

JUNE 2011_V4

ENVIRONMENTAL MANAGEMENT STRATEGY (EMS)

CONVEYOR AND CHUTE

WASTE HANDLING PROCEDURES

FORMER QUARRY SITE AT OLD WALLGROVE ROAD EASTERN CREEK
MATERIALS PROCESSING CENTRE (MPC)
WASTE TRANSFER FACILITY ASSOCIATED WITH AN ADJACENT
PROPOSED SOLID WASTE LANDFILL
DOCUMENT CONTROL

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Relevant Conditions following Project Modification	Compliance Status
<p>7. Insert new condition 3a directly after condition 3: 3a The Proponent shall ensure that at no time is asbestos waste (as defined in the POEO Act) permitted to be placed in the conveyor/chute system for conveyance to the base of the landfill.</p>	<p>Complies – see extracted sections from EMS Waste Monitoring: 4,5,11,12, 13,14, 15 18,19 20,21,22,23,24,25,26,27,28,29,30</p>
<p>8. Insert new condition 16a and 16b directly after condition 16: 16a The Proponent shall prepare detailed design plans for the conveyor/chute system. These plans shall:</p> <ul style="list-style-type: none"> a) be prepared by a suitably qualified engineer in consultation with the DECCW; b) be submitted to the Director-General for approval prior to the commencement of construction; c) include the dimensions and gradients of the conveyor and chute; d) include a fully enclosed conveyor/chute system; e) include a waste drop height of no more than 3 metres between the end of the sock and the base of the quarry; f) incorporate fine mist sprays at the discharge end of the chute to minimise dust; and g) incorporate maintenance access points. 	<p>Partly complies The purpose of this EMS is to initiate discussions and consultations with the DECCW</p>
<p>16b The Proponent shall prepare a Conveyor and Chute System Maintenance and Management Plan. The Plan shall:</p> <ul style="list-style-type: none"> a) be submitted to the Director-General for approval prior to the commencement of operation; b) include a maintenance schedule; c) detail contingency measures in the event that the system breaks down, or is not coping with the intended quantities of waste; and d) detail contingency measures to remove asbestos waste from the system should it be detected. 	<p>For later compliance</p>

REQUIREMENT UNDER CONDITION 3A

The Proponent shall ensure that at no time is asbestos waste (as defined in the POEO Act) permitted to be placed in the conveyor/chute system for conveyance to the base of the landfill.

ACHIEVEMENT OF REQUIREMENTS UNDER CONDITION 3A

The Proponent shall adopt and enforce by the use of Work Directions the following Waste Management procedures:

Materials Receivable Process

Waste material will be delivered to the site by a combination of light, medium and heavy vehicles, with loads typically varying from approximately 1 to 40 tonnes (t) in weight.

The waste transporters will be required to ensure that incoming loads are covered prior to entering the facility.

All waste carrying vehicles entering the Materials recycling and Waste Transfer site will be weighed over the weighbridge.

The loads will be classified at the weighbridge in accordance with the Office of Environment and Heritage's, formerly the Department of Environment, Climate Change and Water ("DECCW") Material Composition Codes.

Classification will be based on advice from the carrier, inspection of the carrier's documentation prepared in accordance with the DECCW (2008) Waste Classification Guidelines and verification of this information by visual inspection using the weighbridge camera ('Check Point 1').

Non-complying loads identified e.g. putrescible, liquid and chemical waste, will be recorded as a rejected load and redirected off-site.

Depending on its constituent material, incoming vehicles will be directed to unload at the appropriate area as follows:

External Area

Segregated loads will be directed to go directly at the appropriate segregated stockpile either at the green/timber waste stockpiles or at the drop off zone (concrete, brick, ceramics, soils & sands).

Internal Area

Mixed loads suitable to undergo the recovery process will be directed to the MPC. Small mixed loads which can be unloaded by hand will be directed to the hand unload area at the western end of the MPC.

Material unable to be recycled at the site or separated (i.e. asbestos waste, loads that are so mixed they cannot be physically or economically separated) and loads of asbestos or asbestos contaminated materials, will be sent directly to landfill.

Loads of separated hardfill materials such as brick and concrete will be sent to the respective segregated waste areas.

A spotter at the MPC will inspect all loads tipped to ascertain that the material conforms to the material classification and will identify any non-complying material missed at Check Point 1.

When the spotter identifies a non complying material during unloading, the vehicle will be reloaded with the non complying material, which will be recorded as a rejected load and will be directed off-site.

After unloading, vehicles will then be reweighed at Weighbridge 1 to calculate the net vehicle weight and thereby recording the total weight of the load delivered, prior to exiting the site.

Preliminary Sorting

Mixed loads delivered to the MPC will be segregated where appropriate by material type and placed in adequate, appropriately labeled bays and bins for transport to appropriate areas for recycling, to landfill or off-site (as required).

The small loads unloaded at the hand unload area of the MPC will be sorted and placed into the segregated bays and bins by hand. Larger loads tipped at the work floor and which, because of their size or the extent of the comingling, are incapable of separation will be mechanically sorted by an automated screening and sorting mechanism.

Ferrous and non-ferrous metals recovered through the sorting process (generally by use of a magnet), as well as plastics and paper/cardboard will be sorted, placed into bays and bins and stored until transferred offsite..

Initially a pre-sort takes place. Recoverable goods capable of resale e.g. furniture items, will be directed to the recoverable goods bay for resale or re-use; other recoverable material will be retrieved from receptacles and placed within the appropriate stockpile to be processed.

The remaining material will be loaded into the shredder, and via conveyor for the automated sorting and screening process.

Any material remaining which is not segregatable or recoverable will be shredded.

The shredded residue following the automated recovery process will then be conveyed by covered conveyor from within the MPC building to the Weighing Assembly at the head of the downhill conveyor.

Asbestos Waste and Asbestos Contaminated Materials

Strict guidelines and procedures for the identification, storage, handling and disposal of asbestos waste and asbestos contaminated materials will be documented in the Waste Monitoring Program (WMP) for the site.

Asbestos waste disposal will meet EPL conditions and Clause 42 of the Protection of the Environment Operations (Waste) Regulation 2005 NSW. During operation of the Project all staff will be trained in accordance with the Industry Asbestos Awareness Course and will receive regular retraining.

Asbestos waste will be identified by the classification and spotting process described in Section 3.4.1 of EAR060239. Complying waste containing asbestos removed from mixed loads will be quarantined and sent for disposal to landfill.

Large waste loads containing only asbestos will be sent directly to landfill from the weighbridge to minimise unnecessary handling of the waste.

Upon receipt, if asbestos is in small quantity (small sealed bags) capable of being handled, bagged asbestos waste will be placed in designated clearly labelled, leak proof, sealed containers at the WTF for disposal at the landfill, and in accordance with procedures to be included in the WMP. Where practicable, stabilised asbestos waste received at the site that is in bonded matrix form and soil contaminated waste will be kept covered at all times.

Asbestos waste sent to landfill will be placed to a depth of at least 0.5 m from the landfilled surface on the same day it is received. Loads which have some loose fibres or are friable will require separate burial and accordingly will be placed in pre-prepared trenches and immediately covered.

Loads will be unloaded in such a manner as to avoid creation of dust. All asbestos waste processed at the site will be in accordance with the DECCW asbestos waste requirements for a general solid waste (non putrescible) licensed landfill.

Asbestos waste will not be shredded and will not be handled in any way within the MPC, except under the most stringent conditions applicable to bagged waste. Asbestos waste will be trucked to the base of the Quarry.

The following Guidelines have been adopted by the Proponent for the receipt, processing management and disposal of waste at the Facility.

ASSURING QUALITY OF INCOMING WASTE (BENCHMARK TABLE BM 21)

The Site Owner will intake a range of inert and solid wastes

A computerised system of recording waste entry will be implemented whereby the weighbridge load cell is linked to the main computer such that accurate records of the weight of incoming wastes can be recorded on a vehicle by vehicle basis.

The system is capable of being operated by a single user within the gatehouse and data obtained from the site can be transferred directly from the gatehouse to the Site Owner's Head Office.

Waste categorisation is required to be made by the gate operative who designates the incoming waste into the appropriate category according to DECCW's Material Composition Codes. All wastes being received at the facility must be tested and classified prior to receipt for disposal or recovery.

The gatehouse operative shall inspect appropriate documentation such as VENM certificates and waste classifications prepared in accordance with the NSW DECCW *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non Liquid Wastes*, 1997.

RECORDING INCOMING WASTES (BENCHMARK TABLES BM 21-23)

Quantification by weight and categorisation by type, which shall include a review of available documents, will enable the Site Owner to clearly distinguish between waste materials which are capable of recycling and those materials which cannot be recycled and must be disposed of by landfilling.

The records maintained by the MPC weighbridge also provide an accurate assessment of the amount of waste levy (tax) to be paid under S88 of the Protection of the Environment Operations Act and provides the Landfill Site Operator with the means of making waste returns to the DECCW in the appropriate format.

Yearly calibration of the weighbridge is to be conducted to ensure that the weights recorded are accurate.

A valid calibration record issued by the Department of Fair Trading certifying that the weighbridge has been properly calibrated will be available for inspection at all times in the site office.

WASTE DISPOSAL ARRANGEMENTS AND METHODS (BENCHMARK TABLE BM 21)

The waste management processes which are proposed at the MPC include the following:

Waste Reception and Preliminary Screening

Preliminary waste reception and visual screening (including questioning the waste transporter/driver regarding load characteristics) will be undertaken at the weighbridge facility.

All incoming vehicles and wastes will be directed through the waste reception area and the loads inspected by the weighbridge (gatehouse) operator.

Unacceptable (excluded) wastes shall be rejected, the DECCW shall be informed of the waste details, carrier and origin, and the carrier told to deliver the waste to an alternative appropriate licensed facility.

Wastes shall be weighed at the weighbridge in gross tonnes, or in the case of the small vehicles the weight of waste shall be calculated using published weight factors in accordance with the DECCW method.

The vehicles will then proceed beyond the weighbridge area along the main haul road where they will be directed by appropriate signage for unloading.

A suitably qualified and experienced person will be placed in a traffic management position to further determine the load contents and to assist in the determination of load contents

This person serves as an extra protective measure against the unloading of materials for which the MPC and landfill is not licensed or which the operator considers to be unacceptable.

SMALL LOADS: UNSEGREGATED WASTE MATERIALS

The Site Owner proposes a system of self-sorting of materials at designated areas of the site into receptacles placed and signposted for this purpose.

Materials capable of further separation or processing by crushing or grinding, thereby making them suitable for sale or for use in operational purposes, may be stockpiled in this area prior to treatment or where the treatment will occur.

LARGE QUANTITIES: BRICK, CONCRETE, DEMOLITION MATERIAL, VENM AND SOILS

Commercial quantities and hardfill type materials which are segregated prior to their arrival on site and do not require further treatment will be directed to the designated external area where these materials may be stockpiled.

UNSEGREGATED SOLID WASTE

General solid waste (mixed), after weighing on the inwards weighbridge will be deposited within the MPC.

Once tipping or emptying of vehicles is complete the vehicles return to weighbridge and are reweighed in order to determine the delivered amount.

Stage 1 of the mechanical processes of sorting unsegregated materials

Stage 1 of the mechanical process is achieved by the preliminary sorting and segregation, which takes place in the following locations:

- primary sorting at the MPC in respect of the contents of small bins; and
- secondary sorting in respect of the contents of large bins and truck loads of excavation material.

Mechanical processes consist of sorting and segregating materials so as to remove valuable recoverable materials – principally metals.

The aim of this preliminary gross sorting is to remove metals, wire, cylinders, batteries and materials of this nature which may be removed for re-use or have valuable re-use function without the need for intervention. The majority of this material can be removed by the use of a magnet or grapple.

Proscribed materials shall be removed and segregated at this stage; organic materials (including green waste) will be removed to the green waste stockpile;

- Liquid and chemical wastes are unacceptable wastes and will be dealt with under the provision for unacceptable wastes; and

The remaining undifferentiated material will be subjected to an automated process of preliminary shredding followed by screening and sorting [by automated mechanical means] with the result that materials will be differentiated into different classes.

Plastics, paper, timber, metals (including steel), cardboard, will be removed to designated areas for processing and recycling or sent to third party processors.

