Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 2:40:16 PM
## Electrical Infrastructure

### Northern Territory Town Camps

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

<table>
<thead>
<tr>
<th>Insp ID: 647</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
</table>

**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
## Electrical Infrastructure

**Northern Territory Town Camps**

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

<table>
<thead>
<tr>
<th>Insp ID: 648</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
</table>

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:** 351

- **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

<table>
<thead>
<tr>
<th>Insp ID: 649</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Insp ID</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
</table>

What Category are you capturing: **Overhead Poles**

<table>
<thead>
<tr>
<th>What is Pole Material type:</th>
<th>Welded</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the condition of pole:</td>
<td>3</td>
</tr>
<tr>
<td>How is the pole planted:</td>
<td>Concrete</td>
</tr>
<tr>
<td>What is the Condition of plant:</td>
<td>3</td>
</tr>
<tr>
<td>Is street light fitted:</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Street Light Power Supply:**

<table>
<thead>
<tr>
<th>Street Light Type</th>
<th>SD50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street Light Watts</td>
<td>50</td>
</tr>
<tr>
<td>Street Light Condition</td>
<td>3</td>
</tr>
</tbody>
</table>

**Street Light Height**

<table>
<thead>
<tr>
<th>What is the type of service:</th>
<th>Three</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the HV voltage level:</td>
<td>400</td>
</tr>
<tr>
<td>What is the arrangement of connected cables:</td>
<td>Twisted</td>
</tr>
<tr>
<td>Are there isolators on the pole:</td>
<td>No</td>
</tr>
<tr>
<td>What is the Condition:</td>
<td>3</td>
</tr>
<tr>
<td>How many Lots are connected to this pole:</td>
<td>1</td>
</tr>
</tbody>
</table>

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
## Electrical Infrastructure

### Northern Territory Town Camps

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

<table>
<thead>
<tr>
<th>Insp ID: 653</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>655</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
</table>

- **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:** 361
- **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 9:15:16 AM

<table>
<thead>
<tr>
<th>Insp ID: 704</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
</table>

**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:**

<table>
<thead>
<tr>
<th>Street Light Type</th>
<th>Street Light Watts</th>
<th>Street Light Condition</th>
<th>Street Light Height</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>363</td>
</tr>
</tbody>
</table>

- **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

Electrical Infrastructure

Inspection Date 29/11/2016 9:15:16 AM
Northern Territory Town Camps

Electrical Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 641</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
</table>

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

[Images of street lights and poles]
Northern Territory Town Camps

Electrical Infrastructure

Inspection Date  29/11/2016 2:55:18 PM
Northern Territory Town Camps

Electrical Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
<tbody>
<tr>
<td>643</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Insp ID: 645</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
</table>

What Category are you capturing: **Overhead Poles**

Is street light fitted: **Yes**

Street Light Power Supply: **Unknown**

Street Light Type: **Unknown**

Street Light Watts: **Unknown**

Street Light Condition: **3**

Street Light Height: **Unknown**

---

![Image of Overhead Poles](P:\GIS\Projects\253963_NT.png)

![Image of Street Light](P:\GIS\Projects\253963_NT.png)

![Image of Street Light Condition](P:\GIS\Projects\253963_NT.png)

![Image of Street Light Height](P:\GIS\Projects\253963_NT.png)
Northern Territory Town Camps

Electrical Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
<tbody>
<tr>
<td>646</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

[Image of Overhead Poles and Street Lights]
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 2:26:29 PM

<table>
<thead>
<tr>
<th>Insp ID: 648</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
</table>

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

[Images of street lights and overhead poles]
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**

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

---

Image found and displayed.
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

<table>
<thead>
<tr>
<th>Insp ID: 650</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What Category are you capturing:</strong></td>
<td>Overhead Poles</td>
<td></td>
</tr>
<tr>
<td>Is street light fitted:</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Street Light Power Supply:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Street Light Type</td>
<td>SD50</td>
<td></td>
</tr>
<tr>
<td>Street Light Watts</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Street Light Condition</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Street Light Height</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Images of Overhead Poles and Street Lights]
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 1:56:58 PM

<table>
<thead>
<tr>
<th>Insp ID: 655</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Elliott South Camp</th>
</tr>
</thead>
</table>

What Category are you capturing: **Overhead Poles**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is street light fitted:</td>
<td>Yes</td>
</tr>
<tr>
<td>Street Light Power Supply:</td>
<td></td>
</tr>
<tr>
<td>Street Light Type</td>
<td>M80D 07</td>
</tr>
<tr>
<td>Street Light Watts</td>
<td>80</td>
</tr>
<tr>
<td>Street Light Condition</td>
<td>3</td>
</tr>
</tbody>
</table>

Street Light Height

[Images of street lights]
Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 29/11/2016 1:56:58 PM
Road map
Existing drawings
NOTE:
The layout dimensions and location of fittings shown on
THIS DRAWING ARE APPROXIMATE ONLY. ALL DIMENSIONS AND
LOCATIONS ARE TO BE CONFIRMED BY THE SUPERINTENDENT ON SITE.

LEGEND

- FIRE HYDRANTS IN ACCORDANCE WITH D进攻 W/97-232 
- PROVISION FOR SERVICE - PIPE AND STOP TAP - 20 M.W. UNLESS NOTED OTHERWISE - CLASS I2 UPVC.
- 100 mm. VALVE AND VALVE BOX - refer to drag W/97-202 for typical details.
- THRUST BLOCKS - refer to drag W/97-201
- 100 mm UPVC CLASS I2 RING MAIN PIPE LINE - APPROX. 700 METERS IDOL.
Stage 1 - Required to achieve 25L/s fire flow to all areas North West of Murranji 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

Other system requirements:
- Decommission Bore 4
- Upgrade Transfer Pump Station
- Relocate SCADA into new room in pump station building.
- Relocate radio antenna from old Elevated tank to new
- Remove old elevated tank and stand
- Upgrade/replace chlorine dosing building?
Transformer data
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
- Power and Water Corporation supplement to WSA 04
- Power and Water Corporation supplement to WSA 03
- 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


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

<table>
<thead>
<tr>
<th>Condition rating</th>
<th>Operability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Very Poor</td>
</tr>
<tr>
<td></td>
<td>Not operational</td>
</tr>
<tr>
<td>2</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td>Not fully operational or requires immediate maintenance to keep operational</td>
</tr>
<tr>
<td>3</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Fully operational, may require routine maintenance</td>
</tr>
<tr>
<td>4</td>
<td>Very Good</td>
</tr>
<tr>
<td></td>
<td>Fully operational, may require maintenance in the next six months</td>
</tr>
<tr>
<td>5</td>
<td>Excellent</td>
</tr>
<tr>
<td></td>
<td>New, fully operational</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Asset type</th>
<th>Number of assets as per documentation</th>
<th>Number of assets assessed during inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manholes</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

The condition ratings of the manholes inspected are as follows:

Table 3 Sewer condition assessment

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manholes</td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Catchment</th>
<th>Current total EP</th>
<th>Diameter of connection (mm)</th>
<th>Adopted PWC minimum slope (%)</th>
<th>Q_{full} (L/s)</th>
<th>Current Q (L/s)</th>
<th>Current capacity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catchment 1</td>
<td>36</td>
<td>150</td>
<td>1.0</td>
<td>16.50</td>
<td>0.64</td>
<td>4%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Asset type</th>
<th>Number of assets as per documentation</th>
<th>Number of assets assessed during inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire hydrants</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Water meter (residential lots)</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

The condition of each asset is as follows:

Table 6 Water asset condition assessment

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire hydrant</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Water meter (residential lots)</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Total dwellings</th>
<th>EP</th>
<th>Demand (l/s)</th>
<th>Peak hour demand (l/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>36</td>
<td>0.54</td>
<td>1.62</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Footpath</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

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.

