| | |
|---|---|
| **RFQ Number** | **NOAM-PM-RFQ-0618** |
| **Request for Quotation Date** | **2024/06/18** |
| **RFQ Closing Date** | **2024/07/09** |
| **RFQ Closing Time** | **16:00** |
| **Site Briefing (compulsory)** | **N/A but can be arranged as per request.** |
| **Contact Person** | **Catherine.matima@necsa.co.za** |
| **Quotation Validity** | **90 Days from the closing date** |
| **Submission Details** | **RFQ Response must be sent to:** ✉ **Catherine.matima@necsa.co.za** |
| **RFQ Description** | **Request for Quotation for the quantification of the material and estimate cost for the material** |

Dear Service Provider

## 1. Introduction

The South African Nuclear Energy Corporation Limited (Necsa) is a state-owned public company (SOC), registered in terms of the Companies Act, (Act No. 61 of 1973), registration number 2000/003735/06.

The Necsa Group engages in commercial business mainly through its wholly-owned commercial subsidiaries: NTP Radioisotopes SOC Ltd (NTP), which is responsible for a range of radiation-based products and services for healthcare, life sciences and industry, and Pelchem SOC Ltd (Pelchem), which supplies fluorine and fluorine-based products. Both subsidiaries, together with their subsidiaries, supply local and global markets, earning valuable foreign exchange for South Africa and are among the best in their field in their respective world markets.

Necsa's safety, health, environment and quality policies provides for top management commitment to compliance with regulatory requirements of ISO 14001, OHSAS 18001 and RD 0034 (Quality and Safety Management Requirements for Nuclear Installations), ISO 9001 and ISO 17025.

Necsa promotes the science, technology and engineering expertise of South Africa and improves the public understanding of these through regular communications at various forums and outreach programmes to the community. We are a proudly South African company continuously striving, and succeeding in many respects, to be at the edge of science, technology and engineering related to the safe use of nuclear knowledge to improve our world.

For more information on Necsa, please visit: www.necsa.co.za

## 2. Request

Necsa hereby invites interested service providers/suppliers to submit quotations, proposals or bids, as appropriate, for the provision of goods and/or services as defined below:

**Scope of work**

Necsa requires services of a Quantity Surveyor to quantify the material required and the estimate cost for the material. The quantification of the material and estimate cost will be based on the design report and drawing stipulated in Table 1 below and also attached to this RFQ. submitted with the RFQ. Estimate quantities and costs for material as per the attached drawings and design report.

*Table 1: Design report and Drawings*

| Item # | **DRAWING NUMBER** | **DESCRIPTION** |
|---|---|---|
| 1. | NNDD-V-C-L1-0001_R2 SHT 1 OF 2 | General Layout |
| 2. | NNDD-V-C-L1-0001_R2 SHT 2 OF 2 | Dimensions |
| 3. | NNDD-V-C-L1-0002_R2 SHT 1 OF 2 | Characterised Waste Storage Area Layout and Detail |
| 4. | NNDD-V-C-L1-0002_R2 SHT 2 OF 2 | Characterised Waste Storage Area Layout and Detail |
| 5. | NNDD-V-C-L1-0003_R2 SHT 1 OF 1 | Un-characterised Waste Storage Area Layout and Detail |
| 6. | NNDD-V-C-L1-0004_R2 SHT 1 OF 3 | General Drum Storage Layout and Detail |
| 7. | NNDD-V-C-L1-0004_R2 SHT 2 OF 3 | General Drum Storage Layout and Detail |
| 8. | NNDD-V-C-L1-0004_R2 SHT 3 OF 3 | Drum Layout |
| 9. | NNDD-V-C-L1-0005_R2 SHT 1 OF 6 | Trench Cover |
| 10. | NNDD-V-C-L1-0007_R2 SHT 1 OF 2 | General Ramp For Pallet Jack |
| 11. | NNDD-V-C-L1-0007_R2 SHT 2 OF 2 | General Ramp For Pallet Jack |
| 12. | MES-CIV-REP-0036 (Rev 2.0) | Design Report: Wet Waste Storage Facility in Cable Tunnel of V-14 |

### 2.2 PROJECT DELIVERABLES

The services provider is expected to deliver an estimation quantities and costs for material.

## 3. Attachments

| Ref # | DOCUMENT NAME | DESCRIPTION |
|---|---|---|
| 1 | Declaration of Interest | Bidder's Disclosure |
| 2 | FBD-SCM-2017-FRM-0024-Rev 7 | Request to register a supplier |

13.

## 4. Pricing

- Use Table 1 to itemize your offer, taking into account the scope of work. Additional rows can be added if there are more itemized items than the rows allocated in Table 1.
- All price quoted to include all applicable taxes.
- Price must be fixed and firm.
- **Price for developing methodology and for drilling and sampling should be provided separately in Table 1.**
- Price should include attendance cost for a compulsory 5 day statutory training at Necsa.
- Price should include cost for the preparation of the safety file.
- Price should include additional cost elements such as freight, insurance until acceptance, duty where applicable, disbursements etc.
- Quotation must be completed in full; incomplete quote could result in the submission being disqualified.
- Payment will be according to Necsa's General Conditions of Purchase.

*Table 1: Costing*

| Ref # | Item description | Quantity | Unit Cost | Line Total |
|---|---|---|---|---|
| **01** | | **1** | | |
| **02** | | | | |
| **03** | | | | |
| **04** | | | | |
| **05** | | | | |
| **06** | | | | |
| **07** | | | | |
| **08** | | | | |
| **09** | | | | |
| **10** | | | | |
| **11** | | | | |
| **12** | | | | |
| **13** | | | | |
| **14** | | | | |
| **15** | | | | |
| | | | **Sub Total (Excl.)** | |
| | | | **VAT (15%)** | |
| | | | **TOTAL (Incl.)** | |

14.

## 5. Evaluation

- **Phase 1- Functionality Evaluation / Technical Evaluation (N/A)**

**NB: The service provider must demonstrate that they are capable of executing the works by issuing method statement they will use in executing the works.**

Where functional or technical evaluation criterion is applicable, assessment will be performed in terms of the criterion listed below and the criterion may include Technical, Performance, Quality and Risk. If the bidder's response to the Technical templates does not indicate that the bidder can support an acceptable technical solution, the bidder's response will be rejected and not evaluated further.

Together; the Technical, Performance, Quality and Risk criteria make up the functionality criterion and a bidder's proposal will be evaluated for functionality out of a possible 100 points. Only RFQ responses achieving an evaluation score of greater than the set threshold points out of the possible 100 points and which score a number of points for functionality that is greater than or equal to the set threshold points of the number of points achieved by the highest scoring bid for functionality will be selected to progress to the second stage.

**IMPORTANT:** A bidder/s that scores less than **80 points out of 100** in respect of functionality will be regarded as submitting a non-responsive bid and will be disqualified. On the other hand, should a bidder/s meet the minimum required percentage or minimum points, they will be evaluated as per Phase 2 evaluation outlined below.

- **Phase 2 - Evaluation In Terms Of Preferential Procurement Policy Framework Act, 2022**

This bid will be evaluated and adjudicated according to the 80/20 point system, in terms of which a maximum of 80 points will be awarded for price and 20 points will be allocated based on the specific goals (B-BBEE status level).

| | POINTS |
|---|---|
| PRICE | 80 |
| SPECIFIC GOALS ( B-BBEE status level) | 20 |
| Total points for Price and SPECIFIC GOALS | 100 |

**Preference goal**
**B-BBEE status level contributor**

| B-BBEE Status Level of Contributor | Number of points (80/20 system) |
|---|---|
| 1 | 20 |
| 2 | 18 |
| 3 | 14 |
| 4 | 12 |
| 5 | 8 |
| 6 | 6 |
| 7 | 4 |
| 8 | 2 |
| Non-compliant contributor | 0 |

## 6. Required Documentation

- Tax Clearance Certificate ( Tax pin issued by SARS)
- Declaration of interest ( SBD 4)
- BEE Certificate / Applicable Affidavit if classified as EME
- CIDB CE ME2
- Letter of Good Standing (COIDA)

## 7. Important

1. Provide a detailed methodology on how drilling and sampling will be done using the attached document as a reference.
2. The methodology will have to be accepted and approved by Necsa.
3. Due to the nature of the work to be performed, the selected bidder will be required to provide basic PPE (e.g. gloves, safety shoes, etc.) for all their employees. Necsa will supply specialized PPE.
4. Quotation must be submitted on or before the RFQ closing date and time stated above.
5. Orders above R 30 000 will be evaluated according to the PPPFA 80/20-point system and a functionality scorecard where applicable and those above R 1 Million will be subjected to the tender process.

6. This RFQ is subjected to the Necsa's General Conditions of Purchase, Preferential Procurement Policy Framework Act 2000 and the Preferential Procurement Regulations, 2022, the General Conditions of Contract (GCC) and, if applicable, any other legislation or special conditions of contract.
7. Failure on the part of a bidder to submit proof of B-BBEE Status level of contributor together with the bid, will be interpreted to mean that preference points for specific goals are not claimed.
8. The purchaser reserves the right to require of a bidder, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to specific goals, in any manner required by the purchaser.
9. For a bidder to obtain clarity on any matter arising from or referred to in this document, please refer queries, in writing, to the contact details provided above. Under no circumstances may any other employee within Necsa be approached for any information. Any such action might result in a disqualification of a response submitted in competition to this RFQ.
10. No goods and/or services should be delivered to Necsa without an official Necsa Purchase order.
11. Necsa reserves the right to either cancel or reject any quote and not to award the RFQ to the lowest bidder or award parts of the RFQ to different bidders, or not to award the RFQ at all.
12. The supplier shall under no circumstances offer, promise or make any gift, payment, loan, reward, inducement, benefit or other advantage, which may be construed as being made to solicit any favour, to any Necsa employee or its representatives. Such an act shall constitute a material breach of Agreement and Necsa shall be entitled to terminate the Agreement forthwith, without prejudice to any of its rights.
13. By responding to this request, it shall be construed that: the bidder, hereby acknowledge to be fully conversant with the details and conditions set out in the Necsa's General Conditions of Purchase, Preferential Procurement Policy Framework Act 2000 and the Preferential Procurement Regulations, 2022, the General Conditions of Contract (GCC), Technical Information and Specifications attached, and hereby agree to supply, render services or perform works in accordance therewith.

| | |
|---|---|
| Document number | MES-CIV-REP-0036 |
| Revision number | 2.0 |
| Date | 2024/04/29 |
| Title | Design Report: Wet Waste Storage Facility in Cable Tunnel of V-14 |

**AUTHORISATION**

| | NAME | SIGNED | DATE |
|---|---|---|---|
| PREPARED | PB VAN ASWEGEN<br>Civil Engineer<br>Pr Eng 20020227 |  | 2024/04/29 |
| REVIEWED | GJ van Heerden<br>B Eng Civil |  | 2024/04/29 |
| APPROVED | SR Mngoma<br>Chief Engineer |  | 2024/04/29 |
| ACCEPTED | PB Dyasi<br>Client: Waste Management |  | 2024/04/30 |
| AUTHORISED | YA Mandri<br>Design Authority Chairperson<br>Engineering |  | 2024/05/20 |

**DISTRIBUTION**

* (Electronic distribution only)

| | | | |
|---|---|---|---|
| 1 | MES Records | 6 | *YA Mandri |
| 2 | WM Records | 7 | *GJ van Heerden |
| 3 | *S Sibande | 8 | |
| 4 | *SR Mngoma | 9 | |
| 5 | *PB Dyasi | 10 | |

## TABLE OF CONTENTS



## REVISIONS

This document has been revised in accordance with the following schedule:

| Rev. No. | Date approved | Nature of Revision | Prepared |
|---|---|---|---|
| 2.0 | See title page | Second issue | PB van Aswegen |

# 1 EXECUTIVE SUMMARY


The design of the conversion of the Cable Tunnel in V-14 to a Wet Waste Storage Facility (WWSF) has been completed. The design shows that the area can be used provided that certain mass limits are applied to the drums stored in the area. The User Requirements Specifications [1] have been met.


# 2 INTRODUCTION

## 2.1 Purpose

This document describes the design process followed to verify that the Cable Tunnel can be used to store waste identified in Pelstore, X-ray facility and other WM (Waste Management) facilities.

## 2.2 Scope

This document only describes the design and verification of the height of the bund wall, the loading capacity of the slab, and the modification of the transfer route from Pelstore to the Cable Tunnel floor.

# 3 REFERENCES

| Document Title | Document No. | Rev |
|---|---|---|
| [1] User Requirement Specification for the Wet Waste Storage Facility in the Cable Tunnel | NLM-SPE-00041 | 2.0 |
| [2] Concrete Details to Slab at 1353,5 Level | 7371-14-010-C07600 | 11 |
| [3] Basis of structural design and actions for buildings and industrial structures - Part 1: Basis of structural design | SANS 10160-1: 2019 | 1.3 |
| [4] Concrete floors - Part 2: Finishes to concrete floors | SANS 10109-2: 2013 | 3.1 |
| [5] V-14 Wet Waste Storage Facility General Layout | NNDD-V-14-C-L1-0001 SHT 1 OF 2 | 2.0 |
| [6] V-14 Wet Waste Storage Facility Dimensions | NNDD-V-14-C-L1-0001 SHT 2 OF 2 | 2.0 |
| [7] V-14 Wet Waste Storage Facility Characterized waste area Layout and Detail | NNDD-V-14-C-L1-0002 SHT 1 OF 2 | 2.0 |

| Document Title | Document No. | Rev |
|---|---|---|
| [8] V-14 Wet Waste Storage Facility Characterized waste area Layout and Detail | NNDD-V-14-C-L1-0002 SHT 2 OF 2 | 2.0 |
| [9] V-14 Wet Waste Storage Facility Un-characterized waste storage area layout and detail | NNDD-V-14-C-L1-0003 SHT 1 OF 1 | 2.0 |
| [10] V-14 Wet Waste Storage Facility General drum storage layout and detail | NNDD-V-14-C-L1-0004 SHT 1 OF 3 | 2.0 |
| [11] V-14 Wet Waste Storage Facility | NNDD-V-14-C-L1-0004 SHT 2 OF 3 | 2.0 |
| [12] V-14 Wet Waste Storage Facility | NNDD-V-14-C-L1-0004 SHT 3 OF 3 | 2.0 |
| [13] V-14 Wet Waste Storage Facility Trench cover | NNDD-V-14-C-L1-0006 SHT 1 OF 1 | 2.0 |
| [14] V-14 Wet Waste Storage Facility General Ramp for Pellet Jack | NNDD-V-14-C-L1-0007 SHT 1 OF 2 | 2.0 |
| [15] V-14 Wet Waste Storage Facility General Layout | NNDD-V-14-C-L1-0007 SHT 2 OF 2 | 2.0 |

# 4 DEFINITIONS AND ABBREVIATIONS

## 4.1 Definitions

| Term | Definition |
|---|---|
| Pelindaba | Pelindaba is the name for the area that NECSA site is located |
| Pelstore | The waste storage facility found in the Building V-14. |
| V-14 | A building located on the Pelindaba East site. |
| Cable Tunnel | A floor of Building V-14 located at an elevation of 1353.5 meters above sea-level. |

## 4.2 Abbreviations

| Term | Definition |
|---|---|
| NECSA | South African Nuclear Energy Corporation |
| WSRF | Waste Segregation and Repacking Facility |
| WM | Waste Management |

### 4.3 Variables

| Term | Definition |
|---|---|
| A | Area |
| b | width |
| B | Edge point |
| c | cover thickness |
| dv | Vessel storage volume |
| f | factor |
| f | strength (stress) |
| g | gravity |
| h | height |
| I | Moment of inertia |
| l | length |
| M | Moment |
| n | Number of |
| P | Point Load |
| Q | Line Load |
| t | thickness |
| V | Volume |
| V | Shear |
| w | width |
| y | distance from centroid to edge |
| γ | Loading Factor |
| θ | Stress/Area Load |
| ρ | density |
| φ | factor |

### 4.4 Subscripts

| Term | Definition |
|---|---|
| 100 | Representing 100-Litre Drum |
| 160 | Representing 160-Litre Drum |
| 210 | Representing 210-Litre Drum |

| Term | Definition |
|---|---|
| allow | Allowable load |
| applied | An applied load |
| applied | Applied to the area/point |
| b | bending |
| bund | Bund wall |
| c5 | Characterised 5-litre containers |
| containers | 5-Litre Containers |
| eff | Effective |
| frame | The frame used for storing 5-Litre containers |
| layers | The number of layers per frame |
| liquid | The amount of liquid |
| LL | Live Load |
| max | maximum |
| pallet | referring to pallet |
| rupture | The percentage of containers that rupture |
| s | screed |
| safety | Safety factor |
| tot | Total |
| uc5 | Uncharacterised 5-litre containers |
| x | x axis |
| y | yield |
| y | Vertical |

# 5 BACKGROUND INFORMATION

During Pelstore's waste management processes such as preparation of drums for compaction in the VRF (Volume Reduction Facility) , drums containing wet or liquid waste are identified using X-Rays. These drums are then separated from the drums to be compacted at the VRF. The Wet Waste Storage Facility (WWSF) will be used to store these drums and later the 5-litre containers containing characterised and uncharacterised liquid removed from the drums in the Waste Segregation and Repacking Facility (WSRF).

