design
Sewerage	\$ 0	\$ 0
Water supply	\$ 2,000	\$ 86,000
Roadworks	\$ 3,000	\$ 0
Stormwater drainage	\$ 0	\$ 0
Community structures	\$ 0	\$ 0
Electrical	\$ 3,000	\$ 0
Communications	\$ 0	\$ 0
Miscellaneous provisions	\$ 12,000	\$ 22,000
Total (including GST)	\$ 20,000	\$ 108,000
Grand total	\$ 128,000	

The cost estimates are a preliminary estimate only. Since Aurecon has no control over the cost of labour, materials, equipment or services furnished by others, or over contractors' methods of determining prices, or over competitive bidding or market conditions, Aurecon cannot guarantee actual costs will not vary from these estimates.

13 Summary

The following works are recommended for Blueberry Hill (Munji-Marla) community:

Sewerage

- No upgrades required.

Water supply

- Clear dirt and overgrown grass from four water meters
- Repaint one fire hydrant
- Disconnect secondary supply point and reconnect to water main creating a looped network.
- Install bulk water meter

Roadworks

- General tidy up of approximately 150 m of footpath

Stormwater drainage

- No works required

Community structures

- No works required

Electrical services

- Replace three 125W street lights.

Communications

- No works are required because NBN is available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

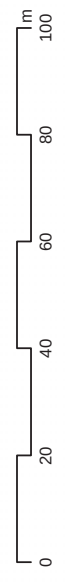
Civil inspection reports



Map by: DMCP P:\GIS\Projects\253963 NT Town Camps\253963_003_Civil_DDP.mxd 23/02/2017 12:02
Imagery: Digital Globe WYZ 2013-2016

A3 scale: 1:1,000

Note:
Label numbers refer to survey IDs



Date: 23/02/2017 Version: 2
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments: Sewerage

215 - Munji-Marla (Tennant Creek)



Map by: DMCP P:\GIS\Projects\253963 NT Town Camps\253963_003_Civil_DDP.mxd 23/02/2017 12:02 Imagery: Digital Globe WV2 2013-2016

A3 scale: 1:1,000

Note:
Label numbers refer to survey IDs



Date: 23/02/2017 Version: 2
Coordinate system: MGA84 Zone 52

NT Town Camp Infrastructure Assessments: Water

215 - Munji-Marla (Tennant Creek)

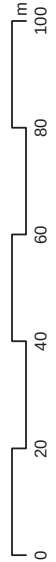


Map by: DMCP P:\GIS\Projects\253963 NT Town Camps\253963_003_Civil_DDP.mxd 23/02/2017 12:02 Imagery: Digital Globe WV2 2013-2016

- Legend**
- Town Camp boundary
 - Road furniture
 - Footpaths (1)
 - Signs (2)
 - Stormwater
 - Side Entry Pt (2)

A3 scale: 1:1,000

Note:
Label numbers refer to survey IDs



Date: 23/02/2017 Version: 2
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments

Road furniture, stormwater drainage & community structures

215 - Munji-Marla (Tennant Creek)

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:46:39 AM

Insp ID: 1347

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 3 - Good

FH Comment: Paint starting to fade



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:42:16 AM

Insp ID: 1352

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

Road Name: 215_1

What are you inspecting: Foot Paths

Footpath Width (mm): 1200

Footpath Type:

Footpath Condition: 3 - Good

Comment: Needs tidy up

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 12:02:56 PM

Insp ID: 1338

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: 16/29A

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:58:03 AM

Insp ID: 1340	Group 3 - Tennant Creek, Elliott	Blueberry Hill (Munji-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: 16/29B

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:56:03 AM

Insp ID: 1343	Group 3 - Tennant Creek, Elliott	Blueberry Hill (Munji-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: 16/29C

Comments: In property



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:53:12 AM

Insp ID: 1345	Group 3 - Tennant Creek, Elliott	Blueberry Hill (Munji-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 4 - Very Good

Notes on Lid: 16/29D

Comments: Paint on lid



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:46:55 AM

Insp ID: 1348

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 4 - Very Good

Notes on Lid: 16/29E

Comments: Within property



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:45:48 AM

Insp ID: 1349

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:45:01 AM

Insp ID: 1350

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid:

Comments: Covered with grass



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:37:08 AM

Insp ID: 1354 **Group 3 - Tennant Creek, Elliott** **Blueberry Hill (Munji-Marla)**

Road Name: 215_1

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.14

Road Type: Sealed - spray seal

Section Width (m): 7.2

Road Condition: 3 - Good

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Bleeding	30	3 - Good	30% of road has bleeding

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Kerb and Gutter	3 - Good	

Shoulders Section

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:37:08 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:37:08 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:58:19 AM

Insp ID: 1341

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

Stormwater Infrastructure:SEP

Number of Bays:1

On grade or sag pit:

Both sides of road:Left

Condition:4 - Very Good

Blockage (%):0

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:55:46 AM

Insp ID: 1342

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

Stormwater Infrastructure: SEP
Number of Bays: 2
On grade or sag pit:
Both sides of road: Both
Condition: 4 - Very Good
Blockage (%):
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 12:02:11 PM

Insp ID: 1339

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

Road Name: 215_1

What are you inspecting: Signs

Type of Sign: Give Way

Sign Condition: 4 - Very Good

Sign Comment:

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:41:25 AM

Insp ID: 1353

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

Road Name: 215_1

What are you inspecting: Signs

Type of Sign: Give Way

Sign Condition: 4 - Very Good

Sign Comment: On slight angle

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:54:40 AM

Insp ID: 1344	Group 3 - Tennant Creek, Elliott	Blueberry Hill (Munji-Marla)

What Water Asset Are you Capturing: Water Meter

Water Meter Type: Lot

Bulk Water Meter Size (mm):

Bulk Water Meter Condition:

Bulk Water Meter Comment:

Lot Number: 25

Lot Water Meter Size:

Lot Water Meter Condition: 4 - Very Good

Lot Water Meter Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:52:02 AM

Insp ID: 1346	Group 3 - Tennant Creek, Elliott	Blueberry Hill (Munji-Marla)

What Water Asset Are you Capturing: Water Meter

Water Meter Type: Lot

Bulk Water Meter Size (mm):

Bulk Water Meter Condition:

Bulk Water Meter Comment:

Lot Number:

Lot Water Meter Size: 25

Lot Water Meter Condition: 4 - Very Good

Lot Water Meter Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:43:38 AM

Insp ID: 1351	Group 3 - Tennant Creek, Elliott	Blueberry Hill (Munji-Marla)

What Water Asset Are you Capturing: Water Meter

Water Meter Type: Lot

Bulk Water Meter Size (mm):

Bulk Water Meter Condition:

Bulk Water Meter Comment:

Lot Number:

Lot Water Meter Size: 25

Lot Water Meter Condition: 4 - Very Good

Lot Water Meter Comment: Two meters



Electrical inspection reports



Map by: DMCP P:\GIS\Projects\253963 NT Town Camps\253963_004 Elec DDP report.mxd 23/02/2017 12:22

- Legend**
- Electrical infrastructure**
 - 11kV HV/LV Pole
 - 11kV Line Pole
 - 11kV Pole Mounted Substation
 - 11kV Air break switch
 - 11kV Switch Fuse
 - 11kV Metering
 - LV Line Pole
 - LV Service Pole
 - LV switch
 - Street Lighting on HV Pole
 - Transformer
 - Town Camp roads
 - NT cadastre
 - Town Camp boundary
 - Electrical survey points**
 - 1234 Other Values
 - 1234 Distribution Panel
 - 1234 Overhead Poles
 - 1234 Street Light
 - 1234 Transformers

A3 scale: 1:1,000



Date: 23/02/2017 Version: 3
Coordinate system: MGA84 Zone 52

NT Town Camp Infrastructure Assessments: Electrical 215 - Munji-Maria (Tennant Creek)

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 5/12/2016 11:39:12 AM

Insp ID: 3551

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 3

Meter Condition: 3

Meter Comment: Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 5/12/2016 11:00:06 AM

Insp ID: 3555

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond:

Meter Condition: 3

Meter Comment: Condition of CB not assessed. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:23:04 PM

Insp ID: 730

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Concrete

What is the Condition of plant: 3

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type M125 D 08

Street Light Watts 125

Street Light Condition 2

Street Light Height

What is the type of service: Three

What is the HV voltage level: 400

What is the arrangement of connected cables:

Are there isolators on the pole: No

What is the Condition: 3

How many Lots are connected to this pole: 2

Overhead Pole Comments: Surface rusted

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:23:04 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:20:32 PM

Insp ID: 731

Group 3 - Tennant Creek, Elliott

Location Blueberry Hill (Munji-Marla)

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Concrete

What is the Condition of plant: 3

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type M125 D 10

Street Light Watts 125

Street Light Condition 2

Street Light Height

What is the type of service: Three

What is the HV voltage level: 400

What is the arrangement of connected cables: Twisted

Are there isolators on the pole: No

What is the Condition: 3

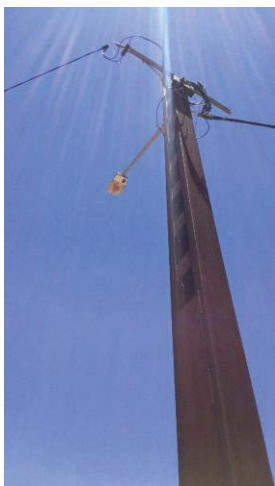
How many Lots are connected to this pole: 1

Overhead Pole Comments: Surface rusted

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:20:32 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:18:37 PM

Insp ID: 732

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Concrete

What is the Condition of plant: 3

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type M125 D 08

Street Light Watts 125

Street Light Condition 2

Street Light Height

What is the type of service: Three

What is the HV voltage level: 400

What is the arrangement of connected cables: Twisted

Are there isolators on the pole: No

What is the Condition: 3

How many Lots are connected to this pole: 0

Overhead Pole Comments: Surface rusted

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:18:37 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:16:21 PM

Insp ID: 733

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Concrete

What is the Condition of plant: 3

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type M125 D 18

Street Light Watts 125

Street Light Condition 3

Street Light Height

What is the type of service: Three

What is the HV voltage level: 400

What is the arrangement of connected cables: Twisted

Are there isolators on the pole: No

What is the Condition: 3

How many Lots are connected to this pole: 0

Overhead Pole Comments: Surface rusted

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:16:21 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:23:04 PM

Insp ID: 730

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

What Category are you capturing: Overhead Poles

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type M125 D 08

Street Light Watts 125

Street Light Condition 2

Street Light Height



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:23:04 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:20:32 PM

Insp ID: 731

Group 3 - Tennant Creek, Elliott

Blueberry Hill (Munji-Marla)

What Category are you capturing: Overhead Poles

Is street light fitted: Yes

Street Light Power Supply:

Street Light Type M125 D 10

Street Light Watts 125

Street Light Condition 2

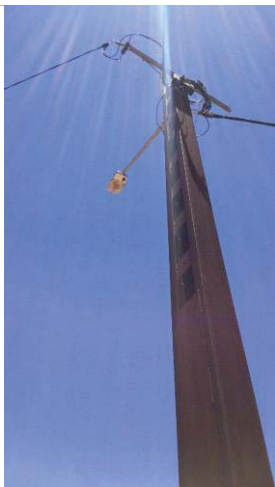
Street Light Height



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:20:32 PM



Northern Territory Town Camps

Electrical Infrastructure

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Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:18:37 PM



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Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 30/11/2016 12:16:21 PM



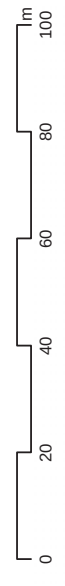
Road map



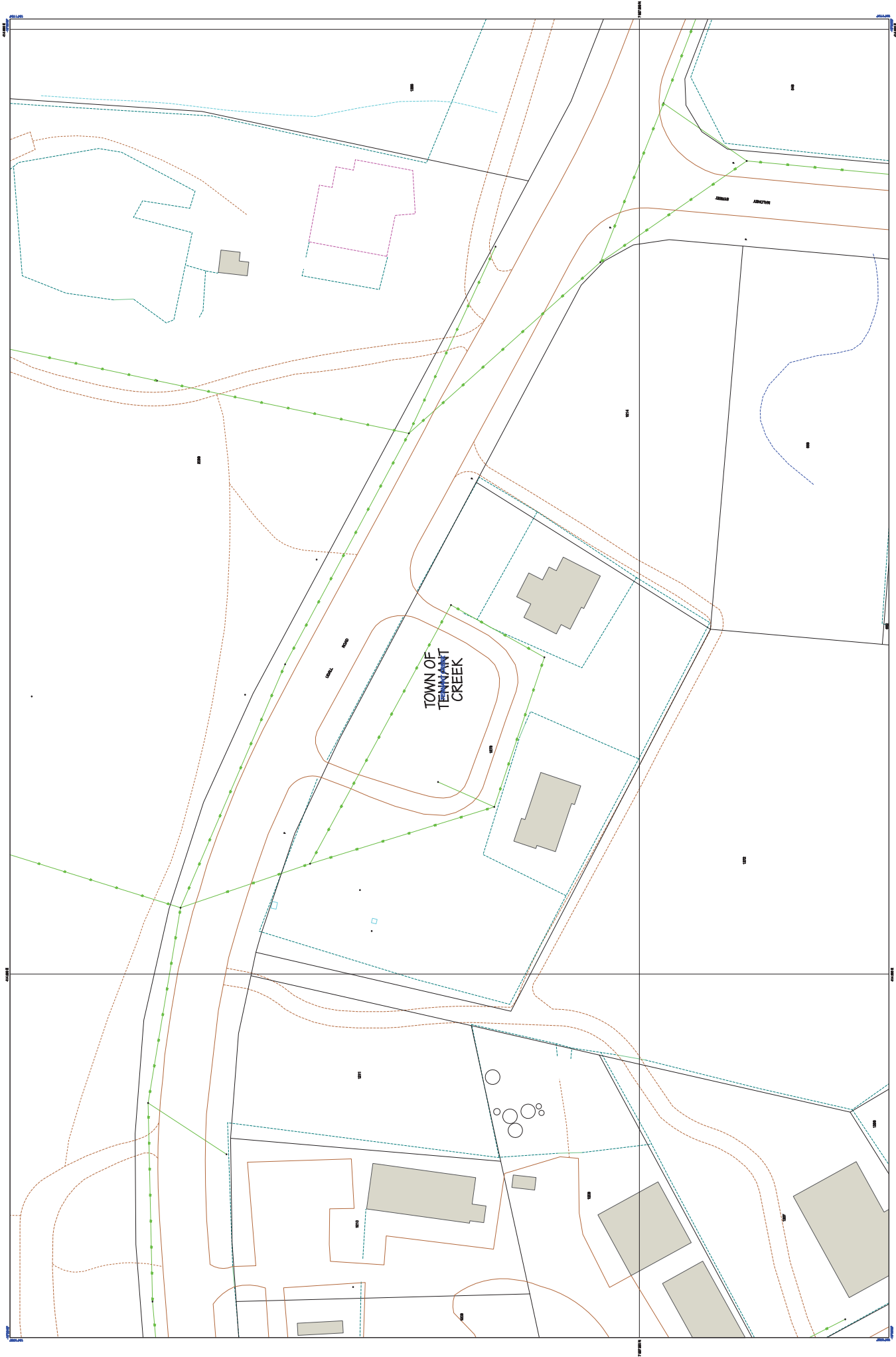
Legend

- Start of road
- Road Condition**
- 1-Very poor
- 2-Poor
- 3-Good
- 4-Very good
- 5-Excellent
- Town Camp boundary

A3 scale: 1:1,000



Existing drawings



LEGEND:

— W —	NEW WATER LINE
— MW —	NEW WATER 3000 MAIN
— W —	EXISTING WATER LINE
— MW —	EXISTING WATER 3000 MAIN
— S —	NEW SEWER LINE
— SS —	NEW SEWER 3000 MAIN
— S —	EXISTING SEWER LINE
— SS —	EXISTING SEWER 3000 MAIN
— LV —	NEW LOW VOLTAGE
— HV —	NEW HIGH VOLTAGE
— LV —	EXISTING LOW VOLTAGE
— HV —	EXISTING HIGH VOLTAGE

0 2500 5000 7500 10000 12500mm
SCALE IN MILLIMETRES (1:250 BEFORE REDUCTION)



H Existing Residential Development (or as highlighted by building sketch layout).

V Forecast Residential Lots for Development (up to 2014). Utility Reticulation Services Compliance has been costed for Existing and Forecast Development up to 2014 only.

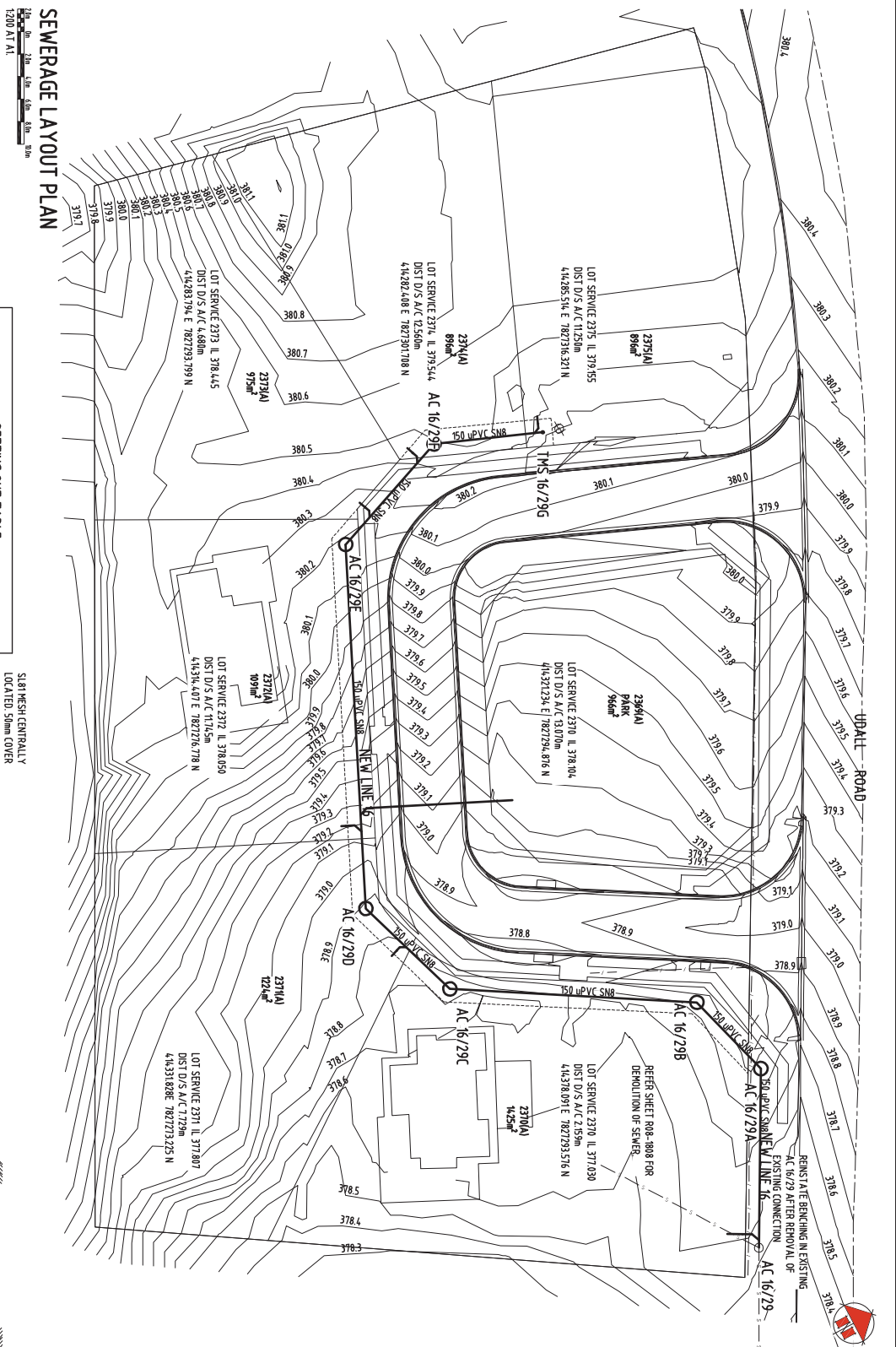
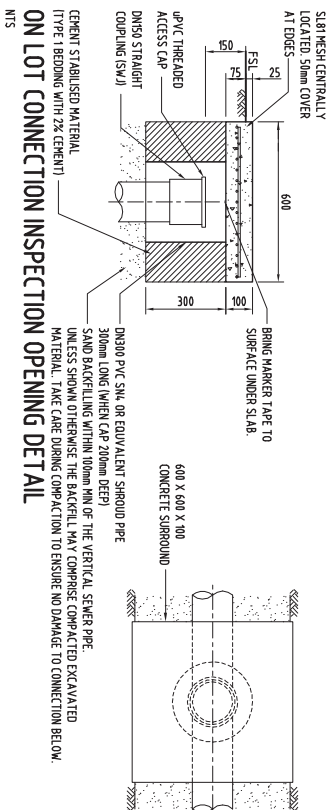
CONNECTING NEIGHBOURS PROJECT - PROPOSED SERVICES LAYOUT
FIGURE F18 - BLUEBERRY HILL

PRELIMINARY

463																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			



BLUEBERRY HILL

[illegible]

- ## GENERAL NOTES
1. DESIGN AND CONSTRUCTION OF THE WATER AND SEWERAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE POWERWATER CONNECTION CODE AND ASSOCIATED DOCUMENTS.
 2. ALL ELEVATIONS GIVEN ARE TO AHD
 3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 4. MINIMUM COVER TO PIPE IS 750mm IN TRAFFICABLE AREAS, 600mm IN OTHER AREAS.
 5. PRIOR TO COMMENCEMENT OF WORKS THE CONSTRUCTION SHALL CHECK THE LOCATION OF ALL UNDERGROUND SERVICES AND COMPLY FINISHED SURFACE LEVELS AND CHECK THE MATERIAL, DIAMETER, ALIGNMENT, LEVEL AND LOCATION OF EXISTING PIPEWORK AT THE CONNECTION POINT.
 6. IT IS NOT GUARANTEED THAT ALL SERVICES ARE SHOWN ON THE DRAWING.
 7. OBTAIN PERMITS FROM THE RELEVANT ROAD AUTHORITY PRIOR TO ROAD EXCAVATION.
 8. ALL WATER/HYDRAULIC WORKS SHALL BE CARRIED OUT AS SHOWN ON THE LATEST AMENDMENT OF THE DESIGN DRAWINGS. CONSTRUCTION SITE DRAWINGS MUST BE SIGNED AS APPROVED FOR CONSTRUCTION BY A LAND DEVELOPMENT OFFICER.
 9. SEVEN (7) DAYS NOTICE MUST BE GIVEN TO LAND DEVELOPMENT, POWERWATER WITH A VIEW OF INTENTION TO START WORK PRIOR TO COMMENCEMENT OF WORK.
 10. SOUTHERN REGION-FACSIMILE BY 5173.72
 11. ANY CHANGES TO THE DRAWING, REQUIRED OR DESIRED DURING THE CONSTRUCTION PHASE MUST BE AUTHORISED BY A LAND DEVELOPMENT OFFICER.
 12. ALL MATERIALS USED IN THE CONSTRUCTION OF WORKS TO BE CONNECTED TO POWERWATER INFRASTRUCTURE ARE TO BE AS NOMINATED BY POWERWATER'S WATER AND SEWER MAINS PRODUCT MANUAL.
 13. ALL CONSTRUCTED DRAINAGES MUST BE PROVIDED TO LAND DEVELOPMENT, POWERWATER PRIOR TO COMMENCEMENT OF CONSTRUCTION.
 14. SUPERSEDED DRAWINGS AND/OR WORKS MUST BE REMOVED PRIOR TO AVOIDING FOR HANDOVER. INSPECTING SEWER DRAINS MUST BE REMOVED PRIOR TO AVOIDING FOR HANDOVER.

SEWERAGE

1. ALL GRAVITY SEWERS PIPES SHALL BE 4"VC CLASS SBN WITH STYRENE-BUTADIENE RUBBER (NO JOINTS ISBL) UNLESS NOT OTHERWISE SPECIFIED.
2. SEWERS SHALL BE OFFSET FROM PROPERTY BOUNDARIES A DISTANCE OF 1.6m IN ROAD RESERVE AND 1.5m IN PRIVATE PROPERTY, EXCEPT WHERE SHOWN OTHERWISE ON THE DRAWINGS.
3. ALL GRAVITY SEWERS ARE MANHO, UNLESS SEWER PIPE BEDDING TYPE AFTER INSPECTION OF THE EXCAVATED TRENCH.
4. THE SUPERINTENDENT SHALL DETERMINE SEWER PIPE BEDDING TYPE AFTER INSPECTION OF THE EXCAVATED TRENCH.
5. MAINTENANCE HOLE COVERS SLABS SHALL FINISH AT:
 - a) FINISHED SURFACE LEVEL IN ROAD RESERVE AND FOOTPATH AND MATCH GROSS FALL TO MANHO.
 - b) FINISHED SURFACE LEVEL IN ROAD ACCESS, THE COVER OF THE PROPERTY AND FOOTPATH.
6. THE CONSTRUCTION SHALL INSURE THE MAINTENANCE HOLE COVER WITH THE IDENTIFYING NUMBER AS SHOWN ON THE DRAWINGS.
7. ALL MAN, SINKER MANHOUS, ACCESS OPENINGS ARE TO BE 750mm dia.
8. BEDDING OF PIPE BELOW INSPECTION CHAMBERS MUST BE COMPACTED TO MIN 98% OF MODIFIED MAXIMUM PIPE DENSITY. USE APPROVED BEDDING AND FULLY FLOOD OR COMPACT BY APPROVED TECHNIQUES.
9. USE CONCRETE WITH MAXIMUM AGGREGATE AND GRADE MINIMUM SLAB COMPLYING WITH AS 3738 USE GRADE W/20 CONC RET FOR FIRST BLOCKS AND GRADE N20 CONC RET FOR ALL OTHER PURPOSES. POUR THICKS BLOCKS AGAINST UNDISTURBED GROUND. PROVIDE FELT OR APPROVED PLASTIC BOARD BEHIND W/20 GRAPE / FITTINGS AND CONCRETE.
10. USE HEAVY DUTY INSPECTION OPENING OF TON FOR DRAINING NUMBERS W2-1.5, W2-1.6 & W2-2.0.

