

## ANZAC Parade Stopbank Upgrade Works: Assumptions Register

The following table lists out the assumptions made when preparing the high-level cost estimate for the stopbank upgrade works for ANZAC Parade stopbank.

**This high-level cost estimate is based on design concepts, estimated quantities and a combination of recent construction rates for similar projects (within the Wellington Region). Consequently, a significant margin of uncertainty exists on the cost estimate and the contingency we have allowed should be considered as part of the cost rather than a potential add on.**

No allowance has been included for cost escalation beyond 2022.

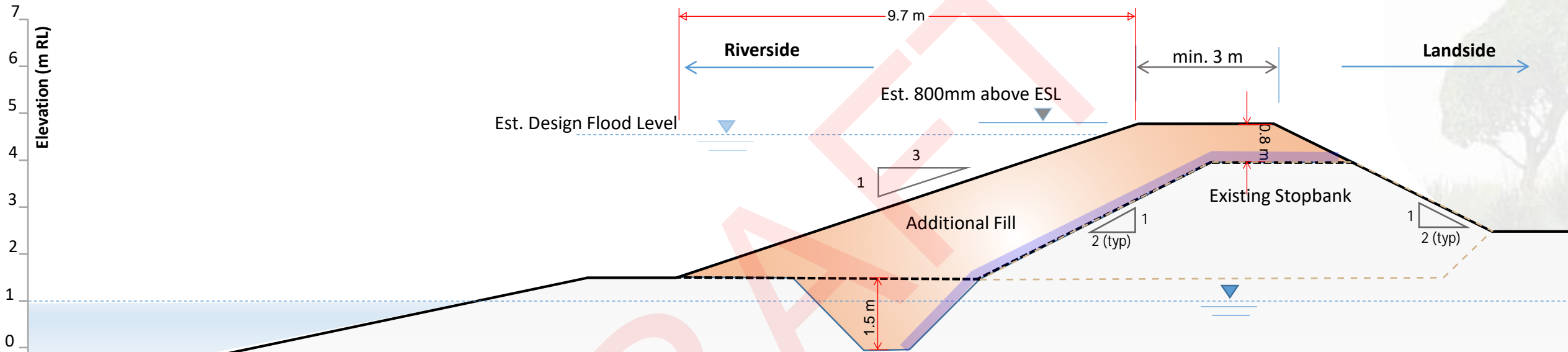
**COVID-19 impacts:** Some of the derived rates are based on information and data obtained prior to and during the COVID-19 pandemic. We have not made any attempt to allow for the impact of COVID-19 in this estimate and recommend you seek specialist economic advice on what budgetary allowances you should make for escalation and changed construction costs post COVID-19.

| Item/Reference                | Assumptions  |
|-------------------------------|--|
| GENERAL                       | <ul style="list-style-type: none"> <li>Estimate based on upgrade options selected by HRC during the meeting on 08/04/2022.</li> <li>The estimate allows for 50% contingency for regional price variations, rate fluctuations and other unforeseen conditions.</li> <li>The estimate allows for GST (15%).</li> <li>An allowance for engineering (10%) and planning (3%) services has been included in the cost-estimate.</li> </ul>  |
| PRELIMINARY & GENERAL         | <ul style="list-style-type: none"> <li>The estimate considers preliminaries and general in the order of 20% of the physical works.</li> <li>This is assumed to include establishment, insurances, time related costs (admin), quality documentation, locating services, survey set out, setting up ESC, site clean-up / disestablishment, as-built survey, general offsite overhead and profit.</li> <li>Assumes the Contractor will be able to store plant and materials within the site.</li> </ul>  |
| TRAFFIC MANAGEMENT            | <ul style="list-style-type: none"> <li>Assumes concrete truck will be able to access site and pump as required</li> <li>Assumes no specialist heavy lifting plant needed.</li> </ul>   |
| SITE CLEARANCE AND EARTHWORKS | <ul style="list-style-type: none"> <li>Cut to waste can be completed with an excavator and dump truck; breaking equipment not required.</li> <li>Assumes depth of vegetation on average is 1m.</li> <li>10% of wastage added to all structural or hardfill to allow for wastage during placement and compaction.</li> <li>The existing topsoil is not suitable for reuse – cut to waste. Assumes all topsoil will be imported.</li> <li>The fill materials are assumed to be sourced from Whanaganui area and within 10 km from the site (e.g. Kaukatea Valley Road or Upokongaro).</li> </ul> |
| PATHWAY                       | <ul style="list-style-type: none"> <li>Assumes all subgrade material below the planned footpath will be imported and use hardfill to meet compaction requirements.</li> <li>Assumes stormwater drainage can be achieved by applying suitable falls to pathway to divert runoff to the riverside.</li> </ul>  |
| UPGRADE OPTION ASSUMPTIONS    | <ul style="list-style-type: none"> <li>Total stopbank length of 2,100 m is considered in this cost estimate.</li> <li>Upgrade option I – assumed to apply to 80% of the stopbank length. Out of this 10% is assumed to be stripped down and reconstructed (to allow for stopbank in bad conditions or where there is a need to realign the stopbank).</li> </ul>   |