The area identified for the WWSF is the Cable Tunnel in the V-14 building on Pelindaba East Site. This area is approximately 3369 $m^2$ and will be fenced off to maintain security. The area will be split into four storage sections, namely general 100/160-litre, 210-litre drum, characterised and uncharacterised 5-litre containers [1].

# 6 REQUIREMENTS AND GENERAL DESIGN INFORMATION

The requirements for the design are split into general and area requirements

## 6.1 General Requirements

The requirements of the general area design are listed below:

**Table 1: General Requirements for the WWSF**

| Requirement Number | Requirement Description | Reference |
|---|---|---|
| [R1] | Each Section must be clearly demarcated from each other | [1] 6.1 |
| [R2] | Approximate number of drums to be stored: 16000 | [1] Table 6-1 |
| [R3] | Approximate number of characterised 5-litre containers to be stored: 11000 | [1] Table 6-1 |
| [R4] | Approximate number of uncharacterised 5-litre containers to be stored: 112 | [1] Table 6-1 |
| [R5] | Storage and configuration layout based on loading capacity of the cable tunnel floor | [1] 6.2.1 & 6.2.2 |
| [R6] | Modification of existing access between the cable tunnel and Pelstore floor for transport of drums between facilities. | [1] 6.2.3 |
| [R7] | A Bund wall shall be erected around the wet waste storage areas to contain any possible spillages. | [1] 6.5 |
| [R8] | Holes in the existing floor are to be sealed or closed | [1] 6.5 |
| [R9] | Floors must be easily cleaned. The materials of construction used must be acid and oil resistant | [1] 6.5 & 6.6 |
| [R10] | There shall be 500mm spacings between rows of drums or shelves to enable inspections | [1] 6.7 |

## 6.2 General Drum Storage Area

The requirements in Table 2 only apply to the general drum storage area:

**Table 2: Requirements for the Drum Storage Area**

| Requirement Number | Requirement Description | Reference |
|---|---|---|
| [R11] | A 2-metre-wide main passage | [1] 6.4.1 |
| [R12] | Drums are stacked four to a pallet. Pallets should be stacked two tiers high depending on floor loading capacity and roof height. | [1] 6.4.1 |

Table 3 describes the drums that can be stored in the WWSF.

**Table 3: General Information on the Drums to be Stored in the WWSF ([1] Table 6-2)**

| Drum Type | Diameter [mm] | Lid Diameter [mm] | Height [mm] | Maximum Mass [kg] |
|---|---|---|---|---|
| 100 L Plastic Buksie (Red) | 503.9 | 523 | 582 | 140 |
| 100 L Plastic Barrel (Blue) | 490.2 | N/A | 573 | 140 |
| 100 L Metal Medical (Red) | 496.6 | 522 | 573 | 140 |
| 100 L Metal (Black) | 460.3 | 488 | 672 | 140 |
| 160 L Metal (Red) | 498.2 | 524 | 837 | 160 |
| 210 L Metal (Yellow) | 573 | 608 | 890 | 300 |

### 6.3 Requirements for 5-Litre Container Storage Area

The requirements in Table 4 only apply to the characterised 5-litre container storage area:

**Table 4: Requirements for the Characterised 5-Litre Container Storage Area**

| Requirement Number | Requirement Description | Reference |
|---|---|---|
| [R13] | The containers shall be laid out with no more than 3 containers deep to be accessible with 500mm passages between shelves for inspection purposes. | [1] 6.4.2 |
| [R14] | The containers shall not be able to slip | [1] 6.4.2 |
| [R15] | The shelves shall be compartmentalised with spacers for precise positioning | [1] 6.4.2 |
| [R16] | The height between shelves shall be a minimum of 400mm And the first shelf shall be 300mm from the floor | [1] 6.4.2 |

The 5 litre containers have a maximum mass of 5kg.

### 6.4 Radiological Requirements for the design of the bund wall

A bund wall shall be erected around the wet waste storage areas to contain any possible spillages and to prevent any leakage to other areas. A HAZOP was conducted for the facility to assess normal operations and the accidents that could possibly occur during those activities.

During the placement of drums in the store, a potential accident was identified where an operator accidentally damages the surrounding drums with a forklift or pallet truck, leading to a possible loss of containment of the surrounding drums. In the HAZOP, it was identified that only four drums could be affected and lose containment [1]. For the 5-Litre containers it was identified that only one 5-Litre litre could potential be affected and lose containment. However to enable the design of the bund wall a more conservative approach was followed as given in Table 5.

**Table 5: Radiological Requirements for the Design of the bund wall**

| Requirement Number | Requirement Description | Reference |
|---|---|---|
| [R17] | Eight (x8) drums are considered to lose containment. The volume of liquid that the bund wall needs to accommodate will be based on the 210L drum.<br><br>Drum storage bund area shall be capable of containing 1.68$m^3$ of liquids which is the volume of 8x 210L drums | [1] 6.5 |
| [R18] | Storage bund area for uncharacterized 5-Litre containers shall be capable of containing 0.04$m^3$ of liquids which is the volume of 8x 5L drums | [1] 6.5 |
| [R19] | Storage bund area for characterized 5-Litre containers shall be capable of containing 0.04$m^3$ of liquids which is the volume of 8x 5L drums | [1] 6.5 |

# 7 DESIGN CALCULATIONS

The following sections illustrates the design calculations performed to conform to the requirements. The general proposed layout of the areas is shown in Drawing NNDD-V-14-C-L1-0001.

## 7.1 Bund Wall Height

The bund wall height for each section is determined by the amount of liquid spilled in an accident scenario. The method for calculating the height of the bund wall was to find the total volume of potentially spilled liquid for each area and divide that by the effective area of each area. The effective area accounts for space occupied by containers, columns and shelving legs.

### 7.1.1 Bund Wall

The bund wall will be constructed of commercial steel. Different sized angle irons or flat bars will be used for the wall. This will be easiest to install, seal and maintain.

### 7.1.2 Drum Storage Area

There are three sections to the drum storage area.

- The first section is the general drum storage area for 100L,160L and 210L drums.
- The second section is the characterized liquid waste storage area for 5L drums
- The third section is the un-characterized liquid waste storage area for 5L drums

#### 7.1.2.1 General Drum Storage Area

This area can store 100-litre, 160-litre and 210-litre drums.

The layout of this area can be found in Drawing NNDD-V-14-C-L1-0001. The bund wall height is calculated to contain 1.68$m^3$ of liquids which is the volume of 8x 210L drums.

The calculations show that the bund wall height is required to be 4.62 mm. Use a 50mm high angle section bolted to the floor to form the bund wall.

The full calculations can be seen in APPENDIX A.

### 7.1.3 Characterised 5-litre Container Storage Area

This area can store 5-litre drums.

The layout of this area can be found in Drawing NNDD-V-14-C-L1-0001. The bund wall height is calculated to contain 0.04m$^3$ of liquids which is the volume of 8x 5L drums.

The calculations show that the bund wall height is required to be 0.11mm. Use a 50mm high angle section bolted to the floor to form the bund wall.

The full calculations can be seen in APPENDIX A.

### 7.1.4 Uncharacterised 5-litre Container Storage Area

This area can store 5-litre drums.

The layout of this area can be found in Drawing NNDD-V-14-C-L1-0001. The bund wall height is calculated to contain 0.04m$^3$ of liquids which is the volume of 8x 5L drums.

The calculations show that the bund wall height is required to be 0.68mm. Use a 50mm high angle section bolted to the floor to form the bund wall.

The full calculations can be seen in APPENDIX A.

## 7.2 Loading on the Floor

The allowable load of the floor was defined by Drawing 7371-14-010-C07600[2]. This is the original structural drawing of the area. The allowable loads are defined in Table 6.

A live load factor, $\gamma_{LL}$, of 1.6 was applied in accordance with SANS 10160-1[3].

**Table 6: Allowable Loads on the Cable Tunnel Slab**

| Variable | Value | Unit | Comment |
|---|---|---|---|
| $\theta_{allow}$ | 5 | kPa | Allowable Area Load |
| $P_{allow}$ | 20 | kN | Allowable Point Load on the Egg-Crate Opening Cover |

### 7.2.1 Drum Storage Area

The loading calculations are split into the three types of drums found in the WWSF, namely 100, 160 and 210 litre drums. The complete calculations can be found in APPENDIX B.

#### 7.2.1.1 100-Litre Drums

A fully loaded pallet, a pallet and four maximum mass drums, will exceed the allowable area loading of the floor, therefore the mass of the four drums on the pallet must be limited. Two situations were considered, namely, a single pallet or two pallets stacked. The summarised calculation is shown in Table 7.

**Table 7: 100-Litre Drums Loading Calculations**

| Variable | Value | Unit | Comment |
|---|---|---|---|
| $m_{100\_max}$ | 140 | kg | Maximum Mass per Drum |
| $m_{100\_pallet}$ | 12 | kg | Mass of the Pallet |
| $l_{pallet}$ | 1050 | mm | Length of the Square Pallet |
| $n_{100\_drums}$ | 4 | | Number of Drums per Pallet |
| $w_{pallet}$ | 8.91 | kN | Factored Maximum Weight of a Pallet |
| $\theta_{100\_applied\_max}$ | 8.08 | kPa | Factored Maximum Area Load (Not Okay) |
| $m_{100\_pallet\_1}$ | 339.2 | kg | Factored Maximum 4 Drum Total Mass per Pallet for a Single Layer |
| $m_{100\_pallet\_2}$ | 151.6 | kg | Factored Maximum 4 Drum Total Mass per Pallet for a Double Layer |

#### 7.2.1.2 160-Litre Drums

A fully loaded pallet, a pallet and four maximum mass drums, will exceed the allowable area loading of the floor, therefore the mass of the four drums on the pallet must be limited. Two situations were considered, namely, a single pallet or two pallets stacked. The summarised calculation is shown in Table 8.

**Table 8: 160-Litre Drums Loading Calculations**

| Variable | Value | Unit | Comment |
|---|---|---|---|
| $m_{160\_max}$ | 160 | kg | Maximum Mass per Drum |
| $m_{160\_pallet}$ | 12 | kg | Mass of the Pallet |
| $l_{pallet}$ | 1050 | mm | Length of the Square Pallet |
| $n_{160\_drums}$ | 4 | | Number of Drums per Pallet |
| $w_{pallet}$ | 10.16 | kN | Factored Maximum Weight of a Pallet |
| $\theta_{160\_applied\_max}$ | 9.28 | kPa | Factored Maximum Area Load (Not Okay) |
| $m_{160\_pallet\_1}$ | 339.2 | kg | Factored Maximum 4 Drum Total Mass per Pallet for a Single Layer |
| $m_{160\_pallet\_2}$ | 151.6 | kg | Factored Maximum 4 Drum Total Mass per Pallet for a Double Layer |

#### 7.2.1.3 210-Litre Drums

A fully loaded pallet, a pallet and four maximum mass drums, will exceed the allowable area loading of the floor, therefore the mass of the four drums on the pallet must be limited. The 210-Litre Drums will only be stored in a single layer. The summarised calculation is shown in Table 9.

**Table 9: 210-Litre Drums Loading Calculations**

| Variable | Value | Unit | Comment |
|---|---|---|---|
| $m_{210\_max}$ | 300 | kg | Maximum Mass per Drum |
| $m_{210\_pallet}$ | 12 | kg | Mass of the Pallet |
| $l_{pallet}$ | 1360 | mm | Length of the Square Pallet |
| $n_{210\_drums}$ | 4 | | Number of Drums per Pallet |
| $w_{pallet}$ | 19.14 | kN | Factored Maximum Weight of a Pallet |
| $\theta_{210\_applied\_max}$ | 10.35 | kPa | Factored Maximum Area Load (Not Okay) |
| $m_{210\_pallet\_1}$ | 558.19 | kg | Factored Maximum 4 Drum Total Mass per Pallet for a Single Layer |

### 7.2.2 Characterised 5-Litre Container Area

The containers will be stored in shelves which can store 21 containers per layer and be in two layers. This will result in 42 containers applying load to the feet between two racks. The rack feet will act predominately as point loads on the floor. An area load was checked never the less and it was limiting. The summarised calculation is shown in Table 10. The full calculations can be found in APPENDIX C.

**Table 10: Characterised 5-Litre Containers Loading Calculations**

| Variable | Value | Unit | Comment |
|---|---|---|---|
| $n_{containers}$ | 21 | | Number of Containers per Layer |
| $n_{layers}$ | 2 | | Number of Layers |
| $m_{container}$ | 5 | kg | Maximum Mass of a Container |
| $m_{frame}$ | 70 | kg | Mass of the Frame on one Pair of Legs |
| $w_{frame}$ | 650 | mm | Width of the Frame |
| $l_{frame}$ | 1270 | mm | Length between leg pairs of the Frame |
| $P_{applied}$ | 4.12 | kN | Point Load Applied |
| $\theta_{applied}$ | 4.99 | kPa | Area Load Applied |

### 7.2.3 Uncharacterised 5-Litre Container Area

The uncharacterised 5-litre containers are stored in geometrically safe trolleys which results is a far less dense than the characterised 5-litre containers and therefore a check will not be performed.

### 7.3 Modification of Passage between the Pelstore Floor and WWSF

The modifications required is to:

- Widen the access door to a double door,
- Install a 500 kg crane to lift a drum to the required level

#### 7.3.1 Widen of Access Door

The reinforced concrete will need to be cut to widen the door. An I-Beam lintel will be installed to maintain the stability of the door and the wall above. A standard Necsa design and drawing will be used.

#### 7.3.2 500 kg Crane

The crane will be designed and installed by a crane manufacturer. This will ensure that the crane is adequate and that it complies with industry and its operational regulations. The crane will be mounted into concrete walls which should be checked once the crane has been designed and drawings are available.

## 8 FINALISED DESIGN

The final design is based on the results of the design calculations shown in Section 7.

### 8.1 Bund Walls

The minimum bund wall heights are calculated in Section 7.1. Table 11 shows the selected angle irons and plates for the bund wall and the bolting spacing. Furthermore, this is illustrated in Drawings References.

**Table 11: Bund Wall Information**

| Storage Area | Minimum Wall Height [mm] | Section [mm] | Tie-Down Bolt Spacing [mm] |
|---|---|---|---|
| General Drums Storage Area | 4.62 | Angle 50x50x5 | 400 |
| Characterised 5-Litre | 0.11 | Angle 50x50x5 | 400 |
| Uncharacterised 5-Litre | 0.68 | Angle 50x50x5 | 400 |

The 50x50x5 angle is significantly larger than required for all the Areas. The 50x50 Angle dimensions are however the minimum practical size taking assembly and bolting into account.

## 8.2 Closure of the Openings in the Slab

The openings in the slab are to be closed. There are 2 types of opening currently, cable trenches running across the slab and rectangular holes.

### 8.2.1 Trenches

The trenches are all 450mm wide. A steel plate will be used to support 50mm of screed which will be placed over the trench. This will allow sealing of the trench while allowing the trench to continue to operate. This is shown in Drawing NNDD-V-14-C-L1-0006 while the calculations can be found in APPENDIX D. The plate is designed to resist the load of the screed and a live load of 5 kPa, the same load allowed on the slab.

