# 15 WASTE MANAGEMENT

This chapter describes how QGC intends to manage waste generated in the development of the Pipeline Component of the Queensland Curtis LNG (QCLNG) Project. Waste generation associated with the construction and operation of the Pipeline Component has been described in *Volume 2, Chapter 12.*

## 15.1 PROJECT ENVIRONMENTAL OBJECTIVES

The Project environmental objectives for waste management are to:

- minimise waste generation and maximise reuse and recycling of waste products
- transport, store, handle, and dispose of waste in a manner that does not cause contamination of soil, air or water.

### 15.1.1 Corporate Standards

QGC is committed, under business principles developed by its parent BG Group, to employing design and construction techniques that minimise the use of resources and reduce waste as much as possible across the Project.

QGC has reviewed the current Queensland and Commonwealth waste management legislation and has framed waste management policies and procedures for the QCLNG Project in accordance with these requirements. Where legislative requirements diverge, the more comprehensive standards take precedence.

QGC's resource use and waste management objective is to reduce the risk of harm to people and the environment by minimising resource use and waste generation[1]. Unavoidable waste is to be effectively treated and disposed of to minimise the overall impact on the environment through the lifecycle of that material.

QGC's philosophy and standards for waste disposal are detailed in *Volume 5, Chapter 17* in addition to both the Commonwealth and Queensland legislative requirements for waste disposal.

Relevant legislation includes but is not limited to:

- the Environmental Protection Act 1994 (EP Act)
- the Environmental Protection (Waste Management,) Policy (EPP Waste) 2000
- the Environmental Protection (Waste Management) Regulation 2000.

1 G Group. *BG Standard: Environment Resource Use and Waste Management Standard*. unpublished BG document, document number BGA-HSSE-ENV-ST-1530.

## 15.2 SOURCES AND QUANTITIES

Relatively small amounts of domestic and industrial waste will be generated during construction of the Pipeline Component. The actual hazardous materials inventory for the Project has not been finalised. However, based on other projects it is expected that these will comprise materials for plant and vehicle maintenance such as gasket adhesives, fuels and oils, cutting lubricants, cleaning agents, water treatment chemicals and non-destructive testing.

Material Safety Data Sheets (MSDS) for relevant materials will be available on site during all phases of the Project.

All waste material will be removed from the Right-of-Way (RoW) daily or stored on site in skips which will be removed on a regular basis. Wastes will be disposed of to a facility agreed to by the Local Government Authority (LGA) and in accordance with regulatory waste management guidelines.

### 15.2.1 Types of Waste

The principal waste types anticipated for the Project are provided in *Table 4.15.1.*

**Table 4.15.1 Waste Types and Classification**

| Type | Activity | Classification |
|---|---|---|
| Tyres | • Operation of temporary maintenance workshop | Recyclable |
| Hydrostatic test waters | • Hydro-testing | Liquid |
| Drilling muds, such as bentonite muds, consisting of approved water-based products or synthetic lubricants | • Infrastructure crossings (trenchless techniques) | Liquid |
| Liquid waste from human waste storage facilities or waste treatment, including pump-out waste and sewage | • Operation of temporary construction camps | Regulated |
| Fuels, engine coolant | • Operation of temporary maintenance workshop | Regulated |
| Batteries, gasket adhesives, cutting lubricants, cleaning agents, water treatment chemicals, and non-destructive testing (spent pipeline x-ray film), acid to etch the pipe surface prior to coating, fusion-bonded epoxy powder or other plastic material | • Operation of temporary maintenance workshop<br>• Pipe welding and inspection | Regulated |
| Wastes from food preparation at camp sites | • Operation of temporary construction camps. | General solid waste (putrescible) |

| Type | Activity | Classification |
|---|---|---|
| Recyclables –<br>Glass, aluminium cans, plastic bottles, welding rods, circumferential fibre/nylon rope spacers used in pipe transport, scrap metal and High-density Polyethylene (HDPE) off-cuts, paper and cardboard | • Operation and demobilisation of temporary construction camps<br>• Pipe delivery, stringing and bending and welding<br>• Construction of Mainline Valves (MLVs) scraper stations | General solid waste (non-putrescible) |
| Soils (topsoil, fill materials), rock escarpment (sheet rubble) | • Clear and grade of the RoW<br>• Trenching<br>• Blasting<br>• Backfilling and compaction<br>• Reinstatement | General solid waste (non-putrescible) |
| Garnet for grit-blasting welded joints | • Pipe cleaning and inspection. | General solid waste (non-putrescible) |
| Drained and crushed oil filters, oil-soaked rags, oil absorbent materials | • Operation of temporary facilities | General solid waste (non-putrescible) |
| General store yard rubbish (example drums, synthetic material fibres) | • Operation of temporary construction camps and maintenance workshop<br>• Construction of ancillary pipeline facilities | General solid waste (non-putrescible) |

### 15.2.2 *Quantity of Waste*

Typical waste volumes for the Project are detailed in *Table 4.15.2*.