| Item/Reference | Assumptions  |
|----------------|--|
|                | <ul style="list-style-type: none"> <li>• Upgrade option II – assumed to apply to 20% of the stopbank length.</li> <li>• The estimate does not include any works for the Matawara stream section upstream of the Matawara bridge on SH4.</li> </ul>   |
| VEGETATION     | <ul style="list-style-type: none"> <li>• At this stage, and as agreed with HRC, we have assumed that all vegetation (including trees) will be removed to make way for the stopbank upgrades.</li> <li>• A unit rate of \$200 per meter length of the stopbanks has been considered for this work.</li> <li>• HRC to verify and confirm if the assumption is valid. If there are protected trees, additional works will be required to retaining stopbank fills around the trees. Cost for this work has not been considered in the cost estimate.</li> </ul> |
| SERVICES       | <ul style="list-style-type: none"> <li>• Services location is assumed for one fibreoptic service that may be present within the stopbanks alignment.</li> <li>• Stormwater services crossing the stopbanks are assumed to be extended and remain functional.</li> <li>• A lumpsum fee of \$500,000 has been allowed for these works.</li> </ul>  |

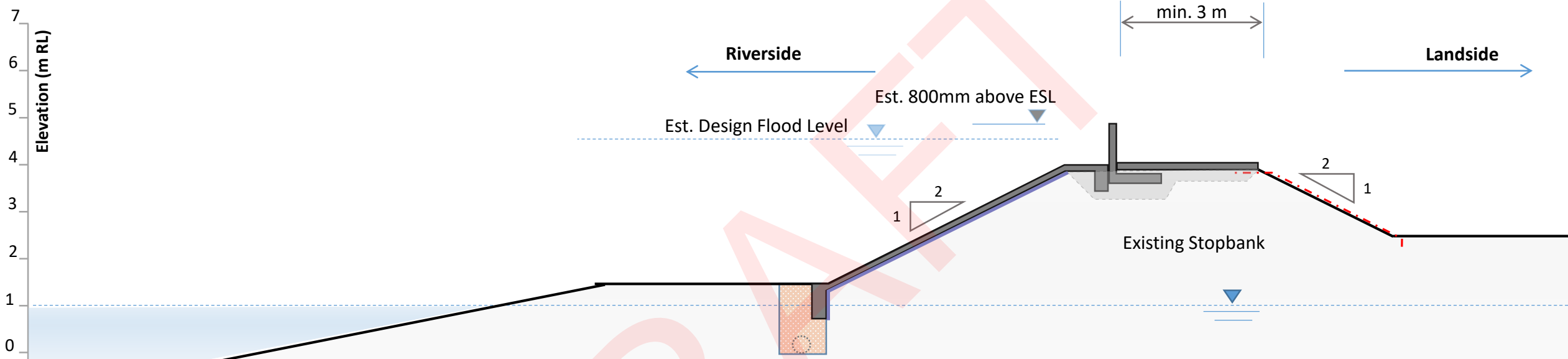
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# Upgrade Option I



| Option description   | Benefits/Opportunities   | Risks  |
|--|--|--|
| <ul style="list-style-type: none"> <li>• Earthworks solution on the riverside of the stopbank</li> <li>• (Optional) slope treatment with geosynthetics.</li> </ul> | <ul style="list-style-type: none"> <li>• Opportunity to improve the overall condition of the stopbank.</li> <li>• May partially address potential seepage through the stopbank.</li> <li>• Opportunity to construct cut-off on river side toe to reduce seepage beneath stopbank.</li> </ul> | <ul style="list-style-type: none"> <li>• Requires space on the riverside of the stopbank.</li> <li>• Requires relatively large volume of earthworks.</li> <li>• Potential settlement and stability issues due to imposes higher fill load on one side only.</li> <li>• Stopbank crest will be shifted.</li> <li>• Filter compatibly of new fill and existing stopbank to be considered as part of design. May require filter layer.</li> </ul> |