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

<table>
<thead>
<tr>
<th>Road name</th>
<th>Chainage start (km)</th>
<th>Chainage end (km)</th>
<th>Condition (1 to 5)</th>
<th>Defects and associated condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>215_1</td>
<td>0.0</td>
<td>0.140</td>
<td>3</td>
<td>-30% of road has bleeding (3)</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side entry pit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead pole</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street light on O/H pole</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-paid meter</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Switchboard</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

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

Table 14 Switchboard condition assessment (housing footprint)

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switchboard</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Community name</th>
<th>Dwellings</th>
<th>Transformer (kVA)</th>
<th>kVA Total @ 4.5kVA</th>
<th>kVA Total @ 7kVA</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blueberry Hill</td>
<td>2</td>
<td>200</td>
<td>9</td>
<td>14</td>
<td>Transformer is not in boundary of Town Camp.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecommunication pit</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Table 17 Telephone booth condition assessment

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone booth</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Infrastructure</th>
<th>Maintenance of existing infrastructure</th>
<th>Upgrades to meet current design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewerage</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Water supply</td>
<td>$2,000</td>
<td>$86,000</td>
</tr>
<tr>
<td>Roadworks</td>
<td>$3,000</td>
<td>$0</td>
</tr>
<tr>
<td>Stormwater drainage</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Community structures</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Electrical</td>
<td>$3,000</td>
<td>$0</td>
</tr>
<tr>
<td>Communications</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Miscellaneous provisions</td>
<td>$12,000</td>
<td>$22,000</td>
</tr>
<tr>
<td><strong>Total (including GST)</strong></td>
<td><strong>$20,000</strong></td>
<td><strong>$108,000</strong></td>
</tr>
<tr>
<td><strong>Grand total</strong></td>
<td><strong>$128,000</strong></td>
<td></td>
</tr>
</tbody>
</table>

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
NT Town Camp Infrastructure Assessments: Sewerage

215 - Munji-Marla (Tennant Creek)

Legend
- Town Camp boundary
- Sewerage
- Manholes (7)

A3 scale: 1:1,000

Note:
Label numbers refer to survey IDs

Coordinate system: MGA94 Zone 52

Date: 23/02/2017
Version: 2

Imagery: Digital Globe WV2 2013-2016

Coordinate system: MGA94 Zone 52
Legend

- Town Camp boundary
- Water
  - Fire Hydrants (1)
  - Water Meters (3)

Note: Label numbers refer to survey IDs

A3 scale: 1:1,000

Date: 23/02/2017

Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments: Water
215 - Munji-Marla (Tennant Creek)
What Water Asset Are you Capturing: Fire Hydrants

Single or Double: 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

<table>
<thead>
<tr>
<th>Insp ID: 1352</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Blueberry Hill (Munji-Marla)</th>
</tr>
</thead>
</table>

**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:**

![Footpath Image](image1.png)

![General Comment Image](image2.png)
### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Blueberry Hill (Munji-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1338</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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:**

![Manhole Image](422)
### Northern Territory Town Camps

#### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1340</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Blueberry Hill (Munji-Marla)</th>
</tr>
</thead>
</table>

- **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:**

![Image of a manhole](image-url)

423
## 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

<table>
<thead>
<tr>
<th>Insp ID: 1345</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Blueberry Hill (Munji-Marla)</th>
</tr>
</thead>
</table>

- **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

<table>
<thead>
<tr>
<th>Insp ID</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Blueberry Hill (Munji-Marla)</th>
</tr>
</thead>
</table>

- **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
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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Blueberry Hill (Munji-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1350</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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

Image found and displayed.
Northern Territory Town Camps

Civil Infrastructure

**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**

<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Defect QTY</th>
<th>Defect Condition</th>
<th>Defect Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>30</td>
<td>3 - Good</td>
<td>30% of road has bleeding</td>
</tr>
</tbody>
</table>

**Kerbs Section**

<table>
<thead>
<tr>
<th>Kerb Type</th>
<th>Kerb Cond</th>
<th>Kerb Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerb and Gutter</td>
<td>3 - Good</td>
<td></td>
</tr>
</tbody>
</table>

**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
### Stormwater Infrastructure: SEP

<table>
<thead>
<tr>
<th>Number of Bays:</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>On grade or sag pit:</td>
<td>Both sides of road: Left</td>
</tr>
<tr>
<td>Condition:</td>
<td>4 - Very Good</td>
</tr>
<tr>
<td>Blockage (%):</td>
<td>0</td>
</tr>
</tbody>
</table>

Comment: P:\GIS\Projects\253963_NT Image found and displayed.
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

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: 

Image found and displayed.
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:
## Civil Infrastructure

### Northern Territory Town Camps

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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>1344</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Blueberry Hill (Munji-Marla)</th>
</tr>
</thead>
</table>

**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**: 4 - Very Good
- **Lot Water Meter Condition**: 4 - Very Good
- **Lot Water Meter Comment**: 

![Image of Water Meter](P:\GIS\Projects\253963_NT)
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):  Lot Water Meter Size:  25
Bulk Water Meter Condition:  Lot Water Meter Condition:  4 - Very Good
Bulk Water Meter Comment:  Lot Water Meter Comment:  Two meters
Electrical inspection reports
Legend

**Electrical infrastructure**
- 11kV HV/LV Pole
- 11kV Line Pole
- 11kV Pole Mounted Substation
- 11kV Air break switch
- 11kV Switch Fuse
- LV 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
- 1235 Distribution Panel
- 1232 Overhead Poles
- 1234 Street Light
- 1234 Transformers

NT Town Camp Infrastructure Assessments: Electrical

215 - Munji-Marla (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:
What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 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

<table>
<thead>
<tr>
<th>Insp ID: 730</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Blueberry Hill (Munji-Marla)</th>
</tr>
</thead>
</table>

**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**: 443

- **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

<table>
<thead>
<tr>
<th>Insp ID: 731</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Blueberry Hill (Munji-Marla)</th>
</tr>
</thead>
</table>

**What Category are you capturing:** Overhead Poles

<table>
<thead>
<tr>
<th>What is Pole Material type:</th>
<th>Welded</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the condition of pole:</td>
<td>3</td>
</tr>
<tr>
<td>How is the pole planted:</td>
<td>Concrete</td>
</tr>
<tr>
<td>What is the Condition of plant:</td>
<td>3</td>
</tr>
<tr>
<td>Is street light fitted:</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Street Light Power Supply:**

<table>
<thead>
<tr>
<th>Street Light Type</th>
<th>M125 D 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street Light Watts</td>
<td>125</td>
</tr>
<tr>
<td>Street Light Condition</td>
<td>2</td>
</tr>
</tbody>
</table>