PROPERTY CONNECTION LEGEND



PROPERTY CONNECTION TYPE
REFER PWC STD DRAWINGS

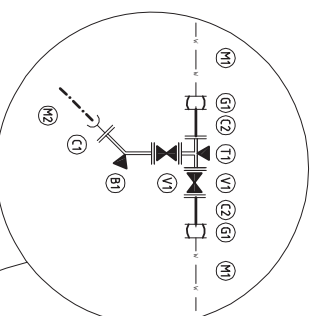
[illegible]

1. DESIGN AND CONSTRUCTION OF THE WATER AND SEWERAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE POWERWATER CONNECTION CODE AND ASSOCIATED

2. ALL LEVELS GIVEN ARE TO AHD.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.
4. MINIMUM COVER TO PIPE IS 750mm IN TRAFFICABLE AREA, 600mm IN OTHER AREAS
5. PRIOR TO COMMENCEMENT OF WORKS THE CONSTRUCTOR SHALL CHECK THE LOCATION
6. ALL UNDERGROUND SERVICES AND CONFINED FINISHED SURFACE LEVELS AND CHECK THE MATERIAL, DIAMETER, ALIGNMENT, LEVEL AND LOCATION OF EXISTING PREWORK AT THE CONNECTION POINT.
7. IT IS NOT GUARANTEED THAT ALL SERVICES ARE SHOWN ON THE DRAWING.
8. OBTAIN PERMISSION FROM THE RELEVANT ROAD AUTHORITY PRIOR TO ROAD EXCAVATION
9. ALL WATER WINDUPLICATION WORKS SHALL BE CARRIED OUT AS SHOWN IN THE LATEST AMENDMENT OF THE DESIGN DRAWINGS. CONSTRUCTION SITE DRAWINGS MUST BE SIGNED AS APPROVED FOR CONSTRUCTION BY A LAND DEVELOPMENT OFFICER.
9. SEVEN DAYS NOTICE HAS TO BE GIVEN TO LAND DEVELOPMENT WORKMANS WITH A NOTICE OF INTENTION TO START WORK PRIOR TO COMMENCEMENT OF WORK
- SOUTHERN REGION-ACSM/SE 89/37242

[illegible]

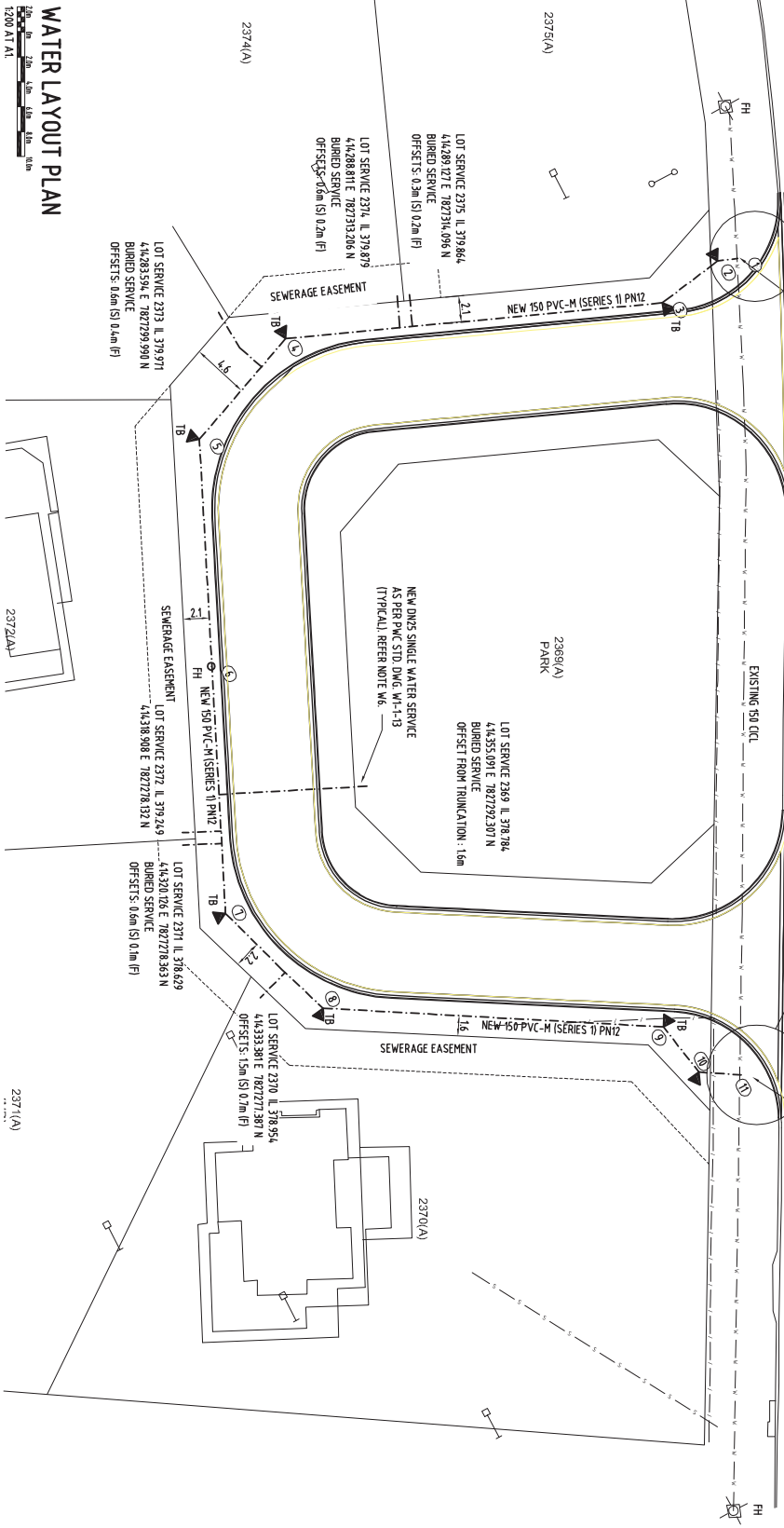
- (M1) EXISTING DMSO DCL WATER MAIN.
- (M2) NEW DMSO PVC-M WATER MAIN.
- (C1) NEW DMSO FLANGE TO SOCKET CONNECTION.
- (C2) NEW DMSO FLANGE TO SPIGOT CONNECTION.
- (T1) NEW DMSO FLANGED TEE WITH THRUST BLOCK.
- (B1) NEW DMSO 45 DEG FLANGED BEND WITH THRUST BLOCK.
- (V1) NEW DMSO SLUICE VALVE.
- (G1) NEW DMSO GRABULT JUNIT.



WATER SETTING OUT TABLE				
		DESCRIPTION	RI, TOP OF PIPE	RI AT SURFACE
REF.	EASTING	NORTHING		
1	44298.710	7827339.04.1	373.558	380.235
2	44298.356	7827331.456	373.658	380.258
3	44299.039	7827333.009	373.570	380.229
4	44298.459	7827303.879	373.675	380.400
5	44297.970	NEW DN50 DUC. 45° BAND WITH THROST BLOCK	373.513	380.61
6	44297.386	NEW DN50 DUC. 45° BAND WITH THROST BLOCK	373.560	379.025
7	44297.980	NEW FIRE HYDRANT TO PVC STD DUG W-2-43A	373.560	378.963
8	44326.076	NEW DN50 DUC. 45° BAND WITH THROST BLOCK	378.375	378.867
9	44338.469	NEW DN50 DUC. 45° BAND WITH THROST BLOCK	378.473	379.053
10	44350.563	NEW DN50 DUC. 45° BAND WITH THROST BLOCK	378.381	379.000
11	44355.089	NEW DN50 DUC. 45° BAND WITH THROST BLOCK	378.364	379.000
12	44356.877	CONNECTION TO MAIN	378.335	378.993

UDALL ROAD

CONTRACTOR TO EXPOSE CONNECTION POINTS TO EXISTING AND CONFIRM MATERIAL, DIAMETER, ALIGNMENT, AND LEVEL. SURVEYOR TO PICK UP ALIGNMENT AND LEVEL AND PROVIDE TO DESIGNERS TO CONFIRM ADEQUACY OF CONNECTION DESIGN.



2.0m 1m 2.0m 4.0m 6.0m 8.0m 10.0m
1:200 AT A1

[illegible]

Date Registered: 17/08/2001

Volume 639 Folio 012

Duplicate Certificate as to Title issued? No

SEARCH CERTIFICATE

CROWN LEASE IN PERPETUITY 01191

Lot 1273 Town of Tennant Creek from plan(s) S 74/062A

Area under title is 9180 square metres

Owner:

Julalikari Housing Incorporated
of PO Box 158, Tennant Creek NT 0861

Registered Date	Dealing Number	Description
17/08/2001	472777	Previous title is Volume 639 Folio 011 Notice of a Right to a Grant of Interest End of Dealings

Commencement Date: 17 August 2001} Expiry Date: In Perpetuity}

Reservations:

1. Reservation of a right of entry and inspection.
2. Reservation of all minerals, mineral substances and ores in or upon the land, including gems, stones, sands, valuable earths and fossil fuels.
3. Reservation of a power of resumption.

Provisions:

1. The lease will be in perpetuity.
2. The annual rent for the lease ("called the rent") will be nil
3. The lease is granted under and subject to the Crown Lands Act ("the Act") and the Regulations for the time being in force thereunder, and is conditional upon compliance by the Lessee and will, subject to the Crown Lands Act and the Regulations be liable to be determined and forfeited for non-compliance with any such lease condition.
4. The Lessee may at any time surrender the lease in the manner prescribed under the Crown Lands Act.
5. For the purpose of section 58 of the Crown Lands Act the Lessee agrees that the Minister may at his absolute discretion determine the Lessee's rights in improvements.

Conditions and Covenants:

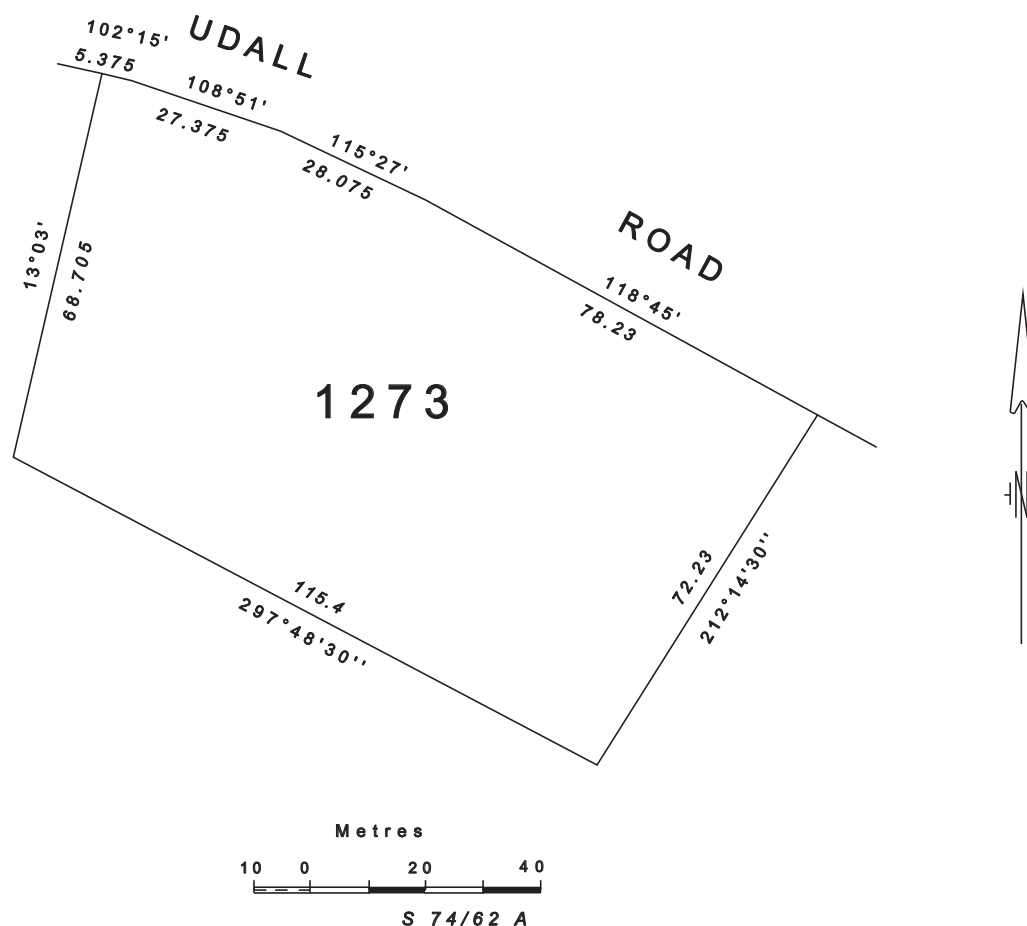
1. Subject to the Crown Lands Act, the Lessee will not use the leased land for a purpose other than the purpose for which it is leased, viz: Aboriginal Communal Living.
2. The Lessee will pay rates and taxes which may at any time become due in respect of the leased land.
3. The Lessee will at all times comply with any Control Plan and/or Development Permit under the Planning Act affecting the leased land.

Duplicate Certificate as to Title issued? No

4. The Lessee will in respect of the land included in the lease, ensure that at all times and to the satisfaction of the Minister, the land is kept clean, tidy and free of weeds, debris, dry herbage, rubbish, carcasses of animals and other unsightly or offensive poisonous, toxic or hazardous matter and harbour for insects, pests and the breeding of mosquitoes

5. If the Lessee fails to observe and carry out or cause to be observed or carried out the conditions of condition 4 above on his part, the Territory shall have the right to enter onto the demised premises and do all things necessary to that end and the expense and cost thereof, as determined by the Minister, shall be borne and payable by the Lessee on demand.

6. The Lessee will at all times maintain and repair and keep in repair all improvements on the leased land to the satisfaction of the Minister.



Date Registered: 17/08/2001
Duplicate Certificate as to Title issued? No

Volume 639 Folio 012



NORTHERN TERRITORY OF AUSTRALIA

Record of Administrative Interests and Information

Record of Administrative Interests and Information

The information contained in this record of Administrative Interests only relates to the below parcel reference.

Parcel Reference: Lot 01273 Town of Tennant Creek plan(s) S 74/062A

(See section 38 of the Land Title Act)

Note: The Record of Administrative Interests and Information is not part of the Land Register and is not guaranteed by the Northern Territory of Australia, and the NT Government accepts no Liability for any omission, misstatement or inaccuracy contained in this statement.

Registrar General

Government Land Register

(none found)

Custodian - Registrar General (+61 8 8999 6252)

Current Title

CUFT 639 012 (order 1)

Tenure Type

CROWN LEASE IN PERPETUITY 1191

Tenure Status

Current

Area Under Title

9180 square metres

Owners

Julalikari Housing Incorporated
PO Box 158, Tennant Creek NT 0861

Easements

(none found)

Scheme Name

(none found)

Scheme Body Corporate Name

(none found)

Reserved Name(s)

(none found)

Unit Entitlements

(none found)



Transfers

(none found)

Tenure Comments

(none found)

Historic Titles

CUFT 639 011 (order 1)

CUCL 191 040 (order 1)

Visit the website http://www.nt.gov.au/justice/bdm/land_title_office/

Custodian - Surveyor General (+61 8 8995 5362)**Address**

29 UDALL RD, TENNANT CREEK

Survey Plan

S 74/062A

Survey Status

Approved

Parcel Status

CURRENT

Parcel Area

9180 square metres

Map Reference

Code 730 Scale 2500 Sheet 22.32

Parent Parcels

(none found)

Parcel Comments

SUBD OF LOTS 1212 & 1213. WARRAMUNGA PABULU HOUSING ASSOCIATION VID E S74/62/94. S2008/31 LOTS 2368(A) TO 2375(A) S2008/30 LOTS 2328(A) TO 2367(A) SEE S2008/29 LOTS 2298(A) TO 2327(A) ALLOCATION OF ADMIN PARCELS AT MUNJI MARIA TOWN CAMP LOT 1273 TENNANT CREEK

Survey Comments

(none found)

Proposed Easements

(none found)

Municipality

BARKLY SHIRE

Region

BARKLY

Custodian - Valuer General (+61 8 8995 5375)**Owner's Last Known Address**

Department of Housing, PROPERTY RATES OFFICER, GPO BOX 4621, DARWIN NT 0801

Parcels in Valuation

Lot 01273 Town of Tennant Creek



Unimproved Capital Value

\$91,000 on 01/07/2015
\$91,000 on 01/07/2012
\$70,000 on 01/07/2010
\$24,000 on 01/07/2004
\$28,250 on 01/07/2001
\$28,250 on 01/07/1998
\$25,000 on 01/07/1995
\$24,750 on 01/07/1992
\$24,750 on 01/01/1990
\$18,750 on 01/01/1987
\$17,000 on 01/01/1984
\$2,000 on 01/01/1981

Valuation Improvements

01/02/1996 House x 5
15/09/1988 Residential other
01/11/1983 Special uses other
Improvement type(ABOR EING)

Custodian - Property Purchasing (+61 8 8999 6631)**Acquisitions**

(none found)

Custodian - Building Advisory Service (+61 8 8999 8965)**Building Control Areas**

BBTEN001 - Building Control Area

TENNANT CREEK BUILDING AREA

Building Permits

Application Number:	5 of 7
Description:	DWELLING (HOUSE 4)
Number of Residential Units:	1
Australian Bureau of Statistics Type:	Separate House
Building Class:	Single Dwelling
Area:	144 square metres
Certification:	Single Dwelling - Full Code - <i>issued on 15/12/1998</i>

Application Number:	1 of 7
Description:	HOUSE
Number of Residential Units:	0
Australian Bureau of Statistics Type:	(none found)
Building Class:	House
Area:	177 square metres
Certification:	House - Full Code - <i>issued on 26/05/1988</i>

Visit the website <http://www.nt.gov.au/building/>

Custodian - Town Planning and Development Assessment Services (+61 8 8999 6046)

Planning Scheme Zone

CL (Community Living)

Interim Development Control Orders

(none found)

Planning Notes

(none found)

Planning Applications

(none found)

Custodian - Power and Water Corporation (1800 245 092)

Meters on Parcel

Power Water - Electricity 1

Power Water - Water 1

For Account balances, contact the Power and Water Corporation.

Custodian - Pool Fencing Unit (+61 8 8924 3641)

Swimming Pool/Spa Status

(none found)

For more information, contact the Pool Fencing Unit (+61 8 8924 3641).

Custodian - Mines and Energy (+61 8 8999 5322)

For information on possible Exploration Licences, contact Mines & Energy or visit the website
http://www.nt.gov.au/d/Minerals_Energy/

For information on possible Petroleum Titles, contact Mines & Energy for further details.

Custodian - NT Environment Protection Authority (+61 8 8924 4218)

Results of site contamination assessment

(none found)

For further information contact Environment Protection Authority or visit the website
<https://ntepa.nt.gov.au/waste-pollution/contaminated-land>

Custodian - Heritage Branch (+61 8 8999 5039)

Heritage Listing:

(none found)

For further information on heritage places contact Heritage Branch or visit the website
<https://nt.gov.au/property/land/heritage-register-search-for-places-or-objects>

Other Interests

For Account balances, contact Barkly Shire Council



Transformer data

Group	Com Id	Location	Community Name	Dwellings No. (Funded Dwellings)	Dwellings No. (Bennett Design)	New Houses ** (Future Demand)	Primary Voltage Level (KV)	PWC Substation ID	PWC Test Number	Transformer size (KVA)	KVA Total dwellings @ 4.5KVA	KVA Total dwellings @ 7KVA	Comments
1	290	Darwin	Bagot	55	55		11	1924	1735	300	247.5	385	
	344	Darwin	Knuckey Lagoons	18	19	2	11	1771	2163	100	85.5	133	
	347	Darwin	Kulajuk	19	19		11	1092	10607	50	85.5	133	
	403	Darwin	Palmerston Town Camp	20	16		22	10196	10245	100	90	140	Two transformers for this Town Camp. Transformers are not in boundary of Town Camp [The nearest transformers data to Town Camp are highlighted in yellow].
	412	Darwin	Railway Dam (One Mile Dam)	5	6	2	22	265	11645	25	27	42	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	427	Adelaide River	Amangel	9	9		22	216	12187	100	40.5	63	Two transformers for this Town Camp.
	687	Jabiru	Manabadurna	10	12		22	184	5646	63	54	84	
	825	Darwin	Minmarana Park	24	24		11	5650	11107	200	108	168	
	606	Katherine	Warlpiri Transient Camp	9	9		22	6416	4886	100	40.5	63	Two transformers for this Town Camp.
	621	Katherine	Miall Brumby (Kelano)	47	31		22	6133	12417	315	211.5	329	
2	640	Pine Creek	Pine Creek Compound	4	4		22	6666	3147	25	18	28	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	971	Mataranka	Mulgagan	12	9	4	22	6819	5296	16	54	84	
							22	6818	5297	16			
							22	6384	11028	25			
3	215	Tennant Creek	Blueberry Hill (Munji-Maria)	2	2		22	7079	1968	200	9	14	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	223	Tennant Creek	Dump Camp (Maria-Maria)	7	7		22	7181	11088	200	31.5	49	
	224	Elliott	Elliott South Camp	12	12		11	7504	4718	200	54	84	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	225	Elliott	Elliott North Camp	36	25		11	7505	4715	100	162	252	
	238	Tennant Creek	Karganu (East Side Camp)	12	12	1	22	7572		200	54	84	
	246	Tennant Creek	Ngalpa Ngajpa	18	21		22	7179		200	94.5	147	Two transformers for this Town Camp.
	271	Tennant Creek	Village Camp	12	12	1	22	7033	10904	315	54	84	
	681	Tennant Creek	Tingkarli	12	12		22	7183	11107	200	54	84	
							22	7180		200	54	84	
	684	Tennant Creek	Wuppa	15	15	1	22	7141	11092	100	67.5	105	Two transformers for this Town Camp.
4	3	Alice Springs	Angwertwaere (Morris Soak)	11	15		11	8596	11336	300	67.5	105	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	16	Alice Springs	Anthellk Empaye (Charles Creek)	17	10		11	8599	315	315	76.5	119	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	17	Alice Springs	Anthepe	15	15		22	8598	5874	200	67.5	105	Data extracted from PWC asset information. There was not access to this Town Camp due to ceremony on inspection day.
	19	Alice Springs	Aper Alwerkinge (Palmer's)	7	6		11	8405	2939	200	31.5	49	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	35	Alice Springs	Ewyenper Atwaaye (Hidden Valley)	47	47		11	8622	11202	100	211.5	329	
							11	8623	11203	100			
							22	8625	11205	63			
							11	8626	11204	100			
	47	Alice Springs	Iiparpa	13	13		22	8611	11702	200	58.5	91	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	48	Alice Springs	Iiperte Iyathe (Walpiri)	10	9		11	8001	11209	315	45	70	
5	50	Alice Springs	Ilyperenye (Old Timers)	10	10		22	8145	3323	100	45	70	
	64	Alice Springs	Bassos	2	2		11	8002	10946	50	9	14	
	69	Alice Springs	Karnte	19	19		22	8282	2345	100	85.5	133	
	87	Alice Springs	Yarrenty Altere (Larapinta Valley)	34	34		11	8617	11334	100			
							11	8618	11200	63	153	238	
							11	8619	11335	100			
							11	8620	11201	100			
	90	Alice Springs	Inarlenge (Little Sisters)	16	22		22	8137	2925	100	99	154	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	108	Alice Springs	Mpwetyerre (Abbotts)	6	6		11	8093	11703	315	27	42	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	113	Alice Springs	Mount Nancy (Nyeuwente)	11	12		11	8405	2939	200	54	84	
6	129	Alice Springs	Nyeuwente (Trucking Yards)	26	26		11	8629	11312	300	117	182	
	675	Alice Springs	Hoppys	15	19		11	8314	369	50	85.5	133	There is not any Transformer in boundary of Town Camp. Also it's not shown in PWC asset information.
	676	Alice Springs	Iipye Iipye (Golders Camp)	15	14		11	8569	315	100	67.5	105	
	1029	Alice Springs	Kunoth	4	4		11	8569	315	100	18	28	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	222	Borrooloola	Mara	28	29	2	11	6187	12610	100	130.5	203	Two transformers for this Town Camp.
	229	Borrooloola	Garawa 1	16	14		11	6545	10166	100	72	112	Two transformers for this Town Camp.
	278	Borrooloola	Yanyula	29	29		11	6162	10496	200	130.5	203	Data extracted from PWC asset information. It's outside of Town Camp shown only Transformer to this Town Camp.
	992	Borrooloola	Garawa 2	11	11		11	6189	2669	25	49.5	77	This transformer is not shown in PWC asset information. It's installed in Boat Ramp Road near to Town Camp and connected to Electrical reticulation of Town Camp.

** For New house's demand calculation see section 13.4 "Future Demand".

Dump Camp

Dump Camp

1 Design

The infrastructure reviews have been undertaken against current relevant standards for typical sub-divisions. The following standards have been used in undertaking the reviews.

Sewerage and water supply

- Water Services Association of Australia – Sewerage Code – WSA 02 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 02
- Water Services Association of Australia – Sewerage Pumping Station Code – WSA 04 -2005 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 04
- Water Services Association of Australia – Water Supply Code – WSA 03 2002 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 03
- Power and Water Corporation Indigenous Community Engineering Guidelines (2008)
- Department of Housing and Community Development Indigenous Community Engineering Guidelines (ICEG 2014, updated September 2016)
- Power and Water Corporation Essential Services Infrastructure Assessment and Upgrade Guidelines (for Town Camps in Urban Communities, 2009)
- Power and Water Corporation Standard Drawings
- Australian Standards

Electrical services

Electrical infrastructure has been assessed against AS/NZS3000 Wiring Rules and against PWC Service, Installation and Metering Rules and Urban Residential Development (URD) Design Standards where possible.

With one exception, town camps are each a single lot and compliance with AS/NZS3000 is sufficient to address potential safety concerns.

As such application of PWC URD Design Standards will mainly apply to the incoming supply and bulk or initial multi-metering panels if provided.

URD Design Standards for internal reticulation and street lighting appear to have been applied in many cases for convenience rather than compliance.

For the purposes of this report, the demand per dwelling allowances of URD Design Standards have been used to estimate incoming supply and overall distribution capacity requirements.

The following standards apply:

- Australian Standards
- Power Networks Design and Construction Guidelines, Power and Water Corporation
 - NP001.1_Design and Construction of Network Assets – General Requirements
 - NP001.3_General Specification for Overhead Electrical Reticulation
 - NP001.6_General Specification for URD Subdivisions
 - NP003_Installation Rules_V3
 - NP007_Service Rules

- NP027_Capture of Newly Installed Street Lighting Information
- NP041_Guidelines for Electrical Design Consultants

Further referral to the guidelines in this report will be designated by the guidelines number, NP001.1.

Communications

- National Broadband Network Website viewed 21 January 2017
(<http://www.nbnco.com.au/>) – NBN rollout maps

General

It should be noted that if the town camps are proposed to be subdivided and services assets gifted to Power and Water Corporation (PWC) for operation and maintenance, all of these services will need to fully meet PWC standards. With the exception of a few town camps that have recently been upgraded, this will require the full replacement and/or realignment of most services.

2 Condition assessment

2.1 Rating assessment matrix

A condition rating matrix was developed and used to assess all municipal infrastructure. The same rating was used for all services to maintain consistency in assessments. Table 1 below shows the condition rating and operability.

Table 1 Condition rating

Condition rating		Operability
1	Very Poor	Not operational
2	Poor	Not fully operational or requires immediate maintenance to keep operational
3	Good	Fully operational, may require routine maintenance
4	Very Good	Fully operational, may require maintenance in the next six months
5	Excellent	New, fully operational

2.2 Civil assessment limitations

The civil infrastructure condition investigations were subject to a number of limitations. These include:

- Only accessible services have been investigated. This includes inspecting the top of sewer manholes, side entry pits, etc., however, does not include opening pits to inspect infrastructure below ground.
- No physical testing of the sewer, water or stormwater network was undertaken.
- No survey or service locating was undertaken.

As there was no survey, potholing or CCTV undertaken on the underground infrastructure there is insufficient information to make determinations on the asset condition. The condition assessments discussed in this report are only for the accessible services and do not necessarily represent the condition of the underground infrastructure. For the majority of the town camps, other than a few that have recently been upgraded it was found that the underground services are generally undersized and it is likely, due to their age, that the these services are in poor condition. Either factor would trigger the need for a complete replacement to meet current relevant standards.

2.3 Electrical assessment limitations

The electrical infrastructure condition investigations were subject to a number of limitations. These include:

- Inspections were carried out without the assistance of an electrical tradesman.
- Only accessible services were investigated. Assessments were of a visual nature and no pit covers were removed.
- Overhead equipment was assessed from ground level.
- Switchboards were not opened and no assessment of the internal connections or bus ratings was made.

- Electrical infrastructure was assessed down to the meter for multi-meter panels and down to the termination, overhead pole or distribution pillar, of the supply cable to a meter located at a dwelling.

3 Current infrastructure issues

Power and Water Corporation (PWC) have advised of the following concerns and issues in regard to the sewerage, water and electrical infrastructure at all town camps.

3.1 Ownership and maintenance

PWC stated there has always been confusion regarding the ownership and responsibilities of the internal sewer, water and electrical infrastructure. PWC have advised that they have no legal tenure on the majority of assets in any town camps and that the owner is essentially that of the land owner or leaseholder. This is further discussed for each type of infrastructure for each town camp.

The ownership and who is responsible for the maintenance of the sewage pump stations and street lighting is a major concern. In most town camps it was found that PWC have been maintaining the assets on an in-kind basis, although there are no maintenance or access agreements in place and the infrastructure is generally not compliant to PWC standards.

3.2 Access to infrastructure

PWC advised that due to the uncertainty surrounding ownership and responsibility of the sewerage, water and electrical infrastructure, each town camp is seen as a single lot with multiple houses on it. There are no formal road reserves or easements where the municipal infrastructure should be located. PWC therefore have no legal right to enter the town camps to work on the infrastructure, nor can PWC stop others from working on the infrastructure. There is a risk that the maintenance undertaken by others may be to a lower standard than PWC.

It should be noted that there are currently no legal services easements within the town camps, except for a few cases where a town service passes through the town camp. Therefore it is recommended that easements are created over any infrastructure owned by PWC and any future assets to be gifted to PWC, to allow the service providers access to the infrastructure.

3.3 Existing infrastructure

PWC have stated that although the existing sewerage and water infrastructure appears to comply with relevant standards in some locations, the capacity cannot be assumed to meet PWC requirements due to the potential for underground substandard condition and/or grading of pipework. It is likely that these assets will need to be fully replaced to PWC standards to ensure sufficient capacity.

The planning process currently allows construction within the town camps on Commonwealth land without requiring service authority (PWC) approvals. This means that there has been no opportunity for PWC to recover contributions towards required upgrades to headworks servicing the developments and these upgrades have been paid for by PWC in the past. This inconsistency needs to be addressed for future developments within the town camps to ensure PWC are able to continue to provide adequate services.

3.4 Safety concerns

PWC have expressed concerns with safety of PWC staff and contractors working within the camps. PWC have employed procedures such as multiple people / vehicles to attend the site, with police or housing safety officers as required. This

generally leads to a delayed response time and increased cost to respond to and remediate emergency situations.

PWC have also raised the concern that if others work on water infrastructure within the town camps and do not apply the correct sanitation procedures they not only risk contaminating the entire water supply network within the town camp, at some town camps with direct connections to the town supply, they risk contaminating the entire town's water supply.

4 Available information

As the site investigations were limited to accessible/visible services, information on below ground services (such as electrical cables, sewer pipes, water supply pipes, etc.) were determined from available information. This information included:

- Serviced Land Availability Program (SLAP) maps,
- Department of Family & Community Services - Connecting Neighbours Program – Essential Services Scoping Study Report Volume 1 April 2005,
- Connecting Neighbours Project – Infrastructure Assessment and Recommendation Report - Arup Pty Ltd, April 2005,
- Drawings supplied by NT Department of Infrastructure - Technical Records,
- Drawings supplied by Power and Water Corporation,
- Bennett Design inspection reports and population data.

Aurecon undertook a site investigation of the Dump Camp community on Wednesday 30 November 2016 to inspect roads, stormwater drainage, electrical services, sewerage and water supply, and community structures. The following sections detail the outcomes of this investigation and the assessments of the infrastructure.

The civil and electrical inspection reports can be found in the Appendices.

