2. PROJECT DESCRIPTION

Introduction

2.1 The coal stockyard operates 24 hours each day, 7 days per week. Since the coal stock yard established in 1976, the annual throughput has varied depending on overseas demand. At its peak in 2010 annual throughput was 2.5 million tonnes but has since reduced. In the last five years the annual throughput has varied between approximately 1 million to 1.5 million tonnes per annum although future volumes may possibly peak at 2.0 million tonnes per annum.

2.2 At present approximately 35 ships per year arrive at the Port to load coal for export. The amount of coal taken by a ship varies from 38,000 to 65,000 tonnes. The time taken to load the ship depends on the load-rate and the amount of coal the ship is receiving, but usually takes no longer than three days.

2.3 The yard can accommodate up to 335,000 tonnes at any one time although in recent times it is in the order of 150,000 to 180,000 tonnes.

2.4 The layout of the coal stockyard is shown on **Figure 2.1** and is also attached as a full page drawing in **Appendix 1**. A photograph of the coal stockyard with the north-eastern sprinkler towers operating to reduce coal dust emissions is shown in **Figure 2.2**.

Delivery and Stockpiling of Coal

2.5 The coal is delivered to the coal stockyard by rail. The coal stockyard could potentially receive up to seven trains from the West Coast each day although in recent years four trains arrive each day: two in the morning and two in the afternoon. Each train comprises no more than 30 wagons due to the grade of the Otira tunnel. On average about 26 wagons arrive at the coal stockyard per train.

2.6 The wagons are specifically designed to transport coal. The base of each coal wagon contains a trap door which opens and releases the coal into an underground hopper. **Figure 2.3** schematically shows a train in the process of unloading with the hopper shown in orange. Once the wagons are unloaded the engine is uncoupled, driven back along a second parallel railway line, and then re-coupled to the rear wagon for the trip back to the West Coast.