**Street Light Height**

<table>
<thead>
<tr>
<th>What is the type of service:</th>
<th>Three</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the HV voltage level:</td>
<td>400</td>
</tr>
<tr>
<td>What is the arrangement of connected cables:</td>
<td>Twisted</td>
</tr>
<tr>
<td>Are there isolators on the pole:</td>
<td>No</td>
</tr>
<tr>
<td>What is the Condition:</td>
<td>3</td>
</tr>
<tr>
<td>How many Lots are connected to this pole:</td>
<td>1</td>
</tr>
</tbody>
</table>

**Overhead Pole Comments:** Surface rusted
Northern Territory Town Camps
Electrical Infrastructure

Inspection Date  30/11/2016 12:20:32 PM
## Electrical Infrastructure

### Northern Territory Town Camps

**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
## Electrical Infrastructure

### Northern Territory Town Camps

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

<table>
<thead>
<tr>
<th>Insp ID: 733</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Blueberry Hill (Munji-Marla)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>What Category are you capturing:</th>
<th>Overhead Poles</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is Pole Material type:</td>
<td>Welded</td>
</tr>
<tr>
<td>What is the condition of pole:</td>
<td>3</td>
</tr>
<tr>
<td>How is the pole planted:</td>
<td>Concrete</td>
</tr>
<tr>
<td>What is the Condition of plant:</td>
<td>3</td>
</tr>
<tr>
<td>Is street light fitted:</td>
<td>Yes</td>
</tr>
<tr>
<td>Street Light Power Supply:</td>
<td></td>
</tr>
<tr>
<td>Street Light Type</td>
<td>M125 D 18</td>
</tr>
<tr>
<td>Street Light Watts</td>
<td>125</td>
</tr>
<tr>
<td>Street Light Condition</td>
<td>3</td>
</tr>
<tr>
<td>Street Light Height</td>
<td>449</td>
</tr>
<tr>
<td>What is the type of service:</td>
<td>Three</td>
</tr>
<tr>
<td>What is the HV voltage level:</td>
<td>400</td>
</tr>
<tr>
<td>What is the arrangement of connected cables:</td>
<td>Twisted</td>
</tr>
<tr>
<td>Are there isolators on the pole:</td>
<td>No</td>
</tr>
<tr>
<td>What is the Condition:</td>
<td>3</td>
</tr>
<tr>
<td>How many Lots are connected to this pole:</td>
<td>0</td>
</tr>
<tr>
<td>Overhead Pole Comments:</td>
<td>Surface rusted</td>
</tr>
</tbody>
</table>

---

449
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

<table>
<thead>
<tr>
<th>Insp ID</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Blueberry Hill (Munji-Marla)</th>
</tr>
</thead>
</table>

What Category are you capturing: **Overhead Poles**

<table>
<thead>
<tr>
<th>Is street light fitted:</th>
<th>Yes</th>
</tr>
</thead>
</table>

**Street Light Power Supply:**

<table>
<thead>
<tr>
<th>Street Light Type</th>
<th>M125 D 08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street Light Watts</td>
<td>125</td>
</tr>
<tr>
<td>Street Light Condition</td>
<td>2</td>
</tr>
</tbody>
</table>

Street Light Height

---

P:

**P:

Image found and displayed.**

P:

Image found and displayed.**

P:

Image found and displayed.**

P:

Image found and displayed.**
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

![Street Light Images]
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**

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

---

Images of street light and overhead poles.
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

<table>
<thead>
<tr>
<th>Insp ID: 733</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Blueberry Hill (Munji-Marla)</th>
</tr>
</thead>
</table>

- **What Category are you capturing:** Overhead Poles
- **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**

![Image of Overhead Poles and Street Light]

---

457
Northern Territory Town Camps

Electrical Infrastructure

Inspection Date  30/11/2016 12:16:21 PM
Road map
Existing drawings
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.
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

<table>
<thead>
<tr>
<th>Registered Date</th>
<th>Dealing Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>17/08/2001</td>
<td>472777</td>
<td>Previous title is <strong>Volume 639 Folio 011</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Notice of a Right to a Grant of Interest</td>
</tr>
</tbody>
</table>

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.
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
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)

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

<table>
<thead>
<tr>
<th>Application Number:</th>
<th>5 of 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td>DWELLING (HOUSE 4)</td>
</tr>
<tr>
<td>Number of Residential Units:</td>
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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://ntepla.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
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** For New house's demand calculation see section 13.4 "Future Demand".
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
- Power and Water Corporation supplement to WSA 04
- Power and Water Corporation supplement to WSA 03
- 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
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

**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

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<tr>
<td></td>
<td>Not operational</td>
</tr>
<tr>
<td>2</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td>Not fully operational or requires immediate maintenance to keep operational</td>
</tr>
<tr>
<td>3</td>
<td>Good</td>
</tr>
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<td></td>
<td>Fully operational, may require routine maintenance</td>
</tr>
<tr>
<td>4</td>
<td>Very Good</td>
</tr>
<tr>
<td></td>
<td>Fully operational, may require maintenance in the next six months</td>
</tr>
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<td>Excellent</td>
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<td>New, fully operational</td>
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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

<table>
<thead>
<tr>
<th>Asset type</th>
<th>Number of assets as per documentation</th>
<th>Number of assets assessed during inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manholes</td>
<td>16</td>
<td>6</td>
</tr>
</tbody>
</table>

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:
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

<table>
<thead>
<tr>
<th>Catchment</th>
<th>Current total EP</th>
<th>Diameter of connection (mm)</th>
<th>Adopted PWC minimum slope (%)</th>
<th>Q_{full} (L/s)</th>
<th>Current Q (L/s)</th>
<th>Current capacity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catchment 1</td>
<td>63</td>
<td>150</td>
<td>1.0</td>
<td>16.50</td>
<td>0.97</td>
<td>6%</td>
</tr>
</tbody>
</table>

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](image)

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**

<table>
<thead>
<tr>
<th>Asset type</th>
<th>Number of assets as per documentation</th>
<th>Number of assets assessed during inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire hydrants</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Water meter (residential lots)</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire hydrant</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Water meter (residential lots)</td>
<td>2</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Total dwellings</th>
<th>EP</th>
<th>Demand (l/s)</th>
<th>Peak hour demand (l/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>63</td>
<td>0.95</td>
<td>2.84</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Footpath</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Signs</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

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.

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

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

Figure 8 Dump Camp road network
<table>
<thead>
<tr>
<th>Road name</th>
<th>Chainage start (km)</th>
<th>Chainage end (km)</th>
<th>Condition (1 to 5)</th>
<th>Defects and associated condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>223_2</td>
<td>0</td>
<td>0.21</td>
<td>3</td>
<td>-30% of road has bleeding defects (3)</td>
</tr>
</tbody>
</table>

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.

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>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culverts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEP</td>
<td>1</td>
<td>3</td>
<td>14</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swales</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Table 10 Stormwater condition assessment
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 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.