5 Sewerage

5.1 Ownership and boundaries

The internal sewer network at Dump Camp is a DN150 PVC reticulation main. As-constructed drawings from 2011 were made available which show that the pipework has only recently been constructed as part of the SIHIP program.

The sewer infrastructure inspected is assumed to be owned by Julalikari Housing Incorporated, but is the responsibility of Far North – T&J Contractors to maintain. The connection the external sewer network is the responsibility of Power and Water Corporation.

There are currently no easements over the sewerage infrastructure according to the Land Title, refer Appendices.

5.1.1 Connection methods and billing

PWC advised that they currently charge a single sewerage bill based on the number of houses, which for Dump Camp is seven. The sewerage bill is charged to the Department of Housing and Community Development.

It is not known what contribution the residents make towards the sewerage bills.

5.2 Existing infrastructure condition assessment

The sewer infrastructure inspection was limited to inspecting the condition of manhole covers, as all other sewerage infrastructure is below ground. A comprehensive review of all available documentation, including reviewing as-constructed drawings and having discussions with Power and Water Corporation was conducted. The following table compares the assets that have been constructed, according to the as-constructed drawings, and the assets assessed during the inspections conducted by Aurecon.

Table 2 Sewerage assets inspected

Asset type	Number of assets as per documentation	Number of assets assessed during inspection
Manholes	16	6

As per Table 2, a number of manholes were not assessed during the inspections, this is likely due to access limitations such as manholes being located within private property or outside of the town camp. However, within Dump Camp there are two sewer lines (Line 3 and Line 3/2) in which none of the manholes were assessed. As a result Aurecon is unable to verify whether these lines have been constructed, especially since the sewer lines are to service 'future' lots which have not been constructed.

The condition ratings of the manholes inspected are as follows:

Table 3 Sewer condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Manholes			3	3		6



Figure 1 Sewer manhole, condition: *good*



Figure 2 Sewer manhole, condition: *very good*

5.3 Current performance and risks

5.3.1 Current sewer network performance

The current capacity of the sewer network was calculated based on the following design assumptions:

- The adopted minimum grade for the pipework is 1.0%, as advised by Power and Water Corporation.
- The Equivalent Population (EP) has been calculated assuming one household equates to 9 EP, based on discussions with Power and Water Corporation.
- The capacity has been assessed by calculating the current flow rate, and the maximum flow rate when the sewer pipe flows full. The result is then a percentage of how much of the pipe is currently being used.
- Manning's roughness coefficient of the pipework is 0.012, as recommended by PWC for PVC pipes.
- Where the sewer pipe grade, size or material is not known, it is assumed to be non-compliant to PWC standards.

The current number of houses in Dump Camp is 7, this multiplied by 9 EP per house gives a total current EP of 63. The capacity of the existing sewer was then calculated. The percentage shows how much of the pipe capacity is currently being used.

Table 4 Existing sewer capacity

Catchment	Current total EP	Diameter of connection (mm)	Adopted PWC minimum slope (%)	Q_{full} (L/s)	Current Q (L/s)	Current capacity (%)
Catchment 1	63	150	1.0	16.50	0.97	6%

Table 4 above shows that the capacity of the existing sewer network is adequate for the current peak population.

As the flow is relatively small compared to the pipe size, it is likely that the self-cleansing minimum velocity is not achieved.

5.4 Future demands

As no new developments are currently planned for the community, there are no additional upgrades required to cater for future demand.

5.5 Recommended works

The sewer infrastructure that was assessed is in good to very good condition. There was one manhole that was covered in graffiti, and another that was covered in gravel. It is recommended that these manholes are cleaned and tidied up.

6 Water supply

6.1 Ownership and boundaries

The water supply infrastructure was upgraded to PWC standards as part of the SIHIP program. As-constructed drawing show the water reticulation servicing Dump Camp is a DN150 PVC ring main.

The water supply assets within Dump Camp are believed to be owned by Julalikari Housing Incorporated, but are the responsibility of Far North – T&J Contractors to maintain. The water is supplied from PWC pipes outside of the community. The following figure shows the extent of water services.

PWC have advised they currently maintain the water assets up to the residential lot water meters, although there is no formal agreement covering this maintenance.

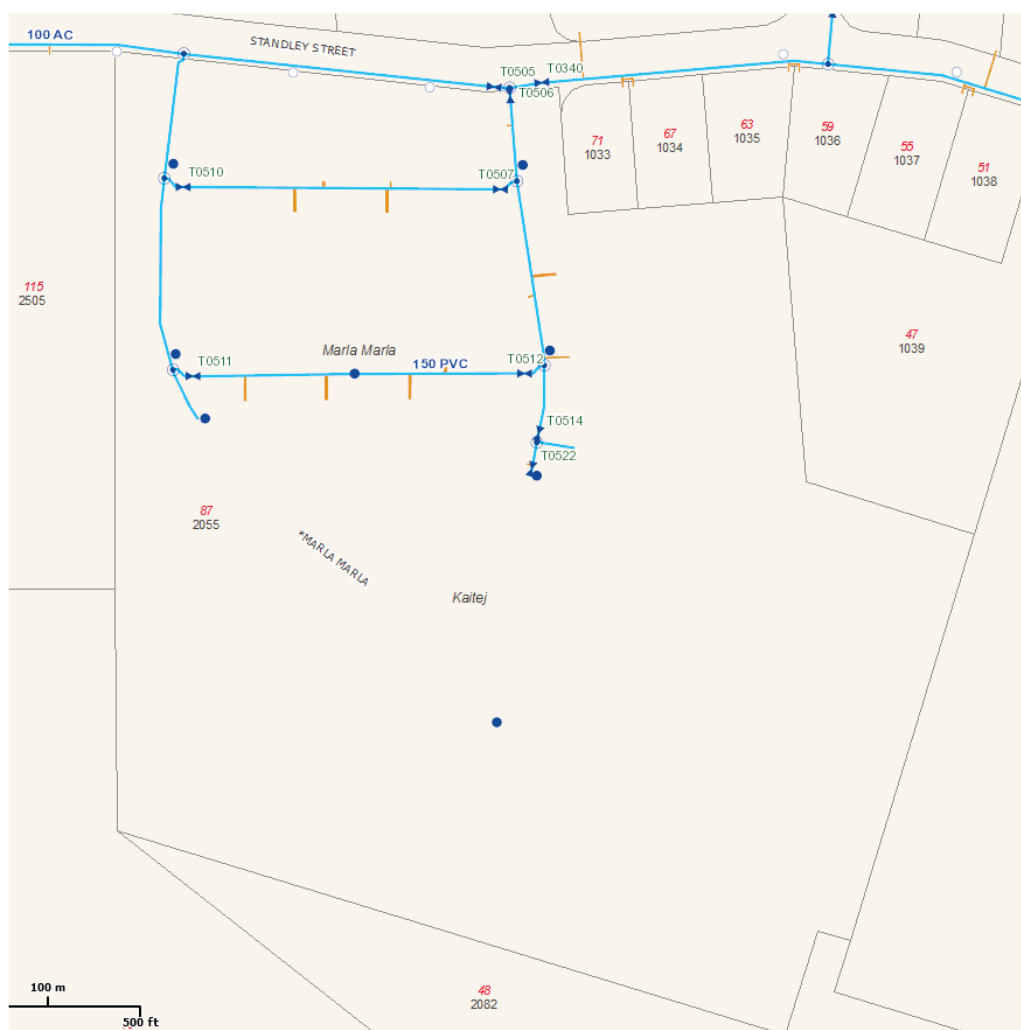


Figure 3 Dump Camp water main network

6.1.1 Connection methods and billing

Through consultation with PWC it has been determined that the water usage is currently charged as a fixed daily rate for 7 house water meters within Dump Camp. The bill is issued to the Department of Housing and Community Services. It is not known what contribution the residents make towards water bills.

A total of 6 residential lot water meters were assessed during the inspection. An additional water meter is required to be installed at the remaining lot currently without an existing water meter. Note, some water meters may have been present however not visible due to overgrown flora or restricted property access. Consequently some water meters may have not been discovered during the inspection.

It is proposed that PWC measures the water supply to the entire community, as opposed to individual lots within the community. This requires the installation of a bulk water meter on the water main located at the community boundaries. Under this scheme, the water bill for the entire community is the responsibility of the governing body, being Julalikari Housing Incorporated for Dump Camp. It will be up to governing body to assign bills to residents accordingly.

It is recommended that the individual lot meters are maintained in addition to the proposed continuation of using a bulk water meter. This will assist with the governing body distributing bills to residents, the identification of any leaks in the network, and meeting PWC standards should the town camp be subdivided in the future.

6.2 Existing infrastructure condition assessment

The site investigation for the water infrastructure included assessing the condition of any air valves, fire hydrants, tanks, taps, and water meters. The assessment was limited to services that could be assessed above ground; no below ground services were inspected. A comprehensive review of all available documentation, including reviewing as-constructed drawings and having discussions with Power and Water Corporation was conducted. The following table compares the assets that have been constructed, according to the as-constructed drawings, and the assets assessed during the inspections conducted by Aurecon.

Table 5 Water supply assets inspected

Asset type	Number of assets as per documentation	Number of assets assessed during inspection
Fire hydrants	8	8
Water meter (residential lots)	8	6

As per Table 5 a number of water meters were not assessed during the inspections, this is likely due to overgrown flora or restricted property access as previously discussed. The condition of each asset is as follows:

Table 6 Water asset condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Fire hydrant			4	4		8
Water meter (residential lots)			2	4		6



Figure 4 Water meter (lot), condition: *good*



Figure 5 Fire hydrant, condition: *good*

No above ground water supply infrastructure was assessed as requiring immediate maintenance.

6.3 Current performance and risks

Given the water supply network has multiple supply points analysing the capacity requires detailed hydraulic modelling.

The current capacity of the water supply was calculated based on the following design assumptions:

- The nominal peak day flow is 1300 L/capita/day, based on PWC's supplement to WSA 03 2002. This value is for the southern region of NT. It was assumed that the nominal peak day flow of 1300 L/capita/day also applies to water usage within the community, although it is possible that this value could be higher in real life due to a lack of controls to reduce water usage.
- The Equivalent Population (EP) has been calculated assuming one household equates to 9 EP, based on discussions with Power and Water Corporation.
- The peak hour factors are listed in PWC's Supplement to WSA 03-2002, and they depend on the population range of the community. The peak hour factor of 3.0 has been adopted, for populations less than 500.

Table 7 shows the properties used to calculate the water demand.

Table 7 Current water demand

Total dwellings	EP	Demand (l/s)	Peak hour demand (l/s)
7	63	0.95	2.84

Given the demand on the system is relatively low, it is expected that the network will supply adequate pressure throughout the community. The layout and pipe sizes are compliant with PWC standards and therefore, for cost estimation, it is taken that the water main is compliant.

The assessment of water supply for firefighting has been based on the size of the water mains and the condition of the accessible fire hydrants. Additional hydrants have been recommended where it appears the existing number of hydrants are insufficient. In the case of Dump Camp no additional hydrants were noted as being required at this stage.

6.4 Future demands

As no new developments are currently planned for the community, there are no additional upgrades required to cater for future demand.

6.5 Recommended works

The infrastructure that was assessed as very poor or poor is recommended to be upgraded to prevent failure in the future. No maintenance works on the water supply infrastructure are currently required.

The community is viewed overall as single lot and as previously detailed proposed have the water usage measured as such. In order to measure the water usages as a single lot, a bulk water meter should be installed. As the network is ring main, one of the supply points should be disconnected and reconnected to the internal network creating a looped main. This allows the single remaining point to be metered. The cost estimates for upgrades at Dump Camp include;

- Install one residential lot water meter
- Install bulk water meter at the community boundary
- Disconnect secondary supply point and reconnect to water main creating a looped network.

7 Roadworks

7.1 Ownership and boundaries

The roads within Dump Camp are assumed to be owned by Julalikari Housing Incorporated, but are the responsibility of Far North – T&J Contractors to maintain.

7.2 Existing infrastructure condition assessment

The road network within the community consists primarily of sealed roads. There are also numerous tracks which appear to be used frequently which are not included in the inspection and report. Road furniture including signs, speed humps and foot paths were also inspected. Table 8 below summarise the condition of the road furniture as assessed during the site inspection.

Table 8 Roadworks condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Footpath			4	4		8
Signs	2	3	3	2		10



Figure 6 Sign, condition: *good*



Figure 7 Footpath, condition: *good*

The condition of the signs varied across Dump Camp. In general, the street name signs were in poorer condition than the give way signs. There were a few instances of there being no sign, despite there being a post. It is recommended that the signs

are repaired or replaced. One sign was bent and leaning over the road. This will also need to be replaced.

The footpaths were in good and very good condition, however they all require a general tidy up to remove weeds, grass, debris and dirt on the path.

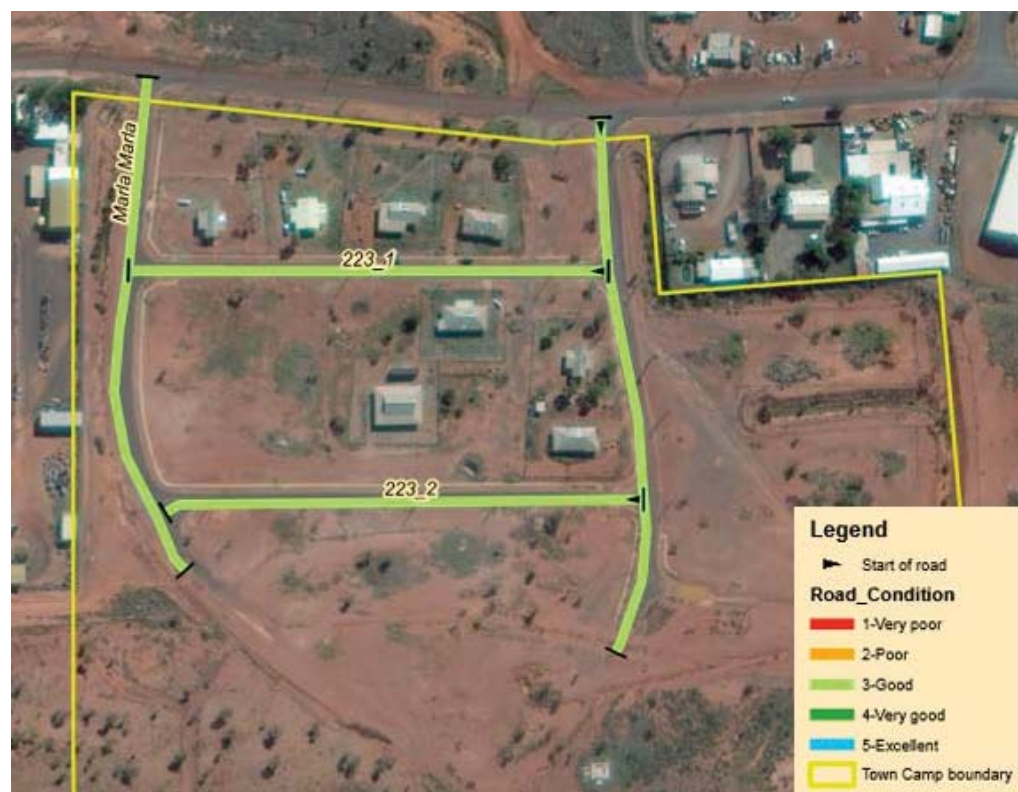


Figure 8 Dump Camp road network

Table 9 below details the condition of the roads within Dump Camp for specific segments. Figure 8 shows a map of the community's road network with the condition ratings, road name, and chainage direction. Note, the percentage refers to the percentage of that particular road segment which experiences the defect.

Table 9 Road network condition assessment

Road name	Chainage start (km)	Chainage end (km)	Condition (1 to 5)	Defects and associated condition
Gurungu Street	0	0.25	3	-gutters filled with dirt in some sections (3) -50% of road has bleeding defects (3)
	0.25	0.50	Not assessed	Road is unsealed
	0.50	0.75	3	-20% of road has bleeding defects (3)
223_1	0	0.21	3	-30% of road has bleeding defects (3) -kerbs and gutters on left of road are full of dirt (2)

Road name	Chainage start (km)	Chainage end (km)	Condition (1 to 5)	Defects and associated condition
223_2	0	0.21	3	-30% of road has bleeding defects (3)

The driveway cross overs unless specifically stated are the same rating as the road in that area. In the areas that the pavement that had no kerbs, the driveways have no layover kerbs and are informal, therefore were not assessed.



Figure 9 Gurungu Street, condition: *good*



Figure 10 Gurungu Street, condition: *good*

7.3 Current performance and risks

The road network into Dump Camp was rated as having good condition, although there were some bleeding defects and the gutters were filled with dirt in some sections.

The layout of the road network is sufficient for the current number of houses.

It was noted during the site inspections that a number of unsealed 'short-cuts' had been created and were regularly used. It is not recommended that these paths are formalised.

It is also recommended that a road safety audit is undertaken to determine where signage, line marking, etc. are required.

7.4 Future demands

As no new developments are currently planned for the community, there are no additional upgrades required to cater for future demand.

7.5 Recommended works

The infrastructure that was assessed as very poor or poor is recommended to be upgraded to prevent failure in the future. The following works are recommended to upgrade the current infrastructure;

- Install street name signs on post (four)
- Remove graffiti from one sign (or replace sign)
- Replace one sign and post
- General tidy up of foot paths – approximately 500 m
- Clean out kerbs and gutters

8 Stormwater drainage

8.1 Ownership and boundaries

The stormwater drainage assets within Dump Camp are believed to be owned by Julalikari Housing Incorporated, but are the responsibility of Far North – T&J Contractors to maintain.

Stormwater drainage infrastructure outside of the community is owned by Barkly Regional Council. The large swale adjacent the community is the responsibility of Barkly Regional Council.

8.2 Existing infrastructure condition assessment

The site investigation for the stormwater infrastructure included assessing the condition of swales, culverts, headwalls, and side entry pits (SEP). Only the above ground infrastructure was assessed. As the inspection was undertaken outside of a storm event and no CCTV of the pipes was undertaken, flooding due to blockages or damage to the underground infrastructure could not be assessed. Table 10 below summarises the condition of the stormwater assets as assessed during the inspection.

Table 10 Stormwater condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Culverts	Cannot view culvert therefore cannot assess.					
SEP		1	3	14		18
Swales			1			1



Figure 11 One bay side entry pit, condition: *very poor*



Figure 12 Swale, condition: *good*



Figure 13 Three bay side entry pit, condition: *very good*

8.3 Current performance and risks

The detailed performance of the stormwater network cannot be fully analysed without significant hydraulic and hydrodynamic modelling, which is outside the scope of this project. However based on the condition of the stormwater infrastructure assessed it would appear to be operating adequately.

8.4 Future demands

As no new developments are currently planned for the community, there are no additional upgrades required to cater for future demand.

8.5 Recommended works

The following works are recommended to upgrade or improve the current infrastructure:

- Repair one side entry pit (one bay)
- Clear blockages from four side entry pits (20 - 40% blocked)
- Clear blockages from culvert headwall and swale, including removing trees and debris.
- Replace lid on one side entry pit.

9 **Community structures**

9.1 **Ownership and boundaries**

There were no community structures identified at Dump Camp.

9.2 **Future demands**

As no new developments are currently planned for the community, there are no additional upgrades required to cater for future demand.

10 Electrical services

10.1 Ownership and boundaries

The following points, from Network Policy NP003 Installation Rules Section 3, define the typical shared ownership of electrical infrastructure by Power and Water Corporation (PWC) and customers.

- The point of supply is defined as the point where PWC makes the electrical supply available. For domestic supply, this is normally one of the following:
- A point of attachment of an overhead service on to a building or pole on which a metering panel is fitted.
- A point of attachment of an overhead service on to a pole forming part of unmetered aerial consumer's mains.
- A nominated point on a distribution substation located on the customer's lot.
- A point of connection of an underground service in a metering panel, including underground services originating at an overhead line.
- A point of connection of an underground service in a pillar or junction box forming part of unmetered consumer's mains, located on the customer's lot.
- A point on a Power and Water pillar located on the customer's lot.

Typically, distribution infrastructure upstream of the Point Of Supply is owned and maintained by PWC and infrastructure below the point of supply is owned and maintained by the customer.

In many cases PWC have defined a Point Of Supply to ensure that they retain responsibility for aerial high voltage infrastructure, and aerial low voltage infrastructure where installed with aerial high voltage infrastructure, to minimise the possibility of the community or it's contractors coming into contact, either deliberately or inadvertently, with aerial high voltage infrastructure.

In other cases isolation facilities are present or desired by PWC to define the Point of Supply at or near the boundary of the town camp.

PWC advise that most of Tennant Creek/Alice Springs Town Camps have undergone upgrades under the SIHIP program with the intent to normalise the services to look like an urban subdivision but have never been formally handed over to PWC for operations and maintenance.

The Dump Camp (Marla-Marla) electrical reticulation systems is supplied by a transformer to an overhead reticulation scheme to individual house and overhead power pole mount street lights.

Prepaid digital meters are utilised in Dump Camp community.

PWC advise that the Point Of Supply is the LV terminals of the substations and that they own and are responsible for the first pole mount substation and upstream infrastructure.

PWC recommend that a GBS (Gas Break Switch) be provided upstream of the first transformer to establish a demarcation point.

PWC advise that street lighting is supplied from unmetered LV infrastructure and is the responsibility of the lot holder and not PWC.

All meters, whether pre- or post-paid are the property of PWC.

Dump Camp community are responsible for all unmetered and metered LV infrastructure including the main switchboard, metering panel (excluding meter), LV

distribution feeders, distribution pillars, consumers' mains and consumer switchboards and street lights.

10.2 Existing infrastructure condition assessment

Table 11 shows the condition rating given to the street lights. The street lights were of a low voltage overhead feeder design, mercury lamp type, M125D with no lamp covers protected by cages. The street lights have 42% operational rating and 58% inoperable.

Table 11 Street light on O/H pole condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Street light on O/H pole		10	14			24

Table 12 shows the condition rating given to the transformer. The transformer was of pole mount substation design. The transformer was visually accessed to be in good condition.

Table 12 Transformer condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Transformer			1			1

Table 13 shows the condition rating given to the Overhead poles. The overhead poles are of Weld Construction (Universal Pole construction). The overhead poles have 100% operational rating from the visual inspection.

Table 13 Overhead pole condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Overhead pole			24			24

Table 14 shows the condition rating given to the Metering panels. All assessed meters in this community are prepaid digital meters.

Table 14 Meter panel condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Pre-paid meter			5			5
Switchboard			5			5

Table 15 shows the condition rating given to the switchboards associated to dwellings.

Table 15 Switchboard condition assessment (housing footprint)

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Switchboard		1	4			5

The details of the individual inspections and photographs of each infrastructure item are included in the Appendices.

10.3 Current performance and risks

The electrical infrastructure evaluation was conducted against the following criteria

- Number of dwellings on tenure, the higher value of the funded dwelling and as quoted in the population report was utilised.
- Urban area, NP001.1, 4. Definitions.
- General Specification for URD Subdivisions, NP001.6, 4.3 Substation Size.
- Normal ADMD (After Diversity Maximum Demand) of 4.5 kVA and high cost subdivisions at 7 kVA.
- Transformer ratings were assumed to be correct in Dekho (PWC asset information system) and compared against photographs of test or transformer numbers collected.
- Substation loads were compared against transformer sizes only. No load flow analysis was conducted.
- No load calculations were performed or assessment conducted on overhead or underground cable, visual inspection from the ground only.
- Street lighting loads were ignored as they are not significant.

The calculated maximum demand of the Dump Camp (Marla-Marla) community transformer is 15% of rated capacity based on 4.5kVA/dwelling. The calculated maximum demand is within the total capacity of the substation on site.

Table 16 Dump Camp (Marla-Marla) current demand load vs transformer ratings

Com Id	Community name	Dwellings	Transformer (kVA)	kVA Total @ 4.5kVA	kVA Total @ 7kVA
223	Dump Camp (Marla-Marla)	7	200	31.5	49

A tabulated summary of all community transformers is included in the Appendices.

There is a risk of equipment not being maintained associated with the non-standard division of responsibilities between the customer and PWC.

The following points from the PWC Metering Rules should be noted:

- The routine maintenance of metering installations and the replacement of any faulty meters is the responsibility of PWC.
- The property owners are responsible for the maintenance and upkeep of meter rooms, boxes and panels (including lids, doors and locking mechanisms).
- The installation of pre-paid metering is a cost to the customer, refer NP010 Meter Manual-Maintenance of Metering Installations, Power and Water Corporation.

10.4 Future demands

As no new developments are currently planned for the community, there are no additional upgrades required to cater for future demand.

10.5 Recommended works

The following maintenance works and upgrades are recommended:

- Repair ten M125 street lights.
- Replace one switchboard associated to dwellings

11 Communications

11.1 Ownership and boundaries

Details of Telstra pit and conduit infrastructure within the town camp boundaries were sought but were not forthcoming.

11.2 Existing infrastructure condition assessment

The telecommunications infrastructure assessed included pits and telephone booths. There were no telephone booths found at Dump Camp.

The Appendices contain the individual reports.

Table 17 Telecommunication pit condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Telecommunication pit						0

11.3 Current performance and risks

No details of the performance of communications infrastructure were obtained.

11.4 Future demands

The current availability of broadband services at Dump Camp (Marla-Marla) is displayed in the Figure 14 below. NBN is available to residents via a fixed telecommunication line on application to an appropriate NBN access provider.

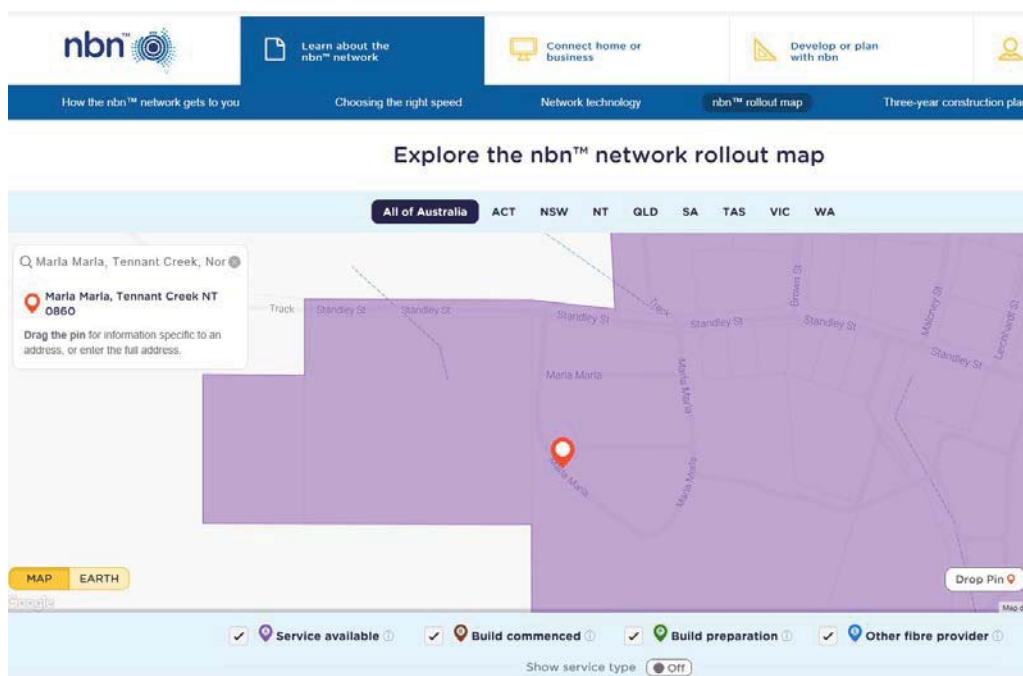


Figure 14 NBN network availability map

The NBN rollout map confirms that NBN is planned to be made available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

11.5 Recommended works

Representatives from NBN's Land Access and Stake Holder management teams are currently engaged with Yilli Housing and NT Housing to look at how camps will be serviced. It is expected that any existing premises in these camps will have some type of NBN service via the NBN brownfields rollout in the future.

No works are required at Dump Camp (Marla-Marla) because NBN is available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

12 Cost estimates

Table 18 below shows a summary of the cost estimates to undertake the maintenance required to fix the existing infrastructure and to upgrade the existing network to meet current design standards. There are no upgrades required for the future design. The estimates take into account a 30% contingency, are inclusive of GST, and a location factor has been applied to town camps outside of Darwin.

Table 18 Cost estimates

Infrastructure	Maintenance of existing infrastructure	Upgrades to meet current design
Sewerage	\$ 1,000	\$ 0
Water supply	\$ 0	\$ 91,000
Roadworks	\$ 33,000	\$ 0
Stormwater drainage	\$ 15,000	\$ 0
Community structures	\$ 0	\$ 0
Electrical	\$ 13,000	\$ 0
Communications	\$ 0	\$ 0
Miscellaneous provisions	\$ 19,000	\$ 22,000
Total (including GST)	\$ 81,000	\$ 113,000
Grand total	\$ 194,000	

The cost estimates are a preliminary estimate only. Since Aurecon has no control over the cost of labour, materials, equipment or services furnished by others, or over contractors' methods of determining prices, or over competitive bidding or market conditions, Aurecon cannot guarantee actual costs will not vary from these estimates.