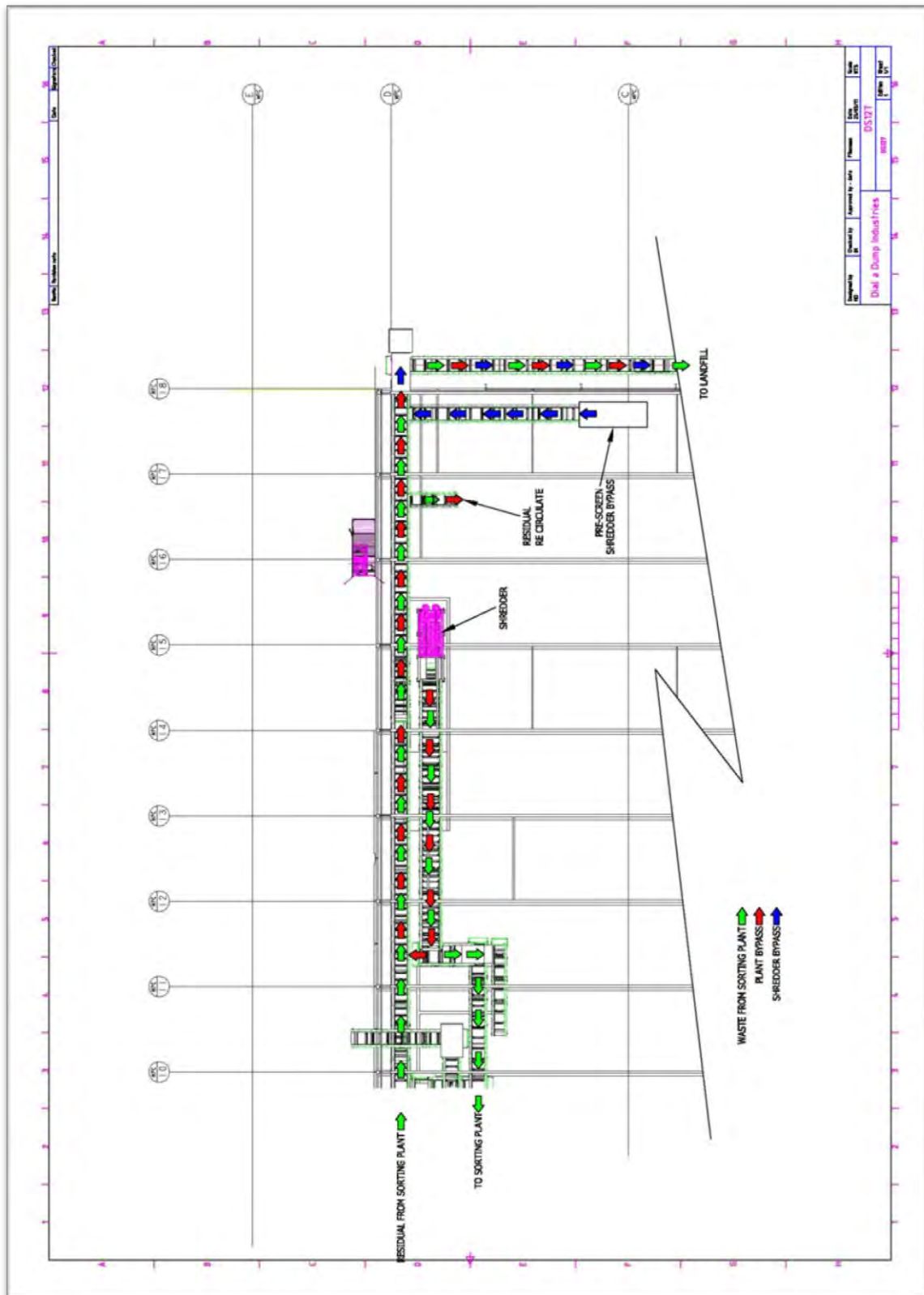
Metals (ferrous and non ferrous) will be either removed to the steel processing area of the site for sorting, shredding and shearing or sent to third party processors.

FINAL SORTING PROCESS FOR DISPOSAL

Material which is residual following the automated sorting process will be transferred by conveyor to the Weighing Assembly for weighing prior to disposal at Landfill.

The capability will exist to re-circulate material back within the process if it should be thought desirable.

Refer to Drawing DS127-2 overleaf.



ACCEPTABLE WASTE CATEGORIES (BENCHMARK TABLES BM 21, 22 & 23)

The MPC/WTF Operator/Site Owner will ensure that only *acceptable* wastes are transported on to the site for either landfilling or recycling purposes.

Should the load contain chemicals or hazardous material the DECCW will be informed of the nature of the load and the carrier's details including registration of the vehicle and the proposed destination (if known).

Acceptable wastes include:-

- Wastes, excluding putrescible wastes, that are assessed to be inert waste or solid waste following the technical assessment procedure outlined in Technical Appendix 1 of the *Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-Liquid Wastes* (DECCW, 1999)
- Waste as specified as inert waste or solid waste as defined in Schedule 1 of the *POEO Act*; and
- Bonded (non-friable) asbestos, asbestos fibre and waste resulting from the removal of thermal or acoustic insulating materials or from processes involving asbestos material provided that such materials are delivered sealed in heavy duty polytarp or plastic.

Asbestos wastes: asbestos contaminated soils and solid waste will be transported directly to landfill and disposed of by landfilling.

SYNTHETIC MINERAL FIBRE WASTES (BENCHMARK TABLES BM 21-23 & 34)

These wastes may be delivered and disposed in sealed containers by prior arrangement.

SLUDGES - PLIABLE AND SPADEABLE WASTES (BENCHMARK TABLES BM 3, 21-23 & 34)

Spadeable moist wastes will be accepted for transfer and disposal only under the following conditions:-

- should contain no free liquid;
- dry enough to be spadeable;
- slump free at 1 vertical on 2 horizontal;
- not contain materials above concentrations prescribed by DECCW as constituting 'restricted solid waste', 'hazardous wastes' or prescribed in the *Scheduled Wastes Chemical Control Order, 1994*;
- pass any prescribed leaching procedure; and
- other criteria established by DECCW in guidelines or statutes as may become applicable.

SPECIAL WASTES (BENCHMARK TABLES BM 21-23)

Clinical and related wastes classified as special waste shall **not** be permitted into the MPC., Special wastes which may be accepted but require prior treatment or particular disposal procedures include:

- bonded or stabilised asbestos wastes (not including friable asbestos); and
- tyres.

TYRES

Tyres will be received, handled and disposed according to the DECCW guidelines provisions set out in the site license.

Not more than 50 tonnes of Tyres may be stockpiled on site at any one time, in accordance with Schedule 3 Condition 1(c) of Project Approval MP06_0139.

SCHEDULED CHEMICAL WASTES

Scheduled chemical wastes are controlled by the *Scheduled Chemical Wastes Chemical Control Order, 2004* under the *Environmentally Hazardous Chemicals Act, 1985*. Scheduled Chemical Wastes will not be allowed into the MPC or the adjacent Landfill site.

DRUMMED WASTES (BENCHMARK TABLES BM 21-23)

Drummed wastes must be in solid form. Any drummed waste that arrives at the waste delivery area in liquid form will be rejected and returned to the gatehouse/weighbridge. Gatehouse staff will be informed of the carrier details and nature of the wastes, if known.

On no occasion will the drums be opened for inspection by operators or supervisory staff. Drummed liquid wastes will be quarantined pending disposal by the transporter, owner or originator. The Site Operator will inform DECCW and an Incident Report completed.

Drums containing authorised solid wastes will be accepted for transfer to an appropriately licensed landfill facility and disposed of there in accordance with their site licence conditions and EMS.

Drummed wastes shall not contain materials above concentrations prescribed by DECCW as constituting hazardous wastes or prescribed in the *Scheduled Waste Chemical Control Order 1994*, and should pass any prescribed leaching test. The wastes should satisfy other criteria as established in the *Environmental Guidelines: Assessment, Classification, & Management of Liquid & Non-Liquid Wastes*.

EMPTY DRUMS (BENCHMARK TABLES BM 21-23)

Empty drums must be observed to be pre-punctured to a sufficient state where no liquid contents could be reasonably present within the drum. Waste drums will be crushed by compactor. Where appropriate, the drums may be made available for recycling.

Drums which are not punctured or are insufficiently punctured will be classified as drummed wastes and disposal arrangements for drummed wastes will apply. Puncturing of drums onsite by transporters or owners of the wastes will not be allowed. Waste owners or transporters who attempt to puncture drums at the MPC will be

reported to the gatehouse/weighbridge (Supervisor Waste Management Facility) and directed back to the weighbridge quarantine area of the MPC and an Incident Report completed.

UNACCEPTABLE WASTES (BENCHMARK TABLES BM 21-23)

Unacceptable wastes include any materials which do not fall into the above categories. These include but are not limited to:-

- liquid wastes;
- explosives;
- poisons;
- dangerous goods;
- radioactive materials;
- clinical, hospital and related wastes;
- loose, uncovered (non-bonded) or friable asbestos;
- scheduled pharmaceuticals;
- hazardous waste,
- restricted waste
- scheduled wastes; and
- putrescible wastes.

Screening of wastes at the gatehouse/weighbridge would normally eliminate these wastes from entry to the site.

PUTRESCIBLE WASTES

Putrescible wastes include food or animal matter, and unstable or untreated biosolids. This material will **NOT** be allowed into the MPC or the adjacent landfill.

REMOVAL OF UNACCEPTABLE WASTES (BENCHMARK TABLE BM 21)

Vehicles attempting to leave unacceptable or excluded wastes at the MPC will be identified and directed to return to the weighbridge. The licensee (operator) will record details of the waste and carrier and communicate this information to the gatehouse and thence to the DECCW under the provisions of the *POEO Act*.

If tipping has occurred then the operator will (if safe to do so), segregate and isolate and/or remove any unacceptable wastes which have been deposited at the MPC and transport the wastes to a designated quarantine area or other suitable location, where the wastes will be securely stored until off-site disposal arrangements are made by the original carrier.

If the carrier or owner of the wastes does not make arrangements for the waste to be collected within 24 hours a fee will be charged for storage of the wastes, and if within 48 hours the wastes have not been collected then the operator will make arrangements for the waste to be tested and disposed at an appropriate licensed facility and the owner or carrier of the wastes will be billed for the costs involved.

The site owner will inform DECCW within 24 hours of the nature, origin, carrier, transporter and owner of the wastes and inform the DECCW of the ultimate fate (if known) of such wastes. Details will be reported in monthly reports and summarised in the annual report.

BONDED OR STABILIZED ASBESTOS (CATEGORY 1) WASTES

The Site Operator will typically deal with bonded asbestos from the Construction and Demolition waste stream and not with loose and friable asbestos which can pose risks of generating airborne fibres if disturbed.

Asbestos wastes will be dealt with at the site through a series of measures as follows:

1. Staff training in accordance with the Industry Asbestos Awareness Course and follow up course by trained in house staff or by external trainers to be undertaken on a regular basis at least once a year;
2. Checking and inspection of incoming materials prior to stockpiling or processing to minimise the risk of asbestos wastes as follows:
 - a. First inspection will be conducted when the load arrives at the facility,
 - b. Second inspection at the checkpoint for traffic management and further load inspection, and
 - c. Third inspection when materials are unloaded.
3. Independent auditing of this system which minimises the risk of the presence of asbestos and other contaminants;
4. Recording of non-complying generators illegally disposing of asbestos wastes; and

5. Redirecting of asbestos wastes to other appropriate facilities or landfilled at the site in accordance with strict regulatory guidelines as set out below.

Wastes that contain asbestos will not be mixed with other wastes.

All asbestos will be carefully unloaded under supervision by the operator.

Disposal of asbestos will be required to meet the site license conditions and comply with Clause 42 of the *Protection of the Environment Operations (Waste) Regulation 2005 NSW*.

The requirements to be implemented by the site operators regarding the collection, storage and landfilling of asbestos wastes are as follows:

- Unbagged, uncovered or unsecured asbestos fibre and dust waste will be directed back to the quarantine and gatehouse area for redirection and the DECCW will be informed and an incident report completed. Waste that is classified as loose or fibrous will not be dealt with except in accordance with the following procedures:
 - the waste will be bagged and covered in such a manner so as to prevent the emission of any dust;
 - the waste will be collected and stored in impermeable bags,
 - each bag will be made of heavy duty low density polyethylene of at least 0.2 mm thickness, and have dimensions of no more than 1.2 m in height and 0.9 m in width,
 - each bag must be sealed by a wire tie, and contain no more than 25 kg of waste, and
 - each bag must be marked with the words “CAUTION ASBESTOS” in letters of not less than 40 mm and which comply with *AS 1319—1994, Safety signs for the occupational environment*.
- If asbestos waste in any form is stored in a bag, the following procedures will be followed;
 - the bag will be placed in a leak-proof container that is used only for the purposes of storing asbestos waste;
 - the container will be marked with the words “DANGER—ASBESTOS WASTE ONLY—AVOID CREATING DUST” in letters of not less than 50 mm and which comply with the Australian Standard, and
 - the container will have a close-fitting sealed cover so as to prevent any spillage or dispersal of the waste,
- If asbestos waste that is in the form of stabilised asbestos waste in bonded matrix is stored otherwise than in a bag, the following procedures will be followed:
 - the waste will be wetted so as to prevent the emission of any dust,
 - in wetting the asbestos waste, special care will be taken to ensure that the wetting process does not cause any emission of dust or lead to any discharge of polluted water, and
 - the waste will then be kept covered at all times.

Asbestos waste will be stored in a secure area so as to prevent entry by unauthorised persons and to prevent the risk of environmental harm and where possible will be stored separately from other types of waste.

Covered containers carrying bagged waste will be transported to the Landfill base by truck **and not transported by chute**. There the containers will be unloaded in the manner described below.

For the disposal of asbestos waste at the Landfill, the waste will be by way of burial at least to a depth of 0.5m on the same day it is received. Loads requiring separate burial (i.e. which have some loose fibres or are friable in condition) will be placed in pre-prepared trenches and immediately covered by the operator.

For logistic reasons co-disposal of asbestos materials if accepted with general refuse, will be practiced in preference to separate (monofill)/segregated asbestos burial at one (single) location in the Site.

In disposing of asbestos waste in any form at the landfill, the waste will be unloaded in such a manner as to avoid the creation of dust. The waste will not be compacted before it is covered and will not come into contact with any earthmoving equipment at any time.

REQUIREMENTS UNDER CONDITION 16A

The Proponent shall prepare detailed design plans for the conveyor/chute system. These plans shall:

- a) be prepared by a suitably qualified engineer in consultation with the DECCW;*
- b) be submitted to the Director-General for approval prior to the commencement of construction;*
- c) include the dimensions and gradients of the conveyor and chute;*
- d) include a fully enclosed conveyor/chute system;*
- e) include a waste drop height of no more than 3 metres between the end of the sock and the base of the quarry;*
- f) incorporate fine mist sprays at the discharge end of the chute to minimise dust; and*
- g) incorporate maintenance access points.*

ACHIEVEMENT OF REQUIREMENTS

Waste Transferred to Landfill

All materials suitable for landfilling and incapable of being recovered, re-used or recycled will be directed from the MPC to the landfill premises.