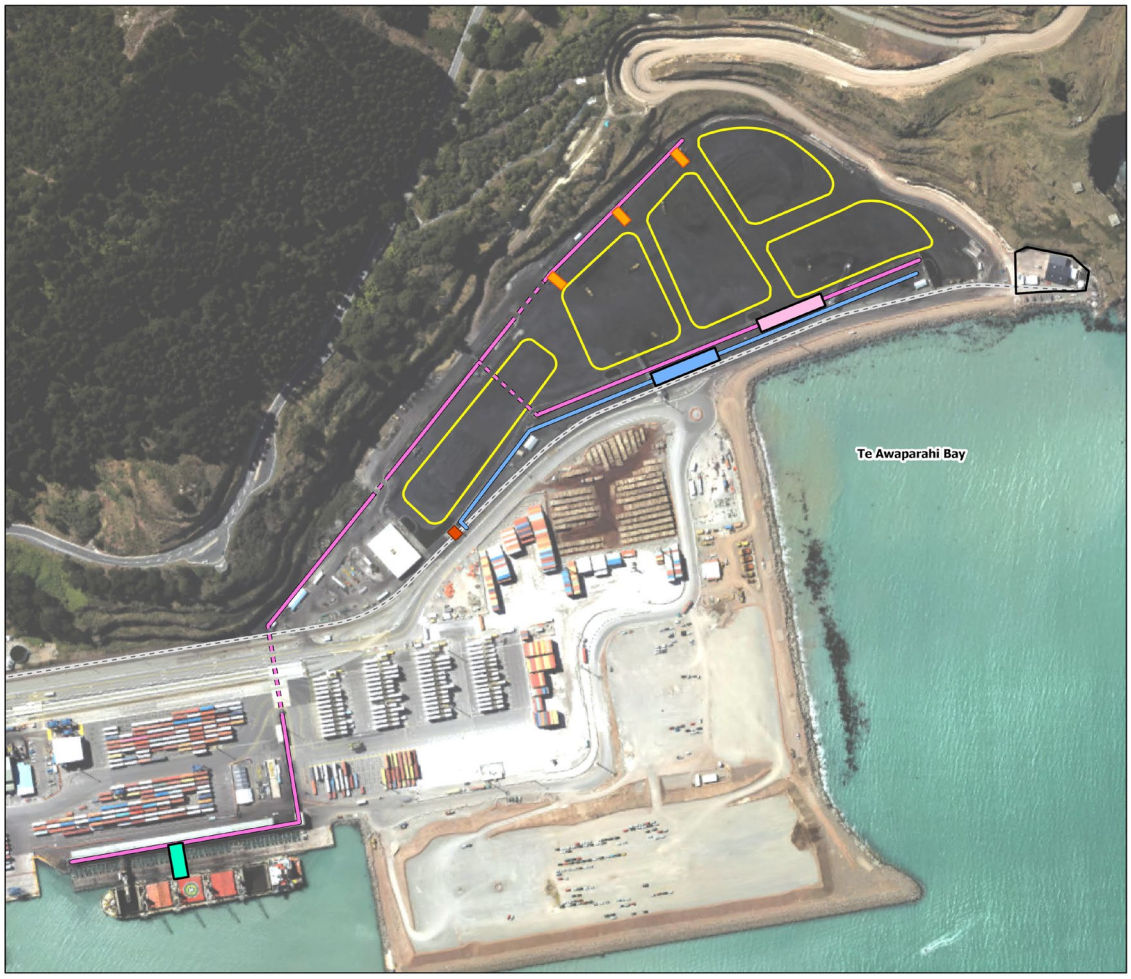

Figure 2.1: Schematic layout of the coal stockyard. The five yellow areas show the indicative locations of the coal stockpiles. The blue line shows the load-in conveyor that takes coal delivered by the trains. The pink/red line shows the load-out conveyors that takes the coal to the vessel moored at Cashin Quay 1. The dashed line represents below-ground conveyors. The blue rectangle represents the gantry stacker while the pink rectangle represents the bucket reclaimer. The smaller orange rectangles represent the load-out hoppers. A full page copy of the drawing with a legend can be found in **Appendix 1**: Source: LPC

2.1 The coal wagons each carry between 30-50 tonnes of coal and therefore each train can carry up to approximately 1,500 tonnes of coal. A train carrying 1,500 tonnes of coal would typically take just over an hour to unload and take up to three hours to both unload from the train and place the coal on designated stockpiles.

2.2 The coal is conveyed from the underground hopper to a gantry stacker. As shown in **Figure 2.1** schematically by the blue rectangle and also the photograph in **Figure 2.4**, the gantry stacker forms an initial coal stockpile. The majority of coal is taken from this initial coal stockpile by front-end loaders and redeposited on the other stockpiles beyond the reach of the stacker. As shown on the photograph in **Figure 2.4**, the height of the

stacker can be varied to minimise the drop height of the coal. The gantry stacker is located on rails and so can move east-west along the axis of the coal stockyard and consequently reduces the travel distance for the front-end loaders to the respective stockpiles. The coal is then formed into stockpiles by front-end loaders and further shaped by a bulldozer.

Figure 2.2: View of coal stockyard looking east, towards the harbour entrance. Source: Tonkin & Taylor

Storage Strategy

2.3 At any one time there are usually five stockpiles in the stockyard as shown indicatively in **Figures 2.1 and 2.3**. The stockpiles range from 10,000 tonnes to 65,000 tonnes in size and up to 20m in height. Each stockpile contains a grade of coal ready for the destination market.[1] The coal from each wagon is directed to a particular stockpile to achieve the pre-determined grade. Quality control sampling is carried out to ensure the grade is correct.

[1] I.e. the coal contains a sulphur or ash content that on its own; or, in combination with other sources of coal, is suitable for the manufacture of steel at the destination plant.

2.4 There is capacity to form another smaller contingency stockpile near the gantry stacker if the other coal stockpiles are at capacity and there has been a holdup in the loading-out of the coal onto the ship.

2.5 If timing is suitable, the coal from the train can be transferred from the load-in conveyor directly to the load-out conveyor on the seaward (south) side of the coal stockyard (see seaward pink/red line shown in **Figure 2.1**). This load-out conveyor runs under the coal stockyard and connects to the load-out in conveyors on the north-side of the coal stockyard, and then taken to the vessel.