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>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street light on O/H pole</td>
<td>10</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td>24</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformer</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead pole</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-paid meter</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Switchboard</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

Table 15 shows the condition rating given to the switchboards associated to dwellings.
Table 15 Switchboard condition assessment (housing footprint)

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switchboard</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Com Id</th>
<th>Community name</th>
<th>Dwellings</th>
<th>Transformer (kVA)</th>
<th>kVA Total @ 4.5kVA</th>
<th>kVA Total @ 7kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>223</td>
<td>Dump Camp (Marla-Marla)</td>
<td>7</td>
<td>200</td>
<td>31.5</td>
<td>49</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>Table 17 Telecommunication pit condition assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asset</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Telecommunication pit</td>
</tr>
</tbody>
</table>

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](image)

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

<table>
<thead>
<tr>
<th>Infrastructure</th>
<th>Maintenance of existing infrastructure</th>
<th>Upgrades to meet current design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewerage</td>
<td>$1,000</td>
<td>$0</td>
</tr>
<tr>
<td>Water supply</td>
<td>$0</td>
<td>$91,000</td>
</tr>
<tr>
<td>Roadworks</td>
<td>$33,000</td>
<td>$0</td>
</tr>
<tr>
<td>Stormwater drainage</td>
<td>$15,000</td>
<td>$0</td>
</tr>
<tr>
<td>Community structures</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Electrical</td>
<td>$13,000</td>
<td>$0</td>
</tr>
<tr>
<td>Communications</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Miscellaneous provisions</td>
<td>$19,000</td>
<td>$22,000</td>
</tr>
<tr>
<td><strong>Total (including GST)</strong></td>
<td><strong>$81,000</strong></td>
<td><strong>$113,000</strong></td>
</tr>
<tr>
<td><strong>Grand total</strong></td>
<td><strong>$194,000</strong></td>
<td></td>
</tr>
</tbody>
</table>

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.
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
NT Town Camp Infrastructure Assessments: Sewerage

Legend
- Town Camp boundary
- Sewerage
- Manholes (6)

Note: Label numbers refer to survey IDs

A3 scale: 1:2,500

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

P:\GIS\Projects\253963_NT_Town_Camps\253963_003_Civil_DDP.mxd  23/02/2017 12:02
Coordinate system: MGA94 Zone 52
Map by: DMcP

°
Northern Territory Town Camps

Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1291</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

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:  No

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:  Yes
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:** No
- **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

<table>
<thead>
<tr>
<th>Insp ID: 1314</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

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: | No |
| 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 |
### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1328</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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:** No
- **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**: Yes
- **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

<table>
<thead>
<tr>
<th>Insp ID</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1282</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Road Name:** Marla Marla  
**What are you inspecting:** Foot Paths  
**Footpath Width (mm):** 1200  
**Footpath Type:** Concrete  
**Footpath Condition:** 3 - Good  
**Comment:** Needs maintenance, rocks and dirt on footpath
Northern Territory Town Camps

Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1284</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Insp ID</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1295</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Road Name**: Marla Marla
- **What are you inspecting**: Foot Paths
- **Footpath Width (mm)**: 1200
- **Footpath Type**: Concrete
- **Footpath Condition**: 4 - Very Good
- **Comment**: Structurally fine, but needs a tidy up

[Image of a footpath]
## Northern Territory Town Camps

### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1296</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

- **Road Name:** Marla Marla
- **What are you inspecting:** Foot Paths
- **Footpath Width (mm):** 1200
- **Footpath Type:** Concrete
- **Footpath Condition:** 4 - Very Good
- **Comment:** Left of road
### Northern Territory Town Camps

#### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1305</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

- **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:**

![Image of Footpath](image_url)
Northern Territory Town Camps

Civil Infrastructure

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

**Insp ID**: 1324  
**Group**: 3 - Tennant Creek, Elliott  
**Camp**: 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**: P:\GIS\Projects\253963_NT Image found and displayed.
## Inspection Details

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

**Insp ID**: 1334  
**Group**: 3 - Tennant Creek, Elliott  
**Operation**: Dump Camp (Marla-Marla)

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Name:</td>
<td>Marla Marla</td>
</tr>
<tr>
<td>What are you inspecting:</td>
<td>Foot Paths</td>
</tr>
<tr>
<td>Footpath Width (mm):</td>
<td>1200</td>
</tr>
<tr>
<td>Footpath Type:</td>
<td>Concrete</td>
</tr>
<tr>
<td>Footpath Condition:</td>
<td>4 - Very Good</td>
</tr>
<tr>
<td>Comment:</td>
<td>Needs general tidy up</td>
</tr>
</tbody>
</table>

**General Comment**: Image found and displayed.
# Northern Territory Town Camps

## Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1308</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

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:

![Manhole Image]

530
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:
<table>
<thead>
<tr>
<th>Inspection Date</th>
<th>30/11/2016 11:26:50 AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insp ID:</td>
<td>1316</td>
</tr>
<tr>
<td>Group 3 - Tennant Creek, Elliott</td>
<td>Dump Camp (Marla-Marla)</td>
</tr>
</tbody>
</table>

- 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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1317</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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
## Civil Infrastructure

### Northern Territory Town Camps

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

<table>
<thead>
<tr>
<th>Insp ID: 1322</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

- **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:**

![Manhole Image](image-url)
Civil Infrastructure

Inspector 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:

Image found and displayed.
# Northern Territory Town Camps

## Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1285</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

- **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:
- Kerbs Section
  - **Kerb Type**
  - **Kerb Cond**
  - **Kerb Comments**
  - Kerb and Gutter
    - **Kerb Cond**
    - Gutters are filled with dirt in some sections

### Road Defects Section

<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Defect QTY</th>
<th>Defect Condition</th>
<th>Defect Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>50</td>
<td>3 - Good</td>
<td>50% of road has bleed defects</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Insp ID: 1307</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

- **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**

<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Defect QTY</th>
<th>Defect Condition</th>
<th>Defect Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>30</td>
<td>3 - Good</td>
<td>30% road</td>
</tr>
</tbody>
</table>

**Kerbs Section**

<table>
<thead>
<tr>
<th>Kerb Type</th>
<th>Kerb Cond</th>
<th>Kerb Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerb and Gutter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Shoulders Section**

**Linemaking 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

<table>
<thead>
<tr>
<th>Insp ID: 1326</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

- **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

<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Defect QTY</th>
<th>Defect Condition</th>
<th>Defect Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>30</td>
<td>3 - Good</td>
<td>30% of road</td>
</tr>
</tbody>
</table>

### Kerbs Section

<table>
<thead>
<tr>
<th>Kerb Type</th>
<th>Kerb Cond</th>
<th>Kerb Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerb and Gutter</td>
<td>2 - Poor</td>
<td>Kerbs on left full of dirt</td>
</tr>
</tbody>
</table>

### 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 11:04:01 AM

<table>
<thead>
<tr>
<th>Insp ID: 1333</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Defect QTY</th>
<th>Defect Condition</th>
<th>Defect Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>20</td>
<td>3 - Good</td>
<td>20% of road</td>
</tr>
</tbody>
</table>

Kerbs Section

<table>
<thead>
<tr>
<th>Kerb Type</th>
<th>Kerb Cond</th>
<th>Kerb Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerb and Gutter</td>
<td>4 - Very Good</td>
<td></td>
</tr>
</tbody>
</table>

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
Civil Infrastructure

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
Both sides of road: Both
Condition: 4 - Very Good
Blockage (%): 0
Comment:

[Images of stormwater infrastructure]
## Northern Territory Town Camps

### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1286</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **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