# Upgrade Option II



| Option description  | Benefits/Opportunities  | Risks  |
|---|---|--|
| <ul style="list-style-type: none"> <li>Construction of a barrier/flood wall, integral with the path/crest top</li> <li>Concrete slope protection on the riverside slope</li> <li>Drain trench on the riverside</li> <li>Landside slope treatment with geosynthetics.</li> </ul> | <ul style="list-style-type: none"> <li>Minimal amount of space requirements and earthworks (unless crest widening or flattening of existing slopes is required).</li> <li>Less issues with additional load related settlements and embankment stability.</li> <li>Good option for areas of low headroom (e.g. below Dublin St bridge).</li> <li>Trench drain to take care of piping and seepage issues below the stopbank.</li> </ul> | <ul style="list-style-type: none"> <li>Requires conditions assessment of the Stopbank crest.</li> <li>Not a sustainable option (higher carbon footprint).</li> <li>Limits access across the stopbank.</li> <li>Cost of managing additional drainage water from filter trench.</li> </ul> |



| Item No.  | Description  | Unit           | Quantity | Rate (NZD) | Amount (NZD) | Sub Total (NZD) | Upgrade Option I              |                                   | Upgrade Option II             |                                   | Project Total       |
|---|--|----------------|----------|------------|--------------|-----------------|-------------------------------|-----------------------------------|-------------------------------|-----------------------------------|---------------------|
|   |  |                |          |            |              |                 | Length of stopbanks (upgrade) | Length of stopbanks (reconstruct) | Length of stopbanks (upgrade) | Length of stopbanks (reconstruct) |                     |
|   |  |                |          |            |              |                 | Quantity for this upgrade     | Total (NZD)                       | Quantity for this upgrade     | Total (NZD)                       | Grand Total (NZD)   |
| 3.3.1   | Excavate for cutoff trench (1.5 m deep) and cart to disposal   | m <sup>3</sup> | 3.8      | 39.00      | 148.20       |                 |                               |                                   |                               |                                   |                     |
| 3.3.2   | Supply, place and compact imported low permeability compacted earthfill  | m <sup>3</sup> | 3.8      | 83.00      | 315.40       |                 |                               |                                   |                               |                                   |                     |
| 3.4   | <b>Geosynthetic and landscaping</b>  |                |          |            |              |                 |                               |                                   |                               |                                   |                     |
| 3.4.1   | Supply and install ENKAMAT 7010 (or approved equivalent), including chemset anchors, anchor trench and steel fixing pins as required (assumed to both riverside and landside slopes of the stopbanks). | m <sup>2</sup> | 16       | 72.00      | 1,152.00     |                 |                               |                                   |                               |                                   |                     |
| 3.4.2   | Supply imported topsoil, cart and spread topsoil (150 mm thick) and grass seed   | m <sup>2</sup> | 16       | 73.00      | 1,168.00     |                 |                               |                                   |                               |                                   |                     |
|   | <b>Section total (per m of stopbanks)</b>  |                |          |            |              | <b>6,945.70</b> | 168                           | 1,166,877.60                      | 0                             | 0.00                              | <b>1,166,877.60</b> |
| <b>Section 4 -- CONCRETE FLOOD BARRIER CONSTRUCTION</b>             |  |                |          |            |              |                 |                               |                                   |                               |                                   |                     |
| 4.1   | <b>Earthworks associated with this option</b>  |                |          |            |              |                 |                               |                                   |                               |                                   |                     |
| 4.1.1   | Prepare foundation for barrier wall construction by excavating top 800 mm thick existing stopbank fill and cart to disposal.   | m <sup>3</sup> | 1.8      | 39.00      | 71.76        |                 |                               |                                   |                               |                                   |                     |
| 4.1.2   | Prepare foundation for slope protection reinforced concrete slab by excavating top 300 mm thick existing stopbank slope material and cart to disposal.   | m <sup>3</sup> | 1.5      | 39.00      | 58.50        |                 |                               |                                   |                               |                                   |                     |
| 4.1.3   | Backfill foundation for barrier wall with 300 mm thick imported structural hardfill.   | m <sup>3</sup> | 0.5      | 72.00      | 38.88        |                 |                               |                                   |                               |                                   |                     |
| 4.1.4   | Supply, place and compact 300 mm thick imported crushed rock to crest (including 10% wastage)  | m <sup>3</sup> | 1.0      | 72.00      | 72.00        |                 |                               |                                   |                               |                                   |                     |