13 Summary

The following works are recommended for Dump Camp (Marla-Marla) community:

Sewerage

- General tidy up of two manholes

Water supply

- Install one residential lot water meter
- Install bulk water meters at the community boundary
- Disconnect secondary supply point and reconnect to water main creating a looped network

Roadworks

- Install street name signs on post (four)
- Remove graffiti from one sign (or replace sign)
- Replace one sign and post
- General tidy up of foot paths – approximately 500 m
- Clean out kerbs and gutters

Stormwater drainage

- Repair one side entry pit (one bay)
- Clear blockages from four side entry pits (20 - 40% blocked)
- Clear blockages from culvert headwall and swale, including removing trees and debris.
- Replace lid on one side entry pit

Community structures

- No works required

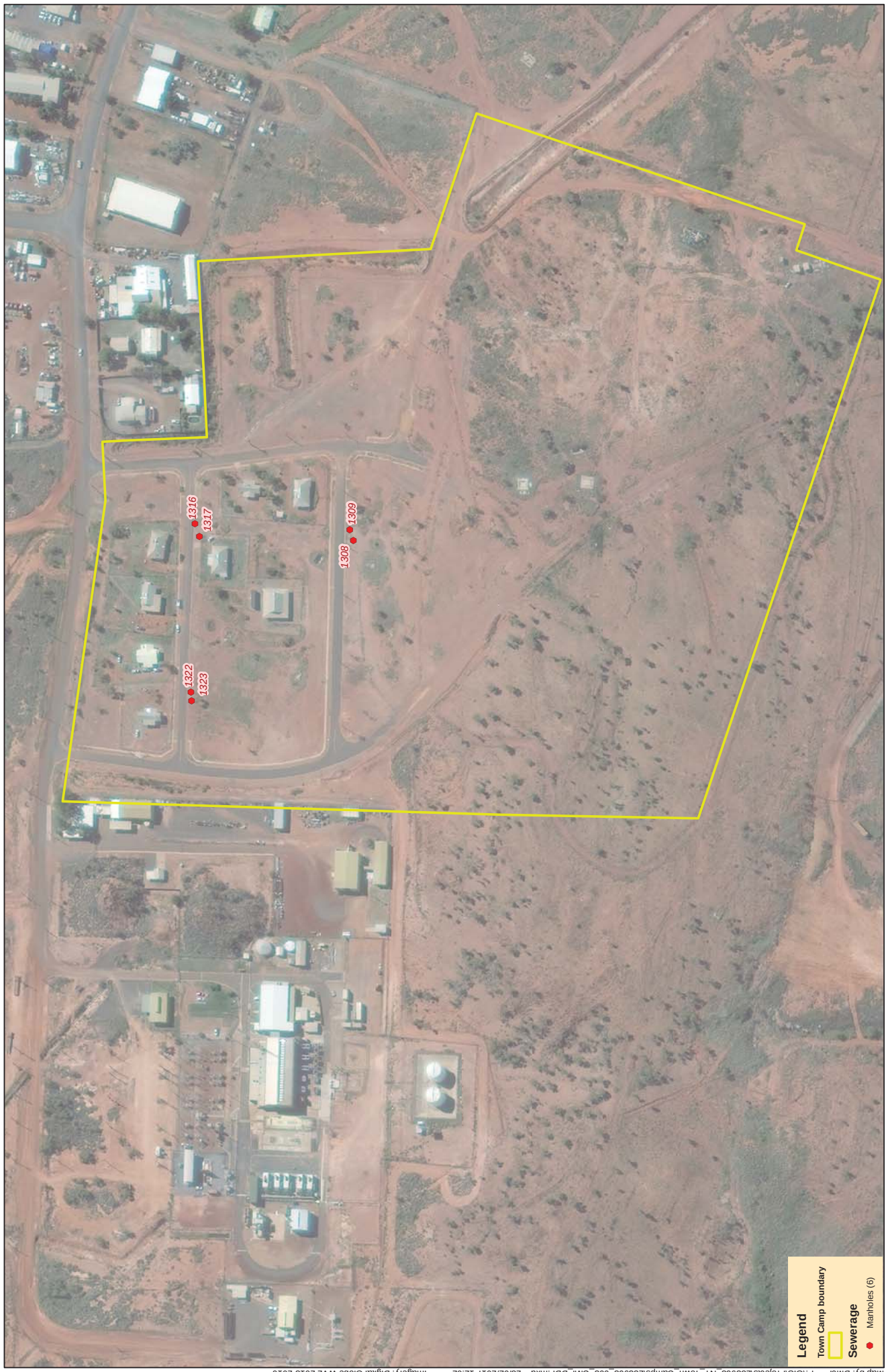
Electrical services

- Repair ten M125 street lights.
- Replace one switchboard associated to dwellings

Communications

- No works are required because NBN is available to residents via fixed telecommunications line on application to an appropriate NBN access provider

Civil inspection reports



Map by: DMCP P:\GIS\Projects\253963 NT Town Camps\253963_003_Civil_DDP.mxd 23/02/2017 12:02 Imagery: Digital Globe WV2 2013-2016

A3 scale: 1:2,500



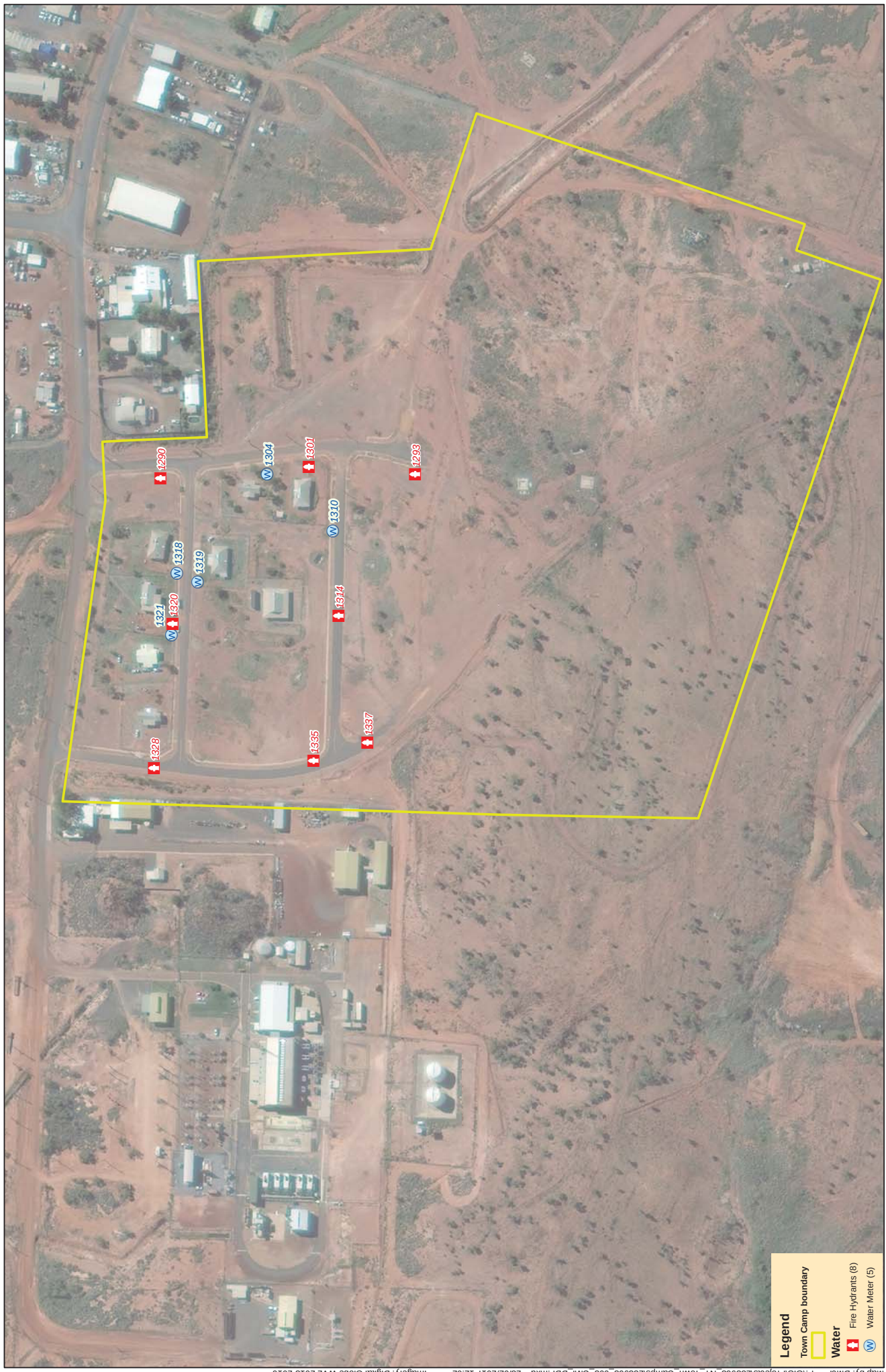
Note:
Label numbers refer to survey IDs



Date: 23/02/2017 Version: 2
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments: Sewerage

223 - Marla Maria (Tennant Creek)



Map by: DMCP P:\GIS\Projects\253963 NT Town Camps\253963_003_Civil_DDP.mxd 23/02/2017 12:02 Imagery: Digital Globe WV2 2013-2016

Legend

- Town Camp boundary
- Water
- Fire Hydrants (6)
- Water Meter (5)

A3 scale: 1:2,500



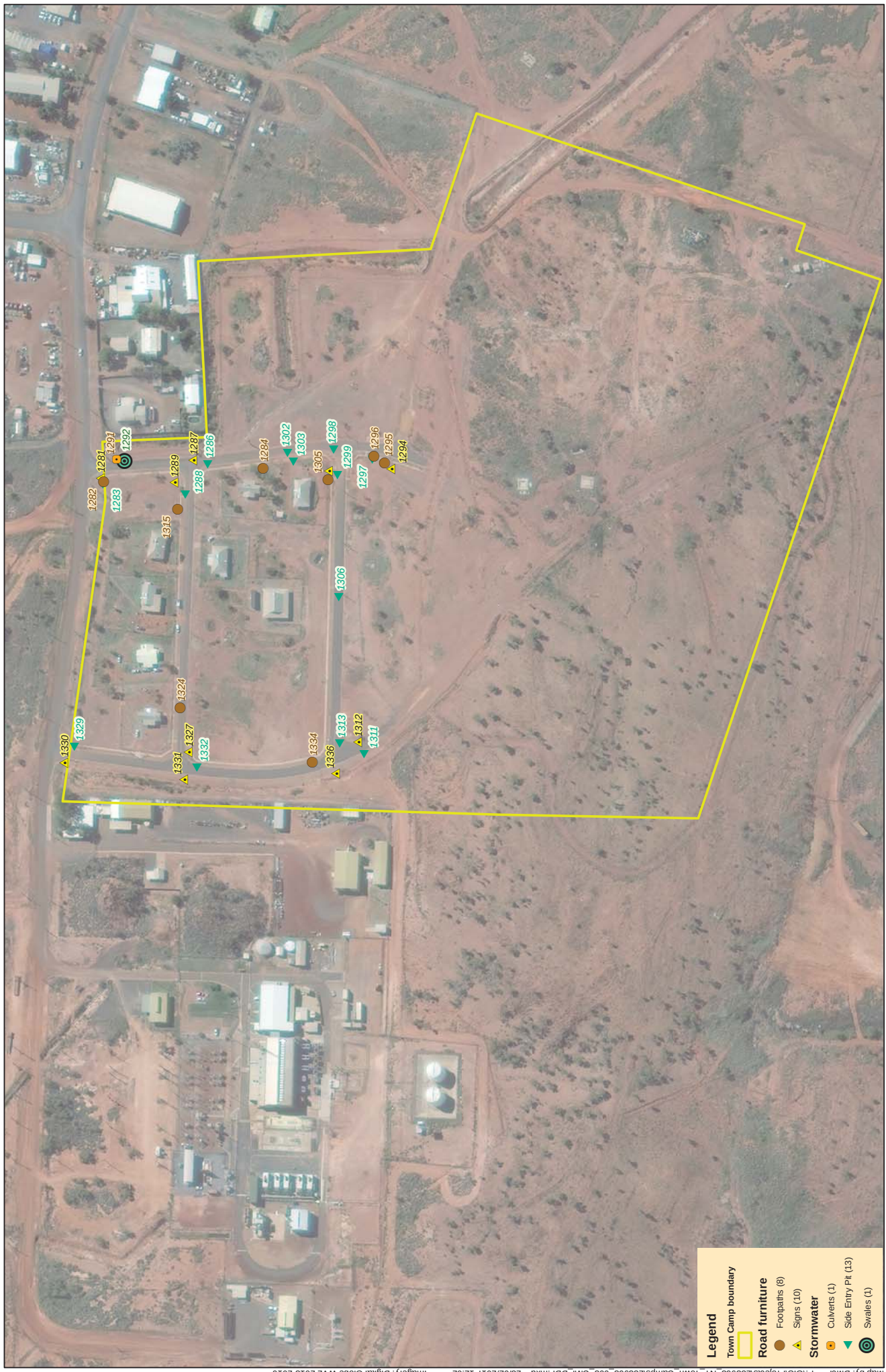
Note:
Label numbers refer to survey IDs



Date: 23/02/2017 Version: 2
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments: Water

223 - Marla Maria (Tennant Creek)



Map by: DMCP P:\GIS\Projects\253963 NT Town Camps\253963_003_Civil_DDP.mxd 23/02/2017 12:02 Imagery: Digital Globe WV2 2013-2016

A3 scale: 1:2,500



Note:
Label numbers refer to survey /Ds



Date: 23/02/2017 Version: 2
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments

Road furniture, stormwater drainage & community structures

223 - Marla Marla (Tennant Creek)

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:31:03 AM

Insp ID: 1291	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

Stormwater Infrastructure: Culverts

Culvert Type:

Diameter (mm):

Width (mm):

Culvert Depth (mm):

Culvert Length (m):

Culvert Condition:

Culvert Blockage (%):

Culvert Comments:

Culvert Head Wall: No

Safety Grate:

Headwall Blockage:

Headwall Condition:

Headwall Comment:

End Wall: Yes

End Wall condition:

EW Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:32:33 AM

Insp ID: 1290

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 3 - Good

FH Comment: Kerb marker paint is fading



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 9:08:40 AM

Insp ID: 1293

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: Yes

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 4 - Very Good

FH Comment: Covered in grass



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:52:14 AM

Insp ID: 1301

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 3 - Good

FH Comment: Covered in dirt



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 10:36:45 AM

Insp ID: 1314	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 4 - Very Good

FH Comment: Covered in dirt



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:22:22 AM

Insp ID: 1320	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 4 - Very Good

FH Comment: In driveway



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:10:51 AM

Insp ID: 1328	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 4 - Very Good

FH Comment: Overgrown



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:02:09 AM

Insp ID: 1335

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 3 - Good

FH Comment: Lid not on properly



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 10:52:33 AM

Insp ID: 1337	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: Yes

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 3 - Good

FH Comment: Paint on kerb starting to peel



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:24:54 AM

Insp ID: 1282

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Foot Paths

Footpath Width (mm): 1200

Footpath Type: Concrete

Footpath Condition: 3 - Good

Comment:

General Comment: Needs maintenance, rocks and dirt on footpath



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:45:32 AM

Insp ID: 1284

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Foot Paths

Footpath Width (mm): 1200

Footpath Type: Concrete

Footpath Condition: 3 - Good

Comment: Needs a clean

General Comment: Right side of road only



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 9:01:53 AM

Insp ID: 1295

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Foot Paths

Footpath Width (mm): 1200

Footpath Type: Concrete

Footpath Condition: 4 - Very Good

Comment:

General Comment: Structurally fine, but needs a tidy up



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 9:00:55 AM

Insp ID: 1296

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Foot Paths

Footpath Width (mm): 1200

Footpath Type: Concrete

Footpath Condition: 4 - Very Good

Comment:

General Comment: Left of road



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 9:16:26 AM

Insp ID: 1305

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: 223_2

What are you inspecting: Foot Paths

Footpath Width (mm): 1200

Footpath Type: Concrete

Footpath Condition: 4 - Very Good

Comment:

General Comment: Needs tidy up



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:26:33 AM

Insp ID: 1315

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: 223_1

What are you inspecting: Foot Paths

Footpath Width (mm): 1200

Footpath Type: Concrete

Footpath Condition: 3 - Good

Comment: Needs tidy up

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:15:15 AM

Insp ID: 1324

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: 223_1

What are you inspecting: Foot Paths

Footpath Width (mm): 1200

Footpath Type: Concrete

Footpath Condition: 3 - Good

Comment: Needs tidy up

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:03:18 AM

Insp ID: 1334

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Foot Paths

Footpath Width (mm): 1200

Footpath Type: Concrete

Footpath Condition: 4 - Very Good

Comment: Needs general tidy up

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 10:30:39 AM

Insp ID: 1308

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: 2/1

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 10:29:13 AM

Insp ID: 1309

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm): 450

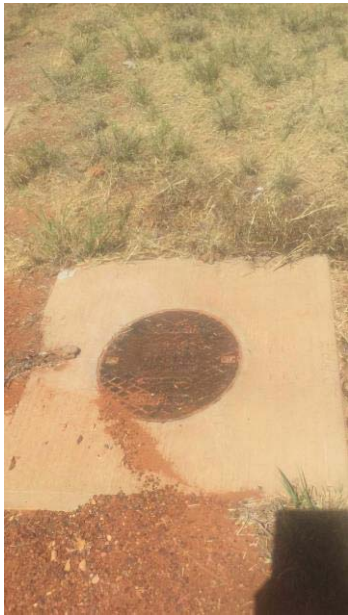
Manhole Length (mm):

Manhole Width (mm):

Manhole Condition: 4 - Very Good

Notes on Lid: Class d 2/2

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:26:50 AM

Insp ID: 1316	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Round

Manhole Cover Diam (mm): 450

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition: 3 - Good

Notes on Lid: 1/4/1

Comments: Covered in gravel



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:24:14 AM

Insp ID: 1317

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: 1/4

Comments: Graffiti



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:19:22 AM

Insp ID: 1322

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 4 - Very Good

Notes on Lid: 1/6

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:17:06 AM

Insp ID: 1323

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm): 450

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition: 4 - Very Good

Notes on Lid: Class d. 1/b/1

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:40:10 AM

Insp ID: 1285	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.25

Road Type: Sealed - spray seal

Section Width (m): 7.2

Road Condition: 3 - Good

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Bleeding	50	3 - Good	50% of road has bleed defects

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Kerb and Gutter	3 - Good	Gutters are filled with dirt in some sections

Shoulders Section

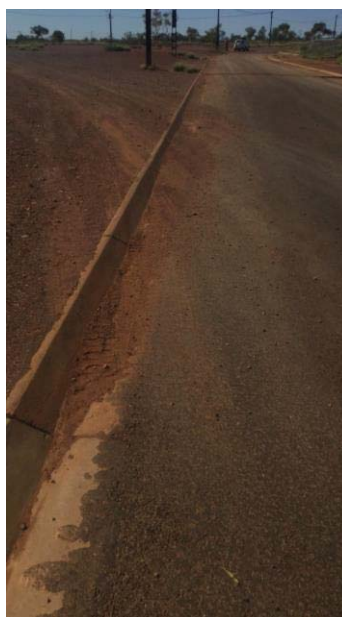
Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:40:10 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:40:10 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 10:32:27 AM

Insp ID: 1307	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

Road Name: 223_2

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.21

Road Type: Sealed - spray seal

Section Width (m): 7.2

Road Condition: 3 - Good

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Bleeding	30	3 - Good	30% road

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Kerb and Gutter		

Shoulders Section

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 10:32:27 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 10:32:27 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:13:24 AM

Insp ID: 1326	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

Road Name: 223_1

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.21

Road Type: Sealed - spray seal

Section Width (m): 7.2

Road Condition: 3 - Good

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Bleeding	30	3 - Good	30% of road

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Kerb and Gutter	2 - Poor	Kerbs on left full of dirt

Shoulders Section

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:13:24 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:13:24 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:04:01 AM

Insp ID: 1333	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Pavements

Ch From (km): 0.5

Ch To (km): 0.75

Road Type: Sealed - spray seal

Section Width (m): 7.2

Road Condition: 3 - Good

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Bleeding	20	3 - Good	20% of road

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Kerb and Gutter	4 - Very Good	

Shoulders Section

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:04:01 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:04:01 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:26:14 AM

Insp ID: 1283

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure: SEP
Number of Bays: 2
On grade or sag pit:
Both sides of road: Both
Condition: 4 - Very Good
Blockage (%): 0
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:39:01 AM

Insp ID: 1286

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure:SEP

Number of Bays:1

On grade or sag pit:

Both sides of road:Left

Condition:2 - Poor

Blockage (%):10

Comment:Broken concrete



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:36:16 AM

Insp ID: 1288

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure: SEP

Number of Bays: 3

On grade or sag pit:

Both sides of road:

Condition: 4 - Very Good

Blockage (%): 10

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:59:22 AM

Insp ID: 1297

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure: SEP
Number of Bays: 1
On grade or sag pit:
Both sides of road: Both
Condition: 4 - Very Good
Blockage (%):
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:58:01 AM

Insp ID: 1298

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure: SEP
Number of Bays: 2
On grade or sag pit:
Both sides of road: Left
Condition: 4 - Very Good
Blockage (%): 10
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:56:12 AM

Insp ID: 1299

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure: SEP
Number of Bays: 3
On grade or sag pit:
Both sides of road: Both
Condition: 4 - Very Good
Blockage (%): 10
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:52:22 AM

Insp ID: 1302

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure: SEP
Number of Bays: 2
On grade or sag pit:
Both sides of road: Left
Condition: 3 - Good
Blockage (%): 40
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:51:22 AM

Insp ID: 1303

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure:	SEP
Number of Bays:	1
On grade or sag pit:	
Both sides of road:	Right
Condition:	3 - Good
Blockage (%):	20
Comment:	Blocked with concrete



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 10:34:53 AM

Insp ID: 1306

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure:SEP

Number of Bays:1

On grade or sag pit:

Both sides of road:Right

Condition:4 - Very Good

Blockage (%):0

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 10:50:15 AM

Insp ID: 1311

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure:

SEP

Number of Bays:

1

On grade or sag pit:

Both sides of road:

Both

Condition:

4 - Very Good

Blockage (%):

0

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 10:37:46 AM

Insp ID: 1313	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

Stormwater Infrastructure:	SEP
Number of Bays:	1
On grade or sag pit:	
Both sides of road:	Right
Condition:	3 - Good
Blockage (%):	20
Comment:	Covered in white paint



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:09:37 AM

Insp ID: 1329

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure: SEP
Number of Bays: 1
On grade or sag pit:
Both sides of road: Both
Condition: 4 - Very Good
Blockage (%):
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:05:31 AM

Insp ID: 1332

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure:

SEP

Number of Bays:

1

On grade or sag pit:

Both sides of road:

Right

Condition:

4 - Very Good

Blockage (%):

20

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:21:41 AM

Insp ID: 1281

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Signs

Type of Sign: Give Way

Sign Condition: 3 - Good

Sign Comment:

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:38:06 AM

Insp ID: 1287

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Signs

Type of Sign: Street name

Sign Condition: 1 - Very Poor

Sign Comment: No street name sign. Post only

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:34:02 AM

Insp ID: 1289	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

Road Name: 223_1

What are you inspecting: Signs

Type of Sign: Give Way

Sign Condition: 3 - Good

Sign Comment:

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 9:07:58 AM

Insp ID: 1294

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Signs

Type of Sign: Street name

Sign Condition: 2 - Poor

Sign Comment: No sign

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:55:13 AM

Insp ID: 1300

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: 223_2

What are you inspecting: Signs

Type of Sign: Give Way

Sign Condition: 4 - Very Good

Sign Comment:

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 10:39:56 AM

Insp ID: 1312	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

Road Name: 223_2

What are you inspecting: Signs

Type of Sign: Give Way

Sign Condition: 1 - Very Poor

Sign Comment: Sign bent, leaning over road

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:12:23 AM

Insp ID: 1327

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: 223_1

What are you inspecting: Signs

Type of Sign: Give Way

Sign Condition: 4 - Very Good

Sign Comment:

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:07:59 AM

Insp ID: 1330	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Signs

Type of Sign: Give Way

Sign Condition: 3 - Good

Sign Comment: Some graffiti

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:07:15 AM

Insp ID: 1331

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Signs

Type of Sign: Street name

Sign Condition: 2 - Poor

Sign Comment: No sign

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:00:41 AM

Insp ID: 1336	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

Road Name: Marla Marla

What are you inspecting: Signs

Type of Sign: Street name

Sign Condition: 2 - Poor

Sign Comment: No sign

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:28:59 AM

Insp ID: 1292

Group 3 - Tennant Creek, Elliott

Dump Camp (Marla-Marla)

Stormwater Infrastructure:	Swales
Type of lining:	No Lining
Are dimensions uniform along drain:	No
Base Width (m):	1
Overall Width (m):	7
Swale Depth (m):	3
Length of Batter 1 (m):	
Length of Batter 2 (m):	
Swale Condition:	3 - Good
Swale Ponding:	No
Drain flooded at time of inspection:	No
Swale Comments:	Approximate dimensions



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 8:49:31 AM

Insp ID: 1304	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Water Meter

Water Meter Type: Bulk

Bulk Water Meter Size (mm): 25

Bulk Water Meter Condition: 3 - Good

Bulk Water Meter Comment:

Lot Number:

Lot Water Meter Size:

Lot Water Meter Condition:

Lot Water Meter Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 10:21:13 AM

Insp ID: 1310	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Water Meter

Water Meter Type: Bulk

Bulk Water Meter Size (mm): 25

Bulk Water Meter Condition: 3 - Good

Bulk Water Meter Comment: Could be lot meter

Lot Number:

Lot Water Meter Size:

Lot Water Meter Condition:

Lot Water Meter Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:24:30 AM

Insp ID: 1318	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Water Meter

Water Meter Type: Lot

Bulk Water Meter Size (mm):

Bulk Water Meter Condition:

Bulk Water Meter Comment:

Lot Number: 1

Lot Water Meter Size:

Lot Water Meter Condition: 4 - Very Good

Lot Water Meter Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:22:06 AM

Insp ID: 1319	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Water Meter

Water Meter Type: Lot

Bulk Water Meter Size (mm):

Bulk Water Meter Condition:

Bulk Water Meter Comment:

Lot Number: 8

Lot Water Meter Size:

Lot Water Meter Condition: 4 - Very Good

Lot Water Meter Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 30/11/2016 11:19:05 AM

Insp ID: 1321	Group 3 - Tennant Creek, Elliott	Dump Camp (Marla-Marla)

What Water Asset Are you Capturing: Water Meter

Water Meter Type: Lot

Bulk Water Meter Size (mm):

Bulk Water Meter Condition:

Bulk Water Meter Comment:

Lot Number:

Lot Water Meter Size:

Lot Water Meter Condition: 4 - Very Good

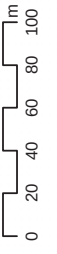
Lot Water Meter Comment: Two meters in one lot



Electrical inspection reports



A3 scale: 1:2,500

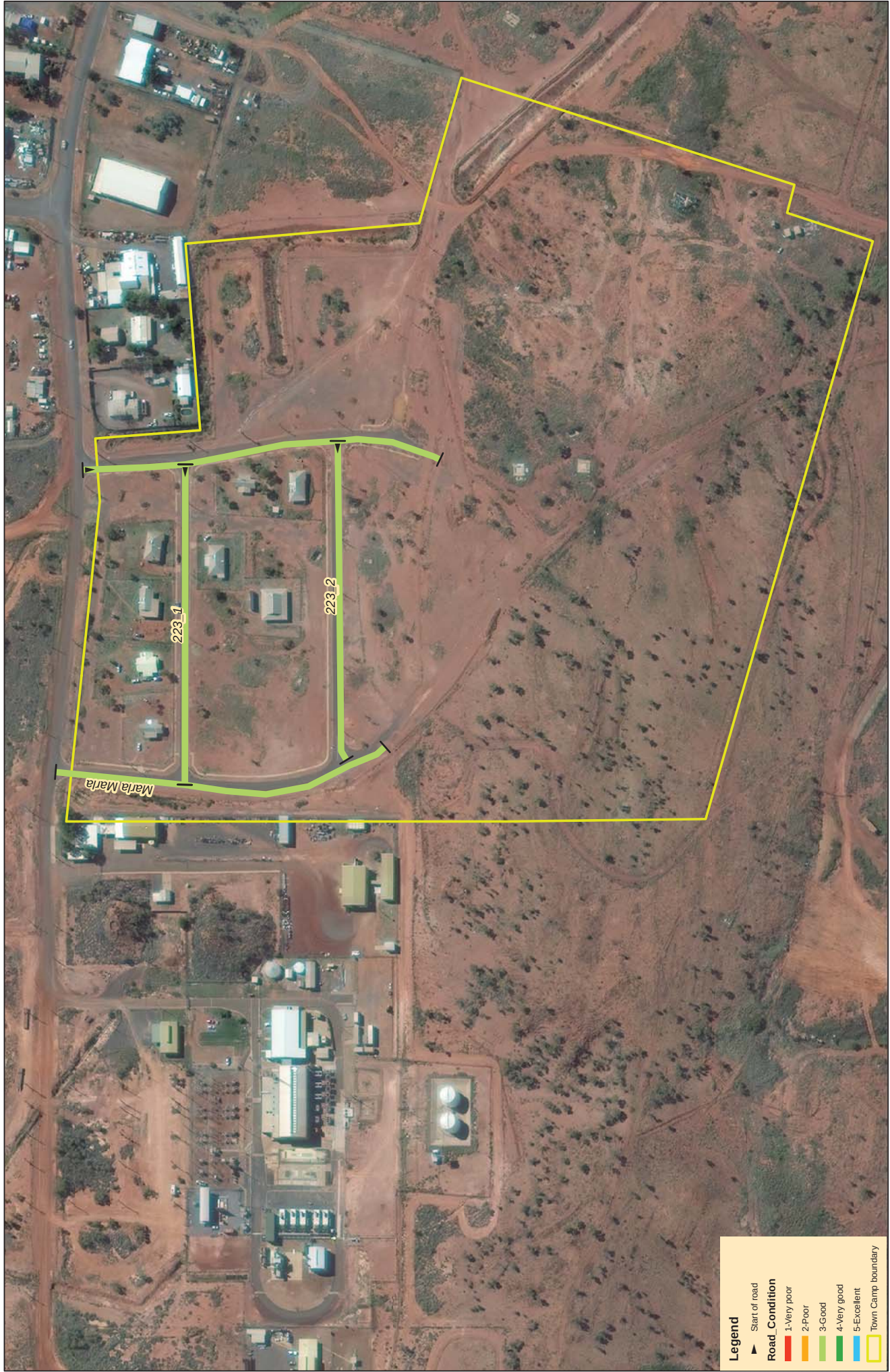


Date: 23/02/2017 Version: 3
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments: Electrical

