25. Waste management

This chapter provides a summary of the spoil handling and waste management options for the Project.

25.1 Methodology

The following was undertaken in order to assess the spoil handling and waste management impacts of the project:

- Review of construction methodology to determine likely sources of spoil and waste that would be generated from the project;
- Estimation of spoil quantities and likely spoil characteristics based on available geotechnical and soil data;
- Estimation of likely spoil generation rates based on construction methodologies and timeframes;
- Identification of options for spoil reuse and disposal, and corresponding major haul routes;
- Identification of waste management measures appropriate for other waste types that would be generated based on the principles of the waste management hierarchy; and
- Identification of appropriate mitigation measures to be implemented during construction and operation of the project in order to minimise the impacts of spoil and other wastes generated from the project.

25.2 Impact assessment

25.2.1 Spoil

Sources of spoil

Spoil is material removed from ground excavation and would be generated during construction from the main project elements, being the pump station and the pipeline including excavations for drilling and thrust boring undertaken.

Spoil from the pump station would be generated from excavation works over an approximate 12 to 14 week period. Spoil material from the pump station would be reused onsite, however an area for stockpiling following excavation works for the project would be required during the construction period.

Spoil is likely to be transported to the pump station site in order to construct the pump station on a mound so it is elevated above flood levels. This would match the level of the existing pump station. It is unlikely that additional spoil would be generated from the construction of the pump station.

The majority of spoil would be generated as a result of excavations along the pipeline route and this is expected to occur over a 12 month period. The construction of the pipeline would be undertaken in sections, with each area of disturbance being progressively reinstated as it is completed. Most of the spoil from the pipeline excavation would be reused (as backfill), excess spoil would need to be reused or disposed of offsite. A small quantity of excess spoil would be generated from the outlet connection point excavations, and would be disposed of offsite. This would occur over an approximate four to eight week period.

Spoil material

The pipeline route would traverse a number of geological units and soil landscapes. The likely spoil materials based on the expected geology along the route are presented in Table 25.1.

Table 25.1 Likely spoil material to be generated along pipeline (*Southern Coalfield Geological Map* and *1:100,000 scale Goulburn geological map sheet, 2008*)

Geological Unit	Approximate Length of Route [1]	Description of likely spoil material
Wianamatta Group (Rw)	26 km (~CH 0 km – CH 26 km)	Ashfied Shale or siltstone (Sedimentary rock). Generally encountered above the Hawkesbury Sandstone.
Robertson Basalts (Jss/Tob)	2 km (total) (~ CH 9 km- CH 9.5 km, between CH 17 km- CH 22 km (two to three occurrences),	Alkali-Olivine Basalt (Igneous rock). Overlies the Wianamatta Group (probably Ashfield Shale).
Mount Broughton, Mount Misery, Cockatoo Hill (Jes)	2 km (CH 11 km- CH13 km)	Syenite - Microsyenite (Igneous rock)
Hawkesbury Sandstone (Rh)	7 km (~CH 25-CH 33.5 km)	Sandstone (Sedimentary rock) Directly overlies the Berry Siltstone formation
Shoalhaven Group (Ps)	12 km (total) (~CH 33 km-CH 37 km, ~CH 41 km-CH 46.5 km)	*Illawarra Coal Measures* – coal, siltstone, sandstone, minor conglomerate. *Berry Siltstone* – Fine grained lithic sandstone, with minor conglomerate *Snapper Point formation* – medium bedded siltstone, sandstone, minor pebble conglomerates
Adaminaby Group (Os-s)	10 km (total) (~CH 37 km - CH 40 km, ~CH 46.5 km – 47.5 km, ~CH 58 km - CH 64 km)	Undifferentiated - Sandstone, quartz greywacke, siltstone, quartzite, phyllite, slate (Sedimentary rock)
Marulan Granite (Dgm)	1 km (~CH 40 km- CH 41 km)	Porphyry (Igneous rock)
Bindook Group (Dlb)	4 km (~CH 47.5 km- CH 52 km)	Granite (Igneous rock)
Lockyersleigh Granite	7 km	Granite (Igneous rock)

Geological Unit	Approximate Length of Route [1]	Description of likely spoil material
(Cgb)	(~ CH 52 km- CH 58 km)	
Cainozoic Sediments (Cza)	9 km (~CH 64 km – 65.5 km, ~CH 70 km – 72 km)	*Alluvial deposits* – Undifferentiated, gravels, sands, clays, claystones, and sandstones.
Towrang Formation (St)	2 km (~CH 65.5 km- CH 67 km)	Shale, siltstone, sandstone, quartzite
Saltpetre Andesite (Suv)	1 km (~CH 67 km – 68 km)	Andesite (Igneous rock)
Lambie Group (Duc/Dua)	2 km (~CH 68 km- CH 70 km)	Conglomerate, sandstone, shale, quartzite
Bungonia Formation (Su)	7 km (total) (~CH 72 km-CH 76.5 km, ~CH 77 km - CH 78.5 km, 79.5 km – 80.5 km)	Undifferentiated Limestone, shale, chert, quartzite, tuff (sedimentary rock)
Bishopthorpe Dolerite (Ig)	1 km (~ CH 78.5 km- CH 79.5 km)	Dolerite (Igneous rock)

Local land uses include farming (mostly cattle grazing and pasture), urban and rural residential development, road, power, gas and communications easements, forestry, mining and conservation. The only industries close to the pipeline corridor are a water extraction and bottling facility and a quarry.