### 8.2.2 Rectangular Holes

The rectangular holes are found in the northern section of the cable tunnel. They are currently covered using a steel plate welded to an egg-crate grid. This is shown in Drawing 7371-14-010-C07600 [2]. The drawing also states that the covers are designed for a point load of 20 kN. They will only affect the characterized and un-characterized 5-Litre Container Storage area.

The shelves legs for the characterized 5-Litre container and the critically geometrically safe trolley/cages will not be placed on the covers. The covers will be filled with screed to ensure that the joints can be sealed to yield an effective bund area. The weight added is checked in APPENDIX D.

## 8.3 Sealant

A general epoxy sealant is recommended with a minimum lifespan of 10 years. This epoxy should adhere to SANS 10109-2. The epoxy should be resistant to acids, bases and oils. The epoxy should be applied according to product instructions.

The epoxy shall be applied to the floor of the area, the columns to the height of the bund wall, and ensure that the bund wall is sealed to the floor.

## 9 DESIGN REQUIREMENTS CHECK

The design requirements, found in Section 6, are listed below with the outcomes of the design.

| Design Requirement | Achieved | Reference / Drawing | Comment |
|---|---|---|---|
| [R1.] | Yes | NNDD-V-14-C-L1-0001 | |
| [R2.] | Yes | NNDD-V-14-C-L1-0004 | |
| [R3.] | Yes | NNDD-V-14-C-L1-0002 | |
| [R4.] | Yes | NNDD-V-14-C-L1-0003 | |
| [R5.] | Yes | Section 7.2 | |
| [R6.] | Yes | Section 7.3 | |
| [R7.] | Yes | Section 7.1 | |
| [R8.] | Yes | Section 8.2 | |
| [R9.] | Yes | Section 8.3 | |
| [R10.] | Yes | NNDD-V-14-C-L1-0001, -0002, -0003, -0004 | |
| [R11.] | Yes | NNDD-V-14-C-L1-0001, -0002, -0003, -0004 | |
| [R12.] | Yes | NNDD-V-14-C-L1-0006 | Mass and drum stacking limitation Refer Section 10 |
| [R13.] | Yes | NNDD-V-14-C-L1-0001, -0002, -0003, -0004 | |
| [R14.] | Yes | NNDD-V-14-C-L1-0002 | |
| [R15.] | Yes | NNDD-V-14-C-L1-0002, -0003 | |
| [R16.] | Yes | NNDD-V-14-C-L1-0002, -0003 | |
| [R17.] | Yes | NNDD-V-14-C-L1-0004 | Refer Section 7.1 |
| [R18.] | Yes | NNDD-V-14-C-L1-0003 | Refer Section 7.1 |
| [R19.] | Yes | NNDD-V-14-C-L1-0002 | Refer Section 7.1 |

## 10 PROCEDURAL REQUIREMENTS

Due to the nature of the outcomes of the design check, various procedural requirements shall be implemented. These are listed below:

**[PR1.]** The maximum mass for four 100-Litre drums on a pallet is 339 kg for a single layer and 151.6 kg (per layer) for a double layer.

**[PR2.]** The maximum mass for the sum of four 160-Litre drums on a pallet is 339 kg for a single layer and 151.6 kg (per layer) for a double layer.

**[PR3.]** The maximum mass for the sum of four 210-Litre drums on a pallet is 558.2 kg for a single layer

## 11 CONCLUSION

The calculations presented show that the Cable Tunnel of V-14 building can be used as a wet waste storage facility with procedural limitations which are described in the previous Section.

This design report is only valid if the limitations set out in Section 10 are implemented in the operational procedures of the facility.

# APPENDIX A BUND WALL HEIGHT CALCULATIONS

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**CALCULATION SHEET**

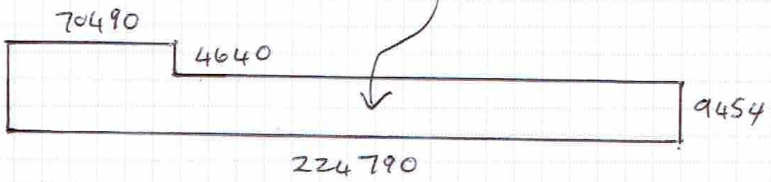
WWSF V-14 BUND

Job : WWSF
Eng: PB VAN ASWEGEN
Date: 2024/3/1
Sheet 1 of 3

A) GENERAL DRUM STORAGE AREA

STORAGE AREA.

SPILLAGE TO BE CONTAINED = 1,68 m³




TOTAL AREA = (224,790 × 9,454) + (4,640 × 70,490)
= 2452 m².

100L, 160L OR 210L MAX DRUM DIAMETER = 573mm

SINGLE DRUM FOOTPRINT = $\pi r^2 = \pi \left(\frac{0,573}{2}\right)^2$
= 0,258 m²

TOTAL NR. OFF DRUMS = 16000

TOTAL DRUM AREA = 16000 × 0,258 m²
= 4128 m²

DOUBLE STACK DRUMS DIVIDE BY 2 = 4128/2 = 2064 m²

ASSUME 1% AREA LOSS FOR COLUMNS = 0,01 × 2452
= 24,52 m²

TOTAL USED/OCCUPIED AREA = 2064 + 24,52
≈ 2089 m²

EFFECTIVE/AVAILABLE AREA FOR SPILLAGE = 2452 - 2089
= 363 m²

MINIMUM BUND WALL HEIGHT = $\frac{1,68 m^3}{363 m^2}$ = 0,00462m
= 4,62mm

⇒ USE 50mm HIGH ANGLE SO

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**CALCULATION SHEET**

WWSF V-14 BUND

Job :
Eng: PB VAN ASWEGEN
Date: 2024/3/1
Sheet 2 of 3

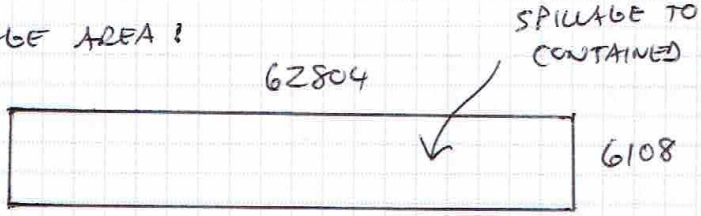
FACTOR OF SAFETY = $\frac{50\text{ mm}}{4,67\text{ mm}}$

= 10,8 ✓ OK.

---

B) CHARACTERISED 5-LITRE CONTAINER STORAGE AREA.

STORAGE AREA :




TOTAL AREA : 62,804 x 6,108 = 383,6 m²

ASSUME 5% AREA LOSS DUE TO RACKING/SHELVING LEGS = 383,6 x 0,05

= 19,2 m²

TOTAL EFFECTIVE/AVAILABLE AREA FOR SPILLAGE = 383,6 - 19,2 = 364,4 m²

MINIMUM BUND WALL HEIGHT = $\frac{0,04\text{ m}^3}{364,4\text{ m}^2}$

= 0,00011 m

= 0,11 mm

⇒ USE 50mm HIGH ANGLE 50 ↑↓

FACTOR OF SAFETY = $\frac{50}{0,11}$ = 455 ✓ OK

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**CALCULATION SHEET**

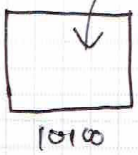
WWSF V-14 BUND

Job :
Eng: AB VAN ASWEGEN
Date: 2024/3/1
Sheet...3..of...3..

c) UN-CHARACTERISED 5-LITRE CONTAINER STORAGE AREA.

STORAGE AREA

SPILLAGE TO BE CONTAINED = $0,04 m^3$




TOTAL AREA = $10,1 \times 6,108 = 61,7 m^2$

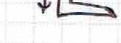
ASSUME 5% LOSS DUE TO RACKING/SITTERING LEGS = $61,7 \times 0,05 = 3,1 m^2$

TOTAL EFFECTIVE/AVAILABLE AREA FOR SPILLAGE = $61,7 - 3,1 = 58,6 m^2$

$$\text{MINIMUM BUND HEIGHT} = \frac{0,04 m^3}{58,6 m^2}$$

$$= 0,00068 m$$

$$\approx 0,68 mm$$

$\Rightarrow$ USE 50mm HIGH ANGLE 


FACTOR OF SAFETY = $\frac{50}{0,68} = 73,5$ ✓ OK.

# APPENDIX B DRUMS LOADING CALCULATIONS

## Loading on the Storage Floor

### Allowable Loading

$\theta_{allow} := 5\ kPa$ Ref Drawing 7371 – 14 – 10 – C07600

### Know variables

$g := 9.81\ \frac{m}{s^2}$ Gravity

$Y_{LL} := 1.6$ Live load factor from SANS 10160 Series

### 100 Litre Drum

$m_{100\_max} := 140\ kg$ Ref NLM-SPE-00041 R01

$m_{100\_pallet} := 12\ kg$ Ref NLM-SPE-00041 R01

$l_{pallet} := 1050\ mm$ Pallet Support Length
Ref NLM-SPE-00041 R01

$n_{100\_drums} := 4$ Drums per Pallet
Ref NLM-SPE-00041 R01

$w_{pallet} := g \cdot \left( Y_{LL} \cdot n_{100\_drums} \cdot m_{100\_max} + m_{100\_pallet} \right) = 8.9075\ kN$ Maximum pallet weight

$\theta_{100\_applied\_max} := \frac{w_{pallet}}{l_{pallet}^2} = 8.0793\ kPa$ Not Okay w.r.t Area Load if all drums are maximum mass.

$m_{100\_Pallet\_1} := \frac{\theta_{allow} \cdot l_{pallet}^2}{g \cdot Y_{LL}} - m_{100\_pallet} = 339.2041\ kg$ Requirement of one layer of drums. The 100 L drums on a pallet cannot have a total mass greater than 339 kg

$m_{100\_Pallet\_2} := \frac{\theta_{allow} \cdot l_{pallet}^2}{2 \cdot g \cdot Y_{LL}} - 2 \cdot m_{100\_pallet} = 151.6021\ kg$ Requirement of two layers of drums. The 100 L drums on a pallet cannot have a total mass greater than 151 kg

**160 Litre Drum**

$m_{160\_max} := 160\ kg$ Ref NLM-SPE-00041 R01

$m_{160\_pallet} := 12\ kg$ Ref NLM-SPE-00041 R01

$l_{pallet} := 1050\ mm$ Pallet Support Length
Ref NLM-SPE-00041 R01

$n_{160\_drums} := 4$ Drums per Pallet
Ref NLM-SPE-00041 R01

$w_{pallet} := g \cdot \left( \gamma_{LL} \cdot n_{160\_drums} \cdot m_{160\_max} + m_{160\_pallet} \right) = 10.1632\ kN$ Maximum pallet weight

$\theta_{applied} := \frac{w_{pallet}}{l_{pallet}^{2}} = 9.2183\ kPa$ Not Okay w.r.t Area Load if all drums are maximum mass.

$m_{160\_Pallet\_1} := \frac{\theta_{allow} \cdot l_{pallet}^{2}}{g \cdot \gamma_{LL}} - m_{160\_pallet} = 339.2041\ kg$ Requirement of one layer of drums. The 160 L drums on a pallet cannot have a total mass greater than 332 kg

$m_{160\_Pallet\_2} := \frac{\theta_{allow} \cdot l_{pallet}^{2}}{2 \cdot g \cdot \gamma_{LL}} - 2 \cdot m_{160\_pallet} = 151.6021\ kg$ Requirement of two layers of drums. The 160 L drums on a pallet cannot have a total mass greater than 156 kg

**210 Litre Drum**

$m_{210\_max} := 300\ kg$ Ref NLM-SPE-00041 R01

$m_{210\_pallet} := 31\ kg$ Ref NLM-SPE-00041 R01

$l_{pallet} := 1360\ mm$ Pallet Support Length
Ref NLM-SPE-00041 R01

$n_{210\_drums} := 4$ Drums per Pallet
Ref NLM-SPE-00041 R01

$w_{pallet} := g \cdot \left( \gamma_{LL} \cdot n_{210\_drums} \cdot m_{210\_max} + m_{210\_pallet} \right) = 19.1393\ kN$ Maximum pallet weight

$\theta_{applied} := \frac{w_{pallet}}{l_{pallet}^{2}} = 10.3478\ kPa$ Not Okay w.r.t Area Load if all drums are maximum mass.

$m_{210\_Pallet\_1} := \frac{\theta_{allow} \cdot l_{pallet}^{2}}{g \cdot \gamma_{LL}} - m_{210\_pallet} = 558.1947\ kg$ Requirement of one layer of drums. The 210 L drums on a pallet cannot have a total mass greater than 539 kg

# APPENDIX C SHELVES LOADING CALCULATIONS

## Loading of on the Storage Floor

### Allowable Loading

$\theta_{allow} := 5\ kPa$ Ref Drawing 7371 – 14 – 10 – C07600

$P_{allow} := 20\ kN$ Ref Drawing 7371 – 14 – 10 – C07600

### Know variables

$g := 9.81\ \frac{m}{s^2}$ Gravity

$\gamma_{DL} := 1.2$ Dead load factor from SANS 10160 Series

$\gamma_{LL} := 1.6$ Live load factor from SANS 10160 Series

### Containers on the Frame

$n_{containers} := 21$ 21 containers per layers

$n_{layers} := 2$ Number of layers

$m_{container} := 5\ kg$ Maximum mass per container

$m_{frame} := 70\ kg$ Mass allowable per frame legs

$w_{frame} := .65\ m = 0.65\ m$ Width of Frame

$l_{frame} := \frac{5.080}{4}\ m = 1.27\ m$ Length of Frame

$P_{applied} := \gamma_{DL} \cdot g \cdot m_{frame} + \gamma_{LL} \cdot g \cdot m_{container} \cdot n_{containers} \cdot n_{layers} = 4.12\ kN$ Point load applied

Okay

$\theta_{applied} := \frac{\gamma_{DL} \cdot g \cdot m_{frame} + \gamma_{LL} \cdot g \cdot m_{container} \cdot n_{containers} \cdot n_{layers}}{w_{frame} \cdot l_{frame}} = 4.99\ kPa$ Area load applied

Okay

# APPENDIX D TRENCH AND OPENING COVER CALCULATIONS

## Load on the trench cover

$b := 450\ \text{mm}$ Width of the Channels

$l := 1000\ \text{mm}$ Unit length

$t := 8\ \text{mm}$ Thickness of the Plate

$c_s := 50\ \text{mm}$ Screed Depth

$\rho_s := 2000\ \frac{\text{kg}}{\text{m}^3}$ Screed Density

$g := 9.81\ \frac{\text{m}}{\text{s}^2}$ Gravity

$f_y := 355\ \text{MPa}$ Yield Stress 355 Steel

$f_{allow} := 0.9 \cdot f_y = 319.5\ \text{MPa}$ Factored Yield Stress

$I_x := \frac{1}{12} \cdot l \cdot \left(\frac{t}{2}\right)^3 = 5333.33\ \text{mm}^4$ Moment of Inertia

$y := \frac{t}{2} = 4\ \text{mm}$ Distance from centriod to Edge

$Q := 1.2 \cdot \rho_s \cdot c_s \cdot g \cdot l + 1.6 \cdot 5\ \text{kPa} \cdot l = 9.18\ \frac{\text{kN}}{\text{m}}$ Line load on the plate

$B_y := \frac{Q \cdot b \cdot \frac{b}{2}}{b} = 2.06\ \text{kN}$ Reaction on the edge

$M := B_y \cdot \left(\frac{b}{2}\right) - \left(Q \cdot \left(\frac{b}{2}\right) \cdot \left(\frac{b}{4}\right)\right) = 232.3\ \text{N m}$ Moment at the middle of the sheet

$\theta_b := \frac{M \cdot y}{I_x} = 174.22\ \text{MPa}$ Stress caused by moment

$V := \frac{B_y}{t \cdot l} = 0.26\ \text{MPa}$ Shear stress maximum

Allowable yield stress of 319.5 MPa not exceeded.