| 4.1.5   | Supply, place and compact 300 mm thick imported drainage layer below slope protection slab on existing cleared slope (including 10% wastage)   | m <sup>3</sup> | 1.5      | 72.00      | 108.00       |                 |                               |                                   |                               |                                   |                     |
| 4.2   | <b>Concrete works</b>  |                |          |            |              |                 |                               |                                   |                               |                                   |                     |
| 4.2.1   | Construct barrier wall in-situ (assumed 200 mm thick reinforced concrete, 1.25m high and 1.5m wide).   | m <sup>2</sup> | 2.8      | 297.00     | 816.75       |                 |                               |                                   |                               |                                   |                     |
| 4.2.2   | Construct slope protection reinforced concrete slab (assumed 160 mm thick reinforced concrete, on existing stopbanks)  | m <sup>2</sup> | 5.0      | 220.00     | 1,100.00     |                 |                               |                                   |                               |                                   |                     |
| 4.2.3   | Construct reinforced concrete anchor trench (300 mm thick, 1,000mm deep trench)  | m <sup>2</sup> | 0.3      | 297.00     | 89.10        |                 |                               |                                   |                               |                                   |                     |
| 4.3   | <b>Filter trench earthworks for stopbank barrier works</b>   |                |          |            |              |                 |                               |                                   |                               |                                   |                     |
| 4.3.1   | Excavate filter trench (1.5 m deep, 1 m wide) and cart to disposal   | m <sup>3</sup> | 1.5      | 39.00      | 58.50        |                 |                               |                                   |                               |                                   |                     |
| 4.3.2   | Supply, place and compact imported filter trench material (including 10% wastage)  | m <sup>3</sup> | 1.7      | 72.00      | 118.80       |                 |                               |                                   |                               |                                   |                     |
| 4.3.3   | Supply and install DN100 slotted draincoil pipe wrapped in Bidim A44 geotextile including endcap and connections   | m              | 1.0      | 66.00      | 66.00        |                 |                               |                                   |                               |                                   |                     |
| 4.3.4   | Discharge filter trench at specified exit locations (assumed as every 50m). Assume a lump sum of \$10,000 for every exit location.   | LS             | -        | -          | 200.00       |                 |                               |                                   |                               |                                   |                     |
| 4.4   | <b>Geosynthetic and landscaping</b>  |                |          |            |              |                 |                               |                                   |                               |                                   |                     |
| 4.4.1   | Supply and install ENKAMAT 7010 (or approved equivalent), including chemset anchors, anchor trench and steel fixing pins as required (assumed to both riverside and landside slopes of the stopbanks). | m <sup>2</sup> | 10       | 72.00      | 720.00       |                 |                               |                                   |                               |                                   |                     |
| 4.4.2   | Supply imported topsoil, cart and spread topsoil (150 mm thick) and grass seed   | m <sup>2</sup> | 10       | 73.00      | 730.00       |                 |                               |                                   |                               |                                   |                     |
|   | <b>Section total (per m of stopbanks)</b>  |                |          |            |              | <b>4,248.29</b> | 0                             | 0.00                              | 420                           | 1,784,281.80                      | <b>1,784,281.80</b> |
| <b>Section 5 -- PATHWAY AND OTHER ENABLING WORKS (PROJECT WIDE)</b> |  |                |          |            |              |                 |                               |                                   |                               |                                   |                     |
| 5.1   | <b>Construct concrete pathway</b>  |                |          |            |              |                 |                               |                                   |                               |                                   |                     |
| 5.1.1   | Construct 160 mm thick steel reinforced concrete slab (min. 30 MPa) for pathway  | m <sup>2</sup> | 6,300    | 193.00     | 1,102,500.00 |                 |                               |                                   |                               |                                   |                     |
| 5.1.2   | Allow for saw cuts (assumed every 3m)  | m              | 2,100    | 7.00       | 11,550.00    |                 |                               |                                   |                               |                                   |                     |