### *Table 4.15.2 Pipeline Waste Volumes*

| Waste Type and Generation Point | Volume | Disposal |
|---|---|---|
| Solid inert | 2 $m^3$ per week | Landfill |
| Recyclable | 0.5 $m^3$ per week | Recycle if practicable |
| Campsite wastes:<br>putrescible, paper, timber and plastic piping | 5 $m^3$ per week | Reuse or landfill as applicable |
| Effluent (including sewage) from camp sites | Up to 400 personnel | As approved by LGA |
| Drilling muds/cuttings | 5 m per 250 m drilled | Licensed landfill |
| Hydro-test water | 25ML per release maximum | To land adjacent to the pipeline |

## 15.3 MANAGEMENT OPTIONS

Pipeline waste management strategies will be in accordance with BG Group standards, the *EP Act* (Qld) and the resource management hierarchy principals of "avoid, reuse, recycle, recover and disposal".

### 15.3.1 Training and Awareness

Workforce induction will inform site personnel of the required waste management procedures in addition to ensuring the health and safety of workers and visitors to the site.

### 15.3.2 Waste Stream Assessment

Prior to the commencement of any waste-producing activities, specific waste-management strategies will be developed for each waste stream. Opportunities for recycling materials will be investigated and implemented where practicable (depending upon the availability and capacity of local facilities).

### 15.3.3 Maintenance and Pollution Prevention

A high emphasis will be placed on contractor housekeeping and all work areas will be maintained in a neat and orderly manner. All equipment and facilities will be maintained in a clean and safe condition. All hazardous wastes will be appropriately stored in bunded areas away from watercourses and in accordance with legislative requirements.

Appropriate drainage and bunding will be installed to prevent the pollution of any artificial or natural watercourse. Sumps will be drained periodically to prevent overflow and subsequent pollution of the surrounding land and/or water body. Wastes generated during pipeline construction will be removed regularly from the RoW.

### 15.3.4 Waste Management Strategies

Waste management strategies are designated by waste type. These are described in *Table 4.15.3.*

#### *15.3.4.1 Spoil*

Removal of waste spoil from site is not anticipated as the use of padding machines, which sift the soil, enables spoil material to be used instead of imported soils for bedding of the pipe. Any residual spoil material will be spread across the RoW, creating a berm effect that will flatten over time, or will be stockpiled in strategic locations, in consultation with the landholder, for future maintenance work.

*15.3.4.2 Vegetation*

Similarly, felled vegetation (including grasses, established trees and shrubs) from ground-clearing works will not be transported off site but will be stockpiled and re-spread during reinstatement works.

Where mulching of felled timber is undertaken, risk management of spontaneous combustion of on site mulch stockpiles will be implemented:

- Mulch stockpiles shall not be wider than 10 m and higher than 2 m. Typically stockpiles shall not exceed 200 m in length.
- After the establishment of the stockpile they shall be turned every two weeks for the first two months. Following this period an assessment shall be made to determine an appropriate turning regime.
- Mulch stockpiles shall be monitored on a weekly basis with a temperature gun for the first two months. Following this timeframe QGC shall determine an appropriate monitoring frequency.
- If the temperature of the stockpile exceeds 60ºC the stockpile shall be turned.

*15.3.4.3 Hydrotest Water*

The Pipeline Component will be constructed using two spreads. There may be up to three hydro-tests occurring on each spread at the same time. Each spread will endeavour to transfer test water from section to section where practicable to minimise the overall use of water. As discussed in *Volume 2, Section 12.17* the maximum volume of water required per fill will be 25 ML. Depending upon the amount of reuse that can be achieved up to 660 ML of hydro-test water may need to be disposed of in 25 ML amounts. This would represent a complete fill for every test section. As it is intended to reuse the test water between a number of sections, the actual volume will be below this.

The disposal method for the hydro-test water would be directly to land adjacent to the pipeline and away from any watercourses. The disposal strategy would be based on the CSIRO Manufacturing and Infrastructure Technology (CMIT) Report 259 completed for the Australian Pipeline Industry Association Ltd (APIA). The disposal method will be selected based on the water quality which in turn will be based on the water source and the intended residence time in the pipeline to avoid internal corrosion. A settlement device such as a large wire basket (e.g. 5 m by 3 m) lined with a filtering fabric would be used to capture the initial discharge water (i.e. approximately 5 per cent or 1.25 ML) which would be contaminated with mill scale and welding debris. The remaining water would then be discharged directly to land.