<table>
<thead>
<tr>
<th>Insp ID: 1288</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater Infrastructure:</td>
<td>SEP</td>
<td></td>
</tr>
<tr>
<td>Number of Bays:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>On grade or sag pit:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both sides of road:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition:</td>
<td>4 - Very Good</td>
<td></td>
</tr>
<tr>
<td>Blockage (%):</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Comment:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Image](P:\GIS\Projects\253963_NT\Image found and displayed.)
## Northern Territory Town Camps

### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1297</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater Infrastructure:</td>
<td>SEP</td>
<td></td>
</tr>
<tr>
<td>Number of Bays:</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>On grade or sag pit:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both sides of road:</td>
<td>Both</td>
<td></td>
</tr>
<tr>
<td>Condition:</td>
<td>4 - Very Good</td>
<td></td>
</tr>
<tr>
<td>Blockage (%):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comment:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Northern Territory Town Camps

### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1298</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater Infrastructure:</td>
<td>SEP</td>
<td></td>
</tr>
<tr>
<td>Number of Bays:</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>On grade or sag pit:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both sides of road:</td>
<td>Left</td>
<td></td>
</tr>
<tr>
<td>Condition:</td>
<td>4 - Very Good</td>
<td></td>
</tr>
<tr>
<td>Blockage (%):</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Comment:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Image of stormwater infrastructure](image)

*Image found and displayed.*
## Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1299</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

*Comment:*

![Image of Stormwater Infrastructure SEP](P:\GIS\Projects\253963_NT Image found and displayed.)

![Another Image of Stormwater Infrastructure SEP](P:\GIS\Projects\253963_NT Image found and displayed.)
Northern Territory Town Camps

Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1302</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

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

[Image of stormwater infrastructure]
Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1303</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Insp ID: 1306</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

- **Stormwater Infrastructure:** SEP
- **Number of Bays:** 1
- **On grade or sag pit:**
  - **Both sides of road:** Right
- **Condition:** 4 - Very Good
- **Blockage (%):** 0

**Comment:** Image found and displayed.
Civil Infrastructure

Northern Territory Town Camps

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:

Image found and displayed.

Image found and displayed.
### Northern Territory Town Camps

#### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>1313</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater Infrastructure:</td>
<td>SEP</td>
<td>Number of Bays:</td>
<td>1</td>
</tr>
<tr>
<td>On grade or sag pit:</td>
<td></td>
<td>Both sides of road:</td>
<td>Right</td>
</tr>
<tr>
<td>Condition:</td>
<td></td>
<td>Condition:</td>
<td>3 - Good</td>
</tr>
<tr>
<td>Blockage (%):</td>
<td>20</td>
<td>Blockage (%):</td>
<td></td>
</tr>
<tr>
<td>Comment:</td>
<td>Covered in white paint</td>
<td>Comment:</td>
<td></td>
</tr>
</tbody>
</table>

![Image of covered stormwater infrastructure](image)
### Northern Territory Town Camps

#### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1329</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

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

![Image 1](image1.png)

![Image 2](image2.png)
## Northern Territory Town Camps

### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1332</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

- **Stormwater Infrastructure:** SEP
- **Number of Bays:** 1
- **On grade or sag pit:**
  - Both sides of road: Right
- **Condition:** 4 - Very Good
- **Blockage (%):** 20
- **Comment:**

![Image link](P:\GIS\Projects\253963_NT\image.png)
## Northern Territory Town Camps

### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1281</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

- **Road Name**: Marla Marla
- **What are you inspecting**: Signs
- **Type of Sign**: Give Way
- **Sign Condition**: 3 - Good
- **Sign Comment**: General Comment:

![Image of a Give Way sign](image)
### Northern Territory Town Camps

#### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>1287</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

**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:**

![Image of road with sign post](image_url)
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:

![Image of a Give Way sign](image.png)
### Northern Territory Town Camps

#### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1294</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

- **Road Name:** Marla Marla
- **What are you inspecting:** Signs
- **Type of Sign:** Street name
- **Sign Condition:** 2 - Poor
- **Sign Comment:** No sign

**General Comment:**

---

![Image of street sign without a sign](image-url)
<table>
<thead>
<tr>
<th>Inspect ID: 1300</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Name:</td>
<td>223_2</td>
<td></td>
</tr>
<tr>
<td>What are you inspecting:</td>
<td>Signs</td>
<td></td>
</tr>
<tr>
<td>Type of Sign:</td>
<td>Give Way</td>
<td></td>
</tr>
<tr>
<td>Sign Condition:</td>
<td>4 - Very Good</td>
<td></td>
</tr>
</tbody>
</table>

General Comment:
# Northern Territory Town Camps

## Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1312</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Name:</td>
<td>223_2</td>
<td></td>
</tr>
<tr>
<td>What are you inspecting:</td>
<td>Signs</td>
<td></td>
</tr>
<tr>
<td>Type of Sign:</td>
<td>Give Way</td>
<td></td>
</tr>
<tr>
<td>Sign Condition:</td>
<td>1 - Very Poor</td>
<td></td>
</tr>
<tr>
<td>Sign Comment:</td>
<td>Sign bent, leaning over road</td>
<td></td>
</tr>
<tr>
<td>General Comment:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Northern Territory Town Camps
Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1327</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Name:</td>
<td>223_1</td>
<td></td>
</tr>
<tr>
<td>What are you inspecting:</td>
<td>Signs</td>
<td></td>
</tr>
<tr>
<td>Type of Sign:</td>
<td>Give Way</td>
<td></td>
</tr>
<tr>
<td>Sign Condition:</td>
<td>4 - Very Good</td>
<td></td>
</tr>
<tr>
<td>Sign Comment:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Comment:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Northern Territory Town Camps

Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1330</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

- **Road Name:** Marla Marla
- **What are you inspecting:** Signs
- **Type of Sign:** Give Way
- **Sign Condition:** 3 - Good
- **Sign Comment:** Some graffiti
- **General Comment:**

![Sign Image](image-url)
**Northern Territory Town Camps**

**Civil Infrastructure**

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

<table>
<thead>
<tr>
<th>Insp ID</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1331</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Road Name:** Marla Marla
- **What are you inspecting:** Signs
- **Type of Sign:** Street name
- **Sign Condition:** 2 - Poor
- **Sign Comment:** No sign
- **General Comment:**

![Image of a sign on a pole in a dusty area with a road in the background]
**Northern Territory Town Camps**

**Civil Infrastructure**

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

<table>
<thead>
<tr>
<th>Insp ID: 1336</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

**Road Name:** Marla Marla  
**What are you inspecting:** Signs  
**Type of Sign:** Street name  
**Sign Condition:** 2 - Poor  
**Sign Comment:** No sign  

**General Comment:**

![Image of a street sign](image-url)
## Northern Territory Town Camps

### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1292</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

| 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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1304</td>
<td></td>
</tr>
</tbody>
</table>

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:  

[Image of water meter and pipes]
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

<table>
<thead>
<tr>
<th>Insp ID: 1318</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

**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:**

[Image of water meter or infrastructure]
Northern Territory Town Camps

Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1319</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Dump Camp (Marla-Marla)</th>
</tr>
</thead>
</table>

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:  

![Image of Water Meter at Marla-Marla Dump Camp]
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**: Lot Water Meter Condition: 4 - Very Good
- **Bulk Water Meter Comment**: Lot Water Meter Comment: Two meters in one lot