223 - Marla Maria (Tennant Creek)

Road map



Date: 11/02/2017 Version: 1
Coordinate system: GDA 1994

NT Town Camp Road Assessments 223 - Marla Marla (Tennant Creek)

A3 scale: 1:2,500



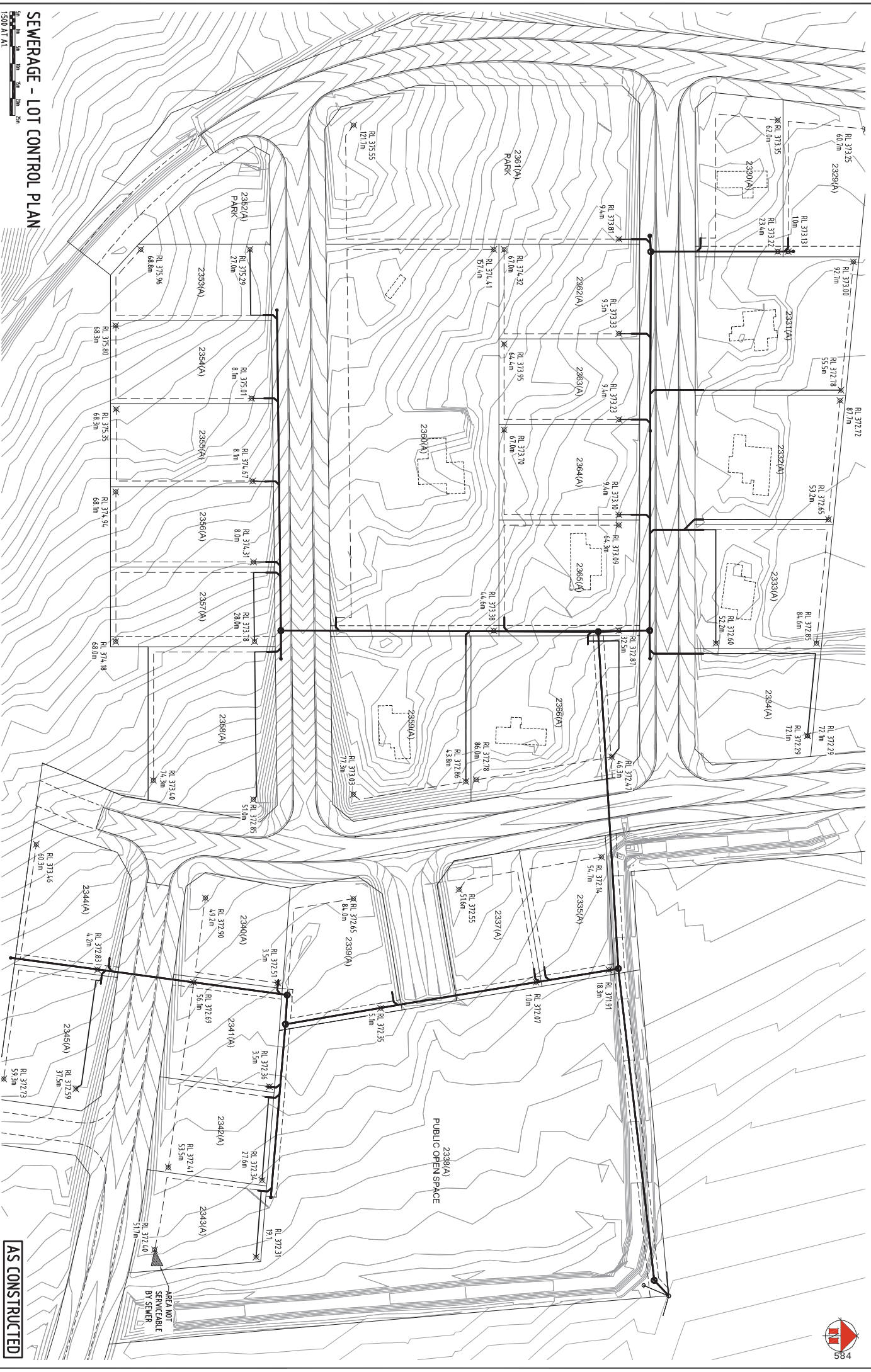
Existing drawings



CONNECTING NEIGHBOURS PROJECT - PROPOSED SERVICES LAYOUT
FIGURE F19 - DUMP CAMP

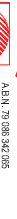
- H Existing Residential Development (or as high-lighted by building sketch layout).
- V Forecast Residential Lots for Development (up to 2014). Utility Reticulation Services Compliance has been costed for Existing and Forecast Development up to 2014 only.
- F Future Residential Lots Forecast for Development beyond 2014. Utility Reticulation Services shown for future planning only

Scale: 1:250		DO NOT SCALE		Client	
Drawn	Designed	Checked	Design	Project	Project
Approved	Approved	Approved	Approved	File	File
Date		Date		Original Size	
The Drawing must not be used for Construction unless signed or approved		A1		Drawing No:	
Rev: A		Connecting Neighbours Project		Dump Camp	
Services Layout		Dump Camp		Rev: A	

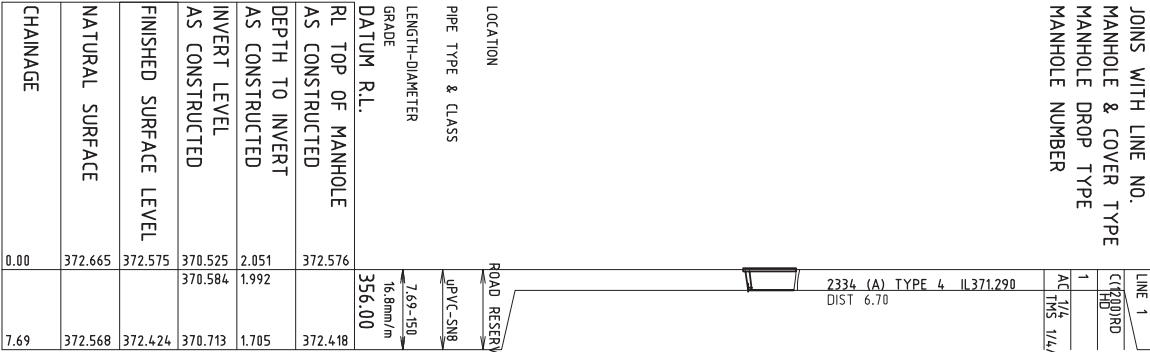


SEWERAGE - LOT CONTROL PLAN

1500 AT 1:1

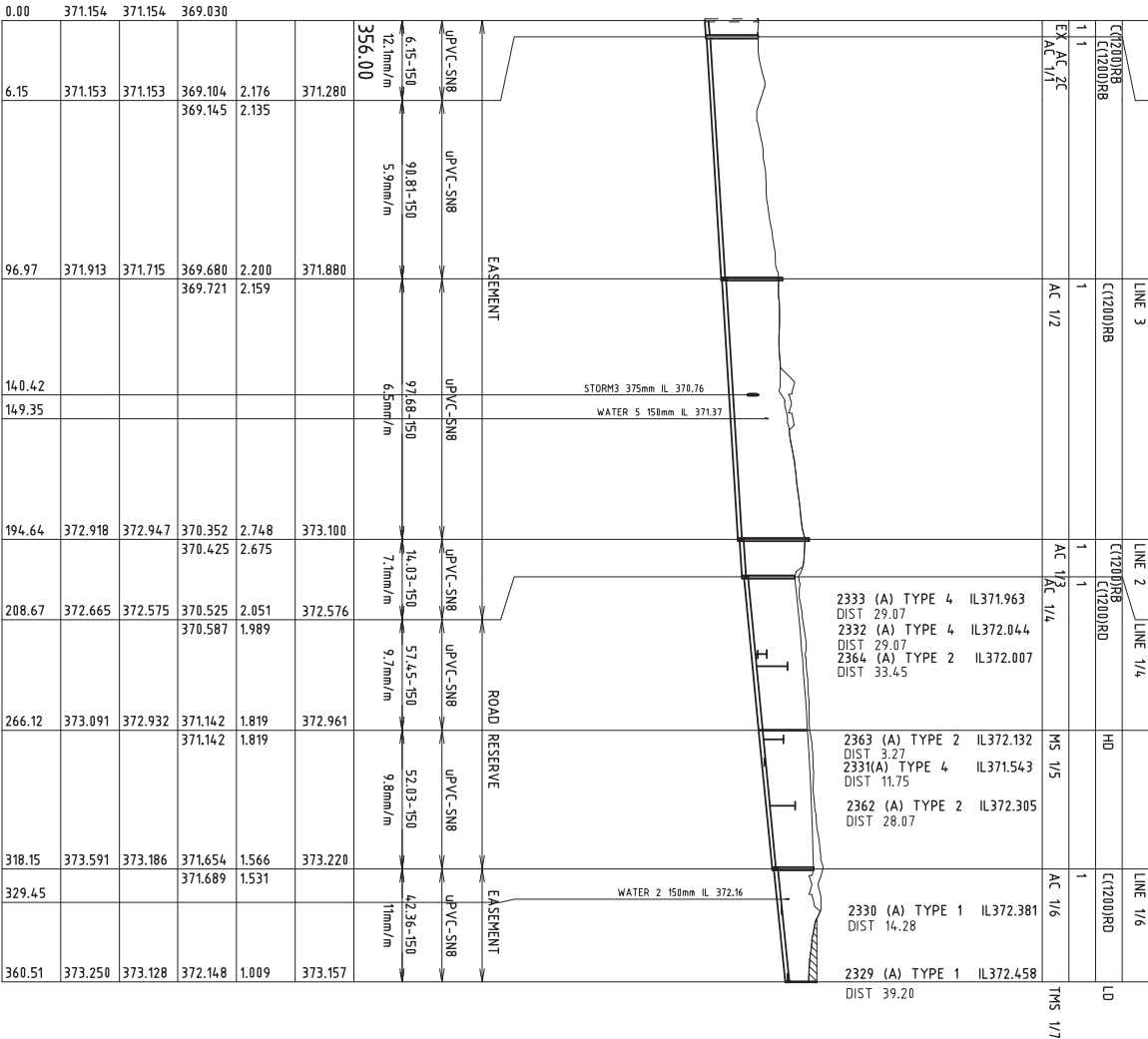
						OPUS QANTEC M-WILLIAM	
						ALB1 710583427065	
						Lot 11, 80 South Street Darwin NT 0801	
						GPO Box 4183 Darwin NT 0801	
5		AS CONSTRUCTED	04.03.2011	JTL			
No.		DESCRIPTION	DATE	INT.			
		AMENDMENTS					
			M-08004.02				
		NFA-072-723-LVL-DWG5-0002					
							
		Department of Planning and Infrastructure					
		Northern Territory Government					
							
		Department of Planning and Infrastructure					
		TENANT CREEK					
		T VAIVASINGHA					
		DATE	MARCH 2011	CHECKED	J LAMBER		
		DESIGNED		DATE	MARCH 2011		
		S/W		CHECKED	DMB		
		DATE	SEP 7 2008	DATE	MARCH 2011		
		DESIGN PROJECT LEADER		PROJECT OFFICER			
		DATE		DATE			
		SEWERAGE - LOT CONTROL PLAN					
		INFRAS TRUCTURE DESIGN PROJECT FOR TENNANT CREEK URBAN LIVING AREAS					
		TENANT CREEK					
		LOT 1231 - LOT 2055 STANDLEY STREET, TENNANT CREEK					
		INFRAS TRUCTURE DESIGN PROJECT FOR TENNANT CREEK URBAN LIVING AREAS					
		SEWERAGE - LOT CONTROL PLAN					
		FILE No.					
		ASSET No.					
		SHEET No.					
		COA. 0406 -					
		DRAWING No.					
		810-11,934					
		5					
		A1					

JOINS WITH LINE NO.
MANHOLE & COVER TYPE
MANHOLE DROP TYPE
MANHOLE NUMBER

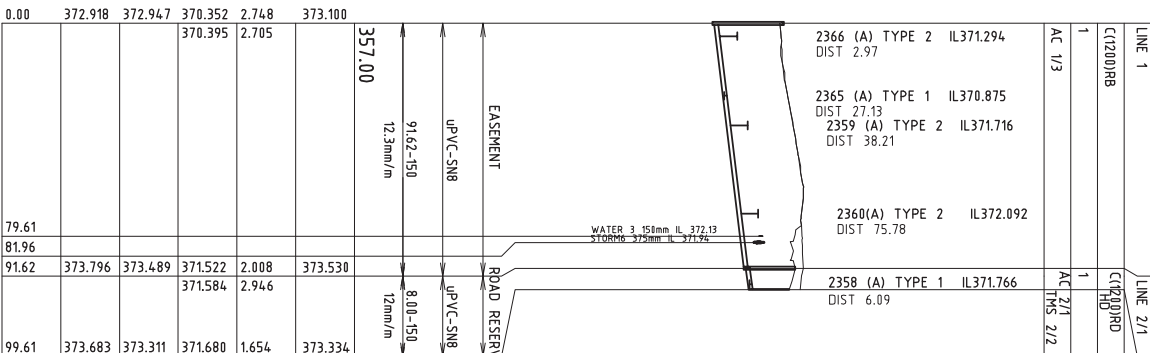


LINE 1/4

SEWERAGE - LONGITUDINAL SECTIONS



LINE 1



LINE 2

AS CONSTRUCTED

OPUS QANTEC McWILLIAM

A.S.N. 73 088 542 085
Level 1, 80 Smith Street
Darwin NT 0801
Darwin NT 0801
Telephone (08) 8841 7500
Facsimile (08) 8841 1882
E-Mail: dmw@qantec.com.au

ACEA
The Association of
Civil Engineers
of Australia

territory housing

DESIGN PROJECT LEADER

DATE: SEPT 2008
DATE: SEPT 2008
DATE: SEPT 2008

SAW
SAW
DHB

PI-02-223-CVL-DWG-0067

Northern Territory Government

Department of Planning and Infrastructure

TENNANT CREEK

MARLA MARLA (223) - LOT 2055 STANDLEY STREET, TENNANT CREEK

INFRASTRUCTURE DESIGN PROJECT FOR TENNANT CREEK URBAN LIVING AREAS

SEWERAGE - LONGITUDINAL SECTION - SHEET 1 OF 2

FILE No. -

ASSET No. -

SHEET No. C04.02a

DRAWING No. R08-1794

AMEND 5

SHEET A1



HOUSE CONNECTIONS					
LOT NO.	DISTANCE FROM DOWNSTREAM AC/MI	DOWNSIDE ACCESS CHAMBER NO.	IL OF HOUSE CONNECTION AT 10' IN	DISTANCE SERVICE EXTENDS INTO PROPERTY IN/1	HOUSE CONNECTION TYPE
2292A/1	39.20	AC 1/6	372.458	4.3	1
2293A/1	14.28	AC 1/6	372.381	4.4	1
2296A/1	28.07	MS 1/5	372.305	0.7	2
2293A/1	11.15	MS 1/5	37154.3	2.4	4
22963A/1	3.27	MS 1/5	372.132	0.9	2
22964A/1	33.45	AC 1/4	372.007	1.0	2
22933A/1	29.07	AC 1/4	371.963	2.1	4
22932A/1	29.07	AC 1/4	372.044	2.0	4
22934A/1	6.70	AC 1/4	371.290	2.4	4
22961A/1	3.62	AC 1/6	372.736	0.9	2
22958A/1	6.09	AC 2/1	371.766	1.33	1
22960A/1	75.78	AC 1/3	372.092	4.19	2
22959A/1	38.21	AC 1/3	371.716	4.75	2
22964A/1	2.97	AC 1/3	371.294	4.52	2
22965A/1	27.13	AC 1/3	370.875	4.77	1
22953A/1	9.13	AC 2/1	374.559	0.96	2
22954A/1	67.13	AC 2/1	374.155	1.08	2
22955A/1	4.32	AC 2/1	373.780	1.01	2
22956A/1	19.86	AC 2/1	373.513	1.26	2
22957A/1	16.86	AC 2/1	372.222	1.45	2
22958A/1	53.86	AC 3/3	371.758	4.69	2
22944A/1	52.11	AC 3/3	371.723	5.05	2
22940A/1	3.04	AC 3/3	371.884	1.15	2
22939A/1	65.58	AC 1/2	371.382	3.85	2
22937A/1	24.10	AC 1/2	371.84	3.93	2
22935A/1	21.0	AC 1/2	370.309	2.31	2
22934A/1	14.53	AC 3/2	371.393	2.18	1
22942A/1	21.42	AC 3/2	371.112	3.30	1
22940A/1	18.42	AC 3/2	371.095	3.24	1

GENERAL NOTES

- DESIGN AND CONSTRUCTION OF THE WATER AND SEWERAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE POWERWATER CONNECTION CODE AND ASSOCIATED DOCUMENTS.
- ALL LEVELS GIVEN ARE TO AHD.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
- MINIMUM COVER TO PIPE IS 750mm IN TRAFFICABLE AREA, 400mm IN OTHER AREAS.
- PRIOR TO COMMENCEMENT OF WORKS THE CONSTRUCTOR SHALL CHECK THE LOCATION OF ALL UNDERGROUND SERVICES AND CONFINED FINISHED SURFACE LEVELS AND CHECK THE MATERIAL, DIAMETER, ALIGNMENT, LEVEL AND LOCATION OF EXISTING PIPEWORK AT THE CONNECTION POINT. IT IS NOT GUARANTEED THAT ALL SERVICES ARE SHOWN ON THE DRAWING.
- OBTAIN PERMITS FROM THE RELEVANT ROAD AUTHORITY PRIOR TO ROAD EXCAVATION.
- ALL WATER AND SEWER HYDRAULIC WORKS SHALL BE CARRIED OUT AS SHOWN ON THE LATEST AMENDMENT OF THE DESIGN DRAWINGS.
- CONSTRUCTION SITE DRAWINGS MUST BE SIGNED AS 'APPROVED FOR CONSTRUCTION' BY A LAND DEVELOPMENT OFFICER.
- SEVEN (7) DAYS NOTICE HAS TO BE GIVEN TO LAND DEVELOPMENT, POWERWATER WITH A NOTICE OF INTENTION TO START WORK PRIOR TO COMMENCEMENT OF WORK.
- SOUTHERN REGION- FASISME E 89.24.712
- ANY CHANGES TO THIS DRAWING, REQUIRED OR DESIRED DURING THE CONSTRUCTION PHASE MUST BE AUTHORIZED BY A LAND DEVELOPMENT OFFICER.
- ALL MATERIALS USED IN THE CONSTRUCTION OF WORKS TO BE CONNECTED TO POWERWATER INFRASTRUCTURE ARE TO BE AS NOMINATED IN POWERWATER'S WATER AND SEWER MAINS PRODUCT MANUAL.
- AS CONSTRUCTED DRAWINGS MUST BE PROVIDED TO LAND DEVELOPMENT, POWERWATER PRIOR TO HANDOVER INSPECTION.
- SUPERINTENDENT TO COM/ACT LAND DEVELOPMENT, POWERWATER TO ARRANGE FOR HANDOVER INSPECTIONS. SEVEN (7) DAYS NOTICE MUST BE PROVIDED PRIOR TO HANDOVER INSPECTIONS.
- CONNECTIONS TO EXISTING WATER AND SEWER MAINS WILL ONLY BE CARRIED OUT WHEN ALL WORKS UPSTREAM OF THE CONNECTION ARE COMPLETE (IE. TESTED, DISINFECTED WHERE APPLICABLE, BACKFILLED AND CERTIFICATES SUBMITTED IN ACCORDANCE WITH THE APPROVED DESIGN DRAWINGS AND HAVE SATISFACTORILY PASSED FINAL HANDOVER INSPECTION.
- POWERWATER PERSONNEL SHALL INSTALL ALL WATER AND SEWER CONNECTIONS TO EXISTING MAINS ONLY AFTER ACCEPTANCE OF THE WORK HAS BEEN ACHIEVED. THE CONSTRUCTOR IS RESPONSIBLE FOR ALL CONNECTION FEES, MATERIALS AND LABOUR FOR EXCAVATION, BACKFILLING AND REMEDIATION.
- THE CONTRACTOR IS TO ARRANGE AND ATTEND A MEETING WITH PWC, THE HYDRAULIC CERTIFIER AND THE DEVELOPER PRIOR TO COMMENCEMENT OF SITE WORKS.
- AS CONSTRUCTED DRAWINGS AND OTHER INFORMATION DOCUMENTATION MUST BE PROVIDED TO SERVICES DEVELOPMENT, POWER AND WATER PRIOR TO HANDOVER INSPECTION ENSURE ALL AS CONSTRUCTED INFORMATION HAS BEEN PICKED UP BY THE SUPERVISOR PRIOR TO BACKFILLING.
- AS CONSTRUCTED DRAWINGS TO BE CERTIFIED BY THE CERTIFYING ENGINEER, AS CONSTRUCTED SURVEY BY A REGISTERED SURVEYOR, PROVIDE AS HARD COPY 1 x A1/PAPER, 1 x A1/FILE, AS WELL AS DIGITAL MICROSTATION DATA FOR WATER SHOW POSITION (CO-ORDINATES TO MGA 94, & LEVELS TO AHD) FOR ALL VALVES, FIRE HYDRANTS, TIES, BEND AND LINE ENDS, SHOW SEPARATION DISTANCES/LEVELS FOR INTERSECTING SERVICES, FOR SEWERS SHOW POSITION (CO-ORDINATES TO MGA 94, & LEVELS TO AHD) FOR ALL ACCESS CHAMBERS, ACCESS SHAFTS, INSPECTION OPENINGS, SEPARATION DISTANCES/LEVELS TO CROSSING SERVICES, ALL OTHER VALUES REQUIRED TO CERTIFY COMPLIANCE OF THE DRAWINGS, SHOW FINISHED SURFACE LEVEL AT LOT CORNERS TO VERIFY LOT COVERAGE, PROVIDE MANUFACTURER AND MODEL DETAILS FOR ALL MAIN COMPONENTS.

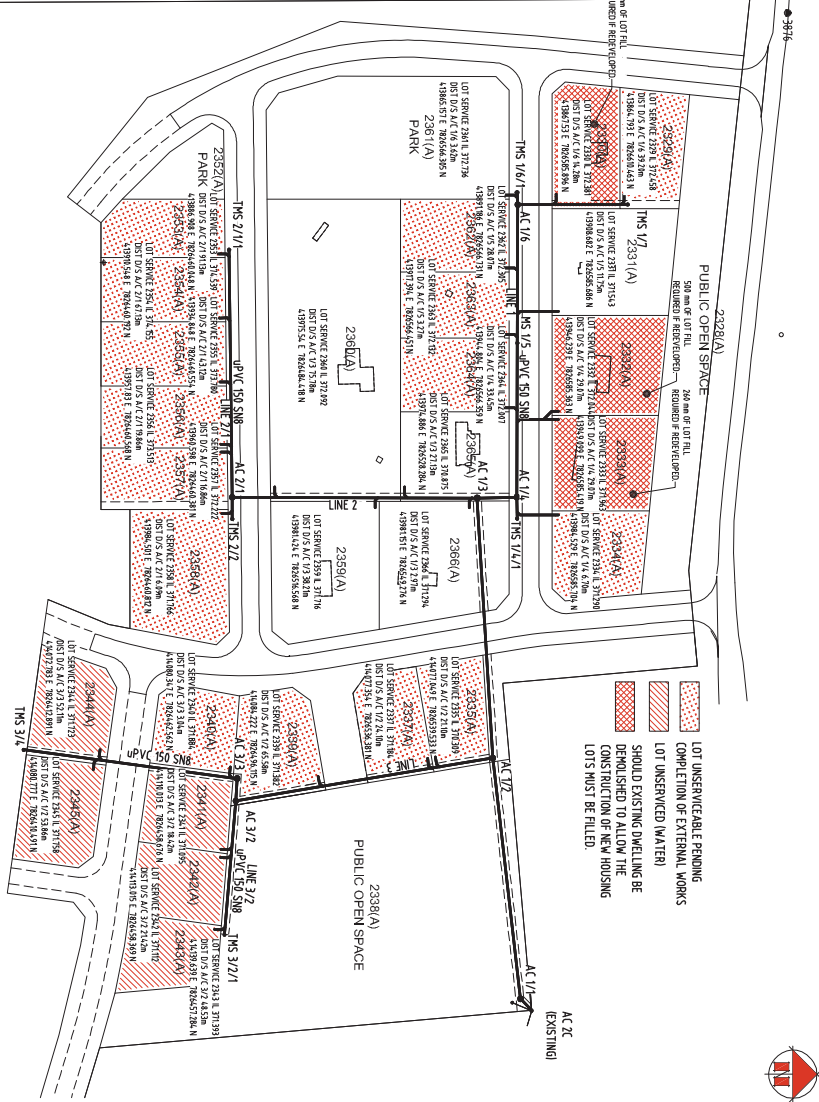
SEWERAGE

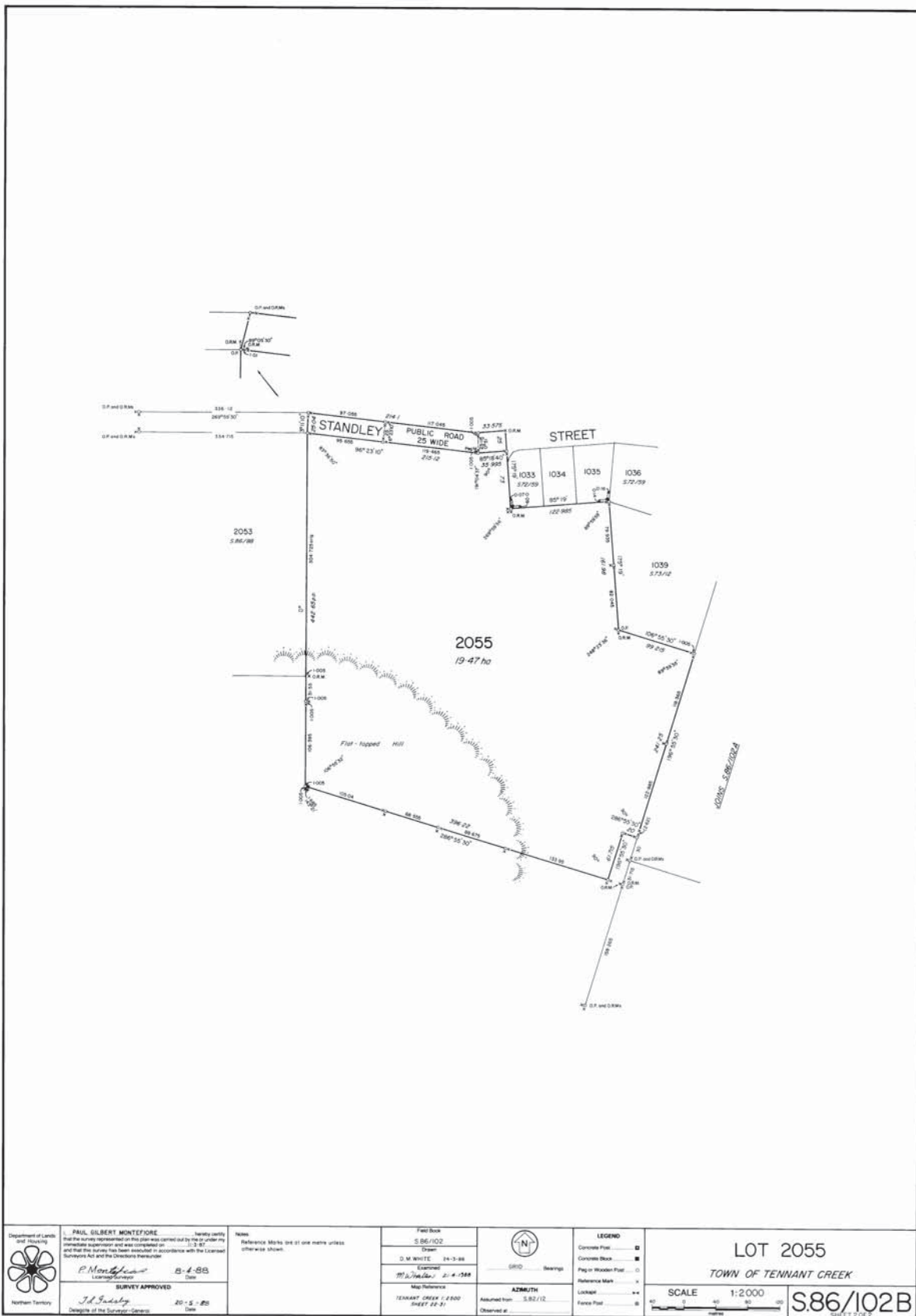
- ALL GRAVITY SEWER PIPES SHALL BE uPVC CLASS S150 WITH STYRENE-BUTADIENE RUBBER RING JOINTS ISBR1, UNLESS NOTED OTHERWISE.
- SEWERS SHALL BE OFFSET FROM PROPERTY BOUNDARIES A DISTANCE OF 1.6m IN ROAD RESERVES AND 1.5m IN PRIVATE PROPERTY, EXCEPT WHERE SHOWN OTHERWISE ON THE DRAWINGS.
- ALL GRAVITY SEWERS ARE DN50, UNLESS NOTED OTHERWISE.
- THE SUPERINTENDENT SHALL DETERMINE SEWER PIPE BEDDING TYPE AFTER INSPECTION OF THE EXCAVATED TRENCH.
- MAINTENANCE HOLE COVERS SLABS SHALL FINISH AT:
 - FINISHED SURFACE LEVEL IN ROAD RESERVES AND FOOTPATHS AND MATCH GROSS FALL TO A MAXIMUM OF 2 DEGREES 1/2mm ACROSS THE DIAMETER OF A 1200mm H91 COVER, AND
 - 150mm MINIMUM ABOVE SURFACE LEVEL IN PRIVATE PROPERTY AND OPEN SPACE.
- THE CONSTRUCTOR SHALL INSURE THE MAINTENANCE HOLE COVER WITH THE IDENTIFYING NUMBER AS SHOWN ON THE DRAWINGS.
- ALL NEW SEWER MANHOLES/ACCESS CHAMBERS ARE TO BE 1200mm DIA.
- WHERE REQUIRED, POLYURETHANE COATING OF NEW OR EXISTING MANHOLES SHALL BE ELASTON (W80) SPRAY POLYURETHANE ELASTOMER OR PVC APPROVED EQUIVALENT. APPLY IN 2 COATS EACH OF 2.0mm THICKNESS IN CONTRASTING COLOURS. SPRAY IN A CONTINUOUS APPLICATION WITH NO DRY JOINTS.
- BEDDING OF PIPE BELOW INSPECTION OPENINGS MUST BE COMPACTED TO MIN 90% OF MODIFIED MAXIMUM DRY DENSITY. USE APPROVED BEDDING AND FULLY FILL TO OR COMPACT FOR MODIFIED TECHNIQUES.
- USE CONCRETE WITH 20mm MAXIMUM AGGREGATE AND 8mm NORMAL SLUMP COMPLIING WITH AS 3779. USE GRADE 425 CONCRETE FOR THURST BLOCKS AND GRADE 425 CONCRETE FOR ALL OTHER PURPOSES. POUR THURST BLOCKS AGAINST UNDISTURBED GROUND. PROVIDE FELT OR APPROVED PLASTIC BOND BREAKER BETWEEN PIPE / FITTINGS AND CONCRETE.
- USE HEAVY DUTY INSPECTION OPENING OPTION FOR DRAINING NUMBERS W2-1-05, W2-1-06 & W2-2-07.
- ALL PROPERTY SERVICES TO LOTS TO BE GRADED AT MINIMUM OF 1100 WITH DN50 PIPE.