The hydro-test regimen for The Narrows crossing will be undertaken prior to pipeline burial and will be completed in a single section, separate from the “on land” sections of the pipeline. Hydro-test water source and disposal methodology and impact assessment will be resolved during Front-End Engineering and Design (FEED) and presented in a Supplementary EIS.

The intention is to use water of a quality minimising the chemical treatment required so as to reduce the impact and ultimate disposal requirements.

#### *15.3.4.4 Site Accommodation*

All waste generated from camp facilities is not included in this section. Waste from utility services is covered in *Volume 3, Chapter 16 – Gas Field Waste Management*.

### *15.3.5 Disposal*

Waste disposal during the construction phase of the Pipeline Component will be carried out by a licensed waste contractor. Waste, where practicable and taking into account health and hygiene issues, will be segregated and collected on site and stored in suitable containers for removal to approved facilities. Waste deemed for offsite disposal would be sent to a waste facility licensed under the relevant state legislation.

Storage and handling of waste chemicals will be conducted in accordance with hazardous waste-handling procedures.

Hazardous wastes, such as solvents, rust-proofing agents and primers will be managed in accordance with the requirements of relevant legislation and industry standard.

Hydrocarbon wastes, including lube oils, will be collected for safe transport offsite by a licensed contractor for reuse, recycling, treatment or disposal at approved locations.

## *15.4 POTENTIAL IMPACT OF MANAGEMENT OPTIONS*

The nature and volume of waste generated during the construction of the Project, if not managed appropriately, may potentially impact upon the Project area.

All waste will be disposed of according to the designated management requirements detailed above and the specifications detailed in the draft Environmental Management Plan (Draft EMP) contained in *Volume 10* of this EIS. Where controls are placed on the management of waste, the overall environmental impact of the Project will be negligible.

### *15.4.1 Water Quality and Stream Condition*

Water quality of local drainage lines and watercourses is particularly relevant for gross pollutants (litter) that may become windborne and enter any watercourses during crossing construction activities.

*Table 4.15.3 Waste Management Strategies*

| Waste | Management techniques | Storage on site | Destination | Waste tracking | Responsible person |
|---|---|---|---|---|---|
| Tyres | Waste tyres will be stored at a central location for disposal offsite to a licensed tyre disposal facility or removed offsite by a contractor | Tyre storage area | Licensed tyre disposal facility | Yes | Construction Supervisor |
| Treated sewage effluent | On site treatment of wastewater. Treated effluent from wastewater treatment will be disposed of via surface irrigation | Treated and irrigated | Irrigation | No | Camp Manager |
| Sewage sludge | Sanitary bio-solids or sludge from camp sewage treatment operations will be disposed at commercially licensed offsite facilities as necessary<br>Sludge from the onsite wastewater treatment facilities will be pumped out periodically and transported to the nearest licensed wastewater treatment works | Holding tank | Sewer licensed disposal contractor | Yes | Camp Manager |
| Waste oil, lubricants, fuels, | The use of oils, chemicals, and related materials will be logged as an identified site for monitoring during construction inspections.<br>Waste oils will be stored on site in appropriately designed above-ground petroleum storage tanks, with separate secondary containment bunds as necessary for above-ground tanks. Waste oils will be collected for offsite recycling through a commercially licensed waste contractor | Waste oil storage area at site office | Licensed oil recycler or disposal | Yes | Construction Supervisor |
| Vehicle batteries, gasket adhesives, cutting lubricants, paint, cleaning agents and water treatment chemicals | Waste chemicals will be collected and disposed of through a licensed waste contractor, preferably one with recycling facilities<br>Waste chemicals that are not consumed will be stored in well-maintained, covered, appropriate containers (original containers when possible), labelled with contents, and stored onsite in accordance with regulated waste provisions | On a bunded pallet in a lockable area | Licensed battery or other chemical disposal facility | Yes | Construction Supervisor |
| General waste (e.g. packaging and food | Putresible solid waste will be stored in covered standard general waste containers to prevent odours and public health hazards, and | General skip/wheelie | Disposal via contractor to | No | Construction Supervisor |