![Image of water meter setup]
Northern Territory Town Camps Review

Living on the edge

Electrical inspection reports
Road map
Existing drawings
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

26/11/1996       364701       Previous title is Register Book CUCL Volume 201 Folio 001
08/06/1993       284563       Statutory Notice - Prescribed Property

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.
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
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)  

Custodian - Surveyor General (+61 8 8995 5362)  
Address  
87 STANDELEY 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 TENTANT 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

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 STANLEY 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  

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

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
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<thead>
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<th>Com M</th>
<th>Location</th>
<th>Community Name</th>
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<th>Own Dwelling No. (Urban Chsl)</th>
<th>New Housing Unit (Future Demand)</th>
<th>Primary Volatile Level (W)</th>
<th>PM2.5 Substitution (2)</th>
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<th>IVA Total Demand (kVA)</th>
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<td>Two transformers for this Town Camp. Transformer is not in boundary of Town Camp. (The nearest transformer data to Town Camp is highlighted in yellow).</td>
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<td>Two transformers for this Town Camp. Transformer is not in boundary of Town Camp. (The nearest transformer data to Town Camp is highlighted in yellow).</td>
</tr>
</tbody>
</table>

**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
- Power and Water Corporation supplement to WSA 03
- 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
Further referral to the guidelines in this report will be designated by the guidelines number, NP001.1.

**Communications**

**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>
<thead>
<tr>
<th>Condition rating</th>
<th>Operability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Very Poor</td>
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<tr>
<td>2</td>
<td>Poor</td>
</tr>
<tr>
<td>3</td>
<td>Good</td>
</tr>
<tr>
<td>4</td>
<td>Very Good</td>
</tr>
<tr>
<td>5</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

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.
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

<table>
<thead>
<tr>
<th>Asset type</th>
<th>Number of assets as per documentation</th>
<th>Number of assets assessed during inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manholes</td>
<td>15</td>
<td>12</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Manholes</td>
<td>12</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>13</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Catchment</th>
<th>Current total EP</th>
<th>Diameter of connection (mm)</th>
<th>Adopted PWC minimum slope (%)</th>
<th>Q_{full} (L/s)</th>
<th>Current Q (L/s)</th>
<th>Current capacity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catchment 1</td>
<td>162</td>
<td>150</td>
<td>1.0</td>
<td>16.50</td>
<td>1.16</td>
<td>7%</td>
</tr>
</tbody>
</table>

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](image)

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

<table>
<thead>
<tr>
<th>Asset type</th>
<th>Number of assets as per documentation</th>
<th>Number of assets assessed during inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire hydrants</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Water meter (residential lots)</td>
<td>21</td>
<td>11</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire hydrants</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Water meter (residential lots)</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td></td>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Total dwellings</th>
<th>EP</th>
<th>Demand</th>
<th>Peak hour demand (l/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>162</td>
<td>2.43</td>
<td>7.29</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Footpath</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

The footpaths in Kargaru were generally in good condition, however there were some weeds and grass overgrowing the path, and some graffiti 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.
community, while the road signs within the community were in good condition. It is recommended that the signs in poor condition are replaced.

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

<table>
<thead>
<tr>
<th>Road name</th>
<th>Chainage start (km)</th>
<th>Chainage end (km)</th>
<th>Condition (1 to 5)</th>
<th>Defects and associated condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>238_5</td>
<td>0.0</td>
<td>0.14</td>
<td>1</td>
<td>-80% of road has stone loss (2) -100% of road has poor general appearance (2)</td>
</tr>
<tr>
<td>0.0</td>
<td>0.25</td>
<td></td>
<td>3</td>
<td>-50% of road has gutters filled with dirt (2)</td>
</tr>
<tr>
<td>0.25</td>
<td>0.45</td>
<td></td>
<td>3</td>
<td>-20% of road has gutters filled with dirt (2)</td>
</tr>
<tr>
<td>0.45</td>
<td>0.55</td>
<td></td>
<td>3</td>
<td>-40% of road has gutters filled with dirt (2)</td>
</tr>
<tr>
<td>0.55</td>
<td>0.7</td>
<td></td>
<td>3</td>
<td>-70% of road has gutters filled with dirt (2)</td>
</tr>
</tbody>
</table>
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>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEP</td>
<td>1</td>
<td>15</td>
<td>4</td>
<td></td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Playground</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Pump station</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 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.

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>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution panels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 (status unknown)</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street light</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street light on O/H pole</td>
<td>9</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformer</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead pole</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-paid meter</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Switchboard</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

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

Table 18 Switchboard condition assessment (Housing footprint)

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switchboard</td>
<td>3</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Com Id</th>
<th>Community name</th>
<th>Dwellings</th>
<th>Transformer (kVA)</th>
<th>kVA Total @ 4.5kVA</th>
<th>kVA Total @ 7kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>238</td>
<td>Kargaru (East Side Camp)</td>
<td>12</td>
<td>200</td>
<td>54</td>
<td>84</td>
</tr>
</tbody>
</table>
A tabulated summary of all the community transformers is 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

<table>
<thead>
<tr>
<th>Com Id</th>
<th>Community name</th>
<th>Dwellings</th>
<th>Transformer (kVA)</th>
<th>kVA Total @ 4.5kVA</th>
<th>kVA Total @ 7kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>238</td>
<td>Kargaru (East Side Camp)</td>
<td>13</td>
<td>200</td>
<td>58.5</td>
<td>91</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
</table>
| Telecommunication Pit |             |        |        |             |             | 8     

Table 22 Telephone booth condition assessment

<table>
<thead>
<tr>
<th>Asset</th>
<th>1 Very Poor</th>
<th>2 Poor</th>
<th>3 Good</th>
<th>4 Very Good</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone booth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 (status unknown)</td>
</tr>
</tbody>
</table>

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.
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

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

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
Legend

Town Camp boundary
Water
Fire Hydrants (7)
Water Meter (9)

A3 scale: 1:3,000

Note:
Label numbers refer to survey IDs.

NT Town Camp Infrastructure Assessments: Water
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:  No
- 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:**  No
- **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:  No
Sluice Valve:  No
Above or Below ground:  Below ground
FH Leakage:  Yes
Bollards around hydrant:  No
FH Condition:  2 - Poor
FH Comment:  Leaking
Civil Infrastructure

Northern Territory Town Camps

Insp ID: 1451  Group 3 - Tennant Creek, Elliott  Kargaru (East Side Camp)

What Water Asset Are you Capturing: Fire Hydrants

Single or Double: 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
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: No

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
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: No

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

<table>
<thead>
<tr>
<th>Insp ID</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1480</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Insp ID: 1437</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Name:</td>
<td>238_4</td>
<td></td>
</tr>
<tr>
<td>What are you inspecting:</td>
<td>Foot Paths</td>
<td></td>
</tr>
<tr>
<td>Footpath Width (mm):</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>Footpath Type:</td>
<td>Concrete</td>
<td></td>
</tr>
<tr>
<td>Footpath Condition:</td>
<td>3 - Good</td>
<td></td>
</tr>
<tr>
<td>Comment:</td>
<td>Needs tidy up. Grass over growing and dirt on footpath</td>
<td></td>
</tr>
</tbody>
</table>

General Comment:

---

[Images of the footpath showing the condition described in the 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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