SETTING OUT TABLE

DESCRIPTION	EASTING	NORTHING	COVER LEVEL
AC 1/1	414,655,800	782,657,514.3	RL313.310
AC 1/2	414,675,758	782,656,248	RL317.990
AC 1/3	413,978,342	782,655,270	RL313.050
AC 1/4	413,978,098	782,657,022	RL312.600
AC 1/5	413,868,662	782,657,046	RL313.250
AC 2/1	413,978,306	782,645,372	RL313.560
AC 2/2	414,091,937	782,645,566	RL312.500
AC 3/3	414,083,516	782,645,564	RL312.770
MS 1/5	413,920,417	782,657,033	RL312.952
THS 1/6/1	413,864,101	782,657,026	RL313.252
THS 1/7	413,868,682	782,648,180	RL313.350
THS 2/1/1	413,868,659	782,648,277	RL315.305
THS 2/2	413,968,997	782,643,999	RL313.654
THS 3/2/1	414,141,963	782,646,857	RL312.430
THS 3/4	414,072,649	782,638,505	RL313.011

MAINTENANCE HOLES MANUFACTURED BY ROLLO. SEWER PIPE & MAINTENANCE SHAFTS MANUFACTURED BY VINDEK.





Date Registered: 08/06/1993

Volume 312 Folio 089

Duplicate Certificate as to Title issued? Yes

SEARCH CERTIFICATE

CROWN LEASE IN PERPETUITY 01114

Lot 2055 Town of Tennant Creek from plan(s) S 86/102B

Area under title is 19 hectares 4700 square metres

Owner:

Julalikari Housing Incorporated

of C/- Public Officer, PO Box 158, Tennant Creek NT 0861

Registered Date	Dealing Number	Description
		Previous title is Register BookCUCL Volume 201 Folio 001
26/11/1996	364701	Statutory Notice - Prescribed Property
08/06/1993	284563	Notice of a Right to a Grant of Interest
End of Dealings		

IMPORTANT MESSAGE: This title information is compiled from the paper register and may be incomplete. Please refer to the scanned image of the paper title for further details. Contact Land Titles Office staff for assistance.

Commencement Date: 6th April, 1993

Expiring Date: In Perpetuity

Reservations:

All reservations and rights to which this grant is made subject by the Crown Lands Act.

Provisions

1. This lease is granted under and subject to the Crown Lands Act and the Regulations for the time being in force thereunder, and is conditional upon compliance by the Lessee with the covenants and conditions to be complied with by the Lessee, and will, subject to the Act and the Regulations, be liable to be determined and forfeited for non-compliance with any such covenant or condition.
2. The Lessee may at any time surrender the lease in the manner prescribed under the Crown Lands Act.
3. For the purposes of sections 58 and 59 of the Crown Lands Act the Lessee agrees that the Minister may at his absolute discretion determine the Lessee's rights in improvements and whether compensation is payable for improvements following surrender, expiry, termination or forfeiture of this lease.

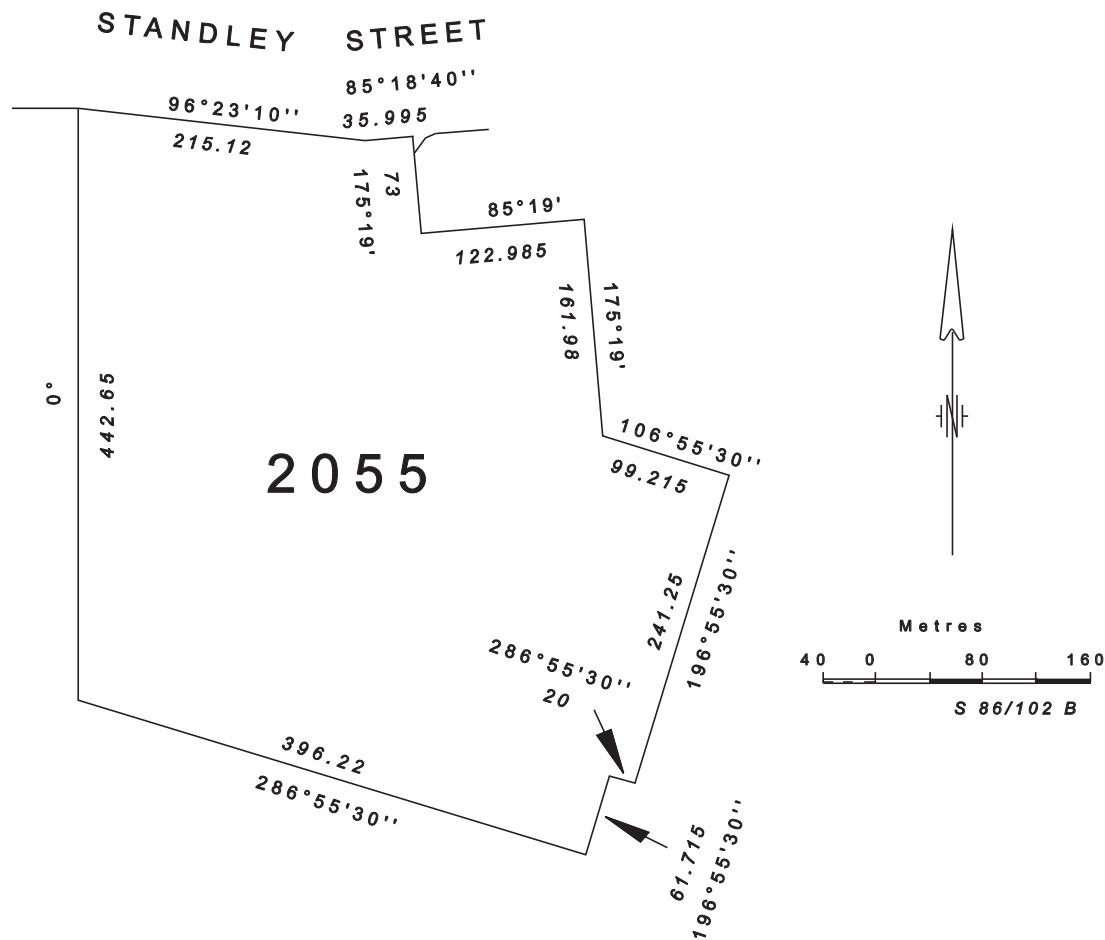
Lease Conditions

1. The lease purpose is Aboriginal Residential Complex and Ancillary.
2. The Lessee will pay rates and taxes which may at any time become due in respect of the leased land.
3. The Lessee will at all times maintain and repair and keep in repair all buildings and improvements on the leased land all to the satisfaction of the Minister.
4. The Lessee will comply with any Planning Instrument affecting the land.
5. The Lessee will maintain landscaping of the whole of the front boundary (driveways excepted) of the leased land with suitable vegetation which will provide a screen at least 2 metres high.

Duplicate Certificate as to Title issued? Yes

6. All electrical and water reticulation plus sewerage will conform at all times with the appropriate by-laws, standards and specifications of the Power and Water Authority.

7. That the leased land will be dust suppressed and adequately drained for stormwater, all such drainage will conform at all times with the appropriate by-laws, standards and specifications of the Department of Transport and Works and the Town Engineer, Tennant Creek Town Council.



Date Registered: 08/06/1993
Duplicate Certificate as to Title issued? Yes

Volume 312 Folio 089



NORTHERN TERRITORY OF AUSTRALIA

Record of Administrative Interests and Information

Record of Administrative Interests and Information

The information contained in this record of Administrative Interests only relates to the below parcel reference.

Parcel Reference: Lot 02055 Town of Tennant Creek plan(s) S 86/102B

(See section 38 of the Land Title Act)

Note: The Record of Administrative Interests and Information is not part of the Land Register and is not guaranteed by the Northern Territory of Australia, and the NT Government accepts no Liability for any omission, misstatement or inaccuracy contained in this statement.

Registrar General

Government Land Register

(none found)

Custodian - Registrar General (+61 8 8999 6252)

Current Title

CUFT 312 089 (order 1)

Tenure Type

CROWN LEASE IN PERPETUITY 1114

Tenure Status

Current

Area Under Title

19 hectares 4700 square metres

Owners

Julalikari Housing Incorporated
C/- Public Officer, PO Box 158, Tennant Creek NT 0861

Easements

(none found)

Scheme Name

(none found)

Scheme Body Corporate Name

(none found)

Reserved Name(s)

(none found)

Unit Entitlements

(none found)



Transfers

(none found)

Tenure Comments

(none found)

Historic Titles

CUCL 201 001 (order 1)

CUCL 201 001 (order 2)

Visit the website http://www.nt.gov.au/justice/bdm/land_title_office/

Custodian - Surveyor General (+61 8 8995 5362)**Address**

87 STANDLEY ST, TENNANT CREEK

Survey Plan

S 86/102B

Survey Status

Approved

Parcel Status

CURRENT

Parcel Area

19 hectares, 4700 square metres

Map Reference

(none found)

Parent Parcels

Lot 00987 Town of Tennant Creek plan(s) A 000814

Lot 00988 Town of Tennant Creek plan(s) A 000814

Lot 01005 Town of Tennant Creek plan(s) S 82/012

Parcel Comments

SUBDN TO FORM LOT 2055 VIDE S86/102. NOTICE OF DETERM OF A CL(T) GRANTED TO JULALIKARI COUNCIL INC. FOR ABORIGINAL RESIDENTIAL COMPLEX & ANCILLARY (DUMP CAMP-MARLA MARLA) VIDE NTG G16 22/4/87. SEE S2008/30 LOTS 2328(A) TO 2367(A) TO 2327(A) ALLOCATION OF ADMIN PARCELS AT MARLA MARLA TOWN CAMP LOTS 2055 AND 2056 TENNANT CREEK

Survey Comments

SURVEY ON PLANS A - B.

Proposed Easements

(none found)

Municipality

BARKLY SHIRE

Region

BARKLY

Custodian - Valuer General (+61 8 8995 5375)**Owner's Last Known Address**

Department of Housing, PROPERTY RATES OFFICER, GPO BOX 4621, DARWIN NT 0801



Parcels in Valuation

Lot 02055 Town of Tennant Creek

Unimproved Capital Value

\$150,000 on 01/07/2015
\$149,000 on 01/07/2012
\$115,000 on 01/07/2010
\$54,000 on 01/07/2004
\$64,000 on 01/07/2001
\$64,000 on 01/07/1998
\$60,000 on 01/07/1995
\$80,000 on 01/07/1992
\$55,000 on 01/01/1990
\$50,000 on 01/01/1987

Valuation Improvements

01/02/1996 House x 12
15/09/1988 Residential other
Improvement type(ABOR ING)

Custodian - Property Purchasing (+61 8 8999 6631)**Acquisitions**

(none found)

Custodian - Building Advisory Service (+61 8 8999 8965)**Building Control Areas**

BBTEN001 - Building Control Area

TENNANT CREEK BUILDING AREA

Building Permits

Application Number:	2 of 9
Description:	4 DWELLINGS
Number of Residential Units:	0
Australian Bureau of Statistics Type:	(none found)
Building Class:	House
Area:	432 square metres
Certification:	House - Full Code - <i>issued on 23/12/1988</i>

Visit the website <http://www.nt.gov.au/building/>

Custodian - Town Planning and Development Assessment Services (+61 8 8999 6046)**Planning Scheme Zone**

CL (Community Living)

Interim Development Control Orders

(none found)

Planning Notes

(none found)

Planning Applications

File Number

PA1990/0213

Type

Development

Date Received

26/04/1990

Application Purpose

COMMUNITY FACILITY THIS SITE IS ON STANDLEY STREET

Application Status

Approved

Other Affected Parcels

(none found)

Instrument Signed

28/05/1990

Instrument Number

DV3823

Instrument Issued

Signed

Instrument Status

Completed

Custodian - Power and Water Corporation (1800 245 092)**Meters on Parcel**

Power Water - Electricity	7
Power Water - Water	2

For Account balances, contact the Power and Water Corporation.

Custodian - Pool Fencing Unit (+61 8 8924 3641)**Swimming Pool/Spa Status**

(none found)

For more information, contact the Pool Fencing Unit (+61 8 8924 3641).

Custodian - Mines and Energy (+61 8 8999 5322)

For information on possible Exploration Licences, contact Mines & Energy or visit the website
http://www.nt.gov.au/d/Minerals_Energy/

For information on possible Petroleum Titles, contact Mines & Energy for further details.



Custodian - NT Environment Protection Authority (+61 8 8924 4218)

Results of site contamination assessment
(none found)

For further information contact Environment Protection Authority or visit the website
<https://ntepa.nt.gov.au/waste-pollution/contaminated-land>

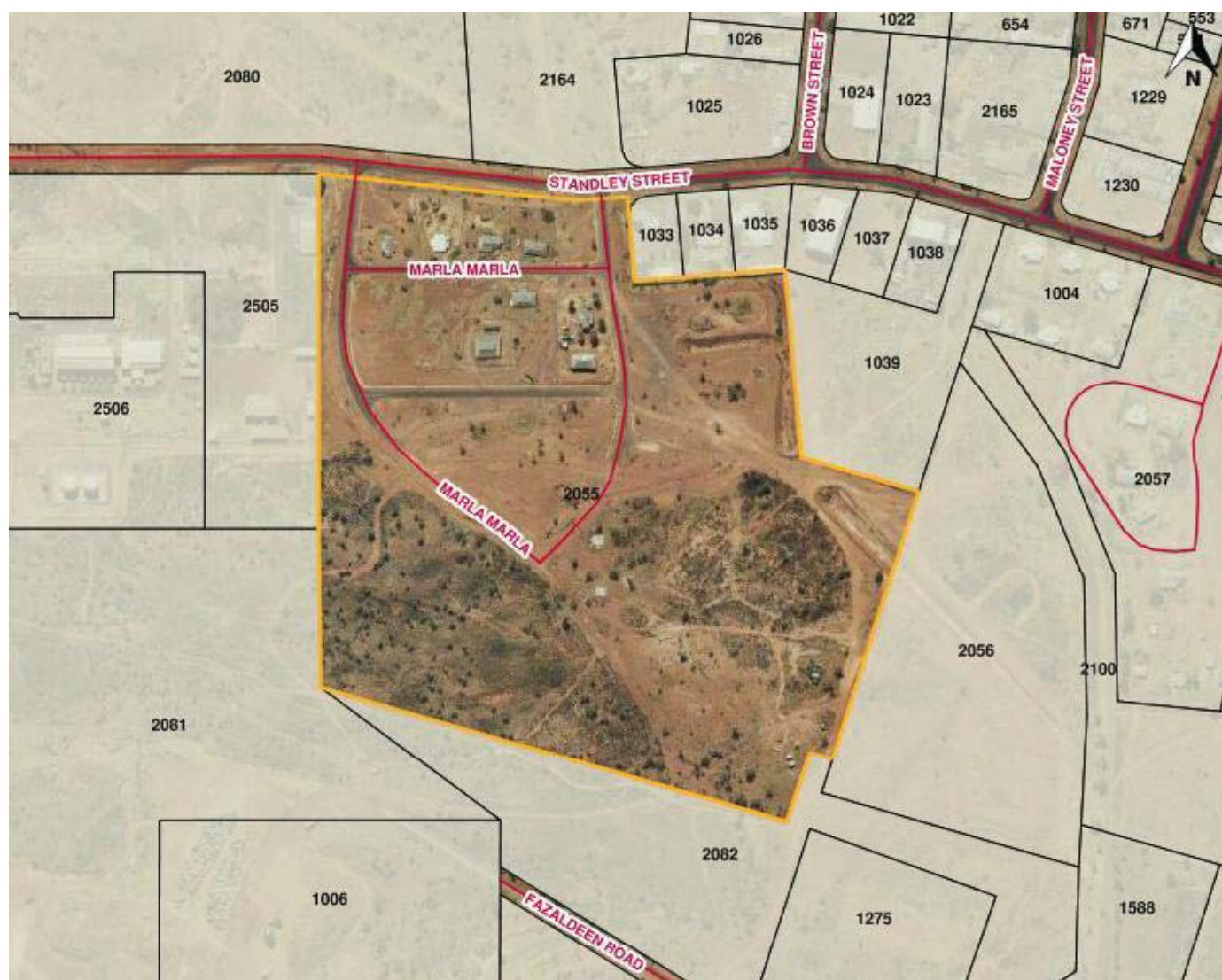
Custodian - Heritage Branch (+61 8 8999 5039)

Heritage Listing:
(none found)

For further information on heritage places contact Heritage Branch or visit the website
<https://nt.gov.au/property/land/heritage-register-search-for-places-or-objects>

Other Interests

For Account balances, contact Barkly Shire Council



Transformer data

Group	Com Id	Location	Community Name	Dwellings No. (Funded Dwellings)	Dwellings No. (Bennett Design)	New Houses ** (Future Demand)	Primary Voltage Level (KV)	PWC Substation ID	PWC Test Number	Transformer size (KVA)	KVA Total dwellings @ 4.5KVA	KVA Total dwellings @ 7KVA	Comments
1	290	Darwin	Bagot	55	55		11	1924	1735	300	247.5	385	
	344	Darwin	Knuckey Lagoons	18	19	2	11	1771	2163	100	85.5	133	
	347	Darwin	Kulajuk	19	19		11	1092	10607	50	85.5	133	
	403	Darwin	Palmerston Town Camp	20	16		22	10196	10245	100	90	140	Two transformers for this Town Camp. Transformers are not in boundary of Town Camp [The nearest transformers data to Town Camp are highlighted in yellow].
	412	Darwin	Railway Dam (One Mile Dam)	5	6	2	22	265	11645	25	27	42	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	427	Adelaide River	Amangel	9	9		22	216	12187	100	40.5	63	Two transformers for this Town Camp.
	687	Jabiru	Manabadurna	10	12		22	184	5646	63	54	84	
	825	Darwin	Minmarana Park	24	24		11	5650	11107	200	108	168	
	606	Katherine	Warlpiri Transient Camp	9	9		22	6416	4886	100	40.5	63	Two transformers for this Town Camp.
	621	Katherine	Miall Brumby (Kelano)	47	31		22	6133	12417	315	211.5	329	
2	640	Pine Creek	Pine Creek Compound	4	4		22	6666	3147	25	18	28	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	971	Mataranka	Mulgagan	12	9	4	22	6819	5296	16	54	84	
							22	6818	5297	16			
							22	6384	11028	25			
3	215	Tennant Creek	Blueberry Hill (Munji-Maria)	2	2		22	7079	1968	200	9	14	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	223	Tennant Creek	Dump Camp (Maria-Maria)	7	7		22	7181	11088	200	31.5	49	
	224	Elliott	Elliott South Camp	12	12		11	7504	4718	200	54	84	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	225	Elliott	Elliott North Camp	36	25		11	7505	4715	100	162	252	
	238	Tennant Creek	Karganu (East Side Camp)	12	12	1	22	7572		200	54	84	
	246	Tennant Creek	Ngalpa Ngajpa	18	21		22	7179		200	94.5	147	Two transformers for this Town Camp.
	271	Tennant Creek	Village Camp	12	12	1	22	7033	10904	315	54	84	
	681	Tennant Creek	Tingkarli	12	12		22	7183	11107	200	54	84	
							22	7180		200	54	84	
	684	Tennant Creek	Wuppa	15	15	1	22	7141	11092	100	67.5	105	Two transformers for this Town Camp.
4	3	Alice Springs	Angwertwaere (Morris Soak)	11	15		11	8596	11336	300	67.5	105	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	16	Alice Springs	Anthellk Empaye (Charles Creek)	17	10		11	8599	315	315	76.5	119	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	17	Alice Springs	Anthepe	15	15		22	8598	5874	200	67.5	105	Data extracted from PWC asset information. There was not access to this Town Camp due to ceremony on inspection day.
	19	Alice Springs	Aper Alwerkinge (Palmer's)	7	6		11	8405	2939	200	31.5	49	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	35	Alice Springs	Ewyenper Atwaive (Hidden Valley)	47	47		11	8622	11202	100	211.5	329	
							11	8623	11203	100			
							22	8625	11205	63			
							11	8626	11204	100			
	47	Alice Springs	Iparpa	13	13		22	8611	11702	200	58.5	91	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	48	Alice Springs	Iperte Yathe (Walpiri)	10	9		11	8001	11209	315	45	70	
5	50	Alice Springs	Iyperenye (Old Timers)	10	10		22	8145	3323	100	45	70	
	64	Alice Springs	Bassos	2	2		11	8002	10946	50	9	14	
	69	Alice Springs	Karnte	19	19		22	8282	2345	100	85.5	133	
	87	Alice Springs	Yarrenty Altere (Larapinta Valley)	34	34		11	8617	11334	100			
							11	8618	11200	63	153	238	
							11	8619	11335	100			
							11	8620	11201	100			
	90	Alice Springs	Inarlenge (Little Sisters)	16	22		22	8137	2925	100	99	154	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	108	Alice Springs	Mpwetyerre (Abbotts)	6	6		11	8093	11703	315	27	42	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	113	Alice Springs	Mount Nancy (Nyeuwente)	11	12		11	8405	2939	200	54	84	
6	129	Alice Springs	Nyeuwente (Trucking Yards)	26	26		11	8629	11312	300	117	182	
	675	Alice Springs	Hoppys	15	19		11	8314	369	50	85.5	133	There is not any Transformer in boundary of Town Camp. Also it's not shown in PWC asset information.
	676	Alice Springs	Ipive Ipive (Golders Camp)	15	14		11	8569	315	100	67.5	105	
	1029	Alice Springs	Kunoth	4	4		11	8569	315	100	18	28	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	222	Borroloola	Mara	28	29	2	11	6187	12610	100	130.5	203	Two transformers for this Town Camp.
	229	Borroloola	Garawa 1	16	14		11	6545	10166	100	72	112	Two transformers for this Town Camp.
	278	Borroloola	Yanyula	29	29		11	6162	10496	200	130.5	203	Data extracted from PWC asset information. It's outside of Town Camp, shown only Transformer to this Town Camp.
	992	Borroloola	Garawa 2	11	11		11	6189	2669	25	49.5	77	This transformer is not shown in PWC asset information. It's installed in Boat Ramp Road near to Town Camp and connected to Electrical reticulation of Town Camp.

** For New house's demand calculation see section 13.4 "Future Demand".

Kargaru

Kargaru

1 Design

The infrastructure reviews have been undertaken against current relevant standards for typical sub-divisions. The following standards have been used in undertaking the reviews.

Sewerage and water supply

- Water Services Association of Australia – Sewerage Code – WSA 02 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 02
- Water Services Association of Australia – Sewerage Pumping Station Code – WSA 04 -2005 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 04
- Water Services Association of Australia – Water Supply Code – WSA 03 2002 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 03
- Power and Water Corporation Indigenous Community Engineering Guidelines (2008)
- Department of Housing and Community Development Indigenous Community Engineering Guidelines (ICEG 2014, updated September 2016)
- Power and Water Corporation Essential Services Infrastructure Assessment and Upgrade Guidelines (for Town Camps in Urban Communities, 2009)
- Power and Water Corporation Standard Drawings
- Australian Standards

Electrical services

Electrical infrastructure has been assessed against AS/NZS3000 Wiring Rules and against PWC Service, Installation and Metering Rules and Urban Residential Development (URD) Design Standards where possible.

With one exception, town camps are each a single lot and compliance with AS/NZS3000 is sufficient to address potential safety concerns.

As such application of PWC URD Design Standards will mainly apply to the incoming supply and bulk or initial multi-metering panels if provided.

URD Design Standards for internal reticulation and street lighting appear to have been applied in many cases for convenience rather than compliance.

For the purposes of this report, the demand per dwelling allowances of URD Design Standards have been used to estimate incoming supply and overall distribution capacity requirements.

The following standards apply:

- Australian Standards
- Power Networks Design and Construction Guidelines, Power and Water Corporation
 - NP001.1_Design and Construction of Network Assets – General Requirements
 - NP001.3_General Specification for Overhead Electrical Reticulation
 - NP001.6_General Specification for URD Subdivisions
 - NP003_Installation Rules_V3
 - NP007_Service Rules

- NP027_Capture of Newly Installed Street Lighting Information
- NP041_Guidelines for Electrical Design Consultants

Further referral to the guidelines in this report will be designated by the guidelines number, NP001.1.

Communications

- National Broadband Network Website viewed 21 January 2017 (<http://www.nbnco.com.au/>) – NBN rollout maps

General

It should be noted that if the town camps are proposed to be subdivided and services assets gifted to Power and Water Corporation (PWC) for operation and maintenance, all of these services will need to fully meet PWC standards. With the exception of a few town camps that have recently been upgraded, this will require the full replacement and/or realignment of most services.

2 Condition assessment

2.1 Rating assessment matrix

A condition rating matrix was developed and used to assess all municipal infrastructure. The same rating was used for all services to maintain consistency in assessments. Table 1 below shows the condition rating and operability.

Table 1 Condition rating

Condition rating		Operability
1	Very Poor	Not operational
2	Poor	Not fully operational or requires immediate maintenance to keep operational
3	Good	Fully operational, may require routine maintenance
4	Very Good	Fully operational, may require maintenance in the next six months
5	Excellent	New, fully operational

2.2 Civil assessment limitations

The civil infrastructure condition investigations were subject to a number of limitations. These include:

- Only accessible services have been investigated. This includes inspecting the top of sewer manholes, side entry pits, etc., however, does not include opening pits to inspect infrastructure below ground.
- No physical testing of the sewer, water or stormwater network was undertaken.
- No survey or service locating was undertaken.

As there was no survey, potholing or CCTV undertaken on the underground infrastructure there is insufficient information to make determinations on the asset condition. The condition assessments discussed in this report are only for the accessible services and do not necessarily represent the condition of the underground infrastructure. For the majority of the town camps, other than a few that have recently been upgraded it was found that the underground services are generally undersized and it is likely, due to their age, that these services are in poor condition. Either factor would trigger the need for a complete replacement to meet current relevant standards.

2.3 Electrical assessment limitations

The electrical infrastructure condition investigations were subject to a number of limitations. These include:

- Inspections were carried out without the assistance of an electrical tradesman.
- Only accessible services were investigated. Assessments were of a visual nature and no pit covers were removed.
- Overhead equipment was assessed from ground level.
- Switchboards were not opened and no assessment of the internal connections or bus ratings was made.