Transfer to Landfill can occur in one of two ways:

1. By dump truck or road truck as described in the EAR, [this applies to all asbestos or asbestos contaminated waste]. This process has been fully described in the EAR.

or

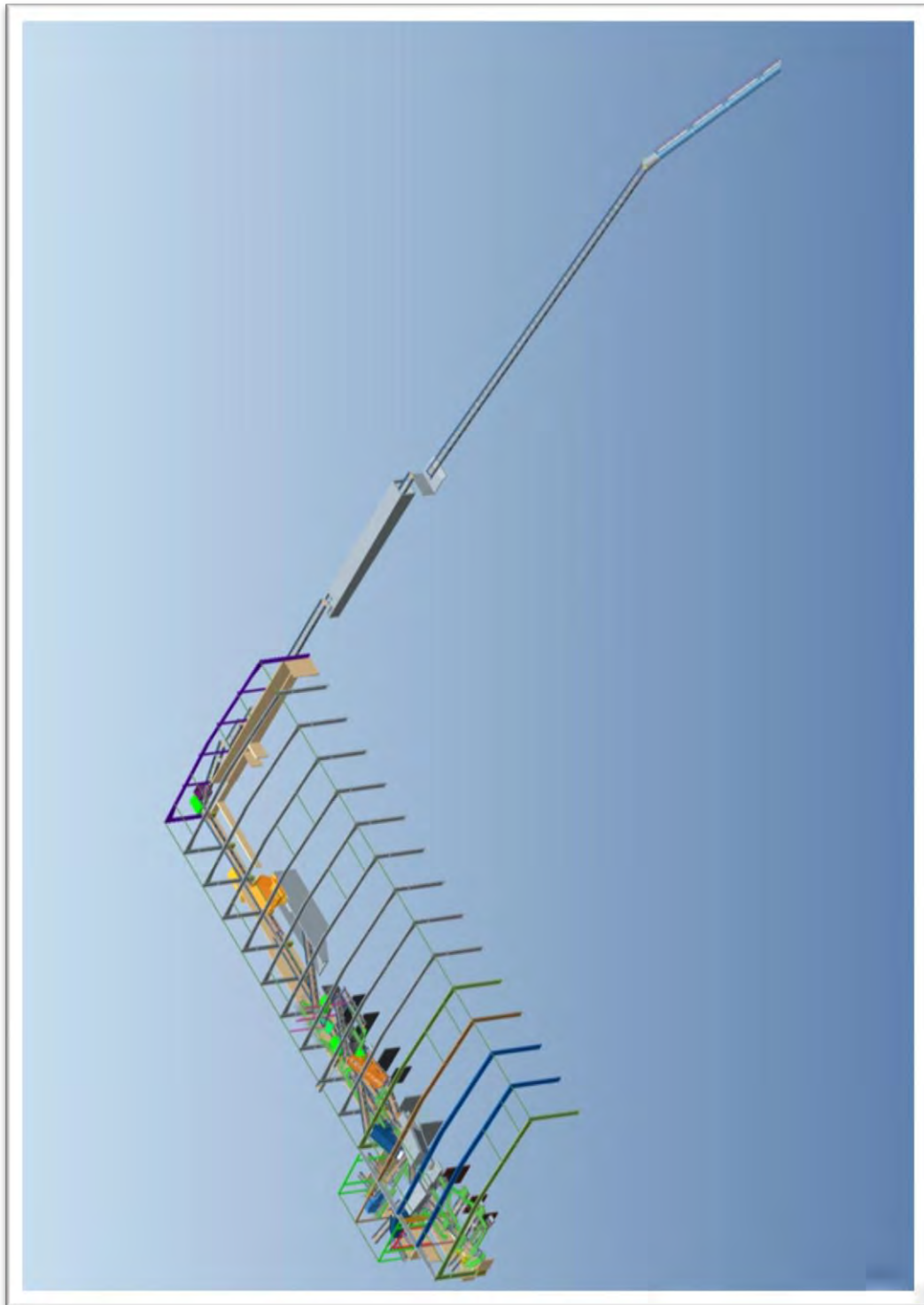
2. By conveyor and chute [this applies to all other non recyclable waste or residual waste transferred from the MPC]. This process was outlined in the EAR lodged with the Department of Planning for the Project Modification [Chute Construction].

All unsegregated [mixed waste] material will be deposited within the MPC after the transporting truck has been weighed over the incoming weighbridge.

Preliminary sorting will take place within the MPC to recover salvageable materials.

A series of shredding and screening plants will be located within the MPC, each connected by conveyors.

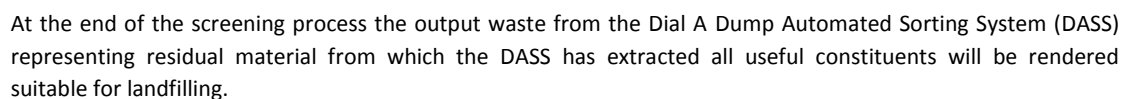
A visual representation of this shown below.



Each item of plant within the Dial A Dump Automated Sorting System (DASS) configuration performs a different automated function specifically designed to separate materials by material types.

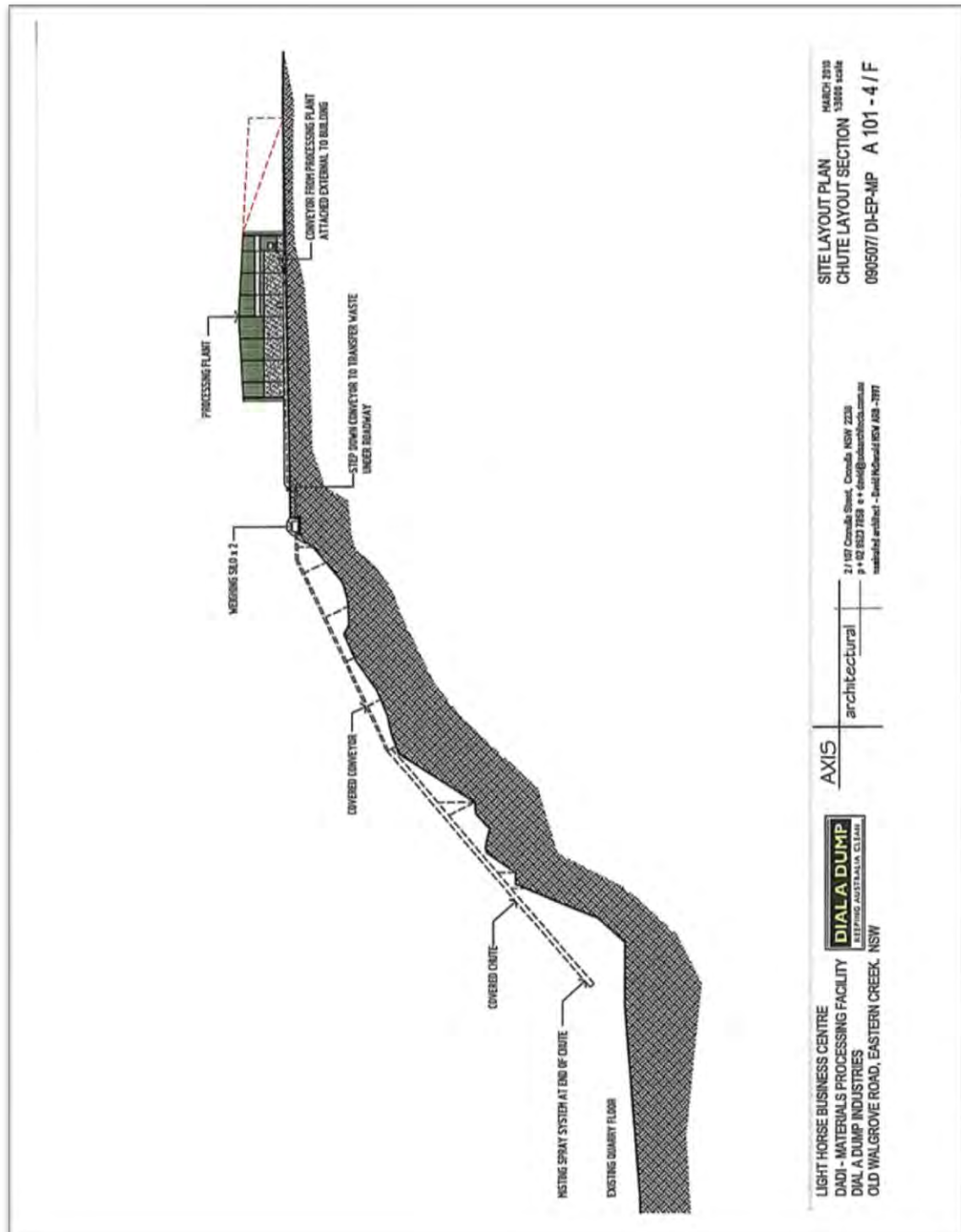
The mixed waste material will be loaded by loader or excavator into the shredder which will reduce the particle size then permitting each subsequent screening process to occur.

The flow of materials is shown on the following diagram.



At the northern end of the MPC building at the location shown on plan Jones Nicholson Plan S02-B, a covered conveyor will exit the MPC building and thence to the Weighing Assembly (refer Appendix D).

It had been suggested that Weighing Silos would be located at the position shown near the Quarry edge as seen in Plan Ref A101-4/F.



Further developments undertaken by the Proponent's design engineers have produced a design whereby the Weighing Assembly may be more conveniently located immediately adjacent to the MPC building rather than at the Quarry edge, as was earlier proposed and shown in Axis Drawing A101-4/F.

By locating the Weighing Assembly closer to the MPC building, the Proponent has improved the opportunities for inspection, testing and maintenance of it.

The entire Weighing Assembly will be fitted with static measuring load cells of a kind approved by the NSW Department of Fair Trading and the entire assembly will be weighed as a weighbridge.

Alternating filling of Weighing Assembly is indicated on pp 14 of the DADI Eastern Creek Weighing Process and Waste Transfer Chute Report, attached at Appendix A.

Further drawings of the Weighing Assembly are attached in Appendix C.

Transportation Capacity

The capacity of the conveyor system to weigh, pause and discharge contents is shown in the Weighing Process and Waste Transfer Chute Report.

That report indicates a minimum throughput of 6 tonnes per hour and a maximum of 200 tonnes per hour.

Weighing Process

The Weighing Assembly consists of two separate conveyors operating and weighing alternately. When the conveyor reaches its established maximum weight that conveyor will automatically pause and the weight of the entire assembly will be automatically recorded for the purposes of DECCW records. From the gross weight of the assembly and the waste (within the hopper upon it) will be deducted the unloaded or tare weight of the assembly, leaving a record of the waste together with the time, date and waste classification.

During the pause period of the first conveyor and hopper assembly (to enable weighing) a secondary conveyor will become operational and it too will begin to fill its second hopper to capacity. As the first assembly resumes movement (after weighing) the second assembly will pause in turn for its weight to be recorded in the same manner.

Each will operate alternately so that when one is filling the other is being weighed and emptied.

Discharge and Conveyance of Material

Following the recording of the weight of the waste filled hopper the conveyor will once again resume operation, discharging its contents onto another conveyor which is enclosed and passes within a culvert located underneath the road and thence to the downhill conveyor.

The downhill conveyor is shown on the marked up Jones Nicholson Plan S13-B (refer Appendix D).

Material discharged from the hopper will be carried by the fully covered downhill conveyor and in turn empty into a covered chute down which the waste travels the remainder of the distance to floor of the quarry.

The end of the chute will be fitted with a water spray and also a sock made of canvas or similar material in order to mitigate dust effects, and prevent waste from falling more than 3 metres.

Waste will then be pushed around the landfill by bulldozer and compactor.

REQUIREMENT UNDER CONDITION 9A

Construction works associated with the weighing silos, [downhill] conveyor and chute system shall be:

- a) the subject of appropriate certification from qualified geotechnical and civil engineers; and*
- b) in accordance with the relevant Australian Standards.*

Geotechnical Considerations

Jeffrey and Katauskas Consulting Geotechnical Engineers have certified geotechnical conditions to be appropriate for the construction of the conveyor and chute. Refer to Appendix B for letter from Jeffrey and Katauskas about the feasibility of the construction of the chute.

Jones Nicholson Consulting Engineers have prepared technical certifications and specifications (refer Appendix D).

Chute design

Dimensions

See drawings 080233-S04-Chute Sections-6 (see page 18 in Appendix A) for dimensional details on the chute and conveyor system.

The conveyor will be approximately 87m long running at 20 degrees with an effective width of 1500mm which will feed material into the chute. The chute will be 81m long running at 50 degrees with an internal diameter of 1.9m.

Gradient

The conveyor will be running at 20 degrees and the chute at 50 degrees as per 080233-S04-Chute Sections-6 (see page 19 in Appendix A).

Footings

Footings have been designed for an allowable bearing capacity as noted in the pad footing schedule this foundation material shall be uniform and be approved by the engineer for this pressure before placing reinforcement or concrete. For more details on the footings refer to 080233-S01-Notes Sheet-1 (refer overleaf and Appendix D).

Access and walkways

The conveyor will be serviced via two platforms running parallel to the conveyor over its entire length. Entry to these platforms will be via the culvert. From the platforms all maintenance for the conveyor can be carried out. Access to the chute will be via an Abseil Access Corridor which will be mounted centrally on the top surface of the chute. Entry to the Abseil Access Corridor will be via the conveyor access platforms. From this corridor all aspects of maintenance and inspection for the chute can be carried out.

In the event that additional access is required to the conveyor or chute this will be obtained via mobile access platforms.

Safety

All aspects of the system will be adequately guarded as per the relevant Australian Standard:

Conveyors:

AS 1755-2000 safety requirements.

AS 1755-1986 Design, construction, installation and operation safety requirements.

Access:

AS 1657-1992 Fixed platforms, walkways, stairways and ladders. Design Construction and installation.

AS 4488 Industrial rope access systems specifications.

AS 1891-1983 Industrial safety belts and harnesses.

Access to the conveyor will be via a locked gate in the culvert. Access to the conveyor and chute will only be granted to skilled and trained personal while the plant is shutdown.

This will be in addition to all required safety features i.e. emergency stops, lockouts etc.

Blockages

Should the conveyor become blocked the plant will be immediately shutdown and personal will unblock the conveyor manually via the two access platforms running alongside the conveyor.

Should the chute become blocked the plant will be immediately shutdown and personal will unblock the conveyor manually via the Abseil Access Corridor located on the chute. Direct access to the blockage would be through one of the three maintenance hatches located in the top surface of each 9M section of the pipe. The blockage would be removed via high powered water cutting lances operated by skilled and trained personal. Each 9M section of pipe will have three 1250mm x 300mm maintenance hatches and one centrally located connection point for a water lance.

Water Supply

The water supply for the misting system and water lances will come from the on-site irrigation system.

Sprays and Sprinklers

In addition to the on-site misting system, the exit point of the chute will have a misting system fitted via the pipe flange. The water supply for the misting system will come from the on-site irrigation system. Pipework for the misting system will run alongside the Abseil Access Corridor and conveyor access platforms.