- **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:**

![Image](image_url)
<table>
<thead>
<tr>
<th><strong>Inspection Date</strong></th>
<th>1/12/2016 8:41:25 AM</th>
</tr>
</thead>
</table>

**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:**

![Image of a footpath]

---

647
## Northern Territory Town Camps

### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1478</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Name:</td>
<td>238_4</td>
<td></td>
</tr>
<tr>
<td>What are you inspecting:</td>
<td>Foot Paths</td>
<td></td>
</tr>
<tr>
<td>Footpath Width (mm):</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>Footpath Type:</td>
<td>Concrete</td>
<td></td>
</tr>
<tr>
<td>Footpath Condition:</td>
<td>3 - Good</td>
<td></td>
</tr>
<tr>
<td>Comment:</td>
<td>Needs tidy up</td>
<td></td>
</tr>
</tbody>
</table>

General Comment: 

![Image of footpath](image_url)
## Civil Infrastructure

### Northern Territory Town Camps

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

<table>
<thead>
<tr>
<th>Insp ID: 1425</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>What Sewerage Asset are you capturing:</td>
<td>Manholes</td>
<td></td>
</tr>
<tr>
<td>MH Cover Shape:</td>
<td>Rectangular</td>
<td></td>
</tr>
<tr>
<td>Manhole Cover Diam (mm):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manhole Length (mm):</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Manhole Width (mm):</td>
<td>700</td>
<td></td>
</tr>
<tr>
<td>Manhole Condition:</td>
<td>3 - Good</td>
<td></td>
</tr>
<tr>
<td>Notes on Lid:</td>
<td>B3</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Manhole Image](Image found and displayed.)
## 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)

<table>
<thead>
<tr>
<th>What Sewerage Asset are you capturing:</th>
<th>Manholes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MH Cover Shape:</td>
<td>Rectangular</td>
</tr>
<tr>
<td>Manhole Cover Diam (mm):</td>
<td></td>
</tr>
<tr>
<td>Manhole Length (mm):</td>
<td>1000</td>
</tr>
<tr>
<td>Manhole Width (mm):</td>
<td>700</td>
</tr>
<tr>
<td>Manhole Condition:</td>
<td>3 - Good</td>
</tr>
<tr>
<td>Notes on Lid:</td>
<td>B2</td>
</tr>
</tbody>
</table>

**Comments:**

P:

[Image found and displayed.]
Northern Territory Town Camps

Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1435</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

What Sewerage Asset are you capturing: **Manholes**

MH Cover Shape: **Rectangular**

Manhole Cover Diam (mm): **1000**

Manhole Length (mm): **700**

Manhole Condition: **3 - Good**

Notes on Lid: **A2**

Comments:

![Image of manhole](Image found and displayed.)
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:

[Image of a manhole cover]
Northern Territory Town Camps

Civil Infrastructure

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

Insp ID: 1438  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: B1
Comments: In footpath
### Northern Territory Town Camps

**Civil Infrastructure**

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

<table>
<thead>
<tr>
<th>Insp ID</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1440</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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:**

![Image of a manhole covered with grass](image-url)
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:

Image found and displayed.
**Northern Territory Town Camps**

**Civil Infrastructure**

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

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>1463</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

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:

![Image of manhole](image_url)
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:

Image found and displayed.
**Northern Territory Town Camps**

**Civil Infrastructure**

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

<table>
<thead>
<tr>
<th>Insp ID: 1473</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

- **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

<table>
<thead>
<tr>
<th>Insp ID: 1479</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

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**

![Image of a manhole covered in dirt](image-url)
## Northern Territory Town Camps

### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1481</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

**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:**

![Image found and displayed.](image-url)
## Northern Territory Town Camps

### Civil Infrastructure

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

<table>
<thead>
<tr>
<th>Insp ID: 1484</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

- **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:**

![Image found and displayed.](image-url)
Northern Territory Town Camps

Civil Infrastructure

Inspection Date  1/12/2016 8:03:04 AM

Insp ID: 1426  Group 3 - Tennant Creek, Elliot  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

<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Defect QTY</th>
<th>Defect Condition</th>
<th>Defect Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Appearance</td>
<td>50</td>
<td>3 - Good</td>
<td>Gutters full of dirt in sections, loose gravel on</td>
</tr>
</tbody>
</table>

Kerbs Section

<table>
<thead>
<tr>
<th>Kerb Type</th>
<th>Kerb Cond</th>
<th>Kerb Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerb and Gutter</td>
<td>3 - Good</td>
<td>Gutters full of dirt in sections</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Insp ID: 1454</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

- **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

<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Defect QTY</th>
<th>Defect Condition</th>
<th>Defect Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Appearance</td>
<td>70</td>
<td>3 - Good</td>
<td>Gutters filled with dirt</td>
</tr>
</tbody>
</table>

### Kerbs Section

<table>
<thead>
<tr>
<th>Kerb Type</th>
<th>Kerb Cond</th>
<th>Kerb Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kerb Type</td>
<td>Kerb Cond</td>
<td>Kerb Comments</td>
</tr>
<tr>
<td>Kerb and Gutter</td>
<td>3 - Good</td>
<td>Gutters filled with dirt</td>
</tr>
</tbody>
</table>

### 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)**

<table>
<thead>
<tr>
<th>Road Name</th>
<th>238_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are you inspecting?</td>
<td>Pavements</td>
</tr>
<tr>
<td>Ch From (km)</td>
<td>0.45</td>
</tr>
<tr>
<td>Ch To (km)</td>
<td>0.55</td>
</tr>
<tr>
<td>Road Type</td>
<td>Sealed - spray seal</td>
</tr>
<tr>
<td>Section Width (m)</td>
<td>7.2</td>
</tr>
<tr>
<td>Road Condition</td>
<td>3 - Good</td>
</tr>
</tbody>
</table>

**General Comment:**

<table>
<thead>
<tr>
<th>Road Defects Section</th>
<th>Defect QTY</th>
<th>Defect Condition</th>
<th>Defect Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Appearance</td>
<td>40</td>
<td>3 - Good</td>
<td>Gutters filled with dirt</td>
</tr>
</tbody>
</table>

- **Kerbs Section**
  - **Kerb Type**
  - **Kerb Cond**
  - **Kerb Comments**
  - 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:

#### Kerbs Section

<table>
<thead>
<tr>
<th>Kerb Type</th>
<th>Kerb Cond</th>
<th>Kerb Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerb and Gutter</td>
<td>3 - Good</td>
<td>Dirt in gutters</td>
</tr>
</tbody>
</table>

#### Shoulders Section

#### Linemarking Section

#### Obstruction Section

---

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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
Civil Infrastructure

Northern Territory Town Camps

**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**

<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Defect QTY</th>
<th>Defect Condition</th>
<th>Defect Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stone Loss</td>
<td>80</td>
<td>2 - Poor</td>
<td></td>
</tr>
<tr>
<td>General Appearance</td>
<td>100</td>
<td>2 - Poor</td>
<td></td>
</tr>
</tbody>
</table>

**Kerbs Section**

<table>
<thead>
<tr>
<th>Kerb Type</th>
<th>Kerb Cond</th>
<th>Kerb Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>No kerb</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Shoulders Section**