| Waste | Management techniques | Storage on site | Destination | Waste tracking | Responsible person |
|---|---|---|---|---|---|
| scraps) | disposed of through a waste contractor<br>General rubbish and non-recycled glass, paper, plastics and related materials will be disposed of to landfill at a commercially operated facility<br>General camp waste will be taken for disposal at a local landfill | bins | local council facilities. | | Camp Manager<br>Administration Manager |
| Recyclables –<br>glass, aluminium cans, plastic bottles, welding rods, paper, printer cartridges, packaging material and cardboard. | Recyclable wastes (including glass, paper and plastic) will be segregated and recycled whenever possible. Recycling bins will be provided for general paper waste and printer cartridges. Recyclable general waste will be recycled by a contractor. Plastic takeaway containers and juice/milk bottles will be disposed of in yellow wheelie bins<br>Aluminium cans will, where practicable, be donated to a local school for recycling and fundraising.<br>Cardboard and plastic packaging, metal wastes and waste oils will be collected in containers at the camp site and removed for recycling or disposal, as appropriate, when required | Wheelie bins | Disposal to recycler via contractor | No | Construction Supervisor<br>Administration Manager |
| Scrap metal,<br>scrap HDPE off-cuts | Scrap metal and plastics (e.g. HDPE off-cuts) will be collected on site, stored at a central location and preferentially recycled (or disposed of when necessary) at commercially licensed offsite facilities. Steel pipeline off-cuts will be recycled by scrap metal dealer | Scrap metal bin | Metal recycler | No | Construction Supervisor |
| Green waste | Felled vegetation will be stockpiled for rehabilitation in designated and agreed areas | Designated areas within the RoW | Onsite for rehabilitation activities | No | Project Supervisor/<br>Contract Superintendent |
| Green waste deemed weed-infested | Felled vegetation will be stockpiled. If the felled vegetation is deemed to be highly contaminated with weeds it will be burned on location under controlled conditions under direction from local fire authorities. | An isolated area set aside for this sort of waste | Treatment for eradication of weed propagules | No | Project Supervisor/<br>Contract Superintendent |

| Waste | Management techniques | Storage on site | Destination | Waste tracking | Responsible person |
|---|---|---|---|---|---|
| Timber waste (pallets, fencing, etc.) | Mulched or chipped if untreated. If treated wood, removed to council dump | Onsite dump | | No | Camp Manager |
| Hydro-test water | The disposal of hydro-test water may impact upon the marine environment through the influx of non-saline waters or surface or groundwater of an area through percolation. Hydro-test water will not be discharged directly to natural water bodies. The water will be treated (aerated) to provide a composition suitable for safe disposal.<br>It is often not practicable for the water to be used for beneficial use due to timing and quality constraints. Any disposal to land will typically be through a settling and filtration structure with erosion and scour controls in place. See also *Section 15.3.4.3.* | N/A | Stay onsite for treatment and beneficial use | No | Construction Supervisor |

### 15.4.2 Visual Amenity

Mismanagement of site and construction-generated waste can lead to loss of visual amenity and aesthetic values in the region.

### 15.4.3 Contaminated Land

Contamination of land or water resources is a potential impact of the Project, particularly through the uncontrolled release of effluent from sewage treatment facilities.

## 15.5 MITIGATION

A detailed waste-management program will be implemented during the Pipeline Component development phase to reduce the amount of wastes generated during construction and commissioning of the pipeline works. The waste management program will be addressed by systematically assessing opportunities to avoid waste at source, or reuse, recycle, and recover materials.

Waste stream types and management methods are detailed in *Table 4.15.3*. Site-specific waste management plans, procedures and policies are used to mitigate the impacts of waste generation from the project camp sites.

### 15.5.1 Solid Waste

Only waste for which no other economic disposal route can be identified will be disposed of via landfill. This will be a last-resort disposal method. Assuming all wastes are treated, transported and disposed of in accordance with waste management legislation, the residual impacts for solid waste are likely to be minor.

### 15.5.2 Liquid Waste

Wastewater generation will be minimised by efficient use of raw water. Comprehensive water management schemes will be devised for both camp construction and operations. It is expected that segregated and/or treated wastewater will be made available for lower grade use (e.g. for irrigation).

All wastewater, except for uncontaminated rainwater, will be treated before discharge or reuse. All run-off and pump-out from facility construction sites will be inspected and, if needed, directed to settling basins to remove suspended solids (e.g. silt). Therefore, the impacts for liquid waste are likely to be minor.

## 15.6 CONCLUSIONS

A waste management plan has been developed and identifies solid and liquid waste streams and volumes produced in development of the Pipeline

Component of the Queensland Curtis LNG (QCLNG) Project. The waste streams include domestic, commercial and industrial waste and some minor amounts of hazardous waste.

Due to the location of the pipelines, which collectively comprise the Pipeline Component, and the necessity to provide a range of waste collection services for the different wastes identified, a waste management plan has been developed as part of the Pipeline Environmental Management Plan, presented in *Volume 10* of this Environmental Impact Statement.

A summary of the impacts associated with waste management outlined in this chapter is provided in *Table 4.15.4*.

***Table 4.15.4 Summary of Impacts for Waste Management***

| Impact assessment criteria | Assessment outcome |
|---|---|
| Impact assessment | Negative |
| Impact type | Direct |
| Impact duration | Short term |
| Impact extent | Local |
| Impact likelihood | High |

Overall assessment of impact significance: minor.