APPENDIX A



Commercial in Confidence

DADI EASTERN CREEK WEIGHING PROCESS AND WASTE TRANSFER CHUTE

Dial A Dump Industries Pty Ltd

ABN 75 131 565 583

PO Box 1040

MASCOT NSW 1460

T: 9519 9999 / F: 9519 5999

Email: customerservice@dadi.com.au

Contents

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Material flows and sizing for conveyors leading to the chute.	5
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Power required for conveyors	7
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Introduction

Input waste from conveyor one is diverted to one of two conveyors, conveyor two or three, material is allowed to build up on the conveyor until the weight of the material reaches 500kg. Once the target weight is reached the input waste from conveyor one is diverted to the second weighing conveyor. Once the material is diverted and no more material is being fed onto the first weighing conveyor the material is weighed. Once weighed the material is ejected onto conveyor four which transfers the material to conveyor five, then conveyor six which is a downhill conveyor and finally into the chute system.

Design criteria

Handle maximum of 200TPH at 1600kg/m^3 .

Handle minimum of 6TPH at 200kg/m^3 .

Handle maximum material lump size of 450mm.

Include a fully enclosed conveyor/chute system.

Include a waste drop height of no more than 3 metres between the end of the sock and the base of the quarry.

Include a waste drop height of no more than 3 metres between the end of the sock and the base of the quarry

Incorporate maintenance access points.

Material flows and hopper sizing for weighing conveyors

Target weight of 500kg on each the conveyor before material is weighed.

200TPH at 1600kg/m³

Feed rate of 55.55kg/s therefore 9.0 seconds to deliver 500kg.

Volume of 500kg of material at 1600kg/m³: 0.3125m³

Therefore minimum volume of hopper is 0.3125m³

6TPH at 200kg/m³

Feed rate of 1.66kg/s therefore 301 seconds to deliver 500kg.

Volume of 500kg of material at 200kg/m³: 2.5m³

Therefore minimum volume of hopper is 2.5m³

Due to the volume required of the lighter material to achieve the minimum 500kg weight the minimum size of hopper is 2.5m³. To allow for coning and rolling of the material a minimum of 5m³ will be selected.

Minimum weight on the conveyor at any time will be 500kg.

Material flows and sizing for conveyors leading to the chute

200TPH at 1600kg/m³

Feed rate of 55.55kg/s

Volume of 0.0347m³/s

Conveyors running at 1.25m/s

Burden depth of material $0.0347 / (1.25 * 1.3) = 0.02135\text{m}$

Burden depth of material is 0.02135m; this assumes that the material is of a uniform density and is a free flowing material that demonstrates liquid like properties during settling on the belt. In practice the material will not be of a uniform density and will not display liquid like properties during settling on the belt and will have large amounts of vacant space in the material flow therefore we can assume that the burden depth of the material will be 250% greater than the theoretical value.

Adjusted burden depth of the material $0.02135 * 2.5 = 0.053\text{m}$

6TPH at 200kg/m³

Feed rate of 1.66kg/s

Volume of 0.008m³/s

Conveyors running at 1.25m/s

Burden depth of material $0.008 / (1.25 * 1.3) = 0.0049\text{m}$

Burden depth of material is 0.0049m; this assumes that the material is of a uniform density and is a free flowing material that demonstrates liquid like properties during settling on the belt. In practice the material will not be of a uniform density and will not display liquid like properties during settling on the belt and will have large amounts of vacant space in the material flow therefore we can assume that the burden depth of the material will be 250% greater than the theoretical value.

Adjusted burden depth of the material $0.0049 * 2.5 = 0.0123\text{m}$

Conveyor sizing

As the in feed conveyor to the weighing system has been previously selected as a 1500mm wide belt conveyor, the conveyors in the weighing system and leading to the chute will also be 1500mm wide.

Useable width of a 1500mm wide belt conveyor is to be taken as 1300mm.

Weigh conveyor lengths:

Both conveyors must be capable of holding a minimum of 5m³ of material in a hopper mounted on the conveyor. Based on a conveyor width of 1.3m and a hopper height of 1.2m the minimum length of the hopper would be 3.2m

The overall length of the conveyor is to be kept to a standard length that allows for ease of installation and maintenance. A length of approx. 6.6m was selected.

Power required for conveyors

Conveyor name	conveyors 2&3
G (acceleration due to Gravity)	9.807
Belt Width	1.5m
Drum Centres	6.6m
Drum Diameter	0.4m
200 tonnes per hour	55.55Kg/s
Tonnes/metre cubed	1600Kg/m ³
Weight of belt	11Kg.m
Coefficient of friction (static)	0.6
Coefficient of friction (moving)	0.6
Acceleration time	2s
Depth of material	1.2m
Volume delivered per second	0.0347m ³ /s
Linear velocity	1.25m/s
Angular speed	6.25rad/s
RPM	60.27000964
Gearbox Ratio	24.4732:1
Efficiency of gearbox	0.97
Load	645.2kg
Force	4199.74N
Torque required accelerate	839.947168Nm
Angle	0 degrees
Sin of angle	0
Force at angle	4199.73584N
Torque required to accelerate at angle	839.947Nm
Power required	5.46KW

Both weigh conveyors are identical.

Conveyor name	Conveyor 4
G (acceleration due to Gravity)	9.807
Belt Width	1.5m
Drum Centres	25m
Drum Diameter	0.4m
200 tonnes per hour	55.55Kg/s
Tonnes/metre cubed	1600Kg/m ³
Weight of belt	11Kg.m
Coefficient of friction (static)	0.6
Coefficient of friction (moving)	0.6
Acceleration time	2s
Depth of material	0.053m
Volume delivered per second	0.0347m ³ /s
Linear velocity	1.25m/s
Angular speed	6.25rad/s
RPM	60.27000964
Gearbox Ratio	24.4732:1
Efficiency of gearbox	0.97
Load	3306kg
Force	21519.42N
Torque required accelerate	4303.88304Nm
Angle	0 degrees
Sin of angle	0
Force at angle	21519.42N
Torque required to accelerate at angle	4303.88304Nm
Power required	28.00KW

Conveyor name	Conveyor 5
G (acceleration due to Gravity)	9.807
Belt Width	1.5m
Drum Centres	28m
Drum Diameter	0.4m
200 tonnes per hour	55.55Kg/s
Tonnes/metre cubed	1600Kg/m ³
Weight of belt	11Kg.m
Coefficient of friction (static)	0.6
Coefficient of friction (moving)	0.6
Acceleration time	2s
Depth of material	0.053m
Volume delivered per second	0.0347m ³ /s
Linear velocity	1.25m/s
Angular speed	6.25rad/s
RPM	60.27000964
Gearbox Ratio	24.4732:1
Efficiency of gearbox	0.97
Load	3702.72kg
Force	24101.75N
Torque required accelerate	4820.349Nm
Angle	0 degrees
Sin of angle	0
Force at angle	24101.75N
Torque required to accelerate at angle	4820.349Nm
Power required	31.36KW

Conveyor name	Conveyor 6
G (acceleration due to Gravity)	9.807
Belt Width	1.5m
Drum Centres	88m
Drum Diameter	0.4m
200 tonnes per hour	55.55Kg/s
Tonnes/metre cubed	1600Kg/m ³
Weight of belt	11Kg.m
Coefficient of friction (static)	0.6
Coefficient of friction (moving)	0.6
Acceleration time	2s
Depth of material	0.053m
Volume delivered per second	0.0347m ³ /s
Linear velocity	1.25m/s
Angular speed	6.25rad/s
RPM	60.27000964
Gearbox Ratio	24.4732:1
Efficiency of gearbox	0.97
Load	11637.12kg
Force	75748.34N
Torque required accelerate	15149.6683Nm
Angle	20 degrees
Sin of angle	0.342020143
Force at angle	85213.82776N
Torque required to accelerate at angle	17042.766Nm
Power required	110.88KW

Notes on conveyor 6

Conveyor 6 is a downhill conveyor feeding the chute.

Due to the conveyor running at a negative angle the conveyor will be fitted with a mechanical brake so that if the power to the motor fails or is turned off the brake will stop the conveyor from running away.

Chute design

The chute is to be designed to transfer material to the base of the quarry.

The chute must be able to handle the expected tonnages and volumes of waste that will be fed into it

Handle maximum of 200TPH at 1600kg/m^3 .

Handle minimum of 6TPH at 200kg/m^3 .

Handle maximum material lump size of 450mm.

Include a fully enclosed conveyor/chute system.

Include a waste drop height of no more than 3 metres between the end of the sock and the base of the quarry.

Include a waste drop height of no more than 3 metres between the end of the sock and the base of the quarry

Incorporate maintenance access points.

Taking one particle of the waste stream entering the chute and assuming that the object starting speed is 1.25m/s , the coefficient of friction between the chute and the object is 0.4 , the object starts from the top of the chute giving a sliding length of 81 metres and it does not roll we can calculate the following for the objects acceleration and final velocity.

Acceleration:

$$F = \mu N = \mu mg \cos 50$$

$$Ma = mg \sin 50 - \mu mg \cos 50$$

$$\text{So } a = g \sin 50 - \mu g \cos 50$$

$$A = 4.99\text{m/s}$$

Final velocity:

$$V_f^2 = V_i^2 + 2ad$$

$$V_f^2 = 1.25^2 + 2 * 4.99 * 81$$

$$VF = 28.45\text{m/s}$$

This equation does not account for air resistance as the drag coefficient for the waste stream is undeterminable. Based on the above calculations the material will rapidly accelerate upon entering the chute and the material stream will thin before exiting the chute.

Chute capacity

Based on a maximum material volume entering the chute of $0.0347\text{m}^3/\text{s}$ at the start of the pipe the cross sectional area of the material can be given by:

$\text{CSA} = \text{Effective conveyor width} * \text{burden depth}$

$\text{CSA} = 1.3 * 0.053$

$\text{CSA} = 0.0689\text{m}^2$

The smallest section of the chute is 2.28m, giving a CSA of 5.544m^2 . This is 80.46 times larger than the material CSA. Based on the above calculations the chute will be large enough at its smallest location to handle the waste stream as well as any miscellaneous items that manage to enter the system up to 1950mm long. The presence of items greater than 450mm long in the system is highly unlikely as the shredder will size material to 450mm.

Maintenance access

Access to the weigh conveyors will be via a series of stairways and access platforms that will provide uninhibited access to all parts of the conveyors. The weighing conveyor system will be fully sealed and access doors will be fitted to all transfer chutes for maintenance access.

Access to the chute and downhill conveyor will be via a series of access platforms and stairways that will run alongside the chute and conveyor. The motor/gearbox and braking system for the downhill conveyor will be located at the base of the culvert for ease of maintenance. Access to the platforms and stairways for the chute and downhill conveyor will also be from the base of the culvert. The covers on the conveyors and weighing system will have removable sections for maintenance.

The chute will have regular inspection points throughout its length.

Material drop height

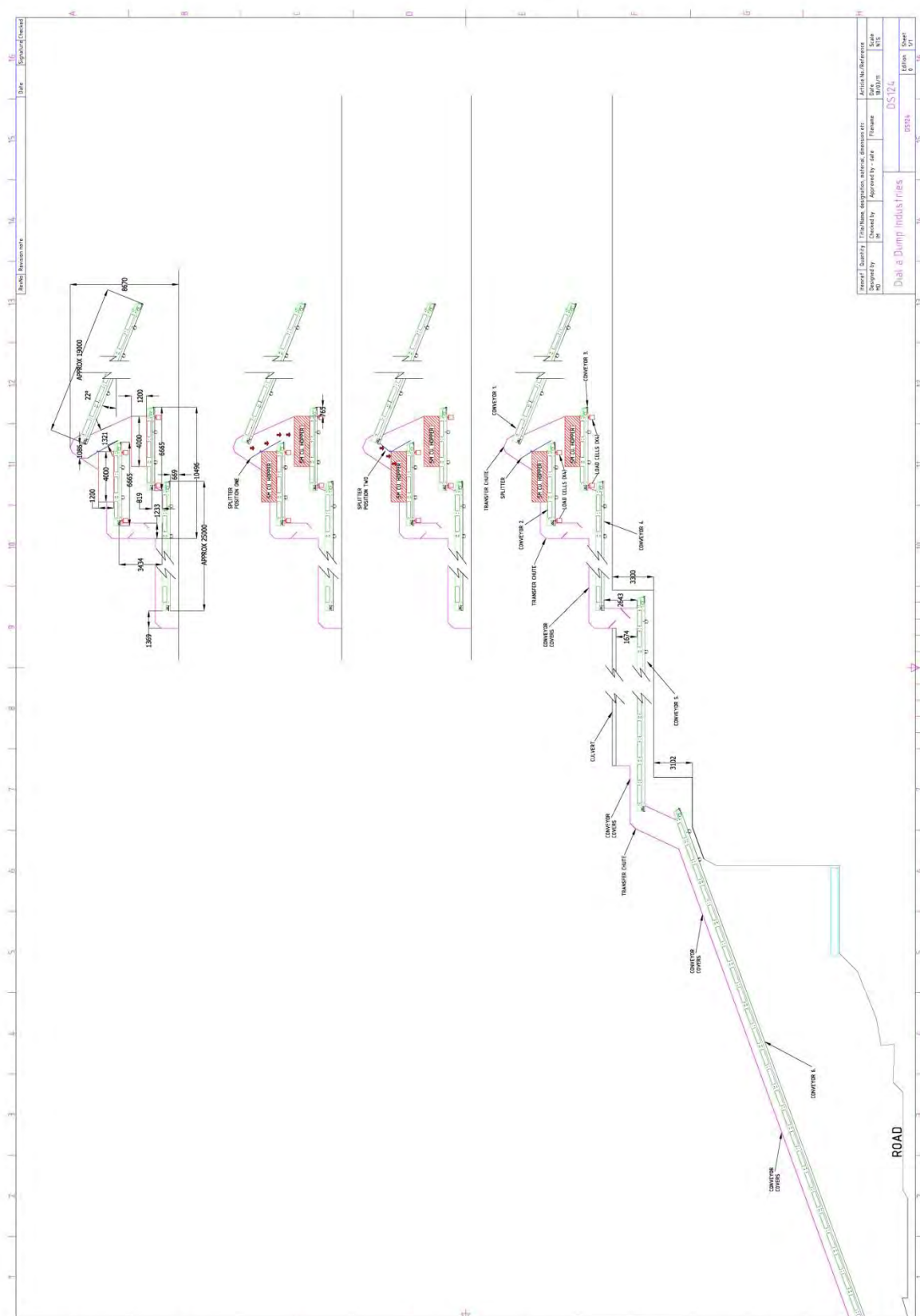
The maximum material drop height in the weighing system is currently 1.9m.