**Linemarking Section**

**Obstruction Section**

<table>
<thead>
<tr>
<th>Road Obstruction</th>
<th>Other Road Obstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debris</td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Insp ID: 1423</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater Infrastructure:</td>
<td>SEP</td>
<td></td>
</tr>
<tr>
<td>Number of Bays:</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>On grade or sag pit:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both sides of road:</td>
<td>Left</td>
<td></td>
</tr>
<tr>
<td>Condition:</td>
<td>3 - Good</td>
<td></td>
</tr>
<tr>
<td>Blockage (%):</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Comment:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Image found and displayed.
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
Both sides of road: Both
Condition: 3 - Good
Blockage (%): 0
Comment:

Image found and displayed.
## Civil Infrastructure

### Inspection Date
1/12/2016 8:00:41 AM

<table>
<thead>
<tr>
<th>Insp ID: 1428</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

- **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
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

<table>
<thead>
<tr>
<th>Insp ID: 1439</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

**Stormwater Infrastructure:** SEP

**Number of Bays:** 1

**On grade or sag pit:**

**Both sides of road:** Both

**Condition:** 3 - Good

**Blockage (%):**

**Comment:**

[Image of a road with a stormwater infrastructure feature]
## Northern Territory Town Camps

### Civil Infrastructure

**Inspector ID:** 1447  
**Group:** 3 - Tennant Creek, Elliott  
**Location:** Kargaru (East Side Camp)

<table>
<thead>
<tr>
<th>Stormwater Infrastructure:</th>
<th>SEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Bays:</td>
<td>1</td>
</tr>
<tr>
<td>On grade or sag pit:</td>
<td></td>
</tr>
<tr>
<td>Both sides of road:</td>
<td>Left</td>
</tr>
<tr>
<td>Condition:</td>
<td>4 - Very Good</td>
</tr>
<tr>
<td>Blockage (%):</td>
<td>0</td>
</tr>
<tr>
<td>Comment:</td>
<td></td>
</tr>
</tbody>
</table>

Image found and displayed.
# Northern Territory Town Camps

## Civil Infrastructure

**Inspection Date**  1/12/2016 8:56:07 AM

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

Stormwater Infrastructure:  
Number of Bays:  
On grade or sag pit:  
Both sides of road:  
Condition:  
Blockage (%):  
Comment:  

![Image](image-url)
# Northern Territory Town Camps

## Civil Infrastructure

**Inspection Date**  
1/12/2016 8:54:23 AM

<table>
<thead>
<tr>
<th>Insp ID: 1452</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

**Stormwater Infrastructure:** SEP  
**Number of Bays:** 1  
**On grade or sag pit:**  
**Both sides of road:** Left  
**Condition:** 2 - Poor  
**Blockage (%):** 100  
**Comment:**

[Image found and displayed.](684)
### Stormwater Infrastructure:

- **Stormwater Infrastructure:** SEP
- **Number of Bays:** 2
- **On grade or sag pit:**
  - Both sides of road: **Left**
- **Condition:** 3 - Good
- **Blockage (%):** 0
- **Comment:**

---

**Image found and displayed.**

---

[Image of the stormwater infrastructure]
Northern Territory Town Camps
Civil Infrastructure

**Inspection Date** 1/12/2016 8:48:51 AM

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>1456</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

- **Stormwater Infrastructure:** SEP
- **Number of Bays:** 1
- **On grade or sag pit:**
- **Both sides of road:** Right
- **Condition:** 3 - Good
- **Blockage (%):** 0

**Comment:**

![Image of Stormwater Infrastructure](image.png)
Civil Infrastructure

Northern Territory Town Camps

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
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

<table>
<thead>
<tr>
<th>Insp ID: 1465</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater Infrastructure:</td>
<td>SEP</td>
<td></td>
</tr>
<tr>
<td>Number of Bays:</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>On grade or sag pit:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both sides of road:</td>
<td>Left</td>
<td></td>
</tr>
<tr>
<td>Condition:</td>
<td>4 - Very Good</td>
<td></td>
</tr>
<tr>
<td>Blockage (%):</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Comment:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Northern Territory Town Camps

### Civil Infrastructure

**Inspection Date** 1/12/2016 8:31:21 AM

<table>
<thead>
<tr>
<th>Insp ID: 1467</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

- **Stormwater Infrastructure:** SEP
- **Number of Bays:** 1
- **On grade or sag pit:**
- **Both sides of road:** Left
- **Condition:** 3 - Good
- **Blockage (%):** 10

**Comment:**

![Image of stormwater infrastructure](image_url)
## Northern Territory Town Camps

### Civil Infrastructure

**Inspection Date**  1/12/2016 8:28:11 AM

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

- **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

<table>
<thead>
<tr>
<th>Insp ID: 1475</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
</table>

- **Stormwater Infrastructure:** SEP
- **Number of Bays:** 1
- **On grade or sag pit:**
- **Both sides of road:** Left
- **Condition:** 3 - Good
- **Blockage (%):** 30

**Comment:** Image found and displayed.
Northern Territory Town Camps

Civil Infrastructure

Inspection Date 1/12/2016 8:21:18 AM

<table>
<thead>
<tr>
<th>Insp ID: 1476</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater Infrastructure:</td>
<td>SEP</td>
<td></td>
</tr>
<tr>
<td>Number of Bays:</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>On grade or sag pit:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both sides of road:</td>
<td>Left</td>
<td></td>
</tr>
<tr>
<td>Condition:</td>
<td>3 - Good</td>
<td></td>
</tr>
<tr>
<td>Blockage (%):</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Comment:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Northern Territory Town Camps

### Civil Infrastructure

**Inspection Date**  1/12/2016  8:11:40 AM

<table>
<thead>
<tr>
<th>Insp ID: 1482</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stormwater Infrastructure:</strong></td>
<td>SEP</td>
<td></td>
</tr>
<tr>
<td><strong>Number of Bays:</strong></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>On grade or sag pit:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Both sides of road:</strong></td>
<td>Left</td>
<td></td>
</tr>
<tr>
<td><strong>Condition:</strong></td>
<td>3 - Good</td>
<td></td>
</tr>
<tr>
<td><strong>Blockage (%):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment:</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Image](https://example.com/image.png)
## Northern Territory Camps

### Civil Infrastructure

**Inspection Date**  1/12/2016 8:27:03 AM

<table>
<thead>
<tr>
<th>Insp ID: 1472</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inspection Type:</strong></td>
<td>Shade Structure</td>
<td></td>
</tr>
<tr>
<td><strong>Shade Structure Type:</strong></td>
<td>Play ground</td>
<td></td>
</tr>
<tr>
<td><strong>Shade Floor Type:</strong></td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td><strong>Roof Type:</strong></td>
<td>Not Covered</td>
<td></td>
</tr>
<tr>
<td><strong>Width (mm):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Length (mm):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Appearance:</strong></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Appearance Comment:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Condition:</strong></td>
<td>2 - Poor</td>
<td></td>
</tr>
<tr>
<td><strong>Comment:</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Northern Territory Town Camps**

**Civil Infrastructure**

**Inspection Date** 1/12/2016 7:59:45 AM

<table>
<thead>
<tr>
<th>Insp ID:</th>
<th>Group 3 - Tennant Creek, Elliott</th>
<th>Kargaru (East Side Camp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1429</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 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:**

![Sign Image](image_url)