Small areas of land potentially contaminated with agricultural chemicals were identified at four locations adjacent to or within the pipeline route (Appendix G) within the Paddys River, Sutton Forest – Exeter, Towrang and Murrays Flat sections of the transfer route including two stockyards (which may or may not contain sheep dips), one area containing old (potentially) chemical drums and one area containing old scrap metal. However, it is unlikely that the pipeline would directly impact these areas and past (or present) activities undertaken at these locations are not likely to be a source of significant ground contamination.

The pipeline route also traverses an area currently used by GMC for the irrigation of treated effluent from the Goulburn Mulwaree STP. Chemicals (including heavy metals, organic chemicals, pesticides and disinfection by-products), endrocine disruptors and pathogens are the most common contaminants associated with treated effluent. Sampling and testing would be undertaken in accordance with the DECCW *Waste Classification Guidelines* (DECCW, 2008).

No other potential contaminated areas were identified within the proposed pipeline route.

Based on this information, it is likely that the majority of spoil material could be classified as either 'general solid waste' (non-putrescible) or 'virgin excavated natural material' under the DECCW *Waste Classification Guidelines* (DECCW, 2008). Where offsite disposal is necessary, testing of the spoil would

confirm its classification prior to disposal. Testing and sampling, if required, would be undertaken in accordance with the NSW legislation and guidelines.

Excavation rates

It is estimated, based on the indicative route location, that spoil would be excavated along the pipeline at an average rate of approximately 1 500 m^3 per day. Excess spoil is expected to be generated at an average rate of approximately 610 m^3 per day.

Estimated spoil quantities

Indicative earthworks quantities are shown in Table 25.2. The pipeline route would be generally 1.5 to 2 m in depth, with a minimum depth of 1.2 m to the top of the pipeline below ground level. The typical volume of excavated material would be approximately 1.5 to 2 m^3 per linear metre of trench. An average of 1.81 m^3 per linear metre of trench has been used in the figures below. Bedding material (sand) would be placed at the base of the trench and approximately two thirds of the excavated material would be returned to the trench once the pipe section has been laid and connected, as backfill material.

Trenching through watercourses would involve laying the pipeline at a greater depth that is proposed through dry land. Through watercourses it is expected that the trench would be excavated up to 2.5 m below ground level. This would allow for sufficient material to be placed over the pipeline to prevent scouring of the pipeline during high velocity water flows in the watercourse.

Some deeper excavations would occur where the pipeline would be horizontally directionally drilled or thrust bored under roads and waterways. The entry and exit pits associated with these activities could require excavations to a depth of approximately three metres below ground level. An average of 2.5 m depth has been used to calculate the figures in Table 25.2.

These quantities do not allow for wastage, overbreak in excavation or any design variance, hence these are likely to be slightly modified during construction. The calculations assume that approximately 90 per cent of the excavated material would be suitable for use as backfill material. These figures also assume that an estimated 40 000 m^3 of backfill sand would be used along the pipeline.

Table 25.2 indicates that the majority of spoil (that can not be reused on site) would be generated from the excess from cut and cover trenching of the pipeline, being approximately 40 000 m^3. It is not expected that any excess spoil would be generated from construction of the pump station and minimal spoil would be generated for connections to the existing Goulburn water supply.

Table 25.2 Estimated quantities of spoil generated

Location	Estimated excavation	Estimated reuse as backfill	Excess to be managed
Pump station	Minor quantities	+ 250 m^3 import	Nil
Pipeline trenching	1.81 m^3 per lineal metre of pipeline Estimated 83 000 m long pipeline TOTAL: 150 230 m^3	1.20 m^3 per lineal metre of pipeline for 90% of the pipeline length TOTAL: 99 600 m^3	0.61 m^3 per lineal metre of pipeline TOTAL: 50,630 m^3 generated over pipeline length

Location	Estimated excavation	Estimated reuse as backfill	Excess to be managed
Drilling and boring	1 930 m^3	1 530 m^3	400 m^3
TOTAL	152 160 m^3	100 880 m^3	51 030 m^3

Note: the earthworks quantities are approximate only and may change as a result of the detailed design process. In addition the volume of spoil may change with additional geotechnical information, and even then the final spoil amount would be determined from the type of materials encountered on site during excavation.