## Egg Crate Cover Screeding

$P_{allow} := 20\ kN$ — Allowable Point Load on the Cover

$w := 1000\ mm$ — Width of cover

$l := 3000\ mm$ — Length of cover

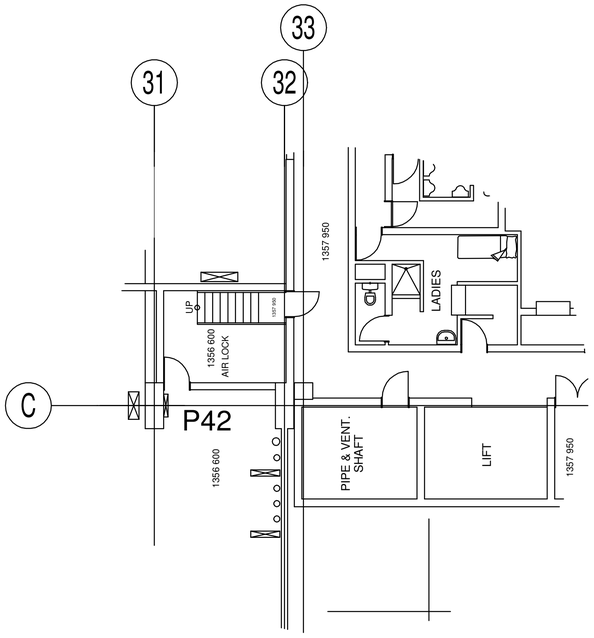
$d := 50\ mm$ — Depth of Cover

$P := 1.2 \cdot \rho_s \cdot g \cdot w \cdot l \cdot d = 3.53\ kN$ — Load on the cover due to the screed

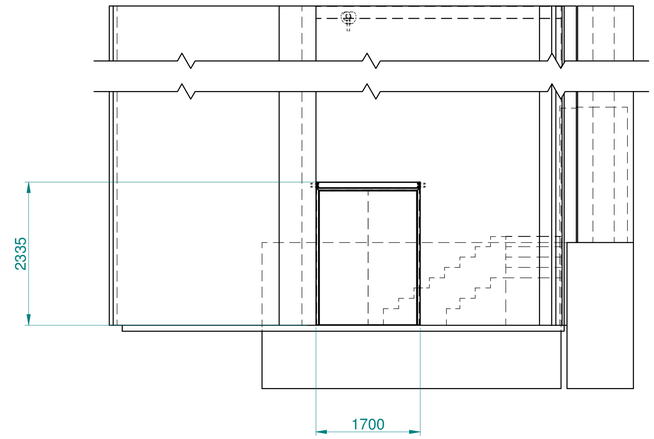
The screed does not exceed the loading limit.

CIVIL

# READ THE NOTES AND LEADERS TO PREVENT MISHAPS




DETAIL A

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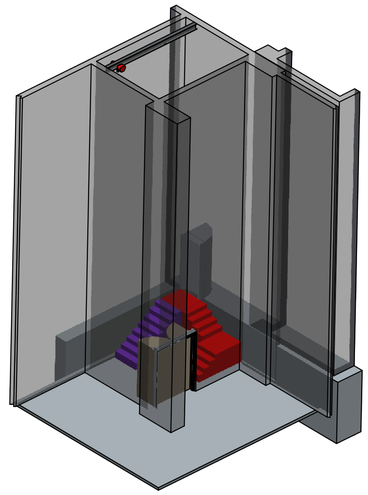

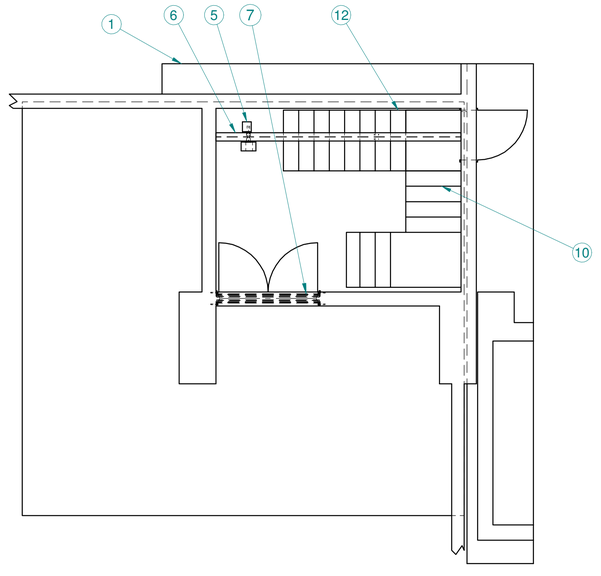


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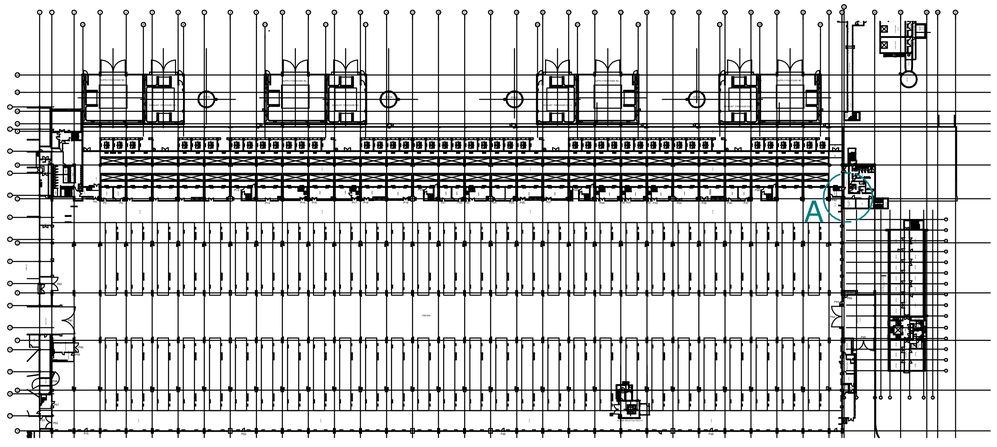



1:1000

| Asm2 | | |
|---|---|---|
| Item Number | Description | Quantity |
| 1 | Building V-14 | 1 |
| 5 | Crane MAS_1000 | 1 |
| 6 | Crane I-Beam | 1 |
| 7 | Lintel Beam_IPE_100x55 SHT 2 OF 2 | 1 |
| 10 | New Stairs | 1 |
| 12 | Existing Stair to be Removed | 1 |



| REV | DESCRIPTION | CHK'D | DATE |
|---|---|---|---|
| 0.1 | ISSUED FOR DESIGN PROCESS AND COMMENT | JMK. | 2022/10/05 |
| 1.0 | ISSUED FOR CONSTRUCTION | JMK. | 2022/12/12 |

REFERENCE DRAWINGS:

| CLIENT ACCEPTANCE APPROVAL OF DRAWING | | | |
|---|---|---|---|
| DISCIPLINE | NAME | SIGNED | DATE |
| FACILITY OWNER : | | | |
| LICENSING : | | | |
| ELECTRICAL ENGINEER | | | |
| CIVIL ENGINEER : | | | |
| PROJECT LEADER : | | | |
| | | | |

APPROVED BY PROFESSIONAL ENGINEER

2022/12/12

DATE

ORIGINAL SCALE: AS SHOWN ON VIEW

DRAWN jank

CHECKED

necsa We're in your world PELINDABA ENTERPRISES

PROJECT:
V-14
WET WASTE STORAGE FACILITY

TITLE
AIR LOCK ROOM LAYOUT

LAST UPDATE 2022/12/12

A1

SOLUTIONS 1.0 REVISION

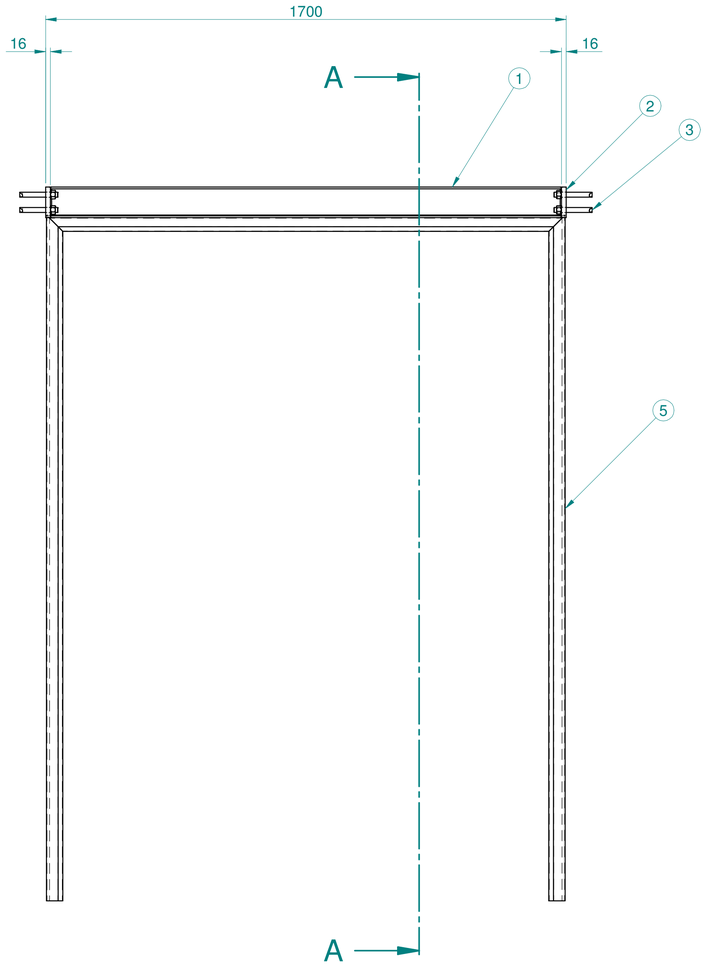
DRG. NO:
NNDD-V-14-C-L2-0001_R1 SHT 1 OF 2

TEAMCENTER No:

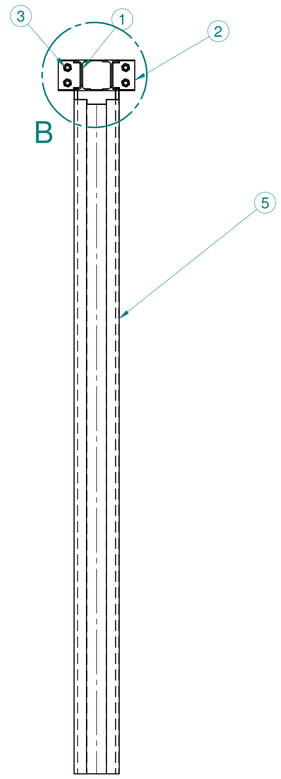
NNDD-V-14-C-L2-0001_R1 SHT 1 OF 2

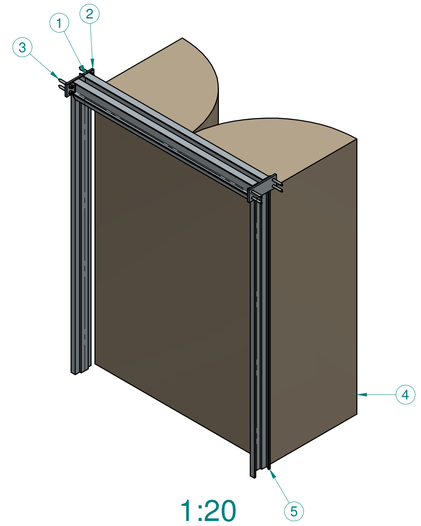
CIVIL

# READ THE NOTES AND LEADERS TO PREVENT MISHAPS




SECTION A-A

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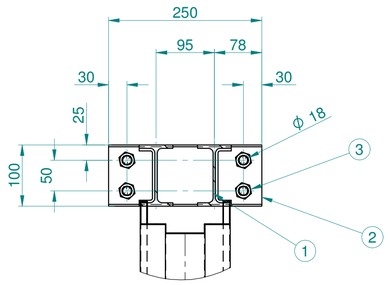


DETAIL B

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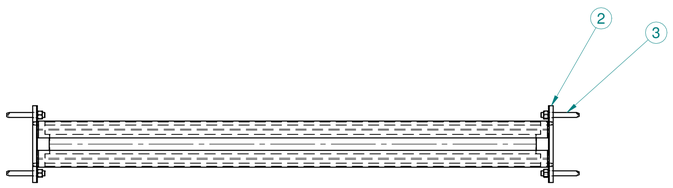


| Beam_IPE_100x55 | | | |
|---|---|---|---|
| Item Number | Description | Material | Quantity |
| 1 | Lintel For Door | EN 10025-2: 2008 S355JR | 2 |
| 2 | 250x100x16 Plate | EN 10025-2: 2008 S355JR | 2 |
| 3 | M16 Chemical Anchor | | 8 |
| 4 | Double Door | Wood, Ash | 1 |
| 5 | Double Door Frame | | 1 |



| REV | DESCRIPTION | CHK'D | DATE |
|---|---|---|---|
| 0.1 | ISSUED FOR DESIGN PROCESS AND COMMENT | JMK. | 2022/10/05 |
| 1.0 | ISSUED FOR CONSTRUCTION | JMK. | 2022/12/12 |

REFERENCE DRAWINGS:

| CLIENT ACCEPTANCE APPROVAL OF DRAWING | | | |
|---|---|---|---|
| DISCIPLINE | NAME | SIGNED | DATE |
| FACILITY OWNER : | | | |
| LICENSING : | | | |
| ELECTRICAL ENGINEER | | | |
| CIVIL ENGINEER : | | | |
| PROJECT LEADER : | | | |

APPROVED BY PROFESSIONAL ENGINEER

2022/12/12

DATE

ORIGINAL SCALE: AS SHOWN ON VIEW

DRAWN jank

CHECKED

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PELINDABA ENTERPRISES

PROJECT:

V-14
WET WASTE STORAGE FACILITY

TITLE

DOOR DETAIL

LAST UPDATE 2022/12/12

A1

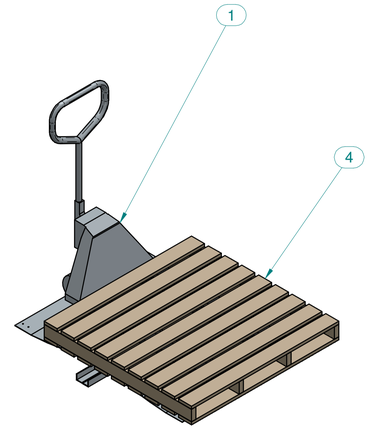
SOLIDEDGE 1.0 REVISION

DRG. NO:
NNDD-V-14-C-L2-0001_R1 SHT 2 OF 2

TEAMCENTER No:

NNDD-V-14-C-L2-0001_R1 SHT 2 OF 2

CIVIL

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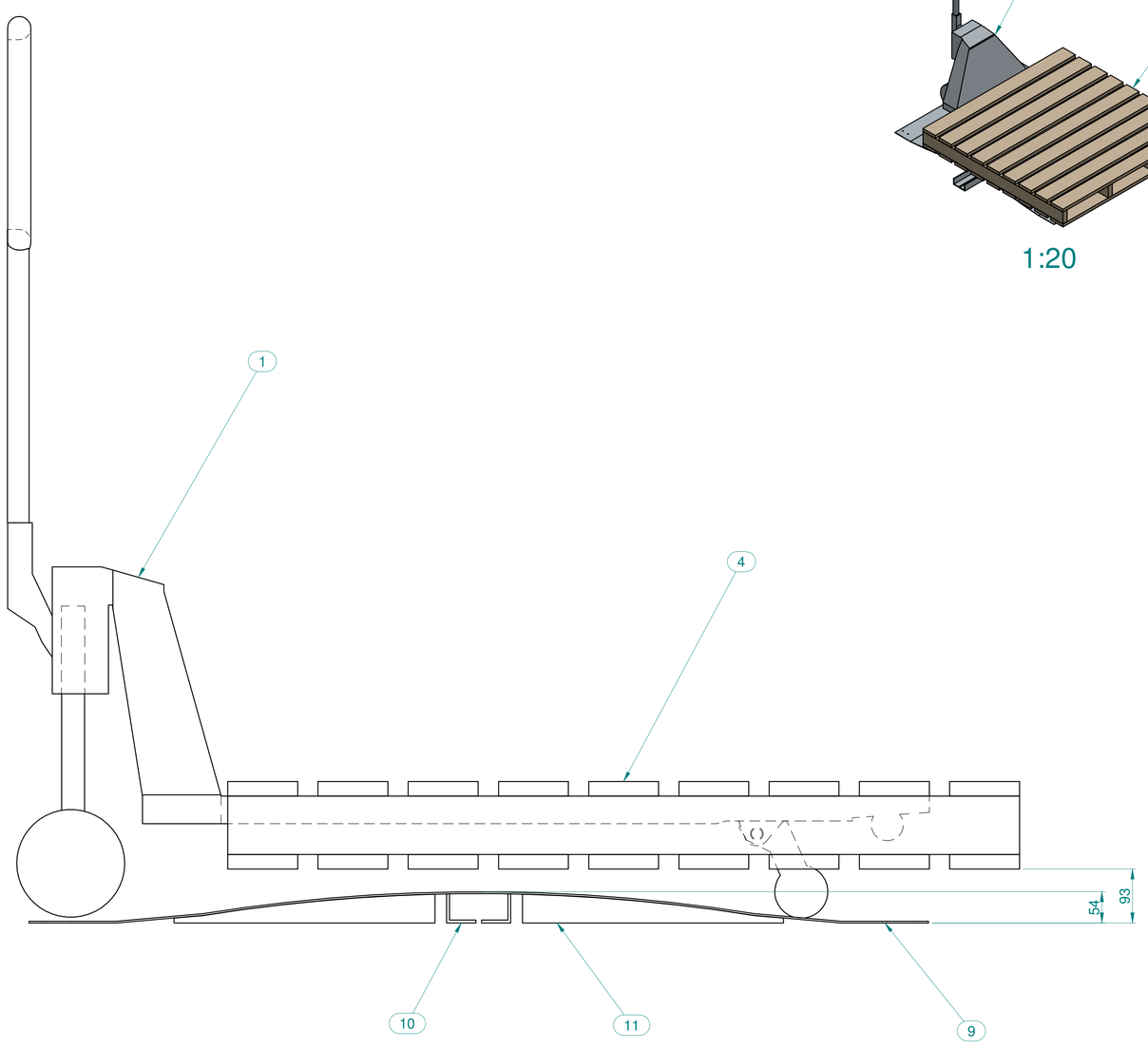


| Toyota_PJ_HPT28U_A | | | | |
|---|---|---|---|---|
| Item Number | Description | Material | Mass (Item) | Quantity |
| 1 | Pallet Jack Trolly | | 0.000 kg | 1 |
| 4 | Pallet | Wood, Pine | 2.281 kg | 18 |
| 9 | Ramp | EN 10025-2: 2008 S355JR | 43.700 kg | 1 |
| 10 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 11.162 kg | 1 |
| 11 | Ramp_2_Rub_1 | EN 10025-2: 2008 S355JR | 0.346 kg | 8 |



| REV | DESCRIPTION | CHK'D | DATE |
|---|---|---|---|
| 0.1 | ISSUED FOR DESIGN PROCESS AND COMMENT | JMK. | 2022/10/05 |
| 1.0 | ISSUED FOR CONSTRUCTION (CLIENT CHANGE DESIGN) | JMK. | 2022/10/20 |
| 2.0 | ISSUED FOR CONSTRUCTION | JMK. | 2024/02/19 |

REFERENCE DRAWINGS:

| CLIENT ACCEPTANCE APPROVAL OF DRAWING | | | |
|---|---|---|---|
| DISCIPLINE | NAME | SIGNED | DATE |
| FACILITY OWNER : | | | |
| LICENSING : | | | |
| ELECTRICAL ENGINEER | | | |
| CIVIL ENGINEER : | PB VAN ASWEGEN | | 2024-03-03 |
| PROJECT LEADER : | | | |

APPROVED BY PROFESSIONAL ENGINEER

Pieter-Ben van Aswegen
Pr. Eng 20020227, M.Eng (Structural)

2024-03-03
DATE

ORIGINAL SCALE: AS SHOWN ON VIEW

DRAWN JanK

CHECKED

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PELINDABA ENTERPRISES

PROJECT:
V-14
WET WASTE STORAGE FACILITY

TITLE
General Ramp For Pallet Jack

LAST UPDATE 2024/02/19

A1

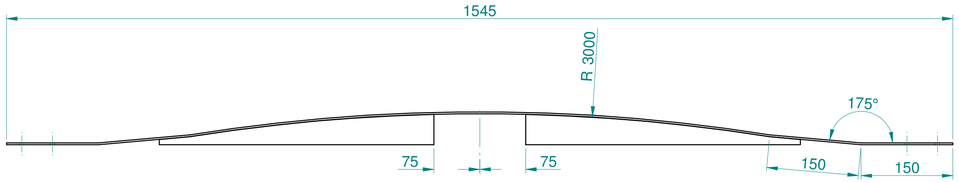
SOLIDEDGE 2.0 REVISION

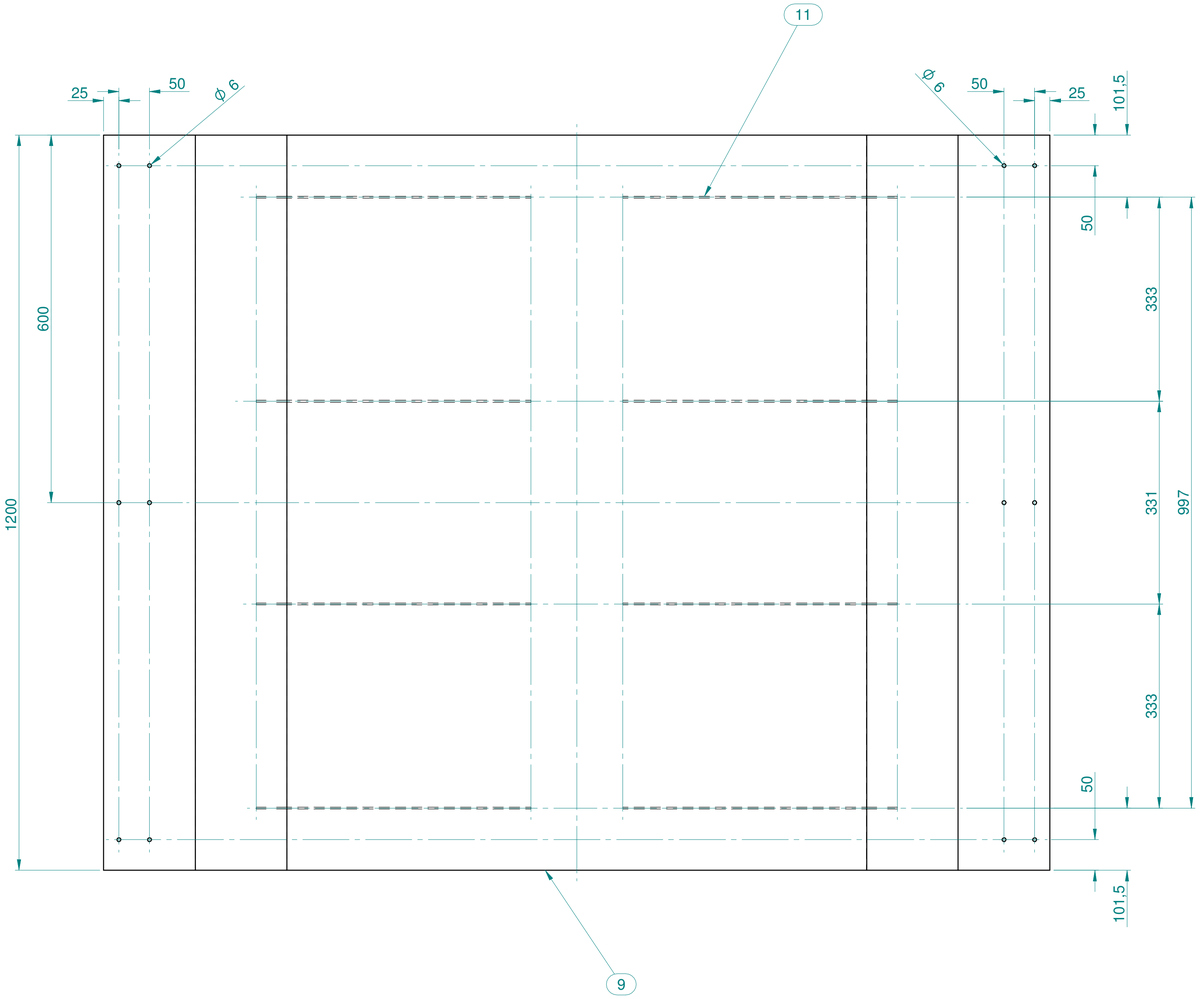
DRG. NO:
NNDD-V-14-C-L1-0007_R2 SHT 1 OF 2

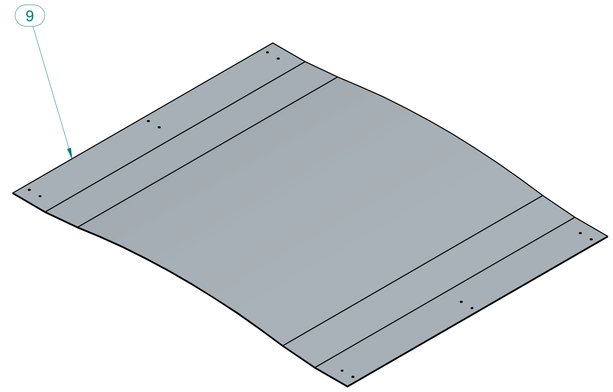
TEAMCENTER No:

NNDD-V-14-C-L1-0007_R2 SHT 1 OF 2

CIVIL

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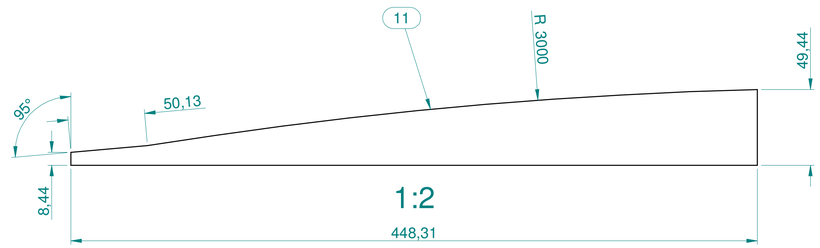


1:2


1:2

NOTE:

1. RIB MUST BE WELDED TO RAMP BY AN EXPERIENCED WELDER

| RAMP | | | | |
|---|---|---|---|---|
| Item Number | Description | Material | Mass (Item) | Quantity |
| 9 | Ramp | EN 10025-2: 2008 S355JR | 43.700 kg | 1 |
| 11 | Ramp_2_Rub_1 | EN 10025-2: 2008 S355JR | 0.346 kg | 8 |



| REV | DESCRIPTION | CHK'D | DATE |
|---|---|---|---|
| 0.1 | ISSUED FOR DESIGN PROCESS AND COMMENT | JMK. | 2022/10/05 |
| 1.0 | ISSUED FOR CONSTRUCTION (CLIENT CHANGE DESIGN) | JMK. | 2022/10/20 |
| 2.0 | ISSUED FOR CONSTRUCTION | JMK. | 2024/02/19 |

REFERENCE DRAWINGS:

| CLIENT ACCEPTANCE APPROVAL OF DRAWING | | | |
|---|---|---|---|
| DISCIPLINE | NAME | SIGNED | DATE |
| FACILITY OWNER : | | | |
| LICENSING : | | | |
| ELECTRICAL ENGINEER | | | |
| CIVIL ENGINEER : | PB VAN ASWEGEN | | 2024-03-03 |
| PROJECT LEADER : | | | |

APPROVED BY PROFESSIONAL ENGINEER

Pieter-Ben van Aswegen
Pr. Eng 20020227, M Eng (Structural)

2024-03-03
DATE

ORIGINAL SCALE: AS SHOWN ON VIEW

DRAWN JanK

CHECKED

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PELINDABA ENTERPRISES

PROJECT:
V-14
WET WASTE STORAGE FACILITY

TITLE
Pallet Jack Ramp Detail

LAST UPDATE 2024/02/19

A1

SOLID EDGE 2.0 REVISION

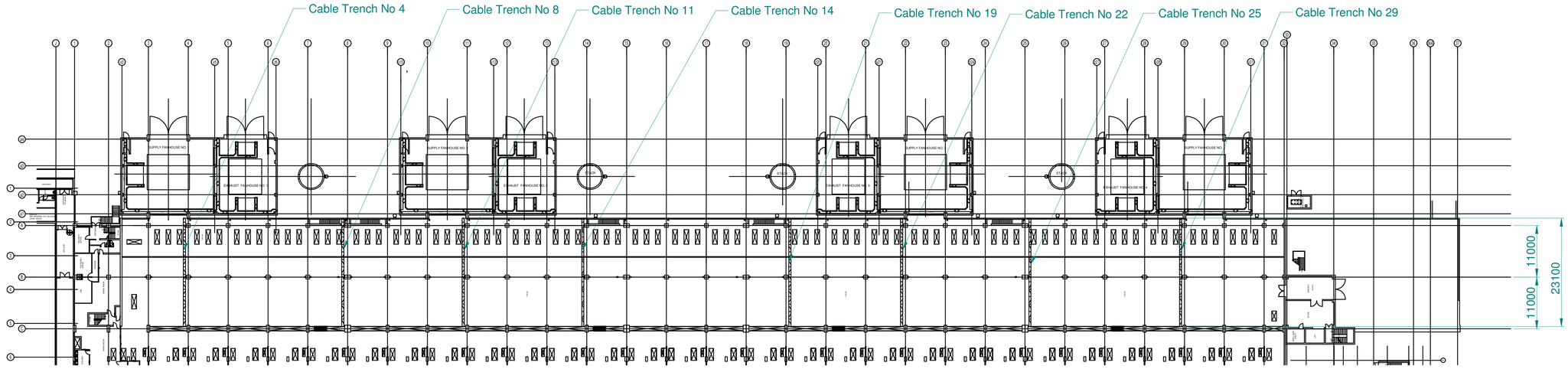
DRG. NO:
NNDD-V-14-C-L1-0007_R2 SHT 2 OF 2

TEAMCENTER No:

NNDD-V-14-C-L1-0007_R2 SHT 2 OF 2

CIVIL

# READ THE NOTES AND LEADERS TO PREVENT MISHAPS

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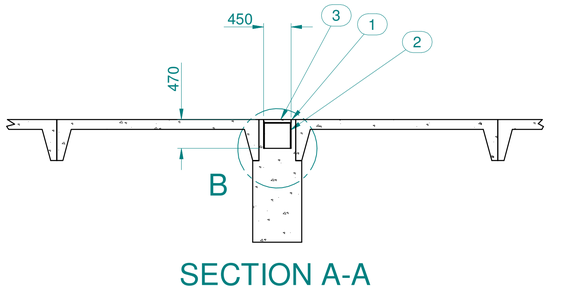
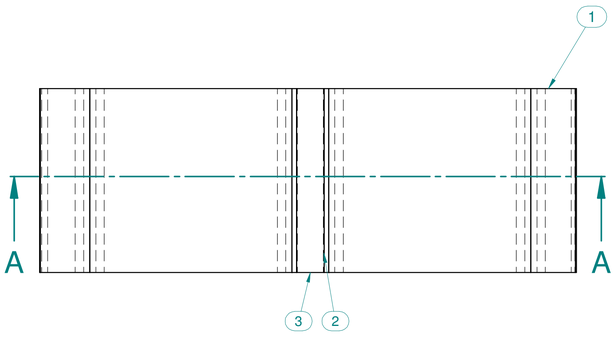
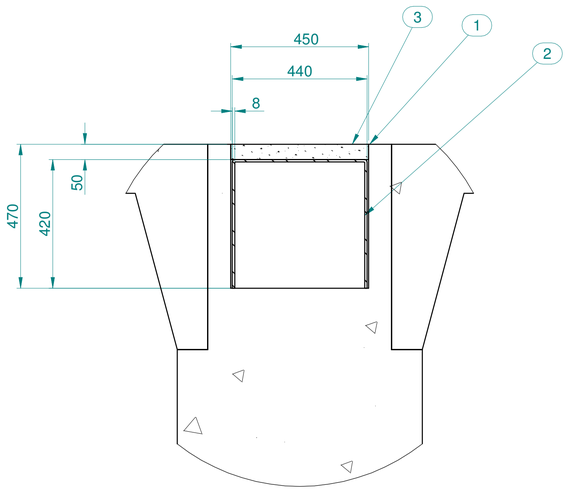