| Item No.   | Description  | Unit | Quantity | Rate (NZD) | Amount (NZD) | Sub Total (NZD)     | Upgrade Option I          |             | Upgrade Option II         |             | Project Total        |
|--|--|------|----------|------------|--------------|---------------------|---------------------------|-------------|---------------------------|-------------|----------------------|
|  |  |      |          |            |              |                     | Quantity for this upgrade | Total (NZD) | Quantity for this upgrade | Total (NZD) |                      |
| 5.2  | <b>Fall from height/barrier provisions</b>   |      |          |            |              |                     |                           |             |                           |             |                      |
| 5.2.1  | Supply and install barriers compliant with the building code at locations where the stopbank slope is steep and there is no space for widening.  | LS   | -        | -          | 100,000.00   |                     |                           |             |                           |             |                      |
| 5.3  | <b>Adjustment of existing roads that cross the stopbanks</b>   |      |          |            |              |                     |                           |             |                           |             |                      |
| 5.3.1  | Adjust existing roads and accesses that cross the stopbanks to suit the raising of the stopbanks   | LS   | -        | -          | 300,000.00   |                     |                           |             |                           |             |                      |
| 5.4  | <b>Landscape Maintenance</b>   |      |          |            |              |                     |                           |             |                           |             |                      |
| 5.4.1  | Landscape maintenance including regermination and weeding (12 month period)  | LS   | -        | -          | 25,000.00    |                     |                           |             |                           |             |                      |
|  | <b>Section total (project wide)</b>  |      |          |            |              | <b>1,539,050.00</b> |                           |             |                           |             | <b>1,539,050.00</b>  |
| <b>Section 6 -- INVESTIGATIONS, INSPECTION OF SERVICES AND RELOCATION WORKS (PROJECT WIDE)</b> |  |      |          |            |              |                     |                           |             |                           |             |                      |
| 6.1  | Geotechnical ground investigations   | LS   | -        | -          | 250,000.00   |                     |                           |             |                           |             |                      |
| 6.2  | CCTV inspections for services  | LS   | -        | -          | 50,000.00    |                     |                           |             |                           |             |                      |
| 6.3  | Relocation of existing services (one fibreoptics and stormwater appurtenances)   | LS   | -        | -          | 500,000.00   |                     |                           |             |                           |             |                      |
|  | <b>Section total (project wide)</b>  |      |          |            |              | <b>800,000.00</b>   |                           |             |                           |             | <b>800,000.00</b>    |
| <b>Section 7 -- PRELIMINARIES AND GENERAL</b>  |  |      |          |            |              |                     |                           |             |                           |             |                      |
| 7.1  | Includes the following items:<br>Site establishment, incl temporary services, fencing, hardstandings, and removal of same on completion.<br>Diestablishment<br>Construction Management and Plans (QM, OHS, EMP, Water control)<br>Control of Water (dewatering of excavations, surface runoff diversion)<br>Work as executed Drawing markups<br>Defects Liability Period Services<br>Offsite overhead and profit | LS   | -        | -          | 20%          |                     |                           |             |                           |             | <b>2,854,823.40</b>  |
| <b>Section 8 -- ENGINEERING AND PLANNING SERVICES</b>  |  |      |          |            |              |                     |                           |             |                           |             |                      |
| 8.1  | <b>Engineering services including:</b><br>Preliminary Design<br>Detailed design and documentation<br>Construction Phase Engineering Services   | LS   | -        | -          | 10%          |                     |                           |             |                           |             | <b>1,427,411.70</b>  |
| 8.2  | <b>Planning and environmental management including:</b><br>Consents<br>Ecological and environmental management<br>Heritage and arboreal management   | LS   | -        | -          | 3%           |                     |                           |             |                           |             | <b>428,223.51</b>    |
| <b>Section 9 -- OTHER ALLOWANCES</b>   |  |      |          |            |              |                     |                           |             |                           |             |                      |
| 9.1  | Contingency  | LS   | -        | -          | 50%          |                     |                           |             |                           |             | <b>7,137,058.50</b>  |
| 9.2  | GST (15% of total)   | LS   | -        | -          | 15%          |                     |                           |             |                           |             | <b>3,918,245.12</b>  |
|  | <b>GRAND TOTAL (without GST)</b>   |      |          |            |              |                     |                           |             |                           |             | <b>26,121,634.11</b> |
|  | <b>GRAND TOTAL (with GST)</b>  |      |          |            |              |                     |                           |             |                           |             | <b>30,039,879.23</b> |

**NOTE:**

1. THIS COST ESTIMATE SHOULD BE READ IN CONJUNCTION WITH THE COST ESTIMATE ASSUMPTIONS REGISTER.