- Electrical infrastructure was assessed down to the meter for multi-meter panels and down to the termination, overhead pole or distribution pillar, of the supply cable to a meter located at a dwelling.

3 Current infrastructure issues

Power and Water Corporation (PWC) have advised of the following concerns and issues in regard to the sewerage, water and electrical infrastructure at all town camps.

3.1 Ownership and maintenance

PWC stated there has always been confusion regarding the ownership and responsibilities of the internal sewer, water and electrical infrastructure. PWC have advised that they have no legal tenure on the majority of assets in any town camps and that the owner is essentially that of the land owner or leaseholder. This is further discussed for each type of infrastructure for each town camp.

The ownership and who is responsible for the maintenance of the sewage pump stations and street lighting is a major concern. In most town camps it was found that PWC have been maintaining the assets on an in-kind basis, although there are no maintenance or access agreements in place and the infrastructure is generally not compliant to PWC standards.

3.2 Access to infrastructure

PWC advised that due to the uncertainty surrounding ownership and responsibility of the sewerage, water and electrical infrastructure, each town camp is seen as a single lot with multiple houses on it. There are no formal road reserves or easements where the municipal infrastructure should be located. PWC therefore have no legal right to enter the town camps to work on the infrastructure, nor can PWC stop others from working on the infrastructure. There is a risk that the maintenance undertaken by others may be to a lower standard than PWC.

It should be noted that there are currently no legal services easements within the town camps, except for a few cases where a town service passes through the town camp. Therefore it is recommended that easements are created over any infrastructure owned by PWC and any future assets to be gifted to PWC, to allow the service providers access to the infrastructure.

3.3 Existing infrastructure

PWC have stated that although the existing sewerage and water infrastructure appears to comply with relevant standards in some locations, the capacity cannot be assumed to meet PWC requirements due to the potential for underground substandard condition and/or grading of pipework. It is likely that these assets will need to be fully replaced to PWC standards to ensure sufficient capacity.

The planning process currently allows construction within the town camps on Commonwealth land without requiring service authority (PWC) approvals. This means that there has been no opportunity for PWC to recover contributions towards required upgrades to headworks servicing the developments and these upgrades have been paid for by PWC in the past. This inconsistency needs to be addressed for future developments within the town camps to ensure PWC are able to continue to provide adequate services.

3.4 Safety concerns

PWC have expressed concerns with safety of PWC staff and contractors working within the camps. PWC have employed procedures such as multiple people / vehicles to attend the site, with police or housing safety officers as required. This

generally leads to a delayed response time and increased cost to respond to and remediate emergency situations.

PWC have also raised the concern that if others work on water infrastructure within the town camps and do not apply the correct sanitation procedures they not only risk contaminating the entire water supply network within the town camp, at some town camps with direct connections to the town supply, they risk contaminating the entire town's water supply.

4 Available information

As the site investigations were limited to accessible / visible services, information on below ground services (such as electrical cables, sewer pipes, water supply pipes, etc.) were determined from available information. This information included:

- Serviced Land Availability Program (SLAP) maps,
- Department of Family & Community Services - Connecting Neighbours Program – Essential Services Scoping Study Report Volume 1 April 2005,
- Connecting Neighbours Project – Infrastructure Assessment and Recommendation Report - Arup Pty Ltd, April 2005,
- Drawings supplied by NT Department of Infrastructure - Technical Records,
- Drawings supplied by Power and Water Corporation,
- Bennett Design inspection reports and population data.

Aurecon undertook a site investigation of the Kargaru community on Thursday 1 December 2016 to inspect roads, stormwater drainage, electrical services, sewerage and water supply, and community structures. The following sections detail the outcomes of this investigation and the assessments of the infrastructure.

The civil and electrical inspection reports can be found in the Appendices.

5 Sewerage

5.1 Ownership and boundaries

As constructed drawings from the SIHIP Program (2011) show that the Kargaru community is serviced by a new DN150 PVC reticulation main. The internal network connects to an existing town sewer line owned by Power and Water Corporation. The internal network is believed to be owned by Julalikari Housing Incorporated, but is the responsibility of Far North – T&J Contractors to maintain.

There are currently no easements over the sewerage infrastructure according to the Land Title, refer Appendices.

5.1.1 Connection methods and billing

PWC advised that they currently charge a single sewerage bill based on the number of houses, which for Kargaru is 12. The sewerage bill is charged to the Department of Housing and Community Development.

It is not known what contribution the residents make towards the sewerage bills.

5.2 Existing infrastructure condition assessment

The sewer infrastructure inspection was limited to inspecting the condition of manhole covers, as all other sewerage infrastructure is below ground. A comprehensive review of all available documentation, including reviewing as-constructed drawings and having discussions with Power and Water Corporation was conducted. The following table compares the assets that have been constructed, according to the as-constructed drawings, and the assets assessed during the inspections conducted by Aurecon.

Table 2 Sewerage assets inspected

Asset type	Number of assets as per documentation	Number of assets assessed during inspection
Manholes	15	12

As per Table 2, a number of manholes were not assessed during the inspections, this is likely due to access limitations such as manholes being located within private property or outside of the town camp. As other manholes along the same sewer line were investigated, it is assumed that all assets have been constructed as per the as-constructed drawings. The condition ratings of the manholes inspected are as follows:

Table 3 Sewer condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Manholes			12	1		13



Figure 1 Sewer manhole, condition: *good*



Figure 2 Sewer manhole, condition: *very good*

5.3 Current performance and risks

5.3.1 Current sewer network performance

The current capacity of the sewer network was calculated based on the following design assumptions:

- The adopted minimum grade for the pipework is 1.0%, as advised by Power and Water Corporation.
- The Equivalent Population (EP) has been calculated assuming one household equates to 9 EP, based on discussions with Power and Water Corporation.
- The capacity has been assessed by calculating the current flow rate, and the maximum flow rate when the sewer pipe flows full. The result is then a percentage of how much of the pipe is currently being used.
- Manning's roughness coefficient of the pipework is 0.012, as recommended by PWC for PVC pipes.
- Where the sewer pipe grade, size or material is not known, it is assumed to be non-compliant to PWC standards.

The current number of houses in Kargaru town camp is 18, this multiplied by 9 EP per house gives a total current EP of 162. The capacity of the existing sewer was then calculated. The percentage shows how much of the pipe capacity is currently being used.

Table 4 Existing sewer capacity

Catchment	Current total EP	Diameter of connection (mm)	Adopted PWC minimum slope (%)	Q _{full} (L/s)	Current Q (L/s)	Current capacity (%)
Catchment 1	162	150	1.0	16.50	1.16	7%

Table 4 above shows that the capacity of the existing sewer network is adequate for the current peak population.

The current sewer network appears to comply with PWC guidelines with respect to pipe size and type, and location of pipe, although there are no easements created. It is recommended that an easement is created over the sewerage infrastructure if the assets are to be gifted to PWC.

5.4 Future demands

The future demand analysis showed that one additional house is required to provide permanent accommodation for residents that are currently living in non-house dwellings. The type and location of house, number of bedrooms, etc. will need to be determined by the Department of Housing and Community Development when this work is undertaken.

An allowance of 9 EP has already been provided for each temporary house (caravans, structures, etc) in the current demand calculations, so the future EP will not increase since the residents from the temporary housing will be living in the new accommodation and the number of tenants will not be increased.

The location of the new house is assumed to be close to the existing houses such that significant extension of the existing sewerage infrastructure would not be required. This means that no additional sewerage infrastructure upgrades would be required to cater for the new house, other than what has already been recommended for the current demand, and not including a new house drain and connection to the existing network. The cost estimates for these works have been allowed for in the upgrades for current demand.

5.5 Recommended works

5.5.1 Works required to existing infrastructure for current demand

The infrastructure assessed during the site inspection does not require any immediate maintenance.

The current network complies with PWC guidelines so no headworks are required.

i. Works required to existing infrastructure for future demand

The upgrades required for the single new house include a new house drain and new connection to the existing network.

6 Water supply

6.1 Ownership and boundaries

The water supply infrastructure was upgraded to PWC standards as part of the SIHIP program. The reticulation servicing the community is a DN150 PVC ring main.

The water supply assets within Kargaru are believed to be owned by Julalikari Housing Incorporated, but are the responsibility of Far North – T&J Contractors to maintain. The water is supplied from a water main outside of the community, which is the responsibility of PWC.

PWC have advised they currently maintain the water assets up to the residential lot water meters, although there is no formal agreement covering this maintenance.

Figure 3 shows the water reticulation network within Kargaru.



Figure 3 Kargaru water main network

6.1.1 Connection method and billing

Through consultation with PWC it has been determined that the water usage is currently charged as a fixed daily rate for 12 house water meters within Kargaru. The bill is issued to the Department of Housing and Community Services. It is not known what contribution the residents make towards water bills.

It is proposed that PWC measures the water supply to the entire community, as opposed to individual lots within the community. This requires the installation of a bulk water meter on the water mains located at the community boundary. Under this scheme, the water bill for the entire community is the responsibility of the governing body, being Julalikari Housing Incorporated for Kargaru. It will be up to governing body to assign bills to residents accordingly.

It is recommended that individual lot meters are maintained in addition to the proposed use bulk water meter. This will assist with the governing body distributing bills to residents, the identification of any leaks in the network, and meeting PWC standards should the town camp be subdivided in the future.

A total of 11 water meters were assessed during the inspection. Bennett Design reported 18 dwellings in the community, however only 12 were permanent houses. Therefore, with respect to current PWC guidelines, approximately one additional water meter is required to cover the property without an existing water meter. Note, some water meters may have been present however, not visible due to overgrown flora or restricted property access. Consequently, water meters may not have been discovered during the inspection.

6.2 Existing infrastructure condition assessment

The site investigation for the water infrastructure included assessing the condition of any air valves, fire hydrants, tanks, taps, and water meters. The assessment was limited to services that could be assessed above ground; no below ground services were inspected. A comprehensive review of all available documentation, including reviewing as-constructed drawings and having discussions with Power and Water Corporation was conducted. The following table compares the assets that have been constructed, according to the as-constructed drawings, and the assets assessed during the inspections conducted by Aurecon.

Table 5 Water supply assets inspected

Asset type	Number of assets as per documentation	Number of assets assessed during inspection
Fire hydrants	7	7
Water meter (residential lots)	21	11

As per Table 5, a number of residential water meters were not assessed during the inspections, this is likely due to overgrown flora or restricted property access as previously discussed. The condition of each asset is as follows:

Table 6 Water asset condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Fire hydrants		3	4	1		8
Water meter (residential lots)		3	6	2		11



Figure 4 Fire hydrant, condition: *poor*



Figure 5 Water meter (lot), condition: *poor*

Three of the residential lot water meters were assessed as being in poor condition due to missing handles. It is recommended that the handles are replaced.

One of the fire hydrants was found to have a small leak and was assessed as being in poor condition. The other two fire hydrants in assessed as being in poor condition simply require clearing and repainting. Maintenance works to these three fire hydrants should be conducted.

6.3 Current performance and risks

The current demand of the community was calculated based on the following design assumptions:

- The nominal peak day flow is 1300 L/capita/day, based on PWC's supplement to WSA 03 2002. This value is for the southern region of NT. It was assumed that the nominal peak day flow of 1300 L/capita/day also applies to water usage within the community, although it is possible that this value could be higher in real life due to a lack of controls to reduce water usage.
- The Equivalent Population (EP) has been calculated assuming one household equates to 9 EP, based on discussions with Power and Water Corporation.
- The peak hour factors are listed in PWC's Supplement to WSA 03-2002, and they depend on the population range of the community. The peak hour factor of 3.0 has been adopted, for populations less than 500.

Table 7 shows the calculated demand.

Table 7 Current water demand

Total dwellings	EP	Demand	Peak hour demand (l/s)
18	162	2.43	7.29

The system is expected to have sufficient capacity to meet peak hour and fire flow demands.

The assessment of water supply for firefighting has been based on the size of the water mains and the condition of the accessible fire hydrants. Additional hydrants have been recommended where it appears the existing number of hydrants are insufficient. In the case of Kargaru no additional hydrants are needed at this time. The layout and pipe sizes appear to be compliant with PWC standards.

6.4 Future demands

The future demand analysis showed that one additional house is required to provide permanent accommodation for residents that are currently living in non-house dwellings. The type and location of house, number of bedrooms, etc. will need to be determined by the Department of Housing and Community Development when this work is undertaken.

An allowance of 9 EP has already been provided for each temporary house (caravans, structures, etc) in the current demand calculations, so the future EP will not increase since the residents from the temporary housing will be living in the new accommodation and the number of tenants will not be increased.

The location of the new house is assumed to be close to the existing houses, so that an extension of the existing water supply infrastructure would not be required. This means that no additional water supply infrastructure upgrades would be required to cater for the new house, except for a new residential lot water meter and connection to the existing network. The cost estimates for these have been allowed for in the upgrades for current demand.

6.5 Recommended works

6.5.1 Works required to existing infrastructure for current demand

The infrastructure that was assessed as very poor or poor is recommended to be upgraded to prevent failure in the future. The following maintenance works are recommended;

- Replace four tap handles for water meters
- Clear overgrown grass from two water meters
- Repair leaking fire hydrant
- Repaint and clear dirty/overgrown grass from two fire hydrants

The community is viewed overall as a large single lot and as previously detailed proposed have the water usage measured as such. In order to measure the water usages as a single lot, a bulk water meter should be installed. As the network is ring main, one of the supply points should be disconnected and reconnected to the

internal network creating a looped main. This allows the single remaining point to be metered. The cost estimates for upgrades at Kargaru include;

- Disconnect secondary supply point and reconnect to water main creating a looped network.
- Install bulk water meter
- Install one residential lot water meter

6.5.2 Works required to existing infrastructure for future demand

The new house will require an additional residential lot water meter and connection the existing network.

7 Roadworks

7.1 Ownership and boundaries

The internal roadworks infrastructure is believed to be owned by Julalikari Housing Incorporated, but are the responsibility of Far North – T&J Contractors to maintain.

7.2 Existing infrastructure condition assessment

The road network within Kargaru community consists primarily of sealed roads. There are also numerous tracks which appear to be used frequently which are not included in the inspection and report. Road furniture including signs, speed humps, foot paths and car parks were also inspected. Table 8 below summarise the condition of the road furniture as assessed during the site inspection.

Table 8 Roadworks condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Sign		3	2			5
Footpath			4			4



Figure 6 Footpath, condition: good



Figure 7 Sign, condition: good

The footpaths in Kargaru were generally in good condition, however there were some weeds and grass overgrowing the path, and some graffitti and dirt on the path. Overall, the paths require a general tidy up.

The signs in Kargaru were in poor and good conditions. The poor condition signs were the liquor act warning and the camp name signs at the front of the

community, while the road signs within the community were in good condition. It is recommended that the signs in poor condition are replaced.

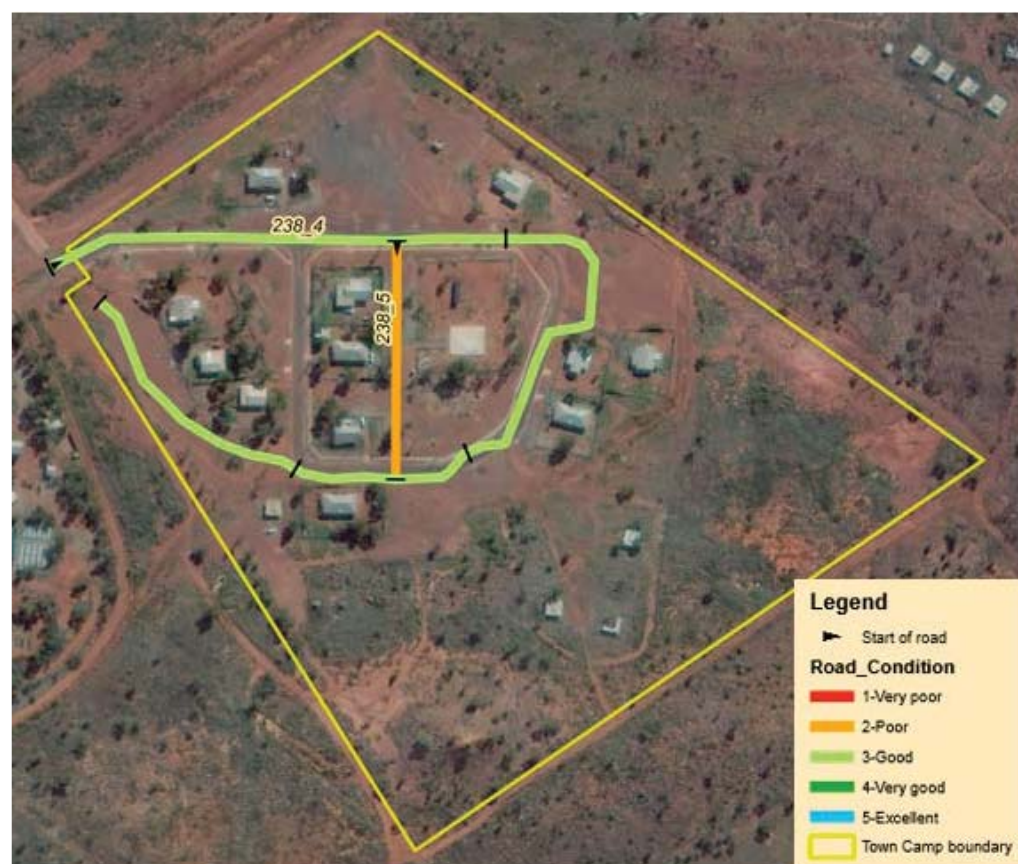


Figure 8 Kargaru community road network

Table 9 below details the condition of the roads within Kargaru community for specific segments. Figure 8 shows a map of the road network with the condition ratings, road name, and chainage direction. Note, the percentage refers to the percentage of that particular road segment which experiences the defect.

Table 9 Road network condition assessment

Road name	Chainage start (km)	Chainage end (km)	Condition (1 to 5)	Defects and associated condition
238_5	0.0	0.14	1	-80% of road has stone loss (2) -100% of road has poor general appearance (2)
238_4	0.0	0.25	3	-50% of road has gutters filled with dirt (2)
	0.25	0.45	3	-20% of road has gutters filled with dirt (2)
	0.45	0.55	3	-40% of road has gutters filled with dirt (2)
	0.55	0.7	3	-70% of road has gutters filled with dirt (2)



Figure 9 Road 238_4, condition: *poor*



Figure 10 Road 238_4, condition: *good*

The roads were generally in a good condition, except for the gutters being full with dirt and gravel, and the general appearance of one road was poor due to graffiti and rubbish.

It is recommended that the gutters are cleaned out so the stormwater drainage can function effectively.

7.3 Current performance and risks

The road network throughout Kargaru resembles a figure eight with the outer circle in good condition and the middle connector road in poor condition. The layout of the road network is sufficient for the current number of houses. It was noted during the site inspections that a number of unsealed 'short-cuts' had been created and were regularly used. It is not recommended that these paths are formalised. It is also recommended that a road safety audit is undertaken to determine where signage, line marking, etc. are required.

7.4 Future demands

The addition of one new house will not require any upgrades to the road network. The additional house will require minor upgrades to the kerb to provide a layover kerb for a driveway.

7.5 Recommended works

7.5.1 Works required to existing infrastructure for current demand

The infrastructure that was assessed as very poor or poor is recommended to be upgraded to prevent failure in the future. The following works are recommended to upgrade the current infrastructure;

- General tidy up of the footpaths – approximately 650 m
- Replace three custom signs
- General tidy up of one road – approximately 140 m
- Clean out gutters – approximately 300 m

7.5.2 Works required to existing infrastructure for future demand

Works required to provide for one additional house include upgrading the existing kerb to a layover kerb.

8 Stormwater drainage

8.1 Ownership and boundaries

The stormwater assets within Kargaru community are believed to be owned by Julalikari Housing Incorporated, but are the responsibility of Far North – T&J Contractors to maintain.

The stormwater assets outside of the community are property of the Barkly Regional Council.

8.2 Existing infrastructure condition assessment

The site investigation for the stormwater infrastructure included assessing the condition of swales, culverts, headwalls, and side entry pits (SEP). Only the above ground infrastructure was assessed. As the inspection was undertaken outside of a storm event and no CCTV of the pipes was undertaken, flooding due to blockages or damage to the underground infrastructure could not be assessed. Table 10 below summarises the condition of the stormwater assets as assessed during the inspection.

Table 10 Stormwater condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
SEP		1	15	4		20



Figure 11 One bay side entry pit, condition: *good*



Figure 12 One bay side entry pit, condition: *poor*, blockage: *100%*

8.3 Current performance and risks

The detailed performance of the stormwater network cannot be fully analysed without significant hydraulic and hydrodynamic modelling, which is outside the scope of this project. However based on the condition of the stormwater infrastructure assessed it would appear to be operating adequately.

During the inspection, 20 side entry pits were inspected. The majority of these pits had one bay. Only one pit was completely blocked, as shown in Figure 12, and four other side entry pits were blocked up to 30%. It is recommended that these pits are cleaned out to prevent the underground drainage getting blocked.

8.4 Future demands

The addition of one new house in the community will not have an impact on the stormwater drainage infrastructure, and no upgrades are required as a result.

8.5 Recommended works

8.5.1 Works required to existing infrastructure for current demand

The following works are recommended to upgrade or improve the current infrastructure:

- Clear blockages from five side entry pits.

8.5.2 Works required to existing infrastructure for future demand

No upgrades required.

9 Community structures

9.1 Ownership and boundaries

The community structures within Kargaru community are owned by Julalikari Housing Incorporated, but are the responsibility of Far North – T&J Contractors to maintain.

9.2 Existing infrastructure condition assessment

The site investigation for the community structures included assessing the condition and features of a playground. The following table shows the condition rating given to the community structure.

Table 11 Community structures condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Playground		1				1
Pump station						



Figure 13 Playground, condition: *poor*

9.3 Current performance and risks

The playground does not appear to be regularly used or maintained. There is graffiti, rubbish, and overgrown grass surrounding the equipment. The lack of shade cloth and gravel floor material may be making the playground uninviting. To improve the amenity and functionality of the playground, it is recommended that the equipment is cleaned and upgraded, new rubber matting or sand flooring is installed, and shade clothes are installed.

9.4 Future demands

The population of Kargaru is not expected to increase with the addition of one new house, as this house will provide permanent accommodation for residents that currently live in temporary housing. No additional community structures are required.

9.5 Recommended works

9.5.1 Works required to existing infrastructure for current demand

The following works are recommended to upgrade the community structures:

- Repair equipment
- Install sand floor
- Install shade cloth

9.5.2 Works required to existing infrastructure for future demand

No upgrade required.

10 Electrical services

10.1 Ownership and boundaries

The following points, from Network Policy NP003 Installation Rules Section 3, define the typical shared ownership of electrical infrastructure by Power and Water Corporation (PWC) and customers.

- The point of supply is defined as the point where PWC makes the electrical supply available. For domestic supply, this is normally one of the following:
- A point of attachment of an overhead service on to a building or pole on which a metering panel is fitted.
- A point of attachment of an overhead service on to a pole forming part of unmetered aerial consumer's mains.
- A nominated point on a distribution substation located on the customer's lot.
- A point of connection of an underground service in a metering panel, including underground services originating at an overhead line.
- A point of connection of an underground service in a pillar or junction box forming part of unmetered consumer's mains, located on the customer's lot.
- A point on a Power and Water pillar located on the customer's lot.

Typically, distribution infrastructure upstream of the Point Of Supply is owned and maintained by PWC and infrastructure below the point of supply is owned and maintained by the customer.

In many cases PWC have defined a Point Of Supply to ensure that they retain responsibility for aerial high voltage infrastructure, and aerial low voltage infrastructure where installed with aerial high voltage infrastructure, to minimise the possibility of the community or its contractors coming into contact, either deliberately or inadvertently, with aerial high voltage infrastructure.

In other cases isolation facilities are present or desired by PWC to define the Point of Supply at or near the boundary of the town camp.

The Kargaru (East Side Camp) community electrical reticulation systems is supplied by a transformer to an overhead reticulation scheme to individual house, overhead power pole mount street lights and to an underground reticulation system for streetlight poles. Prepaid meters are utilised in Kargaru community.

PWC advise that most of Tennant Creek/Alice Springs Town Camps have undergone upgrades under the SIHIP program with the intent to normalise the services to look like an urban subdivision but have never been formally handed over to PWC for operations and maintenance.

PWC advise that the Point Of Supply is the LV terminals of the substations and that they own and are responsible for the first pole mount substation and upstream infrastructure.

PWC recommend that a GBS (Gas Break Switch) be provided upstream of the first transformer to establish a demarcation point.

PWC advise that street lighting is supplied from unmetered LV infrastructure and is the responsibility of the lot holder and not PWC.

All meters, whether pre- or post-paid are the property of PWC.

Kargaru community are responsible for maintain all unmetered and metered LV infrastructure including the main switchboard, metering panel (excluding meter), LV

distribution feeders, distribution pillars, consumers' mains and consumer switchboards and street lights.

10.2 Existing infrastructure condition assessment

Table 12 shows the condition rating given to the distribution panels.

Table 12 Distribution panel condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Distribution panels						1 (status unknown)

Table 13 shows the condition rating given to the street lights. The street lights were of a low voltage overhead feeder design, mercury lamp type, M125. The street lights have 100% non -operational rating, from the visual inspection in the day.

Table 13 Street light condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Street light	2	2				14

Table 14 shows the condition rating given to the street lights. The street lights were of a low voltage overhead feeder design, mercury lamp type, M125. The street lights have 36% operational rating and 64% inoperable.

Table 14 Street light on O/H pole condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Street light on O/H pole		9	5			14

Table 15 shows the condition rating given to the transformer. The transformer was of pole mount substation design. The transformer was visually accessed to be in good condition.

Table 15 Transformer condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Transformer			1			1

The overhead poles are of Weld Construction (Universal Pole construction). Table 16 shows the condition rating given to the Overhead poles. The overhead poles have 100% operational rating from the visual inspection.

Table 16 Overhead pole condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Overhead pole			15			15

Table 17 shows the condition rating given to the Metering panels. All assessed meters in this community are prepaid digital meters.

Table 17 Meter panel condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Pre-paid meter			12			12
Switchboard			12			12

Table 18 shows the condition rating given to the switchboards associated to dwellings.

Table 18 Switchboard condition assessment (Housing footprint)

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Switchboard		3	8			11

The details of the individual inspections and photographs of each infrastructure item are included in the Appendices.

10.3 Current performance and risks

The electrical infrastructure evaluation was conducted against the following criteria

- Number of dwellings on tenure, the higher value of the funded dwelling and as quoted in the population report was utilised.
- Urban area, NP001.1, 4. Definitions.
- General Specification for URD Subdivisions, NP001.6, 4.3 Substation Size.
- Normal ADMD (After Diversity Maximum Demand) of 4.5 kVA and high cost subdivisions at 7 kVA.
- Transformer ratings were assumed to be correct in Dekho (PWC asset information system) and compared against photographs of test or transformer numbers collected.
- Substation loads were compared against transformer sizes only. No load flow analysis was conducted.
- No load calculations were performed or assessment conducted on overhead or underground cable, visual inspection from the ground only.
- Street lighting loads were ignored as they are not significant.

The calculated maximum demand of the Kargaru (East Side Camp) community transformer is 27% of rated capacity based on 4.5kVA/dwelling. The calculated maximum demand is within the total capacity of the substation on site.

Table 19 Kargaru (East Side Camp) current demand load vs transformer ratings

Com Id	Community name	Dwellings	Transformer (kVA)	kVA Total @ 4.5kVA	kVA Total @ 7kVA
238	Kargaru (East Side Camp)	12	200	54	84

A tabulated summary of all the community transformers in in the Appendices.

There is a risk of equipment not being maintained associated with the non-standard division of responsibilities between the customer and PWC.

The following points from the PWC Metering Rules should be noted:

- The routine maintenance of metering installations and the replacement of any faulty meters is the responsibility of PWC.
- The property owners are responsible for the maintenance and upkeep of meter rooms, boxes and panels (including lids, doors and locking mechanisms).
- The installation of pre-paid metering is a cost to the customer, refer NP010 Meter Manual-Maintenance of Metering Installations, Power and Water Corporation.

10.4 Future demands

There is one new development currently planned for Kargaru (East Side Camp) community. Calculated future maximum demand of the Kargaru community transformer is 29% of rated capacity based on 4.5kVA/dwelling. The calculated future maximum demand is within the total capacity of the substation on site.

Table 20 Kargaru (East Side Camp) future demand load vs transformer ratings

Com Id	Community name	Dwellings	Transformer (kVA)	kVA Total @ 4.5kVA	kVA Total @ 7kVA
238	Kargaru (East Side Camp)	13	200	58.5	91

10.5 Recommended works

The following maintenance works and upgrades are recommended:

- Replace thirteen street lights 125W.
- Replace three switchboards associated to dwellings

11 Communications

11.1 Ownership and boundaries

Details of Telstra pit and conduit infrastructure within the town camp boundaries were sought but were not forthcoming.

11.2 Existing infrastructure condition assessment

The telecommunications infrastructure assessed included pits and telephone booths.

The Appendices contain the individual reports.

Table 21 Telecommunication pit condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Telecommunication Pit			8			8

Table 22 Telephone booth condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Phone booth						2 (status unknown)

11.3 Current performance and risks

No details of the performance of communications infrastructure were obtained.