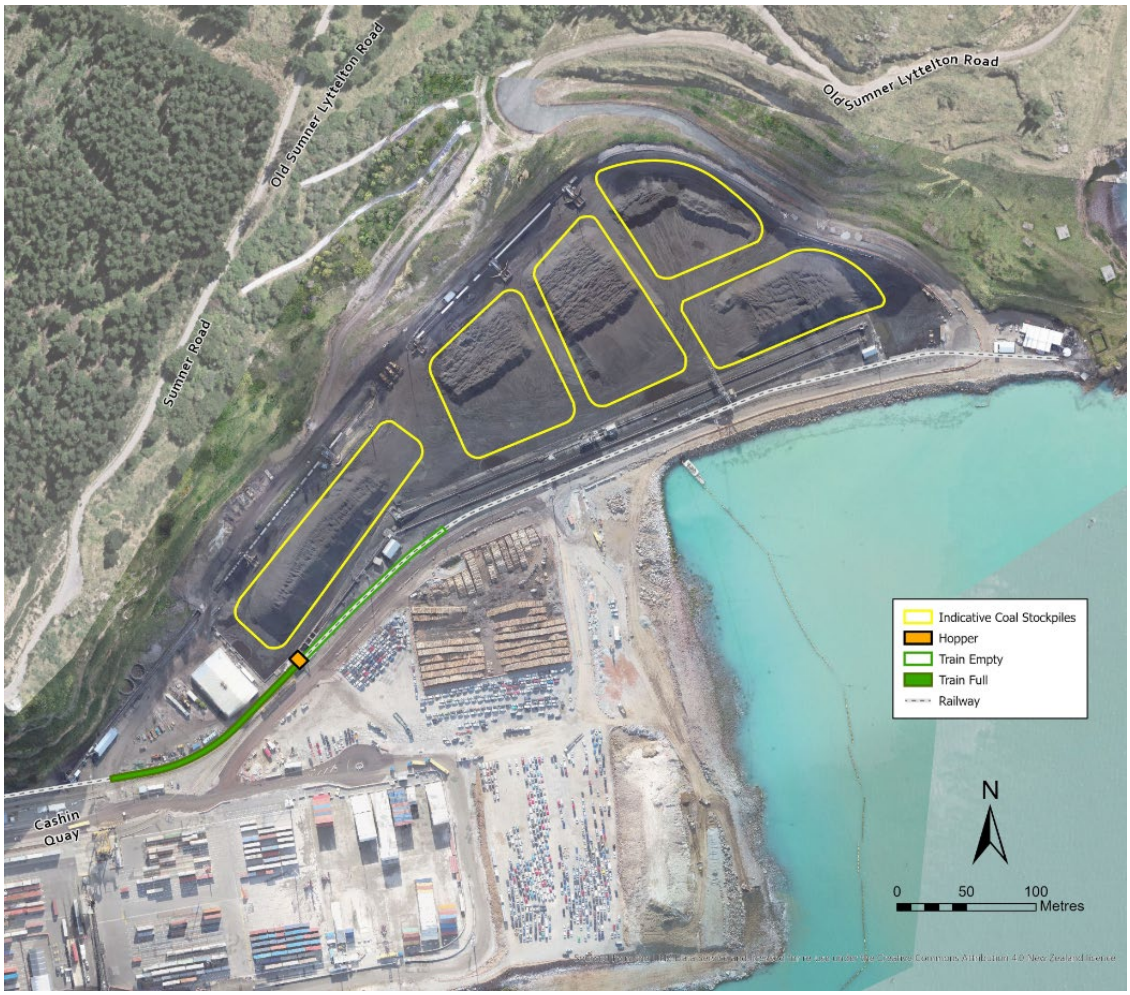

Figure 2.3: Aerial of the Coal Stockyard showing the train unloading and the indicative location of the five coal stockpiles. The wagons unload into a hopper (orange). Source: LPC

Loading Out Coal to the Ship

2.6 The ships receiving coal moor at Cashin Quay 1 (being adjacent to the ship loading infrastructure shown in **Figure 2.1**). The coal is loaded out to the ship in two ways. If accessible, the coal is reclaimed from the stockpiles using a bucket wheel reclaimer that

runs east-west along rails, parallel to the gantry stacker as shown in photograph (see **Figure 2.5**). The bucket wheel transfers the coal to the load-out conveyor on the seaward (south) side of the coal and taken to the load-out conveyor located on the north-side of the coal stockyard as described above (again see **Figure 2.1**).

Figure 2.4: Stockpiles being formed using the gantry stacker. Source: LPC

2.7 However, the majority of coal cannot be reached by the bucket reclaimer and instead is loaded out using the front-end loaders. A bulldozer pushes coal down the side of the stockpile so it can be picked up safely by the loader. The front-end loaders place the coal into one of the three load-out hoppers (shown in orange in **Figure 2.1**) and onto the load-out conveyor. The load-out conveyor takes the coal to the western-end of the coal stockyard and in-turn to Cashin Quay 1 via an underground conveyor (again see **Figure 2.1**). Finally, the coal is transferred up to an elevated conveyor that runs parallel with Cashin Quay 1.

2.8 The load-out conveyor is fitted with a computerised control system which is designed to prevent overloading or under loading of the conveyors and to detect blockages. The system controls the loading gates at the hoppers and shuts the conveyor down if blockages occur.

2.9 All of the conveyors on site are fitted with return side belt wipers which remove the coal

from the underside of the belt on the return trip. Coal that spills from the conveyors, or coal wiped from the return side, collects under the conveyor belts and is periodically removed by suction trucks and sweepers.

Figure 2.5: The bucket wheel reclaimer taking coal off a stockpile which is then conveyed to the north-side of the coal stockyard and then conveyed to a vessel for loading. Source: Tonkin & Taylor

2.10 Most ships have more than one hold (compartment) to receive coal. A mobile conveyor[2] directs the coal into each hold (shown in green in **Figure 2.1**). A jet-slinger usually ejects (throws) the coal from the conveyor about 25m into the respective ship hold as shown in the **Figure 2.6**.

2.11 The load-out rate onto a ship is on average about 1,100 tonnes per hour although can

[2] The conveyor can travel east-west along Cashin Quay 1 to reach each hold as necessary

get up to a maximum of 1,650 tonnes per hour. The exception is from the coal stockpile located at the western-end of the coal stockyard. Here the load-out rate is less due to handling constraints in this area.

Figure 2.6: View of conveyor that can move along Cashin Quay 1 and the jet-slinger on the end that is used to load coal into a ship hold. Source: Tonkin & Taylor