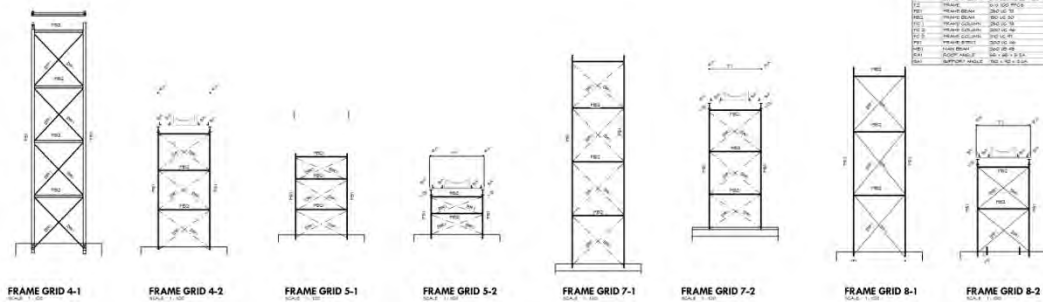
Once the material exits the chute it will be guided through a material sock that will then drop the material from a height of no greater than three metres.

Dust suppression

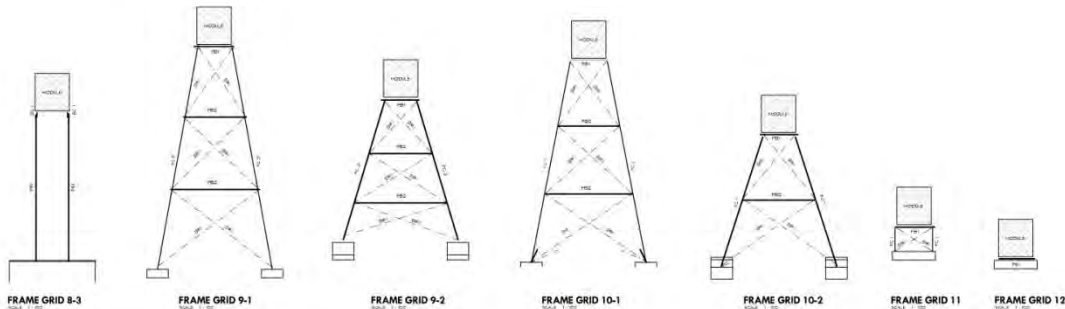
The entire conveyor system including the weighing system will be fully sealed once it leaves the MPC building. The chute is a fully enclosed system. Once the material exits the sock that will guide material to the ground it will past through a misting system to eliminate dust.

Appendix





MARK	MEMBER	SIZE	COMMENTS
801	STEEL COLUMN	200 x 200	
802	STEEL COLUMN	200 x 200	
803	STEEL COLUMN	200 x 200	
804	STEEL COLUMN	200 x 200	
805	STEEL COLUMN	200 x 200	
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811	STEEL COLUMN	200 x 200	
812	STEEL COLUMN	200 x 200	
813	STEEL COLUMN	200 x 200	
814	STEEL COLUMN	200 x 200	
815	STEEL COLUMN	200 x 200	
816	STEEL COLUMN	200 x 200	
817	STEEL COLUMN	200 x 200	
818	STEEL COLUMN	200 x 200	
819	STEEL COLUMN	200 x 200	
820	STEEL COLUMN	200 x 200	



MARK	MEMBER	SIZE	COMMENTS
801	STEEL COLUMN	200 x 200	
802	STEEL COLUMN	200 x 200	
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814	STEEL COLUMN	200 x 200	
815	STEEL COLUMN	200 x 200	
816	STEEL COLUMN	200 x 200	
817	STEEL COLUMN	200 x 200	
818	STEEL COLUMN	200 x 200	
819	STEEL COLUMN	200 x 200	
820	STEEL COLUMN	200 x 200	

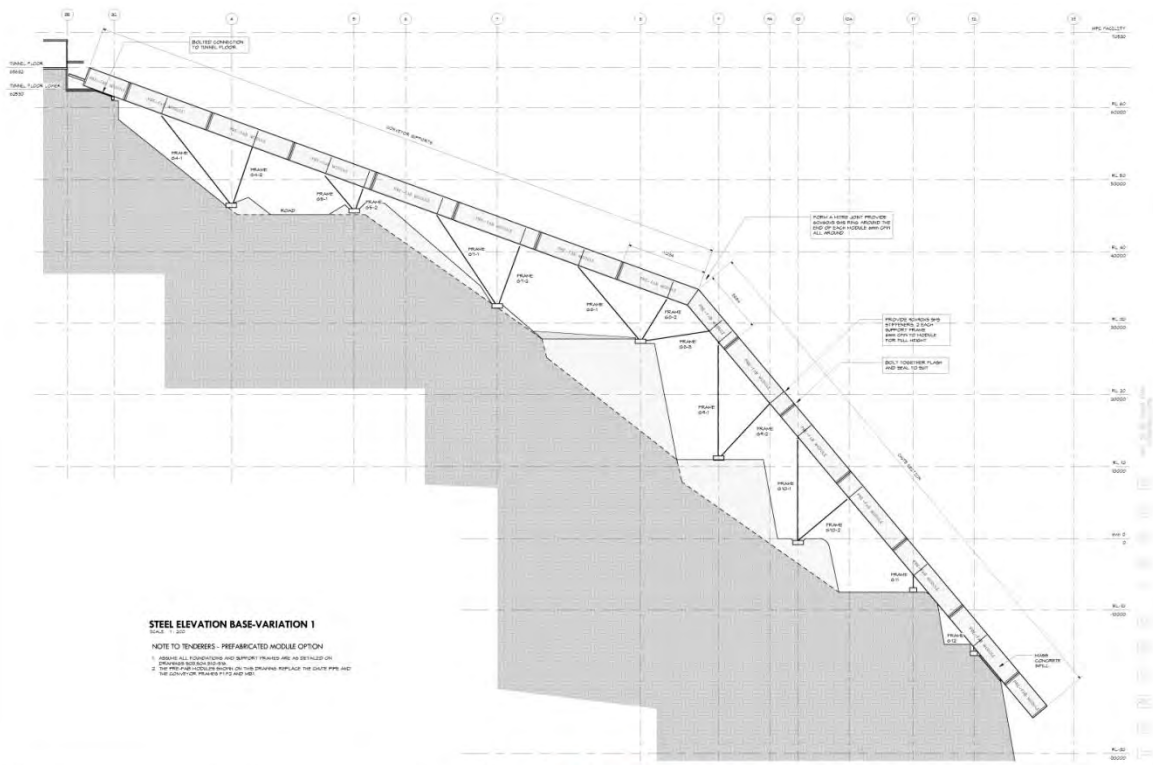
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PTY LTD
100 WILSON ROAD
DIAL A DUMP
DIAL A DUMP

STEEL FRAME
ELEVATIONS

LHBC CHUTE AND
CONVEYOR
DIAL A DUMP

080233
S14 B



MARK	MEMBER	SIZE	COMMENTS
801	STEEL COLUMN	200 x 200	
802	STEEL COLUMN	200 x 200	
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811	STEEL COLUMN	200 x 200	
812	STEEL COLUMN	200 x 200	
813	STEEL COLUMN	200 x 200	
814	STEEL COLUMN	200 x 200	
815	STEEL COLUMN	200 x 200	
816	STEEL COLUMN	200 x 200	
817	STEEL COLUMN	200 x 200	
818	STEEL COLUMN	200 x 200	
819	STEEL COLUMN	200 x 200	
820	STEEL COLUMN	200 x 200	

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DIAL A DUMP

PREFABRICATED
MODULE OPTION
ELEVATION

LHBC CHUTE AND
CONVEYOR
DIAL A DUMP

080233
S18 B



APPENDIX B

Jeffery and Katauskas Pty Ltd

CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
ABN 17 003 550 801



AS/NZS ISO 9001
Certified
Davis Langdon Certification Services

PO BOX 976, NORTH RYDE BC NSW 1670
Tel: 02 9888 5000 • Fax: 02 9888 5003
Email: engineers@jkgroup.net.au

30 June, 2010
Ref:18724ZR6let



Alexandria Landfill Pty Ltd
PO BOX 1040
MASCOT NSW 1460

ATTENTION: Mr Christopher Biggs

Dear Sir

PROPOSED DOWNHILL CONVEYOR AND SHUTE
LIGHT HORSE BUSINESS CENTRE, OLD WALGROVE ROAD, EASTERN CREEK, NSW

We confirm that we have prepared the following geotechnical reports with regard to the future re-development of the existing quarry at the above site:

- Geotechnical Report (Ref. 18724ZRpt1) dated 18 May 2007
- Geotechnical Quarry Slope Stability Assessment (Ref. 18724ZR2let) dated 20 March 2008
- Geotechnical Quarry Slope Stability Assessment (Ref. 18724ZR3let) dated 23 March 2009
- Mapping of Existing Fractures Within the Quarry (Ref. 18724ZR4let) dated 27 April 2009.

The preparation of the above reports has required numerous site visits since 2007 and as such we are very familiar with the subsurface conditions at the site and the associated geotechnical issues.

We have reviewed the provided structural drawings (Drawing Numbers S00, S02 and S04 Issue 1 dated 10 June 2010) prepared by Jones Nicholson Pty Ltd.



Principals: L J Speechley BE(Hons) MEngSc; P Stubbs BSc(Eng) MICE FGS; D Treweek DipTech;
B F Walker BE DIC MSc, Senior Associates: D J Bliss BE(Hons) MEngSc; A L Jackaman BE MEngSc;
A J Kingswell BSc(Hons) MSc; F A Vega BSc(Eng) GDE; P C Wright BE(Hons) MEngSc; A Zenon BSc(Eng) GDE.
Associates: P D Roberts BSc MSc; W Theunissen BE MEngSc; A B Walker BE(Hons) MEngSc.
Principal Consultants: E H Fletcher BSc(Eng) ME; R P Jeffery BE DIC MSc.





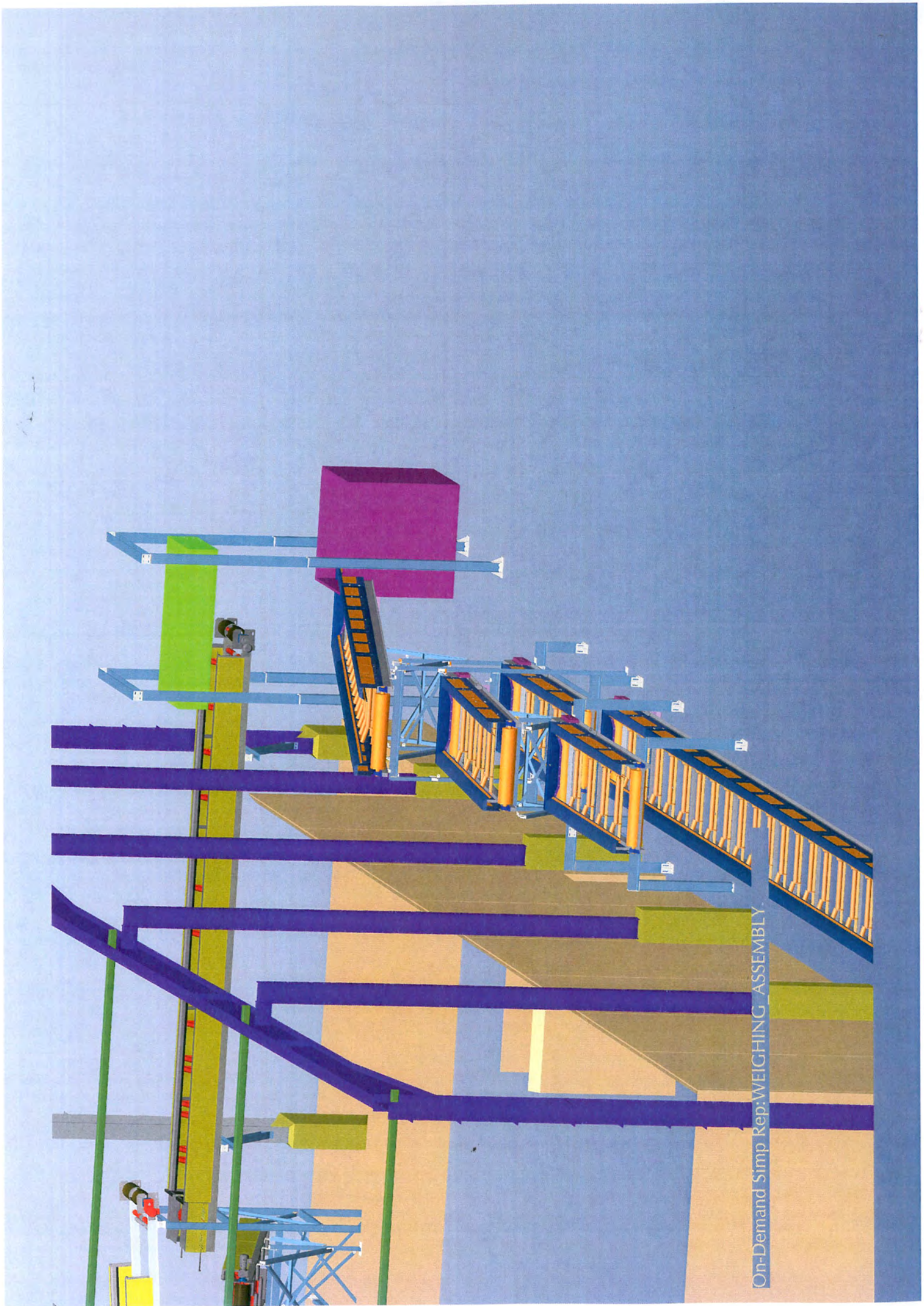
On the basis of our past experience at the site and review of the provided structural drawings we consider that the geotechnical conditions at the site are suitable to support the proposed downhill conveyor and chute. However, this is on condition that the design and construction of the proposed downhill conveyor and chute is completed in accordance with our geotechnical detailed design advice. This geotechnical detailed design advice will be based on the contents of our previous reports and additional geotechnical assessment of the proposed downhill conveyor and chute.