SECTION A-A




DETAIL B
1:10

| Floor_Trench_1 | | | | |
|---|---|---|---|---|
| Item Number | Description | Material | Mass (Item) | Quantity |
| 1 | Existing Floor | Concrete 35MPa | 32110.014 kg | 1 |
| 2 | 8mm Plate | EN 10025-2: 2008 S355JR | 237.017 kg | 1 |
| 3 | New Screed | Screed 15MPa | 135.000 kg | 1 |



| REV | DESCRIPTION | CHK'D | DATE |
|---|---|---|---|
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| 1.0 | ISSUED FOR CONSTRUCTION (CLIENT CHANGE DESIGN) | JMK. | 2022/12/12 |
| 2.0 | ISSUED FOR CONSTRUCTION | JMK. | 2024/02/19 |

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| CLIENT ACCEPTANCE APPROVAL OF DRAWING | | | |
|---|---|---|---|
| DISCIPLINE | NAME | SIGNED | DATE |
| FACILITY OWNER : | | | |
| LICENSING : | | | |
| ELECTRICAL ENGINEER | | | |
| CIVIL ENGINEER : | PB VAN ASWEGEN | | 2024-03-03 |
| PROJECT LEADER : | | | |

APPROVED BY PROFESSIONAL ENGINEER

Pieter-Ben van Aswegen
Pr. Eng 20020227, M Eng (Structural)

2024-03-03
DATE

ORIGINAL SCALE: AS SHOWN ON VIEW

DRAWN JanK

CHECKED

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PELINDABA ENTERPRISES

TITLE: TRENCH COVER

PROJECT: V-14 WET WASTE STORAGE FACILITY

LAST UPDATE 2024/02/19

A1

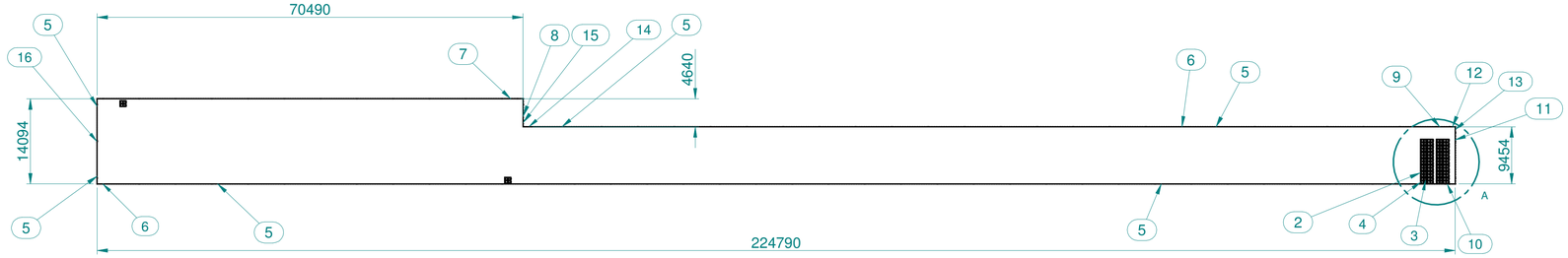
SOLUTEASE 2.0 REVISION

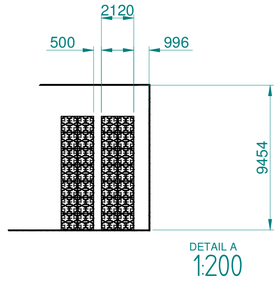
DRG. NO: NNDD-V-14-C-L1-0006_R2 SHT 1 OF 1

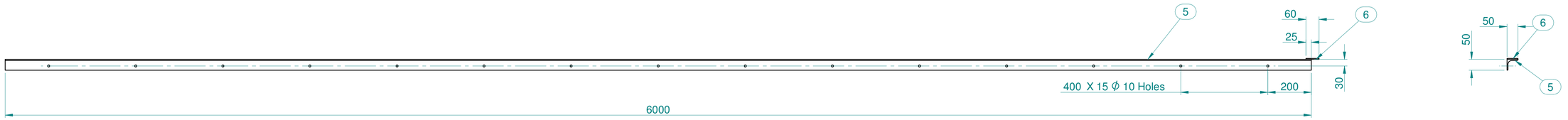
TEAMCENTER No:

NNDD-V-14-C-L1-0006_R2 SHT 1 OF 1

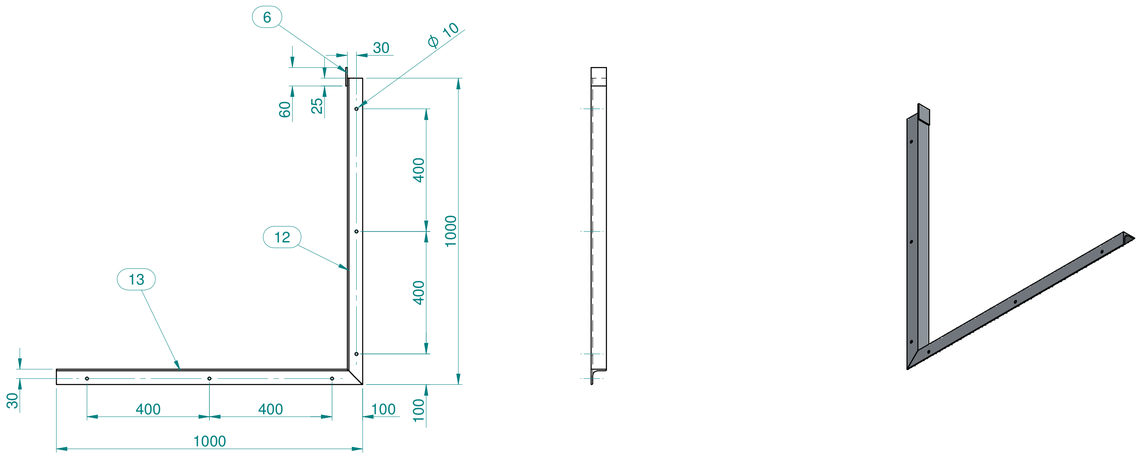
CIVIL








NOTE:

1. ANGLES AND FLAT BAR MUST BE WELDED TOGETHER BY AN EXPERIENCED WELDER.
2. ANGELS MUST BE PROTECTED AGAINST ACIDS, BASES AND OILS.
3. AN EPOXY SEALANT MUST BE USED BETWEEN THE SLAB AND THE ANGLE.
4. THE ANGEL SIDE WITH THE HOLES IS ON THE SLAB AND THE FLAT BAR IS AT THE INSIDE OF THE BUND.
5. GRIND ALL WELDS AT SLAB SIDE FLAT.

Drums_100&160_A

| Item Number | Description | Material | Mass (Item) | Quantity |
|---|---|---|---|---|
| 5 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 24.378 kg | 76 |
| 6 | Flat Bar 50x4,5x60 | EN 10025-2: 2008 S355JR | 0.106 kg | 88 |
| 7 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 10.257 kg | 1 |
| 12 | Angle 50x50x5 Corner_1 | EN 10025-2: 2008 S355JR | 3.913 kg | 5 |
| 13 | Angle 50x50x5 Corner_1 | EN 10025-2: 2008 S355JR | 3.913 kg | 5 |



| REV | DESCRIPTION | CHK'D | DATE |
|---|---|---|---|
| 0.2 | ISSUED FOR DESIGN PROCESS AND COMMENT | JMK. | 2022/10/05 |
| 1.0 | ISSUED FOR CONSTRUCTION (CLIENT CHANGE DESIGN) | JMK. | 2022/12/12 |
| 2.0 | ISSUED FOR CONSTRUCTION | JMK. | 2024/02/19 |

REFERENCE DRAWINGS:

| CLIENT ACCEPTANCE APPROVAL OF DRAWING | | | |
|---|---|---|---|
| DISCIPLINE | NAME | SIGNED | DATE |
| FACILITY OWNER : | | | |
| LICENSING : | | | |
| ELECTRICAL ENGINEER | | | |
| CIVIL ENGINEER : | PB VAN ASWEGEN | | 2024-03-03 |
| PROJECT LEADER : | | | |

APPROVED BY PROFESSIONAL ENGINEER

Pieter-Ben van Aswegen
Pr. Eng 20020227, M Eng (Structural)

2024-03-03

DATE

ORIGINAL SCALE: AS SHOWN ON VIEW

DRAWN jank

CHECKED

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PELINDABA ENTERPRISES

TITLE

GENERAL DRUM STORAGE LAYOUT AND DETAIL

PROJECT:

V-14
WET WASTE STORAGE FACILITY

LAST UPDATE 2024/02/19

A1

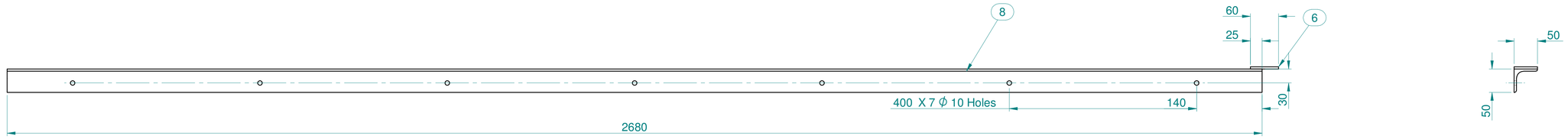
SOLIDEDGE 2.0 REVISION

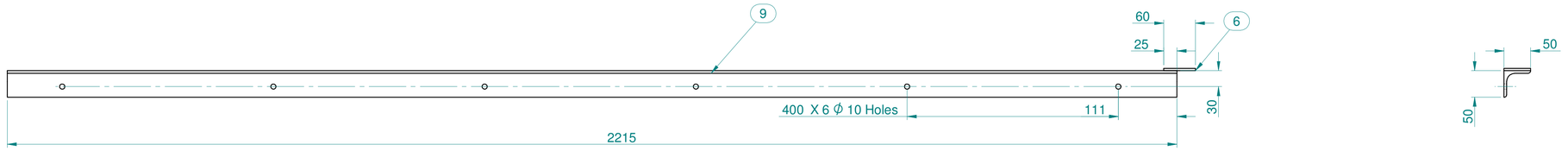
DRG. NO:
NNDD-V-14-C-L1-0004_R2 SHT 1 OF 3

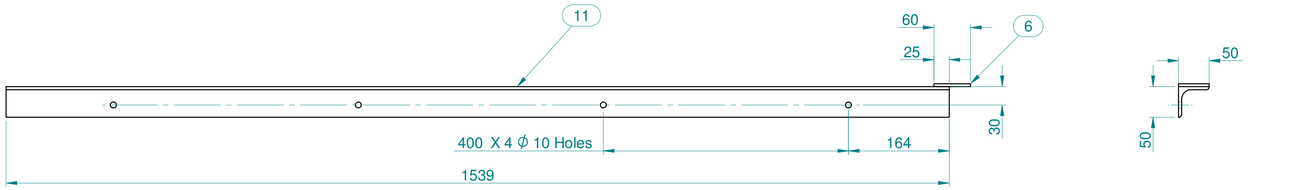
TEAMCENTER No:

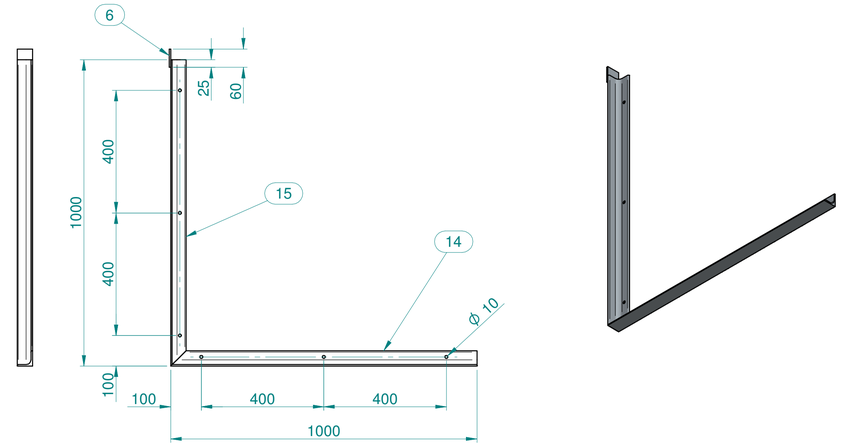
NNDD-V-14-C-L1-0004_R2 SHT 1 OF 3

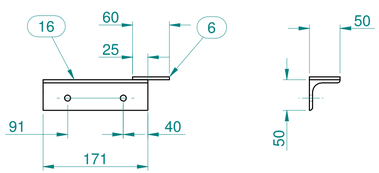
CIVIL

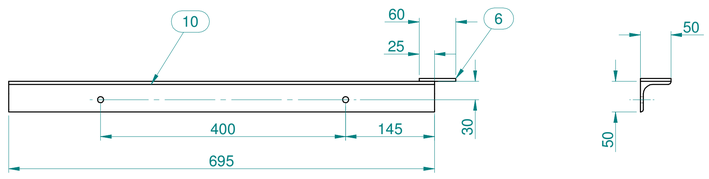



NOTE:

1. ANGLES AND FLAT BAR MUST BE WELDED TOGETHER BY AN EXPERIENCED WELDER.
2. ANGELS MUST BE PROTECTED AGAINST ACIDS, BASES AND OILS.
3. AN EPOXY SEALANT MUST BE USED BETWEEN THE SLAB AND THE ANGLE.
4. THE ANGEL SIDE WITH THE HOLES IS ON THE SLAB AND THE FLAT BAR IS AT THE INSIDE OF THE BUND.
5. GRIND ALL WELDS AT SLAB SIDE FLAT.

Drums_100&160_A

| Item Number | Description | Material | Mass (Item) | Quantity |
|---|---|---|---|---|
| 8 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 10.888 kg | 1 |
| 9 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 8.998 kg | 1 |
| 10 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 2.823 kg | 1 |
| 11 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 6.254 kg | 1 |
| 14 | Angle 50x50x5 Corner_2 | EN 10025-2: 2008 S355JR | 4.006 kg | 1 |
| 15 | Angle 50x50x5 Corner_2 | EN 10025-2: 2008 S355JR | 4.006 kg | 1 |
| 16 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 0.690 kg | 1 |



| REV | DESCRIPTION | CHK'D | DATE |
|---|---|---|---|
| 0.2 | ISSUED FOR DESIGN PROCESS AND COMMENT | JMK. | 2022/10/05 |
| 1.0 | ISSUED FOR CONSTRUCTION (CLIENT CHANGE DESIGN) | JMK. | 2022/12/12 |
| 2.0 | ISSUED FOR CONSTRUCTION | JMK. | 2024/02/19 |

REFERENCE DRAWINGS:

CLIENT ACCEPTANCE APPROVAL OF DRAWING

| DISCIPLINE | NAME | SIGNED | DATE |
|---|---|---|---|
| FACILITY OWNER : | | | |
| LICENSING : | | | |
| ELECTRICAL ENGINEER | | | |
| CIVIL ENGINEER : | PB VAN ASWEGEN | | 2024-03-03 |
| PROJECT LEADER : | | | |

APPROVED BY PROFESSIONAL ENGINEER

Pieter-Ben van Aswegen
Pr. Eng 20020227, M Eng (Structural)