Options for reuse and disposal

As a result of preliminary discussions with landowners as part of the route selection process, many landowners have indicated their interest in using any spoil remaining after pipeline construction works to address erosion issues.

A detailed investigation of these areas would be undertaken as part of the construction program to assess the viability of this option. This would require ongoing liaison with the landowners during the construction process. Any commitments to assist landowners with spoil would be developed and documented before construction commences. Before any commitment is made to assist landowners with spoil, it is their obligation to ensure they have obtained all relevant approvals regarding the acceptance and use of the spoil and that appropriate works are in place to ensure the stability of the placed material. Advice from landowners that they have obtained the relevant approvals would be relied upon and documented in the agreements with the landowners.

Additional excess spoil could also be taken to the Goulburn Waste Management Centre in Goulburn GMC area, or The Resource Recovery Centre, Moss Vale in the WSC area. All of the above disposal/recycling facilities accept inert waste. Appropriate environmental authorisations and approvals from the NSW Environment Protection Agency (EPA) would be obtained prior to disposal. These options would depend on the actual quality of excess spoil.

Haulage routes

Any spoil that is reused by landowners for rehabilitation purposes would be distributed from excavation works adjacent or close to each property.

Some spoil would be used to create the mound at the Wingecarribee Reservoir on which the pump station would be constructed.

Spoil that is provided to the Council waste management/resource recovery facilities may require transport to each facility from the pipeline location. The following haulage would be required for each option:

- Goulburn Waste Management Facility – average haul distance of 45 km one direction; and
- The Resource Recovery Centre, Moss Vale – average haul distance of 30 km one direction.

The main haul routes for offsite reuse and disposal options would be:

- Sheepwash Road/Illawarra Highway/Berrima Road for material originating from the pipeline suitable for use at the pump station construction location;
- Hume Highway/Sydney Road (Old Hume Highway)/Common Street/Sinclair Street for material originating from the pipeline east of Goulburn for disposal/recycling facilities at the Goulburn Waste Management Centre;

- Crookwell Road/Tarago Road/ Sydney Road (Old Hume Highway)/ Common Street/Sinclair Street for material originating from the pipeline north and west of Goulburn for disposal/recycling facilities at the Goulburn Waste Management Centre;
- Hume Highway/Illawarra Highway/Berrima Road for material originating from the pipeline within the Wingecarribee Shire Council area north west of the Hume Highway and transport to The Resource Recovery Centre, Moss Vale; and
- Sheepwash Road/Illawarra Highway/Berrima Road for material originating from the pipeline within the Wingecarribee Shire Council area east of the Hume Highway and transport to The Resource Recovery Centre, Moss Vale.

Traffic impacts and mitigation measures associated with construction, including spoil and other waste haulage, are assessed in Chapter 22.

25.2.2 Other wastes generated

In addition to excess spoil, it is expected that the following wastes would be generated during construction:

- Cleared vegetation and landscaping materials;
- Construction material – such as metal off-cuts, timber from construction and removal of fence posts and plywood etc;
- Drilling slurry;
- General waste from site personnel – such as food scraps, aluminium cans, glass bottles, plastic and paper containers, paper, cardboard and other office wastes;
- Paints and solvents; and
- Wastewater and sewage from site compounds.

The management of wastes (including spoil) would be in accordance with relevant NSW legislation and the principles of the waste management hierarchy as set out in the NSW *Waste Avoidance and Resource Recovery Strategy* (DECC, 2008d) (refer to Figure 25.1).

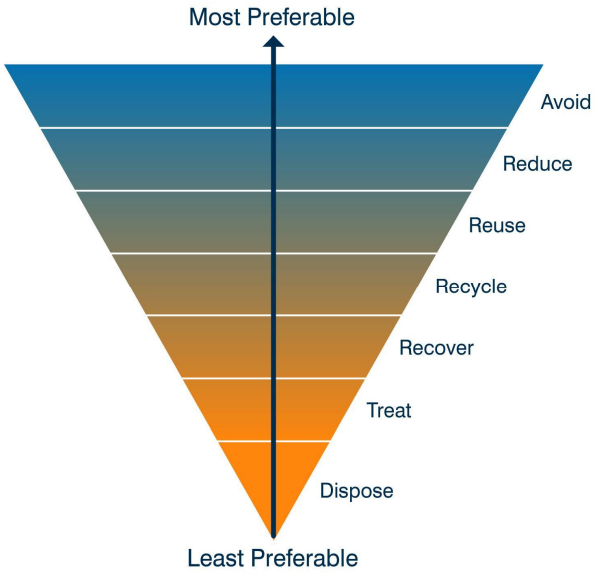

Figure 25.1 The waste hierarchy

Management measures for these wastes are shown in Table 25.3.