11.4 Future demands

The current availability of broadband services at Kargaru (East Side Camp) is displayed in the Figure 14 below. NBN is available to residents via a fixed telecommunication line on application to an appropriate NBN access provider.

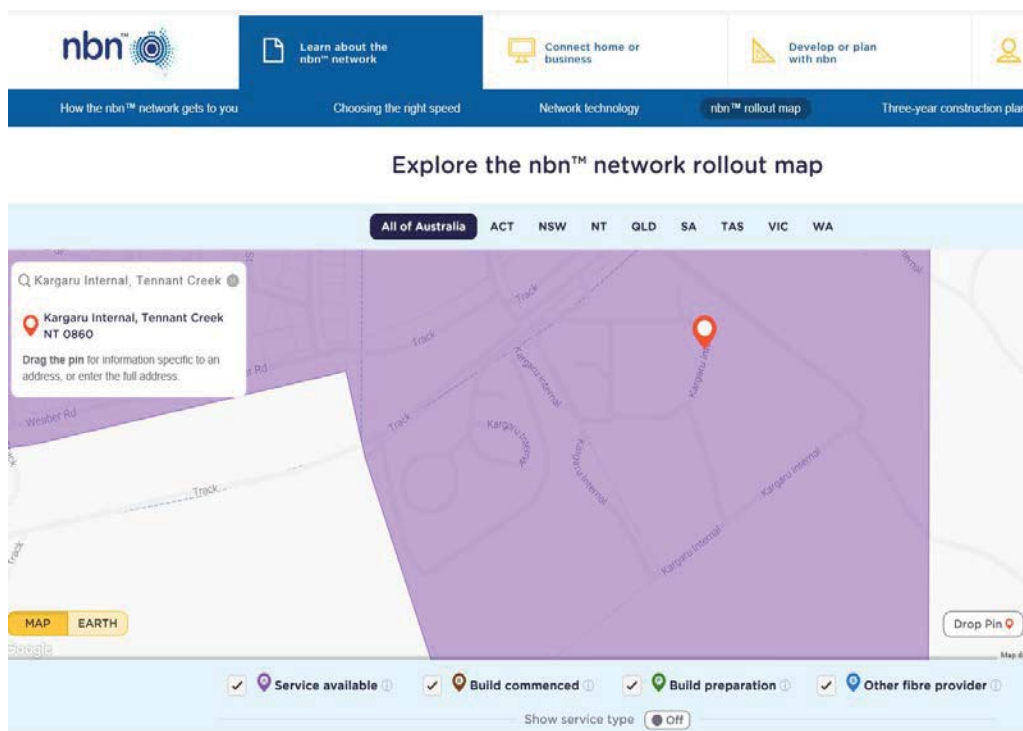


Figure 14 NBN network availability map

The NBN rollout map confirms that NBN is planned to be made available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

11.5 Recommended works

Representatives from NBN's Land Access and Stake Holder management teams are currently engaged with Yilli Housing and NT Housing to look at how camps will be serviced. It is expected that any existing premises in these camps will have some type of NBN service via the NBN brownfields rollout in the future.

No works are required at Kargaru because NBN is available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

12 Cost estimates

Table 23 below shows a summary of the cost estimates to undertake the maintenance required to fix the existing infrastructure, to upgrade the existing network to meet current design standards, and to upgrade the existing network to cater for the future design. The minor infrastructure upgrades required for the one additional house have been included in the upgrades to meet current design cost estimates. The estimates take into account a 30% contingency, are inclusive of GST, and a location factor has been applied to town camps outside of Darwin.

Table 23 Cost estimates

Infrastructure	Maintenance of existing infrastructure	Upgrades to meet current design
Sewerage	\$ 0	\$ 0
Water supply	\$ 4,000	\$ 91,000
Roadworks	\$ 34,000	\$ 0
Stormwater drainage	\$ 3,000	\$ 0
Community structures	\$ 43,000	\$ 0
Electrical	\$ 26,000	\$ 0
Communications	\$ 0	\$ 0
Miscellaneous provisions	\$ 25,000	\$ 22,000
Total (including GST)	\$ 135,000	\$ 113,000
Grand total	\$ 248,000	

The cost estimates are a preliminary estimate only. Since Aurecon has no control over the cost of labour, materials, equipment or services furnished by others, or over contractors' methods of determining prices, or over competitive bidding or market conditions, Aurecon cannot guarantee actual costs will not vary from these estimates.

13 Summary

The following works are recommended for Kargaru (East Side Camp) community:

Sewerage

- No works required

Water supply

- Replace four tap handles for water meters
- Clear overgrown grass from two water meters
- Repair leaking fire hydrant
- Repaint and clear dirty/overgrown grass from two fire hydrants
- Disconnect secondary supply point and reconnect to water main creating a looped network.
- Install bulk water meter
- Install one residential lot water meter

Roadworks

- General tidy up of the footpaths – approximately 650 m
- Replace three custom signs
- General tidy up of one road – approximately 140 m
- Clean out gutters – approximately 300 m

Stormwater drainage

- Clear blockages from five side entry pits

Community structures

- Repair equipment
- Install sand floor
- Install shade cloth

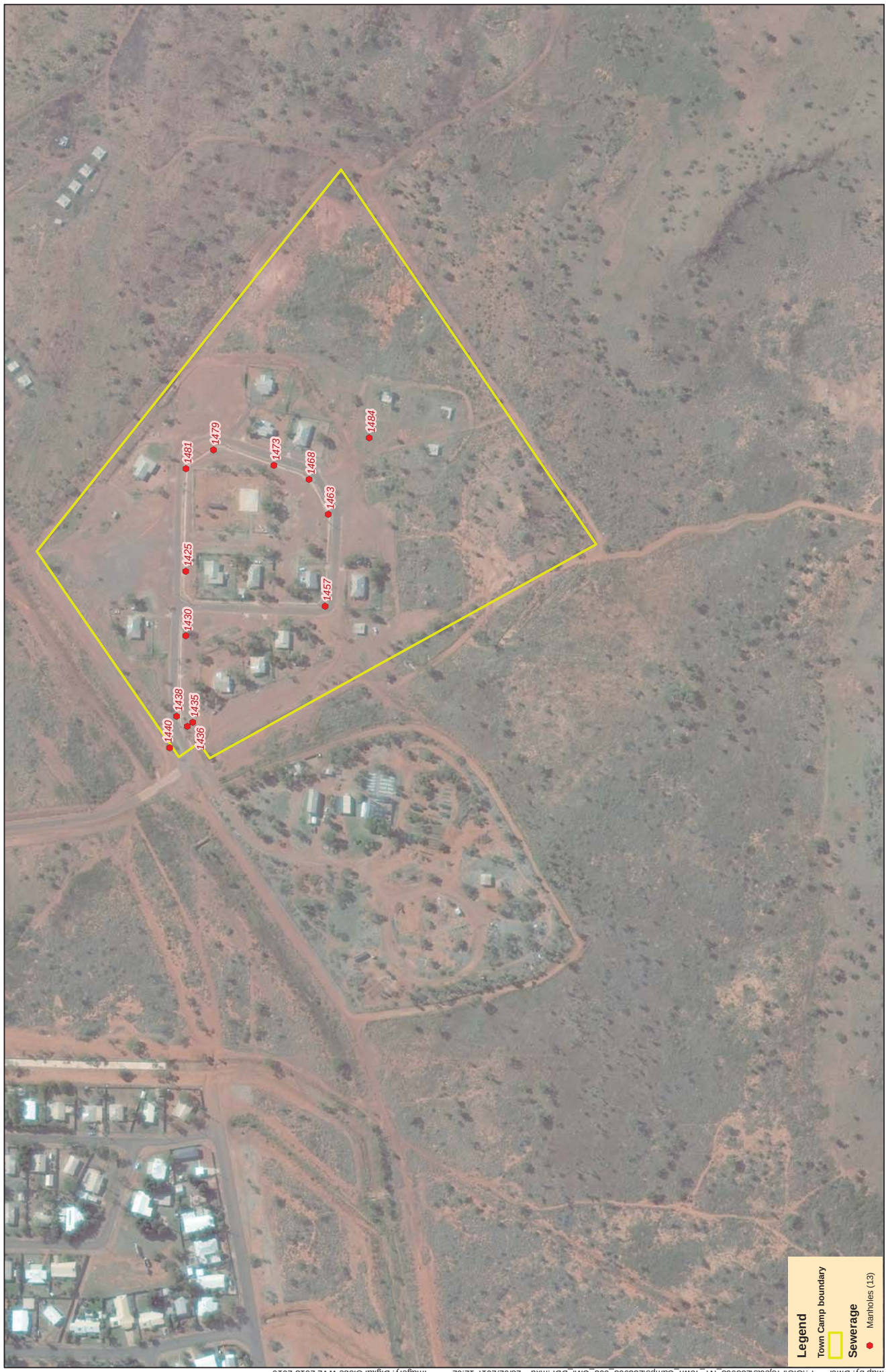
Electrical services

- Replace thirteen street lights 125W.
- Replace three switchboards associated to dwellings

Communications

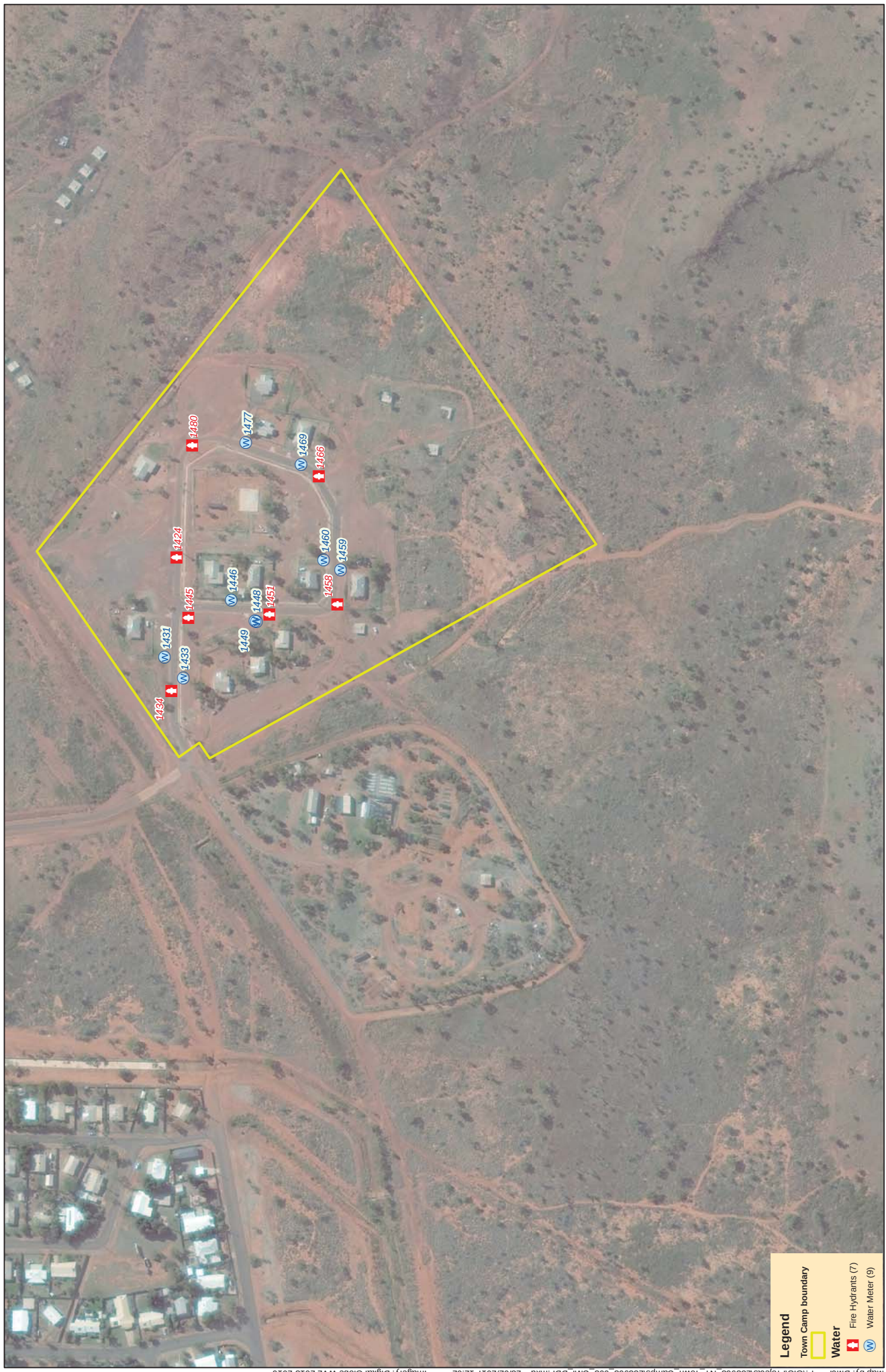
- No works are required because NBN is available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

Civil inspection reports

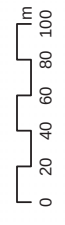


Note:
Label numbers refer to survey IDs





A3 scale: 1:3,000



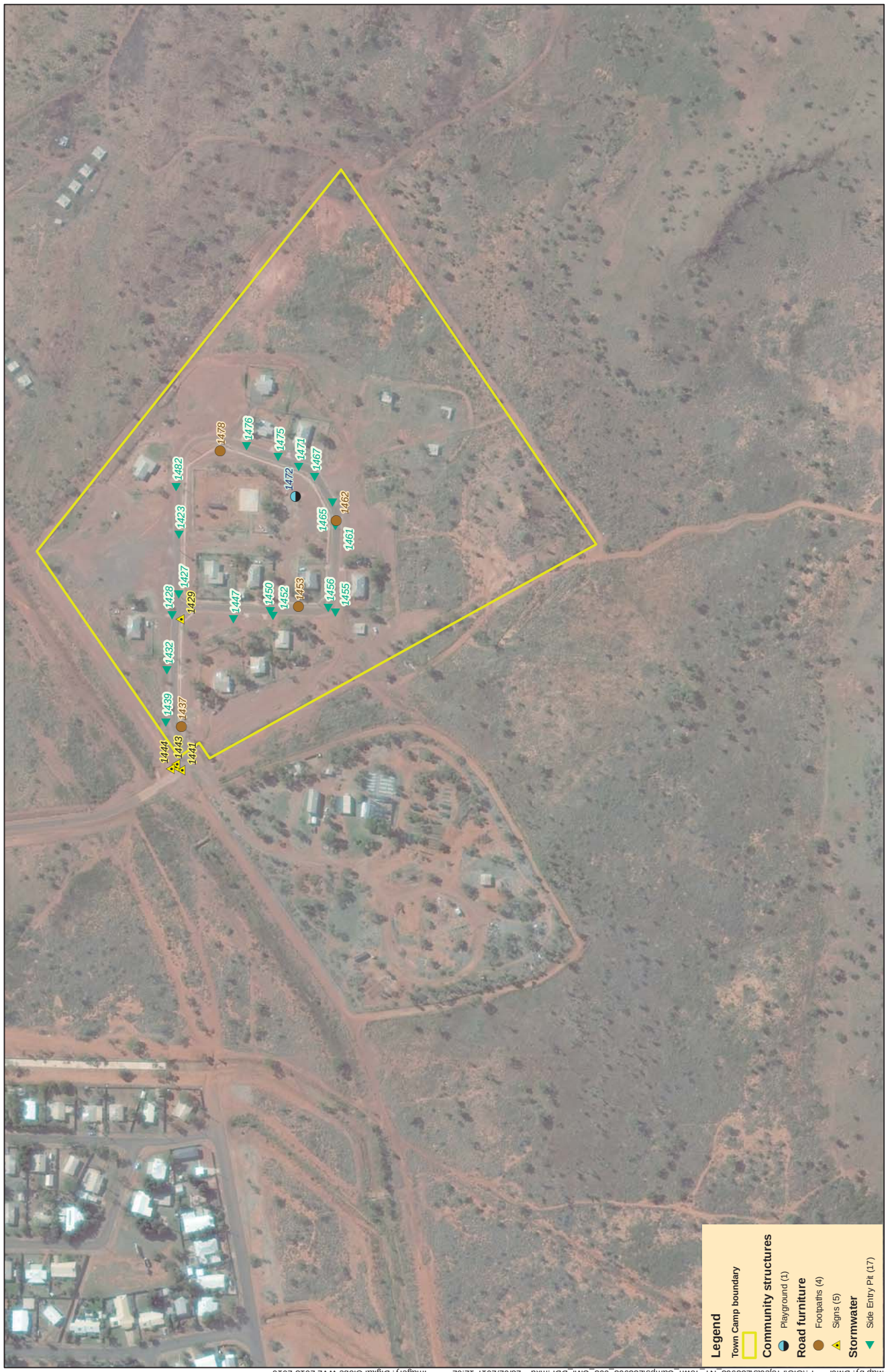
Note:
Label numbers refer to survey IDs



Date: 23/02/2017 Version: 2
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments: Water

238 - Kargaru (Tennant Creek)



Map by: DMCP P:\GIS\Projects\253963 NT Town Camps\253963_003_Civil_DDP.mxd 23/02/2017 12:02 Imagery: Digital Globe WV2 2013-2016

A3 scale: 1:3,000



Note:
Label numbers refer to survey /Ds



Date: 23/02/2017 Version: 2
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments Road furniture, stormwater drainage & community structures 238 - Kargaru (Tennant Creek)

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:06:56 AM

Insp ID: 1424	Group 3 - Tennant Creek, Elliott	Kargaru (East Side Camp)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 2 - Poor

FH Comment: Paint fading and covered in dirt and grass



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 7:53:34 AM

Insp ID: 1434

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 4 - Very Good

FH Comment: Paint on kerb starting to peel



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 9:00:21 AM

Insp ID: 1445

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: Yes

Bollards around hydrant: No

FH Condition: 2 - Poor

FH Comment: Leaking



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:55:18 AM

Insp ID: 1451

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 3 - Good

FH Comment: Paint fading, covered in dirt



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:46:46 AM

Insp ID: 1458

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 2 - Poor

FH Comment: Paint fading , covered in dirt



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:32:23 AM

Insp ID: 1466

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 3 - Good

FH Comment: Paint fading, covered in dirt



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:15:09 AM

Insp ID: 1480

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 3 - Good

FH Comment: Covered in dirt



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 7:49:53 AM

Insp ID: 1437 **Group 3 - Tennant Creek, Elliott** **Kargaru (East Side Camp)**

Road Name: 238_4

What are you inspecting: Foot Paths

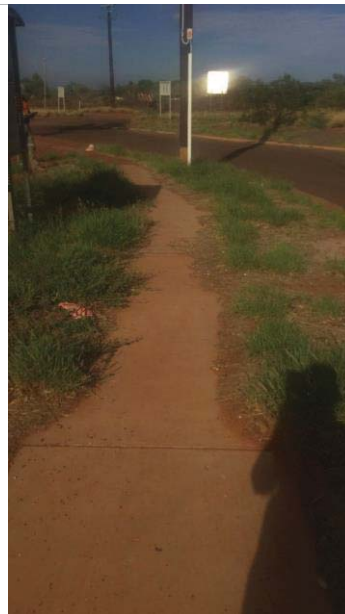
Footpath Width (mm): 1200

Footpath Type: Concrete

Footpath Condition: 3 - Good

Comment: Needs tidy up. Grass over growing and dirt on footpath

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 7:49:53 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:53:34 AM

Insp ID: 1453 **Group 3 - Tennant Creek, Elliott** **Kargaru (East Side Camp)**

Road Name: 238_4

What are you inspecting: Foot Paths

Footpath Width (mm): 1200

Footpath Type: Concrete

Footpath Condition: 3 - Good

Comment: Needs tidy up, rubbish removed

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:41:25 AM

Insp ID: 1462 **Group 3 - Tennant Creek, Elliott** **Kargaru (East Side Camp)**

Road Name: 238_4

What are you inspecting: Foot Paths

Footpath Width (mm): 1200

Footpath Type: Concrete

Footpath Condition: 3 - Good

Comment: Needs tidy up

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:17:47 AM

Insp ID: 1478

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Road Name: 238_4

What are you inspecting: Foot Paths

Footpath Width (mm): 1200

Footpath Type: Concrete

Footpath Condition: 3 - Good

Comment: Needs tidy up

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:05:59 AM

Insp ID: 1425

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: B3

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 7:58:58 AM

Insp ID: 1430

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: B2

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 7:52:15 AM

Insp ID: 1435

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: A2

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 7:51:06 AM

Insp ID: 1436

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

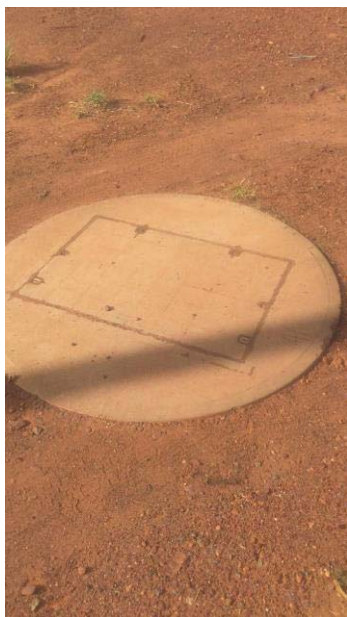
Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: A1

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 7:48:38 AM

Insp ID: 1438

Group 3 - Tennant Creek, Elliott

Location Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: B1

Comments: In footpath



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 7:45:55 AM

Insp ID: 1440

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 4 - Very Good

Notes on Lid: A

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:47:53 AM

Insp ID: 1457

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: A5

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:40:38 AM

Insp ID: 1463

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: A6

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:30:27 AM

Insp ID: 1468

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: A7

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:25:36 AM

Insp ID: 1473

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: A8

Comments: In footpath



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:16:37 AM

Insp ID: 1479

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Round

Manhole Cover Diam (mm): 450

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition: 3 - Good

Notes on Lid: B5

Comments: Covered in dirt



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:12:38 AM

Insp ID: 1481

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: B4

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 9:13:51 AM

Insp ID: 1484

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:03:04 AM

Insp ID: 1426 **Group 3 - Tennant Creek, Elliott** **Kargaru (East Side Camp)**

Road Name: 238_4

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.25

Road Type: Sealed - spray seal

Section Width (m): 7.2

Road Condition: 3 - Good

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
General Appearance	50	3 - Good	Gutters full of dirt in sections , loose gravel on

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Kerb and Gutter	3 - Good	Gutters full of dirt in sections

Shoulders Section

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:03:04 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:03:04 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:50:34 AM

Insp ID: 1454 **Group 3 - Tennant Creek, Elliott** **Kargaru (East Side Camp)**

Road Name: 238_4

What are you inspecting: Pavements

Ch From (km): 0.55

Ch To (km): 0.7

Road Type: Sealed - spray seal

Section Width (m): 7.2

Road Condition: 3 - Good

General Comment: Chainage follows road, not collector map

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
General Appearance	70	3 - Good	Gutters filled with dirt

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Kerb and Gutter	3 - Good	Gutters filled with dirt

Shoulders Section

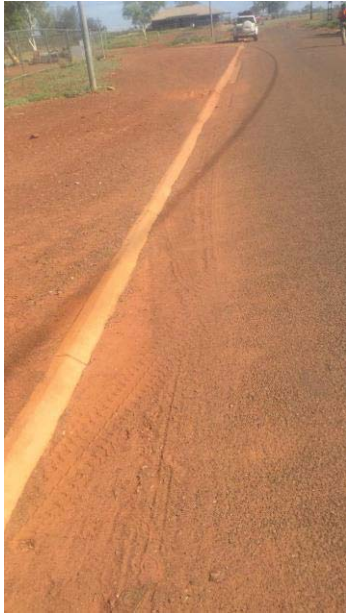
Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:50:34 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:50:34 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:38:22 AM

Insp ID: 1464 **Group 3 - Tennant Creek, Elliott** **Kargaru (East Side Camp)**

Road Name: 238_4

What are you inspecting: Pavements

Ch From (km): 0.45

Ch To (km): 0.55

Road Type: Sealed - spray seal

Section Width (m): 7.2

Road Condition: 3 - Good

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
General Appearance	40	3 - Good	Gutters filled with dirt

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Kerb and Gutter	3 - Good	Gutters filled with dirt

Shoulders Section

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:38:22 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:38:22 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:22:06 AM

Insp ID: 1474 **Group 3 - Tennant Creek, Elliott** **Kargaru (East Side Camp)**

Road Name: 238_4

What are you inspecting: Pavements

Ch From (km): 0.25

Ch To (km): 0.45

Road Type: Sealed - spray seal

Section Width (m): 7.2

Road Condition: 3 - Good

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
General Appearance	20	3 - Good	Dirt in gutters , 20% of road

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Kerb and Gutter	3 - Good	Dirt in gutters

Shoulders Section

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:22:06 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:22:06 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 9:06:25 AM

Insp ID: 1483 **Group 3 - Tennant Creek, Elliott** **Kargaru (East Side Camp)**

Road Name: 238_5

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.14

Road Type: Unsealed

Section Width (m): 7

Road Condition: 2 - Poor

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Stone Loss	80	2 - Poor	
General Appearance	100	2 - Poor	

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
No kerb		

Shoulders Section

Linemarking Section

Obstruction Section

Road Obstruction **Other Road Obstruction**

Debris

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 9:06:25 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 9:06:25 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:08:50 AM

Insp ID: 1423

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:SEP

Number of Bays:1

On grade or sag pit:

Both sides of road:Left

Condition:3 - Good

Blockage (%):10

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:01:59 AM

Insp ID: 1427

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:SEP

Number of Bays:1

On grade or sag pit:

Both sides of road:Both

Condition:3 - Good

Blockage (%):0

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:00:41 AM

Insp ID: 1428

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:

SEP

Number of Bays:

1

On grade or sag pit:

Both sides of road:

Left

Condition:

3 - Good

Blockage (%):

0

Comment:

Gravel at sep entrance, could be blocked in side



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 7:56:39 AM

Insp ID: 1432

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:SEP

Number of Bays:

On grade or sag pit:

Both sides of road:Left

Condition:3 - Good

Blockage (%):

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 7:46:55 AM

Insp ID: 1439

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:SEP

Number of Bays:1

On grade or sag pit:

Both sides of road:Both

Condition:3 - Good

Blockage (%):

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:58:25 AM

Insp ID: 1447

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:SEP

Number of Bays:1

On grade or sag pit:

Both sides of road:Left

Condition:4 - Very Good

Blockage (%):0

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:56:07 AM

Insp ID: 1450

Group 3 - Tennant Creek, Elliott

Location Kargaru (East Side Camp)

Stormwater Infrastructure: SEP

Number of Bays: 1

On grade or sag pit:

Both sides of road: Right

Condition: 3 - Good

Blockage (%): 20

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:54:23 AM

Insp ID: 1452

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:SEP

Number of Bays:1

On grade or sag pit:

Both sides of road:Left

Condition:2 - Poor

Blockage (%):100

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:49:40 AM

Insp ID: 1455

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:SEP

Number of Bays:2

On grade or sag pit:

Both sides of road:Left

Condition:3 - Good

Blockage (%):0

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:48:51 AM

Insp ID: 1456

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:SEP

Number of Bays:1

On grade or sag pit:

Both sides of road:Right

Condition:3 - Good

Blockage (%):0

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:42:09 AM

Insp ID: 1461

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:

SEP

Number of Bays:

1

On grade or sag pit:

Both sides of road:

Both

Condition:

4 - Very Good

Blockage (%):

0

Comment:

Image 1 left, image 2 right



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:34:44 AM

Insp ID: 1465

Group 3 - Tennant Creek, Elliott

Location Kargaru (East Side Camp)

Stormwater Infrastructure: SEP

Number of Bays: 1

On grade or sag pit:

Both sides of road: Left

Condition: 4 - Very Good

Blockage (%): 0

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:31:21 AM

Insp ID: 1467

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:

SEP

Number of Bays:

1

On grade or sag pit:

Both sides of road:

Left

Condition:

3 - Good

Blockage (%):

10

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:28:11 AM

Insp ID: 1471	Group 3 - Tennant Creek, Elliott	Kargaru (East Side Camp)

Stormwater Infrastructure:	SEP
Number of Bays:	1
On grade or sag pit:	
Both sides of road:	Left
Condition:	3 - Good
Blockage (%):	0
Comment:	

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:24:32 AM

Insp ID: 1475

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:SEP

Number of Bays:1

On grade or sag pit:

Both sides of road:Left

Condition:3 - Good

Blockage (%):30

Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:21:18 AM

Insp ID: 1476

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure: SEP
Number of Bays: 1
On grade or sag pit:
Both sides of road: Left
Condition: 3 - Good
Blockage (%): 0
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:11:40 AM

Insp ID: 1482

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Stormwater Infrastructure:SEP

Number of Bays:1

On grade or sag pit:

Both sides of road:Left

Condition:3 - Good

Blockage (%):

Comment:



Northern Territory Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:27:03 AM

Insp ID: 1472

Group 3 - Tennant Creek, Elliott

Kargaru (East Side Camp)

Inspection Type:	Shade Structure
Shade Structure Type:	Play ground
Shade Floor Type:	Gravel
Roof Type:	Not Covered
Width (mm):	
Length (mm):	
Appearance:	2
Appearance Comment:	
Condition:	2 - Poor
Comment:	



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 7:59:45 AM

Insp ID: 1429 **Group 3 - Tennant Creek, Elliott** **Kargaru (East Side Camp)**

Road Name: 238_4

What are you inspecting: Signs

Type of Sign: Give Way

Sign Condition: 3 - Good

Sign Comment: Some paint chipping

General Comment:

