09/11/09
PMG

HIGH LEVEL CONCEPT STUDY

for

MULTI-CARGO

EXPORT FACILITY

at

90 MILE BEACH,

GIPPSLAND,

VICTORIA

MAJOR
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Major Projects Victoria

Multi-Cargo

Export Facility

90 Mile Beach Gippsland, Victoria

HIGH LEVEL CONCEPT STUDY

Prepared by:	Phil McGavin	09/11/2009 Date
Approvals		
Hatch Approved by:	John Ginty	Date
Client Approved by:	Philip mcGavin	Date

Distribution List

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Appendices

1. Conditions and Limitations of Use

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This Report has been prepared by Hatch for the Client and may be used by the Client in connection with their assessment of their project covered herein and shall not be used nor relied upon by any other party nor for any other purpose without the written consent of Hatch (the Consultant). The Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this Report. Furthermore, the Client shall indemnify, defend and hold the Consultant harmless from any kind of damages, losses, expenses or claims incurred by any such third party resulting in whole or in part from the use of this Report including but not limited to any decisions made or actions based on this Report by any party.

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The information contained herein has been prepared based upon information and data obtained by the Consultant from the Client's management and staff, their contract staff and other engineering advisors, or from other public sources the Consultant deemed reliable. Even though the information provided by the Client and his consultants was reviewed, we were required to rely on this information without being able to independently verify its accuracy.

This report is for the Client's own use and for the specific purposes for which the Services were engaged and in no case shall any such Deliverables be used in connection with any offering or sale of securities or any other financing transaction or made available to the public generally.

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Any environmental commentary does not constitute a legal opinion. The disclosure of any information contained in this Report is the sole responsibility of the Client. The principles, procedures and standards applied in conducting an environmental investigation are neither regulated nor universally the same.

The Consultant has conducted this investigation in accordance with the methodology outlined in the Task Brief and the Owners Requirement Specification.

In the Task Brief, the Client formerly acknowledged that the budget available for this work is limited and that the concept design work will therefore be very high-level and cannot be relied upon for decision-making.

It is important to note that the methods of evaluation employed, while aimed at minimizing the risk of unidentified problems, cannot guarantee their absence.

2. Purpose of this Report

The purpose of this document is to provide a High Level Concept Study opinion on the proposed 90 Mile Beach Multi-CargoExport Facility , Gippsland Victoria, including the proposal of a range of possible sites.

3. Executive Summary

3.1 General

From an engineering point of view, the available desk-top information at hand within the study period, would suggest that at a high level concept consideration, the establishment on 90 Mile Beach of a major Multi-Cargo Export Facility, handling a wide range of bulk coal based solids and liquids would appear to be technically feasible, though is not without its challenges and threats.

The range of threats and challenges facing the project are outlined in Section 10 of this report. There are several threats and challenges that cannot yet be quantified and in the extreme have the possible potential to be Fatal Flaws or at least major cost impediments. As a consequence they are recommended for further Threshold Studies. These Threshold Studies are outlined in Section 12, along with a proposed work plan for fuller Pre-feasibility Study.

3.2 High Level Concept Estimate

The capital cost estimate (AACE class 5 estimate) in today's dollars, has been framed within the range of assumptions, available data sets, Basis of Design Report and Owners Requirement Specification. The inclusions and exclusions in these costs are described in Sections 6 and 11 of this report.

The high level concept study indicative estimate of the project is as follows :-.

Gross 63Mpta Terminal Works (all stages, no escalation) (including various storages and equipment and)	=	$ 771 million
Gross 63Mtpa Marine Works (all stages, no escalation) (including 1 ~ 3km filled causeway to access trestle abutment, 4km steel access trestle, 4No. various sized cargo berths, tug harbour and 3No. 70t tugs)	=	$ 855 million
Project Overheads (all stages, no escalation) (4% study fees, 5% freight, 15% P&G's, 15% EPCM +30% CONTINGENCY)	=	$ 960 million
TOTAL HIGH LEVEL CONCEPT STUDY INDICATIVE ESTIMATE	=	**$2.59 billion**

This high level concept estimate is generally taken as having an accuracy spread of +/-50% and attracts a 30% contingency. It is also without any quantified risk or opportunity premium, escalation or financing charges etc. As discussed later in the report, the construction strategy includes the delayed staging of the coal, solids and liquids storage expansion in line with their proposed cargo ramp-ups and a "No Dredging" marine construction

strategy. There are also a range of challenges and threats facing the project as outlined in Section 10 of this report, several of which will require further examination and research before they can be reasonably considered capable of satisfactory mitigation.

Based on these indicative costs including the +/-50% accuracy rnage, the facility appears to be roughly on a par with the more recently constructed, ocean frontage coal loaders along the east Australian coast i.e. in the order of around $30 – $55 per installed tonne of throughput.

Should there be any level of further interest this project, then it is suggested that funding be considered for completion of the Threshold Studies (refer Section 12). If these studies are positive, then progress onto a full Pre-feasibility Study phase in the near future is also recommended.

3.3 Potential Sites

Overall 6 separate site areas have been identified as being potential locations for the export facility.

These prospective sites range along 90 Mile beach from near McLoughlins Beach in the south, to Paradise Beach in the north. From an assessment of the selection criteria, two sites appear to offer the best prospects of supporting an Export Facility.

These are :

- SITE #1 Between Reeve Beach and Woodside Beach.
- SITE #2. Near McGaurans Beach.

It is re-iterated here for emphasis, that the selection of typical sites was done for the purposes of developing concept designs and does not constitute a recommendation that these sites be developed for a commercial trading port.

4. Introduction

Major Projects Victoria (MPV) has been engaged by the Department of Transport (DoT) to investigate options for freight infrastructure that could facilitate new investment in the Gippsland brown coal resource.

MPV wishes to undertake an initial evaluation of the feasibility of establishing a multi-purpose export port on the 90 Mile Beach.

This high level concept study has been based on available existing information about the coastal processes and conditions on the 90 Mile Beach stretch of coast and assumptions drawn from that and other experiences within the team.

The MPV requires the facility to export a range of fertilisers, brown coal briquetts, dry brown coal and possible bulk liquid fuels and slurries.

The site for the export facility is generally located on 90 Mile Beach in Gippsland, Victoria.

MPV has separately engaged geomorphology and coast engineering consultants to participate in the selection of a range of sites along the beach and to assist Hatch Associates in determining the recommended site.

5. The Study Brief

This High Level Concept Study report is intended to be read and considered in concert with the Basis of Design Report included in Appendix A. The Basis of Design report outlines the general considerations, broad engineering criteria, summary research, consultants briefs and reports as well as the strategic concepts used to produce the layouts and costings contained in this summary report. As a consequence this report is brief and summarises the results of the work elements outlined in the Basis of Design Report.

The details of the specific facility requirements, cargo ramp-ups and general performance criteria have been previously agreed to by the parties in the Hatch prepared Owners Requirement Specification (ORS) for the project. These requirements have all been incorporated into the Basis of Design Report attached to this report as Appendix A.

5.1 Terms of Reference

Industry has approached Government with proposals to establish new coal treatment technologies in Gippsland, with potential for export of significant volumes of solid and liquid products derived from coal.

New freight infrastructure, including expansion of existing ports or the establishment of new ports may be required to facilitate these new developments.

Government wishes to consider all available options for freight infrastructure and is conducting a preliminary 'Scoping' phase study to identify and assess potential sites for new ports.

Hatch has been engaged by MPV to undertake this study work in line with the Task Brief. Hatch has taken a pragmatic approach to this assignment and progressed the study as far as reasonable within the constraints of time, cost and available information.

In the Task Brief, MPV formerly acknowledged that the budget available for this work is limited and that the concept design work will therefore be very high-level and cannot be relied upon for decision-making.

5.2 Contributors

The contributors to this study and background research were led by Hatch and include Coastal Engineering Solutions Pty Ltd, and Environmental GeoSurveys Pty Ltd. The work of both assisting consultants is included in full as sub-appendices in the Basis of Design.

6. Study Assumptions

This high level assessment of the project is heavily conditioned by the assumptions and the limitations of the desk top information available on the 90 Mile Beach coastal strip, that could be sourced within the limited study period. The assumptions are therefore by nature wide ranging and cover most areas of the study.

This being a high level concept study, there are also many traditional assumptions associated with the lack of completeness of research, data gathering, analysis and design common to all concept level studies.

However this study has included several assumptions that are considered to have the potential to have increased affect beyond the norm for this class of work.

For completeness, the most significant of these are set out below :

- The study has been limited to the site boundaries and battery limits as specifically noted elsewhere throughout this report and the MPV Task Brief.
- Detailed atmospheric, coastal, geotechnical and meteorological data has had to be inferred from what little is available across a wide area of the region. In particular the potentially high energy wind and wave climate requires considerably more investigation.
- The level of research into the accuracy of what data has been sourced has been considerably limited by the time allowed for the study.
- Without more details of the exact non-coal dry bulk solid and bulk liquid cargoes, it is difficult to be prescriptive as to the sizing and layout of the dry and liquid bulk storages, offset distances, hazard analysis and berths etc.
- Similarly without knowledge of likely destination ports and parcel sizes, the choice of design vessels is problematic.
- No detailed analysis of the towage requirements have been made in order to validate the choice of 3No. 70t BP tugs for the project.
- It is assumed that the breakwater style Tug Facility planned for the project will allow the tugs to stay on-call at the jetty for over 90% of the time they are needed. Otherwise they face over a 100km or more transit each way to safer shelter.
- The access trestle and loading platforms have been conceptually based on non-site specific wave or wind data. Berth occupation and ship loader capacity design have been broadly based on experience as the currently available data lacks adequate detail.
- As instructed by MPV, no consideration has been given to the provision of adequate rail, road, power, water or sewerage facilities to the site boundary or battery limits.
- No allowances have been made for land purchases or financing charges of any kind.

- No allowances have been made for the cost or schedule impacts of any potential environmental mitigations or measures that may flow from the project approval process.

- No allowances have been made for the impacts of poor foundation supports either on land or off-shore. Similarly no allowances have been made to pre-consolidate the site under the main structures or machine runway or coal stockpile pads.

- Pricing of the various elements of the facility is based on approximations of pricing of generally similar facilities, recent contracts and other opinions. Hence the pricing is merely indicative of the size of the potential investment required and should not be used for decision making purposes or detailed comparisons.

- No risk premium has been considered or added to the estimate, other that the 30% contingency typical of a traditional concept level study.

7. Selection of Typical Sites for Assessment

7.1 Site Selection Boundaries

It has been agreed that the terrestrial limits of this study shall be along 90 Mile Beach extending from McLoughlins Beach near Yarram in the south, to Paradise Beach north of Seaspray.

The site of Barrys beach has been excluded from this study as other proposals have already been developed for that site.

Figure 1. Specific Study Area

7.2 Identification Criteria for Typical Sites

For the purposes of developing a high-level concept design, a small number of typical potentially feasible development sites have been identified. These sites have been identified based on a number of assessment criteria, including but not limited to:

- Land availability and ownership
- Geomorphologic and Geological considerations
- Coastal Engineering considerations
- Pipeline, Rail and Road access
- Environmental impact acceptability
- Recreational and Commercial acceptability
- Public acceptability
- Accessibility for the provision of rail, road, pipeline and utilities
- Cost
- Other relevant considerations

The prime selection process has been assessed by the MPV engaged Geomorphologic Consultant in co-operation with the MPV engaged Coastal Engineering Consultant. Hatch has assessed their research and suggestions and carries forward into this report, those sites or options considered most reasonable overall.

From the range of potentially feasible sites, two have been selected because they present the most achievable sites on the general 90 Mile Beach coastal strip. The engineering solution for each may possibly be similar with only small adjustments to causeway and layout necessary to move from one to another. At this stage the cost impact of these changes is considered to fall within the limits of accuracy of the high level concept study estimate and hence are not see as a primary driver for site selection at this stage. Further study and more focussed site data may lead to a more differentiated design that may yet result in a cost premium for one over the other.

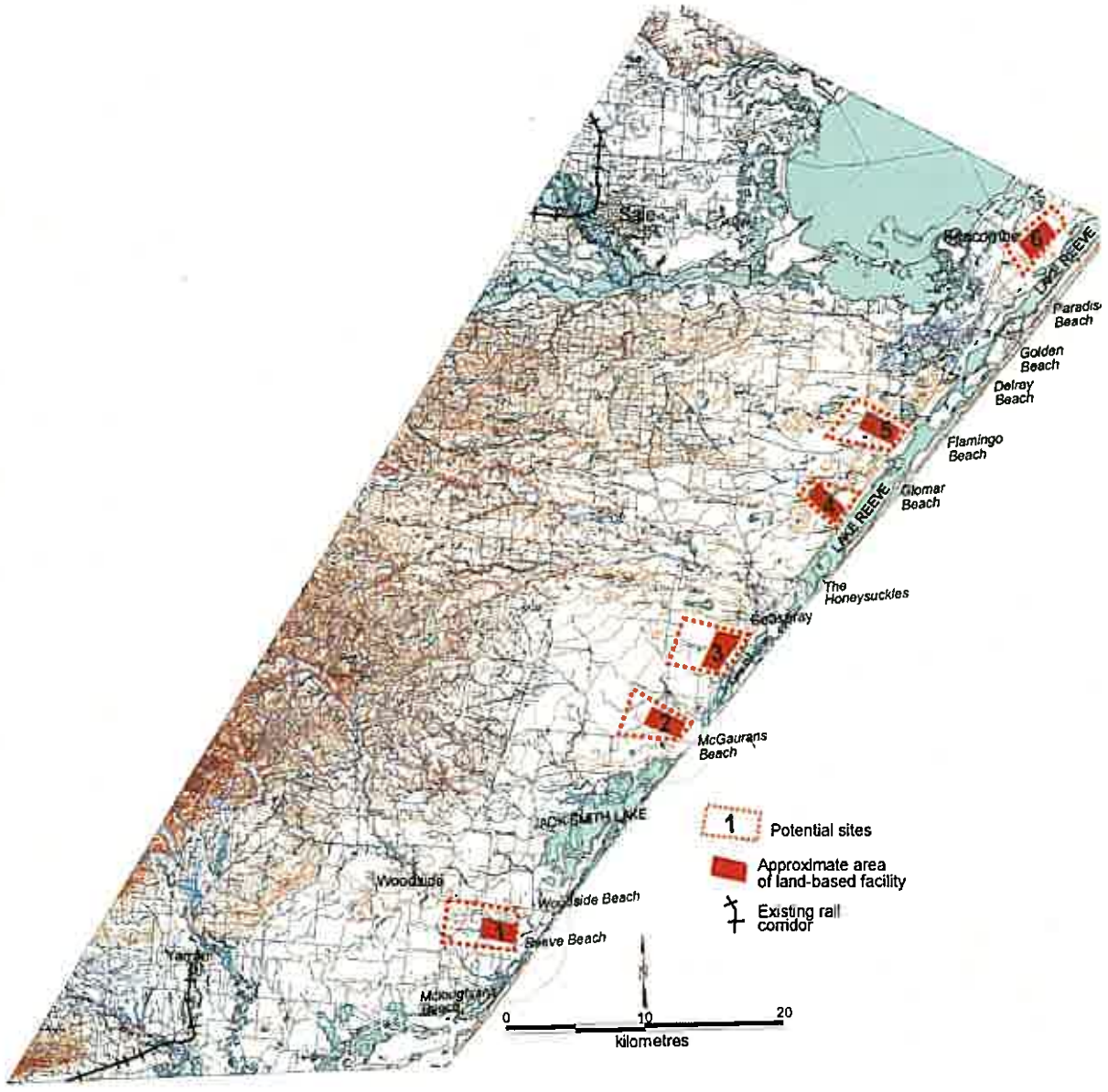
It is re-iterated here for emphasis, that the selection of typical sites was done for the purposes of developing concept designs and does not constitute a recommendation that these sites be developed for a commercial trading port.

7.3 Identification for Typical Sites

In all, six possible typical sites have been identified in this high level concept study.

The map below shows the location of six potential sites of sufficient size and appropriate physical characteristics to accommodate the land-based export terminals, and with access to a coast with potential for construction of a marine loading facility.

Figure 2. Possible Typical Sites



Opportunities and constraints for each of these six sites have been assessed and are summarised in the following table.

Table 1 Summary of Sites' Constraints

SITE	Topography & Geomorphology	Geology	Acid Sulphate Soils	Coast Access	Land Ownership	Residential	Environment	Recreation & Community	Main constraints
1	LOW	LOW	LOW	LOW	MOD	LOW	LOW	LOW	N/A
2	LOW	LOW	MOD	MOD	LOW	LOW	LOW	LOW	N/A
3	LOW	LOW	MOD to HIGH	MOD	HIGH	LOW	HIGH	MOD	Marine Nat Park, Coast access, CASS
4	MOD	LOW	HIGH	HIGH	MOD	LOW	MOD	MOD	Coast access. Recreation impact, CASS
5	MOD	MOD	MOD to HIGH	HIGH	MOD	LOW	MOD	MOD	Coast access. Recreation impact, CASS
6	LOW	MOD	HIGH	HIGH	HIGH	LOW	HIGH	MOD	Coastal Park, Coast access, CASS

From the above assessment, two sites appear to offer the best prospects of supporting an Export Facility. These are :

- **SITE #1 Between Reeve Beach to Woodside Beach.**
- **SITE #2. Near McGaurans Beach.**

Apart from the above assessment criteria, both these sites have the added advantage of being reasonably close to the rail line at Yarram and afford the shortest distance from terminal to coast of all the sites. Additionally they have superior navigational safety as they are both south of the Gippsland Oil and Gas field rigs and associated facilities.

The particular details of the assessment of the tow sites above is as follows :-

Table 2 SITE #1 (Reeve Beach to Woodside Beach).

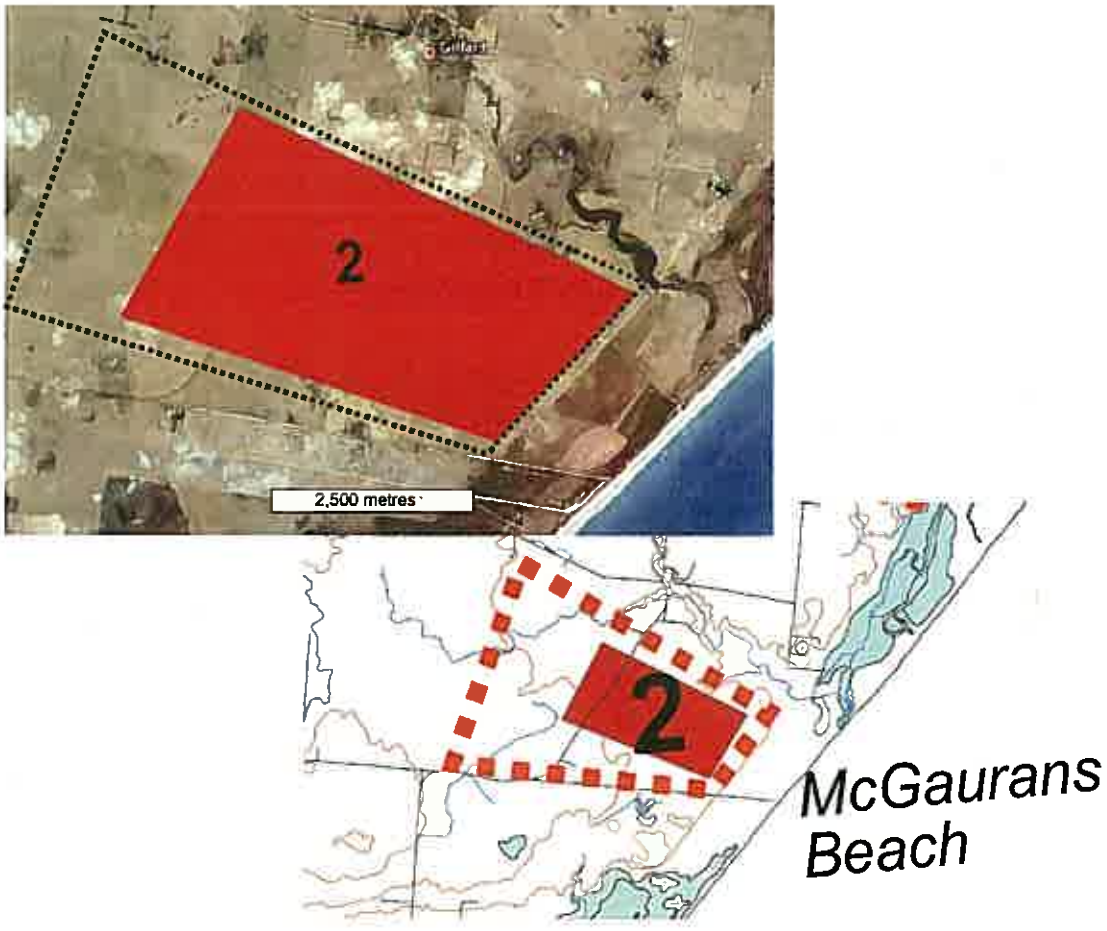
Topography & Geomorphology	Geology	Acid Sulphate Soils	Coast Access	Land Ownership	Residential	Environmental Sensitivity	Recreation/ Commercial	Main constraints
Elevation 6 m to 14 m. Gentle slope. One 3 m valley. Weak stream incision. Old flood channels of Bruthen Ck. No swamp or lake. No coastal lagoon.	Surface – alluvium of Bruthen Creek. Sub-surface Haunted Hill Fm: 0-3.3m sand - 13.7 clay - 14.3 f. sand - 16.5 clay - 17.3 f. sand - 24.1 clay	Minimal above 3 metres elev.	No lagoon. Barrier ridges to 6 m high and 150 m wide. No significant offshore constraints.	1. Private land. 2. McLoughlins Beach to Seaspray Coastal Reserve (150 m wide). 3. Coastal waters reserve near-shore	Zoned rural/farming Several farm properties	Aboriginal Cultural Sensitivity (coast dunes and waterways).	Beach access for fishing, surfing	Potential flooding Bruthen Creek. Shoreline recession.

Figure 3. Potential SITE #1 (Reeves Beach to Woodside Beach).

Table 3 SITE #2 (McGaurans Beach).

Topography & Geomorphology	Geology	Acid Sulphate Soils	Coast Access	Land Ownership	Residential	Environmental Sensitivity	Recreation/ Commercial	Main constraints
Elevation 16 m to 22 m. Weak stream incision. Gentle slope. Bordered on eastern side by 8-10 m deep valley. No high swamp/lake. Wide coastal lagoon.	Surface – colluvial and shallow alluvium. Haunted Hill Fm: 0 14.5 m sand and clay -18.0 limestone - 30.0 sandy clay	Minimal above 3 metres elev. High risk of below 3 metres in swamp and lagoon.	Backbarrier swamp and lagoon 1.2 km wide and < 2m elevation. Single low (< 3m high) barrier ridge 30 m wide.	1. Private land. 2. McLoughlins Beach Seaspray Coastal Reserve (150 m wide). 3. 3 km of the NE part of coast is Adjoins Ninety Mile Beach Marine National Park (extends to 5 km offshore)	Zoned rural/farming. Several farm properties	Aboriginal Cultural Sensitivity (coast dunes and waterways).	Beach access for fishing, surfing	Potential flooding of backbarrier lagoon and swamp. Rapid shoreline recession. Acid sulphate soils.

Figure 4. Potential SITE #2 (McGaurans Beach).



8. Storage Terminal Facility

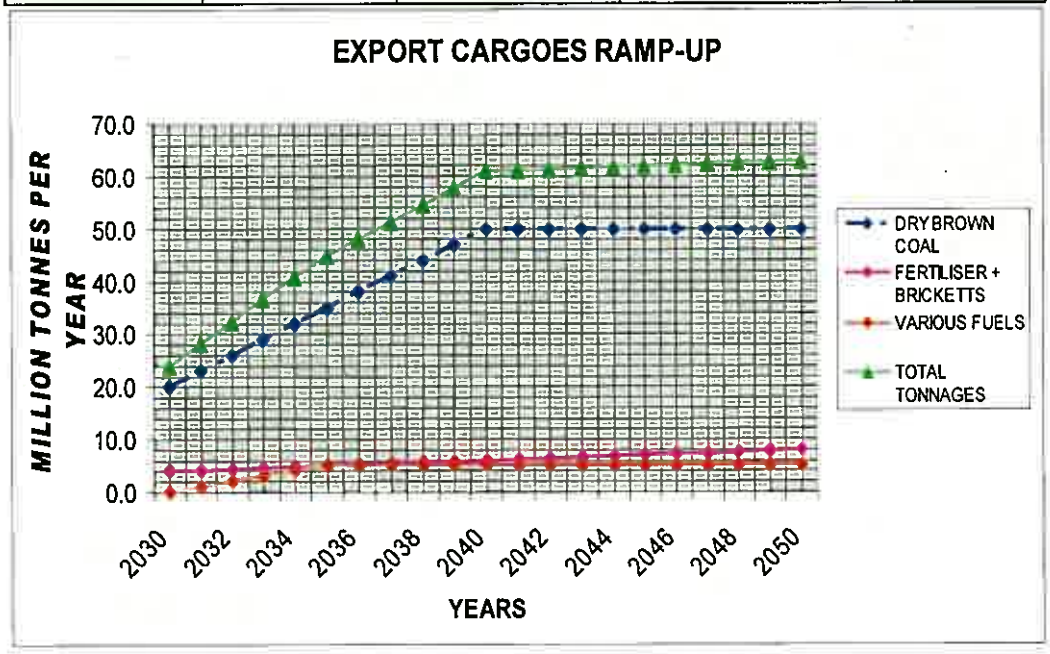
8.1 Cargoes and Throughputs

The range of cargoes envisaged for the export terminal will originate generally in eastern Victoria and mostly from the Latrobe valley and South Gippsland coal fields.

The tonnage growth ramp-up for each cargo has been given as follows :-

Table 4 Cargo Tonnage Ramp-ups

CARGO RAMP-UPS	DRIED BROWN COAL (assuming 4 blends)	PROCESSED COAL BRIQUETTS (assuming 2 types)	UREA BASED FERTILISER (assuming 2 types)	VARIOUS FUELS (assuming 5 types)
	Open Stockpiles & Rail delivered	Covered Storages & Rail or Road delivered	Covered Storages & Rail or Road delivered	Tank Farm Storages & Pipeline delivered
At 2030	20Mtpa	2Mtpa	2Mtpa	0
2035	35Mtpa	2.5Mtpa	2.5Mtpa	5Mtpa
2040	50Mtpa	3Mtpa	3Mtpa	5Mtpa
2050	50Mtpa	4Mtpa	4Mtpa	5Mtpa



8.2 Layouts and Areas

The land based export terminals may include multiple large volume bulk stockpiles, covered storage sheds, liquid storage tank farms and large scale bulk liquid and solids receival assets.

Overall, initial indications suggest that suitable sites may be required to have available all inclusive areas in the order of approximately 200 ~ 300Ha.

It is anticipated that approximately 150 ~ 200Ha may be needed for coal and other solid bulk cargoes including major stacker and reclaimer machinery rail runways, coal stockpiles around 50m wide, 16m high and 3000m long, approx 10m deep rail and road dump stations, large span covered compartmentalised cargo storages, kilometres of conveyor galleries, transfer stations, surge bins, material handling machinery, weighing and testing stations, property and maritime security, administration and control buildings, workshops, sheds and other ancillary buildings.

Another approximately 20 ~ 50Ha may be required to be dedicated to a range of bulk liquid and fuel storage tanks, pipeline and pipeline equipment, pigging stations, bunding and pollution controls, minor reprocessing facilities, sheds, minor sewage and wastes pumping facilities, water reclamation and other ancillary buildings.

Additional lands may be required for major overall security controls, emergency response, sewerage and waste water treatment as well as major rail loops and roads, parking, marshalling etc. This additional area could be 30 ~ 50Ha depending on design, environmental measures, safe guards and local terrain.

The repercussions of any potentially hazardous interaction between some fertilisers, other combustible liquids, brown bulk coal and briquettes has not been assessed. This will require further study.

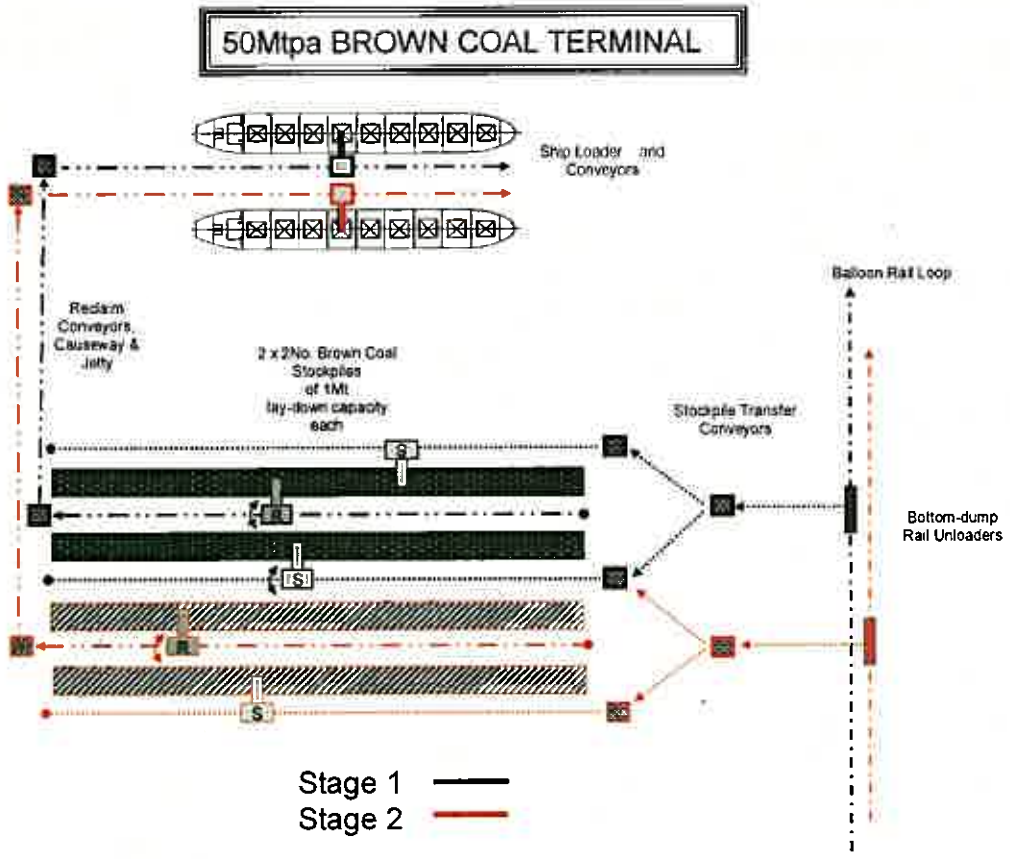
Wherever possible, all structures are preferred to be founded on raft foundations rather than on piles.

8.2.1 Brown Coal Storage

The Brown Coal Terminal may be similar to other coal terminals in Australia, but limiting onsite storage of the coal to under 1 month of throughput. This may well need to be further reduced to around the equivalent of 14 ~ 17 Flow Days, due to the potential for the coal to self-heat in the stockpile. Additional research is required on this topic.

This suggests that the ultimate high-case 50Mtpa throughput may be achieved via a basic 4No 1Mt stockpiles using a combination of "tent" and "trapezoidal" shape stockpiles up to 3km long, being serviced through 2No rail dump stations, 3No stackers and 2No reclaimers, high volume conventional conveyors and 2No ship loaders.

A basic diagrammatical layout in as follows :

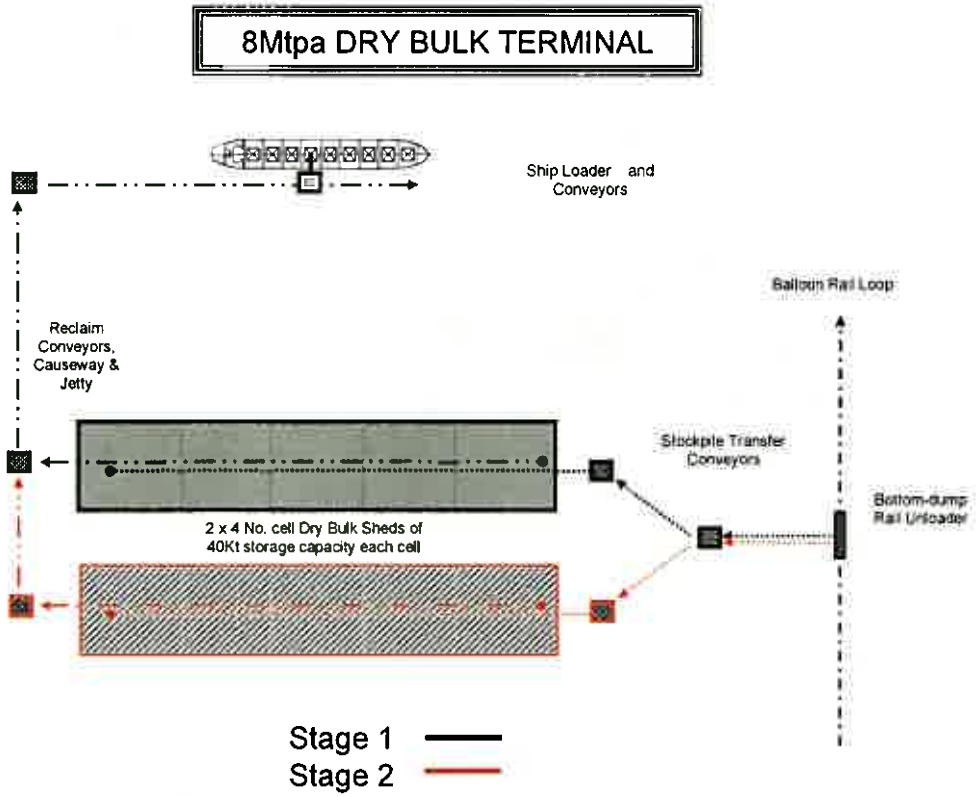


8.2.2 *Bulk Solids Storage (Brown Coal Briquetts and Fertilisers)*

The Bulk Solids Terminal may be similar to other bulk solid multi-user terminals in Australia, but could be limited in onsite storage to much less than 1 month throughput of each cargo. Given that the solids may well be of high per tonne value, commercial reality may push for a very quick cargo consolidation and export cycle ~ flow days of around 10-12 could be expected.

This suggests that the ultimate 8Mtpa throughput may be achieved via 2No secure, major, sophisticated, dust controlled, covered storage sheds using a combination of up to 4No 50Kt compartmentalised storages serviced by a shared high-line stacker and a shared hopper style reclaimer each, with both being supplied through 1No smaller rail dump station, transfer stations, high volume conveyors and 1No multi-purpose cargo ship loader.

A basic diagrammatical layout in as follows :



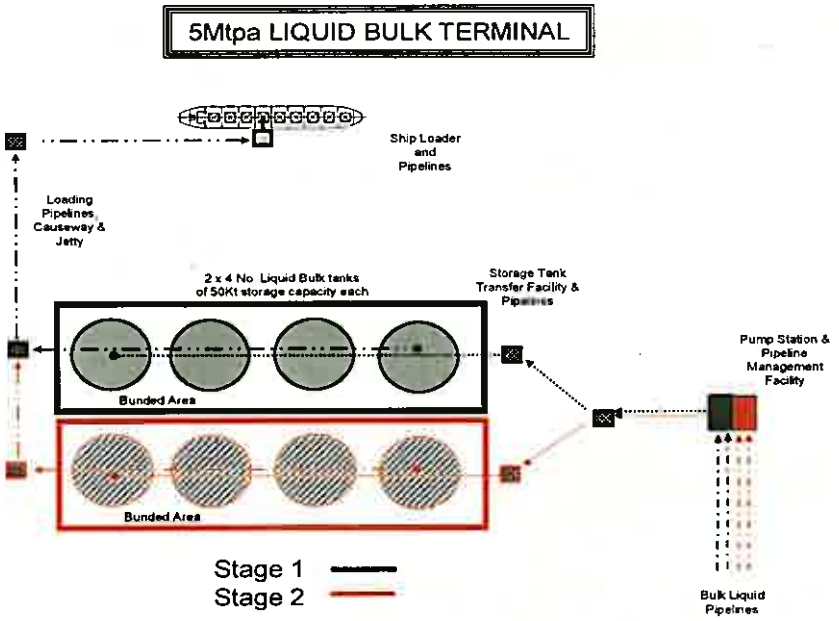
8.2.3 Bulk Liquids Storage

The Bulk Solids Terminal may be similar to other bulk liquid multi-user terminals in Australia, but will limit the onsite storage of the products to 1 month throughput of each cargo. Given that the liquids may well be of moderate to high per tonne value, commercial reality will push for a quicker cargo consolidation and export. This is very dependant on the specific cargo that may use the facility.

Given the variable nature and flammability of the intended bulk liquids, it is considered reasonable in this high level concept study to simply allow for a range of 50Kt tank storages inside a bunded area.

This suggests that the ultimate 5Mtpa throughput may be achieved via 2No secure, major, sophisticated, bunded and sealed tank storages totalling 8No. 50Kt tanks, transfer stations, numerous high volume pump stations, multiple export pipelines and 1 or 2No high capacity ship loading monitor arms (depending on inter-changeability of products). No allowances have been made for heated pipelines.

A basic diagrammatical layout in as follows :



8.3 Expansion Stages

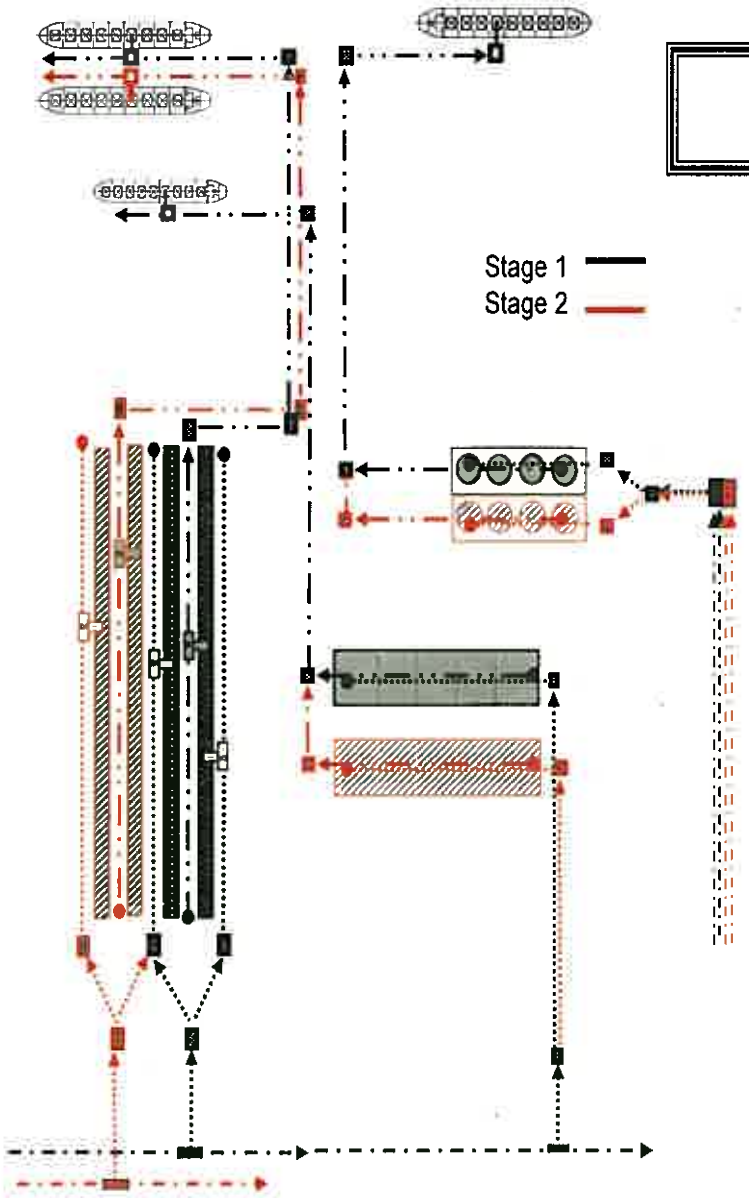
As mentioned in the Basis of Design Report, the proposed cargo ramp-up suggests that the expansion of the facility over time is logically carried out in two stages. The first stage being able to handle 50% of ultimate capacity and the second being for the remainder of capacity. This should give the project some commercially viable cash flow and a coarse yet phased revenue linkage to capital expenditure,

Based on this concept, the staging of each facility can be broadly taken as follows :

Table 5 Cargo Growth-Driven Staged Construction

CARGO TYPE	STAGE 1	STAGE 2
BULK BROWN COAL	2030	2035
BULK FERTILISERS	2030	2040
BULK COAL BRIQUETTS	2030	2040
BULK LIQUIDS	2030	2035

The 2 stage development of each cargo facility is shown on the various diagrammatical materials handling layouts above and below. The actual orientation of specific elements of the terminal can be adjusted to suit the various overall site land mass, topography and product delivery drivers.



COMBINED COAL, SOLIDS & LIQUID BULK TERMINAL

Basic Layout (up to 300ha)

- **Coal Terminal (nom 150~200ha)**
  50Mtpa throughput in 2 stages
- **Bulk Liquids Terminal (nom 10~25ha)**
  5Mtpa throughput in 2 stages
- **Bulk Solids Terminal (nom 10~25ha)**
  8Mtpa throughput in 2 stages
- **Rail Balloon Loops (nom 20~30ha)**
  3 loop track incl train storage

Plus

Ancillary Structures etc (nom 10~20)
roads, parking, sewerage, power water. Admin, control, security signals, marshalling etc

8.4 Major Terminal Equipment List

Table 6 Major Terminal Equipment Listing (all stages)

CARGO TYPE	Product Delivery	Receival	Storages	Reclaim	Transfer System
BULK BROWN COAL	2No Rail Dumps 4000tph each	3No. Stackers 4000tph each	4No. 1M tonne Dynamic Stockpiles each	2No. Reclaimers 7000tph each	High Speed Conveyors 7000tph each
BULK FERTILISERS	Shared Rail Dump 1500tph	1No. High Line Shed Stacker 1500tph	1No Shed 200,000t (4No x 50kt	1No Reclaim Hopper 3000tph	Shared High Speed Conveyors 3000tph
BULK COAL BRIQUETTS	Shared Rail Dump 1500tph	1No. High Line Shed Stacker 1500tph	1No. Shed 200,000t (4No x 50kt)	1No. Reclaim Hopper 3000tph	Shared High Speed Conveyors 3000tph
BULK LIQUIDS	Multiple Product Pipelines 100 ~ 1000tph each	High Duty Input Pumps 100 ~ 1000tph each	8No. tanks 50,000t ea	High Duty Output Pumps 1000-2000tph each	Multiple Product Pipelines 2000tph each
GENERAL TERMINAL ELEMENTS	Control Tower, cleaning stations, rail balloon loops. admin bldgs, truck and car parking, security, etc	Stacker runways, yard pads, inward conveyor structures, transfer towers, general equipment, testing facilities, cleaning stations etc	Dust controllers, emergency response fire fighting, Admin, amenities etc	Reclaimer runways, outward conveyor structures, transfer towers, bins, general equipment, weighing facilities, etc	Outward conveyor structures to loading berths, transfer towers, bins, general equipment, weighing facilities,

9. Marine Export Facility

9.1 Site Sea State and Climatic Environment

Based on the Coastal Engineer's research and assessment of the nearest available data, the sites can be generally characterised as follows:-

Table 7 Coastal and Geomorphologic Characteristics of the Region

CONDITION	TIDES	WAVE	WIND	CURRENT & SURGE	LITTORAL DRIFT
GENERALISED COASTAL DATA	HAT = 2.1m MSL = 1.1m ISLW = 0.1m	1:10 Hmax = 9m 1:100 Hmax = 12m 1:500 Hmax = 15m	Exceedences > 50kt = 6% > 40kt = 14% > 30kt = 15% > 20kt = 24%	Storm surge = .5m	Potential bi-directional cumulative volume of 250,000 cum annual.
	SEA RISE = 1.71m by 2030 2.1m by 2070	Hs 1m wave exceed'ce = 23% 1.5m wave exceed'ce = 7% 2.0m wave exceed'ce = 2%		Currents = 1kt ave Maximum currents are unknown.	
		Potentially large SWELL waves of 18 sec period, over 1.2m Hs			

The wind and wave exceedence statistics above indicate that the sites are in a high energy climate and hence the marine facilities will need special consideration and substantially more site data collection and analysis. The impact on vessel mooring, tug safe haven, cargo berth operation and overall loading performance will also require further study.

9.2 General Arrangement

The combined marine facility in this high level concept study has been consciously designed with a NO-DREDGE strategy. This is on the premise that the traditional near shore dredged berth and major breakwater construction (that would obviate the need for the long access trestle to access suitably deep water) would adversely impact on the bi-directional coastal littoral drift and thereby pose a potential major environmental fatal flaw in the project. This premise would need further study in order to validate or refute. It requires both an environmental and commercial trade-off assessment.

The marine facility has been sized to handle the proposed design vessels customised to each cargo and its suggested parcel size. High level concept assessment of this task favours the construction of an integrated off-shore bulk solids and liquid terminal, fed by conveyors and pipelines along an access trestle to individual jetty berths.

While there are other options for the export of bulk materials from off-shore "non-traditional" port sites such as this including floating terminals, transfer barges or single point moorings, none are capable of reliably handling

up to 63Mtpa as an overall duty cycle. Hence this high level assessment has focused on the access trestle and jetty loading platform solution. Other solutions as mentioned above, could be given deeper analysis in a Pre-feasibility Study (project selection phase) should to project be considered for further progression.

The berths to be constructed for the ultimate cargo throughputs are :

- 2No Cape size Bulk Coal export berths, plus the possibility of 1No. lay-by berth to assist in increased ship turnaround. Berth depths -20m CD
- 1No. Cape size Bulk Liquid export berth. Berth depths -19m CD
- 1No. Panamax size Bulk Solids export berth. Berth depths -16.5m CD
- 1No. set of 3 Tug berths, breakwater protected including access to main trestle. Berth depths -8m CD
- 4km approx long Access Trestle for conveyors, pipelines and vehicles. Deck level 15m CD approx

9.2.1 Overall Design Efficiency Parameters

As a marine facility design goal, Berth Utilisation (FLO-LLO method) should not exceed 75%, and Berth Occupation (simple continuous loading method) should not exceed 65%. These metrics, combined with the above vessel demographics, has been used to size the assets both in capacity and number.

The berth utilisation input factors for the above has been broadly assessed on non-site specific weather experiences and hence require further assessment in order to better allow for specific weather impacts on shipping and loader operations. Refer further Threshold Studies recommended in Section 12.1 of this report.

9.3 Single Point Mooring Alternative (Bulk Liquid export only)

As mentioned above, one commonly considered solution for the export of bulk liquids, is to pump from the storage terminal to a tanker moored off-shore via a Single Point Mooring (SPM).

While an SPM at this site is a theoretical possibility, it has been rejected in this high level concept study assessment as the sea and wind state off shore at around the 4km ~ 20m depth mark, is considered to be harsh, as indicated in the Coastal Engineer's Study and Section 9.1 above. In addition with the other bulk cargoes requiring an access trestle and loading jetty, the use of a separate SPM just for bulk liquids is not considered commercially warranted.

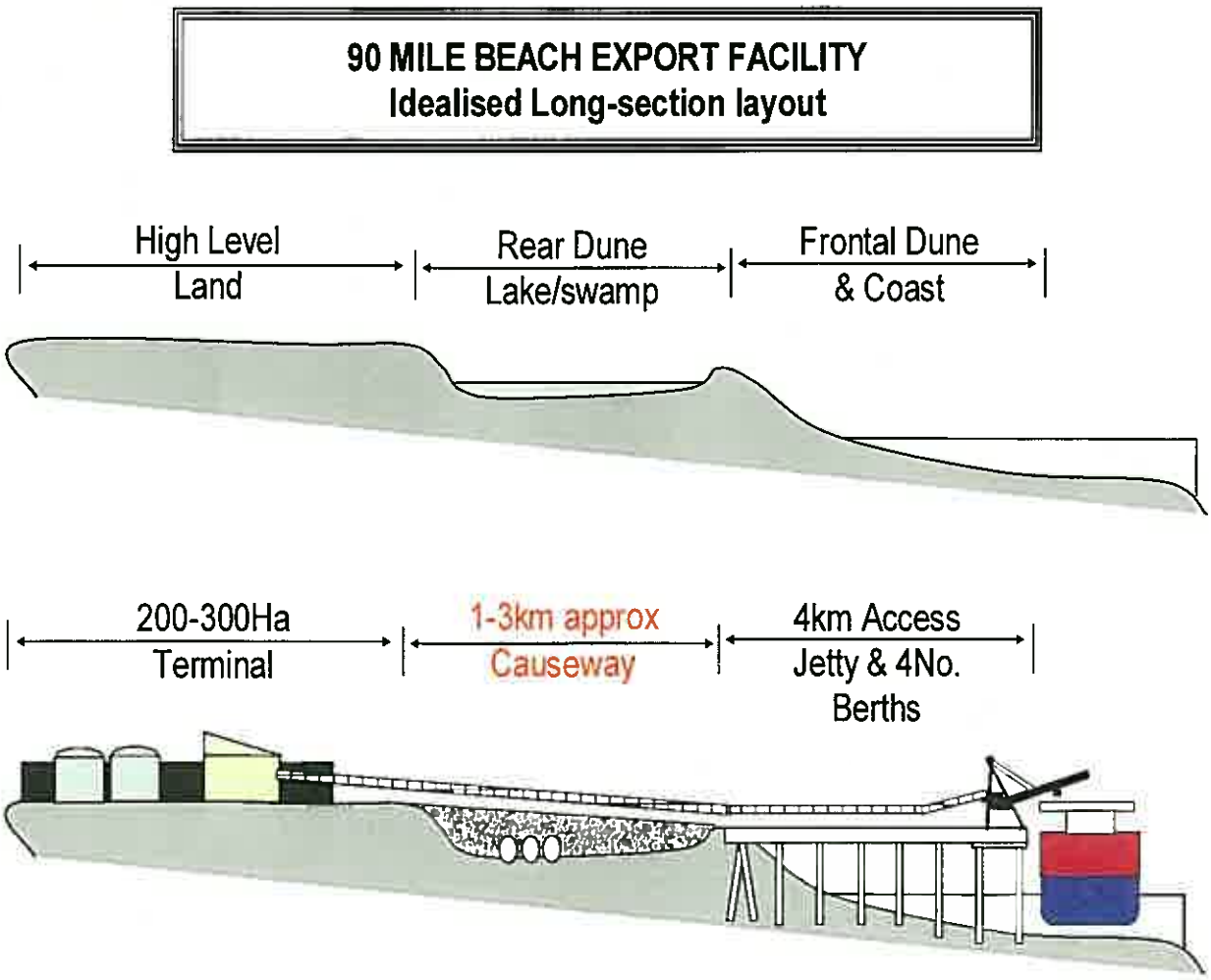
If only bulk liquids were to be exported through this project, then the use of an SPM may be worthy of further assessment. If deployed, such a SPM would have to be akin to a Bass Straight or North Sea style facility in order to meet sea state climate longevity expectations, berthing conditions, environmental regulations as well as AMSA, MARPOL and other industry safe guard requirements. Hence it is likely to be very expensive if installed for only 5 Mpta of mixed carges . Moreover additional costs would accrue if the product pipelines had to be heated (as yet unknown) as they would now be underwater thereby using considerably more energy in order to keep to the required temperature during operations.

Should the project be restricted to only bulk liquids export, then the current suggested sites may themselves also become uneconomical as the 5Mpta of liquid cargo will now have to sustain what is currently the other cargoes share of the site establishment costs of access, utilities, security, general terminal infrastructure, tug safe haven and 1-3km causeway etc.

Should the cargo ramp-ups assumed in this study change to the extent that the project reduces to the export of bulk liquids alone, then the entire project concept will require a complete re-assessment.

9.4 Marine Facility Layout

Integrating the available geomorphology and coastal data and the general topography of the 90 Mile Beach area, the typical cross-section of the facility is assumed to be as follows :-



9.5 Expansion Stages

Unlike the terminal storages, not all marine assets can be provided incrementally. Hence the only staging possible is to build the second Bulk Coal berth and the optional lay-by berth as stage 2. All other elements are required from start and cannot be phased in as long as the current cargo ramp-up profile is maintained. Based on that concept, the staging of each facility can be broadly taken as follows :

Table 8 Cargo Growth Driven Staged Construction

CARGO TYPE	STAGE 1	STAGE 2
BULK BROWN COAL	Berth 1 2030	Berth 2 and optional Lay-by 2035
ALL OTHER CARGOES	2030	NA

9.6 Major Marine Equipment List

Table 9 Major Marine Equipment Listing (all stages)

CARGO TYPE	Berth	Ship Loading
BULK BROWN COAL	2No. Fully decked Cape size berth 360m overall	2No Ship Loaders 7000tph each 2No Buffer Bins
BULK FERTILISERS	Shared Fully decked Panamax size berth 280m overall	Shared Ship Loader 3000tph 1No Buffer Bin
BULK COAL BRIQUETTS	Shared Fully decked Panamx size berth 280m overall	Shared Ship Loader 3000tph 1No. Buffer Bin
BULK LIQUIDS	Skeletal Cape size berth 360m overall	1 or 2 No. Loading Monitor Arms 2000tph each
GENERAL MARINE ELEMENTS	4km (approx) long Steel Access Trestle 3No. 70t bollard pull "Z-peller" or "Voit" tugs or equivalent , 3 No Rubble Breakwater Protected "poor weather" Tug pens	Transfer towers, dust controls, bins, navigational aids etc **PLUS** 1 ~ 3km (approx) long Filled causeway 10m wide from terminal to access trestle

10. Major Project Risks

10.1 Perceived Challenges, Threats and Risks

The major perceived challenges and threats to the project, generally stem from the assumptions made during the execution of this study. The major assumptions are outlined in Section 6 of this report.

At this high level concept stage of the investigation, the project is exposed to a wide and sometimes unknown range of potential challenges and threats. These challenges and threats have not yet been afforded adequate analysis to confirm them to be worthy as recordable project risks. How much each potential challenges or threat will ultimately impact on project time and cost is rightly the subject of further research and analysis. Hence the points of issue including the salient project assumptions are simply recorded below as threats and not risks at this stage.

10.1.1 Terminal Challenges and Threats

A summary of the significant issues that are currently unresolved and may yet have a adverse affect on project viability include :

- General environmental threat and difficulty in gaining timely and reasonable environmental approvals
- Concept Study, AACE Class 5, estimate accuracy and uncertainty
- Potentially insufficient acquirable suitable land area in a suitable location for both site storage and general access
- Insufficient survey or site topography
- Containment and disposal of contaminated run-off and spills from the site
- Reliability of the delivery of the 63Mtpa of cargo expected to be handled by the project
- Reliability of the cargo ramp-up and ultimate volume predictions
- No consideration of the potentially high costs or construction difficulties of heavy haulage railway, balloon loop, access road and pipeline corridors
- Cost of provision of adequate power, sewerage and water utilities
- Reliance on very generalised geological information including the unquantified risk of the potential for large settlements due to possible existence of significant depths of organic or unconsolidated material across the sites.
- Environmental impact, size and cost of a filled causeway required to provide an all-weather conveyor and vehicle access from the terminal across the dune barriers to the access trestle abutment.

- Unknown interaction hazard between brown coal, compressed briquetts, an unidentified range of fuels and other potentially flammable slurries etc. Potential for brown coal to self-heat while in stockpile is also of concern.

10.1.2 Marine Challenges and Threats

A summary of the significant issues that are currently unresolved and may yet have a adverse affect on project viability include :

- General environmental threat and difficulty in gaining timely and reasonable approvals
- Concept Study, AACE Class 5, estimate accuracy and uncertainty
- Insufficient survey and site bathymetry
- Marine ballast water, other biological and chemical hazards generated by the trafficking of large foreign flagged vessels in the area near to shore, especially as 5Mtpa of fuel and other hazardous substances are to be exported via an open sea berth.
- The proximity to the Gippsland oil and gas fields will require navigational restrictions of some level.
- Ocean sea state data is yet to be fully collected, analyzed or modeled with respect to impact on size and nature of access trestle and loading platforms, weather delays to loading, ship delays, berth utilisation, towage requirements and tug deployment and berth safety. Current data suggests that the site has a potentially high wave and wind energy climate and hence the adverse impact on berth productivity and overall structure costs is of significant concern. In particular the impact on the ability to provide a long term on-site safe haven for the facility's tugs is of even more concern.
- Potential for large storm and sea level rise generating coastal erosion that may lead to undermining of jetty abutments is largely not understood. This may force considerably more jetty to be constructed than expected. The potential severity of coastal storms may also make the sea defenses of any armoured structure problematic.
- Unknown geotechnical parameters for pile design for access trestle and loading platforms.
- Impact of access trestle, loading platforms, tug breakwater berths on bi-directional coastal littoral drifts.
- Possibility for the need to house the tugs remote from the site and hence endure long lead times in the ordering of towage services for each export vessel movement.

11. Indicative Cap tal Expenditures

11.1 Accuracy

The estimate is an "Order of Magnitude" estimate similar to a AACE class 5 estimate, namely +/- 50% accuracy and 30% contingency to P_{50}.

11.2 Basis of Estimate

The facility is priced based on confidential empirical data held by Hatch based on a variable combination of other similar benchmarked projects, recent contracts and opinion.

This estimate should not be relied upon for any decision making purposes and is indicative only of the scope of the investment that may be contemplated. Many factors exist that may dramatically positively or negatively affect the final installed cost of the facility and its operations.

The major assumptions embodied in this estimate are outlined in Section 6 of this report.

11.3 Escalation

Given the somewhat fluid nature of the timing of the various cargo ramp-ups and hence the terminals and marine facilities construction, Escalation for the calculation of the staging of the works has been omitted for clarity.

However future studies should certainly factor in the possibility of staging the development in sympathy with cargo ramp-up and revenue streams.

11.4 Battery limits of Estimate

Pricing only **includes** the Export Terminal and Marine facilities commencing from the incoming side of all Rail or Road Dump Stations or Final Discharge Flange of any overland bulk delivery pipeline and concluding once the cargoes cross the export vessel's side.

Consequently the immediate near-field **exclusions** are the rail balloon loop railways, all access roads, truck storage, incoming product pipelines, pilotage, utilities of all kinds, sewerage systems, environmental conditions and approvals, all land and right away negotiations and acquisitions, etc.

11.5 Indicative Capex and Opex

11.5.1 Overall Capex

The capital cost AACE class 5 estimate in today's dollars, is as follows :

Gross 63Mpta Terminal Works (all stages, no escalation) (including various storages and equipment and)	=	$ 771 million
Gross 63Mtpa Marine Works (all stages, no escalation) (including 1 ~ 3km filled causeway to access trestle abutment, 4km steel access trestle, 4No. various sized cargo berths, tug harbour and 3No. 70t tugs)	=	$ 855 million
Project Overheads (all stages, no escalation) (4% study fees, 5% freight, 15% P&G's, 15% EPCM +30% CONTINGENCY)	=	$ 960 million
TOTAL HIGH LEVEL CONCEPT STUDY INDICATIVE ESTIMATE	=	**$2.59 billion**

This high level concept costing has an accuracy spread of +/-50% and is without any quantified risk or opportunity premium. As mentioned earlier, estimate includes the delayed staging of the coal, solids and liquids storage expansion in line with their proposed cargo ramp-ups.

11.5.2 Staged Capex

As indicated earlier, the overall project is logically constructed in certain stages based around cargo ramp-up volumes and the need for enabling infrastructure. However not all the assets are scalable based on throughput, as some are required as initial site access, utilities, security, communications, administration buildings and workshops, waste controls and other core infrastructure that will be used across all stages.

Hence the cost breakdown between stages is skewed towards Stage 1 works. This is even more true of the marine assets, where apart from the second coal berth and loader, all others are required upfront in Stage 1.

Therefore the above high level concept costs can be further broken down as follows :-

Table 10 Estimated Staged CAPEX Costs

HIGH LEVEL CONCEPT CAPEX (2009 $)	TERMINAL FACILITY	MARINE FACILITY	CAPEX COST PER TONNE OF INSTALLED THROUGHPUT
Stage 1	$786	$1,158	**$58.04**
Stage 2	$358	$283	**$21.71**
TOTAL	$1,144	$1,441	**$41.04**

Based on these costs, the facility is roughly on a par with the more recently constructed ocean coal loaders along the east Australian coast i.e. in the order of around $30 ~ $55 of capex per installed tonne of throughput. What is also highlighted is that the asset intensive Stage 1 of the development is potentially not so cost effective in $/t terms and requires further refinement to better balance cash flow and revenue streams.

11.5.3 IndicativeOpex

Based on a crude 63Mpta turnover across all the terminal storages and the marine facilities, it is estimated that the opex expenditure excluding financials, demurrage, spares, recurrent capex and major failures, upgrades or re-fits, may be in the concept order of $1.40 ~ 2.00/tonne of annual throughput. This equates to an operational spend about $100 million per annum once all stages are complete and the terminal is in full production.

Table 11 Estimated OPEX Costs

OPEX summary	$/t approx
Civil Maintenance	0.15
Mech Maintenance	1.20
Fuel for TUG	0.05
General Utilities	0.05
Shore based labour	0.10
Marine based labour	0.10
TOTAL	**$1.65/t**

At this high level concept study assessment and within the limits of the estimate accuracy, the opex costs are considered to be reasonably "$/t stable across all stages of the project's development and throughput. Further, more details studies will be required to specifically tailor opex to cargo ramp-up and stage development.

From a utility perspective, the combined 63Mtpa throughput terminal may be expected to annually consume 60GWhr power and a net 2.0GL potable water augmented by significant levels of recycling and run-off harvesting. These water figures are based on a typical black coal terminal and NSW mid north coast climate. Hence they are seen as conservative and will possibly need a downward adjustment to account for the potentially wetter brown coal and wetter southern Victorian weather patterns.

12. Proposed Next Steps

12.1 Further Threshold Studies Recommended

As mentioned earlier, a range of limitations on this high level concept study has meant that there are certain challenges, threats and areas of research that have not been covered or assessed to a degree that would adequately dispel the risk of Fatal Flaws even in this Concept Study stage (refer Section 10.1).

Consequently prior to any decision being made to progress to a full Pre-feasibility Study, it is recommended that the following Threshold Studies be completed. These studies will take the form of a more focused, yetstill Concept Level assessment of certain issues, challenges or threats, so as to decide if any pose a potential Fatal Flaw in the project definition. The studies are seen to include, but may not be limited to :-

- Concept level environmental assessment of the preferred sites and their road, rail and pipeline accesses.

  While there will need to be far more detailed research and assessment of environmental affects and impacts as the works proceed towards Feasibility Study, the current lack of even general site specific field data, poses an undefined approval and execution threat of extreme importance and consequence.

- Concept level assessment of the available lands and the cost of road, rail and pipeline land access to the site.

  While clearly there are processes that can address the issue of land acquisition, the lack of initial detailed information is seen as an undefined cost threat of significant importance that could be simply mitigated once the base facts are discovered.

- Concept level study of the individual and combined hazards of the cargoes being considered for the export facility, including HAZOP analysis, scan for legislative and regulatory restrictions and the identification of necessary and prudent precautions.

  While there will need to be far more detailed research and assessment of environmental affects and impacts of any project of this nature as the works proceed toward Feasibility Study, the current lack of general cargo specific data, poses an undefined execution and operational threat of high to very high importance and consequence.

- Concept level consideration of the potential adverse impacts of preferred sites' wind and wave states on the current design and cost options as well a likely impacts on site erosion, berth productivity, utilisation and durability. This has the added potential to impact on jetty design, length, strength as well as causeway and jetty abutment sea defences.

  The high energy wave and wind state also calls into question as to how and where the on-site safe haven for the facility's tugs can be built. If no safe haven can be feasibly built on-site, then the option of transiting the tugs some 100km to the nearest natural safe haven, becomes a major cost, efficiency and safety impediment.

  While there will need to be far more detailed research and assessment of climatic affects and impacts of the works as the project proceeds towards Feasibility Study, the current lack of site specific data and deeper analysis thereof, poses an undefined cost, design, execution and operational threat of high importance and consequence.

- Concept level assessment of the range of the sensitivity of cargo ramp-up and ultimate tonnage scenarios in each product stream envisaged for the terminal. This has a large impact on terminal's 'cost per tonne' global competitiveness with particular relevance to amortisation of the considerable sunk

infrastructure costs necessary to set up the initial stages of the facility. Given the generally low value of the major export product of brown coal, the terminal's charge-out costs will be a crucial factor in the project's success.

While there will need to be far more detailed research and assessment of cargo ramp-up and throughput scenario cash flows and impacts as the works proceed toward Feasibility Study, the current lack of general cargo specific data and deeper analysis thereof, poses an undefined cost threat of significant importance and consequence.

While it is considered that these additional threshold studies are an essential immediate next step in the project assessment continuum, they are not expected to be of significant cost or duration.

12.2 Suggested Pre-feasibility Study Work Plan

Should there be a desire to progress this project to a Pre-feasibility Study level of consideration, a list of the major topics for the further investigation Work Plan includes but may not be limited to :

- Firmly establish the project's key success factors, acceptable performance levels, industry expectations and likely future usage. A major stakeholder group that is crucial to the success of the project is the various 'above' and 'below' track rail organisations who will be responsible for the reliable delivery of the majority of the 63Mtpa forecast product to the site.
- Consider in more detail the environmental framework that may govern the project and its relevance to assessment of the project's perceived impacts.
- Deeper market-based definition around the type, volume and likely ramp-up of each cargo and their potential combined storage and throughput drivers for each stage of terminal's development.
- Deeper definition of the specific cargoes, their properties and their potential individual and combined hazards at each stage of development and environmental and social impacts.
- Develop trade growth scenarios for various permutations of progressive volumes and ramp-up of each cargo type and consider the impacts on staging and overall cash flow.
- Specific bathymetric and terrain survey of each proposed site.
- Assessment of the possible road, rail and pipeline corridor accesses to each prospective site.
- Carry out a detailed assessment of land ownership and likelihood of its acquisition for each prospective site. Also consider broadening the site selection boundary to include other areas as need be.
- Collection of definitive site data on the environment, geomorphology, coastal engineering and meteorology of the prospective sites.

- Deeper analysis of definitive site specific data on the environment, geomorphology, coastal engineering and meteorology of the prospective sites. Particular reference to the affect of long term erosion on structures, sea defences, minimum jetty length and land areas is essential.

- Conduct a detailed vessel simulation and mooring study under a range of wind and wave conditions for both cargo vessels and tug fleet. Adjust concept designs and options accordingly

- Carry out a more comprehensive environmental scan of each site wrt the possible impacts of construction and operation of various terminal storages, waste management, marine and access elements of the project.

- Use the above data sets for a customised basic design of rail, road, pipeline, terminal and marine trestle, loading jetty and tug berth facilities to suit each prospective site.

- Based on the above designs, use a multi-variant analysis re-assess the NO DREDGE design strategy for the construction of the marine facility.

- Conduct a Risk Workshop in order to properly probe currently identified threats and quantify the realistic risks and opportunities facing the project.

- Carry out a Probabilistic Risk Assessment of the quantified project risks so as to establish a robust basis for the development of a P_{80} estimate and schedule for the works.

- Re-estimate to AACE class 3 or 4, for the capex and opex works based on the fuller assessment of site data and site specific designs, incorporating the above risk assessment premiums.

- Recommend a preferred site and carry out 10 + % engineering design of the recommended facilities both on and off shore.

- Develop a business case for the project based on the most likely range of scenarios derived from the above body of work incorporating all aspects of road, rail, pipeline, terminal and marine facilities.

- Compare to investor appetite for recent similar infrastructure projects.

END OF MAIN REPORT

Appendix A

Basis of Design Report