2024-03-03
DATE

ORIGINAL SCALE: AS SHOWN ON VIEW

DRAWN jank

CHECKED

TITLE

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PELINDABA ENTERPRISES

PROJECT:
V-14
WET WASTE STORAGE FACILITY

LAST UPDATE 2024/02/19

A1

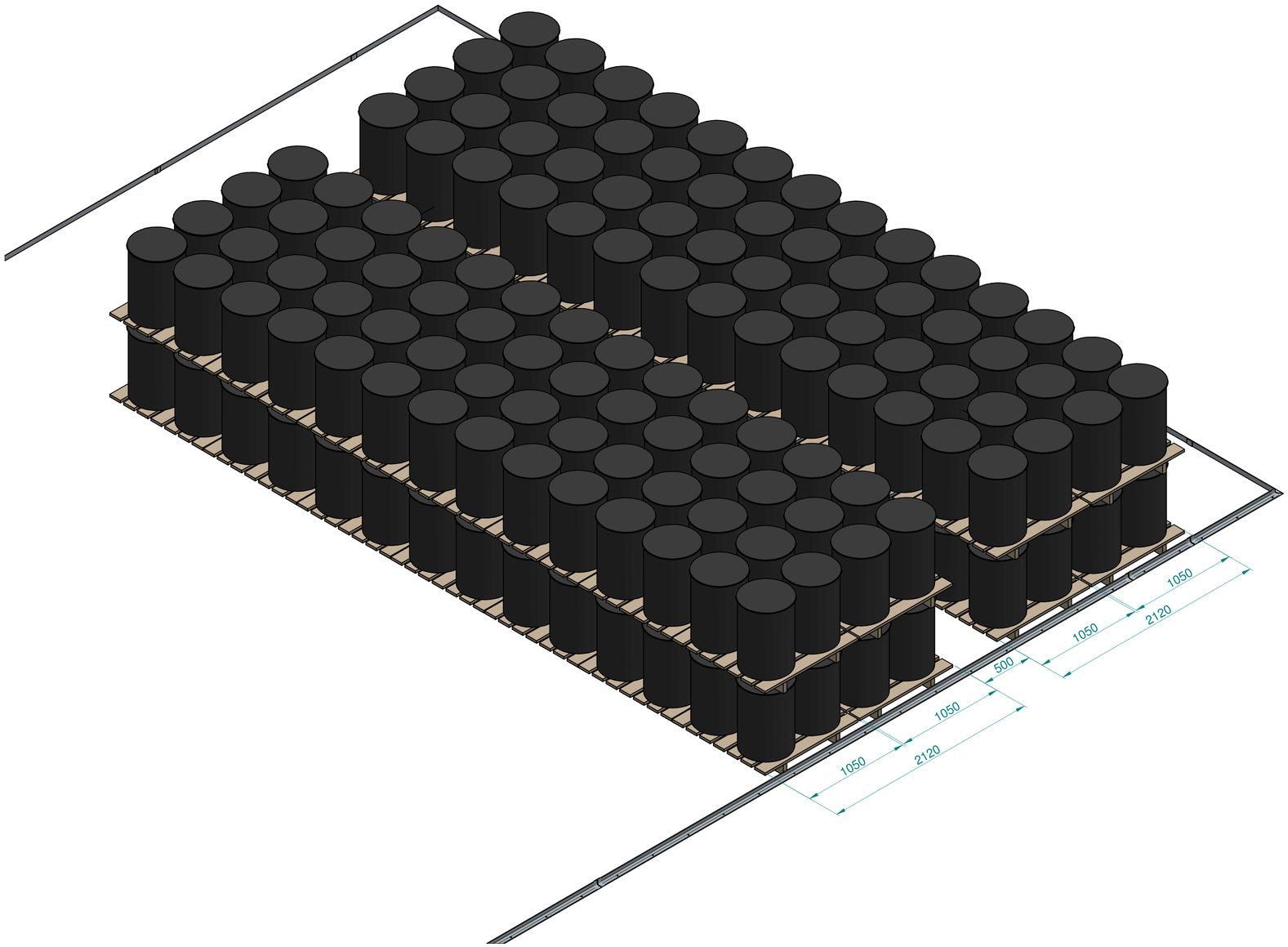
SOLIDEDGE 2.0 REVISION

DRG. NO:
NNDD-V-14-C-L1-0004_R2 SHT 2 OF 3

TEAMCENTER No:

NNDD-V-14-C-L1-0004_R2 SHT 2 OF 3

CIVIL






| REV | DESCRIPTION | CHK'D | DATE |
|---|---|---|---|
| 0.2 | ISSUED FOR DESIGN PROCESS AND COMMENT | JMK. | 2022/10/05 |
| 1.0 | ISSUED FOR CONSTRUCTION (CLIENT CHANGE DESIGN) | JMK. | 2022/12/12 |
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REFERENCE DRAWINGS:

| CLIENT ACCEPTANCE APPROVAL OF DRAWING | | | |
|---|---|---|---|
| DISCIPLINE | NAME | SIGNED | DATE |
| FACILITY OWNER : | | | |
| LICENSING : | | | |
| ELECTRICAL ENGINEER | | | |
| CIVIL ENGINEER : | PB VAN ASWEGEN | | 2024-03-03 |
| PROJECT LEADER : | | | |

APPROVED BY PROFESSIONAL ENGINEER

Pieter-Ben van Aswegen
Pr. Eng 20020227, M Eng (Structural)

2024-03-03
DATE

ORIGINAL SCALE: AS SHOWN ON VIEW

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PELINDABA ENTERPRISES

PROJECT:
V-14
WET WASTE STORAGE FACILITY

TITLE
DRUM LAYOUT

LAST UPDATE 2024/02/19

A1

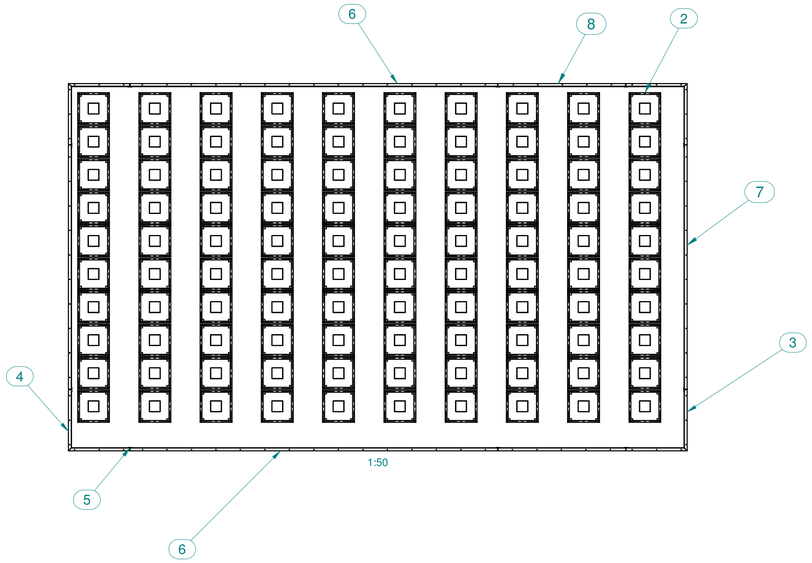
SOLID EDGE 2.0 REVISION

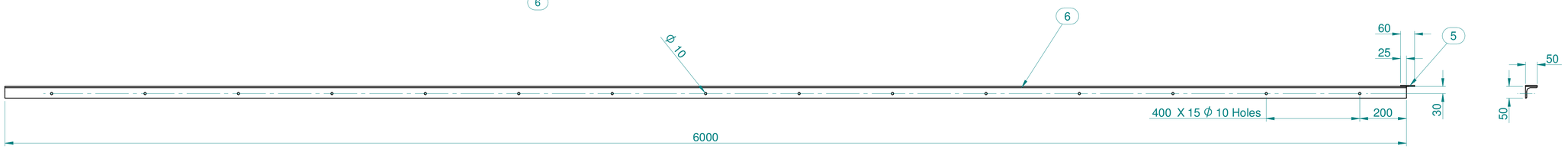
DRG. NO:
NNDD-V-14-C-L1-0004_R2 SHT 3 OF 3

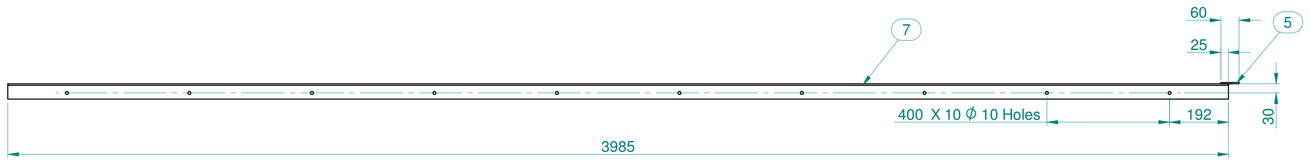
TEAMCENTER No:

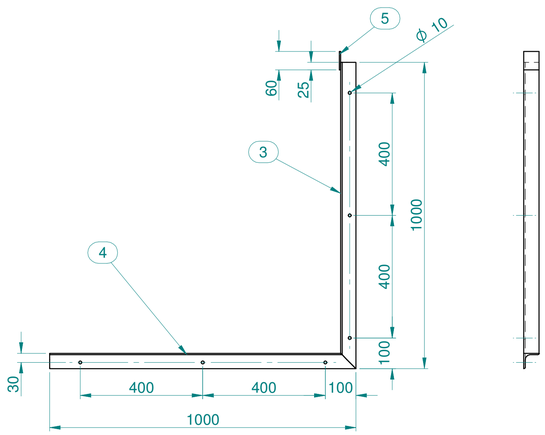
NNDD-V-14-C-L1-0004_R2 SHT 3 OF 3

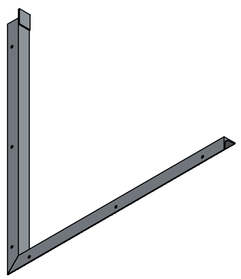
CIVIL

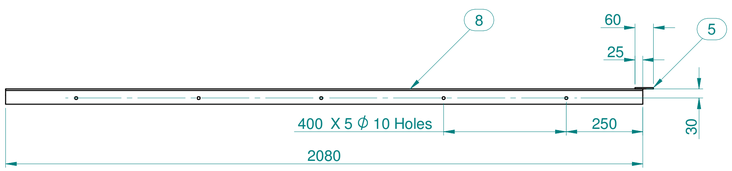





NOTE:

1. ANGLES AND FLAT BAR MUST BE WELDED TOGETHER BY AN EXPERIENCED WELDER.
2. ANGELS MUST BE PROTECTED AGAINST ACIDS, BASES AND OILS.
3. AN EPOXY SEALANT MUST BE USED BETWEEN THE SLAB AND THE ANGLE.
4. THE ANGEL SIDE WITH THE HOLES IS ON THE SLAB AND THE FLAT BAR IS AT THE INSIDE OF THE BUND.
5. GRIND ALL WELDS AT SLAB SIDE FLAT.

JK_5L_Uncharacterised_N3

| Item Number | Description | Material | Mass (Item) | Quantity |
|---|---|---|---|---|
| 2 | Trolly_1 | | 0.000 kg | 100 |
| 3 | Angle 50x50x5 Corner_1 | EN 10025-2: 2008 S355JR | 3.913 kg | 4 |
| 4 | Angle 50x50x5 Corner_1 | EN 10025-2: 2008 S355JR | 3.913 kg | 4 |
| 5 | Flat Bar 50x4.5x60 | EN 10025-2: 2008 S355JR | 0.106 kg | 10 |
| 6 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 24.378 kg | 2 |
| 7 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 16.191 kg | 2 |
| 8 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 8.452 kg | 2 |



| REV | DESCRIPTION | CHK'D | DATE |
|---|---|---|---|
| 0.1 | ISSUED FOR DESIGN PROCESS AND COMMENT | JMK. | 2022/10/20 |
| 1.0 | ISSUED FOR CONSTRUCTION (CLIENT CHANGE DESIGN) | JMK. | 2022/12/12 |
| 2.0 | ISSUED FOR CONSTRUCTION | JMK. | 2024/02/19 |

REFERENCE DRAWINGS:

CLIENT ACCEPTANCE APPROVAL OF DRAWING

| DISCIPLINE | NAME | SIGNED | DATE |
|---|---|---|---|
| FACILITY OWNER : | | | |
| LICENSING : | | | |
| ELECTRICAL ENGINEER | | | |
| CIVIL ENGINEER : | PB VAN ASWEGEN | | 2024-03-03 |
| PROJECT LEADER : | | | |

APPROVED BY PROFESSIONAL ENGINEER

Pieter-Ben van Aswegen
Pr. Eng 20020227, M Eng (Structural)

2024-03-03
DATE

ORIGINAL SCALE: AS SHOWN ON VIEW

DRAWN JanK

CHECKED

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PELINDABA ENTERPRISES

TITLE
UN-CHARACTERISED WASTE STORAGE AREA LAYOUT AND DETAIL

PROJECT:
V-14
WET WASTE STORAGE FACILITY

LAST UPDATE
2024/02/19

A1

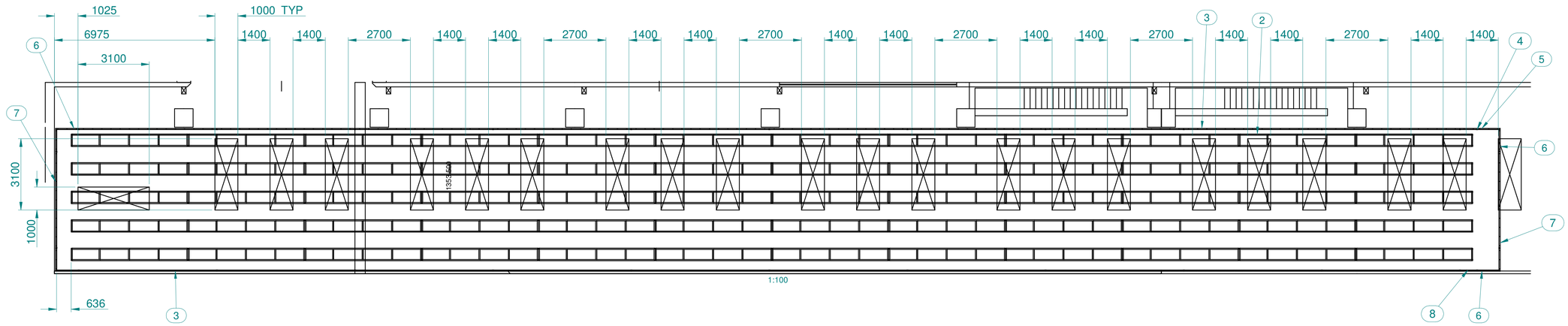
SOLID STATE 2.0 REVISION

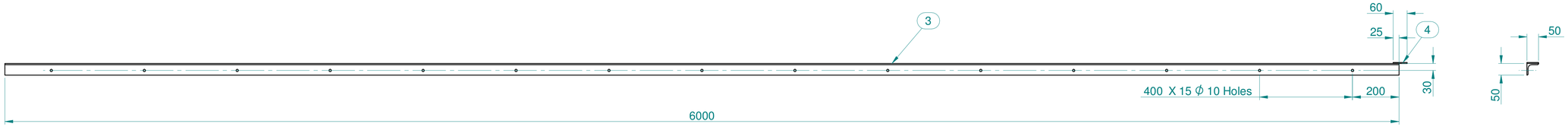
DRG. NO:
NNDD-V-14-C-L1-0003_R2 SHT 1 OF 1

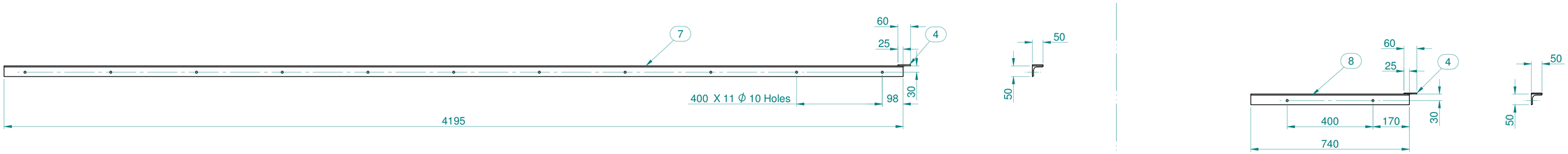
TEAMCENTER No:

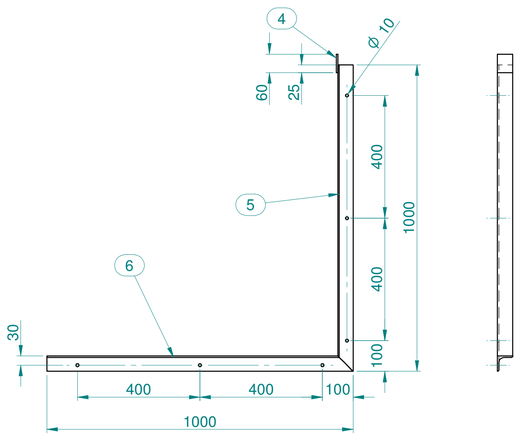
NNDD-V-14-C-L1-0003_R2 SHT 1 OF 1

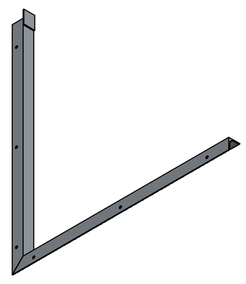
CIVIL



NOTE:

1. ANGLES AND FLAT BAR MUST BE WELDED TOGETHER BY AN EXPERIENCED WELDER.
2. ANGELS MUST BE PROTECTED AGAINST ACIDS, BASES AND OILS.
3. AN EPOXY SEALANT MUST BE USED BETWEEN THE SLAB AND THE ANGLE.
4. THE ANGEL SIDE WITH THE HOLES IS ON THE SLAB AND THE FLAT BAR IS AT THE INSIDE OF THE BUND.
5. GRIND ALL WELDS AT SLAB SIDE FLAT.