Should you require any further information regarding the above please do not hesitate to contact the undersigned.

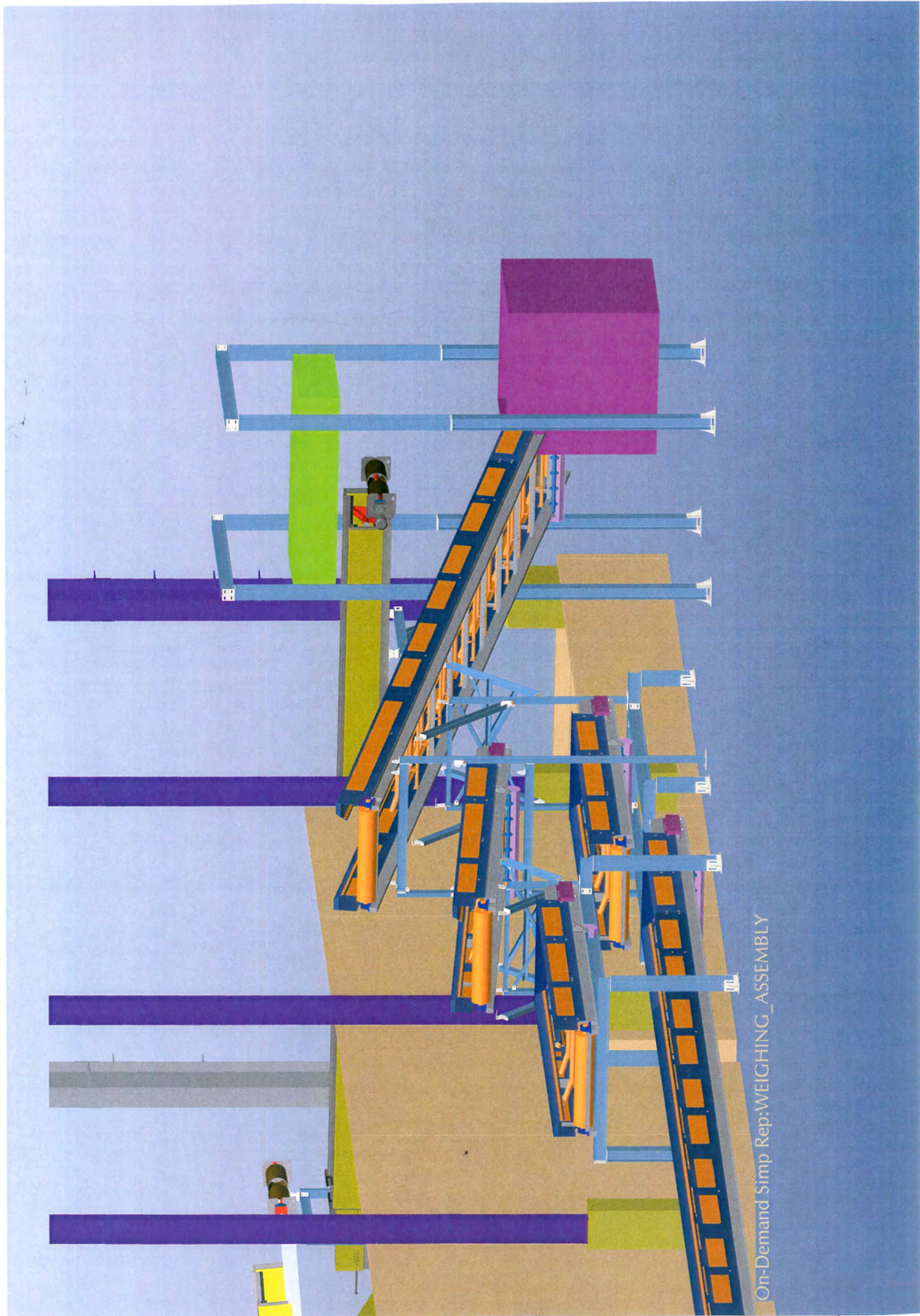
Yours faithfully
For and on behalf of
JEFFERY AND KATAUSKAS PTY LTD

Paul Roberts
Associate

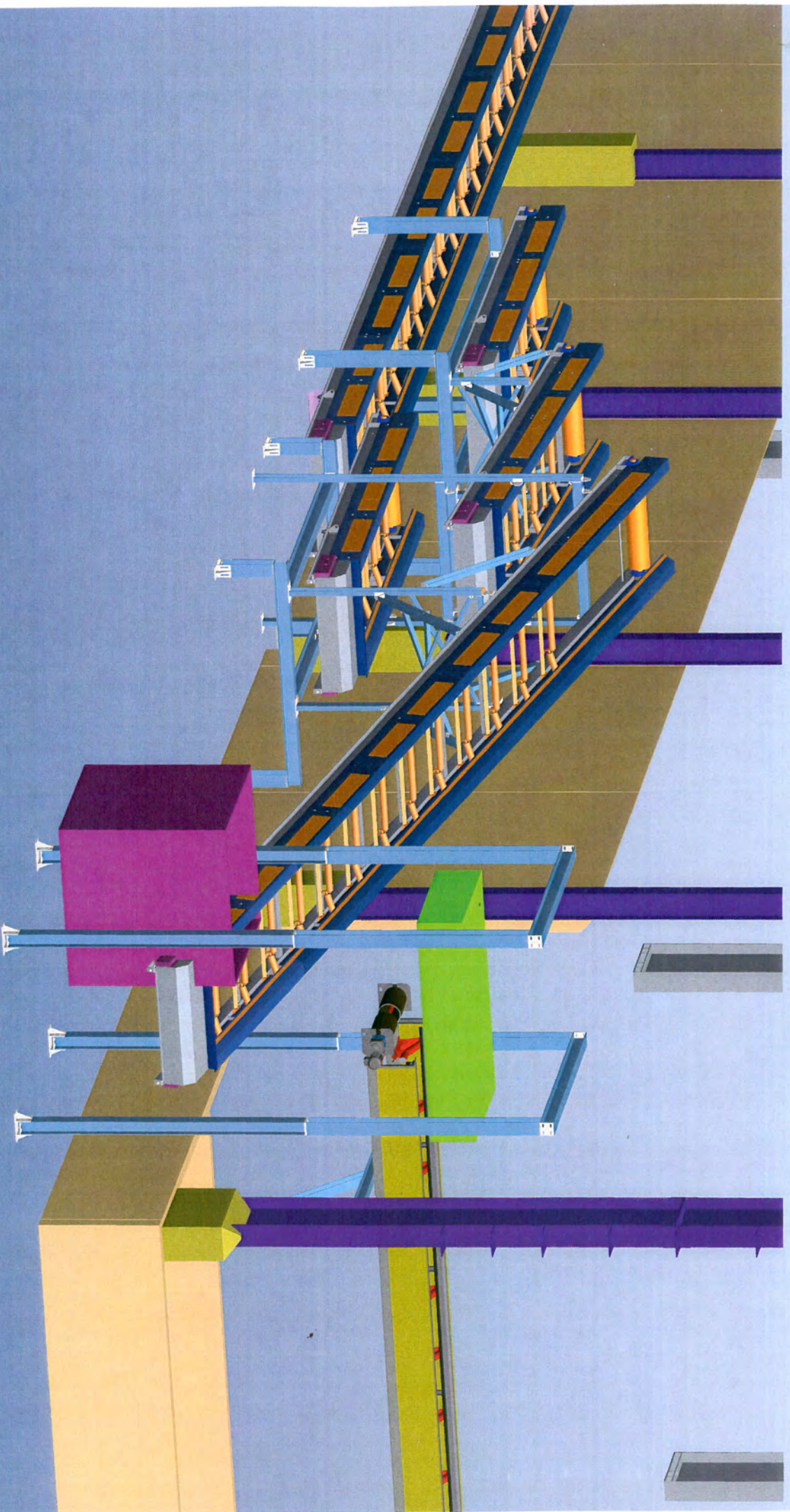
APPENDIX C



On-Demand Simp Rep:WEIGHING ASSEMBLY.