Table 25.3 Waste management measures

Waste type	Waste management measures
Vegetation and landscape materials	Clearance of vegetation would be minimised where possible. Vegetation materials would be mulched and used onsite for rehabilitation and revegetation works. Mulch would also be made available to farmers for soil improvement and weed suppression.
Construction material	Steel – suitable steel off cuts or scrap would be recycled. Timber and plywood – suitable wood waste would be reused or recycled where possible, for example for firewood/wood chips. Other construction materials – non-recyclable construction materials would be disposed of at an appropriately licensed landfill in accordance with NSW legislative requirements.
Drilling slurry	The water and drilling slurry used to undertake the horizontal directional drilling would be recycled during the construction of the pipeline. Once the pipeline construction has been completed, the slurry would be disposed of at an appropriately licensed facility in accordance with NSW legislative requirements.
General waste from site personnel	Recycling bins would be provided at site offices and amenities. Recyclable materials such as glass, aluminium, plastic and paper would then be taken off site for recycling.
Paints and solvents	Paints and solvent use would be minimised by using pre-painted products where practicable. Used or waste paints and solvents would by recycled or sent for disposal by an appropriately licensed facility.

Waste type	Waste management measures
Spent oils and liquids from construction plant and equipment	Waste oils and liquids would be appropriately disposed at a licensed facility.
Wastewater and sewage	All sewage and wastewater would be pumped out and disposed of at an appropriately licensed facility.

25.2.3 Toxic and hazardous materials

There is potential to cause minor contamination of soils during construction of the pipeline, resulting from oil and/or fuel leaks from operating construction equipment. To minimise the likelihood of a spill or fuel leak occurring, all construction and transport vehicles would be kept in a clean condition and be maintained appropriately. In addition, no onsite maintenance of machinery or construction vehicles would be conducted.

In order to manage potential environmental incidents that result in a spill, suitable containment and absorbent products would be stored at the construction sites in readily assessable locations. These and other measures would be developed fully and included in the construction environmental management plan that would be prepared for the project.

25.3 Summary of results

The main wastes that would generated during construction of the Project include excess spoil, vegetation and landscape materials, construction material, general waste from site personnel, paints and solvents and wastewater. The majority of spoil would be reused onsite as backfill or for remediation of the construction corridor or potentially by local landowners for farm erosion mitigation works. Residual spoil that cannot be used on site or by local landowners would be sent to a licensed landfill operation, where it could be used for purposes such as landfill caping. Other construction waste would be reused and recycled were possible. The remaining waste would be disposed of at appropriately licensed facilities.

Potential major haulage routes for offsite disposal or reuse of spoil and other waste materials include the Hume Highway, Illawarra Highway, Sheepwash Road, Sydney Road (Old Hume Highway), Crookwell Road and Tarago Road. Traffic impacts associated with transport of spoil and other waste offsite for disposal or reuse are addressed in Chapter 22. The Project is not expected to generate a large volume of excess spoil, therefore traffic movements associated with spoil and other waste disposal is expected to be a minor contribution to the traffic associated with the construction of the pipeline.

A detailed waste management sub-plan to the construction environmental management plan would be prepared to address all relevant legislation and set out the requirements and procedures for the management of spoil and other wastes from the project. Procedures to prevent spillage and emergency plans to manage environmental incidents would also be developed as part of the construction environmental management plan for the Project.

The Project is not expected to impact significantly on the waste management operations and waste minimisation goals of region.

25.4 Mitigation measures

Wherever practicable, spoil would be reused onsite as backfill or transferred for reuse by local landowners. Any surplus spoil that cannot be reused would be transported off-site to recycling facilities or to approved landfill sites where it would be beneficially used (*e.g.*, landfill cap material). The material would be tested in accordance with relevant NSW legislation prior to off site disposal. Any transfers of waste would take place in accordance with legislated docket tracking systems that ensure waste reaches the appropriate destination. Only licensed contractors and drivers would be used. Any transporters would be expected to meet requirements for spill control and be equipped with emergency equipment.

The Proponent would continue dialogue with local landowners regarding spoil reuse options.

As part of the construction environmental management plan, a detailed waste management plan would be prepared. The plan would be framed using the waste management hierarchy principles outlined above. The plan would be prepared prior to construction commencing and be consistent with the *Waste Minimisation Act 2001*, *Waste Avoidance and Resource Recovery Act 2001* and the DECCW *Waste Classification Guidelines.*

The sub-plan would:

- Identify requirements for waste avoidance, reduction, reuse and recycling;
- Provide procedures for handling, stockpiling, and reuse of wastes;
- Identify disposal sites and relevant testing; and
- Set out procedures for obtaining the required approvals for offsite management of spoil.

Procedures to prevent spillage and emergency plans to manage environmental incidents would also be developed as part of the construction environmental management plan for the project.