5L_Characterised_2_N3_A

| Item Number | Description | Material | Mass (Item) | Quantity |
|---|---|---|---|---|
| 2 | Shelf Frame | | 0.000 kg | 60 |
| 3 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 24.378 kg | 20 |
| 4 | Flat Bar 50x4,5x60 | EN 10025-2: 2008 S355JR | 0.106 kg | 28 |
| 5 | Angle 50x50x5 Corner_1 | EN 10025-2: 2008 S355JR | 3.913 kg | 4 |
| 6 | Angle 50x50x5 Corner_1 | EN 10025-2: 2008 S355JR | 3.913 kg | 4 |
| 7 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 17.043 kg | 2 |
| 8 | Angle 50x50x5 | EN 10025-2: 2008 S355JR | 3.006 kg | 2 |



| REV | DESCRIPTION | CHK'D | DATE |
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| 0.1 | ISSUED FOR DESIGN PROCESS AND COMMENT | JMK. | 2022/10/05 |
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| 2.0 | ISSUED FOR CONSTRUCTION | JMK. | 2024/02/19 |

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| FACILITY OWNER : | | | |
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| ELECTRICAL ENGINEER | | | |
| CIVIL ENGINEER : | PB VAN ASWEGEN | | 2024-03-03 |
| PROJECT LEADER : | | | |

APPROVED BY PROFESSIONAL ENGINEER

Pieter-Ben van Aswegen
Pr. Eng 20020227, M Eng (Structural)

2024-03-03
DATE

ORIGINAL SCALE: AS SHOWN ON VIEW

DRAWN JanK

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PELINDABA ENTERPRISES

TITLE

PROJECT:
V-14
WET WASTE STORAGE FACILITY

CHARACTERISED WASTE AREA LAYOUT AND DETAIL

LAST UPDATE 2024/02/19

A1

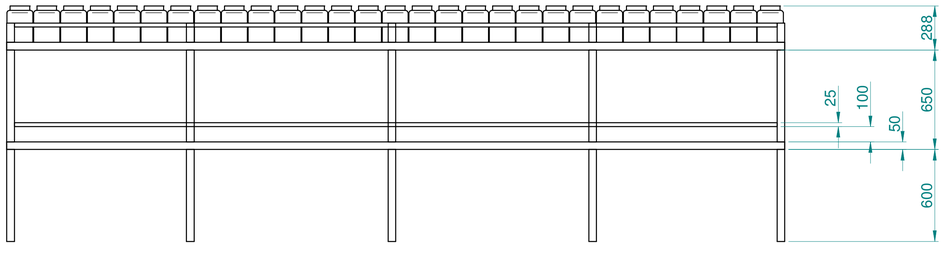
SOLIDWORKS 2.0 REVISION

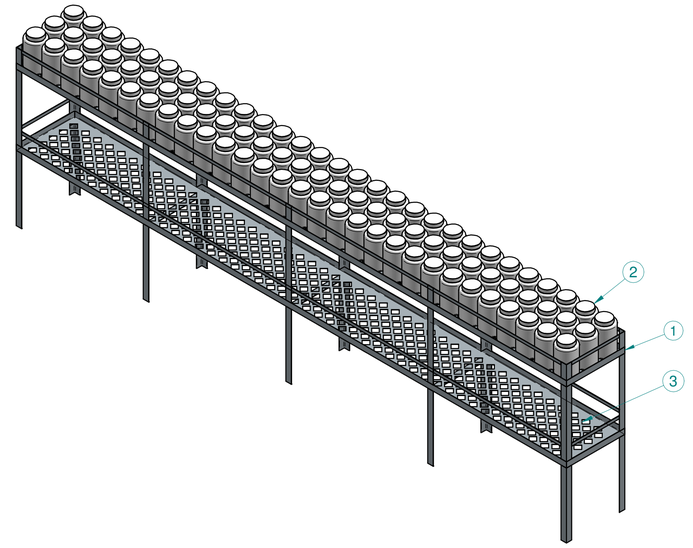
DRG. NO:
NNDD-V-14-C-L1-0002_R2 SHT 1 OF 2

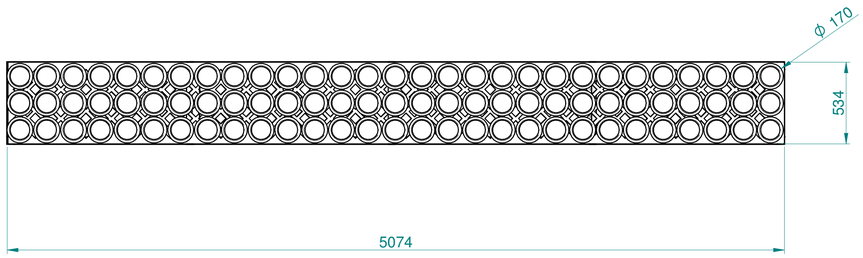
TEAMCENTER No:

NNDD-V-14-C-L1-0002_ R2 SHT 1 OF 2

CIVIL




## NOTE:

1. THE MAXIMUM ALLOWABLE DISTANCE BETWEEN LEGS IS 1300 MM.
2. SHELVING TO BE SUPPLIED BY CLIENT.
3. THE LEGS MUST BE ATTACHED TO THE FLOOR.
4. THE MASS ON EACH SET OF LEGS CANNOT EXCEED 70 KGS.
5. THE SHELVING MUST BE PROTECTED FROM ACIDS, BASES AND OILS.

| N_1_Shelf_Frame_A_1 | | |
|---|---|---|
| Item Number | Description | Quantity |
| 1 | Frame | 1 |
| 2 | 5L_Container | 87 |
| 3 | Expanded_Metal | 2 |



| REV | DESCRIPTION | CHK'D | DATE |
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| ELECTRICAL ENGINEER | | | |
| CIVIL ENGINEER : | PB VAN ASWEGEN | | 2024-03-03 |
| PROJECT LEADER : | | | |

APPROVED BY PROFESSIONAL ENGINEER

Pieter-Ben van Aswegen
Pr. Eng 20020227, M Eng (Structural)

2024-03-03
DATE

ORIGINAL SCALE: AS SHOWN ON VIEW

DRAWN JanK

CHECKED

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PELINDABA ENTERPRISES

TITLE

PROJECT:
V-14
WET WASTE STORAGE FACILITY

CHARACTERISED WASTE AREA LAYOUT AND DETAIL

LAST UPDATE 2024/02/19

A1

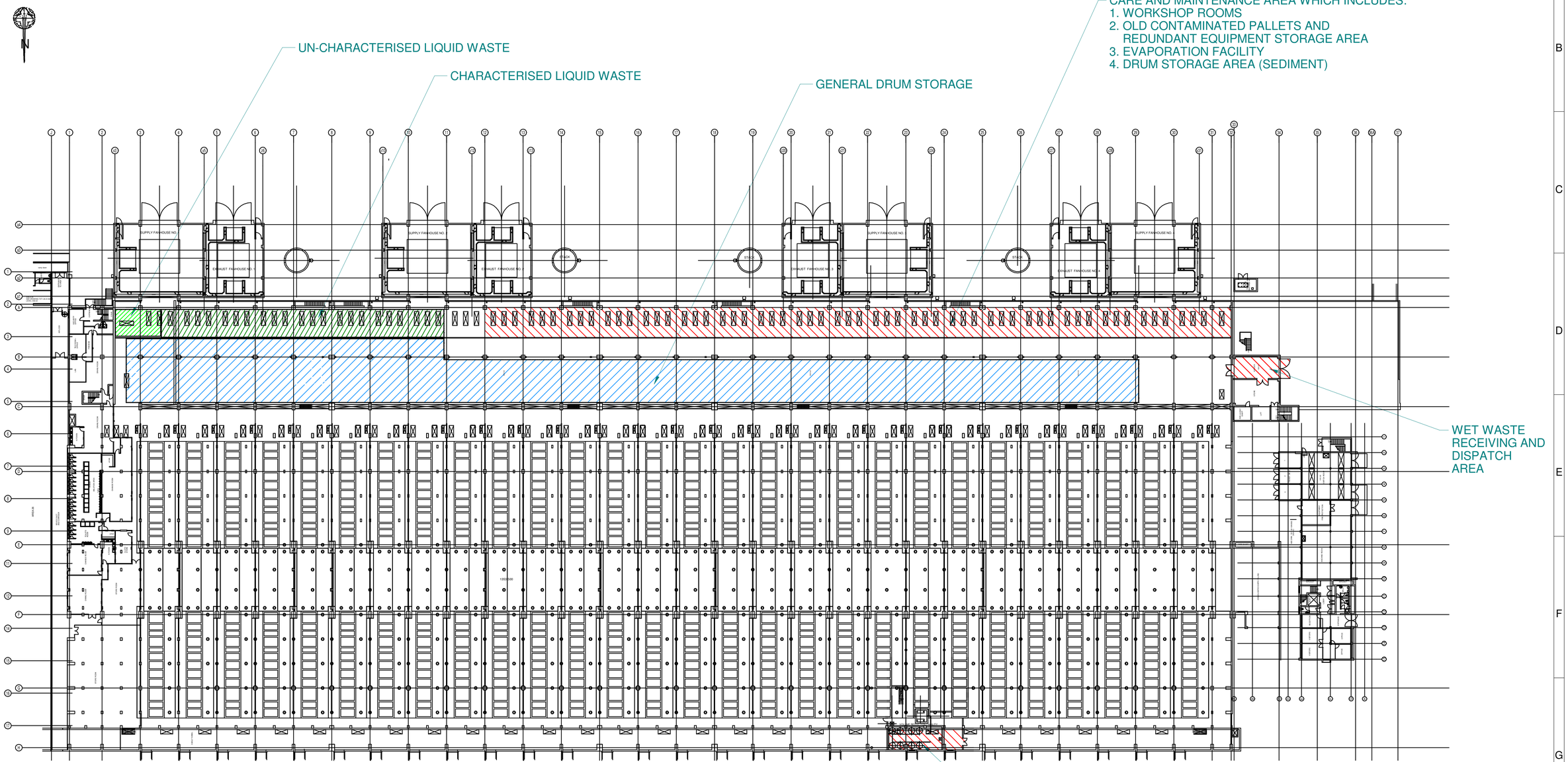
SOLIDEDGE 2.0 REVISION

DRG. NO:
NNDD-V-14-C-L1-0002_R2 SHT 2 OF 2

TEAMCENTER No:

NNDD-V-14-C-L1-0002_R2 SHT 2 OF 2

CIVIL

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| REV | DESCRIPTION | CHK'D | DATE |
|---|---|---|---|
| 0.3 | ISSUED FOR DESIGN PROCESS AND COMMENT | JMK. | 2022/10/17 |
| 1.0 | ISSUED FOR CONSTRUCTION (CLIENT CHANGE DESIGN) | JMK. | 2022/12/12 |
| 2.0 | ISSUED FOR CONSTRUCTION | JMK. | 2024/02/19 |

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| LICENSING : | | | |
| ELECTRICAL ENGINEER | | | |
| CIVIL ENGINEER : | PB VAN ASWEGEN | | 2024-03-03 |
| PROJECT LEADER : | | | |

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Pieter-Ben van Aswegen
Pr. Eng 20020227, M Eng (Structural)

2024-03-03

DATE

ORIGINAL SCALE: AS SHOWN ON VIEW

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PROJECT:
V-14
WET WASTE STORAGE FACILITY

TITLE
GENERAL LAYOUT

LAST UPDATE 2024/02/20

A1

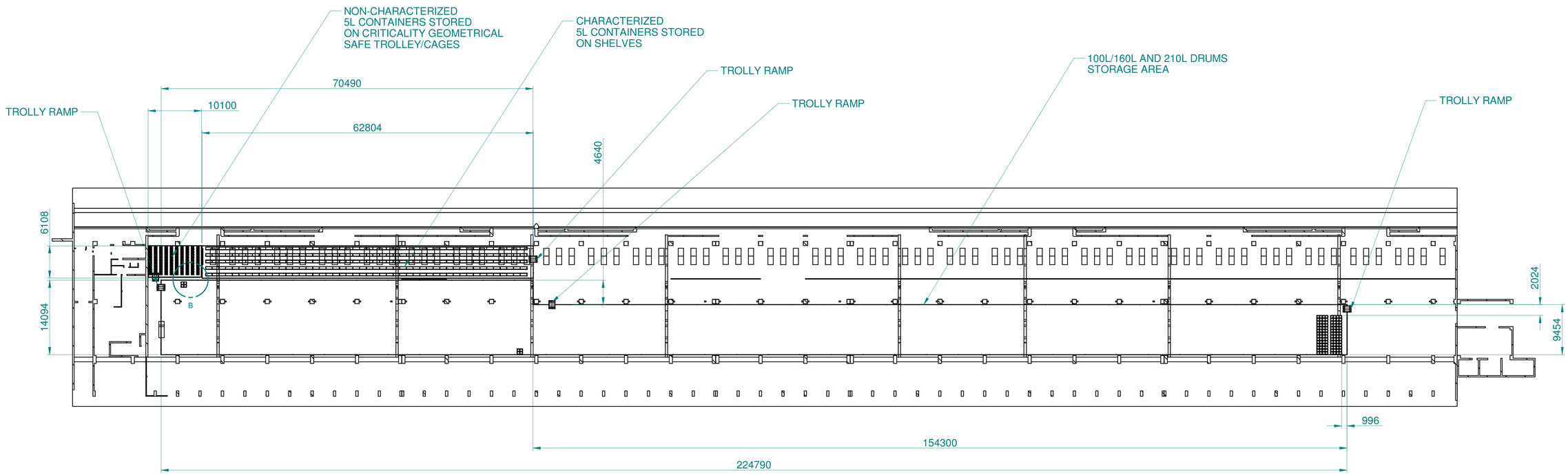
SOLIDEDGE 2.0 REVISION

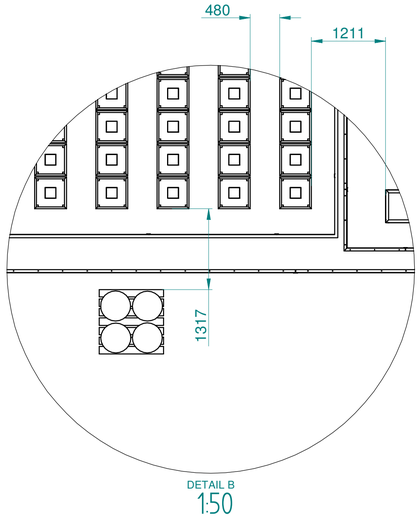
DRG. NO:
NNDD-V-14-C-L1-0001_R2 SHT 1 OF 2

TEAMCENTER No:

NNDD-V-14-C-L1-0001_R2 SHT 1 OF 2

CIVIL




DETAIL B
1:50



| REV | DESCRIPTION | CHK'D | DATE |
|---|---|---|---|
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| CIVIL ENGINEER : | PB VAN ASWEGEN | | 2024-03-03 |
| PROJECT LEADER : | | | |

APPROVED BY PROFESSIONAL ENGINEER

Pieter-Ben van Aswegen
Pr. Eng 20020227, M Eng (Structural)

2024-03-03
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ORIGINAL SCALE:
AS SHOWN ON VIEW

DRAWN JanK

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TITLE

DIMENSIONS

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PROJECT:
V-14
WET WASTE STORAGE FACILITY

LAST UPDATE
2024/02/20

A1

SOLID EDGE
2.0
REVISION

DRG. NO:
NNDD-V-14-C-L1-0001_R2 SHT 2 OF 2

TEAMCENTER No:

NNDD-V-14-C-L1-0001_R2 SHT 2 OF 2