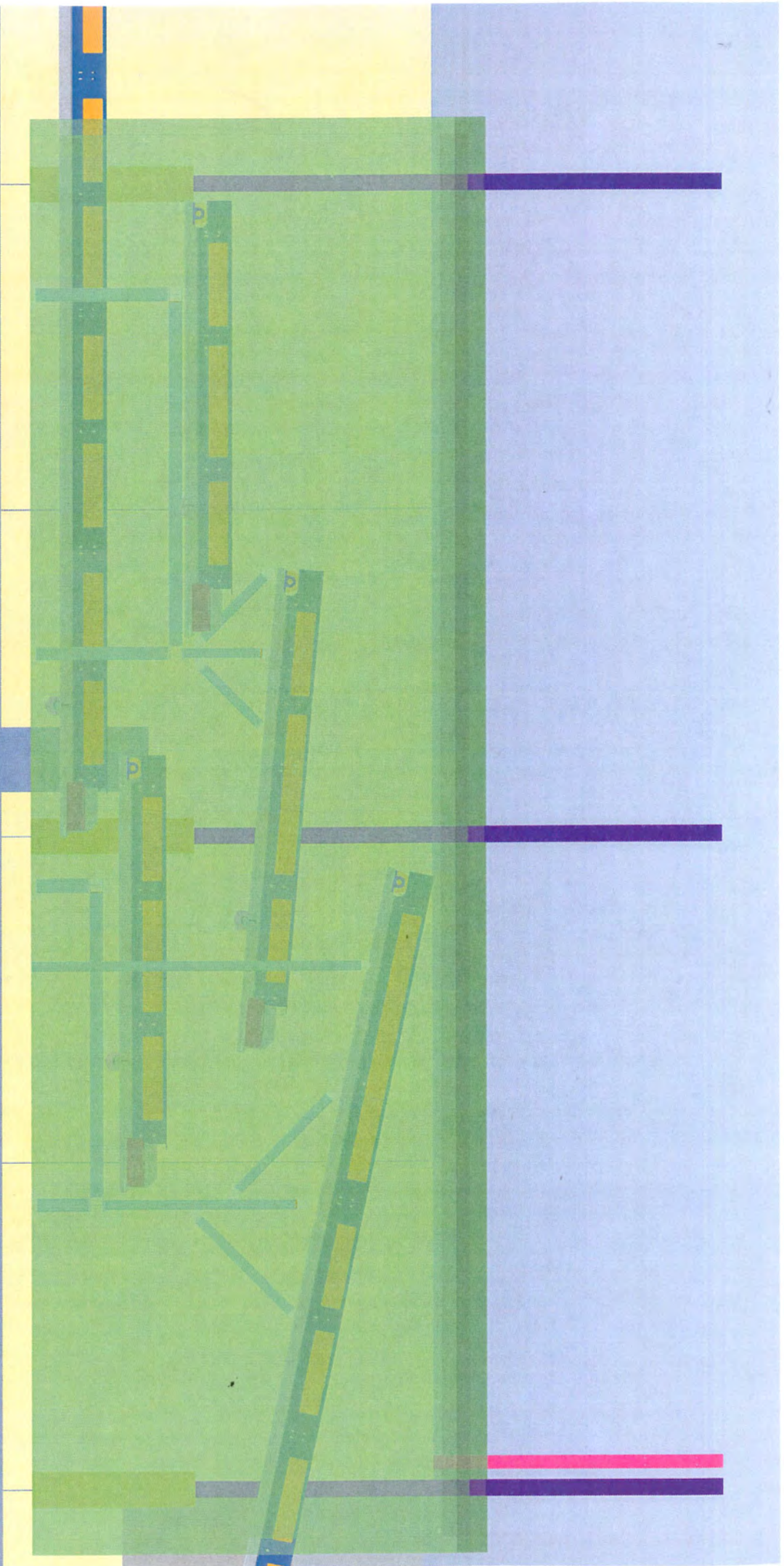


On-Demand Simp Rep:WEIGHING_ASSEMBLY

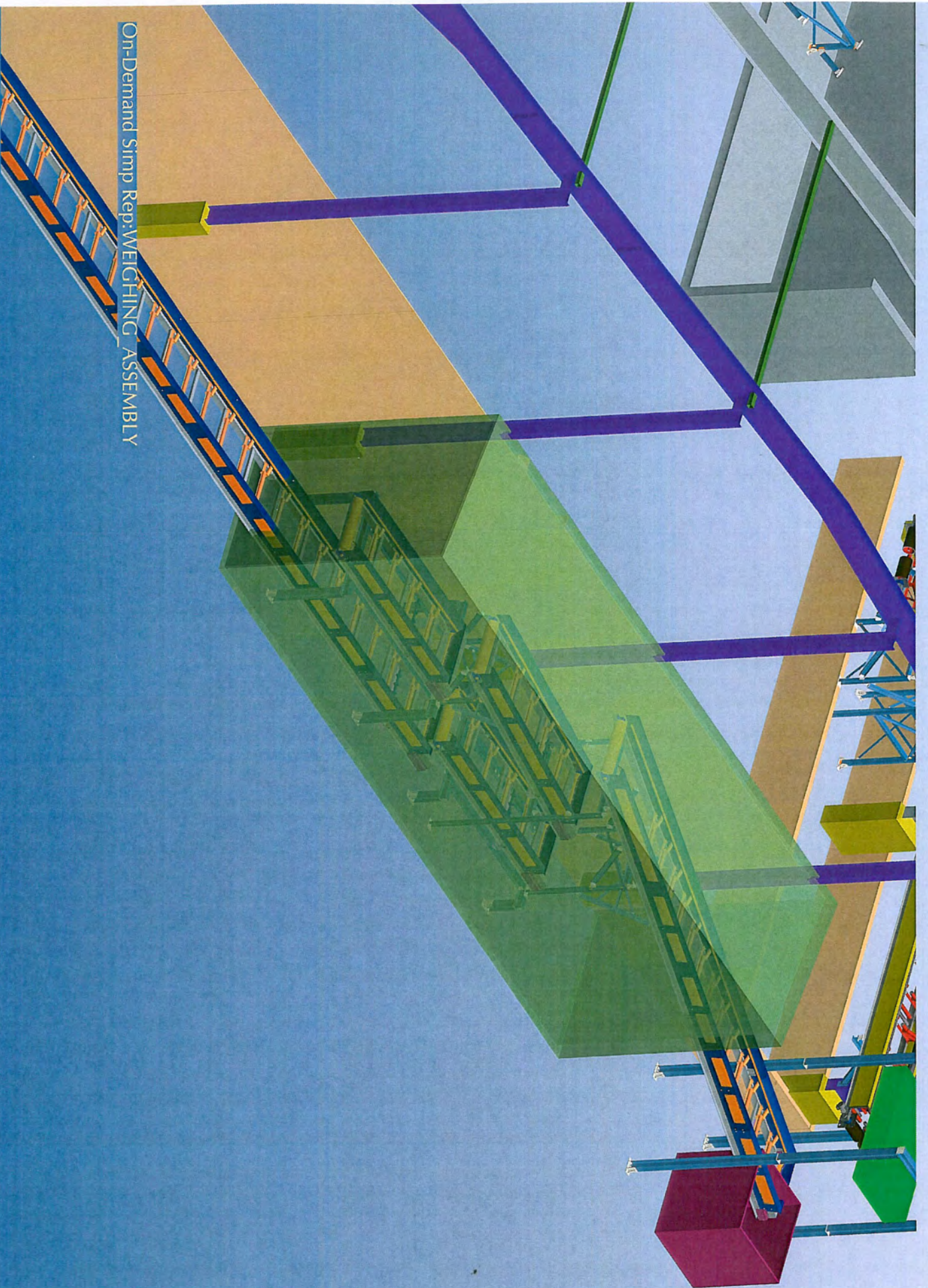


On-Demand Simp Rep:WEIGHING_ASSEMBLY

On-Demand Simp Rep:WEIGHING_ASSEMBLY



On-Demand Simp Rep:WEIGHING ASSEMBLY



APPENDIX D

LHBC CHUTE AND CONVEYOR

OLD WALGROVE ROAD EASTERN CREEK, NSW

Job No. 080233

SHEET	DRAWING LIST
500	COVER SHEET
501	NOTES SHEET
502	SITE PLAN
503	CONCRETE PLAN
504	CHUTE SECTIONS
505	STEEL MARKING PLAN AT BASE OF CONVEYOR AND PIPE FRAMES
506	STEEL WORK ELEVATION AND DETAILS
507	STEEL FRAME ELEVATIONS
508	STEEL WORK- DETAILS SHEET 1
509	STEEL WORK- DETAILS SHEET 2



NO.	DATE	REVISION	BY	DATE	DESCRIPTION
1	08-04-11	ISSUED FOR CONSTRUCTION			
2	08-04-11	ISSUED FOR INFORMATION			
3	08-04-11	ISSUED FOR INFORMATION			

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DESIGN: MM
DRAWN: DWS
DATE: 2010
DWS SIZE: A1
SCALE: PROJECT WSP

LHBC CHUTE AND CONVEYOR
OLD WALGROVE ROAD
EASTERN CREEK, NSW
DIAL A PUMP

080233
S00C

OLD WALGROVE ROAD EASTERN CREEK. NSW

Job No. 080233

GENERAL

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THE RELEVANT PROVISIONS OF A. 1704 HAVE BEEN APPLIED FOR AN
 EARLY
 APPLICATION CURRENT OF 400

FOUNDATIONS

- [illegible]

REINFORCEMENT

- [illegible]



- [illegible]

LEAD LENGTHS FOR INSULATED BARS IN SLABS & WALLS				
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10'0"	10'0"	10'0"	10'0"	10'0"
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22'6"	22'6"	22'6"	22'6"	22'6"
23'0"	23'0"	23'0"	23'0"	23'0"
23'6"	23'6"	23'6"	23'6"	23'6"
24'0"	24'0"	24'0"	24'0"	24'0"
24'6"	24'6"	24'6"	24'6"	24'6"
25'0"	25'0"	25'0"	25'0"	25'0"
25'6"	25'6"	25'6"	25'6"	25'6"
26'0"	26'0"	26'0"	26'0"	26'0"
26'6"	26'6"	26'6"	26'6"	26'6"
27'0"	27'0"	27'0"	27'0"	27'0"
27'6"	27'6"	27'6"	27'6"	27'6"
28'0"	28'0"	28'0"	28'0"	28'0"
28'6"	28'6"	28'6"	28'6"	28'6"
29'0"	29'0"	29'0"	29'0"	29'0"
29'6"	29'6"	29'6"	29'6"	29'6"
30'0"	30'0"	30'0"	30'0"	30'0"
30'6"	30'6"	30'6"	30'6"	30'6"
31'0"	31'0"	31'0"	31'0"	31'0"
31'6"	31'6"	31'6"	31'6"	31'6"
32'0"	32'0"	32'0"	32'0"	32'0"
32'6"	32'6"	32'6"	32'6"	32'6"
33'0"	33'0"	33'0"	33'0"	33'0"
33'6"	33'6"	33'6"	33'6"	33'6"
34'0"	34'0"	34'0"	34'0"	34'0"
34'6"	34'6"	34'6"	34'6"	34'6"
35'0"	35'0"	35'0"	35'0"	35'0"
35'6"	35'6"	35'6"	35'6"	35'6"
36'0"	36'0"	36'0"	36'0"	36'0"
36'6"	36'6"	36'6"	36'6"	36'6"
37'0"	37'0"	37'0"	37'0"	37'0"
37'6"	37'6"	37'6"	37'6"	37'6"
38'0"	38'0"	38'0"	38'0"	38'0"
38'6"	38'6"	38'6"	38'6"	38'6"
39'0"	39'0"	39'0"	39'0"	39'0"
39'6"	39'6"	39'6"	39'6"	39'6"
40'0"	40'0"	40'0"	40'0"	40'0"
40'6"	40'6"	40'6"	40'6"	40'6"
41'0"	41'0"	41'0"	41'0"	41'0"
41'6"	41'6"	41'6"	41'6"	41'6"
42'0"	42'0"	42'0"	42'0"	42'0"
42'6"	42'6"	42'6"	42'6"	42'6"
43'0"	43'0"	43'0"	43'0"	43'0"
43'6"	43'6"	43'6"	43'6"	43'6"
44'0"	44'0"	44'0"	44'0"	44'0"
44'6"	44'6"	44'6"	44'6"	44'6"
45'				

LAP LENGTH FOR REINFORCED BARS IN BEAMS & COLUMNS					
W/L	W/D	W/S	W/L	W/D	W/S
10L	10D	0.000	0.000	0.000	0.000
12L	12D	0.000	0.000	0.000	0.000
14L	14D	0.000	0.000	0.000	0.000
16L	16D	0.000	0.000	0.000	0.000
18L	18D	0.000	0.000	0.000	0.000
20L	20D	0.000	0.000	0.000	0.000
22L	22D	0.000	0.000	0.000	0.000
24L	24D	0.000	0.000	0.000	0.000
26L	26D	0.000	0.000	0.000	0.000
28L	28D	0.000	0.000	0.000	0.000
30L	30D	0.000	0.000	0.000	0.000
32L	32D	0.000	0.000	0.000	0.000
34L	34D	0.000	0.000	0.000	0.000
36L	36D	0.000	0.000	0.000	0.000
38L	38D	0.000	0.000	0.000	0.000
40L	40D	0.000	0.000	0.000	0.000
42L	42D	0.000	0.000	0.000	0.000
44L	44D	0.000	0.000	0.000	0.000
46L	46D	0.000	0.000	0.000	0.000
48L	48D	0.000	0.000	0.000	0.000
50L	50D	0.000	0.000	0.000	0.000
52L	52D	0.000	0.000	0.000	0.000
54L	54D	0.000	0.000	0.000	0.000
56L	56D	0.000	0.000	0.000	0.000
58L	58D	0.000	0.000	0.000	0.000
60L	60D	0.000	0.000	0.000	0.000
62L	62D	0.000	0.000	0.000	0.000
64L	64D	0.000	0.000	0.000	0.000
66L	66D	0.000	0.000	0.000	0.000
68L	68D	0.000	0.000	0.000	0.000
70L	70D	0.000	0.000	0.000	0.000
72L	72D	0.000	0.000	0.000	0.000
74L	74D	0.000	0.000	0.000	0.000
76L	76D	0.000	0.000	0.000	0.000
78L	78D	0.000	0.000	0.000	0.000
80L	80D	0.000	0.000	0.000	0.000
82L	82D	0.000	0.000	0.000	0.000
84L	84D	0.000	0.000	0.000	0.000
86L	86D	0.000	0.000	0.000	0.000
88L	88D	0.000	0.000	0.000	0.000
90L	90D	0.000	0.000	0.000	0.000
92L	92D	0.000	0.000	0.000	0.000
94L	94D	0.000	0.000	0.000	0.000
96L	96D	0.000	0.000	0.000	0.000
98L	98D	0.000	0.000	0.000	0.000
100L	100D	0.000	0.000	0.000	0.000

CONCRETE

- CONCRETE**
- ALL VENDORING AND MATERIALS SHALL BE IN ACCORDANCE WITH ALL SACS AND ALL
FOR CONTRACT DOCUMENTS WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT
DOCUMENTS.
- CLIMATE QUALITY**
- CLIMATE QUALITY SHALL BE IN ACCORDANCE WITH ALL SACS AND ALL
FOR CONTRACT DOCUMENTS WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT
DOCUMENTS.

ELEMENT	STRENGTH	STRENGTH GRADE	SLIP GRADE	SLIP GRADE	TENSILE		TENSILE	
					YIELD	TENSILE	YIELD	TENSILE
1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
10	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
11	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
12	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
13	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
14	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
15	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
16	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
17	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
18	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
19	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
20	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
21	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
22	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
23	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
24	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
25	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
26	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
27	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
28	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
29	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
30	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
31	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
32	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
33	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

- [illegible]

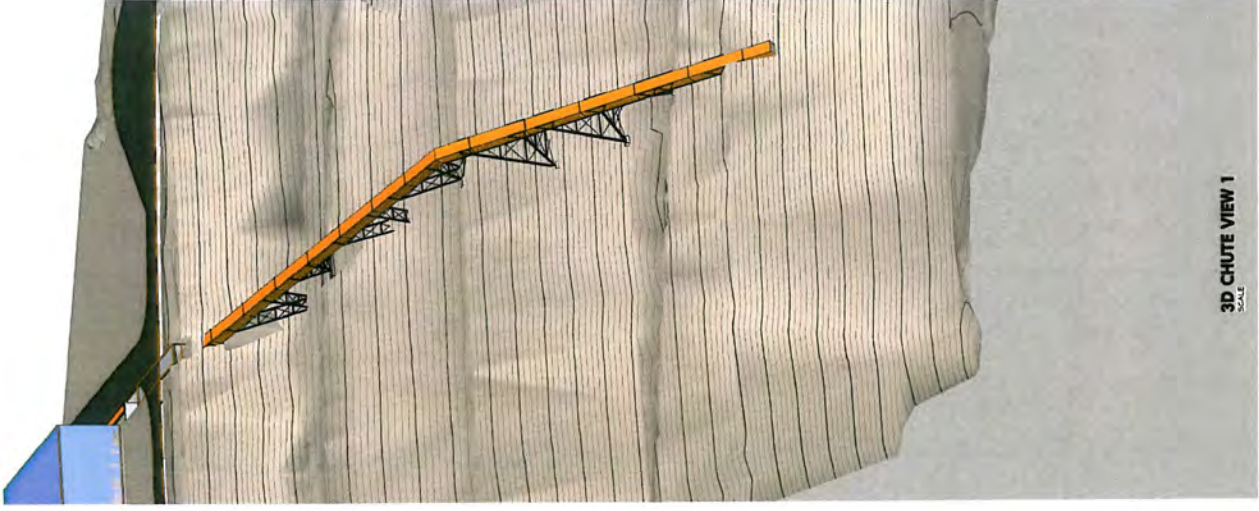
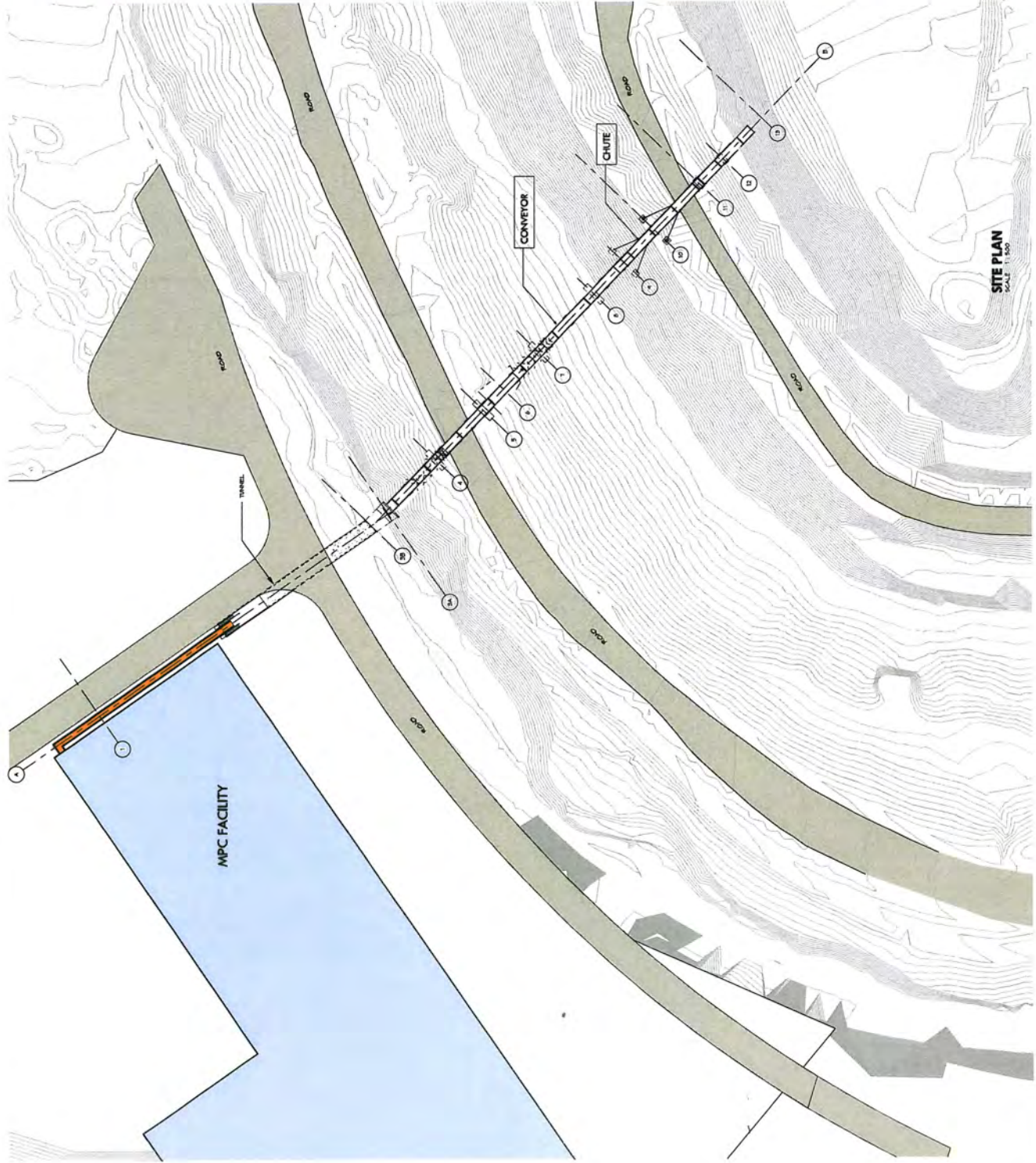
EXCAVATION IN ROCK

- ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE. DATE 05-10-2011 BY 60322 UCBAW/STP

CONSTRUCTION STEEL

- [illegible]

ELEMENT	SURFACE CLEANING	TREATMENT
EXTERNAL	BLAST CLEAN TO CLASS 2.5	IMBIBING ZINC DILUTE PAINT PR AS 20161 IN PROPORTION PRAS 2212



NO.	DATE	BY	DESCRIPTION
1	08-04-11	DM	ISSUED FOR CONSTRUCTION
2	08-04-11	DM	ISSUED FOR CONSTRUCTION
3	08-04-11	DM	ISSUED FOR CONSTRUCTION
4	08-04-11	DM	ISSUED FOR CONSTRUCTION
5	08-04-11	DM	ISSUED FOR CONSTRUCTION
6	08-04-11	DM	ISSUED FOR CONSTRUCTION
7	08-04-11	DM	ISSUED FOR CONSTRUCTION
8	08-04-11	DM	ISSUED FOR CONSTRUCTION
9	08-04-11	DM	ISSUED FOR CONSTRUCTION
10	08-04-11	DM	ISSUED FOR CONSTRUCTION

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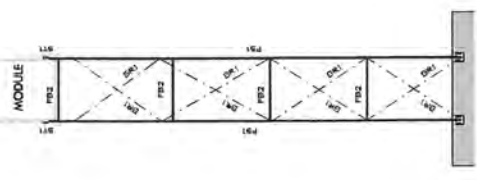
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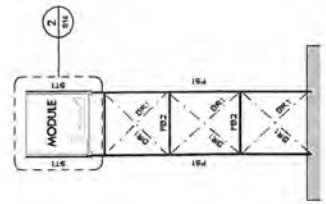
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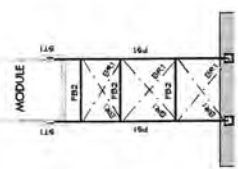
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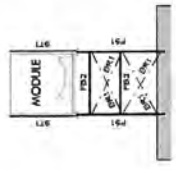
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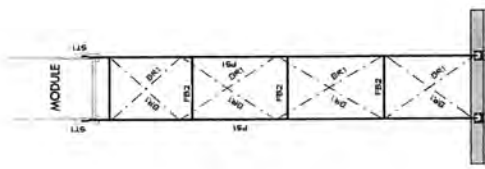
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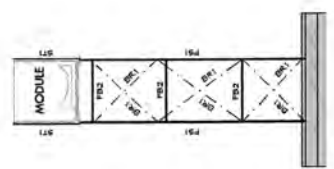
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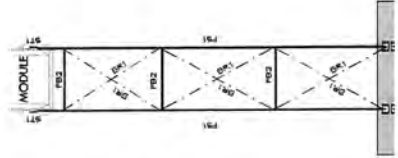
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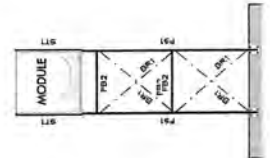
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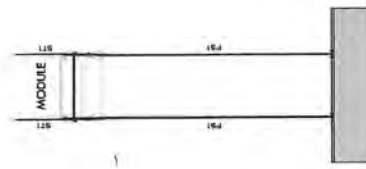
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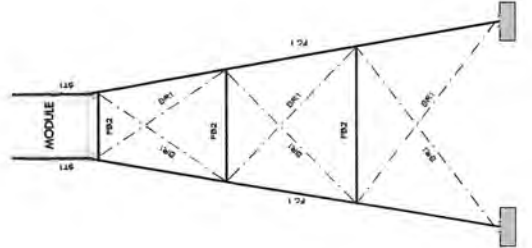
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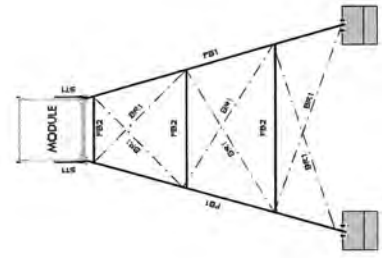
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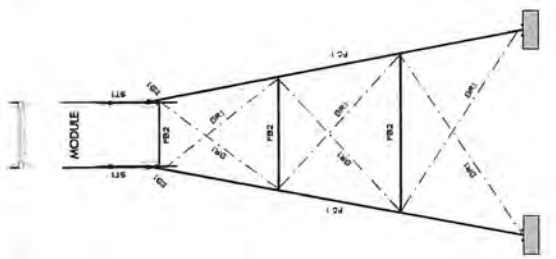
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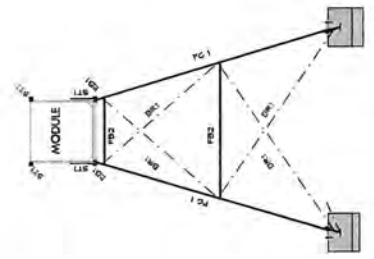
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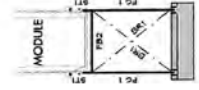
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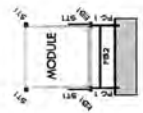
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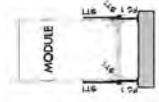
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FRAME GRID 11-2
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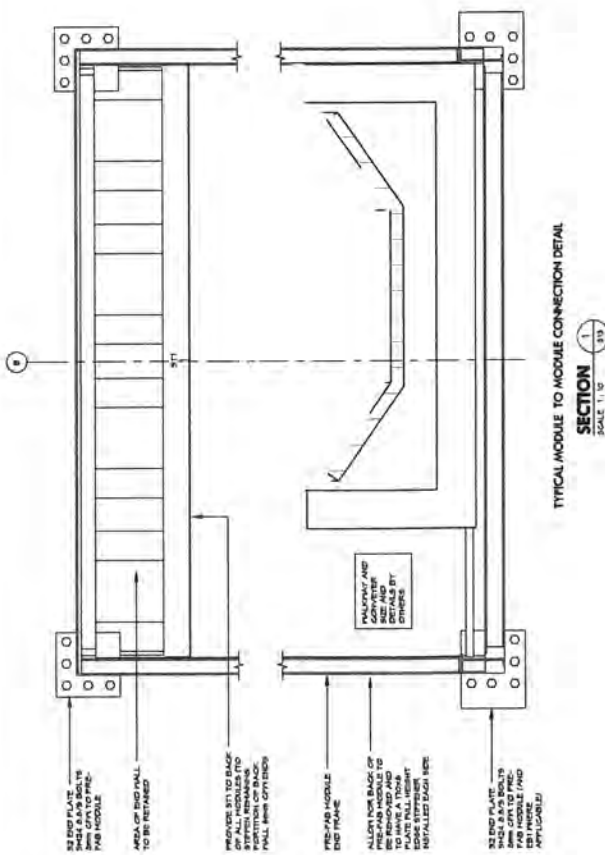
JONES NICHOLSON
CONSULTING ENGINEERS
SUTHERLAND SUITE 45-46 BELMONT
STREET, SUTHERLAND NSW 2232
Ph: (02) 9221 2088
Fax: (02) 9221 2089
PROJECT NO: 080233

DATE: 2010
SCALE: 1/100
PROJECT NO: 080233

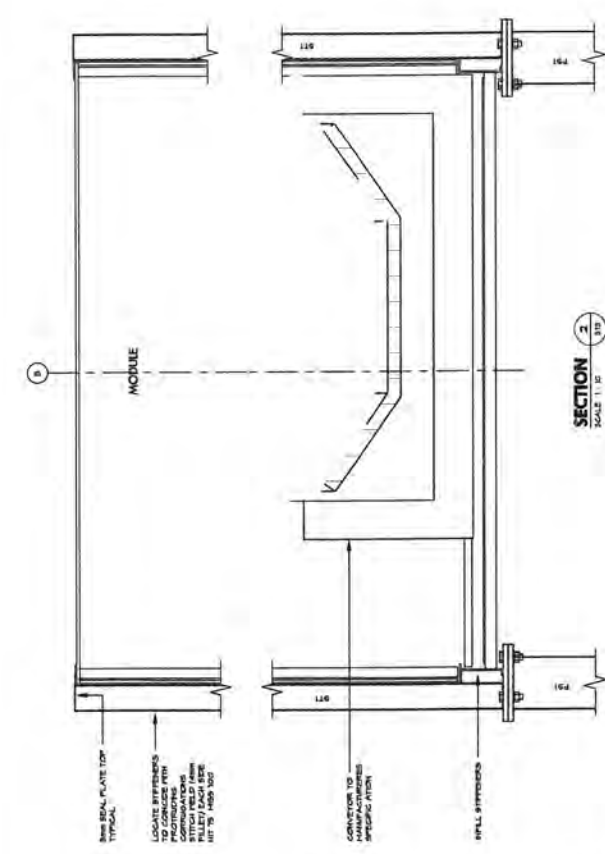
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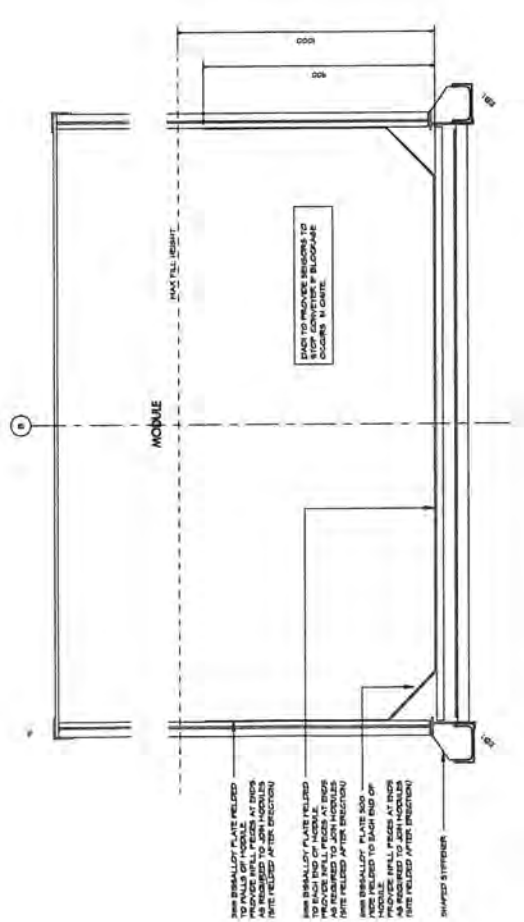
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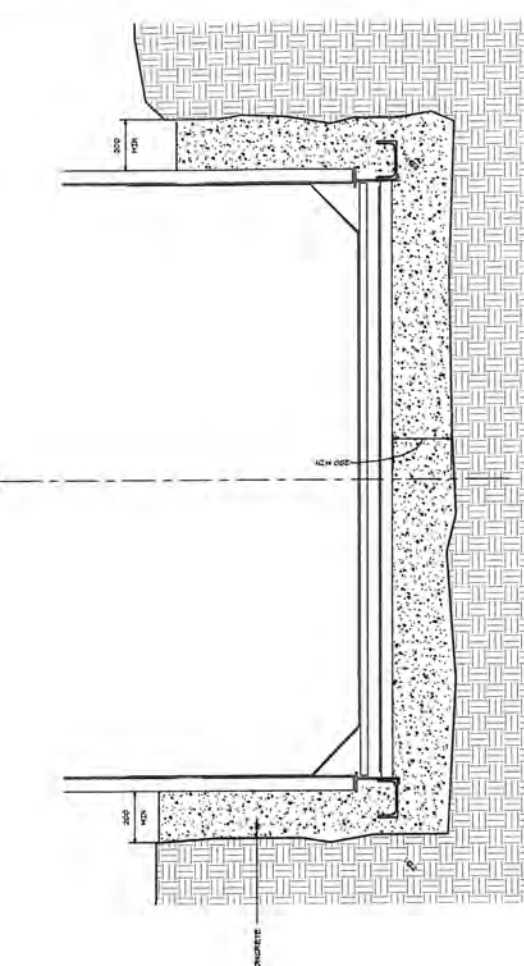
TYPICAL MODULE TO MODULE CONNECTION DETAIL
SECTION 1
SCALE 1:10



MODULE END DETAIL
SECTION 2
SCALE 1:10



SECTION 3
SCALE 1:10



SECTION 4
SCALE 1:10

NO.	DATE	BY	CHKD	DATE	DESCRIPTION
1					
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